ORIGINAL

CONTRACT

Pursuant to form adopted by the Swedish Shipbuilders' Association on the 30th January 1947 with amendments adopted on the 28th January 1964

This Contract is made between Partrederiet S. 592, Stockholm, Managing Owner Rederiaktiebolaget SLITE, Stockholm/ Schweden, Sturegatan 6

as Purchaser, on the one part and Shipyard Jos. L. Meyer, 2990 Papenburg (Ems)/ Germany, Hauptkanal rechts 2

as Builders, on the other part.
Whereby it is agreed as follows:

§ 1.

The vessel ordered

Subject to the conditions set out below the Builders will build for the Purchaser ~~and will deliver~~ at the Builders' yard at Papenburg (Ems)-Germany and will deliver a two compartment car- and passenger ferry at Emden/ Germany (hereinafter called "the Vessel") having the Yard No. S. 592, substantially in accordance with the specifications and drawings numbered 5686/78 dated 1st June, 1978 relating to this Contract, and intended to be taken as part hereof.

The Yard number shall be considered solely as the means of identifying the Vessel and the parts intended for her and does not imply any priority in regard to other vessels accepted for earlier delivery by the Builders.

In the event of any discrepancy between this Agreement and the said specifications of drawings the provisions of this Agreement shall prevail and be adopted. In the event of any discrepancy between the specifications and the drawings the specifications shall prevail.

§ 2.

Leading dimensions and particulars

The dimensions of the Vessel shall be the following:

Length overall: .... approx. 137,00 m

Length between perpendiculars 119,00

Breadth, moulded in A-Deck (car deck) 24,20
in waterline 23,60

Depth, moulded, to upper deck 13,00

Depth, moulded, to second deck 7,65

Number of passengers 1700

Number of crew 150

The deadweight capacity of the Vessel including fuel, stores, provisions, fresh water, passengers (if any), crew and spare parts beyond the requirements of the Classification Society, etc., shall be about 2400 tons (of [redacted] 1000 kilos) on the international summer freeboard, whereof min. 1600t for cargo (lorries on car de corresponding to a mean draft in salt water (specific gravity 1.025) of about 5,45 m

The propelling machinery of the Vessel shall consist of four main engines MAN, type 8 L 40/45, each 4400 KW (6000 HP) at 600 rpm.

~~developing approx.~~ .... ~~I.H.P./B.H.P. (metric) at approx.~~ .... ~~r.p.m.~~

The mean speed of the Vessel on trials with clean bottom ~~, when loaded to the said mean draft~~ with a draft corresponding to 1500 tons deadweight and with her propelling machinery developing the said power is estimated to be 21 knots in calm weather and smooth sea on opposite runs over a measured mile.

~~The warranties of deadweight and speed shall be deemed to have been complied with if the Purchaser shall dispense with the trials or shall not for the purpose of the trials provide and ship on board the deadweight required to submerge the Vessel down to the said mean draft.~~

The fuel consumption of the propelling machinery, ~~including all auxiliaries required for the propulsion of the Vessel~~, when developing approx. 24.000 HP ~~I.H.P./B.H.P.~~ (metric) and when running on 1800 sec. Redw.I, 100° F with an effective thermal value of at least 10.000 kcal per kilo, is estimated not to exceed 154 ± 3% grams per HP ~~I.H.P./B.H.P.~~ (metric) per hour.

The Vessel with her accomodation, equipment and machinery shall be built in accordance with the rules and requirements for class

BUREAU VERITAS

I 3/3 + Deep Sea Finnish Ice Class 1 A

and rules/regulation corresponding to specification

The Builders shall supply at their cost Builders' certificate, certificate of the Classification society, and certificates of tonnage for international measurement ~~and for~~

~~Unless otherwise agreed between the parties Svensk Varvsstandard (Swedish Shipbuilding Standard) shall apply to all equipment, materials etc., for which such standard is published~~.

If, during the period of building, alterations or additions are made to any rules, regulations or enactments in force before 15th of May, 1978 and applicable to the Vessel the Builders shall inform the Purchaser thereof as soon as possible. The Purchaser must then decide whether and to what extent the alterations or additions which are not mandatory shall be incorporated in the Vessel. The amount of the additional expense or saving in cost arising from any alterations or additions shall be borne by or credited to the Purchaser, as the case may be.

§ 3.

Deficiency in deadweight and speed; excessive fuel consumption

If the estimated deadweight capacity mentioned in Clause 2 be not attained and if the deficiency exceeds ~~2~~ 3 % of the said deadweight capacity, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages, of 20.000 Skr for every 1 ton~~s~~ of deficiency beyond the said margin of ~~2~~ 3 %.

On the other hand, the Purchaser shall pay the same amount to the Builders for every 1 ton~~s~~, by which the actual deadweight exceeds the said estimated deadweight increased by 2 %.

~~Should the speed estimated in Clause 2 not be attained, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages, of the following percentages of the contract price stated in Clause 10~~:

~~For the first two tenth (2/10) of a knot deficiency~~ .... ~~Nil~~.
~~For each successive complete tenth (1/10) of a knot deficiency up to one half (½) of a knot~~ .... ~~0,2~~ %
~~For each complete tenth (1/10) of a knot deficiency exceeding one half (½) of a knot~~ .... ~~0,4~~ %

~~Should the fuel consumption exceed the consumption estimated in Clause 2 by more than 5%, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages,~~ .... ~~for each full five (5) grams per I.H.P./B.H.P. (metric) per hour by which the fuel consumption is increased beyond the said margin of 5 %~~.

The Builders guarantee the speed of the Vessel to be not less than 20 knots as determined under Clause 2. If the deadweight capacity of the Vessel determined in Clause 2 will be less than 2200 tons or the cargo capacity including war risk and sabotage as from launching until delivery of the Vessel

§ 13.

Insurance

Until delivery has been effected, the Builders shall keep the Vessel and all parts intended for use in her construction insured against the usual builder's risks, for an amount not less than the instalments paid on account by the Purchaser. If considered necessary by the Builders or purchaser the Vessel shall also be insured against war risks, and the cost of such insurance shall be borne by the Purchaser.

Should the Vessel in the opinion of the Builders be damaged by fire or other accident, to a considerable extent, the Builders shall be entitled to cancel this Contract and shall thereupon refund to the Purchaser the instalments paid on account of the contract price.
plus interest

§ 14.

Disputes

This Contract shall be construed and the relations between the parties determined in accordance with Swedish law. Disputes shall be settled by arbitration at the venue of the place of building according to the Swedish law relating to arbitrations.

If the Builders so require the Purchaser shall lodge such security as is approved by the arbitrator(s) for costs and damages likely to arise from the arbitration proceedings. If the Purchaser does not meet this requirement, he shall be debarred from any further step in the proceeding.

§ 15.

Assignment of Contract

This Contract cannot be assigned without the written consent of the Builders.

This Contract with attached specifications, drawing and appendices has been drawn up and signed by or on behalf of the parties hereto in duplicate, one copy being retained by each party.

This contract is valid subject the approval of Sveriges Riksbank and subject Purchaser finalizing the negotiations with Bank regarding the financing of the Vessel on terms acceptable to Owner.

Stockholm, June 24, 1978
Signed in duplicate:

PURCHASER:	BUILDERS:
Partrederiet för S. 592 Rederi A/B SLITE	Jos. L. Meyer

15/06 '95 17:54 FAX +49 4961 81298 MEYER WERFT TS

Enclosure 2.3.1.6

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

S. 592

Besprechung Bureau Veritas Hamburg am 23. Juni 1978

Herr Schwenker	Bureau Veritas
Herr ~~de Suza~~ D'Souza	Bureau Veritas
Herr Gormes	Bureau Veritas
Herr Wahnes	Jos. L. Meyer
Herr Möhlenkamp	Jos. L. Meyer

upper C-Deck [illegible]

1. Das Kollisionsschott muß durch eine wasserdichte Rampe bis zum A-Deck weitergeführt werden. Die Lage der Rampe zum VL kann in der Schrägen gemittelt werden, Absprache mit BV und der schwedischen Sicherheitsbehörde.
2. Die Schmierölumlauftanks können ohne Kofferdämme zum Boden gebaut werden, wenn die Tanks durch Absperrorgane voneinander getrennt werden können.
3. Der Eisgürtel in der Außenhaut muß geändert werden von 0,5 auf 0,6 m über LWL.
4. Bei Abnahme und Prüfung der Hängedecks durch die Klasse kann das Klassenzeichen den Zusatz PFA erhalten. BV 1-43.5 S. 330.
5. Der Winkel von 73° zwischen den Wellenbockarmen ist i. O., die Klasse hat hier keine speziellen Vorschriften.
6. Die PKW-Rampe muß nur für die Wagenbelastung ausgelegt werden, Gurtungsdeck-Zuschläge sind nicht erforderlich.
7. Nach Aufgabe der Hubschraubergröße kann die Belastung des Decks nach 6 - 24.4 festgelegt werden.
8. Das dickwandige Kabelrohr zum Bugstrahlruderraum kann bis zu 40 % des Querschnittes mit Kabeln belegt werden. Wegen der Leckstabilität muß auf den 1/5-Bereich der Abschottung geachtet werden.
9. Gegen eine überlappte Verbindung der Längsdeckbalken nach vorgelegter Skizze bestehen keine Bedenken.
10. Nach SOLAS Regel 26 II müssen die Fenster im Bereich der Back in B 15 - Ausführung sein. (Pietermann Hardglas BV, Postbus 30, Zoetermeer, Holland)
11. Durchführung von Kunststoffrohren durch horizontale Schotte: Nach Rapport från Byggforskeningen, Stockholm, bis zu einem gewissen Durchmesser keine Stahlmanschetten erforderlich (Kopie des Berichtes liegt im TBS vor).
12. BV übergab der Werft die Vorschriften für den Einbau von Liftanlagen.

TBS-Mö-Zw
23. Juni 1978

15/06 '95 16:43 FAX +49 4961 81298 MEYER WERFT TS

Enclosure 2.3.1.7

Wahnes Tagebuch (1)

23.10.78 Herren [illegible], Wahnes, [illegible], [illegible]

1) [illegible] Kontrollblech als [illegible] für [illegible]platte.

2) K.S.S. [illegible]

3) [illegible] !

H. Kruse: 24.10.78

Raum für Gasflaschen für Gasgrille einschließl. Rohrleitung bis in die Küche, jedoch ohne Montage der Grillöfen u. [illegible], kleine Flanschen und vollst. [illegible] ca. 50 [illegible]:

D.M. 5.200.—

1 Stck. Wendezeiger-Anlage für Anschütz liefern und einbauen

D.M. 2.950.—

[illegible] Anzeige- [illegible] Gesamt D.M. [illegible].000.—

Enclosure 2.3.1.8

20.11.78

Hr. C.B. Meyerdierks

Frau Meyerdierks

Hr. Kruse

Hr. Tillberg

Hr. K. Andersson

Wg.

Tagesordnung (1)

1.) Rettungsboote: 4 × 85 = 340
1 × 60 = 58 ÷ 60 unterhalb Brücke
1 × 15 = 15

= 415 = 30%

100% ≈ 1400; bis auf 1400 aufstockbare Rettungsflöße

– Vorschlag von Reederei:

–	720	Fahrgäste
–	100	Besatzung
	820	
–	410	Boote
	410	:44 = 16/17

Rettungsinseln ≙ 4 Kräne, da 4 Inseln pro Kran.

2.) Bei Bestellung von Rettungsinseln darauf achten, daß a.) faltbar
b.) Aufschrift oben!

per Telex 20.11.

3.) Sjöfartsverket Rotterdam: anfragen, welche Sachen abgenommen werden sollen!!

4.) Brief v. Sjöfartsverket beantwortet mit Dispens für Kategorie 7 für Kabinen beantragen. (Holzbauteile, sowie eventuell Material).

5.) Modellbau: Schreiben „VIKING-LINE“ Unterlagen von „DIANA“

6.) 140-Decke: Nach Aussage von Hr. Kjellegaard muß Brandversuch in Stockholm durchgeführt

K. Sjöholm: Kollisionsabsicht → [illegible]

(N.S. 23.6.78)

B.V. Funke B-15 Soles Reg. 26 II

(N.S. 23.6.78 P. 10)

Tagebuch Wollmer

1

VERKET

BILAGA 9
1(8)

PASSENGER SHIP SAFETY CERTIFICATE

Enclosure 2.3.1.9

This certificate shall be supplemented by a Record of Equipment (Form P).

SWEDEN

for [–] an international voyage
[X] a short (Select as appropriate)

Issued under the provisions of the INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA 1974, in accordance with Assembly resolution A.718(17) relating to the early implementation of the harmonized system of survey and certification under the authority of the Government of Sweden by the National Maritime Administration.

Particulars of ship

Name of ship : DIANA II

Port of registry: Slite

Gross tonnage : 11537

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced: 1978

Call sign : S I A J

IMO Number : 7816874

Sea areas in which ship is certified to operate (reg.IV/2) : –

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/7 of the Convention.

2 That the survey showed that:

2.1 the ship complied with the requirements of the Convention as regards:

.1 the structure, main and auxiliary machinery, boilers and other pressure vessels;

.2 the watertight subdivision arrangements and details;

.3 the following subdivision load lines:

Subdivision load lines assigned and marked on the ship's side amidships (regulation II-1/13)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C.1	2012	
C.2		
C.3		

BILAGA 9
2(8)

2.2 the ship complied with the requirements of the Convention as regards structural fire protection, fire safety systems and appliances and fire control plans;

2.3 the life-saving appliances and the equipment of lifeboats, liferafts and rescue boats were provided in accordance with the requirements of the Convention;

2.4 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of the Convention;

2.5 the ship complied with the requirements of the Convention as regards radio installations;

2.6 the functioning of the radio installations used in life-saving appliances complied with the requirements of the Convention;

2.7 the ship complied with the requirements of the Convention as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.8 the ship was provided with lights, shapes, means of making sound signals and distress signals in accordance with the requirements of the Convention and the International Regulations for Preventing Collisions at Sea in force;

2.9 in all other respects the ship complied with the relevant requirements of the Convention.

3. That an Exemption Certificate [X] *has* [-] *has not* been issued. (Select as appropriate.)

This certificate is valid until : 1 February 1995

Issued Malmö (Date of issue) at 10 June 1994 (Place of issue of certificate)

(Signature of authorized official issuing the certificate)
Åke Sjöblom

SJÖFARTSVERKET

'95 08:17 FAX +49 4961 81298 MEYER WERFT 15

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

Enclosure 2.4.1.11

13.9.79

SPECIFICATION

for a

abt. 15.000 BRT

CAR-PASSENGER FERRY

1-1
1-8
1-12
2-5
3-3

(in connection with general arrangement plan 5675/79 dated 5.9.1979)

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Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

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Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

1. GENERAL

General Regulations

The vessel shall be built in accordance with this specification and the General Arrangement drawings, equipped to comply with the specific regulations.

Inventories shall be delivered according to the included lists. Should any object be mentioned in more than one place, however it is only to be delivered once.
When two or more materials or methods of manufacture are mentioned, the Builders have the right to choose between these.

The design of subcontractors' equipment and recommendations for installation of the same equipment refer to their standard on the date of this specification.

If, as a result of increased experience or general technical development, other designs, materials or methods of manufacture than those stated in this specification are found equivalent but more practical, the Builders reserve the right to adopt these new designs etc. Such alterations, however, are always to be submitted to the Owners' surveyor for approval before being carried out.

The shipyard alone is responsible for the construction and quality of work of the ship. The fact that drawings or other documents, test results, etc. have been shown to the Owners or been approved by the Owners or an authority or that modifications have been carried out according to Owners' requirements does not relieve the shipyard from the above mentioned responsibility.

If drawings are submitted and any discrepancy should exist between this specification and the drawings, the specification shall prevail.

Details and equipment necessary for a ship of this type but not stated in this specification to be done according to yard's praxis approved by the Owners'.

General Description

The ship to be built in every respect as a modern car/passenger ferry, designed for short international voyage.

23/02 '95 05:21 FAX +49 4961 81298 MEYER WERFT TS 019
Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb
1-1

1. GENERAL

General Regulations

The vessel shall be built in accordance with this specification and the General Arrangement drawings, equipped to comply with the specific regulations.

Inventories shall be delivered according to the included lists. Should any object be mentioned in more than one place, however it is only to be delivered once.
When two or more materials or methods of manufacture are mentioned, the Builders have the right to choose between these.

The design of subcontractors' equipment and recommendations for installation of the same equipment refer to their standard on the date of this specification.

If, as a result of increased experience or general technical development, other designs, materials or methods of manufacture than those stated in this specification are found equivalent but more practical, the Builders reserve the right to adopt these new designs etc. Such alterations, however, are always to be submitted to the Owners' surveyor for approval before being carried out.

The shipyard alone is responsible for the construction and quality of work of the ship. The fact that drawings or other documents, test results, etc. have been shown to the Owners or been approved by the Owners or an authority or that modifications have been carried out according to Owners' requirements does not relieve the shipyard from the above mentioned responsibility.

If drawings are submitted and any discrepancy should exist between this specification and the drawings, the specification shall prevail.

Details and equipment necessary for a ship of this type but not stated in this specification to be done according to yard's praxis approved by the Owners'.

General Description

The ship to be built in every respect as a modern car/passenger ferry, designed for short international voyage.

14. CLASSIFICATION, REGULATIONS, NOISE PREVENTING

The vessel with her accommodation, equipment and machinery shall be built under special survey to Bureau Veritas class, I 3/3 E + Car and Passenger ferry Deep sea Finnish Ice class I A
+(AUT) = EO
The vessel with equipment shall comply with the following rules and regulations:

- The Finnish Board of Shipping.
- International Conference on Safety of Life at Sea 1974
- International Load Line Convention 1966 and admendments 1971 + 1975
- Convention for Tonnage Measurement of Ships, Oslo 1947
- Pollution Preventions 1973
- International Regulations for Preventing Collision at Sea 1972
- Finnish Authorities' recommendations for Safety Ship Labour 77 : 33
- US Regulations regarding sanitation (fresh water tank arrangement excluded) (as reasonable applicable)
- Convention on the Protection of the Marine Environment of the Baltic Sea Area 1974/232
- IMCO resolution A 325 (1x) 1975 concerning regulations for machinery and electric installations in passenger vessel and cargo ships
- USCG requirements for passenger vessels' safety to be followed, as reasonable applicable
- The Finnish Board of Shipping and Navigation Rules and Recommendations of Noise Level Criterium

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

13.CERTIFICATES, DELIVERY DRAWINGS,MODELS

133. CERTIFICATES

All necessary certificates to be delivered with the ship including:

- Certificate from the Classification Society for Hull and Machinery
- Tonnage Certificates
- Load Line Certificate
- Safety Construction Certificate
- Safety Equipment Certificate
- Safety Radiotelegraphy Certificate
- Register of Lifting Gear (attestation by the classificatio
- Builder's Certificate
- Deratting Certificate

Certificates for
anchors, chain cables, davits, navigation lights, compasses etc. will be delivered.

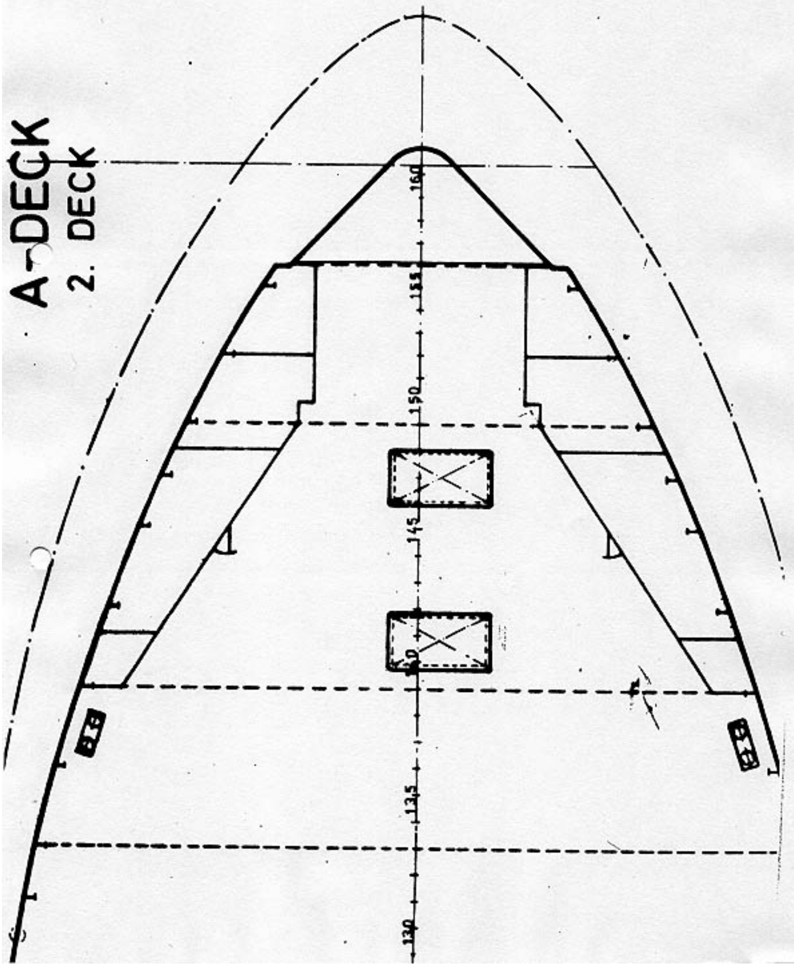
Certificates and costs for approval of plans by the Authorities concerned shall be paid for by the Builders.

214. BULKHEADS

Steel bulkheads below car deck to fulfil the two-compartment stability and flooding requirements. Steel bulkheads on upper decks for main fire zones, main stair casings, around galley departments, store rooms etc. of 4 mm corrugated plates.

Part of GA-drawing
dated 5.9.79

Enclosure 2.4.1.12



CONTRACT

Pursuant to form adopted by the Swedish Shipbuilders' Association on the 30th January 1947 with amendments adopted on the 28th January 1964

This Contract is made between Rederiaktiebolaget Sally, Strandgatan 7, 22100 Mariehamn, Finland

as Purchaser, on the one part and Shipyard Jos. L. Meyer, W-Germany, 2990 Papenburg (EMS), Hauptkanal Rechts 2

as Builders, on the other part.
Whereby it is agreed as follows:

§ 1.

Subject to the conditions set out below the Builders will build for the Purchaser ~~and will deliver~~ at the Builders' yard at Papenburg (EMS)-Germany and will deliver *The vessel ordered* a two compartment car- and passenger ferry at Emden/Germany (hereinafter called "the Vessel") having the Yard No. 5 : 590 substantially in accordance with the specification~~s~~ and drawing~~s~~ numbered 5675/79 dated 5th September, 1979 relating to this Contract, and intended to be taken as part hereof.

The Yard number shall be considered solely as the means of identifying the Vessel and the parts intended for her and does not imply any priority in regard to other vessels accepted for earlier delivery by the Builders.

In the event of any discrepancy between this Agreement and the said specifications ~~of~~ or drawings the provisions of this Agreement shall prevail and be adopted. In the event of any discrepancy between the specifications and the drawings the specifications shall prevail.

§ 2.

Leading dimensions and particulars

The dimensions of the Vessel shall be the following:

Length overall: .... approx.	155,40 m
Length between perpendiculars	137,40 m
Breadth, ~~moulded~~ max	24,60 m
moulded in waterline	23,60 m
Depth, moulded, to upper deck	13,40 m
Depth, moulded, to second deck	7,65 m
Number of passengers	2.000
Number of crew	188

The deadweight capacity of the Vessel including fuel, stores, provisions, fresh water, passengers (if any), crew and spare parts beyond the requirements of the Classification Society, etc., shall be about 2.800 tons (of ~~1,016~~ 1.000 kilos) on the international summer freeboard, corresponding to a mean draft in salt water (specific gravity 1.025) of about 5.55 m

The propelling machinery of the Vessel shall consist of four main engines of M.A.N., type 8L 40/45, each 4400 kw (5.984 HP) at 600 rpm

~~developing approx. I.H.P./B.H.P. (metric) at approx. r.p.m.~~

The mean speed of the Vessel on trials with clean bottom ~~when loaded to the said mean draft~~ with a draft corresponding to 1.460 tons deadweight and with her propelling machinery developing ~~xxxxxxxxxx~~ /90% of the MCR at 188,5 rpm/ is estimated to be 21,2 knots in calm weather and smooth sea on opposite runs over a measured mile.

The warranties of deadweight and speed shall be deemed to have been complied with if the Purchaser shall dispense with the trials~~, or shall not for the purpose of the trials provide and ship on board the deadweight required to submerge the Vessel down to the said mean draft~~.

The fuel consumption of the propelling machinery, ~~including all auxiliaries required for the propulsion of the Vessel~~, when developing approx. 17.600 kw ~~I.H.P./B.H.P. (metric)~~ and when running on 1.500 sec redwood I, 100°F with an effective thermal value of at least 10.000 kcal per kilo, is estimated not to exceed 209 ± 3 % grams per kw ~~I.H.P./B.H.P. (metric)~~ per hour.

The Vessel with her accomodation, equipment and machinery shall be built in accordance with the rules and requirements for class

Bureau Veritas

I 3/3 E + car- and passenger ferry deep sea, /Finnish/ ice class 1A

+ (Aut) and rules/regulations corresponding to specification

The Builders shall supply at their cost Builders' certificate, certificate of the Classification society, and certificates of tonnage for international measurement and ~~for~~ other certificates provided for in the specification

Unless otherwise agreed between the parties ~~Svensk Varvsstandard (Swedish Shipbuilding Standard)~~ Scandinavian standard for car/passenger ferries shall apply to all equipment, materials etc., ~~for which such standard is published.~~

If, during the period of building, alterations or additions are made to any rules, regulations or enactments in force before 11th September 1979 as far as the classification society is ~~concerned and 1st April 1979 in all other respects~~. and applicable to the Vessel the Builders shall inform the Purchaser thereof as soon as possible. The Purchaser must then decide whether and to what extent the alterations or additions which are not mandatory shall be incorporated in the Vessel. The amount of the additional expense or saving in cost arising from any alterations or additions shall be borne by or credited to the Purchaser, as the case may be.

§ 3.

Deficiency in deadweight and speed; excessive fuel consumption

If the estimated deadweight capacity mentioned in Clause 2 be not attained and if the deficiency exceeds ~~x%~~ 2,35% of the said deadweight capacity, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages, of DEM 15.000,- for every .... ~~tons~~ of deficiency beyond the said margin of ~~x%~~ 2,35%.

On the other hand, the Purchaser shall pay the same amount to the Builders for every .... ~~tons~~, by which the actual deadweight exceeds the said estimated deadweight increased by ~~x%~~ 4%.

Should the speed estimated in Clause 2 not be attained, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages, of the following percentages of the contract price stated in Clause 10:

For the first two tenth (2/10) of a knot deficiency .... Nil.
For each successive complete tenth (1/10) of a knot deficiency up to one half (½) of a knot .... 0,2 %
For each complete tenth (1/10) of a knot deficiency exceeding one half (½) of a knot .... 0,4 %

~~Should the fuel consumption exceed the consumption estimated in Clause 2 by more than 5%, the liability of the Builders shall be limited to the payment to the Purchaser, as liquidated damages, ... for each full five (5) grams per I.H.P./B.H.P. (metric) per hour by which the fuel consumption it increased beyond the said margin of 5%.~~

The Builders guarantee that the deadweight capacity of the vessel determined in clause 2 shall not be less than 2500 tons, whereof no less than 1500 t. for cargo (lorries) on car deck and that the speed determined as stated in clause 2 shall not be less than 20,1 knots.

... Builders cannot fulfill one or both of these two guarantees the Purchaser ... the right and option to refuse to take delivery of the vessel and to cancel ...ontract with an obligation for the Builders to refund immediately to the Purchaser ...e instalments paid on account of the contract price plus interest. 4

§ 4

Trial trip

When the Builders have notified the Purchaser that the Vessel is ready for delivery, a trial trip shall take place off .... EMDEN .... to ascertain whether the Vessel conforms with the terms of the contract. The trial trip, which shall be undertaken in the presence of representatives of the Purchaser and representatives of the cla[ssification society] ~~shall be of approxima-~~ according to the specification. ~~tely ... hours duration and the propelling machinery shall be operating during two hours thereof at the normal working speed~~. The Builders at their discretion may extend the trial trip or hold further trial trips.

If, during the trial trip or within 6 hours after its completion the Purchaser makes no substantial complaint to the effect that the Vessel does not comply with the terms of the Contract, the Vessel shall be accepted by the Purchaser, who, if so required by the Builders, shall declare such acceptance in writing.

If, however, faults or defects arise during the trial trip, the Builders shall be entitled to remedy these and to ascertain by further trials whether the Vessel complies with the terms of this Contract.

If, in order to ascertain whether the Vessel complies with the terms of the contract, the Purchaser requires the Vessel to be loaded, the loading and discharge of the cargo shall be carried out by the Purchaser at his own risk and expense and the Builders shall not be held in any way responsible for delay or damage arising as a result of the loading and discharge.

§ 5.

Additional works

The Purchaser shall be entitled, subject to the approval of the Classification Society and to government regulation, to require alterations or additions to be made to the Vessel, provided such alterations or additions do not materially affect the general intention of the parties as embodied in the specifications and drawings relating to this Agreement and are notified in writing to the Builders at an appropriate time and a fair price adjustment shall have been agreed before the work thereon be put in hand.

If such alterations or additions cause delay x) the time of delivery of the Vessel shall be extended by the period of delay.

x) and the Builders notify the Purchaser that such delay will occur

§ 6.

Increase in weight

Should any alterations or additions mentioned in Clauses 2 or 5 cause an increase in the weight of the Vessel and the Builders notify the Purchaser that such increase will result, the deadweight capacity of the Vessel mentioned in Clause 2 shall be reduced by the actual increase in the weight. ~~accordingly~~.

§ 7.

Purchaser's supervision

The Purchaser or his representatives shall be entitled to supervise the construction of the Vessel according to the specification ~~[illegible]~~, and the Builders shall have due regard to any proper complaint or observations made by the Purchaser or his representatives concerning materials and workmanship. If the Builders so desire, the Purchaser or his representatives shall make such complaints or observations in writing. The Builders will in reasonable time notify the Purchaser or his representatives of dock trials and other such trials and tests.

§ 8.

Completion and delivery

The delivery date for the Vessel shall be

.... 30th June 1980 ....

Should delivery be delayed beyond the above mentioned date, the Builders shall only be liable to pay to the Purchaser, ~~[illegible]~~ a compensation at the rate of DEM 20.000,- per day as from 1st July 1980. On the other hand, the Purchaser shall pay the Builders a compensation of DEM 5.000,- for every day the vessel is delivered earlier than 30th June 1980.

Should the Vessel not be delivered before 1st November 1980 the Purchaser has the option of cancelling this contract against being paid back the instalments paid on account of the contract price plus interest and also compensation due for payment as mentioned above. 5

~~the instalments already paid by the Purchaser in cash or by bills, at the highest rate charged from time to time by the Swedish private commercial banks on loans secured by mortgages on ships.~~

The Builders shall not be liable for damages or otherwise howsoever if the delay is due to force majeur such as war or warlike operations, strike, lockout or other labour conflicts, whether approved or supported by trade unions or not, shorter working hours imposed on the Builders, ~~shortage of manpower or materials, late delivery of materials or goods, defects in major forgings or castings, materials or goods supplied by sub-contractors,~~ fire, accident, act of God, ~~unfavourable weather~~ exceptionally bad weather or any other circumstances outside the control of the Builders and ~~whether~~ affecting the Vessel ~~or any other commitments of the Builders~~. And the time for delivery shall be extended by the number of working days lost to the Builders by reason of any of the above mentioned occurances, even if the cause of the delay arises after the date of delivery stated in this Contract.

The same sha apply to lat delivery cau by late deli of substanti parts or ser vices by sub contractors providing th reason for l delivery wou constitute force majeure for the Buil

If, during the period of building, the Vessel sustains damage which has been repaired to the satisfaction of the Classification Society and/or the government authorities concerned, the Purchaser is not thereby entitled to refuse delivery of the Vessel or to claim compensation.

If the Vessel is put into service by the Purchaser before it is entirely ready for delivery, the Purchaser's right to claim compensation for any delay in the delivery shall cease from the day the Vessel is put into such service.

If the Vessel is ready for delivery before the date mentioned in the first paragraph of this Clause and the Builders give to the Purchaser at least two weeks notice thereof the Purchaser ~~shall~~ gladly take delivery as soon as it has been ascertained that the Vessel has been built in accordance with the terms of the Contract. If such events occur, which in the Builders judgement, may cause a delay, the Builders shall within two weeks notify the Purchaser of such events and, if possible, the estimated duration of the delay. If such written notice is not given within the stipulated two weeks, force majeure cannot be claimed for the period preceeding such notice.

§ 9

Liability

(a). When the Vessel has been delivered to the Purchaser or the Purchaser has, at his request, taken over the Vessel, the liability of the Builders shall cease, except that the Builders shall remedy at their own yard, free of charge and as speedily as possible any defect detailed in writing by the Purchaser to the Builders which may have developed in the propelling or auxiliary machinery and hull during the ~~six~~ twelve months from the date the Vessel was delivered to or taken over by the Purchaser, or any longer period as may be granted by the sub-contractor provided such defect is due to inferior workmanship or latent defects in material and is not due to overloading, incorrect fuel or lubrication, wear and tear, neglect, careless handling, external causes, accident or the like, or is due to putting the Vessel into service before it was entirely ready for delivery.

If the defect cannot be conveniently remedied at the Builders' yard, and if no other agreement can be arrived at between the parties, the Builders shall only be bound to pay in full and final settlement of their liability under this Clause to the Purchaser, such a sum as it would have cost the Builders had they done the work at their yard.

During the guarantee period ~~six months~~ twelve the Builders shall have the right to appoint a marine engineer, or mechanic fully conversant with the construction and running of the machinery as guarantee engineer, and the person so appointed shall receive from the Purchaser the customary salary and other remuneration due to a chief engineer on board a ~~Swedish~~ Finnish vessel of the same size, together, if so required, with a free passage and maintenance home as well as salary for the journey home. The Builders may accept the Purchaser's engineer as guarantee engineer.

The Builders' responsibility for the propelling and auxiliary machinery during the guarantee period shall cease if the guarantee engineer is dismissed without the Builders' approval. The Builders shall not be liable for any faults or omissions on the part of the guarantee engineer or on the part of any other member of the engineroom staff during the guarantee period.

(b). The Builders shall not in any circumstance be liable for loss of earnings or profits or for any other loss, or damage, whether direct or indirect, or for accidents or the consequences thereof which may arise after the delivery of the Vessel nor shall their liability extend further or otherwise than in the first paragraph of this Clause provided.

(c) The Builders shall upon request supply the Purchaser with copies of the relevant guarantee clauses regarding important goods installed in the Vessel.

§ 10.

Payment

The Purchaser undertakes to pay to the Builders as follows:

	In Cash	By bills of exchange
On signing of this Contract	10 %	-
the 15th October 1979 On ~~receipt of the bulk of rolled steel material~~	-	15 %
the 15th December 1979	-	15 %
On ~~laying of the keel or when construction~~ the 2nd January 1980 on ~~the berth commences~~	10 %	-
On launching (March 1980)	10 %	10 %
On delivery (June 1980)		
	30 %	40 %
On delivery to be covered by way of the loan	30 %	
Total	60 %	40 %

The Builders shall inform the Purchaser at least fourteen days in advance of the date on which each of the foregoing instalments is due for payment.

~~The Purchaser undertakes to hand over to the Builders at the signing of the contract the following securities in addition to the first instalment:~~

The total fixed price for the Vessel amounts to eightytwomillionsevenhundred-andfiftythousand (DEM 82.750.000,-) German marks. The Bills of exchange and and additional instalment of 30 %, equalling total of 70 % of the contract price will be covered by a loan.

~~The Purchaser shall pay to the Builders in advance, interest on the amount of outstanding bills together with any charges at the rate charged from time to time by the Swedish private commercial banks for bills of the kind delivered (the rate at present being .... %).~~

The cost of additional work done as well as allowances made, in accordance with Clauses 2, 3 and 5 hereof, shall be settled in ~~cash on~~ the delivery of the Vessel.

If for any reason the Purchaser cannot take delivery of the Vessel on the date the Builders have notified ~~that the Vessel will be ready for delivery, the Purchaser shall nevertheless be liable to make full and final payment on that date.~~

1

~~The bills shall mature at six monthly intervals and shall be redeemed by half yearly instal-~~
ments of

....

beginning six months after the date of delivery. The Purchaser shall, however, have the right to redeem the amount of the bills wholly or in part at any time prior to their maturity dates.

As security for the bills the Purchaser shall on the delivery of the Vessel hand over to the Builders a first priority mortgage in a form to be approved by the Builders registered on the Vessel for the full amount of the bills and interest thereon.

If the Builders so desire, the Purchaser shall apply to a credit institution approved by the Builders for the largest sum obtainable by way of loan on the security of a mortgage on the Vessel and in her charterparty (if any). The amount of such loan shall be paid to the Builders as soon as received and the Builders shall then hand to the Purchaser bills of the same amount as the loan as well as the mortgage required for the loan. If and when such loan is redeemed the mortgage thereby released shall be transferred to the Builders in exchange for any mortgage of lesser priority which the Purchaser may have created on the Vessel in favour of the Builders.

As long as any part of the bills remains unpaid the Purchaser shall keep the Vessel after delivery fully insured with such underwriters, insurance companies or institutions and on such terms as approved by the Builders, for all marine and other risks and protection and indemnity risks and war risks, with (if possible) mortgagee's protection insurance in addition. The policies shall provide (unless otherwise agreed) that all losses and claims shall be paid direct to the Builders who shall be entitled, out of the proceeds of the insurances, to retain an amount sufficient to meet what is owing by the Purchaser to the Builders.

If, at the time of delivery, there exists an abnormal international situation affecting currency and/or insurance conditions which may, in the Builders' opinion, prejudice the ready transfer of money to the Builders, the Purchaser shall at the request of the Builders redeem on delivery of the Vessel all outstanding bills or make available a guarantee acceptable to the Builders.

In addition to the foregoing the "General Loan conditions" annexed to this Contract shall apply.

§ 11.

Delay in payment

If payments in accordance with Clause 10 hereof are not made on due dates, the Builders shall be entitled to interest on the amount due, until payment made, at the highest rate charged by the ~~Swedish~~ German private commercial banks for short term loans on securities other than bonds or real estate mortgages, with a minimum of 6%.

If, during the period of building, any payment is more than thirty days in arrear, the Builders shall have the right to cancel this Contract and to claim damages according to law. If any delay in payment occurs after the delivery of the Vessel, the Builders shall be entitled to call for the immediate payment of all sums due from the Purchaser for the Vessel, with interest thereon.

§ 12.

Crisis Clause

If, by reason of circumstances of an exceptional nature, such as, for example, war, or the risk of war, or occurences or incidents which have a like effect or consequence as war or the risk of war, the rate of wages, and/or costs and/or prices for materials increase to such an extent that it would be unreasonable for the Builders to bear the increase occasioned as aforesaid, then the Builders shall be entitled to request an additional payment from the Purchaser of an amount which the parties hereto may agree on a basis reasonable to them both. If the parties are unable to reach an agreement, the amount of the payment shall be decided by arbitration in the manner laid down in Clause 14 hereof.

Such payment shall be made in cash on the delivery of the Vessel.

§ 13

Until delivery has been effected, the Builders shall keep the Vessel and all parts intended for use in her construction insured against the usual builder's risks, including war risk and sabotage as from the launching until the delivery of the vessel, for an amount not less than the instalments paid on account by the Purchaser. If considered necessary by the Purchaser the Vessel shall also be insured for an amount equaling the difference between the contract price and the present repurchase price and the additional cost of such insurance shall be borne by the Purchaser. Insurance

Should the Vessel be a total loss the parties may agree to cancel this contract and the Builders shall thereupon refund to the Purchaser the instalments paid on account of the contract price, plus interest and, in the event an additional insurance has been taken for the repurchase price, the difference between the contract price and the repurchase price.

§ 14

This contract shall be construed and the relations between the parties determined in accordance with German law. Disputes shall be settled by arbitration at the venue of the place of building according to the German law relating to arbitrations. Disputes

If the Builders so require the Purchaser shall lodge such security as is approved by the arbitrator(s) for costs and damages likely to arise from the arbitration proceedings. If the Purchaser does not meet this requirement, he shall be debarred from any further step in the proceeding.

§ 15

This contract cannot be assigned without the written consent of the Builders, which the Builders shall not unreasonably withhold. Assignment of contract

§ 16

The scope of supply for S. 592 is included in the specification for the Vessel. Scope of supply

§ 17

Defects in major forgings or castings can only be considered to constitute force majeure for the Builders provided the Builders have ordered the respective goods with utmost dispatch, have had the respective goods tested by X-ray or other available, effective method either at the sub-contractors works or at the yard at the earliest possible date, and have taken every reasonable step to avoid delay and provided such defects and the resulting delay in the construction affects the delivery date of the Vessel. Defects in forgings and castings

§ 18

This contract is subject the approval of Finlands Bank. Subject

---

This contract with attached specifications and drawings has been drawn up and signed by or on behalf of the parties hereto in duplicate, one copy being retained by each party.

Mariehamn, 11th September, 1979.

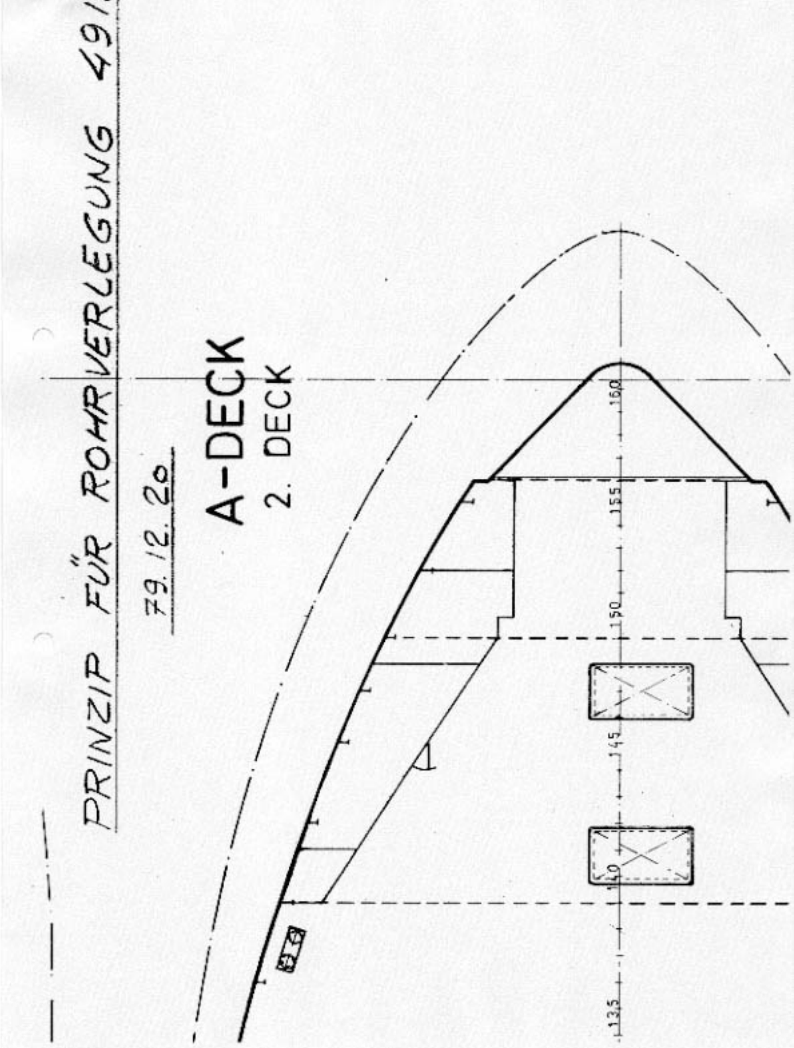
REDERIAKTIEBOLAGET SALLY
Sven-Erik Johansson

JOS. L. MEYER
Joseph F. Meyer

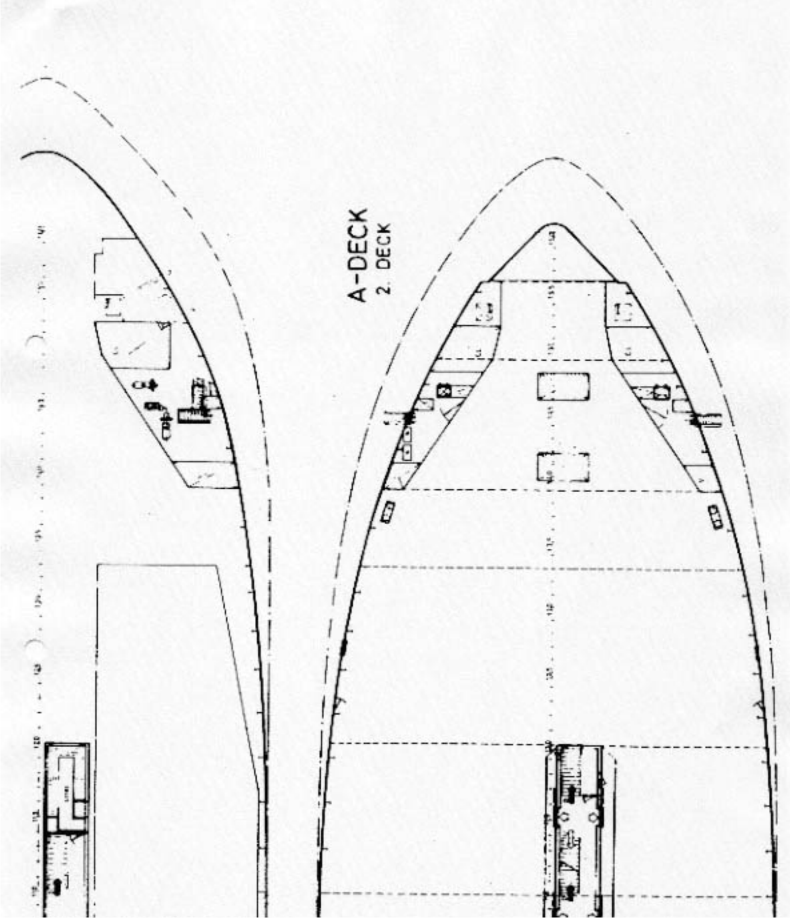
Witnesses:

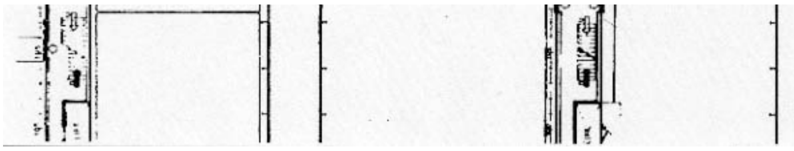
1

Enclosure 2.4.1.14



Enclosure 2.4.1.15





6315 elgot sf
27118y meypb d   tbs/mo/zi   tlx no. 1378   30/8/79

att. mr. alf johansson

8 M

neubau einer faehre
projekt nr. 5675/78-79

sehr geehrter herr johansson,

bezugnehmend auf das gestrige telefongespraech moechte ich innen hiermit aufgaben, welche mit innen besprochenen punkte in meinem angebot mit fs vom 28.6.79 nicht bzw. modifiziert beruecksichtigt worden sind:

1. klasse: bureau veritas anstelle von det norske veritas

2. maschinenanlage wird gebaut nach den vorschriften und mit abnahme von b.v. die automation wird ausgelegt nach den vorschriften von b.v. fuer das klassenzeichen: (aut), jedoch ohne abnahme.

3. schleppversuche sind nicht vorgesehen, da mit dem bau des schiffes nach auftragserteilung sofort begonnen werden muss, zur information koennen sie zu einem spaeteren zeitpunkt, falls gewuenscht, durchgefuehrt werden.

4. die genannten us-vorschriften sind bei diesem schiff nur teilweise zu erfuellen. die regeln, die nicht eingehalten werden koennen, werden ihnen aufgegeben.

5. die stahl-qualitaeten fuer den schiffskoerper werden entsprechend den vorschriften von b.v. gewaehlt.

6. buc- und heckrampenanordnung entsprechend ''diana ii''.

   betriebsdruck der hydraulikanlage bis 250 bar.

ich hoffe, innen hiermit gedient zu haben.

m f g

jos.l. meyer, papenburg
gez. motikat

27118y meypb dtttttttoooooooo
6315 elgot sf

Umbau "VIKING 4"

Die Werft erhielt für englische Rechnung den Auftrag, die "VIKING 4" umzubauen. Dieses Schiff wurde 1973 unter der Baunummer S. 570 von der Werft an die Reederei SALLY abgeliefert und wurde erfolgreich von der VIKING-LINE im Verkehr zwischen Schweden und Finnland eingesetzt, bis sie jetzt durch die neue Fährengeneration, zu der auch Neubau S. 590 "VIKING SALLY" gehört, ersetzt wird. Nach der Sommersaison 1980 kommt das Schiff nach Papenburg, und die Werft wird folgende umfangreiche Arbeiten durchführen:

- Einbau einer neuen Hauptmotorenanlage
- Einbau einer Flossenstabilisierungsanlage
- Umstellung des Schiffes auf englische Flagge (Erfüllung der DOT-Vorschriften)
- Änderungen in der Einrichtung für den neuen Liniendienst
- Wartungsarbeiten.

Nach Rücklieferung des umgebauten Schiffes Anfang 1981 wird das Schiff von der Reederei SEALINK U.K. LIMITED gechartert und im Verkehr zu den Kanalinseln eingesetzt werden.

Papenburg, 25. Juni 1980

-1- 24. 6. [illegible]

Aus Ordner Mehr + Minderkosten

Enclosure 2.4.1.18

BV 1) Bauleistungsmängel [illegible]

4-18 a) Pos. 452 fehlt in allen Pos. 2[illegible]. [illegible] und Handgriffe / [illegible]. [illegible] ca. 500 Stck und Preis- angabe 150.- [illegible] / Handgriff.

b) Kojenbreite [illegible] Kojen statt 900 mm jetzt 800 mm. ca. 500 Stck 100.- ?

c) [illegible] [illegible] 4 Mann. Kabinen [illegible] statt 800 mm 100.- Stk

4-19 d) [illegible] / [illegible] (453 [illegible])

versendet 0 + 200,-

4-19a e) Barsalon: [illegible] [illegible] ges Tisch 350.- und Lampe 200.- (Kupferspiegelplatten)

16 + 200,-

4-19a f) [illegible] im Barsalon [illegible] fehlt nach BV. 200.- Stk. (452)

4-19 g) [illegible] (453) nicht so ausgeführt wie [illegible] ca. 15.-

OK

5-4 h) Öffentliche WC's: [illegible] für Urinale fehlt. (5-4) (EVAK-Anlage [illegible])

5-4 i) Handtuchspender in öffentl. WC's fehlen (el. Händetrockner

k) Deckung ?

3-21 l) Signalmast vorne anders [illegible] ca. 4.000 30.000.- ? (3531)

2-8 m) Brücke nicht [illegible] 50.000. ca. 10.000 (2-8)

8. a) 3–3 Kollisionsschotte fehlt.
ca. 7 to … 25.000.-

-9 o.) Std. Tür im Übergang Boot vor Bord
Zeichn. glatt
… 2 Stck 21.000.-

-10 p.) 2–10 Fensterrahmen aus anderem Material 590.-/Stck.

-8 r.) 444 Fußboden nicht entspr. B.V., dito über Raum der Toilettenanlage

s.) Entfall von Fenstern im Nacht-club (Rückwand) ca. 12 Stck

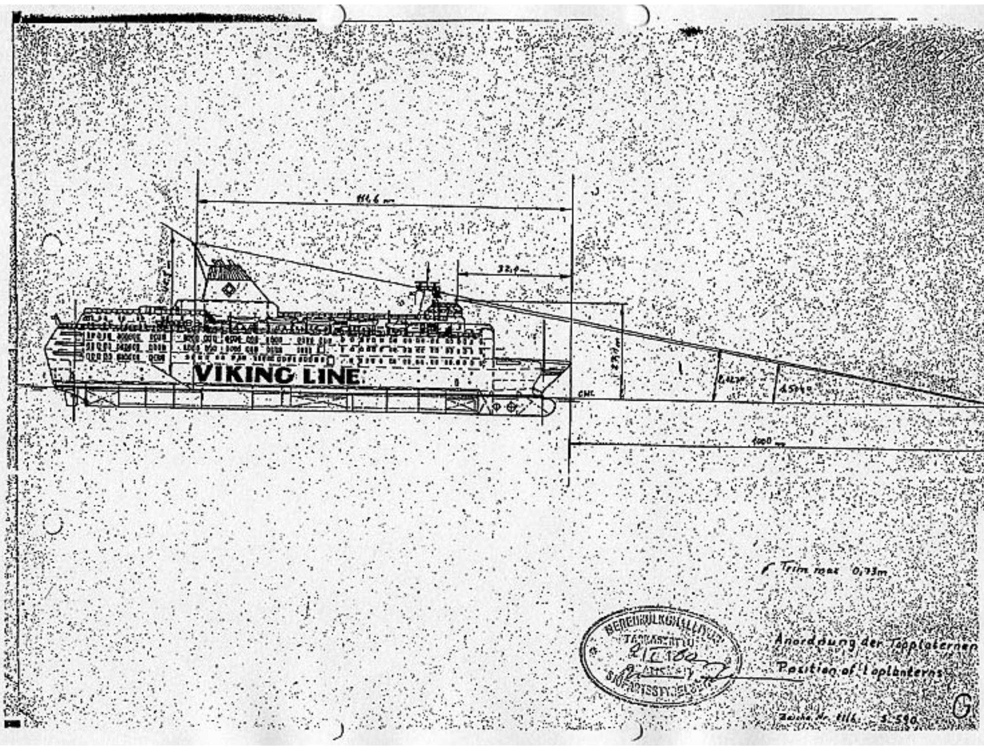
3. b) Zwischenboden für Wohnanlage?

c.) Stabilität:
Pos. 1 Fehler von Seed. an Schiff vom 14.9.89 … [illegible]

Pos. 2. Für Kursverhalten gilt gleiches wie Pos. 1; Seitenansicht … entsprechend ändern.

Pos. 3 o.k.
Pos. 4 o.k. überprüfen
Pos. 5 o.k. – " –
Pos. 6 – " –
Pos. 7 – " –
Pos. 8 – " –
Pos. 9 – " –
Pos. 10 – " – Leergewicht? 9,2 to.

– 3 –



Enclosure 2.4.1.19

Enclosure 2.4.2.20

JOS. L. MEYER · PAPENBURG-EMS

SCHIFFSWERFT MASCHINENFABRIK DOCKBETRIEB

Telefon Sammelnummer (04961) 811
Telex 027118 maypbg
Telegramme: Meyerwerft Papenburg
Postscheck: Hannover (BLZ 25010050) Kto. 12718-303
Banken: Oldenburgische Landesbank AG, Fil. Papenburg (BLZ 285 215 18) Konto-Nr. 18-39304
Deutsche Bank AG, Zweigstelle Papenburg (BLZ 285 700 00) Konto-Nr. 02/60716
Commerzbank AG, Zweigstelle Papenburg (BLZ 285 415 78) Konto-Nr. 4510103
Landeszentralbank Niedersachsen, Filiale Leer (BLZ 285 000 00) Konto-Nr. 28508002
Geschäftszeit: 7.30 Uhr bis 16.30 Uhr

von Tell GmbH
Sophienallee 24

2000 Hamburg 19

2990 PAPENBURG 1
HAUPTKANAL RECHTS 2
POSTFACH 1120

IHR ZEICHEN / YOUR REF.	IHR SCHREIBEN VOM / YOUR LETTER OF	MEIN ZEICHEN / MY REF.	DURCHWAHL / DIRECT EXTENSION	
		EK-Hö-Cl	(0 49 61) 81 /211	27. Sept. 1979

Auftrag Nr. 3344/79 - S. 590 -

In allen Briefen, Rechnungen, Versandpapieren, Frachtbriefen unbedingt anzugeben! Versandanzeigen und Rechnungen zweifach erbeten!

Hiermit erteile ich Ihnen nachstehenden Auftrag zu meinen umseitigen Einkaufsbedingungen. Auftragsbestätigung sofort erbeten.

Frachtbriefvermerk:

Liefertermin: siehe Seite 12 und 13

	Menge			Preis
Pos. 1	1		<u>Hydraulische Betätigung für eine Bugklappe</u> Die Bugklappe wird von Ihnen, wie von mir angegeben, mit einem Gewicht von 56 t angenommen. Sie wird von zwei direkt angelenkten Hydraulikzylindern bewegt. Die Zylinder erhalten Gelenklager, um evtl. Fluchtfehler auszugleichen. Die direkt hinter den Zylindern vorgesehenen Drosselrückschlagventile regeln die Senkgeschwindigkeit. 2 Kisbreck-Zylinder unterstützen am Anfang den Öffnungsvorgang und dämpfen den Schließvorgang. Die Verriegelung der geschlossenen Bugklappe erfolgt hydraulisch. Sie wird so ausgebildet, daß sie auch bei abgeschalteter Hydraulik die Verriegelung	

Jos. L. Meyer, Papenburg (Ems)
Blatt 2 zum Auftrag Nr. 3344/79 - S. 590 - vom 27. Sept. 1979
an von Tell GmbH

Menge			Preis
		sicherstellt. An der Verriegelung werden Kontaktschalter vorgesehen, die bei geschlossener Verriegelung in der Manöverplatte und auf der Brücke befindlichen Lampen einschalten. Es wird eine zusätzliche Verriegelung für die Atlantiksicherung vorgesehen. Das Bugvisier wird mit einer hydraulisch betätigten Feststellvorrichtung, welche nach Beendigung des Öffnungsvorganges bewegt wird, versehen. Die Bugrampe wird gegen die Bugklappe hydraulisch verblockt. Ihr Lieferumfang für diese Anlage umfaßt:	
2		Höchstdruck-Hydraulikzylinder, Drosselrückschlagventile, Achsen mit Schmiernuten und Schmiernippeln sowie die erforderlichen Höchstdruck-Hydraulikschläuche. Die erforderlichen Höchstdruck-Hydraulikzylinder für die Verriegelung, die Verriegelung selbst, einschl. Achsen mit Schmiernuten und Nippeln, Hochdruckschläuche und Kontaktschalter für die optische Anzeige.	
1		Höchstdruck-Hydraulikzylinder für die Atlantikverriegelung mit Versteckbolzen, Achsen mit Schmiernuten und Schmiernippeln sowie Höchstdruck-Hydraulikschläuche.	
2		Hydraulikzylinder mit Vorsteckbolzen für die Sicherung der Bugklappe in geöffneter Stellung, einschl. der Achsen mit Schmiernuten und Nippeln und den Höchstdruck-Hydraulikschläuchen. Die Zylinder werden hydraulisch so geschaltet, daß die Bugklappe zwangsweise verriegelt wird, wenn sie ganz geöffnet ist. Dagegen muß die Entriegelung beim Schließen der Bugklappe getrennt erfolgen.	

Menge			Preis

1 Manöverplatte mit den hintergebauten hydraulischen Steuerungseinheiten für die vorstehend beschriebenen Bewegungsvorgänge, einschl. Lampenanzeige für geschlossene Verriegelung, Atlantikverriegelung und Verriegelung in geöffneter Stellung, ferner Pumpenstart und -Stopp mit optischer Anzeige. Die hydraulischen Steuerungseinheiten werden verrohrt und die elektrischen Teile, soweit erforderlich, verkabelt.

2 Beschläge für die manuelle Sicherung der Bugklappe

Sie liefern ferner das hydraulische und, soweit erforderlich, auch das elektrische Schaltschema für die vorstehend beschriebenen Bewegungen der Bugklappe, einschl. der Zeichnungsunterlagen mit der Anordnung der Hydraulikzylinder und Verriegelung mit Angaben der Kräfte, die in die Schiffskonstruktion eingeleitet werden müssen. An nicht oder schwer zugängigen Schmierstellen werden automatische Schmiernippel angebracht.

Pos. 2 1 hydraulisch betätigte Bugrampe

Die Bugrampe mit einer Länge von 7,625 m für eine Breite zwischen den Häusern von 5,5 m kann von LKW's mit einer Achslast von 18,0 t bei 1,3 m Achsabstand und einem Radstand von 2,0 m befahren werden.

Die wasserdichte Rampe hat an der Vorkante bewegliche Vorläufer von 1,5 m Länge, die automatisch über Seilbetätigung ausgeklappt werden können. Die Außenlager werden im mittleren Teil als Gelenklager ausgebildet. Die Rampe wird durch 2 direkt angelenkte Zylinder, die Gelenklager haben, betätigt. Die Zylinder erhalten eine Bypaßstellung, so daß die Rampe den Schiffsbewegungen folgen kann. Die Verriegelung der geschlossenen Rampe erfolgt ebenfalls hydraulisch. Sie wird so ausgebildet, daß sie auch bei

Menge			Preis

abgeschalteter Hydraulik die Verriegelung sicherstellt. An der Verriegelung werden Kontaktschalter vorgesehen, die bei geschlossener Verriegelung in der Manöverplatte und auf der Brücke befindliche Lampen einschalten. Die Bugklappe wird gegen die Bugrampe hydraulisch verblockt. Die Hauptzylinder erhalten je 1 Rohrbruchsicherung und Absenkventile.

Ihre Lieferung umfaßt:

1 Bugrampe, kompl. mit Vorläufern in den vorgenannten Abmessungen und Belastungen. Die gesamte Fahrbahnbreite wird als Rutschsicherung mit Quadratstahl in Fischgrätenform belegt. Es werden feststehende Geländer vorgesehen, Achsen mit Schmiernuten und Nippeln für die Befestigung am Schiffskörper. Die Stahlkonstruktion wird gestrahlt nach SA 2,5 und mit Shopprimer ca. 30 my konserviert. An nicht oder schwer zugängigen Schmierstellen werden automatische Schmiernippel angebracht.

2 Hydraulikzylinder, Drosselrückschlagventile, Achsen mit Schmiernuten und Schmiernippeln sowie Hochdruck-Hydraulikschläuche.

Die erforderlichen Hydraulikzylinder für die wasserdichte Verriegelung, die Verriegelung mit Achsen mit Schmiernuten und Schmiernippeln, Hochdruckschläuche, Steuerschieber und Kontaktschalter für optische Anzeige, ferner die erforderlichen Gummidichtungen.

1 Manöverplatte für die hydraulische Betätigung und Verriegelung sonst wie unter Pos. 1 beschrieben.

Erforderliche Zeichnungen wie unter Pos. 1 beschrieben.

Jos. L. Meyer, Papenburg (Ems)

Blatt 5 zum Auftrag Nr. 3364/79 - S. 390 - vom 27. Sept. 1979

an: von Tell GmbH

	Menge			Preis
Pos. 3	2		<u>hydraulisch betätigte Heckrampen</u> Die Heckrampen, Längen 6,5 m und Spurbreiten 5,5 m (zwischen den Schrammborden) bilden den wasserdichten Abschluß des Wagendecks am Heck. Die Belastbarkeit wird wie bei der Bugrampe vorgesehen. Die Vorläufer von 1,5 m Länge erhalten einen Anschlag, so daß sie sich beim Auflegen der Rampen auf den Kai von selbst richtig auflegen. Die Außenlager werden im mittleren Teil als Gelenklager ausgebildet. Die Verriegelung und Betätigung erfolgt wie unter Pos. 2 für die Bugrampe beschrieben. Die Bugrampe wird gegen die Bugklappe hydraulisch verblockt. Eine der Heckrampen erhält einen Beschlag für eine Kette oder Seil, um die Rampe im Notfall auch öffnen und befahren zu können, ohne daß sie am Kai aufliegt. Die andere Heckrampe erhält Beschlag für Preventer. <u>Ihre Lieferung umfaßt:</u>	
	2		Heckrampen, kompl. mit Vorläufern in den vorgenannten Abmessungen. Die Ausführung der Rampen, mitzuliefernde lose Teile und Konservierung wie für die Bugrampe beschrieben. An nicht oder schwer zugängigen Schmierstellen werden automatische Schmiernippel angebracht. Je Rampe 2 direkt angelenkte Hydraulikzylinder, Drosselrückschlagventile, Achsen mit Schmiernuten und Schmiernippeln sowie Höchstdruck-Hydraulikschläuche. Für jede Rampe die erforderlichen Hydraulikzylinder für die wasserdichte Verriegelung, die Verriegelung selbst mit Achsen mit Schmiernuten und Schmiernippeln, Höchstdruck-Hydraulikschläuche, Steuerschieber sowie Kontaktschalter für die optische Anzeige.	

Jos. L. Meyer, Papenburg (Ems)

Blatt 6 zum Auftrag Nr. 3344/79 – E. 590 – vom 27. Sept. 1979

an von Tell GmbH

	Menge	Text	Preis
		Je Rampe 2 Eisbrech-Zylinder	
		Für jede Rampe die erforderlichen Gummidichtungen	
	2	Manöverplatten für die hydraulische Betätigung der Rampen und die hydraulischen Verriegelung, sonst wie unter Pos. 1 beschrieben.	
		Die erforderlichen Zeichnungen wie unter Pos. 1 beschrieben.	
Pos. 4	4	<u>hydraulisch betätigte Passagier-Seitenpforten auf dem C- und D-Deck</u>	
		Die Seitenpforten, lichte Breite 2,5 m und lichte Höhe 2,0 m, sind einflügelig je auf einem Schwenkarm gelagert und öffnen parallel geführt nach außen. Die Pforten werden komplett mit den erforderlichen Gegenrahmen angeliefert, so daß die fertigen Pforten so in die Außenhaut eingesetzt und verschweißt werden können. Die Gummiabdichtungen werden lose mitgeliefert.	
		Ihre Lieferung je Pforte umfaßt, d.h. wenn Stückzahlen genannt sind, = 4x.	
	1	Türblatt mit Versteifungen und Lager, Entrostung und Konservierung wie unter Pos. 2 beschrieben.	
	1	Schwenkarm mit Lager	
	1	Parallellenker mit Lager und Höchstdruck-Hydraulikzylinder	
		Die erforderlichen Verriegelungszylinder für die wasserdichte Verriegelung, die Achsen mit Schmiernuten und Schmiernippeln, Höchstdruck-Hydraulikschläuche, Steuerschieber und Kontaktschalter für die optische Anzeige.	
	1	Manöverplatte für die Betätigung und Verriegelung, sonst wie unter Pos. 1 beschrieben.	

Jos. L. Meyer, Papenburg (Ems)

Blatt 7 zum Auftrag Nr. 3344/79 – E. 590 – vom 27. Sept. 1979

an von Tell GmbH

	Menge	Text	Preis
		Die erforderlichen Zeichnungen wie unter Pos. 1 beschrieben.	
Pos. 5	2	<u>hydraulisch betätigte Lotsen-Pforten auf dem A-Deck</u>	
		Die Seitenpforten, lichte Breite 1,2 m und lichte Höhe 2,0 m, sind einflügelig und werden nach innen um 90° hydraulisch geschwenkt. Die sonstige Ausführung wie unter Pos. 4 aufgeführt.	
		Lieferumfang je Pforte:	
		Unter Berücksichtigung der anderen Betätigungsart wie unter Pos. 4 aufgeführt.	
Pos. 6	1	<u>hydraulisch betätigte wasserdichte Luke für Maschinenraum auf dem A-Deck</u>	
		Der Klappdeckel verschließt eine lichte Öffnung von 2,4 m breit und 1,2 m lang und wird über die lange Seite hydraulisch betätigt und verriegelt. Der Lukendeckel wird für die gleiche Belastungen wie bei der Bugrampe angegeben ausgelegt.	
		Ihre Lieferung umfaßt:	
	1	Lukendeckel mit Versteifungen und Lagern, einschl. Gummiabdichtung, konserviert wie unter Pos. 1 aufgeführt.	
		Den erforderlichen Hydraulikzylinder für das Öffnen und Schließen der Luke, die erforderlichen Hydraulikzylinder für die wasserdichte Verriegelung der Luke, einschl. der Verriegelung selbst, Achsen mit Schmiernuten und Schmiernippeln, Höchstdruck-Hydraulikschläuche, Steuerschieber und Kontaktschalter für die optische Anzeige.	
	1	Manöverplatte für die Betätigung der Luke und Verriegelung, sonst wie unter Pos. 1 aufgeführt.	

Jos. L. Meyer, Papenburg (Ems)

Blatt 8 zum Auftrag Nr. 3344/79 – G. 590 – vom 27. Sept. 1979

an von Tell GmbH

	Menge			Preis
Pos. 7	6		**Hydraulisch mechanisch betätigte Hängedecks mit Auffahrrampen**	

An BB-Seite des Schiffes sind 3 Hängedecksektionen und 2 Auffahrrampen von je ca. 20 m Länge und 1 Sektion von 18,4 m Länge und ca. 5,5 m Breite, an StB-Seite ebenfalls 3 Hängedecksektionen und 2 Auffahrrampen von je ca. 20 m Länge und 1 von 18,4 m Länge und ca. 8,5 m Breite vorgesehen. Auf den Hängedecks und Rampen können Pkw's mit einem Raddruck von 400 kg dicht an dicht gestellt werden. Die vollbeladenen Rampen können aus der Rampenstellung in die Horizontale gehoben werden.

In Staustellung liegen die Hängedecks und Auffahrrampen hydraulisch hochgezogen und verriegelt unter dem C-Deck.

Jede Hängedecksektion wird durch einen hydraulischen Flaschenzug, der in die Hängedecksektionen eingebaut ist, sowie mit Stahlseilen und Umlenkrollen betätigt. Die Flaschenzüge sind für das Hochziehen der leeren Hängedecksektionen ausgelegt. Abgesenkt liegen die Hängedecksektionen auf festen Konsolen. Jede Sektion erhält einen eigenen Steuerstand.

Die Rampen werden ebenfalls mit hydraulischen Flaschenzügen bewegt, die jedoch an der Außenhaut angeordnet und über Umlenkungen mit Stahldrahtseilen mit den Rampen verbunden werden. Die Rampen können mit Pkw's vollgestellt aus der Rampenstellung in die Horizontale gehoben werden.

Die Funktionen, Heben der vollen Rampen in die Horizontale, Absenken in Rampenlage und Heben der leeren Rampe in Staustellung unter dem C-Deck, werden je Rampe von einem Flaschenzug durchgeführt.

Die Sicherung der Rampen in Staustellung unter dem C-Deck erfolgt hydraulisch, in horizontaler Arbeitsstellung mechanisch durch Hängestützen.

Jos. L. Meyer, Papenburg (Ems)

Blatt 9 zum Auftrag Nr. 3344/79 – G. 590 – vom 27. Sept. 1979

an von Tell GmbH

	Menge			Preis

Die Rohrleitungen für die Wagendeck-Sprühanlage werden nach meinen Angaben von Ihnen mit in Decks und Rampen vorgesehen.

Ihre Lieferung umfaßt:

6 Hängedecksektionen mit Umlenkrollen, Fundamenten für die Hydraulikflaschen, Strahlentrostung und Konservierung wie Pos. 2

4 Hängedeck-Auffahrrampen, Deckblech gemäß meinem Wunsch aus Tränenblech.

Die erforderlichen Stahldrahtseilumlenkrollen, die nicht in den Decks oder Rampen eingebaut werden, mit Stahlachsen, jedoch ohne die Käfige, Steuerschieber, Höchstdruck-Hydraulikschläuche sowie Kontaktschalter für optische Anzeige.

Die erforderlichen Klappständer mit Geländer.

Die erforderlichen Hydraulikflaschen zum Fahren der Decks und Rampen, einschl. der erforderlichen Hydraulikzylinder, soweit erforderlich, mit Haken und weiterem Zubehör für die hydraulische Verriegelung der Decks und Rampen in Staustellung unter dem C-Deck.

12 Manöverplatten für Decks und Rampen, sonst wie Pos. 1.

Die erforderlichen Zeichnungen etc. wie Pos. 1 sowie zusätzlich die Zeichnungen für die Umlenkrollen-Käfige, die nicht in den Decks oder Rampen eingebaut werden.

Pos. 8 — 2 — **Hydraulische Betätigung von 2 Passagier-Übergängen**

Zwischen dem Mittschiffshaus auf dem Wagendeck und den Hängedecks auf BB-Seite muß der Zwischenraum durch Passagier-Übergänge überbrückt werden. Die Übergänge selbst werden werftseitig gefertigt. Sie liefern die Hydraulik und Steuerung.

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Blatt 10 zum Auftrag Nr. 3344/79 - S. 590 - vom 27. Sept. 1979
an von Tell GmbH

Menge			Preis
		Ihre Lieferung umfaßt:	
		Die erforderlichen Hydraulikzylinder mit Stahlbolzen, mit Schmierrauten und Schmiernippeln, Hochdruckschläuchen und Steuerschieber.	
2		Manövrierplatten für die Betätigung der Übergänge und die hydraulische Verriegelung, sonst wie Pos. 1.	
		Die erforderlichen Zeichnungen wie Pos. 1.	
Pos. 9 4		Elektro-Hydraulik-Zentrale:	
		und zwar:	
2		mit jeweils 3 Pumpen als Kompakteinheiten zusammengebaut, die Bug- und Heckhydraulik und Hängedecks mit Auffahrrampen versorgen.	
1		mit 2 Pumpen als Kompakteinheit zusammengebaut für die 4 Passagierpforten und die 2 Passagier-Übergänge.	
1		mit 2 Pumpen als Kompakteinheit zusammengebaut für die Maschinenraumluken und Lotsen-Pforten.	
		Wir haben vorgemerkt, daß von den großen Aggregaten je eines im Vorschiff und eines im Hinterschiff zur Aufstellung kommt. Es wird vorgesehen, daß die getrennten Rohrleitungssysteme dieser beiden Anlagen Ventile so verbunden werden können, daß mit dem einen Aggregat auf das Rohrleitungssystem des anderen Aggregates und umgekehrt gefahren werden kann.	
		Die Förderleistung von 2 Pumpen der 3er-Aggregate wird so dimensioniert, daß sich folgende reine Fahrzeiten ohne Entriegelung oder dergleichen ergeben:	
		Bugklappe ca. 60 sec. Bug- oder Heckrampe ca. 60 sec. Auffahrrampen ca. 30 sec. Hängedecks ca. 15 sec.	

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an von Tell GmbH

Menge			Preis
		Die 3. Pumpe je Aggregat wird als Reservepumpe vorgesehen.	
		Die weiteren Doppelpumpenaggregate für die Pforten, Passagier-Übergänge und Luke erhalten je 2 Pumpen gleicher Förderleistung, von denen die eine in der Lage ist, eine Pforte in ca. 15 sec. zu öffnen bzw. zu schließen auch wiederum als reine Bewegungszeit, ohne die Verriegelung. Die 2. Pumpe wird auch hier als Reserve vorgesehen.	
		Ihre Lieferung je Kompakteinheit umfaßt:	
		Öltank mit den erforderlichen Höchstdruck-Hydraulikpumpen (2 x 3 Stück, 2 x 2 Stück), einschl. der E-Motoren für 380 V, 50 Hz, Überdruckventile, Niveauschalter, Ölstandsanzeiger, Manometer, By-Pass-Ventile, Absperrschieber, Rückschlagventile und die Ventile für die Kreuz-Schaltung.	
		Ihre Lieferung endet elektrischerseits an den Klemmkästen der E-Motoren.	
		Sie liefern die erforderlichen Zeichnungen wie Hydraulikschaltschema, Rohrleitungsplan etc.	
Pos. 10		Reserveteile nach den Vorschriften der Klassifikationsgesellschaft bzw. Ihrem Standard. Die genaue Spezifikation folgt.	
		Da meine Termisvorstellungen nicht realisierbar waren, fertige ich nach Ihren Zeichnungen	
		Pos. 2 1 Bugrampe Pos. 3 2 Heckrampen Pos. 7 8 Hängedecks und 4 Auffahrrampen	
		Auch der Anbau der von Ihnen beizustellenden Teile und Beschläge sowie der Einbau der Betätigungs- und Hydraulikteile erfolgt durch mich.	

Menge			Preis
		GESAMT-FESTPREIS DM	690.000,--
		+	frei Werft MW-Steuer

Über die folgenden Mehr- und Minderleistungen muß noch eine Klärung mit der Reederei herbei geführt werden, und zwar:

Lieferung und Einbau von 13 Sensoren
Mehrpreis: DM 3.250,--

Falls die Luke für den Maschinenraum einschl. Aggregate (Pos. 6) entfällt.
Minderpreis: DM 10.400,--

Falls die Seitentüren mit 8 Handpumpen ausgerüstet werden müssen.
Mehrpreis: DM 4.000,--

Falls dafür 1 Motorpumpe entfällt,
Minderpreis: DM 1.000,--

Falls die Bugklappe mit automatischer Verriegelung versehen wird (1 St.)
Mehrpreis: DM 3.500,--

Lieferung von Zeichnungen und Plänen:

Freigabe der vorliegenden Zeichnungen für die Hängedecks zur Fertigung bis Ende der 39. KW. 1979.

Einreichen der neuen Zeichnungen für die neuen Hängedecksektion bis Ende nächster Woche.

Lieferung der Zeichnungen für Auffahrrampe bis zur 42. KW. 1979.

Lieferung der Zeichnungen für Heckrampe bis zur 43. KW. 1979.

Lieferung der Zeichnungen für Bugrampe bis zur 42. KW. 1979.

Vorlage sämtlicher K-Pläne bis zum 31.12.1979. Die X-Werte legen Sie mir bis zur 44. KW. 1979 vor.

Einreichen der Hydraulik-Schemata bis zum 31.12.1979

Ihre Lieferungen:

6 Seitenpforten kompl. und Beschläge für Hängedecks, Heck- und Bugrampen und Bugklappe bis zum 31.12.1979 auf der Werft

Hydraulikmaterial für die Hängedecks und Gangway bis zum 31.01.1980 auf der Werft.

Hydraulikzylinder bis zum 28.02.1980 auf der Werft.

Pumpenaggregate bis zum 15.[illegible].1980 auf der Werft.

KONVENTIONALSTRAFE

Bei Überschreiten der vorgenannten Liefertermine zahlen Sie nach Ablauf einer Karenzzeit von 14 Tagen eine Konventionalstrafe in Höhe von 0,5 % je Woche, max. 5 % vom Auftragswert.

ZAHLUNGSBEDINGUNGEN

10 % - nach Erhalt der Auftragsbestätigung

30 % - nach Erhalt der 1. Materiallieferung 31.12.1979.

55 % - bei Lieferung des Restmaterials 28.02.1979

5 % - bei Ablieferung des Schiffes an die Reederei (Ende Juni 1980).

In dem obigen Preis ist eine Monteurgestellung von 35 Tagen für den Stahlbau bei normaler Arbeitszeit und einmaliger An- und Rückreise enthalten.

Ferner eine kostenlose Monteurgestellung für einen Montageinspektor für die Einregulierung der Anlage.

ABNAHME + TEST

Die vorgenannten Anlagen sind nach Vorschrift und mit Abnahme und Test des Bureau Veritas Aut und der finnischen Behörde - Finnish Board of Navigation - zu liefern.

Jos. L. Meyer, Papenburg (Ems)

Blatt 14 zum Auftrag Nr. 3344/79 – 6. 390 – 27. Sept. 1979

an von Tell GmbH

Menge			Preis
		SCHILDER in englischer Sprache **INSTRUKTIONSBÜCHER** 3 x schwedisch/englisch 1 x deutsch **GEWÄHRLEISTUNG** 1. Die Gewährleistungsfrist beträgt 13 Monate nach Schiffsablieferung, jedoch max. 19 Monate nach Versand der Liefergegenstände. 2. Im Gewährleistungsfall tragen Sie die Kosten für die Monteurgestellung und für von den Monteuren benötigtes Hilfspersonal. Außerdem tragen Sie die Kosten der zum Ein- und Ausbau benötigten Materialien für die Liefergegenstände. Voraussetzung dazu ist, daß die Arbeiten unter Ihrer Aufsicht in einem deutschen oder nordeuropäischen Hafen durchgeführt werden. 3. Weiter tragen Sie die Transportkosten für mangelhaft reparierte Teile zwischen Ihrem Werk und Aufstellungsort der Anlage. Sollte innerhalb der Garantiezeit die Ausführung der Arbeiten in einem anderen Hafen als in den vorgenannten erfolgen, tragen Sie die Kosten in der Höhe, wie sie normalerweise in einem der vorgenannten Häfen entstanden wären. 4. Für im Rahmen der Garantie geleisteten Ersatz beginnt die Gewährleistungsfrist mit deren Einbau und währt nach 12 Monaten. Für die Abwicklung dieser Bestellung gelten meine Einkaufsbedingungen. Hochachtungsvoll	

Günther Todsen, geb. 31. Juli 1932
wohnhaft Möhnweg 4, 24109 Kiel
Telefon: 0431 / 527591

Ich habe Kfz-Mechaniker in Eckernförde gelernt und diese Lehre 1951 beendet. Anschließend bin ich Lkw gefahren und habe dann 1955 bei HDW-Kiel als Stahlbauschlosser angefangen. Im Jahre 1959 begann HDW im Auftrage der Firma von Tell/Göteborg Lukendeckel zu bauen. Bestandteil des entsprechenden Vertrages zwischen HDW und von Tell war die Gestellung eines Monteurs bei der Montage der Lukendeckel an Bord sowie bei eventuellen Reparaturen. Dies wurde meine Aufgabe. Ich habe also in den folgenden Jahren überwiegend den Einbau sowie die Reparaturen von Lukendeckeln auf Neubauten deutscher und ausländischer Werften überwacht. Mein erster Kontakt mit der Meyer Werft in Papenburg war der Auftrag durch Herrn Rottmann sen. der Firma von Tell, an einer Vorbesprechung über den Einbau von Bugvisier, Bug- und Heckrampe sowie Hängedeck und Außentüren in dem Neubau "DIANA II" teilzunehmen. Dies war im Februar 1979. Ich erinnere das deshalb so genau, weil wir durch den seinerzeitigen zweiten Teil der "Schneekatastrophe" Probleme hatten, mit dem Auto nach Hause zu kommen.

Zirka Anfang April 1979 nahm ich meine Arbeit in Papenburg auf. Kurz vor Himmelfahrt hatte ich einen Arbeitsunfall an Bord der "DIANA II", bei dem ich mir einen Trümmerbruch des großen Zehs des rechten Fußes zuzog. Dadurch fiel ich für mehrere Wochen aus und konnte daher die "DIANA II" nicht fertigstellen. Nach meiner Genesung habe ich Lukendeckel auf verschiedenen Neubauten eingebaut, bis ich im April 1980 den Auftrag bekam, auf dem Neubau "VIKING SALLY" der Meyer Werft in Papenburg den Einbau von Bugvisier, Bug- und Heckrampe, Hängedecks und Außentüren - wie bereits zuvor bei der nahezu baugleichen "DIANA II" - zu überwachen.

Meine Aufgabe bestand im einzelnen darin, die Werft beim Einbau der durch von Tell gelieferten Bauteile bzw. der durch die Werft nach von Tell-.Konstruktionszeichnungen gebauten Teile zu unterstützen und die Arbeiten der Werft in dieser Hinsicht zu kontrollieren. Ich hatte eine große Anzahl von Detailzeichnungen dieser Bauteile zu meiner Verfügung, aus denen sich z.B. die Dimensionierung dieser Teile, aber auch die Schweißnahtstärke ergaben. Ich hatte Kopien dieser Zeichnungen in meinem Keller bis vor etwa zwei Jahren aufbewahrt, sie dann aber beim Aufräumen weggeworfen, da für mich nicht erkennbar war, daß ich sie jemals wieder gebrauchen würde.

Als ich meine Tätigkeit auf der "VIKING SALLY" aufnahm, befand sich das Visier in geschlossener Lage starr durch verschiedene angeschweißte Flach- und Profileisen mit dem Schiffskörper verbunden. In dieser Situation überwachte ich folgende, im Werftbereich durchgeführte Arbeiten:

a) <u>Einbau der Scharniere</u>

Die Bohrungen für die Buchsen waren in der Halle mittels eines Bohrwerks ausgeführt worden. Ich habe die Bohrungen persönlich in Augenschein genommen und befühlt, bevor die Buchsen eingebaut wurden und kann bestätigen, daß es sich keinesfalls um gebrannte Löcher gehandelt hat. Ich hätte eine derartige Pfuscharbeit, wie sie auf den mir vorgelegten Fotos der Restscharnierbleche der "ESTONIA" zu sehen ist, niemals abgenommen. Für den Fall, daß die Werft meine Einwände nicht zur Kenntnis genommen hätte, wäre ich von Bord gegangen und hätte meine Auftraggeber informiert.

So ist es z.B. auf einem Schiff in Dünkirchen geschehen. Ich hatte den Auftrag, die Reparaturen von Lukendeckeln auszuführen. Als die Besatzung sich weigerte, mir die nach meiner Auffassung und Erfahrung erforderlichen Ersatzteile, ohne die die ordnungsgemäße Reparatur nicht möglich gewesen wäre, zur Verfügung zu stellen (obwohl diese an Bord waren), habe ich mich geweigert, die Arbeit fortzuführen und bin zurück nach Kiel gefahren.

An Bord wurden unter meiner Aufsicht die Stahlbuchsen in die Visierarme eingeschweißt und anschließend soweit ausgebohrt, daß die Bronzebuchsen paßten. Diese Bohrungen wurden sehr genau ausgeführt, so daß Backbord und Steuerbord genau in der Flucht waren, um Bruchbelastungen beim Öffnen bzw. Schließen des Visiers zu vermeiden. Anschließend wurden die Bolzen eingeführt, wobei gleichzeitig die Distanzringe (2 mm Stärke) eingesetzt wurden. Ich erinnere diese Arbeit insbesondere deshalb sehr genau, weil es sich um eine ziemliche "Fummelei" handelte. Diese Bolzen waren aus NIROSTA-Stahl und mit einer Fettnut mit Schmiernippel versehen. Mittels dieser Schmiernippel waren die Scharniere mindestens einmal pro Woche per Fettpresse zu schmieren.

Mir sind die Unterwasservideoaufnahmen der "ESTONIA" sowie mehrere Standfotos gezeigt worden. Darauf habe ich u.a. die Scharniere des Visiers mit Bolzen und teilweise Buchsen auf dem Backdeck des Schiffes identifizieren können.

Im einzelnen habe ich folgendes festgestellt:

Backbord-Scharnier:

- Bolzen mit davorhängender äußerer Buchse aus der mittleren, fest eingeschweißten Buchse gerutscht und auf dem angrenzenden Geländer stehend;

- der Distanzring ist nicht erkennbar;

- die Fettnuten am Bolzen sind nicht sichtbar;

- an der Unterseite der mittleren Buchse befindet sich ein rundes, ca. 50 mm breites Loch, von dem Rost- und Fettstreifen auf das direkt darunter liegende grüne Deck gelaufen sind. Eine derartige Öffnung ist beim Neubau nicht vorhanden gewesen;

- an beiden Scharnierblechen sind an den Vorkanten oben Kontakt- bzw. Aufschlagspuren sichtbar;

- der Bolzen glänzt auffällig; dies wäre nicht möglich bei einem Fettfilm.

Steuerbord-Scharnier

- Bolzen ohne äußere Buchse aus der mittleren, fest eingeschweißten Buchse gerutscht und auf dem angrenzenden Geländer stehend;

- der Distanzring ist nicht erkennbar;

- an beiden Scharnierblechen sind an den Vorkanten oben Kontakt- bzw. Aufschlagspuren sichtbar.

Darüber hinaus sind mir auch Fotos einer vom Wrack geborgenen Scharnierbuchse gezeigt worden. Auf den Fotos sind u.a. Teile der Schweißnähte zwischen dieser Buchse und dem Visierarm zu sehen. Ich kann ausschließen, daß es sich dabei um die Schweißnähte handelt, die seinerzeit beim Bau der "VIKING SALLY" durch Schweißer der Meyer Werft gelegt wurden.

b) Seitenverriegelungen

Soweit ich erinnere, waren die Augen für die hydraulischen Verriegelungen sowie die Haken für die manuellen Verriegelungen bereits auf die Achterkantschotte des Visiers geschweißt. Auf jeden Fall wurden die Gegenstücke auf der Schiffsseite dazu passend angeschweißt.

c) Atlantik-Sicherung

Die drei auf das A-Deck geschweißten Augen sowie das an der Achterkante des Visierbodens angebrachte Auge sind Werftlieferungen. Die drei erstgenannten Augen wurden mit Übermaß angefertigt. Es ist aus der entsprechenden Zeichnung ersichtlich, daß die beiden Buchsen der Bolzen sowie Zylinder mit Zylinderstange und die Endlageschalter (Sensoren) von Tell-Lieferungen waren. Das Auge des Visiers wurde angeschweißt und als Festpunkt bei der Ausrichtung der anderen drei Augen der Atlantik-Sicherung benutzt.

Beide Buchsen wurden in der Werkstatt so in die Augen eingeschweißt, daß die große Buchse zwischen Mittel- und Backbordauge und die kleine in das Steuerbordauge mit dem Stützblech paßte. Wie bereits oben erwähnt, lagen mir für alle Einzelteile Detailzeichnungen vor, aus denen u.a. auch die Stärke der Schweißnähte hervorging.

Mir sind Fotos von zwei der drei Restaugen der Atlantiksicherung vorgelegt worden, auf denen auch die Schweißnähte sehr gut zu sehen sind, mit denen die Buchsen mit den jeweiligen Augen verbunden waren. Ich schließe aus, daß es sich bei diesen, höchstens 3 mm dicken Schweißnähten um die Originalschweißungen handelt. Diese sind nach meiner Erinnerung mindestens dreimal so dick gewesen. Ich habe die Schweißungen der Buchsen vor dem endgültigen Einbau kontrolliert und hätte derartige Schweißnähte, wie sie auf den mir vorgelegten Fotos zu sehen sind, niemals akzeptiert.

Der Einbau der Atlantik-Sicherung vollzog sich bei geschlossenen, wie oben beschriebenen Visier, wie folgt:

- Der Festpunkt war das Visierauge;

- danach wurden Hydraulikzylinder und die drei Augen mit bereits zuvor angeschweißten Buchsen ausgerichtet, passend gebrannt und angeschweißt.

Dabei habe ich insbesondere darauf geachtet, daß die drei Augen gleichmäßig, d.h. innen und außen gleich, auf das A-Deck geschweißt wurden und weiterhin dafür gesorgt, daß unterhalb jedes Auges in der Leerzelle unter dem A-Deck eine Verstärkung angebracht wurde.

d) <u>Bugrampe</u>

Die Bugrampe wurde ebenfalls unter meiner Kontrolle eingebaut und ausgerichtet. Die Sicherungsbolzen wurden angepaßt. Beim Verriegeln der Rampe klappte zunächst je ein Haken an jeder Seite über die entsprechenden Teile der Rampe und zog die Rampe nach innen, bis ein bestimmter Totpunkt erreicht und überschritten war. Jetzt lag die Rampe an. Anschließend fuhren auf jeder Seite zwei Bolzen aus dem Schiff nacheinander in entsprechende Taschen an der Rampe.

Diese Bolzen rasteten hörbar in ihren Endstellungen ein. Da von dem Bedienpult auf dem Autodeck weder Visier- noch Rampenverriegelungen einsehbar waren, mußte sich der Bediener auf die Kontrollampen und auf sein Gehör verlassen. Man konnte deutlich hören, wie die Bolzen mit knackenden Geräuschen in den Taschen einrasteten. Erst bei vollständigem Einrasten der Bolzen wurden die Sensoren betätigt, was - wenn alle Bolzen und auch die Haken entsprechenden Kontakt mit den Sensoren hatten - dazu führte, daß am Bedienpult und auf der Brücke "grün" aufleuchtete, d.h. Rampe geschlossen und verriegelt.

e) <u>Gummidichtungen</u>

Der Einbau der 50 mm dicken Gummidichtungen wurde mittels eines Innentasters alle 300-400 mm der Abstand zwischen den gegenüberliegenden Teilen Visier/Schiff gemessen und - wo Abweichungen festgestellt wurden - wurden diese mit Flacheisen ausgeglichen. Dadurch war gewährleistet, daß die danach eingebauten Gummidichtungen bei geschlossenem Visier einen absolut gleichmäßigen Anpreßdruck hatten, da sich das Visier ca. 8-10 mm in die Gummidichtungen eindrückte und dadurch einen wasserdichten (wetterdichten) Abschluß des Innenraumes des Visiers bildete.

f) <u>Erprobungen im Zusammenhang mit der Abnahme</u>

Während der Werftprobefahrt nach Helgoland wurde u.a. auch das Visier auf seine Dichtigkeit geprüft. Es befand sich in vollständig verriegeltem Zustand, d.h. auch die manuellen

Verriegelungen waren eingelegt. Ich habe bei voller Fahrt, d.h. ca. 2,5 m hoher Bugwelle und leicht stampfendem Schiff, mit dem B.V.-Besichtiger Lohmann und einem Vertreter der Reederei, dessen Namen ich nicht erinnere, im Innenraum des Visiers gestanden und festgestellt, daß das Visier nicht völlig wasserdicht war, sondern an einigen Stellen etwas leckte Nach Rückkehr wurden in Emden die Gummidichtungen mit Schlemmkreide eingeschmiert, das Visier geschlossen und anschließend wieder geöffnet. Aufgrund der verbleibenden Abdrücke wurden die leckenden Stellen ermittelt und entsprechend wurden die Gummidichtungen in diesen Bereichen angehoben. Bei einer anschließenden erneuten Dichtigkeitsprobe wurde das Visier für dicht befunden und durch Reederei, Klasse und finnische Schiffssicherheitsbehörde endgültig abgenommen.

Die offizielle Abnahme war - nach erfolgreicher Funktionsprobe am 19. Juni 1980 - bereits am 20. Juni 1980 erfolgt. Anschließend wurde die in der Anlage beigefügte Abnahmebebescheinigung ausgefüllt und von Vertretern der Reederei, des B.V., der Werft und meinem Kollegen Brandt unterschrieben.

Ich habe die "VIKING SALLY" zuletzt bei ihrer Kiel-Kanal-Passage in die Ostsee gesehen und danach mit dem Schiff keinen Kontakt mehr gehabt.

Hamburg, den 26. Juli 1995

Günther Todsen

G. Todsen

Office Translation

Günther Todsen, born July 31, 1932
address: Möhnweg 4, 24109 Kiel
telephone: 0431 - 527591

states:

I became an auto mechanic in Eckernförde and terminated my apprenticeship in 1951. Afterwards I drove a truck and then in 1955 started work at HDW-Kiel as a steel construction mechanic. In 1959 HDW began to build hatch covers for von Tell/Göteborg. Part of the corresponding contract between HDW and von Tell was the supply of a mechanic to supervise the mounting of hatch covers onboard as well as possible repairs. This was my work. In the following years I thus supervised the installation as well as the repairs of hatch covers on newbuildings for German and foreign yards. My first contact with Meyer Werft in Papenburg was the participation in a meeting upon instruction of Mr. Rottmann, sen. when the installation of bow visor, bow and stern ramps as well as hanging decks and outer doors were preliminarily discussed. This was in February 1979. The reason for my recalling this so well is that we had tremendous difficulties getting home by car due to the 2nd part of the so-called "snow catastrophe".

Circa at the beginning of April 1979 I took up my work in Papenburg. Shortly before Ascension Day (national holiday in Germany) I had an accident at work onboard "DIANA II" shattering the big toe of my right foot. I was on sick leave for several weeks and therefore could not complete my work on "DIANA II". After my recovery I installed hatch covers on several newbuildings until in April 1980 I received the order to supervise - as previously for the practically identical construction on "DIANA II" - the installation of the bow visor, bow and stern ramps, hanging decks and outer doors on the newbuilding "VIKING SALLY" for Meyer Werft in Papenburg.

My work in detail consisted of assistance to the yard for installation of the components delivered by von Tell resp. the components made by the yard according to the von Tell construction drawings, and of supervising the yard's work in this respect. I had a large number of detail drawings of these construction parts at my disposal, which showed the dimensions of these parts and also of the welding seams. I had saved copies of these drawings in my basement until about two years ago, but then threw them away while cleaning out the basement because I didn't think I would ever need them again.

When I started work on "VIKING SALLY" the bow visor was in closed position, fixed to the ship's hull by means of various flat bars and structural bars. In this position I supervised the following work performed at the yard:

a.) <u>Installation of Hinges</u>

The bore holes for the bushings were made by means of a boring mill in the fabrication hall. I personally took a close look at the the bore holes and touched them with my fingers before the bushings were installed and can confirm that by no means were they burned holes. I would never have accepted such dubbed work as can be seen on the photographs shown to me of the remnants of "ESTONIA's" hinge plate. In case the yard would had not taken notice of my objections I would have left the ship and would have informed my principals accordingly.

This was the case on a ship in Dunkerque. I had the order to execute the repair of the hatch covers. When the crew refused to put the necessary spare parts at my disposal, without which, in my opinion and experience, it was not possible to perform the repairs properly (although these parts were onboard), I refused to continue the work and returned to Kiel.

Under my supervision onboard the steel bushings were welded into the visor's arms and subsequently bored out to the extent that the bronze bushings did fit. These bores were carried out with extreme precision in order that port side and starboard side were in alignment in order to avoid breaking tension when opening resp. closing of the visor. Subsequently the bolts were guided in whilst simultaneously the distance rings (2 mm thickness) were fitted. I recall this work especially because it was rather fumbly work. The bolts were made of NIROSTA steel and had a grease groove with grease nipple. By means of these grease nipples the hinges had to be greased at least once a week by grease gun.

Underwater videos of the "ESTONIA" as well as several pictures have been shown to me. On these I have been able to identify a.o. the hinges of the visor on the forecastle deck of the vessel together with bolts and partly with bushings.

In detail I have found the following:

Port Hinge:

- Bolts with outer bushings hanging in front, having slid out of the middle firmly welded bushing and standing on the adjacent railing;
- the distance ring is not recognizable;
- the grease groove at the bolt is not visible;
- at the under side of the middle bushing there is a round ca. 50 mm wide hole, from which rust and grease have run onto the green deck directly below. Such an opening has not been there at newbuilding;
- at the upper front edges of both hinge plates contact resp. impact marks are visible.
- the bolt is noticeably shiny; this would not be possible if covered by a grease film.

Starboard Hinge

- Bolt without outer bushing having slid out of the middle, firmly welded bushing and standing on the adjacent railing;
- the distance ring is not recognizable;

- at the upper front edge of both hinge plates contact resp. impact marks are visible.

In addition to this, also pictures of a hinge bushing brought up from the wreck were shown to me. The photos showed among other things parts of the welding seams between this bushing and the visor arm. I can exclude that these welding seams are the welding seams made by welders of Meyer Werft during the newbuilding of "VIKING SALLY".

b) Side locks

As far as I remember, the lugs of the hydraulic locking as well as the hooks of the manual locking were already welded to the aft bulkhead of the visor. In any case the mating parts had been welded to the ship's side respectively.

c) Atlantic lock

The three lugs, welded to the A-deck, as well as the lug at the aft part of the visor's bottom are yard-supply. The 3 first mentioned lugs had been constructed with overmeasure. It can be seen from the respective drawing that both bushings of the bolt, the cylinder including piston rod and the limit switches (sensors) had been delivered by von Tell. The lug of the visor was welded and used as fixing point for the alignment of the other three lugs of the Atlantic lock.

At the workshop both bushings had been welded into the lugs in such a way that the large bushing fitted between the middle and the port lug and the small bushing into the starboard lug with the support bracket. As already mentioned above, I have had detail drawings for all components from which among others also the thickness of the welding seams were revealed.

Photographs were submitted to me, showing 2 of the 3 lug remnants of the Atlantic lock, on which welding seams can be seen very clearly, which had connected bushings with the respective lugs. I exclude that these welding seams, having a maximum thickness of 3 mm, are the orignal welds. According to my memory these welding seams had been at least 3 times as thick. I have checked the weldings of the bushings prior to final installation and would never have accepted such welding seams as recognisable on the photographs submitted to me.

The installation of the Atlantic lock was carried out as follows by closed visor:

- The fixing point was the lug of the visor
- accordingly hydraulic cylinder and the 3 lugs with already previously welded bushings were aligned, burned to fit and welded.

Thereby I paid special attention to the even welding of the 3 lugs to the A-deck, i.e. inner and outer side the same. Furthermore, I took care that below each lug, in the void space under A-deck, a reinforcement was fitted.

d) Bow ramp

The bow ramp as well had been installed and arranged under my supervision. The securing bolts were made to fit. During locking the ramp at first each one hook on each side of the corresponding parts at the ramp lowered and pulled the ramp inwards, up to a special point had been reached and passed. Now the ramp was tight in position. Then two bolts on each side were moving out of the ship into corresponding pockets of the ramp.

The bolts snapped audibly into their end positions. As from the control console on the car deck neither visor nor ramp-locking devices could be seen, the operator had to rely on the control lamps and his sense of hearing. It was clearly audible by snapping noises when the bolts engaged the pockets. Only after the bolts had fully engaged did the sensors become activated, which - if all bolts and also the hooks were in contact with the sensors - led to the "green light" at the control console as well as on the bridge, i.e. the ramp was closed **and** locked.

e) Rubber packings

Prior to installing the 50 mm thick rubber gaskets every 300 - 400 mm the distance between the opposite parts visor/ship were measured by means of an inside callipers and ascertained deviations were compensated by flat iron. This way guaranteed that the afterwards installed rubber gaskets had absolutely the same contact pressure, as the visor was pressed into the rubber gaskets up to 8 - 10 mm, which made the inside of the visor watertight (weathertight).

f) Testing in connection with acceptance

During the trial trip to Helgoland a.o. also the visor was checked in respect of its tightness. The visor was totally locked, i.e. also the manual locking devices were closed.

During full speed - i.e. about 2,5 m high bow wave and slightly pitching vessel - myself, Mr. Lohmann, surveyor of Bureau Veritas, and a representative of the owners, whose name I do not remember, were inside the visor and noted that the visor was not totally watertight, but at some places water was slightly leaking through. After returning to Emden the rubber packings were marked with chalk, the visor was closed and opened again. Due to the remaining imprints the leakings were found out and the rubber packings were raised in these particular areas. During a subsequent tightness test the visor was found to be tight and finally accepted by the owners, the classification society and the Finnish board of navigation.

The official delivery took place already on 20th June 1980 - after successful function test on 19th June 1980. Afterwards the attached Delivery Certificate was filled in and signed by representatives of the owners, the B.V., the shipyard and my colleague Brandt.

I have seen the "VIKING SALLY" the last time when passing the Kiel Canal to the Baltic sea. Since that time I have never been in contact with this vessel again.

Hamburg, the 26th July 1995 signed by Günther Todsen

Enclosure 2.4.2.22

ANKOM 7 JULI 1980

VON TELL

MOTTAGNINGS- EL. ÖVERLÄMNINGSBEVIS x)
Abnahme- oder Übergabebescheinigung x)
Receipt or Transfer Certificate x)

4911.1/80.151.1

von Tell-Nr.: ....
M.S. VIKING SALLY

VARV / Bauwerft / Shipyard	Jos. L. Meyer	NYBYGGE/OMBYGGE x) / Neubau/Umbau x) / Newbuilding/Rebuilding x)	590
REDERI / Reederei / Shipping Co.	Sally	KLASS / Klasse / Class	Bureau Veritas
MONTÖR / Service-Mann / Mounter	G. Todsen H. Brandt	DATUM / Datum / Date	20. 6. 80

VATTENPROVNING/LUCKMANÖVRERING/ÖVERLÄMNING x)
Wasserprobe/Deckelmanöver/Übergabe x)
Waterproof/Hatch Operating/Transfer x)

LUCKOR / Luken / Hatches: 1 Bugklappe, 1 Bugrampe, 2 Heckrampen, 4 Passagierpforten, 2 Lotsenpforten, 2 Wagendecks mit Auffahrrampen, 2 Passagierübergänge

ANMÄRKNING / Bemerkung / Notes: [illegible]

MEDVERKANDE:
Teilnehmer:
Co-Operater:

REDERI / Reederei / Shipping Co.: [signature]

KLASS / Klasse / Class: [signature] B.V.

VARV / Werft / Yard: Werft

von TELL: Herbert Brandt

UTFÄRDANDEN / Ausfertigungen / Issues: 6-fach

x) ICKE TILLÄMPLIGA STRYKES
Nichtzutreffendes streichen
Not appliecable cross over

Enclosure 2.4.2.23

N° 1

To DT1 - Mr Segretain
Mr Cornil
Sect 35397 -
19.10.94

21542617934
20617 vontell s 80-03-18/868

good afternoon this is von tell ab gothenburg/sweden

att.: mr desoussa

re.: ferry in papenburg
bow visor
our ref 4911.1

---

we refer to phone conversation with mr desoussa.

in lack of bv rules we have used the lr rules and got

total horizontal force abt 230 tonne
total vertical force abt 470 tonne

we have calculated with the two side cleatings and the atlantic securing device and will then have a load of abt 80 tonne for each device.

calculated shear stress will be 800 kp/cm2 and bending stress 2400 kp/cm2.

we think we are slightly above the stress permitted by lr and we could change the present steel with min breaking strength of 50 kp/mm2 to a material with a breaking strength of 90 kp/mm2.
75 kp/mm²

please advise++

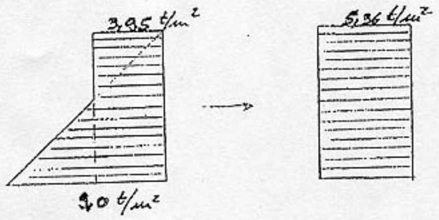
regards
von tell / a eriksson

21542617934
20617 vontell s

(1)

Enclosure 2.4.2.24

Angreifende Kräfte nach BV-Rules 1976



Kraftangriffspunkt im Flächenschwerpunkt der projizierten Flächen:

$P_x = 381$ to

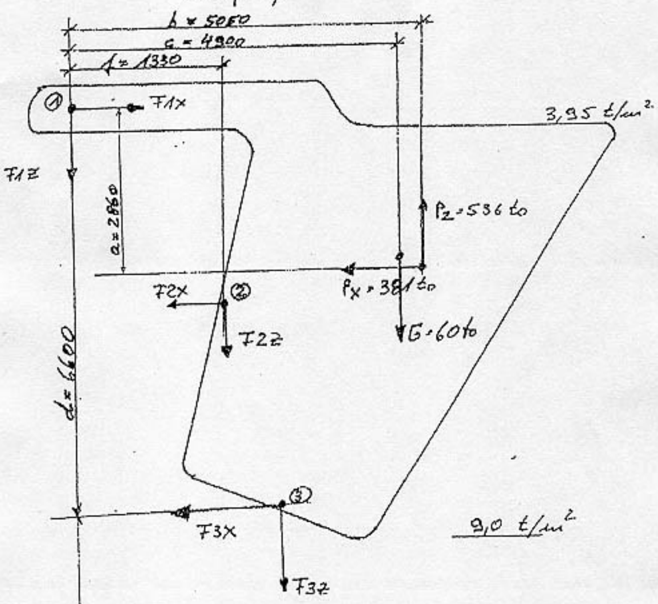
$P_z = 536$ to

$G = 60$ to

(2)

Bugklappe 590

Kräftesystem



Gesamt horizontal kraft:

$$R_x = \frac{P_z(b-f/2) - G(c-f/2) - P_x \cdot a}{d} = 152{,}5 \text{ to}$$

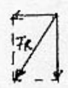
Gesamt vertikalkraft:

$$R_z = P_z - G = 476 \text{ to}$$

Insgesamt 5 Aufhängepunkte

$F_{ix} = R_x/5 = 30{,}5$ to

$F_{iz} = R_z/5 = 95{,}2$ to



$F_R = \sqrt{F_{ix}^2 + F_{iz}^2} = 100$ to

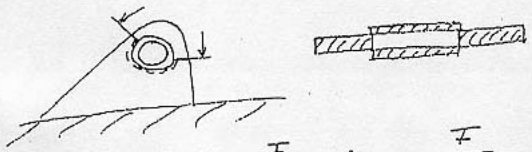
→ 100 to Belastung / Aufhängepunkt

Mindestquerschnitte für Augen:

Material: St 52-2

$R_{eH} = 355$ N/mm² ⇒ $k = 0{,}75$

$\sigma_{zul} = 123/k$ ⇒ 164 N/mm²



$\sigma = \frac{F}{A}$ $\quad A_{min} = \frac{F}{164}$

$$A_{min} = \frac{100 \text{ to}}{164 \text{ N/mm}^2} = 6.100 \text{ mm}^2$$

Enclosure 2.4.2.25

The German Group of Experts investigating the sinking of M/V "ESTONIA"

c/o AHLERS & VOGEL · Schaartor 1 D-20459 Hamburg · Telephone 49-40-37 85 88-0

Memo

Betr.: Besuch bei Kvaerner Ships Equipment AB, Göteborg und Durchsicht der alten von Tell AB Akten bezüglich "Diana II" und "Viking Sally"

Am 8. und 9.1. d.J. wurde die

Kvaerner Ships Equipment AB
Kämpegatan 3
S-41104 Göteborg
Tel. + 46 – 31 – 725 7900
Fax + 46 – 31 – 705 40 4062

besucht und mit tatkräftiger Unterstützung des Managing Directors Göran K. Johansson, des Sales Managers Dan Magnusson sowie des Consultants Per Fagerlund insgesamt 42 Ordner und Schnellhefter mit Konstruktionsunterlagen und Korrespondenz der Firma von Tell & Trading AB, Göteborg bezüglich "Diana II" und "Viking Sally" durchgesehen.

Zur Vorgeschichte wurde folgendes mitgeteilt:

- Kvaerner hat Ende der 80er Jahre den Aktenbestand mit Kundenkartei aus der Konkursmasse der von Tell & Trading AB gekauft, ohne die Firma selbst zu übernehmen, die als Name nach wie vor besteht und mit der Nummer von Kvaerner im Telefonbuch von Göteborg steht. Die Akten waren in 20-25 Kartons verpackt, die gesichtet wurden und der interessante Teil wurde in das Kvaerner Archiv direkt im Bürogebäude übernommen (ca. 20 lfd. Meter Aktenordner) während der Rest in Kartons in einem Schuppen eingelagert blieb, wo er sich nach wie vor befinden soll.

- Als die "Estonia" Katastrophe bekannt wurde, war Peter Rösholm MD in Göteborg (jetzt Kvaerner, Rostock) und veranlaßte
  (a) Schreiben an das Kommunikationsministerium vom 13.10.94 gemäß Anlage 1, welches mit Schreiben vom 9.2.95 beantwortet wurde (Anlage 2);
  (b) Durchsicht der "Diana II" und "Viking Sally" Akten und Information über deren Vorhandensein an der schwedischen Teil der Internationalen Kommission offenbar telefonisch;
  (c) Kalkulation der Verriegelungen des Visiers mit dem Ergebnis, daß die LCC - nach heutigem Standard – im unteren Bereich lag.

- Im 2. Halbjahr 1995 meldete sich Jan-Ove Carlsson – MD von MacGregor, Göteborg, und verlangte Akteneinsicht. Dieses wurde von Göran Johansson, der inzwischen Peter Rösholm als MD abgelöst hatte, zunächst abgelehnt und um Vorlage einer entsprechenden Vollmacht durch die Internationalen Kommission ersucht. Diese wurde kurz darauf durch Börje Stenström erteilt und J.O. Carlsson beschäftigte sich daraufhin 2 Tage mit den Akten und kopierte diverse, im einzelnen nicht bekannte Teile der Akten. Dafür waren Teile der Akten für mehrere Wochen außer Haus.

- Als nächstes meldete sich im Dezember 1996 Tuomo Karppinen, der anschließend in Begleitung von Klaus Rahka sowie eines weiteren Mitarbeiters der VTT, Helsinki, erschien und einen Tag mit den Akten verbrachte. Anschließend besuchten sie noch die

  GRIMMEREDS VERKSTADS AB

  in Göteborg, wo alle Komponenten der Verriegelungsysteme beider Schiffe, mit Ausnahme der von der Werft hergestellten Augen, angefertigt worden waren. Angeblich sollen sie da von einem langjährigen Mitarbeiter abgefertigt worden sein, nachdem sie ihre Theorie vorgetragen hatten, und mit hängenden Köpfen wieder abgezogen sein.

- Danach war wieder Ruhe bis sich im Vorfeld der Veröffentlichung des Berichtes der Internationalen Kommission mehrere Medienvertreter meldeten, denen jedoch Einsicht in die Akten verwehrt wurde.

Das Ergebnis der Aktendurchsicht durch den Unterzeichneten läßt sich folgendermaßen zusammenfassen (nur bezogen auf die Verriegelungen von Visier und Bugrampe):

1. "Diana II" – S 592 - 48611

1.1. Es sind alle Zeichnungen einschl. Detailzeichnungen vom Entwurf bis zur BV genehmigten Endfassung mit handschriftlichen Vermerken in rot (Original) vorhanden. Es wurden jedoch keine durch das Sjöfartsverket Rotterdam genehmigten Kopien gefunden. Dieses ist wahrscheinlich mit der bis zur "Estonia" Katastrophe durch Sjöfartsverket, wie auch F.B.N., verfolgten Philosophie zu erklären, nämlich daß alle strukturellen Komponenten Sache der Klasse seien. Dieses bezog sich jedoch offensichtlich nicht auf die Belastung der Hängedecks, über die noch weit nach Indienststellung der "Diana II" mit dem Sjöfartsverket korrespondiert wurde.

1.2. Es gibt einen Ordner mit handschriftlichen Berechnungen plus Tipstreifen für die Bereiche:
- Bug- und Heckrampenverriegelungen – keilförmige Bolzen (7 Seiten)
- Belastung Autodecks und Rampen (10 Seiten)
- Verschlußanordnung Maschinenraumluke (3 Seiten)
- Autodeck und Auffahrrampen (42 Seiten)
- Heckrampen
- Bugvisier – ohne Inhalt

1.3. In den insgesamt 3 Korrespondenzordnern, die vollständig zu sein scheinen, wurden u.a. folgende Bemerkungen gefunden:

- Besprechung 26.7.78: Visier soll mit 2 hydraulischen Bolzen verriegelt werden, Atlantiksicherung wird von der Werft gemacht.
- Besprechung 14.9.78: Bugrampe nach 11-44.21 als Kollisionsschott unter Berücksichtigung der rollenden Last.
  Bugvisier wie benachbarte Außenhaut gemäß 11.-44.22, also 1,75 ts.
- 19.10.78 mit BV-de Souza:
  Bugrampe muß spritzwasserdicht sein.
  Bugrampe = Kollisionsschott.
  Bugklappe: - Gummidichtungen müssen durch Schraubverbindungen befestigt werden;
  - Hydraulische Verriegelung plus Handverriegelung
- 20.10.78: Es waren für das Visier ursprünglich 4 manuelle Sicherungen vorgesehen, dieses wurde am 3.10.78 auf Vorschlag von Tell auf 2 reduziert und von der Werft akzeptiert.
- 15.12.78: Einsatz von Todsen abgestimmt.
- 22.12.78: BV hat uns darauf aufmerksam gemacht, daß die Löcher in der Schottwand (Frontschotten) für Verschlußanordnung abgedichtet werden müssen.
- 5.1.79: Kommentar zur Änderung des Visierscharniers.
- 9.1.79: Nach Rücksprache mit der Werft wollen Sie sich wegen der Farben für die Lampen der Verriegelungsanzeige nach den Vorschriften der schwedischen Behörden richten.
  Todsen weist daraufhin, daß im Falle einer Beschädigung der Gummipackungen des Visiers, die Endlagenschalter der Atlantiksicherung unter Wasser stehen und fragt: Sind sie wassergeschützt?
- 24.1.79: Die Reederei (Kure) besteht darauf, die Verriegelung des Visiers und die Atlantiksicherung zu trennen, d.h. 2 Steuerschieber.
- 29.1.79: Es sind nur noch die Beschläge Atlantiksicherung auf dem Zeichentisch und sollen alsbald bestellt werden.

- 5.2.79: Atlantiksicherung liegt noch auf dem Zeichentisch.
- 12.2.79: Endgültige Zeichnungen Atlantiksicherung 372 + 373 + Details abgeschickt.

2. "Viking Sally" – S 590 - 49111

2.1. Es sind Zeichnungen vorhanden, auch Detailzeichnungen mit Schweißnahtstärkenangaben, z.B. für Rampenhaken 5 mm, jedoch keine Originale mit den handschriftlichen BV-Eintragungen.

2.2. Aus den Bestell- bzw. Rechnungsordnern geht hervor, daß die Beschläge für Bugrampe und Visier gemäß Zeichnungen
49111 – 304 / 305
49111 – 360 / 361
49111 – 371 / 372 / 373
am 5.11.79 bei Grimmered bestellt und am 21.12.79 (Rechnungsdatum) geliefert wurden.
Anmerkung: Das bedeutet, daß die Komponente der Atlantik- und Seitenverriegelungen bereits fertig vor Ort waren, als sich die Diskussionen zwischen de Souza und von Tell AB über die Dimensionierung im März/April 1980 abspielten.

2.3. Der Korrespondenzordner, wie auch jedwede Kalkulationsordner, fehlen. Auch eine Durchsicht des Kvaerner Archivs führte zu keinem anderen Ergebnis. Kvaerner wird jedoch die Kartons im Schuppen gelegentlich durchsehen und sich melden, falls die Ordner auftauchen sollten.

3. <u>von Tell & Trading AB Angestellte</u>

Es ergibt sich aus den Unterlagen, daß es sich im Wesentlichen um folgende Personen gehandelt hat:

- Bo Bengtsson – Manager Design Office
- Bo Jonasson
- Alv Eriksson
- Herbert Brandt
- Tage Karlsson (TK)
- Sven Samuelsson
- Ernst Magnusson

Davon wurden vor Abreise des Unterzeichneten in Göteborg

Bo Jonasson (Gothenburg Port Authority)

Alv Eriksson (retired)

lokalisiert und werden in der kommenden Woche angesprochen. Der langjährige Mitarbeiter von Grimmered wurde ebenfalls lokalisiert, ist jedoch aufgrund einer Krebserkrankung nicht mehr ansprechbar. Die Fa. Grimmered bemüht sich jedoch herauszufinden, ob eine 2. Atlantiksicherung für "Viking Sally" geliefert wurde.

Hamburg, 11.1.98

Werner Hummel

Kvaerner Ships Equipment AB

Anlag 1

KOMMUNIKATIONSDEPARTEMENTET
103 33 STOCKHOLM

ATT: KOMMUNIKATIONSMINISTERN

PR/CAX 1994-10-13

SÄKERHET PÅ RO-RO FARTYG/FÄRJOR

Vi kontakter Er med anledning av den tragiska olyckan med M/S Estonia och den information som cirkulerar om tillsättande av en arbetsgrupp för att studera RoRo-fartygs säkerhet.

Kvaerner Ships Equipment AB konstruerar, säljer och utför service av fartygsutrustning såsom lastluckor, ramper, portar (bl.a. bogportar och bogvisir), hissbara bildäck, lastelevatorer etc.

Bolaget tillhör norska Kværner koncernen med aktiviteter inom skeppsbyggeri, rederiverksamhet, offshore, skogs- och mekanisk industri. Kværner är idag en av världens ledande fartygsbyggare - och störst i Europa.

Vi vill med detta brev visa vårt intresse för att deltaga som experter i arbetet med att skapa säkrare fartyg och fartygsdrift i framtiden.

Vårt bolags kunskaper inom området är unika och vi har samtidigt tillgång till kunskaper och erfarenheter från koncernens aktiviteter inom områdena skeppsbyggeri, fartygsdrift och offshore.

Vår utrustning sitter i flera färjor som opererar i Nordsjön, Engelska Kanalen och i Irländska Sjön där väderförhållandena kan vara hårdare än de vi upplever i Östersjön.

Hoppas Ni finner denna information intressant och vi ser fram emot att höra från Er.

Med vänliga hälsningar

KVAERNER SHIPS EQUIPMENT AB

Peter Rösholm
Verkställande Direktör

KVÆRNER

C:\MSOFFICE\WINWORD\PR\12-10KOM.B

Anlage 2

KOMMUNIKATIONSDEPARTEMENTET
Statsrådet och chefen

1995-02-09 K94/2638/2

Peter Rösholm
Kvaerner Ships Equipment AB
Kilsgatan 4
411 04 GÖTEBORG

Tack för Ditt brev kring säkerhet på Ro-Ro fartyg och färjor. M/S Estonias förlisning har förorsakat mänskliga tragedier. Det återstår mycket arbete för att klarlägga katastrofens orsaker.

Vi måste också medverka till att sjösäkerheten förbättras i framtiden. Regeringen har därför tillsatt en kommitté för att analysera möjligheterna att ytterligare utveckla säkerheten inom sjöfarten. Kommittén skall lämna förslag om hur det nationella och internationella sjösäkerhetsarbetet bör inriktas och bedrivas för att förbättra säkerheten främst i den sjöfart som berör Sverige. Kommittén skall utarbeta ett handlingsprogram för ökad sjösäkerhet med speciell inriktning på passagerartransporter med färjor och redovisa en samlad strategi för det svenska agerandet i Europeiska unionen, IMO och i det övriga internationella samarbetet.

Kommittén skall redovisa sitt arbete senast den 1 november 1995.

Med vänlig hälsning

Ines Uusmann

Jos. L. Meyer
Schiffswerft - Maschinenfabrik
2990 Papenburg 1
Postfach 1120

Terminplan

Blatt ..5a

Woche .24.

Termin Date	Verantwortlich Responsible	Abnahme Acceptance: Klasse Class.	Abnahme Acceptance: Bauaufs. Build. superv.	Auszuführende Arbeiten work to be carried out
Freitag, 13.6.	Bless RL, MB, EL, Sanea,		X	Ölgefeuerte Hilfskessel in Betrieb nehmen. Heizungsanlage in Betrieb Wärmeabgabe für Maschinenanlage sicherstellen.
	Wecke, SB, Schl.			Bugklappe betriebsbereit
	EL Bless			Maschinenraumreinigung
	Buhl, Schl.	FSS	X	Kontrolle aller Rettungsmittel (Schwimmwesten, Inseln, Rettungsringe Flöße)

Jos. L. Meyer
Schiffswerft - Maschinenfabrik
2990 Papenburg 1
Postfach 1120

Terminplan

Blatt ...7.
Woche ...25.

Termin Date	Verantwortlich Responsible	Abnahme Acceptance: Klasse Class.	Abnahme Acceptance: Bauaufs. Build. superv.	Auszuführende Arbeiten work to be carried out
Mittwoch, 18.6.1980	Bless MB RL EL Alfa-Laval	BV	x x	Brennstoffseparatoren in Betrieb Spülbetrieb Brennstoff für die Hauptmotore
	Buhl, EL, Ti Buhl, RL, EL, Schl.			Weckanlage betriebsbereit Scheibenwischer, Heizscheiben, Scheibenwaschanlage betriebsbereit
	Bless/Stal-Astra			Klimakompressoren in Betrieb
	Buhl, Eissing EL			Zentralantennenanlage in Betrieb
	Buhl, Elna, EL			Wechselsprechanlage in Betr.
	Buhl, Teleste EL			Musikanlage in Betrieb
	Bless, RL, EL, Hipress			Einregulieren Klimaanlage
Donnerst 19.6.1980	Bless MB RL			Auffüllen des Kühlwassersystems Hauptmotor
	Bless, KB, RL, EL, MB		x	Inbetriebnahme Anlaßluftkomp.
	Bless, Eissing MB, EL		x	Inbetriebnahme Ruderanlagen
	Wecke, v.Tell, Schl.	FSS	x	Funktionsprobe aller Hängedecks, Seitenpforten, Bug- und Heckrampen, Bugklappe

Jos. L. Meyer
Schiffswerft - Maschinenfabrik
2990 Papenburg 1
Postfach 1120

Terminplan

Blatt 9
Woche 26

Termin Date	Verantwortlich Responsible	Abnahme Acceptance: Klasse Class.	Abnahme Acceptance: Bauaufs. Build. superv.	Auszuführende Arbeiten work to be carried out
Montag, 23.6.80	Bless, MAN, RL, MB, EL			Kalte Funktionsproben Hauptmotore
	Abrams			Fahrterlaubnisschein SeeBG
"				nach Programm Herr Abrams
Dienstag, 24.6.	Bless/Abrams MB, MA, EL, RL	BV	x	Standprobe Hauptmotor
	Rosema, Bless Buhl			Schiffsreinigung Stellagen & Werkzeuge von Bord
Mittwoch 25.6.80	Abrams, Bless/Buhl	BV PSS	x	Schiffsüberführung nach Emden mit anschließender Probefahrt

Translation summary of correspondance between von Tell AB and the Finnish Board of Navigation regarding the ramp and visor installation in MV Viking Sally

Letter dated 1979-12-14 from von Tell AB to Sjöfartsstyrelsen, Helsingfors (the Finnish Board of Navigation)

Attn: The Ship Section

Subject: Approval of drawings, our ref no 4911.1

The Sally shipping company, Mariehamn, is building at Jos. L Meyer, Papenburg, a passenger and car ferry for traffic between Sweden and Finland. This ferry is to be built to Bureau Veritas and your approval.

We have got from the yard in Germany the contract to deliver elevating car decks, ramps for stern and bow, visor and side doors. Identical equipment was delivered to the sister vessel DIANA II that was build in 1979 by Meyer with approval by BV and the Swedish National Maritime Administration.

We would like to be informed about the details for which we should submit drawings for your approval.

We look forward with interest to your early reply.

With kind regards,

Letter dated 27.12.1979 from the Finnish Board of Navigation to von Tell AB, Gothenburg

Subject: Newbuilding at Jos. L Meyer

Regarding the bow and stern ramps, the side doors and the visor we assume that the drawings are examined by Bureau Veritas. Only in case the class is uncertain about how any detail in the Load line and SOLAS conventions is interpreted by the Finnish Administration should drawings be sent to this office.

In such case the problem should be clearly defined in order to facilitate dealing with it. The Board is lacking resources for routine examination of all the drawings required in a modern newbuilding.

Also regarding the elevating car decks do we accept the approval by class unless special questions arrise. If it is intended that it should be possible to lift and lower the decks in loaded condition, i.e. with cars, are the devices to be regarded as loading devices and must be approved by the Finnish Board of Labour Safety.

With kind regards,

handwritten remark by F.B.N. Ref. Co.S.
" "Supposedly it is regarding drawings concerning LL (Load Line) questions
As long as we stay within LL questions, matter can be dealt with by BV
when it comes to interpretations and/or exemptions, the approving authority is F.B.N.

Mölndal • Sweden   [illegible] -12 1979 KD.

von Tell AB

Vårt datum Our date	Vår referens/Our reference
1979-12-14	CB/IA
Ert datum Your date	Er referens/Your reference

Sjöfartsstyrelsen
Bergmansgatan 1
HELSINGFORS
Finland

M

Att.: Fartygssektionen

Betr.: Godkännande av ritningar
vår ref. nr 4911.1

Rederi AB Sally, Mariehamn bygger vid Jos. L Meyer, Papenburg en passagerar- och bilfärja för trafik mellan Sverige och Finland. Denna färja skall byggas till Bureau Veritas och Ert godkännande.

Vi har av varvet i Tyskland erhållit i uppdrag att leverera höj- och sänkbara bildäck, ramper i för och akter, visir och sidoportar. Samma utrustning levererade vi till systerfartyget DIANA II, som byggts 1979 hos Meyer med godkännande av B.V. och Svenska Sjöfartsverket.

Vi önskar veta på vilka detaljer vi skall översända ritningar för Ert godkännande.

Vi avvaktar med intresse Er snabba behandling och svar.

Med vänliga hälsningar

von TELL AB

Conny Bryfors

Conny Bryfors

1. Edelmann
2. Wiberg
(3. Hankainen)?
1979-12-20
OS.

Kyseessä lienee kai on LL-
kysymyksissä [illegible]
[illegible].
Vain kansi- [illegible] sel-
[illegible] LL- [illegible] osien [illegible] B
kin [illegible] j/tai
[illegible], [illegible] MKH.

Postal address:	Office address:	Phone:	Telex:	Telegram:	Bank:	Bank Giro No.
P.O. Box 472	Göteborgsvägen 97	031-87 05 00	20617 vontelle	telltrade	Skandinaviska Enskilda Banken,	501-3836
S-401 27 Göteborg 1	S-431 37 Mölndal				Göteborg	Post Giro No.
Sweden	Sweden					340945-4

SJÖFARTSSTYRELSEN

Helsingfors 27.12.1979

Nr KD 3965/79/301

L 1296

Hänvisning CB/IA

von Tell AB
PB 472
S-40127 Göteborg 1
Sverige

ARKISTO

Ärende Nybygge fos Jos.L.Meyer

Beträffande för-och akterramperna, sidoportarna och visiret förutsätter vi att ritningarna i första hand granskas av Bureau Veritas. Endast i det fall att klassen är osäker om hur någon punkt i lastlinje- eller SOLAS-konventionen tolkas av den finska administrationen, skall ritningar sändas till sjöfartsstyrelsen.
För snabb behandling bör i så fall problemet vara klart beskrivet. Sjöfartsstyrelsen saknar kapacitet för rutinmässig genomgång av allt det ritningsmaterial ett modärnt fartyg förutsätter.

Även beträffande de höj- och sänkbara bildäcken nöjer vi oss med att de godkänns av klassen om icke speciella problem uppstår. Om det dock är meningen att bildäcken skall kunna lyftas och sänkas i lastat tillstånd d.v.s. med bilar på, betraktas de som lastningsanordningar och skall godkännas av arbetarskyddsstyrelsen.

Med vänlig hälsning

Byråingenjör Gunnar Edelmann

GE/MS

MATERIALLISTE

Enclosure 2.4.2.28

POS	BENENNUNG	ANZ	SKIZZE	MATERIAL, TYP
1	VERSCHLUSSBOLZEN	1	49111-372/1	SIEHE DET.
2	STEUERGEHÄUSE FÜR VERSCHLUSSBOLZ.	1	-372/2	ROHR SIS 2172 (ST.52)
3	VERSCHLUSSROHR	1	-372/3	-"- -"- -"-
4	STEUERGEHÄUSE FÜR SICHERUNGSSTIFT	1	-372/4	SIS 1412 (ST 42)
5	SICHERUNGSSTIFT	1	-372/5	SIS 2172 (ST 52)
6	VERSCHRAUBUNG	1	-372/6	SIS 1412 (ST 42)
7	AUGENBOLZEN	1	-372/7	SIS 2172 (ST 52)
8	ACHSE	2	371/4	SIS 2172 (ST 52)
9	ACHSE	1	372/8	-"- 2321 W.NR. 1.4057
10	SCHEIBE	1		Ø 110/50 × 20 Fz.v.
11	-"-	2		Ø 80/51 × 5 Fz.v.
12	-"-	8		Ø 52/31 × 5 Fz.v.
13	TELLERFEDER	10		40 × 20,4 × 1 DIN 2093
14	STEUERSCHRAUBE	2		T6SS M10 × 35 Fz.v.
15	MUTTER	2		M6M M10 Fz.v.
16	"	1		M6M M48 × 5 Fz.v.
17	SEEGER RING	4		A 30 × 1,5 DIN 471 Fz.v.
18	SPLINT	2		SP 10 × 80 Fz.v.
19	SCHMIERNIPPEL	4		DIN 3404 AM 10 × 1 Fz.v.
20				

Diese Zeichnung und alle dazugehörigen Unterlagen sind bestimmt für Jos. L. Meyer. Sie dürfen ohne unsere Einwilligung weder kopiert noch Dritten zugängig gemacht werden. Eine widerrechtliche Benutzung wird gemäß geltendem Gesetz zur Anzeige gebracht.

20 NOV. 1979

SHIPYARD: JOS. L. MEYER PAPENBURG
OWNER:
SHIP: S 590 — DRAWN BY: T.K. — DATE: 79.10.03
CLASS: B.V. — SCALE: 1:10, 1:5

AUTOMATISCHE UND MANUELLE VERSCHLUSSANORDNUNGEN FÜR BUGKLAPPE

von Tell 49111-372

MATERIALLISTE

Enclosure 2.4.2.29

POS	BENENNUNG	ANZ	SKIZZE	MATERIAL, TYP
1	VERSCHLUSSBOLZEN	1	49111-373/1	SIEHE DET.
2	STEUERGEHÄUSE FÜR VERSCHL.-BOLZ.	1	-372/2	ROHR SIS 2172 (ST.5
3	VERSCHLUSSROHR	1	-373/2	-"- -"- -"-
4	STEUERGEHÄUSE FÜR SICHERUNGSSTIFT	1	-372/4	SIS 1412 (ST 42)
5	SICHERUNGSSTIFT	1	-372/5	SIS 2172 (ST 52)
6	VERSCHRAUBUNG	1	-372/6	SIS 1412 (ST 42)
7	ACHSE	2	-371/4	SIS 2321 W.NR. 1.40
8	SCHEIBE	8		Ø 52/31 × 5 Fz.v.
9	TELLERFEDER	10		40 × 20,4 × 1 DIN 20
10	STEUERSCHRAUBE	2		T6SS M10 × 35 Fz
11	MUTTER	2		M6M M10 Fz.
12	SEEGER RING	4		A 30 × 1,5 DIN 471
13	SCHMIERNIPPEL	4		DIN 3404 AM 10 × 1 F

60151-1

'Viking Sally'

20 NOV. 1979

SHIPYARD: JOS. L. MEYER PAPENBURG
OWNER:
SHIP: 590 — DRAWN BY: T.K. — DATE: 79.10.03
CLASS: B.V. — SCALE: 1:10, 1:5

ATLANTIKSICHERUNG (UND EINWEISER)

von Tell 49111-373

Bureau Veritas

Enclosure 2.4.2.30

INTERNATIONALE GESELLSCHAFT FÜR DIE KLASSIFIKATION VON SCHIFFEN UND LUFTFAHRZEUGEN SOWIE ABNAHME VON WERKSTOFFEN UND INDUSTRIEERZEUGNISSEN

BUREAU VERITAS-DZB Hopfenmarkt 33 D 2000 Hamburg 11

von Tell GmbH.
Sophienallee 24.
2000 Hamburg 19.

DEUTSCHES ZENTRALBÜRO
HOPFENMARKT 33
D 2000 HAMBURG 11

TELEFON 3 4 4 9 5 7-5 9
TELEGRAMME: BUVER HAMBURG
TELEX: 2 15 426 BUV D

COPIE

SECTION No. 35387.
Im Antwortschreiben bitte zu wiederholen

NR TB 10 02 S/ DS

Hamburg, den 2 July. 1980.

Betr.: Neubau 590 der Werft Jos. L. Meyer, Papenburg.

Ihr Schreiben vom 10. April 1980.

Sehr geehrte Herren,

Sie erhalten in der Anlage die nachstehend aufgeführten Unterlagen mit unserem Sicht - bzw. Genehmigungsvermerk versehen zurück.

Mit freundlichen Grüßen!

Bureau Veritas

Anlage:
49111 - 373 Atlantiksicherung
49111 - 372 Aut. u. man. Verschlüsse für Bugklappe.

Anzahl : je 2 "
Zu beachtende Bemerkungen: 1 - rot

cc mit Anlagen : BV Oldenburg

BANK: DEUTSCHE BANK A.G. HAMBURG, ZWEIGST. MATTENTWIETE, KTO. 37/09664 (BLZ 200 700 00)

Enclosure 2.4.2.31

M/S "VIKING-SALLY"

OPERATION INSTRUCTIONS
SPARE PARTS SPECIFICATION
HYDRAULIC CYLINDERS

von Tell

Operation instructions for hydraulic and mechanical installations on board passenger ferry, yard No 590, built at Jos. L. Meyer, Papenburg, 1980.

The hydraulic and mechanical arrangements are constructed by VON TELL under manufacturing No 4911.1.

For I - V in the operation instructions the position Nos in brackets ( ) correspond to the hydraulic scheme 49111-801.

For VI and VII in the operation instructions the position Nos in brackets (.) correspond to the hydraulic scheme 49111-802.

DRAWINGS

STERN RAMP, BOW VISOR AND BOW RAMP

49111-230, -260, -304, -330, -360, -361, -371, -372, -373

HANGING DECK, DRIVE-ON RAMPS

49111-101, -161, -162, -163, -164

PASSENGER BRIDGE, PASSENGER- AND PILOT DOORS

49111-761, -423, -426, -427, -428

HYDRAULIC

49111- 287, -387, -401, -785, -801, -802, -804, -805, -806, -821, -822, -823, -824, -825, -826, -827, -828, -830, -831, -871

+ all the hydraulic cylinders

+ 49111-502 Spare parts spec.

I. STERN RAMP (SB and PS)

1) Construction

Dimensions: L = 6500 mm
B = 5500 mm between the tracks

Weight: abt 11,5 tons

The fore-end part of the ramp is provided with 9 sloping flaps of 1,5 m length. Any sloping flap can be moved independent from the others in order to level the incline of the ramp to the quay in case of heeling of the ship (2 degrees max.). The ramp is pivoted to the ship with 4 hinges. The two outer hinges are pivoted with spherical bearings and the inner ones with bronze bushes. The axles are of stainless material.

The ramps are provided with fastenings for preventer stays.

2) Maintenance

All bearings without zerk fittings and sloping flaps must be lubricated with engine oil in space of about two weeks.

The cylinder bearing bolts are provided with zerk fittings type DIN 3404 AM 10 x 1. The lubricating point should be lubricated with seawater consistent grease under use of the grease gun in space of every four weeks.

The axles of the ramp bearings are equipped with "automatic" grease filler. The lifetime for these is 5-6 months. Control at regular intervals that the grease fillers are intact and have lubricant.

All piston-rods and cylinders should be covered during painting. Dry paint spirts upon the surface of the piston-rod would spoil the cylinder packings within short time, what means undesirable leakages.

Check all hoses, hose connections and pipe connections to prevent leakages. Damaged components should be replaced if necessary in order to avoid interruption.

The hose connections should be painted, but not the hydraulic hoses.

The rubber packings should be treated with Tellin or similar mixture containing graphite and tallow in order to reduce the wear of the rubber. When a defect rubber packing is going to be replaced the packing channel has to be sufficiently cleaned before the new packing is fitted with glue. von Tell UK 2 glue or glue of the same quality has to be used.

3) Load capacity

The ramp is constructed to carry an axle load of 18 tons at the distance between the axle of 1,3 m and the distance between the wheels of 2,0 m.

The star board ramp is provided with lugs for emergency operations, designed for normal load (axle load of 18 t).

4) Locking device

In closed position the ramp is locked by 3 wedges on each side and 2 hooks on the upper side. The wedges are operated by one hydraulic cylinder (11) on each side and each hook by one hydraulic cylinder (10).

The hooks on the upper side are first pressing the ramp into the rubber sealing frame and then the ramp is locked by the wedges.

The rubber packing is fixed with bolts.

The pressure reducing valves (32) (33) are reducing the pressure on the cleats, and the valves (28) and (29) are controlling the operating sequence of hooks and wedges.

5) Operation

For operation of the ramp, a hand-operated electric valve (17) is used which guides an operating valve (21) and a relief and by-pass valve (16). The operation itself of the ramp is carried out by two hydraulic cylinders (5) with spherical bearings. Two ice-breaking cylinders (8) assist the opening process. When the locking device of the ramp has been released the ice-breaking cylinders (8) are put under pressure to push the ramp outwardly. The ramp continues lowering by sole weight until it rests upon the quay. The control lever remains in lowering position all through the loading process in order to adjust the ramp inclining according to the actual depth of the quay. The lowering speed is adjustable by throttle non-return valves (40) at the cylinders (5). The throttles are to tune on parallel lowering of both sides. For closing the cylinder (5) is put under pressure and the ramp will close. Speed is adjusted by throttle valve (41). When the ramp is fully closed it is locked with hooks and wedges.

For the operation of the hydraulic cylinders for the hooks and the wedges a manual operating valve (24) is used. The speed is adjusted by the throttle valve (41).

The relief and by-pass valve (16) is reducing the pressure if the ramp is not correctly operated and one forgets to set the operating valve on "floating position", when the ramp rests upon the quay.

6) Control

Opening of the ramp

1) Start one of the pumps.

2) Close the ramp. The control lever will be in UPP position. (The pressure on the wedges is reduced.)

3) Open up the cleats. The control lever will be in position ÖPPNA until red lamp indicates ÖPPEN.

4) Lower the ramp. The control lever will be in position NER until the ramp is resting on the quay. The lever should remain on NER ("floating position") until the ramp will be closed.

5) Switch off the pump.

Closing of the ramp

1) Start one of the pumps.

2) Check that red lamp indicates ÖPPEN for the cleats. If not, open up the cleats.

3) Close the ramp. The control lever in position UPP until green lamp indicates UPPE.

4) Close the cleats. The control lever will be in position LÅSA until green lamp indicates LÅST.

5) Switch off the pump.

II. BOW VISOR

1) Construction

The visor has a weight of abt 54,5 tons and forms the W.T. front closure of the ship. The bow visor is pivoted at the upper deck. It opens in upward direction.

2) Maintenance

Under circumstances when temperature reaches 0° C or below check that the limit switches and other equipment on weather deck are not getting covered with ice. See also item I pos. 2).

3) Locking device (25)

In closed position the visor is locked by two locking pins which are operated by one hydraulic cylinder (12) each. As a reserve the visor can also be locked by two manually operated locking devices. There is also one hydraulic operated "atlantic locking device" (12).

In open position the bow visor is locked by 2 locking pins which are hydraulic operated with one hydraulic cylinder (12) each.

In closed position the rubber packing is compressed by the sole weight of the bow visor. The rubber packing is fixed with bolts.

4) Operation

For the operation of the bow visor a hand-operated electrical valve (pos 17) is used which is guiding an operating valve (19). An electrical blocking is built in to prevent faulty operation between bow visor and bow ramp.

The very operation of the visor is performed by two hydraulic cylinder (2) with spherical bearings. Two ice-breaking cylinders (8) assist the opening process when the visor starts opening. When the locking devices of the bow visor are released the ice-breaking- and operating cylinders are put under pressure and the visor will open. When the visor is fully opened it will be locked.

When lowering the bow visor the top of the cylinder will be put under pressure. In the bottom of the cylinder a valve (15) is fitted which is controlling the lowering when a pressure arises in the cylinder which is higher than the adjusting pressure of the valve. The lowering speed is adjustable by throttle non-return valves (39) and they should also bo so adjusted that the cylinders get the same timing.

5) Control

Opening of the bow visor

1) Start both of the pumps.

2) Open the atlantic locking device and the cleats. Put the control levers (one by one) in position ÖPPNA until red lamp indicates ÖPPEN.

If the manual locking device has been used this has to be opened.

3) Check that the lamp for the locking devices indicates ÖPPEN. If not, open up the locking devices which are locked.

4) Open the bow visor. The control lever will be in position UPP until green lamp indicates UPPE.

5) Close the locking device. The control lever will be in position LÅSA until green lamp indicates LÅST.

6) Lower the bow visor and let it rest on the locking device in order to release the hydraulic pressure in the operating cylinder.

7) Switch off the pumps.

Closing of the bow visor

(Check that the bow ramp is closed and locked.)

1) Start the pumps.

2) Check that red lamp indicates ÖPPEN for cleats and the atlantic locking device. If not, open up the cleats and the atlantic locking device.

3) Open up the bow visor. (The load on the locking device is released.)

4) Open up the locking device. Put the control lever on ÖPPNA until red lamp indicates ÖPPEN.

5) Close the bow visor. The control lever will be in position NER until green lamp indicates NERE.

6) Lock the cleats. The control lever will be in position LÅSA until green lamp indicates LÅST.

7) If the atlantic locking device is going to be used this should also be locked.

8) Switch off the pumps.

III. BOW RAMP

1) Construction

Dimensions: L = 8225 mm
B = 5500 mm between the tracks

Weight: abt 12,1 tons

The fore-end part of the ramp is provided with 8 sloping flaps, which automaticly extend when the ramp is opening. Each sloping flap is working independently from the others in order to compensate for the heeling of the ship (2 degrees max.)

The ramp is pivoted to the ship with 4 hinges. The two outer hinges are provided with spherical bearings and the two inner with bronze bushes. The axles are of stainless steel.

The ramp is equipped with fastenings for preventer stays.

2) Maintenance

See item I. pos. 2).

3) Load capacity

See item I. pos. 4).

4) Locking device

The side cleats consists of 2 hydraulic operated locking pins on each side of the ramp in contrast to the stern ramp which has hydraulic operated wedges. See also the stern ramp (item I).

5) Operation

On the bow ramp an electrical blocking is built in which is preventing faulty operation between bow visor and bow ramp. The bow ramp has no ice-breaking cylinders similar to the stern ramp. In other respects see the stern ramp (item I).

Note: The bow ramp must not be operated until the bow visor is fully opened and in locked position.

6) Control

See item I pos. 6).

IV. HANGING DECK

1) Construction

The hanging decks are constructed for the transport of passenger cars. They are laid out as installation of raisable car decks. The area of decks consists of all together 8 sections, L = 6 x 20 m + 2 x 18,4 m. The sections at port are B = 5,5 m - those at star board B = 8,5 m. At star board side the lowered decks rest upon consols fixed to the ship. At the port side there are fixed supports to the ship side and towards the centre line of the ship hanging standers (folding standers) which can be folded. Lateral guide rollers prevent the decks to be bent out of line when manoeuvering to stowed position under C-deck.

On port side hanging deck there are hand rails mounted between the folding standers. These are automaticly folded together with the hanging standers when the deck is lifted up to stowed position.

2) See item I. pos. 2).

3) Load capacity

The decks can be loaded with vehicles with the max. load from each wheel of 400 kg, and be stowed close by close. The axle load of the single axle amount to maximum 800 kg. The star board side has the capacity of 4 lines of vehicles and the port side 2 lines.

4) Locking device (25)

In stowed position the hanging decks rest underneath the C-deck where they are locked by means of hooks which are hydraulic operated by hydraulic cylinders (14).

5) Operation (22)

Each section is suspended to four steel wire-ropes which are fixed to the C-deck. They are led over guide rollers to a hydraulic tackle-block in the hanging deck.

Each deck is furnished with a separate control stand with control valves. Over a control valve the deck can be lifted or lowered. The lifting speed and the opening- and closing speed for the locking hooks are adjustable by the installed throttle (41) at the control stand, while the lowering speed is to be adjusted by the throttle (40) at the cylinder (4) on star board and (7) on port side.

6) Control

Lifting of the hanging deck

1) Start one of the pumps (two pumps on P.S.).

2) Check that the red lamp indicates ÖPPEN for the locking device. If not, open up the locking device.

3) Lift the hanging deck to the stop. The control lever in position UPP.

4) Lock the locking device. The control lever will be in position LÅSA, until a green lamp indicates LÅST.

5) Lower the hanging deck to the locking arrangement in order to release the wires.

6) Switch off the pump.

Lowering of the hanging deck

1) Start one of the pumps.

2) Lift the hanging deck to the stop. The control lever in position UPP.

3) Open up the locking device. The control lever will be in position ÖPPNA until the red lamp indicates ÖPPEN.

4) Lower the hanging deck down to the consols. The control lever in position NER.

5) Switch off the pump.

V. DRIVE-ON RAMPS

1) Construction

The end parts of the hanging decks are equipped with drive-on ramps of length 19,8 m each. In horizontal position the decks are supported by folding supports and folding standers which are automaticly folded when the ramps are stowed underneath the C-deck. The supports are manually operated. When the ramp shall be brought into drive-on position from horizontal position the folding standers have to be unshackled. Folding supports for the horizontal position of the ramp are folded away and supports for the lowered position are folded out.

The folding stander for the drive-on position of the port side ramps will always be connected. It is placed on about half the length of the ramp towards the centre line of the ship and is folding in the longitudinal direction.

2) Maintenance

See item I. pos. 2).

3) Load capacity

The decks can be loaded with vehicles with the max. load from each wheel of 400 kg, and be stowed close by close. The axle load of the single axle amount to max. 800 kg. The star board side has the capacity of 4 lines, and the port side 2 lines of vehicles.

The fully loaded ramps can be hydraulic lifted from drive-on position to horizontal position, where it is locked by folding standers and folding supports.

4) Locking device

See item IV. pos. 4).

5) Operation

For the lifting of the ramp from drive-on position to the horizontal position four points of suspensions are used. The points are connected 2 + 2 with wires, which are guided over a "sledge". The sledge is connected with wires to a hydraulic tackle-block which is placed at the side shell of the ship.

When the ramp is lifted from the horizontal to the stowed position underneath the C-deck the four lifting points mentioned above are used plus 2 more stations at the pivotting end of the ramp.

The control station consists of 3 operation valves:

1 for lifting the loaded ramp from drive-on position to the horizontal position, valve I (22),

1 for lifting the ramp from horizontal position to the stowed position, underneath the C-deck, valve II (22),

1 for the locking of the deck in stowed position (25).

A hydraulic limit switch stops the hydraulic oil to the operation cylinder, whən the ramp reaches the horizontal position.

The lifting speed is adjusted by the valve (42) on S.B. (for P.S. it is full pump flow) and the opening- and closing speed of the locking arrangement by valve (41) at the control station. The lowering speed of the ramp is adjusted by a valve (40), which is placed at the bottom of the cylinder (1) S.B. and (3) P.S.

A relief valve (30) is built in in order to reduce the pressure, when the ramp is lifted up against the C-deck.

6) Control

The lifting of the drive-on ramp from the drive-on position to the horizontal position (star board ramp).

1) Start one of the pumps (two pumps on P.S.).

2) Check that the folding supports for the horizontal position are free.

3) Lift the ramp to the horizontal position. The control leverIin position UPP.

4) Connect the folding standers and extend the supports.

5) Lower the ramp so that it rests upon the folding standers and the supports. This will release the wires.

6) Switch off the pump.

Lowering

1) Start one of the pumps.

2) Extend the supports for the inclined position of the ramp.

3) Lift the ramp so that the folding standers and the supports will be free. The control lever I in position UP.

4) Release the folding standers and the supports.

5) Lower the ramp. The control lever I will be in position NER.

6) Switch off the pump.

Lifting of the ramp from the horizontal position to the stowed position.-

1) Start one of the pumps (two pumps on P.S.).

2) Fell the hand rails all way round the ramp.

3) Check that the folding standers are connected.

4) Check that the lamp for the locking arrangement indicates ÖPPEN. If not, open up the locking device.

5) Lift the ramp towards the stops. The control lever II in position UPP.

6) Lock the locking arrangement. Put the control lever in position LÅSA until the green lamp indicates LÅST.

7) Lower the ramp on the locking arrangement. This will release the wires. The control lever II will be in position NER.

8) Switch off the pump.

Lowering

1) Start one of the pumps.

2) Extend the supports for the horizontal position of the ramp.

3) Lift the ramp. The control lever II in position UPP.

4) Open up the locking arrangement. Put the control lever in position ÖPPNA, until red lamp indicates ÖPPEN.

5) Lower the ramp so that it is resting on the supports and folding standers. The control lever II in position NED.

6) Rise the hand rails all round the ramp.

7) Switch off the pump.

For the port side ramp the same operation will take part but this ramp has no folding supports in the inclined position.

VI. PASSENGER BRIDGE

1) Construction

For passenger traffic between the trunk in centre line and the port side hanging deck there are 2 passenger bridges. The bridges are designed by the yard and have the dimensions L X B = abt 6,2 x 1,2 m.

2) Maintenance

See item I. pos. 2).

3) Locking device (7)

The locking of the passenger bridge in lifted position toward the C-deck is arranged by locking devices at both ends. These are hydraulic operated (3).

4) Operation (11)

The lifting operation is arranged by wires, which are connected to a hydraulic tackle-block underneath the C-deck.

The lifting speed is controlled by the valve (9) and the opening- and closing speed of the locking arrangement by the valve (8). For the lowering speed there is a valve (9) which is situated at the bottom of the cylinder (5).

The pressure is reduced for the lifting cylinder by the valve (12).

5) Control

Lifting and lowering (one pump only)

See hanging deck IV, pos. 6)

I. PASSENGER- AND PILOT DOORS

1) Construction

The doors are installed on port side and star board side according to the following numbers and dimensions:

Passenger doors	4 pcs	2,5 x 2,0 m
Pilot doors	2 "	1,2 x 2,0 m

The passenger doors are opened in the aft directions and parallel to the ship side. The pilot doors are opened 90 degrees towards the centre line of the ship.

2) Maintenance

See item I, pos. 2).

3) Locking device (6)

The doors are locked to the ship by wedges, which are compressing the rubber packing in order to give a suitable sealing. The wedges are hydraulic operated (4).

4) Operation (6)

The passenger doors are operated by a hydraulic cylinder(1) and a link system, so that the doors will open parallel to the ship side.

The pilot doors are operated by a hydraulic cylinder (2), which gives the opening direction 90 degrees towards the centre line of the ship.

5) Control

Opening of the doors

1) Start the pump.

2) Release the security for the locking device.

3) Open the locking device. The control lever in position ÖPPNA, until red lamp is indicating ÖPPEN.

4) Open the doors. The control lever in position ÖPPNA.

5) Secure the door.

6) Switch off the pump.

Closing of the doors

1) Start the pump.

2) Check that the red lamp for the locking device indicates ÖPPEN. If not, open the locking device.

3) Release the security for the door.

4) Close the door. The control lever in position STÄNGA.

5) Lock the locking device. The control lever will be on LÅSA until green lamp is indicating LÅST.

6) Secure the locking device.

7) Switch off the pump.

PUMPSTATIONS

There are 3 pumpstations, 2 big ones and 1 small one. The working pressure for the big ones is about 250 bar and for the small one about 150 bar.

1 big pumpstation is placed in the stern part on star board side and is serving the port side stern ramp, the port side drive-on ramps, the port side hanging decks. Drawing No 49111-804,

1 big pump station in the fore part on port side is serving the bow visor, the bow ramp, the star board stern ramp, the drive-on ramps on star board and the star board hanging decks. Drawing No 49111-805.

1 small pumpstation placed in the midship trunk is serving 2 pilot doors, 4 passenger doors and 2 passenger bridges on port side. Drawing No 49111-806.

The big pumpstations consist of 1 oil tank each containing 900 ltrs. The tanks should be filled up to the maximum level only, to be able to receive oil from the other system by emergency operation.

In the pumpstation there are 3 pumps. Normally when the system is operating only two pumps, sometimes only one, should be in service. If the system is served by two pumps instead of one, this will make no difference in capacity as volume limiting valves will protect the hydraulic components. The only disadvantage is that the oil will be warm quicker.

All the pumps should be regularly changed so that all pumps will be frequently used in service. The third pump should be used as a reserve if one of the other pumps is out of order.

The hydraulic system is connected parallally and the pumps are pressure compensated axial piston pumps which deliver only that quantity of oil requiring on every occasion. Required quantity at every user is adjusted with throttle valves. The max. working pressure of the pumpstation is adjusted on the valve (17); this valve is adjusted at delivery and must afterwards not be altered. The valve (18) is a safety valve which is normally not in function but only comes into effect when the pressure exceeds the valid max. working pressure.

The pumpstation is equipped with a level control unit which protects the pumps from breaking down, if the oil reaches a level which is too low.

At the aft pumpstation there is a hydraulic lift connected.

For position No. in brackets ( ) see drawings Nos 49111-804, -805.

The small pumpstation consists of 2 pumps and an oil tank containing 150 ltrs. Normally when the system is operating one pump is working and the other is used as a reserve.

The hydraulic system is connected parallelly. In order to reduce the pressure in the system, when no item is to be served, a hydraulic relief valve (11) will make the oil circulate to the tank. To stop the valve from opening and closing too frequently an accumulator (17) is connected. To reduce the pressure completely, for instance when repairing, a shut-off valve (17) will be opened.

For position No. in brackets ( ) see drwg No 49111-806.

For the service and maintenance of the accumulators see the recommendations from the manufacturer.

Hydraulic oil

Check the oil level of the tank in regular intervals.

Check also the oil cleaner in regular intervals to protect from interruption of the service. Dismantle the filter to check that the filter is intact.

Check the oil in regular intervals and change it according to the recommendations from the oil supplier.

Use NYNÄS TD-17 HVX (Visga 22).

Oil from different manufacturers may not be mixed.

When the filter has to be changed, it is of great importance to be careful when refilling or repairing the system in order to prevent dirt in the hydraulic system.

Emergency, "cross-over", for the big pump stations only

If a pumpstation is put out of operation the other pumpstation can be connected. The two shut-off valves (Avstängningsventiler för "Cross-over körning", orange coloured) of the pumpstation which do not work will then be switched off. Then the "cross-over" between the two hydraulic systems will be opened by the two shut-off valves (Huvudventiler för "Cross-over körning", orange coloured) which are situated in the aft pumpstation, drwg No, 49111-804. The operating time will be slightly longer, if the pumpstation aft is used to serve the forward system. This is valid for the bow visor and drive-on ramps on S.B.
Check the oil level in the tank carefully. Before the pumpstation which broke down, is going to be used again, the items which wereserved before the breaking down, should be in the same positions again in order to put the oil levels of the tanks back to normal. Before going back to normal service don't forget to reset all the shut-off valves for the "cross-over".

von Tell

19:19

SPARE PARTS

When ordering spare parts the following data must be specified:

1) The name of the ship: M/S "VIKING-SALLY"
2) Yard and newbuilding No.: Jos. L. Meyer, Papenburg, No. 590
3) Number, symbol and drawing No.
4) Delivery address.
5) Delivery time.

von Tell GmbH
Sophienallee 24
D-2000 HAMBURG 19
West Germany

Tel.: 040/493755
Telex: 02 14277 erokg d
Telegram: Erottmann Hmb

Scandinavia

von Tell AB
Box 472
S-401 27 GÖTEBORG
Sweden

Tel.: 031/870500
Telex: 20617 vontell s
Telegram: Telltrade

Great Britain

von Tell (U.K.) Co Ltd
Aldwych House
Aldwych
LONDON WC2B 4EL
England

Tel.: 01-404-0755
Telex: 8952161 ajcouk g
Telegram: Agenticum London

Benelux

von Tell B.V.
Postbus 30061
3001 DA ROTTERDAM
Holland

Tel.: 010/126267
Telex: 21565 tbg nl
Telegram: Grenhuis

Bureau Veritas

Marine Departments

Register no: 35P387

REQUEST FOR CLASSIFICATION

The undersigned builder Jos. L. Meyer (1), requests BUREAU VERITAS to proceed with the operations required by their Rules for the purpose of obtaining the classification (2) under special survey of the hull and of the propelling machinery of the ship (3) newbuilding S 590

Class contemplated (4):

Classification symbols: I 3/3 E

Construction survey mark and Service notation(s): ✠ passenger ferry

Navigation notation(s): deep sea

Additional mark(s):

Special marks: Ice Class I A

(AUT)

Demande de surveillance reçue

Type and Service: Passenger- and car ferry

Flag: Finish

District where built: Hamburg - sub-district Oldenburg

In making this request the undersigned agrees to comply with the requirements of the Rules of BUREAU VERITAS and in particular of the General Conditions given hereunder.

~~in Papenburg~~ on September 27, 1979

Jos. L. Meyer

GENERAL CONDITIONS OF BUREAU VERITAS

Article I. – Bureau Veritas is a Society established for the purpose of undertaking the Classification of Ships and Aircrafts of all categories, the inspection of Materials and equipment as well as supervision and survey reports of construction of Buildings and General Civil Engineering.

Bureau Veritas publishes Construction Regulations and Classification Registers, and issues Certificates, Attestations, Reports or similar Documents which result from its interventions.

Article II. – Requests for interventions shall, as a rule, be submitted in writing. They entail, for the requesting party, the obligation to comply with the Regulations published by Bureau Veritas, as such regulations may exist, except for agreements covering specific cases, and the acceptance without reservation, of the present General Conditions and of any special conditions which may be attached thereto.

Bureau Veritas alone is qualified to apply and to interpret its own Regulations.

Any reference to these Regulations connected with their application is strictly forbidden if it does not follow the intervention of Bureau Veritas which is necessary and obligatory.

Article III – Bureau Veritas does not act as Underwriter, Consulting Engineer, Architect or Naval Architect, nor as Builder or Contractor, and cannot assume the responsibilities inherent to such functions even though the experience of the Society enables it to answer enquiries concerning matters not covered by its own Regulations. Also it cannot act in substitution for Constructional or Engineering Works or Contractors who retain their full responsibility whatever its nature may be notwithstanding the intervention of Bureau Veritas, nor can the Society act in lieu of the competent National Authorities, even where legal texts make reference by name or not to Bureau Veritas.

The interventions of Bureau Veritas, carried out either in accordance with its own Regulations or according to standards, specifications or similar documents expressly called for, or alternatively the opinions of the Society as expressed by the symbols or marks of Classification, Certificates, Attestations, Reports or similar documents, shall not in any case engage the responsibility of the Society.

Although the utmost care is taken in the drafting of Bureau Veritas publications, particularly in respect to the Register, the Society declines any responsibility for errors or omissions which may be found therein, or in the Certificates, Attestations, or Reports drawn up by its Services or by its Surveyors, and which may be made the subject of observations by the parties concerned. Furthermore, Bureau Veritas declines any responsibility for errors of judgement, mistakes or negligence which may be committed by its technical or administrative staff or by its Agents, in the preparation of such documents and in the performance of the interventions which they cover, nor shall the responsibility of the staff be involved.

Article IV. – Any intervention by representatives of Bureau Veritas whatever may be its nature, and whether it is completed or incomplete for any cause whatsoever, shall entail the payment of fees in accordance with the importance of the services rendered, and the reimbursement of expenses incurred.

The attribution or maintenance of Classification marks, the entry in the Registers, the issuance of Certificates, Attestations and Reports or similar documents, entail the acceptance of the corresponding invoices.

Article V – Should a technical disagreement arise between the requesting party and the Representative of Bureau Veritas the Administration may, at the request of the interested party, designate another of its Experts.

Article VI – All disputes shall come under the exclusive jurisdiction of the Paris Courts, including the case of an appeal under a guarantee or of forced intervention also in the case of a plurality of defendants.

(1) Builder or owner.
(2) Under special survey, under ordinary survey or after construction.
(3) Name of ship or yard number.
(4) See Chapter 1 of Rules. Select Marks and notations from current Rules edition.

[illegible]

DESCRIPTION OF THE SHIP (1)

Hull No. or Ship's Name: S 590 | Flag: SF

Owner's Name: A-B SALLY, MARIEHAM, FINLAND.

Shipyard's Name: Jos. L. Meyer

Schedule (1) Keel laying: | Launching: 3 – 80 | Delivery: 6 – 80

HULL

Length (BP): 137,4 m | Breadth (M): 24,20 m | Depth (M): 7,65 m | Draught: 5,55 m

Gross tonnage (approx.): | Deadweight (MT or LT):

Type of Ship: Passenger- and car ferry | Material hull: steel

PROPULSION MACHINERY

No., Type, Model and Licence: 4 x, 8 L 40/45, je 4400 kW | built by: MAN, Augsburg

No., Type, Model and Licence: | built by:

Total power: 17.600 KW (23936 BHP) at 600/188,5 rpm

Number of tailshafts: 2

AUXILIARY MACHINERIES

No., Type, Model and Licence: 4 x, 6 S 28 LH, je 1104 kW | built by: B + W, Holeby/DK

No., Type, Model and Licence: | built by:

No., Type, Model and Licence: | built by:

Total power: 4416 KW (6000 BHP) at 750 rpm

ELECTRIC INSTALLATION

No. and Type of Generator: | KW or KVA Total:

BOILER

Main, No.: | Type:

Pressure (bar): | Heating Surface (m²): | Steam Production (t/h):

Auxiliary, No.: | Type: Thermalöl- Kesselanlage 2 x ölgef. je 2.800 Mcal/h

Auxiliary, No.: | Type: 4 x Abgaskessel je 1.100 Mcal/h

Pressure (bar): | Heating Surface (m²): | Steam Production (t/h):

RMC:

AUT: (AUT)

Certificates to be issued by the Society (on behalf of National Authorities):

Loadline: ☐ ☒ Other:

Statutory: Safety Construction | Safety Equipment | Safety Radio | Other:

Tonnage: National | Suez canal | Panama canal

Cargo Gear documents: ____ x ____ t, ____ x ____ t.

please fill in this "minimum information required" for data processing

BUREAU VERITAS Enclosure 2.4.3.33

INTERNATIONAL REGISTER FOR THE CLASSIFICATION OF SHIPPING AND AIRCRAFT

APPLICATION FOR AN INTERNATIONAL FREEBOARD CERTIFICATE OR FOR AN INTERNATIONAL LOAD LINE EXEMPTION CERTIFICATE WITHIN THE SCOPE OF THE INTERNATIONAL CONVENTION ON LOAD LINES, 1966

The undersigned, ~~owner~~ / builder (1) of the vessel described below, hereby applies to the Administration of BUREAU VERITAS for an international freeboard / ~~load line exemption~~ certificate ~~with~~ / without (1) the special marks for the stowage of timber deck cargo :

Name of ship / Hull No (1) : S. 590 "Viking Sally"

~~owned by~~ / being built for (1) : Rederi A.B. Sally, Mariehamn, Finland

Port of Registry : Mariehamn, Finland

Classification { class symbols : I 3/3 + ; Marks and notations : Deep Sea Ice A }

Length (L) measured in compliance with Article 2 (8) : 132.13 m

Type of ship (1) : type A, type B, type B with reduced freeboard, type B with incrased freeboard.

The Certificate is to be set up in compliance with Attachment 1 or with Article 6 of the International Convention on Load Lines, 1966.

The documents listed overleaf are appended to the present application.

The undersigned undertakes to comply with the « General Conditions of BUREAU VERITAS » as quoted below.

Place, date and signature :

Papenburg, 21st April 1980
Jos. L. Meyer
i.V. [signature]

Section No. : 35387

GENERAL CONDITIONS OF BUREAU VERITAS.

ARTICLE I. — Bureau Veritas is a Society established for the purpose of undertaking the Classification of Ships an Aircrafts of all categories, the inspection of Materials and equipment as well as supervision and survey reports of construction of Buildings and General Civil Engineering.

Bureau Veritas publishes Construction Regulations and Classification Registers, and issues Certificates, Attestations, Reports or similar Documents which result from its interventions.

ARTICLE II. — Requests for interventions shall, as a rule, be submitted in writing. They entail, for the requesting party, the obligation to comply with the Regulations published by Bureau Veritas, as such regulations may exist, except for agreements covering specific cases, and the acceptance without reservation, of the present General Conditions and of any special conditions which may be attached thereto.

Bureau Veritas alone is qualified to apply and to interpret its own Regulations.

Any reference to these Regulations connected with their application is strictly forbidden if it does not imply the intervention of Bureau Veritas, which is necessary and obligatory.

ARTICLE III. — Bureau Veritas does not act as Underwriter, Consulting Engineer, Architect or Naval Architect, nor as Builder or Contractor, and cannot assume the responsibilities inherent to such functions, even though the experience of the Society enables it to answer enquiries concerning matters not covered by its own Regulations. Also it cannot act in substitution for Constructional or Engineering Works or Contractors, who retain their full responsibility, whatever its nature may be, notwithstanding the intervention of Bureau Veritas, nor can the Society act in lieu of the competent National Authorities, even where legal texts make reference by name or not, to Bureau Veritas.

The interventions of Bureau Veritas, carried out either in accordance with its own Regulations or according to standars, specifications or similar documents explicitly called for, or alternatively, the opinions of the Society as expressed by the symbols or marks of Classification, Certificates, Attestations, Reports or similar documents, shall not in any case, involve the responsibility of the Society.

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ARTICLE IV. — Any intervention by representatives of Bureau Veritas whatever may be its nature, and whether it is completed or incomplete for any cause whatsoever, shall entail the payment of fees in accordance with the importance of the sevices rendered, and the reimbursement of expenses incurred.

The attribution or maintenance of Classification marks, the entry in the Registers, the issuance of Certificates, Attestations and Reports or similar documents, entail the acceptance of the corresponding invoices.

ARTICLE V. — Should a technical disagreement arise between the requesting party and the Representative of Bureau Veritas the Administration may, at the request of the interested party, designate another of its Experts.

ARTICLE VI. — All disputes shall come under the exclusive juridiction of the Paris Courts, including the case of an appeal under a guarantee, or of forced intervention also in the case of a plurality of defendants.

(1) delete where not applicable.

Mod Ad. E 542 a - 5000-3-74

N° 2/2

APPENDED DOCUMENTS (2)

1-fold	Freeboard-Report	
6-fold	Draw.	02/2
6-fold	Draw.	02/3
6-fold	Draw.	02/6
6-fold	Draw.	02/19
6-fold	Draw.	61/1
6-fold	Draw.	61/3

(2) For a newbuilding, a drawing is to be appended to the present application showing the principal dimensions of the ship as well as the basic data needed for the calculation of the preliminary freeboard. Additional information may be obtained trough BUREAU VERITAS Surveyors regarding this drawing.

For a type A ship or for a type B ship with reduced freeboard, a special questionnaire entitled « Data required for the study of subdivision and stability after damage » is to be appended to the present application. The questionnaire may be obtained through BUREAU VERITAS Surveyors.

Where a ship is to carry special marks for timber deck cargo, a drawing showing the stowage arrangements for the timber deck cargo is to be further appended to the present application.

BV - Rules 1977

in force 1980

Enclosure 2.4.3.34

16 - It is recommended to protect side doors against shocks which can result of cargo mistowage (for instance by use of a net or cables). To be efficient, protection devices re to be at so me distance of the door.

2 - Bow and stern doors

21 - When the ship is equipped with a bow door, to allow access to garage, the collision bulkhead must have a removable part. This design is acceptable only above freeboard deck and only if the removable part has a water-tightness and a strength equivalent to these of fixed rule bulkhead.

A movable access ramp may be used for this purpose.

22 - Scantlings of plating and stiffeners of a bow door are to be equivalent to those of adjacent shell structure.

23 - Thickness of a stern door plating is not to be less than:

$$e = 4{,}75E\sqrt{h}$$

Section modulus of stiffeners is not to be less than:

$$w = 7{,}7hE\ell^2$$

where value of h is calculated in 11-42.25.

24 - If stern door is used as access ramp for vehicles, it has also to be checked that scantlings of plating and stiffeners comply with rules of 11-43.

3 - Securing of doors

31 - Doors and screen-doors have to be firmly secured by use of cleats conveniently spaced or other similar devices.

Particularly, it has to be provided one of these devices at each corner of opening.

Structure reinforcements have to be realised on door and adjacent shell plating to attached points of cleats, hinges, jacks, etc.

32 - If door opens to inside of ship, securing devices have to be scantled in way to resist at a load height, in metres, equal to value calculated in 11-42.2.

35P387 DRAWINGS LIST

DRWG N°	HULL N°	DRWG DATE	TITLE	REVIEW	DATE	LOCATION	
02 1	590	28.05.1980	GENERAL ARRANGEMENT				MEYER
49 111 201	590	28.09.1979	HECKRAMPE B.B.	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 202	590	01.10.1979	HECKRAMPE ST.B. (MIT NOTBETATIGUNGSAUGE)	APPROUVE	01.10.1979	HAMBOURG	VON TELL
49 111 203	590	28.09.1979	DETAILS FUR HECKRAMPE ST.B. U BB	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 204	590	04.10.1979	DETAILS FUR HECKRAMPE (VON TELL LIEFERUNG WO NICHTS ANDERS GESAGT	APPROUVE	04.10.1979	HAMBOURG	VON TELL
49 111 230	590	03.10.1979	HECKRAMPEN ZUSAMMENSTELLUNG	VU	05.11.1979	HAMBOURG	VON TELL
49 111 260	590	27.09.1979	HYDRAULISCHE VERSCHLUSSANORDNUNG HECKRAMPE ST	VU	05.11.1979	HAMBOURG	VON TELL
49 111 413	590	09.10.1979	SHELL PORT FOR PILOT	APPROUVE	06.11.1979	HAMBOURG	VON TELL
49 111 428	590	30.11.1978	ERECTION OF PILOT PORT WITH HYDR JACK	VU	05.11.1979	HAMBOURG	VON TELL
49 111 427	590	23.11.1978	HYDR. SECURING CLEAT ARR. FOR PILOT SHELL PORT	VU	08.11.1979	HAMBOURG	VON TELL
49 111 412	590	28.08.1979	SHELL PORT FOR PASENGER	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 420	590	30.09.1979	ARR. OF HYDRAULIC SECURING CLEAT FOR PASSENGER SHELL PORT	VU	05.11.1979	HAMBOURG	VON TELL
32 84 1	590	29.08.1978	HAKEN	VU	05.11.1979	HAMBOURG	VON TELL
1321	590	11.09.1979	DOPPELBODEN SPT.23-32	APPROUVE	06.11.1979	HAMBOURG	MEYER
1322	590	11.09.1979	DOPPELBODEN SPT.33-43	APPROUVE	07.11.1979	HAMBOURG	MEYER
1323	590	11.09.1979	DOPPELBODEN SPT.43-53	APPROUVE	06.11.1979	HAMBOURG	MEYER
1331	590	11.09.1979	DOPPELBODEN SPT.54-64	APPROUVE	06.11.1979	HAMBOURG	MEYER
1332	590	11.09.1979	DOPPELBODEN SPT.65-75	APPROUVE	06.11.1979	HAMBOURG	MEYER
1333	590	11.09.1979	DOPPELBODEN SPT.76-80F	APPROUVE	06.11.1979	HAMBOURG	MEYER
1334	590	20.09.1979	DOPPELBODEN SPT.80G-80S	APPROUVE	06.11.1979	HAMBOURG	MEYER
1335	590	25.09.1979	DOPPELBODEN SPT.80T-86	APPROUVE	06.11.1979	HAMBOURG	MEYER
1341	590	18.09.1979	DOPPELBODEN SPT.87-97	APPROUVE	06.11.1979	HAMBOURG	MEYER
1342	590	18.09.1979	DOPPELBODEN SPT.98-108	APPROUVE	06.11.1979	HAMBOURG	MEYER
1343	590	18.09.1979	DOPPELBODEN SPT.109-119	APPROUVE	06.11.1979	HAMBOURG	MEYER
1351	590	17.09.1979	DOPPELBODEN SPT.120-135	APPROUVE	06.11.1979	HAMBOURG	MEYER
1632	590	11.09.1979	HILFSMASCH FUNDAMENTE	APPROUVE	06.11.1979	HAMBOURG	MEYER
1631	590	11.09.1979	FUNDAMENT HAUPTMOTOR	APPROUVE	06.11.1979	HAMBOURG	MEYER
1621	590	15.10.1979	QUERSCHOTT SPT.33	APPROUVE	09.11.1979	HAMBOURG	MEYER
1622	590	13.09.1979	QUERSCHOTT SPT.43	APPROUVE	09.11.1979	HAMBOURG	MEYER
1623	590	13.09.1979	QUERSCHOTT SPT.53	APPROUVE	09.11.1979	HAMBOURG	MEYER
1631	590	13.09.1979	QUERSCHOTT SPT.71	APPROUVE	09.11.1979	HAMBOURG	MEYER
1632	590	08.10.1979	QUERSCHOTT SPT.80E/80H UND LANGSSCHOTT 6900A.M.SPT.80E-80H	APPROUVE	09.11.1979	HAMBOURG	MEYER
1633	590	05.10.1979	QUERSCHOTT 80R	APPROUVE	09.11.1979	HAMBOURG	MEYER
1634	590	08.10.1979	QUERSCHOTT SPT.85	APPROUVE	09.11.1979	HAMBOURG	MEYER
1641	590	25.09.1979	QUERSCHOTT SPT.93	APPROUVE	09.11.1979	HAMBOURG	MEYER
1642	590	03.10.1979	QUERSCHOTT SPT.110	APPROUVE	09.11.1979	HAMBOURG	MEYER
1643	590	02.10.1979	QUERSCHOTT SPT.120	APPROUVE	09.11.1979	HAMBOURG	MEYER
1526	590	18.10.1979	A-DECK SPT.43-53	APPROUVE	14.12.1979	HAMBOURG	MEYER
1534	590	15.10.1979	A-DECK V. SPT.54-64	APPROUVE	14.12.1979	HAMBOURG	MEYER
1535	590	17.10.1979	A-DECK VON SPT.65-75	APPROUVE	14.12.1979	HAMBOURG	MEYER
1431	590	13.09.1979	AUBENHAUT V. SPT.54-64 V. DOPPELBOTEN -A- DECK	APPROUVE	14.12.1979	HAMBOURG	MEYER
1432	590	13.09.1979	AUBENHAUT VON SPT.65-75 VON DOPPELBODEN BIS A-DECK	APPROUVE	14.12.1979	HAMBOURG	MEYER
1523	590	23.10.1979	ZWISCHENDECK SPT.43-54	APPROUVE	14.12.1979	HAMBOURG	MEYER
1531	590	14.09.1979	ZWISCHENDECK SPT.54-64	APPROUVE	14.12.1979	HAMBOURG	MEYER
1532	590	14.09.1979	ZWISCHENDECK SPT.65-75	APPROUVE	14.12.1979	HAMBOURG	MEYER
1212	590	13.09.1979	HINTERSCHIFF SPT.10-23	APPROUVE	14.12.1979	HAMBOURG	MEYER
1524	590	20.10.1979	A-DECK VON SPT.24-32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1525	590	17.09.1979	A-DECK VON SPT.33-42	APPROUVE	21.12.1979	HAMBOURG	MEYER
1536	590	19.09.1979	A-DECK VON SPT.76-80F	APPROUVE	21.12.1979	HAMBOURG	MEYER

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1538	590	02.10.1979	A-DECK VON SPT.80G-88	APPROUVE	19.11.1979	HAMBOURG	MEYER
1544	590	10.10.1979	A-DECK VON SPT.87-97	APPROUVE	19.11.1979	HAMBOURG	MEYER
1545	590	12.10.1979	A-DECK SPT.98-108	APPROUVE	19.11.1979	HAMBOURG	MEYER
1548	590	20.10.1979	A-DECK VON SPT.109-119	APPROUVE	19.11.1979	HAMBOURG	MEYER
1552	590	07.11.1979	A-DECK SPT.120-138	APPROUVE	14.01.1980	HAMBOURG	MEYER
1521	590	30.10.1979	ZWISCHENDECK SPT.24-32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1522	590	29.10.1979	ZWISCHENDECK V. SPT.33-42	APPROUVE	21.12.1979	HAMBOURG	MEYER
1533	590	14.09.1979	ZWISCHENDECK V. SPT.76-80F	APPROUVE	21.12.1979	HAMBOURG	MEYER
1537	590	27.09.1979	ZWISCHENDECK SPT.80G-86	APPROUVE	19.11.1979	HAMBOURG	MEYER
1541	590	04.10.1979	ZWISCHENDECK SPT.87-97	APPROUVE	19.11.1979	HAMBOURG	MEYER
1543	590	09.10.1979	ZWISCHENDECK SPT.109-119	APPROUVE	19.11.1979	HAMBOURG	MEYER
1551	590	03.11.1979	ZWISCHENDECK V. SPT.120-138 KOFFERDAMM DECK V. SPT.120-135	APPROUVE	14.01.1980	HAMBOURG	MEYER
3590 587 1	590	22.11.1979	5. DECK (D. DECK)	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
3590 587 2	590	09.10.1979	6. DECK (E. DECK)	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
3590 587 3	590	28.11.1979	7. DECK (F. DECK)	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
3590 587 4	590	24.11.1979	8.(G)DECK	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
3590 587 5	590	19.11.1979	9.(H)DECK	APPROUVE	11.01.1980	HAMBOURG	AG "WESER"
3590 531 1A	590	20.11.1979	AUBENHAUT 4-7 DECK SPT.6-75 1/2	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
3590 531 2	590	1979	AUBENHAUT 4-7 DECK SPT.75 1/2-139	APPROUVE	10.01.1980	HAMBOURG	AG "WESER"
1421	590	12.09.1979	AUBENHAUT SPT.23-32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1422		22.10.1979	AUBENHAUT V. SPT.33-43 V. DOPPELBODEN BIS A-DECK	APPROUVE	21.12.1979	HAMBOURG	MEYER
1423		13.09.1979	AUBENHAUT SPT.43-53 VON TANKDECK BIS A-DECK	APPROUVE	21.12.1979	HAMBOURG	MEYER
1433		13.09.1979	AUSSENHAUT V. SPT.80F V. DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1436		21.09.1979	AUSSENHAUT V. SPT.80G-86 V.DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1441		29.11.1979	AUBENHAUT VON SPT.87-97 VON DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1442		15.09.1979	AUBENHAUT SPT.98-108 VON TANKDECK BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1443		18.09.1979	AUBENHAUT SPT.119	APPROUVE	29.11.1979	HAMBOURG	MEYER
1451		19.09.1979	AUBENHAUT SPT.120-138 V. TANKDECK BIS A-DECK	APPROUVE	14.01.1980	HAMBOURG	MEYER
1102		05.10.1979	VORSCHIFF SPT.139-148	APPROUVE	04.12.1979	HAMBOURG	MEYER
588 289		24.10.1979	KA ME WA - STEUERPROPELLER 2000/AS-CP/736KW - 1650/AS-CP/590KW INSTALLATION	VU	09.04.1980	HAMBOURG	K.M.W.
900 200-1/2		05.05.1976	KA ME WA - STEERING PROPELLER 1650/AS - CP/590KW SAMMANSTALLNING ASSEMBLY	VU	09.04.1980	HAMBOURG	K.M.W.
900 200-2/2		05.05.1976	KA ME WA - STEERING PROPELLER 1650/AS - CP/590KW SAMMANSTALLNING ASSEMBLY	VU	09.04.1980	HAMBOURG	K.M.W.
900 297		03.10.1977	WELDING OF PROPELLER UNIT	APPROUVE	09.04.1980	HAMBOURG	K.M.W.
587480-1/2		11.11.1974	STEERING PROPELLER	VU	09.04.1980	HAMBOURG	K.M.W.
587 480-2/2		03.12.1976	STEERING PROPELLER	VU	09.04.1980	HAMBOURG	K.M.W.
531 398		09.02.1972	WELDING OF PROPELLER UNIT	APPROUVE	09.04.1980	HAMBOURG	K.M.W.
3590 531-3B		17.10.1979	FRONTWAND SPT.139	APPROUVE	15.02.1980	HAMBOURG	K.M.W.
1851	590	14.11.1979	QUERSCHOTT SPT.132-133 TANKLANGSWAND V. SPT.120-132	APPROUVE	15.02.1980	HAMBOURG	MEYER
1841	590	11.10.1979	EINBAUWANDE A. D. TANKDECKE	APPROUVE	15.02.1980	HAMBOURG	MEYER
1822	590	03.01.1980	EINBAUWANDE AUF DEM ZWISCHENDECK SPT.23-133	APPROUVE	15.02.1980	HAMBOURG	MEYER
1412	590	14.11.1979	AUBENHAUT A-C-DECK SPT.2 BIS 66	APPROUVE	15.02.1980	HAMBOURG	MEYER
1444	590	20.11.1979	AUBENHAUT SPT.87-138 A-BIS C-DECK	APPROUVE	15.02.1980	HAMBOURG	MEYER
1211	590	17.09.1979	HINTERSCHIFF HINTEN SPT.9	APPROUVE	18.04.1980	HAMBOURG	MEYER
3590 561 1C		10.12.1979	4. (C) - DECK	APPROUVE	05.05.1980	HAMBOURG	AG "WESER"
1053	590	17.04.1980	VERSTARHG. UNT. 4. DECK	APPROUVE	05.05.1980	HAMBOURG	MEYER
1823	590	03.11.1979	SCHACHTWANDE AUF DEM A-DECK VON SPT.23-64	APPROUVE	05.05.1980	HAMBOURG	MEYER
1843	590	08.11.1979	SCHACHTWANDE AU DEM A-DECK VON SPT.65 BIS 86	APPROUVE	05.05.1980	HAMBOURG	MEYER
1853	590	12.11.1979	SCHACHTWANDE AUF DEM A-DECK VON SPT.87-120	APPROUVE	05.05.1980	HAMBOURG	MEYER
1411	590	11.12.1979	HINTERSCHIFF SPT.2 BIS HINTEN VON A-DECK BIS C-DECK	APPROUVE	05.05.1980	HAMBOURG	MEYER

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1028	590	24.09.1979	STUTZENPLAN	VU	02.07.1980	HAMBOURG	MEYER
1003	590	30.01.1980	AUBENHAUTABWICKLUNG	APPROUVE	25.06.1980	HAMBOURG	MEYER
1022	590	16.06.1980	STAHLPLAN D-IE-IF-IG-DECK	APPROUVE	25.06.1980	HAMBOURG	MEYER
1023	590	16.06.1980	STAHLPLAN TD, A-IB-IC-DECK	APPROUVE	25.06.1980	HAMBOURG	MEYER
4110	590	15.09.1979	RUDER	APPROUVE	18.04.1980	HAMBOURG	MEYER
4116	590	30.10.1979	RUDERSCHAFT FINGERLING UND ZUBEHOR	APPROUVE	18.04.1980	HAMBOURG	MEYER
4120	590	15.10.1979	RUDERSCHAFTS UND FINGERLINGS ABDICHTUNG	APPROUVE	17.04.1980	HAMBOURG	MEYER
11119445		25.05.1993	STRUCTURAL ARRANGEMENT (VM200)	APPROUVE	06.12.1993	COPENHAGUE	BROWN BROTHERS
1451		19.09.1979	AUBENHAUT SPT.120-138 V. TANKDECK BIS A-DECK	APPROUVE	14.01.1980	HAMBOURG	MEYER
1442		15.09.1979	AUBENHAUT SPT.98-108 VON TANKDECK BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1441		29.11.1979	AUBENHAUT VON SPT.87-97 VON DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1443		18.09.1979	AUBENHAUT SPT.119	APPROUVE	29.11.1979	HAMBOURG	MEYER
1436		21.09.1979	AUSSENHAUT V. SPT.80G-88 V.DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1433		13.09.1979	AUSSENHAUT V. SPT.80F V. DOPPELBODEN BIS A-DECK	APPROUVE	29.11.1979	HAMBOURG	MEYER
1432	590	13.09.1979	AUBENHAUT VON SPT.65-75 VON DOPPELBODEN BIS A-DECK	APPROUVE	14.12.1979	HAMBOURG	MEYER
1431	590	13.09.1979	AUBENHAUT V. SPT.54-64 V. DOPPELBOTEN -A- DECK	APPROUVE	14.12.1979	HAMBOURG	MEYER
1423		13.09.1979	AUBENHAUT SPT.43-53 VON TANKDECK BIS A-DECK	APPROUVE	21.12.1979	HAMBOURG	MEYER
1422		22.10.1979	AUBENHAUT V. SPT.33-43 V. DOPPELBODEN BIS A-DECK	APPROUVE	21.12.1979	HAMBOURG	MEYER
1421	590	12.09.1979	AUBENHAUT SPT.23-32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1832	590	11.09.1979	HILFSMASCH FUNDAMENTE	APPROUVE	06.11.1979	HAMBOURG	MEYER
1831	590	11.09.1979	FUNDAMENT HAUPTMOTOR	APPROUVE	06.11.1979	HAMBOURG	MEYER
1351	590	17.09.1979	DOPPELBODEN SPT.120-138	APPROUVE	06.11.1979	HAMBOURG	MEYER
1343	590	18.09.1979	DOPPELBODEN SPT.109-119	APPROUVE	06.11.1979	HAMBOURG	MEYER
1342	590	18.09.1979	DOPPELBODEN SPT.98-108	APPROUVE	06.11.1979	HAMBOURG	MEYER
1341	590	18.09.1979	DOPPELBODEN SPT.87-97	APPROUVE	06.11.1979	HAMBOURG	MEYER
1335	590	25.09.1979	DOPPELBODEN SPT.80T-86	APPROUVE	06.11.1979	HAMBOURG	MEYER
1334	590	20.09.1979	DOPPELBODEN SPT.80G-80S	APPROUVE	06.11.1979	HAMBOURG	MEYER
1333	590	11.09.1979	DOPPELBODEN SPT.76-80F	APPROUVE	06.11.1979	HAMBOURG	MEYER
1332	590	11.09.1979	DOPPELBODEN SPT.65-75	APPROUVE	06.11.1979	HAMBOURG	MEYER
1331	590	11.09.1979	DOPPELBODEN SPT.54-64	APPROUVE	06.11.1979	HAMBOURG	MEYER
1323	590	11.09.1979	DOPPELBODEN SPT.43-53	APPROUVE	06.11.1979	HAMBOURG	MEYER
1322	590	11.09.1979	DOPPELBODEN SPT.33-43	APPROUVE	07.11.1979	HAMBOURG	MEYER
1321	590	11.09.1979	DOPPELBODEN SPT.23-32	APPROUVE	06.11.1979	HAMBOURG	MEYER
11119445		25.05.1993	STRUCTURAL ARRANGEMENT (VM200)	APPROUVE	10.05.1993	HAMBOURG	BROWN BROTHERS
11319592-1/3		22.07.1993	FIN & CRUXBOX FAB & M/C (PORT)	APPROUVE	10.05.1993	HAMBOURG	BROWN BROTHERS
11319592-2/3		22.07.1993	FIN & CRUXBOX FAB & M/C (PORT)	APPROUVE	10.08.1993	HAMBOURG	BROWN BROTHERS
11319592-3/3		22.07.1993	FIN & CRUXBOX FAB & M/C (PORT)	APPROUVE	10.08.1993	HAMBOURG	BROWN BROTHERS
1001	590	13.06.1980	HAUPTSPANT	APPROUVE	02.07.1980	HAMBOURG	MEYER
1003	590	30.01.1980	AUBENHAUTABWICKLUNG	APPROUVE	25.06.1980	HAMBOURG	MEYER
1002	590	14.06.1980	EISENLANGSSCHNITT	APPROUVE	02.07.1980	HAMBOURG	MEYER
1028	590	24.09.1979	STUTZENPLAN	VU	02.07.1980	HAMBOURG	MEYER
1023	590	16.06.1980	STAHLPLAN TD, A-IB-IC-DECK	APPROUVE	25.06.1980	HAMBOURG	MEYER
1022	590	16.06.1980	STAHLPLAN D-IE-IF-IG-DECK	APPROUVE	25.06.1980	HAMBOURG	MEYER
23 1	590	18.12.1979	BOOTSAUFSTELLUNG	FOR INFO.		HAMBOURG	MEYER
MA. 500	590	15.09.1979	ARRANGEMENT ENGINE ROOM	VU	17.12.1979	PARIS	MEYER
MA. 888 0	590	19.10.1979	DIAGRAM OF THERMAL OIL SYSTEM	VU	27.11.1979	PARIS	MEYER
MA. 514 0	590	20.10.1979	DIAGRAM OF LUBRICATING OIL SYSTEM	APPROUVE	27.11.1979	PARIS	MEYER
MA. 513 0	590	17.10.1979	DIAGRAM OF FUEL OIL SYSTEM	APPROUVE	27.11.1979	PARIS	MEYER
MA. 614 0	590	17.12.1979	BILGE AND BALLAST PIPING	APPROUVE	17.12.1979	PARIS	MEYER

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MA. 515 0	590	25.10.1979	DIAGRAM OFCOOLING WATER SYSTEM	APPROUVE	27.11.1979	PARIS	MEYER
MA. 513 2	590	23.10.1979	DIAGRAM OF SEPARATOR PLANT	APPROUVE	27.11.1979	PARIS	MEYER
B11 70110 8036		05.01.1979	HALBFABRIKAT PRE-PRODUCT SCHWUNGRAD FLYWHEEL	VU	15.11.1979	HAMBOURG	M.A.N.
B11 70110 0844		17.10.1978	SCHWUNGRAD FLYWHEEL	VU	15.11.1979	HAMBOURG	M.A.N.
B11 844 36 0016		18.10.1979	SCHWUNGRADANORDNUNG ARRANGEMENT OF FLYWHEEL	APPROUVE	15.11.1979	HAMBOURG	M.A.N.
MA. 561	590	11.09.1979	LINE SHAFTING	APPROUVE	17.10.1979	HAMBOURG	MEYER
588 294	590	20.08.1979	SHAFTING	APPROUVE	06.11.1979	HAMBOURG	K.M.W.
23605 D		02.10.1979	FLAMSCHWELLE TYPE DIDB 140G/SD	VU	29.10.1979	PARIS	A.VAN KAICK
4120	590	15.10.1979	RUDERSCHAFTS UND FINGERLINGS ABDICHTUNG	APPROUVE	17.04.1980	HAMBOURG	MEYER
4110	590	15.09.1979	RUDER	APPROUVE	18.04.1980	HAMBOURG	MEYER
4118	590	30.10.1979	RUDERSCHAFT FINGERLING UND ZUBEHOR	APPROUVE	18.04.1980	HAMBOURG	MEYER
1211	590	17.09.1979	HINTERSCHIFF HINTEN SPT.9	APPROUVE	18.04.1980	HAMBOURG	MEYER
531 398		09.02.1972	KAMEWA STEERINGPROPELLER 800/2000/AS-CP	APPROUVE	09.04.1980	HAMBOURG	K.M.W.
587480 1/2		11.11.1974	KAMEWA STYRPROPELLER 800/2000/AS-CP	VU	09.04.1980	HAMBOURG	K.M.W.
587481		03.12.1976	KAMEWA STYRPROPELLER 800/2000/AS-CP	VU	09.04.1980	HAMBOURG	K.M.W.
900 297		03.10.1977	WELDING OF PROPELLER UNIT	APPROUVE	09.04.1980	HAMBOURG	K.M.W.
900 200-1/2		05.05.1976	KA ME WA - STEERING PROPELLER 1650/AS - CP/590KW SAMMANSTALLNING ASSEMBLY	VU	09.04.1980	HAMBOURG	K.M.W.
900 200-2/2		05.05.1976	KA ME WA - STEERING PROPELLER 1650/AS - CP/590KW SAMMANSTALLNING ASSEMBLY	VU	09.04.1980	HAMBOURG	K.M.W.
588 299		24.10.1979	KA ME WA - STEUERPROPELLER 2000/AS-CP/736KW - 1650/AS-CP/590KW INSTALLATION	VU	09.04.1980	HAMBOURG	K.M.W.
33-03 500 1/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 2/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 3/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 4/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 5/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 6/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 7/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 8/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 9/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
33-03 500 10/10	590	26.11.1979	ELECTRIC SCHEME W.T. DOOR SYSTEM	APPROUVE	04.02.1980	PARIS	SCHOENROK-HYDRAULIK
B0106-S294	590	25.08.1980	GENERAL ARR. TANK-DECK DECK 1	APPROUVE	29.07.1980	PARIS	MEYER
B0106-S293	590	04.06.1980	GENERAL ARR. DECK 2, 3, 4	APPROUVE	29.07.1980	PARIS	MEYER
B0106-S292	590	03.06.1980	GENERAL ARR. DECK 5, 6 ,7	APPROUVE	29.07.1980	PARIS	MEYER
B0106-S291	590	07.05.1980	GENERAL ARR. DECK 8, 9, 10	APPROUVE	29.07.1980	PARIS	MEYER
514,457/02	590	11.12.1979	DIESELSTART AND CONNECTION BOX	APPROUVE	27.12.1979	PARIS	ROLF JANSSEN GMBH
B0106-L295	590	04.07.1980	LIST OF LAMPS	VU	29.07.1980	PARIS	SIEMENS AG
FB133-003		24.01.1980	ELECTRIC DIAGRAM FOR POSITION INDICATOR	APPROUVE	19.03.1980	PARIS	CAVO
FB133-004		28.01.1980	ELECTRIC DIAGRAM FOR VALVE CONTROL	APPROUVE	19.03.1980	PARIS	CAVO
MA 688 5		15.04.1979	EXHAUST GAS HEATER GENERAL ARR.	APPROUVE	05.03.1980	PARIS	SANEA
513189		12.03.1975	PROPELLER PANEL FOR INSTRUMENTS 2 ENGINES LOAD CONTROL II	APPROUVE	08.04.1980	PARIS	K.M.W.
592939		26.10.1978	PROPELLER LOAD SHARING UNIT	APPROUVE	08.04.1980	PARIS	K.M.W.
18037		04.10.1979	PROPELLER COMBINATOR DIAGRAM	APPROUVE	08.04.1980	PARIS	K.M.W.
592974 1&2		14.11.1978	PROPELLER SPARE PARTS ELECTRIC REMOTE CONTROL SYSTEM	APPROUVE	08.10.1980	PARIS	K.M.W.
MA 688 6	590	25.02.1980	ISOLIERUNG THERMAL OL ROHRE	APPROUVE	05.03.1980	PARIS	MEYER
594826		04.10.1979	PROPELLER ELECTRIC REMOTE CONTROL SYSTEME ERC 1	APPROUVE	08.04.1980	PARIS	K.M.W.
594827 1/3		04.10.1979	PROPELLER EL. REMOTE CONTROL CABLE DIAGRAM	APPROUVE	08.04.1980	PARIS	K.M.W.
594827 2/3		04.10.1979	PROPELLER EL. REMOTE CONTROL CABLE DIAGRAM	APPROUVE	08.04.1980	PARIS	K.M.W.
594827-2/3		31.10.1979	PROPELLER EL. REMOTE CONTROL CABLE DIAGRAM	APPROUVE	08.04.1980	PARIS	K.M.W.
594828		04.10.1979	PROPELLER CONNECTION DIAGRAM O.D-BOX	APPROUVE	08.04.1980	PARIS	K.M.W.
594853 1/2		01.11.1979	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL BRIDGE	APPROUVE	08.04.1980	PARIS	K.M.W.

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594853-2/2		01.11.1979	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL BRIDGE	APPROUVE	08.04.1980	PARIS	K.M.W.
902975 1/2		17.08.1978	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL CONTROL ROOM	APPROUVE	08.04.1980	PARIS	K.M.W.
902975-2/2		17.08.1978	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL FOR CONTROL ROOM	APPROUVE	08.04.1980	PARIS	K.M.W.
902974 1/2		17.08.1978	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL ANNEX	APPROUVE	08.04.1980	PARIS	K.M.W.
902974-2/2		17.08.1978	PROPELLER EL. REMOTE CONTROL SYSTEM CONTROL PANEL ANNEX	APPROUVE	08.04.1980	PARIS	K.M.W.
63 1	590	16.11.1979	ANORDN. DER SPEIGAT. GRAUWASS. TKS AUFBEREIT. ANLAG. AUSTRITTE IN DER AUSSENHAUT	APPROUVE	25.01.1980	PARIS	MEYER
63 2	590	12.10.1979	QUERSCHNITTE WAGENDECK SPEIGATTE	APPROUVE	25.01.1980	PARIS	MEYER
64 1	590	01.02.1980	VENTILATION PLAN BLATT 1	APPROUVE	17.06.1980	PARIS	MEYER
64 1	590	14.02.1980	VENTILATION PLAN BLATT 2	APPROUVE	17.06.1980	PARIS	MEYER
MA.281 0	590	09.11.1979	DIAGRAM OF FIRE EXTINGUISHING SYSTEM	APPROUVE	25.01.1980	PARIS	MEYER
MA.516 0	590	13.11.1979	DIAGRAM OF PNEUMATIC SYSTEM	APPROUVE	25.01.1980	PARIS	MEYER
MA.628 0	590	05.11.1979	DIAGRAM OF WATER SUPPLY	VU	25.01.1980	PARIS	MEYER
22014 79 01	590	15.11.1979	DRENCHER SYSTEM WASSER SPRUH SCHEMA	VU	22.01.1980	PARIS	RUD. OTTO MEYER
22014 79 02	590	18.11.1979	DRENCHER SYSTEM OPERATING DIAGRAM	VU	22.01.1980	PARIS	RUD. OTTO MEYER
25015 79 06	590	17.12.1979	GENERAL ARRANGEMENT 1	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 07	590	12.12.1979	GENERAL ARRANGEMENT 5	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 05	590	10.12.1979	PIPESCHEME CO2 FIRE EXTINGUISHING SYSTEM	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 04	590	30.11.1979	CO2 CYLINDERROOM	APPROUVE	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 02	590	11.01.1979	CO2 FIRE EXTINGUISHING SYSTEM	APPROUVE	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 01		30.11.1979	CALCULATION OF THE CO2 QUTITY	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 02	590	29.01.1979	CO2 FIRE EXTINGUISHING SYSTEM	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 330	590	27.11.1978	PIPE DIMENSIONS CO2 FIRE EXTINGUISHING SYSTEM	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
25015 79 02	590	13.12.1978	LIST OF PIECES FOR CO2 FIRE EXTINGUISHING SYSTEM	VU	07.01.1980	HAMBOURG	RUD. OTTO MEYER
49 111 372	590 •	03.10.1979	AUTOMATISCHE UND MANUELLE VERSCHLUSSANORDNUNGEN FUR BUGKLAPPE	VU •	02.07.1980	HAMBOURG	VON TELL
49 111 330	590	02.10.1979	BUGKLAPPE UND BUGRAMPE ZUSAMMENSTELLUNG	VU	05.11.1979	HAMBOURG	VON TELL
49 111 373	590 •	03.10.1979	ATLANTIKSICHERUNG UN EINWEISER	VU •	02.07.1980	HAMBOURG	VON TELL
49 111 361	590	03.10.1979	VERRIEGELUNG FUR BUGRAMPE	VU	05.11.1979	HAMBOURG	VON TELL
49111 301 A	590	01.10.1979	BUGRAMPE	APPROUVE	05.11.1979	HAMBOURG	VON TELL
32 84 1		29.08.1978	HAKEN	VU	05.11.1979	HAMBOURG	VON TELL
49 111 360	590	02.10.1979	HYDRAULISCHE VERSCHLUSSANORDNUNG BUGRAMPE 5 T	VU	05.11.1979	HAMBOURG	VON TELL
49 111 303	590	04.10.1979	DETAILS FUR BUGRAMPE VON TELL LIEFERUNG WO NICHT ANDERS GESACG	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 302	590		DETAILS FUR BUGRAMPE	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 230	590	03.10.1979	HECKRAMPEN ZUSAMMENSTELLUNG	VU	05.11.1979	HAMBOURG	VON TELL
49 111 260	590	27.09.1979	HYDRAULISCHE VERSCHLUSSANORDNUNG HECKRAMPE 5 T	VU	05.11.1979	HAMBOURG	VON TELL
49 111 203	590	28.09.1979	DETAILS FUR HECKRAMPE STB U BB	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 204	590	04.10.1979	DETAILS FUR HECKRAMPE VON TELL LIEFERUNG WO NICHTS ANDERS GESAGT	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 202	590	01.10.1979	HECKRAMPE STB MIT NOTBETATIGUNGSAUGE	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 201	590	28.09.1979	HECKRAMPE BB	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 427	590	23.11.1978	HYDR. SECURING CLEAT ARR. FOR PILOT SHELL PORT	VU	05.11.1979	HAMBOURG	VON TELL
49 111 428	590	30.11.1978	ERECTION OF PILOT PORT WITH HYDR JACK	VU	05.11.1979	HAMBOURG	VON TELL
49 111 426	590	30.09.1979	ARRANGEMENT OF HYDRAULIC SECURING CLEAT FOR PASSENGER SHELL PORT	VU	05.11.1979	HAMBOURG	VON TELL
49 111 412	590	28.09.1979	SHELL PORT FOR PASSENGER	APPROUVE	05.11.1979	HAMBOURG	VON TELL
49 111 413	590	09.10.1979	SHELL PORT FOR PILOT	APPROUVE	05.11.1979	HAMBOURG	VON TELL
	590	23.04.1980	RAPPORT DE FRANC-BORD			HAMBOURG	VERITAS
02 19	590	21.03.1980	FREEBOARD PLAN			HAMBOURG	MEYER
	590		GENERAL ARRANGEMENT 1			HAMBOURG	MEYER
	590		GENERAL ARRANGEMENT 2			HAMBOURG	MEYER
	590		GENERAL ARRANGEMENT 5			HAMBOURG	MEYER
61 3	590	24.10.1979	LUFTROHRKOPF AUSFUHRUNG C'			HAMBOURG	MEYER

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61 1	590	19/1079	ANORDNUNG DER LUFT-UND PEILROHRE			HAMBOURG	MEYER
80106-S25	590	14.12.1979	MAIN SWITCHBOARD PANEL 15.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S15	590	11/121/79	MAIN SWITCHBOARD PANEL 5.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S166	590	17.12.1979	EMERG. SWITCHBOARD PANEL 5.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-A151C	590	13.11.1979	EMERG. SWITCHBOARD	VU	19.02.1980	PARIS	SIEMENS AG
80106-S160	590	19.12.1979	SINGLE LINE DIAGRAM	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S162	590	17.12.1979	EMERG. SWITCHBOARD PANEL 2.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S161	590	27.12.1979	EMERG. SWITCHBOARD PANEL 1.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S163	590	17.12.1979	EMERG. SWITCHBOARD PANEL 2.4 -	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S164	590	17.12.1979	EMERG. SWITCHBOARD PANEL 3	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S165	590		EMERG. SWITCHBOARD PANEL 4.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-L165A	590	12.12.1979	EMERG. SWITCHBOARD	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-A101	590	11.12.1979	220V/MAIN SWITCHBOARD FRONT VIEW	VU	19.02.1980	PARIS	SIEMENS AG
80106-A003	590	11.12.1979	380V/MAIN SWITCHBOARD FRONT VIEW	VU	19.02.1980	PARIS	SIEMENS AG
80106-S110	590	10.01.1980	220V-SWITCHBOARD	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S112A	590	17.12.1979	220V-SWITCHBOARD PANEL 2.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-L117A	590	07.12.1979	220V-SWITCHBOARD	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S111A	590	16.12.1979	220V-SWITCHBOARD PANEL 1.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-A002	590	11.12.1979	380V/MAIN SWITCHBOARD FRONT VIEW	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S10	590	18.12.1979	MAIN SWITCHBOARD PANEL 1.12	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S11	590	11.12.1979	MAIN SWITCHBOARD PANEL 1.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S12	590	11.12.1979	MAIN SWITCHBOARD PANEL 2.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S13A	590	11.12.1979	MAIN SWITCHBOARD PANEL 3.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S14	590	12.12.1979	MAIN SWITCHBOARD PANEL 4.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S17	590	12.12.1979	MAIN SWITCHBOARD PANEL 7.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S18	590	12.12.1979	MAIN SWITCHBOARD PANEL 8.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S19	590	12.12.1979	MAIN SWITCHBOARD PANEL 9.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S20A	590	13.12.1979	MAIN SWITCHBOARD PANEL 10 ALTERNATOR 1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S21	590	13.12.1979	MAIN SWITCHBOARD PANEL 11 ALTERNATOR 2	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S22	590	11.12.1979	MAIN SWITCHBOARD PANEL 12.1 BOW THRUSTER 1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S23A	590	14.12.1979	MAIN SWITCHBOARD PANEL 13 ALTERNATOR 3	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S24A	590	17.12.1979	MAIN SWITCHBOARD PANEL 14 ALTERNATOR 4	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S26	590	12.12.1979	MAIN SWITCHBOARD PANEL 16.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S27	590	12.12.1979	MAIN SWITCHBOARD PANEL 17.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S28	590	12.12.1979	MAIN SWITCHBOARD PANEL 18.13.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S29	590	12.12.1979	MAIN SWITCHBOARD PANEL 19.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S30	590	12.12.1979	MAIN SWITCHBOARD PANEL 20.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-S31	590	13.12.1979	MAIN SWITCHBOARD PANEL 21.1	APPROUVE	19.02.1980	PARIS	SIEMENS AG
80106-L037B	590	07.12.1979	MAIN SWITCHBOARD	APPROUVE	19.02.1980	PARIS	SIEMENS AG
	590		KURZSCHLUBDERECHNUNG NACH DIN 89013	APPROUVE	23.04.1980	PARIS	SIEMENS AG 77
31-02250	590	28.11.1979	ROHR U. HYDRAULIK SCHEMA	APPROUVE	19.12.1979	HAMBOURG	SCHOENROCK HYRAULIK
30-14260A	590	28.11.1979	SCHOTTSCHIEBETUR SPT 23 2700X2600	APPROUVE	07.01.1980	HAMBOURG	SCHOENROCK HYRAULIK
1651	590	14.11.1979	QUERSCHOTT SPT. 132/133 TANKLANGSWAND V. SPT. 120/132	APPROUVE	15.02.1980	HAMBOURG	MEYER
1641	590	11.10.1979	EINBAUWANDE A. D. TANKDECKE	APPROUVE	15.02.1980	HAMBOURG	MEYER
32-02254	590	26.11.1979	HYDR. SCHEMA SCHOTTUR NR.12 2700X2600MM	APPROUVE	07.01.1980	HAMBOURG	SCHOENROCK HYRAULIK
	590	29.11.1979	GENERAL ARRANGEMENT 1	VU	19.12.1979	HAMBOURG	MEYER
32-02 055/SD	590	02.01.1979	HYDRAULIC CONTROL SYSTEM FOR W.T. BULKHEAD DOORS RIGHT CLOSING	APPROUVE	19.12.1979	HAMBOURG	SCHOENROCK HYRAULIK
32-02 055/GIO	590	02.01.1979	HYDRAULIC CONTROL SYSTEM FOR W.T. BULKHEAD DOORS RIGHT CLOSING	APPROUVE	19.12.1979	HAMBOURG	SCHOENROCK HYRAULIK
31-14000	590	12.10.1966	ZUSAMMENSTELLUNG	APPROUVE	19.12.1979	HAMBOURG	SCHOENROCK HYRAULIK

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1643	590	02.10.1979	QUERSCHOTT SPT. 120	APPROUVE	09.11.1979	HAMBOURG	MEYER
1642	590	03.10.1979	QUERSCHOTT SPT. 110	APPROUVE	09.10.1979	HAMBOURG	MEYER
1641	590	25.09.1979	QUERSCHOTT SPT. 98	APPROUVE	09.10.1979	HAMBOURG	MEYER
1634	590	08.10.1979	QUERSCHOTT SPT. 85	APPROUVE	09.10.1979	HAMBOURG	MEYER
1633	590	05.10.1979	QUERSCHOTT SPT. 80R	APPROUVE	09.10.1979	HAMBOURG	MEYER
1632	590	08.10.1979	QUERSCHOTT SPT. 80E/80H UND LANGSSCHOTT 6900A.M. SPT. 80E/80H	APPROUVE	09.10.1979	HAMBOURG	MEYER
1631	590	13.09.1979	QUERSCHOTT SPT. 71	APPROUVE	09.10.1979	HAMBOURG	MEYER
1622	590	13.09.1979	QUERSCHOTT SPT. 43	APPROUVE	09.10.1979	HAMBOURG	MEYER
1623	590	13.09.1979	QUERSCHOTT SPT. 53	APPROUVE	09.10.1979	HAMBOURG	MEYER
1621	590	15.10.1979	QUERSCHOTT SPT. 33	APPROUVE	09.10.1979	HAMBOURG	MEYER
40-02153		06.12.1979	ARRANGEMENT LIFT P=7T SPT. 23/28	INFO.		HAMBOURG	SCHOENROCK HYRAULIK
1412	590	14.11.1979	AUBENHAUT A/C-DECK SPT. 2BIS 86	APPROUVE	15.02.1980	HAMBOURG	MEYER
40-03150	590	30.11.1979	TUR VOR DEM LIFT	INFO.		HAMBOURG	SCHOENROCK HYRAULIK
1444	590	20.11.1979	AUBENHAUT SPT. 87-138 A BIS C - DECK	APPROUVE	15.02.1980	HAMBOURG	MEYER
1823	590	03.11.1979	SCHACHTWANDE AUF DEM A-DECK VON SPT.23/24	APPROUVE	05.05.1980	HAMBOURG	MEYER
1843	590	08.11.1979	SCHACHTWANDE AUF DEM A-DECK VON SPT.65 BIS 86	APPROUVE	05.05.1980	HAMBOURG	MEYER
1853	590	12.11.1979	SCHACHTWANDE AUF DEM A-DECK VON SPT.87/120	APPROUVE	05.05.1980	HAMBOURG	MEYER
1411	590	11.12.1979	HINTERSCHIFF SPT. 2BIS HINTEN VON A-DECK BIS C-DECK	APPROUVE	05.05.1980	HAMBOURG	MEYER
1053	590	17.04.1980	VERSTURKG UNDER 4-DECK	APPROUVE	05.05.1980	HAMBOURG	MEYER
3590-561-1C		15.12.1979	4 C-DECK	APPROUVE	05.05.1980	HAMBOURG	AG "WESER
3590-587-1		22.11.1979	5. DECK D.DECK	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-587-2		09.10.1979	6. DECK E.DECK	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-587-3		28.11.1979	7.DECK F.DECK	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-587-4		24.11.1979	8. G.DECK	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-531-1		20.11.1979	AUBENHAUT 4.-7. DECK SPT. -6/75.1/2	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-531-2		1979	AUBENHAUT 4.-7. DECK SPT.75.1/2 - 139	APPROUVE	10.01.1980	HAMBOURG	AG "WESER
3590-587-5		19.11.1979	9. H -DECK	APPROUVE	11.01.1980	HAMBOURG	AG "WESER
3590-531-3B		17.10.1979	FRONTWAND SPT.139	APPROUVE	15.02.1980	HAMBOURG	AG "WESER
	590	27.03.1980	LIST OF DRAWINGS SUPPLY FOR CONTROL ENGINE, REMOTE CONTROL SAFETY SYSTEM AND MONITORING	APPROUVE	30.07.1980	PARIS	M.A.N.
1080005/8/9/10		02.04.1980	LIST OF MESS + CONTROL DEVICE	WITHOUT AP			M.A.N.
A11.12500-3445			STEUERUNGSSCHEMA FUR ZWEI NICHT UMSTEUERBARE MOTOREN UBER	WITHOUT AP			M.A.N.
			SAMMELUNTERSETZUNGSGETRIEBE AUF VERSTELLPROPELLER	WITHOUT AP			M.A.N.
S11.12560-00138			CONTROL SYSTEM TWIN-ENGINE PLANT NON REVERSIBLE 40/45	WITHOUT AP			M.A.N.
B11.12500-3572		01.10.1979	OPERATING EQUIPMENT VP-DOUBLE-ENGINES ENGINE	WITHOUT AP			M.A.N.
B11.12500-3574		10.10.1979	OPERATING EQUIPMENT VP-DOUBLE-ENGINES ENGINE	WITHOUT AP			M.A.N.
B11.12500-3511		14.05.1979	KLEMMENPLAN FUR BEDIENUNGSTAND AM MOTOR FUR ZWEI NICHT UMSTEUERBARE MOTOREN MIT	WITHOUT AP			M.A.N.
			SAMMELUNTERSETZUNGSGETRIEBE UND VERSTELLPROPELLER	WITHOUT AP			M.A.N.
B11.12500-3511		14.05.1979	KLEMMENPLAN FUR BEDIENUNGSTAND AM MOTOR FUR ZWEI NICHT UMSTEUERBARE MOTOREN MIT	WITHOUT AP			M.A.N.
			SAMMELUNTERSETZUNGSGETRIEBE UND VERSTELLPROPELLER	WITHOUT AP			M.A.N.
C11.12500-3578		09.01.1980	TETE ADMISSION TRANSMITTER	WITHOUT AP			M.A.N.
B11.12500-3443		03.10.1978	DREHZAHLSTEUERUNG FUR ZWEI NICHT UMSTEUERBARE MOTOREN UBER	WITHOUT AP			M.A.N.
			SAMMELUNTERSETZUNGSGETRIEBE AUF VERSTELLPROPELLER	WITHOUT AP			M.A.N.
F11.12500-3448		06.09.1977	SPEED SETTING FROM ENGINE CONTROL ROOM	WITHOUT AP			M.A.N.
B11.48900-1203			CABLING OF ELECTRICAL MONOTORING UNIT ON ENGINE	WITHOUT AP			M.A.N.
C11.48900-1203		26.09.1979	CABLING OF ELECTRICAL MONOTORING UNIT ON ENGINE	WITHOUT AP			M.A.N.
A11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.
A11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.
A11.12500-4366		28.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.
A11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.

DRWG N°	HULL N°	DRWG DATE	TITLE	REVIEW	DATE	LOCATION	
A11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.
A11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP			M.A.N.
513189		12.03.1975	PROPELLER PANEL FOR INSTRUMENTS 2 ENGINES	APPROUVE	08.04.1980	HAMBOURG	KMW
592939		28.10.1978	PROPELLER LOAD SHARING UNIT	APPROUVE	08.04.1980	HAMBOURG	KMW
594828		04.10.1979	PROPELLER CONNECTION DIAGAM O.D. BOX	APPROUVE	08.04.1980	HAMBOURG	KMW
594827-3/3		31.10.1979	PROPELLER EL REMOTE CONTROL CABLE DIAGAM	APPROUVE	08.04.1980	HAMBOURG	KMW
594827-2/3		04.10.1979	PROPELLER EL REMOTE CONTROL CABLE DIAGAM	APPROUVE	08.04.1980	HAMBOURG	KMW
594827-1/3		04.10.1979	PROPELLER EL REMOTE CONTROL CABLE DIAGAM	APPROUVE	08.04.1980	HAMBOURG	KMW
594826		04.10.1979	PROPELLER EL REMOTE CONTROL SYSTEM ERC1	APPROUVE	08.04.1980	HAMBOURG	KMW
902975-1/2		17.08.1978	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL CONTROL ROOM	APPROUVE	08.04.1980	HAMBOURG	KMW
902975-2/2		17.08.1978	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL CONTROL ROOM	APPROUVE	08.04.1980	HAMBOURG	KMW
902974-1/2		17.08.1978	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL ANNEX	APPROUVE	08.04.1980	HAMBOURG	KMW
902974-2/2		17.08.1978	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL ANNEX	APPROUVE	08.04.1980	HAMBOURG	KMW
594853-1/2		01.11.1979	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL BRIDGE	APPROUVE	08.04.1980	HAMBOURG	KMW
594853-2/2		01.11.1979	PROPELLER EL REMOTE CONTROL SYSTEM CONTROL PANEL BRIDGE	APPROUVE	08.04.1980	HAMBOURG	KMW
18037	590		PROPELLER COMBINATOR DIAGRAM	APPROUVE	08.04.1980	HAMBOURG	KMW
5S114.366.01		05.03.1980	UBERWACHUNG-SCHIFF (US) 24V	WITHOUT AP		HAMBOURG	STRUVER
1212	590	13.09.1979	HINTERSCHIFF SPT.10/23	APPROUVE	14.12.1979	HAMBOURG	MEYER
1521	590	30.10.1979	ZWISCHENDECK SPT. 24/32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1522	590	29.10.1979	ZWISCHENDECK SPT. 33 - 42	APPROUVE	21.12.1979	HAMBOURG	MEYER
1523	590	23.10.1979	ZWISCHENDECK SPT. 43 - 54	APPROUVE	14.12.1979	HAMBOURG	MEYER
1524	590	20.10.1979	A-DECK VON SPT.24 - 32	APPROUVE	14.01.1980	HAMBOURG	MEYER
1525	590	17.09.1979	A-DECK VON SPT. 33 - 42	APPROUVE	21.12.1979	HAMBOURG	MEYER
1526	590	18.10.1979	A-DECK VON SPT. 43 - 53	APPROUVE	14.12.1979	HAMBOURG	MEYER
1531	590	14.09.1979	ZWISCHENDECK V. SPT. 54 - 64	APPROUVE	14.12.1979	HAMBOURG	MEYER
1532	590	14.09.1979	ZWISCHENDECK V. SPT. 65 - 75	APPROUVE	14.12.1979	HAMBOURG	MEYER
1533	590	14.09.1979	ZWISCHENDECK V. SPT. 76 - 80F	APPROUVE	21.12.1979	HAMBOURG	MEYER
1534	590	15.10.1979	A-DECK V. SPT. 54 - 64	APPROUVE	14.12.1979	HAMBOURG	MEYER
1535	590	17.10.1979	A-DECK V. SPT. 65 - 75	APPROUVE	14.12.1979	HAMBOURG	MEYER
1536	590	19.09.1979	A-DECK V. SPT. 76 - 80F65 - 75	APPROUVE	21.12.1979	HAMBOURG	MEYER
1537	590	27.09.1979	ZWISCHENDECK SPT. 80G - 86	APPROUVE	19.11.1979	HAMBOURG	MEYER
1538	590	02.10.1979	A-DECK V. SPT. 80G - 86	APPROUVE	19.11.1979	HAMBOURG	MEYER
1541	590	04.10.1979	ZWISCHENDECK SPT. 87 - 97	APPROUVE	19.11.1979	HAMBOURG	MEYER
1543	590	08.10.1979	ZWISCHENDECK SPT. 109 - 119	APPROUVE	19.11.1979	HAMBOURG	MEYER
1544	590	10.10.1979	A-DECK V. SPT. 87 - 97	APPROUVE	19.11.1979	HAMBOURG	MEYER
1545	590	12.10.1979	A-DECK V. SPT. 93 - 108	APPROUVE	19.11.1979	HAMBOURG	MEYER
1546	590	20.10.1979	A-DECK V. SPT. 109 - 119	APPROUVE	19.11.1979	HAMBOURG	MEYER
1551	590	03.11.1979	ZWISCHENDECK V. SPT. 120 - 138 KOFFERDAMM DECK V. SPT. 120 - 133	APPROUVE	14.01.1980	HAMBOURG	MEYER
1552	590	07.11.1979	A-DECK SPT. 120 - 135	APPROUVE	14.01.1980	HAMBOURG	MEYER
1622	590	03.01.1980	EINBAUWANDE AUF DEM ZWISCHENDECK SPT. 23 - 133	APPROUVE	15.02.1980	HAMBOURG	MEYER
D11.12500-4366		14.03.1980	CONNECTION DIAGRAM FOR REMOTE CONTROL CLUTCH AND ENGINE MONITORING	WITHOUT AP		HAMBOURG	M.A.N.
D1015-3CE		15.05.1975	ENGINE POWER RANGES OF WITH CONTROLABLE PITCH PROPELLER	WITHOUT AP		HAMBOURG	M.A.N.
		24.09.1979	DATENBLATT FUR WOODWARD REGLER BESTELLUNG MIT EINSTELLWERTEN	WITHOUT AP		HAMBOURG	M.A.N.
F11.12500-4038	590	24.04.1979	FUEL OF THE ENGINE FOR THE LOAD CURVE WITH LOAD CONTROL	WITHOUT AP		HAMBOURG	M.A.N.
B11.12500-3563		29.07.1977	STEUERGERATESCHRANK Z	WITHOUT AP		HAMBOURG	M.A.N.
F11.12500-3508		23.05.1977	TERMINAL DIAGRAM FOR CONTROL UNIT CABINET 'Z' WITHOUT PTO	WITHOUT AP		HAMBOURG	M.A.N.
C11.12500-1820			EINS TELTUNGEN UND ANSCHLUSSE AM WOOD WARDREGLER TYP PS-A	WITHOUT AP		HAMBOURG	M.A.N.
			TECHNICAL NOTE MAaut 43/70 PAGES 1 - 10	WITHOUT AP		HAMBOURG	M.A.N.
S11.12500-1059			PIPE SPECIFICATION AND INSTRUCTIONS FOR INSTALLING PNEUMATIC DEVICES	WITHOUT AP		HAMBOURG	M.A.N.

DRWG N°	HULL N°	DRWG DATE	TITLE	REVIEW	DATE	LOCATION	
A11.12500-3965		10.11.1978	CONTROL FOR ADMISSION DEPENDENT LUB. OIL PREHEATING FOR TURBO CHARGER	WITHOUT AP		HAMBOURG	M.A.N.
A11.12500-3445		12.07.1977	CONT. SCH. FOR TWO NON REVERS. ENG. WITH MULTIPLE GEARBOX AND CONTROLABLE PITCH PROPELLE	WITHOUT AP		HAMBOURG	M.A.N.
C11.12500-4365		18.03.1980	SWITCHING PROPOSED FOR STARTING OF STAND-BY PUMP FOR THE LUB. OIL SUPPLY OF EACH ENGINE	WITHOUT AP		HAMBOURG	M.A.N.
C11.16200-0148		25.11.1977	MAIN STARTING VALVE NW 80	WITHOUT AP		HAMBOURG	M.A.N.
C11.99002-0079		09.05.1978	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	M.A.N.
E11.99003-0147		28.11.1975	3 WAY VALVE	WITHOUT AP		HAMBOURG	M.A.N.
F11.99003-0147		28.11.1975	3 WAY VALVE	WITHOUT AP		HAMBOURG	M.A.N.
E11.99001-0042		15.04.1975	FINE REGULATING VALVE	WITHOUT AP		HAMBOURG	M.A.N.
D11.99001-0040		22.11.1974	SCHAFTVENTIL	WITHOUT AP		HAMBOURG	M.A.N.
D11.99003-0181		02.05.1977	3/2 WAY SOLENOID VALVE	WITHOUT AP		HAMBOURG	M.A.N.
D11.99003-0182		04.05.1977	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	M.A.N.
D11.99003-0002			THREE WAY VALVE	WITHOUT AP		HAMBOURG	M.A.N.
D11.99003-0068		16.05.1968	3/2 WAY MAGNET VALVE	WITHOUT AP		HAMBOURG	M.A.N.
B11.99003-0202		18.03.1978	3/2 WAY SOLENOIDE VALVE OPEN CIRCUIT	WITHOUT AP		HAMBOURG	M.A.N.
D11.99004-0091		03/13/75	DRUCKMINDER VENTIL	WITHOUT AP		HAMBOURG	M.A.N.
F11.99004-0056		17.12.1968	DOUBLE NON-RETURN VALVE	WITHOUT AP		HAMBOURG	M.A.N.
E11.99004-0055		09.10.1968	WATER SEPERATOR	WITHOUT AP		HAMBOURG	M.A.N.
D11.99004-0070		31.05.1972	DRUCKREGELVENTIL	WITHOUT AP		HAMBOURG	M.A.N.
D11.99005-0059		03.11.1975	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0200		14.11.1975	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0062		06.11.1975	TIME DELAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0062		13.03.1973	TIME DELAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0090		06.11.1975	PRESSURE SWITCH	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0090		11.11.1975	PRESSURE SWITCH	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
E11.99005-0077		06.09.1972	DRUCKMINDERVENTIL	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
E11.99005-0077		27.02.1978	DRUCKMINDERVENTIL	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0066		28.10.1975	WECHSELVENTIL	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0066		11.11.1975	WECHSELVENTIL	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
E11.99003-0152		25.07.1972	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
E11.99003-0152		25.07.1972	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0068		04.11.1975	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99005-0068		11.11.1975	3/2 WAY VALVE	WITHOUT AP		HAMBOURG	WABCO WESTINGHOUSE
D11.99006-0002		15.09.1975	PRESSURE REDUCING STATION	WITHOUT AP		HAMBOURG	M.A.N.
C11.99006-0002		15.09.1975	PRESSURE REDUCING STATION	WITHOUT AP		HAMBOURG	M.A.N.
AE1011			FLUSH TYPE ILLUMINATED ON/OFF PUSHBUTTON SWITCH TYP KIOSL4	WITHOUT AP		HAMBOURG	M.A.N.
E11.99007-0742		01.04.1977	LIMIT SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
E11.99007-0560		31.10.1975	ILLUMINATED KEY	WITHOUT AP		HAMBOURG	M.A.N.
E11.99007-0544		31.10.1975	ILLUMINATED SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
D11.40002-0003		21.03.1967	SEL D.C. SPEED TRANSMITTER	WITHOUT AP		HAMBOURG	M.A.N.
E11.99013-0169		12.01.1977	EL. SPEED INDICATING INSTRUMENT	WITHOUT AP		HAMBOURG	M.A.N.
E11.99013-0171		14.01.1977	ELEKTRISCHER DREHZAHLANZEIGER	WITHOUT AP		HAMBOURG	M.A.N.
F11.56252-0045		02.08.1972	SPEED TRANSMITTER READY FOR INSTALLATION	WITHOUT AP		HAMBOURG	M.A.N.
E11.99013-0174		15.02.1977	EL. SPEED INDICATOR (TURBOLADER)	WITHOUT AP		HAMBOURG	M.A.N.
E11.99007-0771		09.03.1977	MULTIPLE LIMIT SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
E11.99012-0103		22.04.1977	PRESSURE SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0267		21.01.1977	TEMPERATURFUHLER FUR KURBELWELLENLAGER	WITHOUT AP		HAMBOURG	M.A.N.
E11.-99012-0028		18.04.1968	PRESSURE DIFFERENTIAL SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
218931-002		12.03.1980	UNIVERSAL MONITORING SYSTEM 213 MAIN BEARING SUPERVISION DIAGRAM	WITHOUT AP		HAMBOURG	SORENT. LYNGSO
E11.99011-0189		26.02.1979	TEMPERATURE SENSOR	WITHOUT AP		HAMBOURG	M.A.N.

DRWG N°	HULL N°	DRWG DATE	TITLE	REVIEW	DATE	LOCATION	
E11.99011-0188		26.02.1979	MODULAR SWITCHGEAR	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0346		26.02.1979	MODULAR SWITCHGEAR	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0115		22.05.1972	RESISTANCE THERMOMETER	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0105		13.05.1971	SWITCHGEAR FOR MONITORING FUEL TEMPERATURE	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0108		19.07.1971	SWITCHING DEVICE FOR CONTROL OF FUEL TEMPERATURE	WITHOUT AP		HAMBOURG	M.A.N.
F11.64001-0175		11.01.1972	F.O. LEAKAGE COLLECTING TANK WITH BAR-TYPE PROBE	WITHOUT AP		HAMBOURG	M.A.N.
F11.60001-0068		27.09.1978	CONDENSATE WATER COLLECTING TANK WITH BAR TYPE PROBE	WITHOUT AP		HAMBOURG	M.A.N.
E11.99016-0025		30.04.1974	BAR TYPE PROBE WITH ELECTRONIC INSERT	WITHOUT AP		HAMBOURG	M.A.N.
E11.99007-0305		30.04.1974	NIVOTESTER	WITHOUT AP		HAMBOURG	M.A.N.
E11.99011-0216		17.09.1975	DOUBLE TUERMO COUPLE WITH PROTECTING WELL	WITHOUT AP		HAMBOURG	M.A.N.
A11.12500-3964		09.11.1978	ARRANGEMENT OF PRESSURE SWITCHES	WITHOUT AP		HAMBOURG	M.A.N.
C11.12500-3965		09.11.1978	TERMINAL DIAGRAM OF MOUNTING OF PRESSURE SWITCHES	WITHOUT AP		HAMBOURG	M.A.N.
C11.12500-3820		15.03.1978	MOUNTING OF PRESSURE SWITCHES	WITHOUT AP		HAMBOURG	M.A.N.
C11.12500-3434		25.04.1977	MOUNTING OF PRESSURE SWITCHES	WITHOUT AP		HAMBOURG	M.A.N.
E11.12500-1420		15.02.1971	ATTACH TESTING DEVICE FOR PRESURE SWITCH	WITHOUT AP		HAMBOURG	M.A.N.
F11.12591-1018		06.10.1978	SCHILD 220X150mm (BESTELLZEICHNUNG)	WITHOUT AP		HAMBOURG	M.A.N.
F11.12591-1019		09.10.1978	SCHILD 220X150mm (BESTELLZEICHNUNG)	WITHOUT AP		HAMBOURG	M.A.N.
F11.12591-1020		09.10.1978	SCHILD 220X150mm (BESTELLZEICHNUNG)	WITHOUT AP		HAMBOURG	M.A.N.
D11.99016-0019		14.09.1971	OILMISTDETECTOR	WITHOUT AP		HAMBOURG	M.A.N.
E11.99016-0020		09.11.1971	TERMINAL BOX AND TERMINAL DIAGRAM TO OIL MIST DETECTOR MK4	WITHOUT AP		HAMBOURG	M.A.N.

Enclosure 2.4.3.36

DRAWING N°	TITLE	DATE OF APPROVAL
Bow visor		
590/1103 rev.6	Bugklappe	20.06.80
590/1106 rev.G	BUgklappeverriegelung	20.06.80
49111-373	Atlantiksicherung	02.07.80
590/1101 a	Vorschiff spt 149 - vorne	04.12.79
49111-372	Automatische und manuelle verschlussanordnungen für bugklappe	02.07.80
49111-330	Bugklappe und bugrampe zusammenstellung	05.11.79
Bow ramp		
49111-301 a	Bugrampe	05.11.79
49111-303	Details für bugrampe (von Teil lieferung)	05.11.79
49111-360	Hydraulische verschlussanordnungen bugrampe	05.11.79
49111-302	Details für bugrampe	05.11.79
49111-361	Verriegelung für bugrampe	05.11.79

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Enclosure 2.4.3.37

BUREAU VERITAS
Marine Division
T.N. DT1/N° 95/00136/SEG

Paris La Défense, 10 January 1995

M/V ESTONIA
Summary of class and statutory interventions

Contents

A Classification

A1 Review of drawings

A11 Bureau Veritas Rules

M/V Estonia has been classed by Bureau Veritas since newbuilding under special survey.

The request for classification (Annex 1) was signed 27 September 1979.

The class rules in force at that time were the 1977 issue.

A complete set of these rules is annexed to this summary.

A111 Requirements for bow doors in the 1977 rules

These requirements are given in para. 11-44, indentation 2 & 3:

- the scantlings of door plating and stiffeners are those of the adjacent shell structure;
- local reinforcements are required in way of cleats, hinges, and jacks attachments;
- the removable extension of the collision bulkhead above the bulkhead deck is to be made weathertight, however its position is not specified (see also 6-62.14 of the Bureau Veritas rules)

A112 Rules evolution since 1977

The 1980 set of rules is identical to the 1977, for bow doors requirements.

The June 1981 amendments contained a rule calculation method for bow visor securing devices, similar to the S8 unified requirement of IACS, except for the pressure criteria. The distance from the inner door to the fore perpendicular is required to be within the limits specified in Solas 1974, as amended 1981.

No change made in the 1982 issue.

In the 1985 issue, slight modifications were made to the rule calculation of forces on bow visor to be considered for securing devices.

In the November 1987 issue, the requirements were consolidated in full compliance with the IACS S8 unified requirement.

In January 1991, the minimum thickness of bow door plating was increased. The strength of large flared bow doors was to be specially considered.

A113 Implementing Solas requirements in Bureau Veritas rules

The 1960 Solas convention was in force at the time the Estonia was built. Chapter II, reg. 9 requests a weathertight extension of the collision bulkhead to be located aft of the forward perpendicular by 5 percent of the ship's length, at least.

This requirement was maintained in the Solas 1974.

The 1981 amendments to the convention mentioned for the first time bow ramps and specifically allowed the part higher than 2.3 meter above the bulkhead deck to be outside the limit for the location of the extension of the collision bulkhead. (relevant excerpts are enclosed as annex 3).

After the entry into force of the 1981 amendments, in September 1984, most internal sloped bow ramps could be located within the limit. Operational constraints made it difficult to comply with the previous requirement which was not aimed at this arrangement.
Bureau Veritas implemented this new requirement in its rules as from adoption at IMO, in june 1981, thus anticipating the September 1984 entry into force. No requirement was implemented to this end in the Bureau Veritas rules prior to this date.

A12 Examination of locking devices

The bow door drawings of the M/V Estonia were reviewed by the Hamburg local office of Bureau Veritas which was in charge of the review. List of reviewed drawings is given as annex 4.

The drawings were checked against the Bureau Veritas 1977 rules which did not contain formula for the rule strength of securing devices of shell doors opening outwards.

Information was received from the bow door designer, Messrs Von Tell, which stated in their telex dated 18 march 1980 (annex 5) to the local Bureau Veritas office in Hamburg that they had designed according to the Lloyd's Register rules.

A121 Remarks put on the reviewed drawings

Bow visor drawing (590/1103)
The remarks conform strictly to the rule requirements:

Rule requirements	Remarks on the drawing
15- The closing of doors is to be watertight. The thickness of plating is not to be less than for adjacent side shell.	1) Arrangements of locking devices subject to the approval of the national Authorities. 2) Watertightness of the ramp and local reinforcements of the ship's structures in way of locking devices, cylinders and hinges to Surveyor's satisfaction.
31- Doors and screen-doors have to be firmly secured by use of cleats conveniently spaced or other similar devices. Particularly, it has to be provided one of these devices at each corner of opening. Structure reinforcements have to be realised on door and adjacent shell plating to attached points of cleats, hinges, jacks, etc.	3) Jack lifting eye on arms, atlantic lock eye, side lock eyes, requested in steel grade St 52-3. 4) Local reinforcements requested and indicated under the side blocks active in y-direction (transverse).

General arrangement drawing of bow visor and ramp (49111-330)
Similar remarks were made:

Remarks on the drawing
1) Arrangement of locking devices and protection against shifting cargoes subject to the approval of the National Authorities.
2) Watertightness of the ramp and bow visor to Surveyor's satisfaction.
3) Local reinforcement of the ship's structure in way of - locking devices - cylinders - hinges to Surveyor's satisfaction.
4) High pressure flexible pipes must be approved by BV .

By the remark concerning the National Authorities it was made clear that locking devices were considered as an item subject to the examination and approval of the Finnish Authorities issuing the Passenger Ship Safety Certificate of the vessel.

A2 Appraisal of the selection of materials

The Bureau Veritas rule requirements are set out in chapters 3 and 25 of the 1977 issue.

For grade A steel, a ladle anlysis and a tensile test is required for each 50 tons batch (para. 25-32 of the 1977 rules).

Grade A steel is acceptable for all plates under 20 mm thickness.

A3 Survey during construction

The survey of the construction of the bow visor and ramp was done by the Oldenburg field office of Bureau Veritas.

Due consideration was given to the classification remarks put on the drawings .

A translated extract of the field Surveyor remarks appearing in his note book is given in annex 6.

Concerning the reinforcements under locks, two flat bars 230x22 mm were fitted under the side locks (visor side).

A31 Survey of bow visor welds

The control of welds is carried out according to the requirements of section 3-3 of the 1977 issue of the rules.

It includes a visual inspection of the line of welding to check aspect and uniformity.

The Surveyor carries out random close up surveys and requests non destructive testing where specified on the drawing or by the rules, and in case of doubt.

B Issuance of statutory certificates

B1 Certificates issued by Bureau Veritas in 1980

The certificates issued by Bureau Veritas to the newbuilding are listed in the request of classification (annex 1, second page).

Bureau Veritas issued the International Load Line certificate to the vessel, in accordance with the request of classification and on behalf of the Finnish Authorities.

In relation with the issuance of this certificate, the field Surveyor checked the watertightness of the bow visor (rubber packing) during construction and at sea trials. (remarks dated 23 April, 11 and 26 June 1980 of the Surveyor notebook, in annex 6)

B2 Certificates issued by the National Authorities in 1980

The Finnish Authorities issued the Passenger Ship Safety Certificate pursuant to Solas 1960 Convention.

The stability file was approved by the Finnish Authorities in 1981.

C Implementing Retrofit requirements according to IMO

C1 Stability

In 1991, a file modified further to the new IMO requirements was re-examined and approved by the Finnish Authorities.

C2 Monitoring of bow locking

Also in 1991-1992, the bow door and bow ramp control and monitoring devices were checked by the Finnish Authorities against the new IMO requirements.

The bow door cleating and monitoring consisted of:

- 2 side cleats hydraulically operated with limit switches on bolts (open & closed positions);

- 1 central lower cleat ("Atlantic") with separate hydraulic control with limit switches on bolts (open & closed positions);

- 2 manually operated fasteners for heavy weather with limit switches on bolts (open & closed positions).

The ramp cleating consisted of:

- 2 jack operated hooks;
- 4 horizontal cleats;

all hydraulically controlled and provided with limit switches for open and closed positions.

The overall cleating was surveyable from a mimic panel (red and green lamps for each cleating group) both at the local control station and on the navigating bridge; video monitoring of the car deck included a view of the ramp closure.

D- Change of flag in February 1993

D1 Bureau Veritas authorizations for Estonian flag vessels

Bureau Veritas received as of 18 August 1992 authorisation from the Government of Estonia to issue certificates pursuant to the following conventions:

Load Line 1966
SOLAS 1974
MARPOL 1973
Tonnage 1969

The following documents were issued to the vessel:

International Load Line Certificate
Passenger Ship Safety Certificate
International Oil Pollution Prevention Certificate
International Tonnage Certificate 1969

Attestation pursuant to the Helsinki convention 1974
(prevention of pollution by sewage).

D2 Surveys carried out by Bureau Veritas

The vessel had valid International Certificates and kept the Bureau Veritas class when applying to fly the Estonian flag.

A periodical survey pursuant to SOLAS 1974, consolidated edition 1992, Chapter I, Part B, Regulation 7 (b) (ii) was carried out by Bureau Veritas on behalf of the Estonian Government according to the transfer of flag clauses of the Agreement signed 18 August 1992 between the Estonian Maritime Administration and Bureau Veritas.

The Exemption Certificate granted by the Finnish Authorities for radiotelegraphy (hours of listening by operator) was not re-issued under Estonian flag.

In the course of the periodical survey carried out by Bureau Veritas, a few anomalies were detected and notified to the Finnish Authorities.

E Renewal of certificates as from 1993.

The ship was surveyed and certificates renewed during the period 1993-1994.

The Passenger Ship Safety Certificate was kept Interim pending completion of the vessel new loading cases.

J.-F. SEGRETAIN

BUREAU VERITAS
HULL DIVISION
PARIS
1828
DT1
INTERNATIONAL REGISTER

List of annexes

Annex 1

Request for classification
dated 27 September 1979

Annex 2

Extracts of Bureau Veritas Rules

June 1980
June 1981
June 1982
August 1985
November 1987

Annex 3

Solas 1960, Reg. 9, Chapter II-1

Solas 1974, as amended 1981, Reg. 10, Chapter II-1

Annex 4

List of reviewed drawings.

Annex 5.

Copy of telex dated 18 March 1980
received from Messrs Von Tell,
designers of the bow visor and ramp.

Annex 6

Translated extract of the field Surveyor Notebook

Enclosure 2.4.3.38

EXTRACT of inspections acc. to Surveyor's Notebook

carried out on the NC. 590 (BV-Reg.-No. 35 P 387) of the shipyard Messrs. Jos. L. Meyer at Papenburg during building.-

28 - 03 - 80 GLo

Bugklappenanschluß an Hinterkante

Inspection of HULL-Construction acc. to the remarks made on drawings of Messrs. TELL during approval.

23 - 04 - 80 JD

Allgemeine Besichtigung Freibord

Checking of closing arrangements for the FREEBOARD REPORT on Form Mod. 195

11 - 06 - 80

Kontrolle des Seitenhauses vorn und achtern, sowie des achteren Mittelhauses auf dem Hauptdeck - Geringe Restarbeiten.

Checkings in way of the CARDECK forward including bowramp and bowvisor - resting and connection.

Remark: Condition and fitting of packings in closed position checked by means of chalk.-

26 - 06 - 80

Fortsetzung des Programms vom 25. Juni 1980 in See u.a. Kontrolle des Bugvisiers.

During trials at sea under normal running conditions the space between bow visor and bowramp has been inspected for tightness.

NOTE: For inspections, tests and trials yard-protocols are made from the yard and signed by the parties concerned.-

G. Lohmann

Made out at Oldenburg on Nov. 23-1994

Enclosure 2.4.3.39

BUREAU VERITAS

REGISTRE INTERNATIONAL DE CLASSIFICATION DE NAVIRES ET D'AÉRONEFS
INTERNATIONAL REGISTER FOR THE CLASSIFICATION OF SHIPPING AND AIRCRAFT

RAPPORT DE FRANC-BORD
SURVEY FOR FREEBOARD

Etabli en vue de la délivrance d'un certificat de franc-bord international
In view of delivery of an international freeboard certificate

– Nom du navire *(Name of ship)* : "VIKING – SALLY"
– Port d'immatriculation *(Port of registry)* : Mariehamn, Finland
– Nationalité *(Nationality)* : Finnish
– Numéro ou lettres distinctifs *(Distinctive number or letters)* :
– Constructeurs du navire *(Ship builders)* : Jos. L. Meyer, Papenburg/Ems
– Numéro du chantier *(Yard number)* : S. 590
– Date de la construction/conversion *(Date of build/conversion)* : 1980
– Franc-bord assigné au titre d'un navire du type *(Freeboard assigned as a ship of type)* : "B"
– Classification *(Classification)* : I 3/3 E. DEEP SEA, Ice Class I A (AUT) Passenger Ferry
– Date et lieu de la visite initiale *(Date and place of initial survey)* : Papenburg/Ems April 1980

– Numéro de registre *(Register number)* : 35 P 387
– Catégorie *(Kind of ship)* : new
– Armateur *(Owner)* : Rederi Aktiebolaget Sally, Finland
– Lieu de construction *(Place of build)* : Papenburg, W. Germany
– Visite effectuée par *(Survey made by)* : J. Drasenovic

Le constructeur doit établir un plan plié au format 210 x 297 mm sur lequel doivent être indiquées les dimensions principales en tenant compte des règles de la Convention de 1966 sur les lignes de charge, ainsi que la description du type des ouvertures dans le bordé extérieur, dans les parois latérales et les cloisons d'extrémités des superstructures.

Le constructeur doit également fournir un dossier séparé pour permettre d'étudier la possibilité d'attribuer à un navire un franc-bord " A " ou " B réduit ".

(The builder should draw a plan fold in the dimensions 210 x 297 mm on which should be indicated the principal dimensions taking into account the regulations of the 1966 load line Convention as well as the description of the type of the openings in the sides of the ship, in the side plating and in the end of bulkheads of the superstructures.

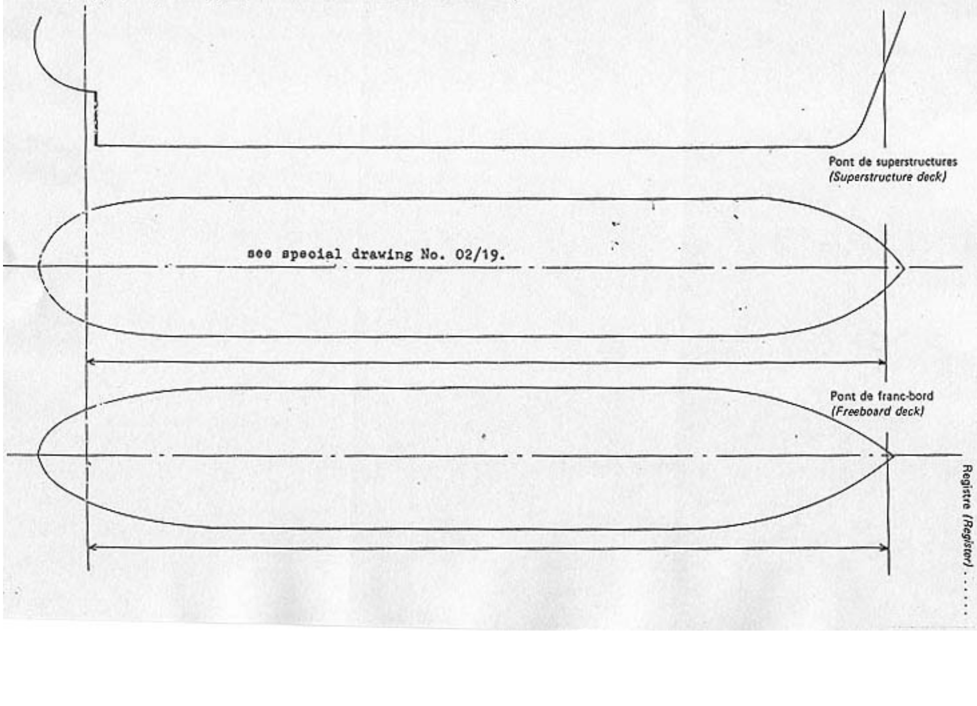
The builder should equally submit a separated file in order to allow considering the possibility of assigning a freeboard to " type A " ships or a reduced freeboard to " type B " ships.

Mod. Ad. ME 195

Un plan aux dimensions appropriées peut être joint au présent rapport de préférence aux schémas figurant dans cette page
(A plan of suitable size may be attached to this report in preference to sketches on this page)

Agencement et dimensions des superstructures, trunks, roufles, encaissement des machines, hauteur des pavois, rambardes et bordages en bois sur le pont exposé, à insérer dans les diagrammes et tableaux qui suivent, ainsi que l'emplacement des écoutilles, passerelles et autres moyens destinés à la protection de l'équipage ; écoutilles de chargement, portes à l'avant et à l'arrière, hublots, sabords de décharge, manches à air, tuyaux de dégagement d'air, capots de descentes et autres éléments qui affecteraient la navigabilité du navire.

(Disposition and dimensions of superstructures, trunks, deckhouses, machinery casings ; extent of bulwarks, guard rails and wood sheathing on exposed deck, to be inserted in the diagrams below and tables following ; together with positions of hatchways, gangway, cargo ports, bow and stern doors, side scuttles, scuppers, ventilators, air pipes, companionways, etc.., which would affect the seaworthiness of the ship).



Registre *(Register)* . . . . . .

PORTES DES SUPERSTRUCTURES, E[illegible]AISSEMENTS EXPOSÉS DES MACHINES ET ROU[illegible]
LES OUVERTURES SITUÉES SUR LES [illegible]TS DE FRANC-BORD ET DE SUPERSTRUCTURE [illegible]REGLES 12, 17 et 18)

(DOORWAYS IN SUPERSTRUCTURES, EXPOSED MACHINERY CASINGS AND DECKHOUSES PROTECTING OPENINGS IN FREEBOARD AND SUPERSTRUCTURE DECKS (REGULATIONS 12, 17 and 18))

Emplacement *(Location)*	N° de référence sur le schéma ou le plan *(Ref. No on sketch or plan)*	Nombre et dimensions des ouvertures *(Number and size of openings)*	Hauteur des seuils *(Height of sills)*	Dispositifs de fermeture *(closing appliances)*	
				Type et matériau *(Type and material)*	Nombre de tourniquets de serrage *(Number of clips)*
Dans la cloison du gaillard *(In forecastle bulkhead)*					
Dans la cloison de château avant *(In bridge forward bulkhead)*	"D1" on 4th deck P. & S.	2 x (1370 x 620)	600	steel	4
Dans la cloison de château arrière *(In bridge after bulkhead)*					
Dans la cloison de pont surélevé *(In raised quarter deck bulkhead)*					
Dans la cloison de dunette *(In poop bulkhead)*					
Dans les encaissements exposés des machines situés sur les ponts de franc-bord ou de demi-dunette. *(In exposed machinery casings on freeboard or raised quarter decks).*					

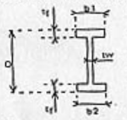
PORTES DES SUPERSTRUCTURES, [illegible]NCAISSEMENTS EXPOSÉS DES MACHINES ET R[illegible]FLES PROTEGEA[illegible]
LES OUVERTURES SITUÉES S[illegible] LES PONTS DE FRANC-BORD ET DE SUPERST[illegible]CTURES (Suite)

DOORWAYS IN SUPERSTRUCTURES, EXPOSED MACHINERY CASINGS AND DECKHOUSES PROTECTING OPENINGS IN FREEBOARD AND SUPERSTRUCTURE DECKS (Continued)

Emplacement *(Location)*	N° de référence sur le schéma ou le plan *(Ref. No on sketch or plan)*	Nombre et dimensions des ouvertures *(Number and size of openings)*	Hauteur des seuils *(Height of sills)*	Dispositifs de Fermeture *(closing appliances)*	
				Type et matériau *(Type and material)*	Nombre de tourniquets de serrage *(number of clips)*
Sur les encaissements exposés des machines situés sur les ponts de superstructures *(In exposed machinery casings on superstructure decks)*					
Sur les encaissements des machines situés à l'intérieur des superstructures ou roufles sur le pont de franc-bord. *(In machinery casings within superstructures or deckhouses on freeboard deck).*	D 7 on 2nd deck	1 x (1670 x 1600)	200	steel	2
Sur les roufles situés dans un emplacement de la catégorie 1 entourant des ouvertures donnant accès sous le pont de Franc-bord. *(In deckhouses in position 1 enclosing openings leading below freeboard deck).*	D 2 D 6 D 8 D 9 D 10 ~~D 11~~	2 x (1370 x 680) (4th deck) 2 x (1450 x 670) (2nd deck) 12 x (1630 x 800) (2nd deck) 4000 x 2600 (2nd deck) 3 x (1700 x 2150) (2nd deck) ~~2 x (1250 x 2150) (2nd deck)~~	600 600 230 - - ~~-~~	steel steel pneumat. doors hydr. door lift doors ~~lift doors~~	4 2 - - - ~~-~~
Sur les roufles situés dans un emplacement de la catégorie 2 entourant des ouvertures donnant accès sous le pont de franc-bord ou à l'intérieur de superstructures fermées. *(In deckhouses in position 2 enclosing openings leading within enclosed superstructures or below freeboard deck).*	D 3 D 4 D 5	2 x (1970 x 1350) (2nd deck) 1370 x 620 (2nd deck) 1970 x 850 (2nd deck)	- 600 -	wire steel wire	- 2 -
Sur les encaissements exposés de la chambre des pompes. *(In exposed pump room casings).*					

ÉCOUTILLES SITUÉES DANS DES EMPLACEMENTS ...
PANNEAUX MOBILES ET RENDUES ÉTANCH AUX INTEMPÉRIES PAR DES PRÉLARTS ET DES SPOSITIFS A ...

HATCHWAYS AT POSITIONS 1 AND 2 CLOSED BY PORTABLE COVERS A SECURED WEATHERTIGHT BY TARPAULINS AND BATTENING DEVICES (Regulation 15)

Emplacement et N° de référence sur le schéma ou le plan *(Position and reference No. on sketch or plan)*						
Dimensions du clair de l'ouverture au sommet du surbau *(Dimensions of clear opening at top of coaming)*						
Hauteur des surbaux au-dessus du pont *(Height of coamings above deck)*						
BARROTS MOBILES Nombre *(Number)* *(PORTABLE BEAMS)*						
Écartement *(Spacing)*						
 b1 x tf						
D x tw						
b2 x tf						
Surface de portage *(Bearing surface)*						
Moyens d'assujettissement de chaque barrot *(Means of securing each beam)*						
PANNEAUX MOBILES *(HATCH COVERS)* Matériau *(Material)*						
Épaisseur *(Thickness)*						
Sens dans lequel ils sont installés *(Direction fitted)*						
Surface de portage *(Bearing surface)*						
Écartement des taquets *(Spacing of cleats)*						
PRÉLARTS *(TARPAULINS)* Nombre d'épaisseurs *(No. of layers)*						
Matériau *(Material)*						

Moyens d'assujettissement de chaque élément transversal de panneau :
(Means of securing each section of covers) :

Les panneaux en bois sont-ils munis à leurs extrémités de bandes en acier galvanisé ?
(Are wood covers fitted with galvanized end bands ?)

ÉCOUTILLES SITUÉES DANS L. MPLACEMENTS DES CATÉGORIES 1 ET 2 FER ES PAR DES PANNEAUX ÉTANCHES AUX INTEMPÉRIES, EN ACIER (OU AUTRE MATÉRIAU ÉQUI LENT), DOTÉES DE GARNITURES ET DE DISPOSITIFS DE SERRAGE (Règle 16)

HATCHWAYS AT POSITION 1 AND 2 CLOSED BY WEATHERTIGHT COVERS OF STEEL (OR OTHER EQUIVALENT MATERIAL) FITTED WITH GASKETS AND CLAMPING DEVICES (Regulation 16)

Emplacement et N° de référence sur le schéma ou le plan *(Position and reference No. on sketch or plan)*	4th deck fr. 167 A 1	2nd deck fr. 146 2x A 2	2nd deck fr. 6 2 x A3			
Dimensions du clair de l'ouverture au sommet du surbau *(Dimensions of clear opening at top of coaming)*	820 x 820	1000 x 690	800 x 800			
Hauteur des surbaux au-dessus du pont *(Height of coamings above deck)*	800	800	600			
Type du panneau ou marque de fabrique *(Type of cover or patent name)*	6 bow nuts	2 clips	2 clips			
Matériau *(Material)*	steel	steel	steel			

Emplacement et N° de référence sur le schéma ou le plan *(Position and reference No. on sketch or plan)*						
Dimensions du clair de l'ouverture au sommet du surbau *(Dimensions of clear opening at top of coaming)*						
Hauteur des surbaux au-dessus du pont *(Height of coamings above deck)*						
Type du panneau ou marque de fabrique *(Type of cover or patent name)*						
Matériau *(Material)*						

OUVERTURES SITU DANS LA TRANCHE DES MACHINES ET OUVE URES DIVERSES DANS LES PONTS DE FRANC BORD ET DE SUPERSTRUCTURES gles 17 et 18)

MACHINERY SPACE OPENINGS AND MISCELLANEOUS OPENINGS IN FREEBOARD AND SUPERSTRUCTURE DECKS (Regulations 17 and 18)

Emplacement et N° de référence sur le schéma ou le plan *(Position and reference No on sketch or plan)*	2nd deck fr. 147 CL F 1	2nd deck fr. 141 CL F 2	2nd deck fr. 66 P.S. F 3	2nd deck fr. 0 P.S. F 4	2nd deck fr. 0 St.b. F 5	
Dimensions *(Dimensions)*	1560x2280	1580x2280	2260x2280	3500x2300	3500x2300	
Hauteur du surbau *(Height of coaming)*	flush deck	flush deck	flush deck	flush deck	flush deck	
PANNEAU *(COVER)* Matériau *(Material)*	steel	steel	steel	steel	steel	
PANNEAU *(COVER)* Moyen d'attache *(How attached)*	by screws	by screws	by screws	by screws	by screws	
Nombre et écartement des cabillots *(Number and spacing of toggles)*	28 screws spacing=300	28 screws spacing=300	28 screws spacing=300	38 screws spacing=300	38 screws spacing=300	

Emplacement et N° de référence sur le schéma ou le plan *(Position and reference No on sketch or plan)*						
Dimensions *(Dimensions)*						
Hauteur du surbau *(Height of coaming)*						
PANNEAU *(COVER)* Matériau *(Material)*						
PANNEAU *(COVER)* Moyen d'attache *(How attached)*						
Nombre et écartement des cabillots *(Number and spacing of toggles)*						

MANCHES A AIR SITU SUR LES PONTS DE FRANC BORD ET DE SUP STRUCTURES (EMPLACEM TS DES CATÉGORIES 1 ET 2) (Règle 19)

VENTILATORS ON FREEBOARD AND SUPERSTRUCTURE DECKS (POSITION 1 AND 2) (Regulation 19)

Pont sur lequel elles sont installées *(Deck on which fitted)*		Nombre de manches à air installées *(Number fitted)*	Surbau *(Coaming)* Dimensions *(Dimensions)*	Surbau *(Coaming)* Hauteur *(Height)*	Type (Préciser la marque de fabrique s'il y en a une) *(Type)* *(state patent name if any)*	Moyens de fermeture *(Closing appliances)*
4th deck	V 1	6	400x200	900	Goosenock	steelcover with one bow nut
4th deck	V 2	2	Ø 810	1700	EMA-VS-SLD	Fireflap
	)	6	1200x1300	700	Jalousies	Jalousies with closing laminae
4th deck	V 3)	2	1200x800	1120	"	" " " "
	)	2	1000x1100	840	"	" " " "
4th deck	V 4	12	1000x1400	700	"	" " " "
4th deck	V 5	2	500x600	700	"	" " " "
2nd deck	V 6	24	600x500	4950	"	Fireflap

TUYAUX DE DÉGAGEMENT D'AIR ... ÉS SUR LES PONTS DE FRANC BORD ET DE S... RSTRUCTURES (Règle 20)

AIR PIPES ON FREEBOARD AND SUPERSTRUCTURE DECKS (Regulation 20)

Pont sur lequel ils sont installés *(Deck on which fitted)*	Nombre de tuyaux installés *(Number fitted)*	Surbau *(Coaming)*		Type (Préciser la marque de fabrique s'il y en a une) *(Type)* *(state patent name if any)*	Moyens de fermeture *(Closing appliances)*
		Dimensions *(Dimensions)*	Hauteur *(Height)*		
2nd deck	1	ø 200x5,9	915	Air pipes	39 with opening in shell without closing appliance. acc. to draw. 61/1.
2nd deck	16	150x4,5	915	" "	
2nd deck	8	100x4,5	915	" "	
2nd deck	16	90x4,5	915	" "	31 with manuell closing acc. to drawing No. 61/3
2nd deck	25	65x4,5	915	" "	
2nd deck	5	50x4,0	915	" "	
2nd deck	11	40x4,5	300	sounding pipes	screw closing
2nd deck	7	40x4,5	fl.deck	" "	screw closing
2nd deck	15	ø50-ø150 x4; 4,5	800-950	filling- and band over pipes	flange closing

SABORD DE CHARG...ENT ET AUTRES OUVERTURES ANALOGUES (R...le 21)

CARGO PORT AND OTHER SIMILAR OPENINGS (Regulation 21)

Emplacement du sabord *(position of port)*	Dimensions de l'ouverture *(Dimensions of opening)*	Distance du can inférieur au pont de franc-bord *(Distance of lower edge (from freeboard deck)*	Dispositifs d'assujettissement *(Securing devices)*	Observations *(Remarks)*
Bow part	1 x(5500 x 5150)	-	hydr. closing	by von Tell
Stern parts	2 x (7000x5100)	-	" "	" " "
Fr. 123 D 12	2 x (600x1700)	200 above 2nd deck	6 taggle-bolts	-
Fr. 80 D 13	2 x (2000x1200)	500 above 2nd deck	hydr. closing	by von Tell
Fr. 1 D 14	2 x (600x1700)	200 above 2nd deck	6 taggle-bolts	-
Fr. 80u D 15	2 x (2800x2200)	100 above 4th deck	hydr. closing	by von Tell

All parts with rubber-packing and according to approved drawings.

SCUPPERS, INLETS AND DISCHARGES *(Regulation 22)*

Préciser s'il s'agit de dalot ou de décharge *(State if scupper or discharge)*	Nombre *(Number)*	Tuyau *(Pipe)* Diamètre *(Diameter)*	Épaisseur *(Thickness)*	Matériau *(Material)*	Provenant de *(From)*	Distance verticale au-dessus de la quille *(Vertical distance above top of keel)* — Décharge *(Discharge)*: Sortie dans la coque *(outlet in hull)*	Extrémité du tuyau de décharge à l'intérieur du navire *(Inboard end)*	Clapet situé à l'emplacement le plus élevé *(Uppermost valve)*	Nombre, type et matériau des clapets de décharge *(Number, type and material of discharge valves)*	Emplacement des commandes *(Position of controls)*
D	1	ø 50	7,5	MS	Bilge-pump	4650	4650	4650		
D	2	ø300	17,5	MS	Main-engine	4300	4300	7000		
D	1	ø200	17,5	MS	Bilge-pump	4300	4300	4300	Remote-	
D	1	ø200	17,5	MS	Aux.-engine	4590	4590	4590	controlled	
D	1	ø200	17,5	MS	Ballast-pp.	4580	4580	4580	cast	
D	1	ø200	17,5	MS	Ball.-system	4550	4550	4550	steel	
D	1	ø150	17,5	MS	Bilgo-pump	3200	3200	3200		engine
D	1	ø200	17,5	MS	Em.bilge-p.	3200	3200	3200		control-
D	1	ø200	17,5	MS	Bilge-pump	2500	2500	2500		room
D	1	ø250	17,5	MS	Coolw.aggr.	4500	4500	4500		
D	4	ø150	17,5	MS	KaMeWa-plant	3000	3000	3000		
D	2	ø100	17,5	MS	Sewage-plant	5700	2200	5700		
D	2	ø100	17,5	MS	DW-tanks	5700	5700	5700		
D	1	ø150	17,5	MS	Prov.cool.pl.	4500	4500	4500	spring loaded	at outlet
S	24	ø150	12,5	MS	2nd deck	5700	2nd deck	5700	" "	2nd deck
S	8	ø100	11,0	MS	4th deck	5700	4th deck	5700	no valve	-

S – Dalot *(Scupper)*
D – Décharge *(Discharge)*

MS – Acier doux *(Mild steel)*
CS – Acier moulé *(Cast steel)*
GM – Bronze industriel *(Gun metal)*
Indiquez tout autre matériau approuvé, le cas échéant
(Any other approved material to be designated)

SD – Soupape à clapet attelé *(Screw down)*
ANR – Clapet automatique de non retour *(Automatic non-return)*
SD ANR – Clapet automatique de non retour avec moyen de fermeture direct *(Screw down automatic non-return)*

HUBLOTS (Règle 23)
SIDE SCUTTLES (Regulation 23)

Emplacement *(Position)*	Nombre de hublots installés *(Number fitted)*	Dimensions de la surface nette du verre *(Clear glass size)*	Fixe ou ouvrable *(Fixed or opening)*	Matériau *(Material)* Cadre *(Frame)*	Contre-hublot *(Dead-light)*	Type et épaisseur du verre *(Type of glass and thickness)*	Normes utilisées et type N° *(Standards used) and type No)*
2nd dock	6	ø 300	fixed	steel	steel	15 mm	150 Type B
2nd deck	12	ø 300	opening	steel	steel	15 mm	150 Type B
3rd deck	14	ø 300	fixed	steel	steel	15 mm	150 Type B
3rd deck	2	ø 300	opening	steel	steel	15 mm	150 Type B
4th deck	30	600x1500	fixed	steel	no dead-light	10 mm	150
4th deck	75	400x800	fixed	steel	no dead-light	10 mm	150
4th deck	4	400x800	opening	steel	no dead-light	10 mm	150
4th deck	4	400x800	fixed	steel	steel	10 mm	150
4th deck	4	400x800	opening	steel	steel	10 mm	150

Indiquer la distance verticale entre le pont de franc-bord et le can inférieur du hublot situé à la plus grande distance verticale au-dessous du pont de franc-bord.

(Indicate the vertical distance between the freeboard deck and the lower sill of the side scuttle positioned at the greatest vertical distance below the freeboard deck).

SABORDS DE DÉCHARGE (Règle 24)
FREEING PORTS (Regulation 24)

	Longueur du pavois *(Lenght of bulwark)*	Hauteur du pavois *(Height of bulwark)*	Nombre et dimensions des sabords de décharge de chaque bord *(Number and size of freeing ports each side)*	Section totale de chaque bord *(Total area each side)*	Section requise de chaque bord *(Required area each side)*
Puits arrière sur le pont de franc-bord *(Freeboard deck after well)*					
Puits avant *(Forward well)*	26,4 m	1,75-2,85m	1 x (5,65 m x 0,10 m) 1 x (3,70 m x 0,10 m)	0,935 m^2	0,924 m^2
Pont de superstructures *(Superstructure deck)*					

Préciser l'emplacement arrière et avant de chaque sabord de décharge par rapport aux cloisons d'extrémités de superstructures
(State fore and aft position of each freeing port in relation to superstructure end bulkheads)

Puits arrière *(After well)* —
Puits avant *(Forward well)* —

Détails sur les volets battants, barres ou tringles dont sont munis les sabords de décharge
(Particulars of shutters, bars or rails fitted to freeing ports) none

Hauteur du seuil inférieur du sabord de décharge au-dessus du pont
(Height of lower edge of freeing port above deck) 100 mm

PROTECTION DE L'ÉQUIPAGE (Règles 25 et 26)
PROTECTION OF THE CREW (Regulations 25 and 26)

Donner des détails sur les pavois ou rambardes installés sur les ponts de franc-bord ou de superstructures :
(State particulars of bulwarks or guardrails on freeboard and superstructure decks :)

As per drawing No. 02/19

Donner des détails sur les filières, passages, passerelles ou passages sous pont, lorsqu'ils sont prescrits :
(State details of lifelines, walkways, gangways or underdeck passageways where required to be fitted :)

—

DISPOSITIF D'ARRIMAGE DES CHARGEMENTS DE BOIS EN PONTÉE (Règle 44)
TIMBER DECK CARGO FITTINGS (Regulation 44)

Donner des détails sur les montants, sabots, saisines, rambardes et filières :
(State particulars of uprights, sockets, lashings, guardrails and lifelines :)

—

AUTRES CARACTÉRISTIQUES PARTICULIERES
OTHER SPECIAL FEATURES

Les conditions d'assignation figurant dans le présent recueil correspondent aux aménagements et installations prévus à bord du navire et sont conformes aux dispositions des règles pertinentes de la Convention Internationale de 1966 sur les lignes de charge.

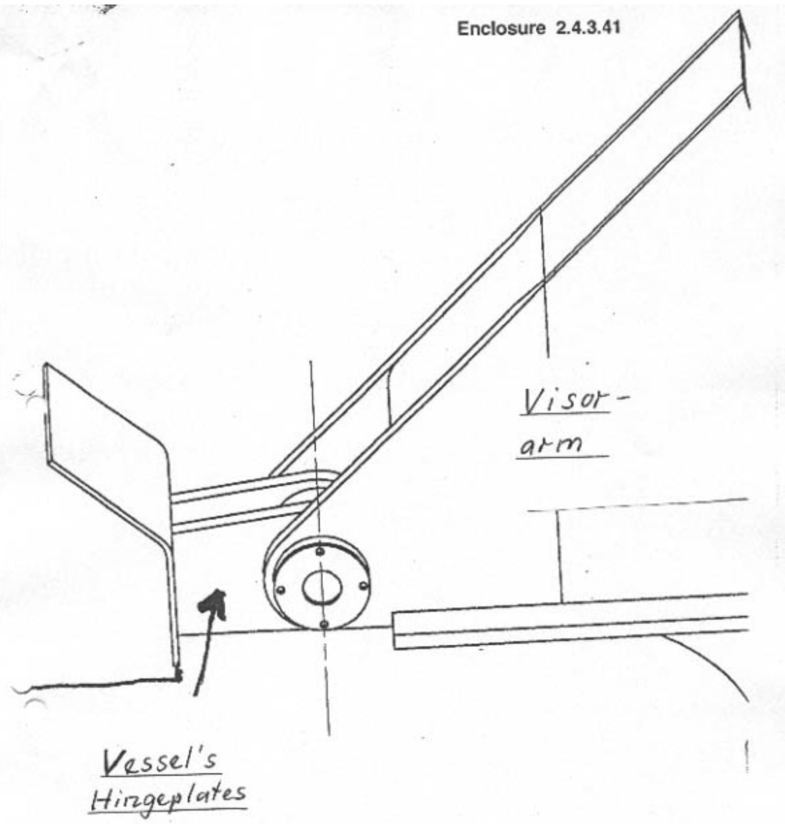
(The conditions of assignment shown on this form are a record of the arrangements and fittings provided on the ship and are in accordance with the requirements of the relevant regulations of the International Convention on Loadlines, 1966).

A Oldenburg, le April 23, 1980
(Place) *(Date)*

J. Brazonovic
(Signature)

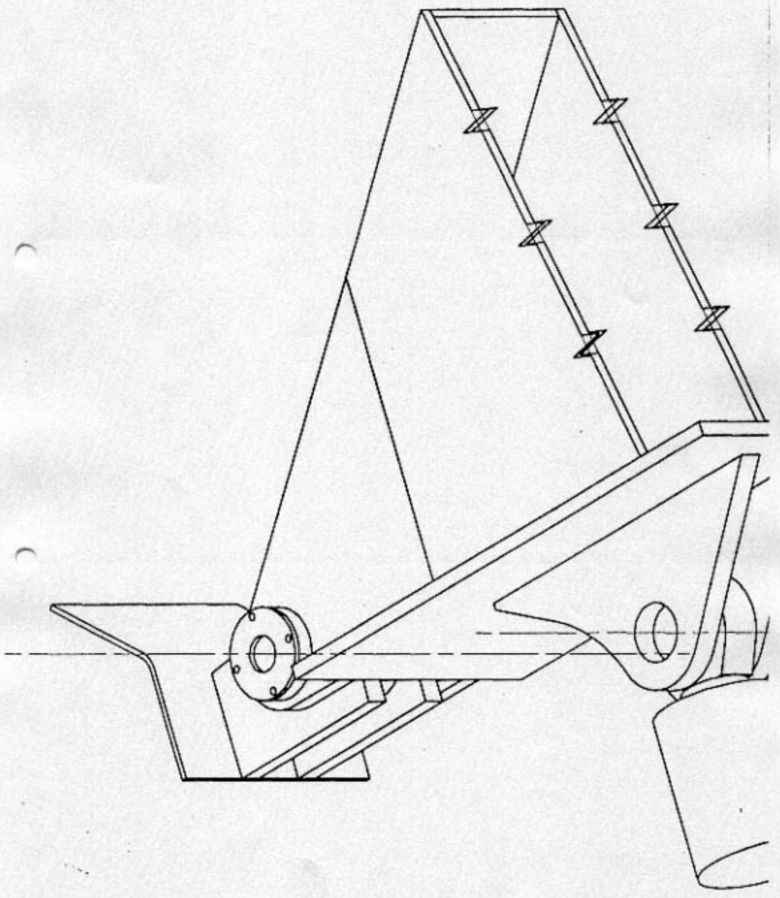
Expert du BUREAU VERITAS
(Surveyor to BUREAU VERITAS)


Enclosure 2.4.3.40



VIEW "X"

VIEW "X"



Nr.	Art der Änderung	Datum	Name
3			
2	Scharnierbleche geändert	2.1.80	Se
1	geprüft: von Tell	22.11.79	Se

Maßstab: 1:10	Jos. L. Meyer Papenburg (Ems) Schiffswerft, Maschinenfabrik, Dockbetrieb
Datum: 31.10.79 Se	Bugklappenverriegelung

Gewerk.	Schiffs Nr.	Sektions Nr.	Zeichn. Nr.	Archiv Nr.
	590		1106	

Von Tell GmbH
Sophienallee 24

2000 Hamburg 19

TBS/Se/Sk -257 09.01.1980

Ihre Komm. Nr. 4911.1/60.151.1
Mein Neubau S. 590

Sehr geehrte Herren,

anliegend erhalten Sie 2 Pausen der Zeichnung

1106 Bugklappenverriegelung .

In dieser Zeichnung ist das Bugklappenscharnier in der geänderten Form (gegenüber S. 593) dargestellt.

Bitte prüfen Sie die Zeichnung und senden Sie mir eine Pause, mit Ihrem Genehmigungsvermerk versehen, zurück.

Mit freundlichem Gruß

J O S. L. M E Y E R

Anlage

Enclosure 2.4.3.44

Bureau Veritas
Hopfenmarkt 33

2000 Hamburg 11

TBS/De/Sk -257 9.01.1980

Mein Neubau S. 590

Sehr geehrte Herren,

anliegend erhalten Sie 4 Pausen der Zeichnung

1106 Bugklappenverriegelung.

In dieser Zeichnung ist das Bugklappenscharnier in der geänderten Form (gegenüber S 592) dargestellt.

Bitte prüfen Sie die Zeichnung und senden Sie mir eine Pause, mit Ihrem Genehmigungsvermerk versehen, zurück.

Mit freundlichem Gruß

J O S. L. M E Y E R

Anlage

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1979 09 25	Informal meeting with Mr Zerrahn.
1979 10 04	Inspection of double bottom sections iwo gear foundations.
1979 10 09	Meeting with yard and owner in drawing office.
1979 10 10	Meeting with Mr Brück of Seebeckwerft at Bremerhaven, supplier of deck house sections.
1979 10 12	Inspections on building berth and in shops.
1979 10 24	Meeting and inspection.
1979 11 05	Inspections on building berth and in shops. Meeting with yard managers, X ray program made.
1979 11 08	Inspections and discussions at the yard.
1979 11 13	Meeting at Bremerhaven Seebeckwerft.
1979 11 14	Inspections at Bremerhaven; Messrs Rickmerswerft & Tileman.
1979 11 16	Inspections of sections at Messrs Rickmerswerft & Tileman. Inspection of double bottom tanks at the yard.
1979 11 23	Pressure test and inspection of tanks. Meeting with owners rep. & yard
1979 11 28	Inspection and pressure test of tanks.
1979 12 04	Inspection of sections at Bremerhaven - Rickmerswerft.
1979 12 05	Pressure test and inspections of tanks. Inspection of tweendeck spaces before painting and insulation.
1979 12 06	Seebeckwerft, Bremerhaven, inspections.
1979 12 11	Air test of void spaces. Inspections of db tanks and engine rooms.
1979 12 13	Inspection of tanks, cofferdams as well as pressure tests.
1979 12 14	Seebeckwerft Bremerhaven, inspections and meeting.
1979 12 17	Seebeckwerft Bremerhaven, inspection of superstructures.
1979 12 18	Meeting and inspections.
1979 12 19	Pressure test of tanks. Rickmerswerft, Bremerhaven, inspection of bulbous bow sections.
1979 12 20	Pressure test of heeling tanks (tk 14). Discussion in yard offices.
1980 01 06	Pressure test and inspections of tanks.
1980 01 08	Seebeckwerft Bremerhaven, inspection of superstructures.

Enclosure 2.4.3.44.1

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1980 01 14	Air test of both heeling tanks. Inspection of tween deck spaces. All 4 aux. units in the aux. eng. room. First sections from Bremen have arrived in Papenburg.
1980 01 16	Pressure tests witnessed by owners representatives.
1980 01 18	Seebeckwerft & Rickmerswerft, bremerhaven; insp. of sections. Pressure test of small tanks at old facilities.
1980 01 29	Inspection and pressure tests.
1980 01 30	Tests of small tanks -at old facilities-
1980 02 01	Inspection of tanks, spaces and tweendeck spaces.
1980 02 04	Seebeckwerft, Bremerhaven, inspection of superstructure sections.
1980 02 05	AUT meeting with MM Trousse & Lavaine. Pressure tests and inspections according to programme.
1980 02 07	Inspections and discussions with owners rep. and yard.
1980 02 08	Inspection of tanks and tweendeck spaces. Start of freeboard report survey.
1980 02 12	Inspection and pressure tests of tanks and cofferdams.
1980 02 15	Continuation of insp. and pressure tests.
1980 02 19	Inspection of both rudders and identification of materials in the workshops - at old facilities-
1980 02 21	Pressure test of tanks and inspection of several spaces.
1980 02 26	Inspection and pressure tests of tanks and void spaces. Inspection of staircases. Viewing of X ray films.
1980 02 29	Inspection and pressure tests of tanks.
1980 03 04	Inspection and supervision.
1980 03 05	Seebeckwerft, Bremerhaven, inspections and supervisions with owner and yard.
1980 03 06	Inspections of tanks, cofferdams and staircases
1980 03 11	Inspection of cofferdam iwo: swimming pool; prov. stores and steering gear compartment. Check of fire protection insulation.

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1980 03 14	Pressure tests of tanks. Inspection of shell plating. Pressure tests of starting air lines and hydraulic lines.
1980 03 18	Pressure tests of cofferdams and inspection of bulkhead on frame 133. check of shaft struts.
1980 03 28	Internal inspection of fresh water tanks. Check of bow ramp connections. Check of armatures for the Sanea pump units. Inspection of section butts of the upper superstructures.
1980 03 31	Check of fwd draught marks. Discussion about Superfos hydraulic control room and inspection of Sanea pump units.
1980 04 01	Completion of recording for inspection on 25 March 1980. Checks of rudder main pieces and pintles with nuts and bearings. Freeboard record with drawings examined.
1980 04 02	Inspection of trim tank N° 2 WB and starboard side "C" deck. Recommendations made.
1980 04 09	Fitting of pintle bushes in both skegs verified. Checking of PS rudder main piece. Pressure tetst of freshwater tanks N° 56 & 57. Checking of bow thruster motor foundation forward. Checking of X ray films.
1980 04 11	Pressure tests of sea chests and void spaces. Inspection of fresh water tanks N° 56 & 57
1980 04 15	Fitting of shaft bushes checked. Draught marks aft examined.
1980 04 17	Fitting of propeller shaft stbd witnessed. Surveys for freeboard report.
1980 04 18	Fitting of shaft bushes.
1980 04 21	Fitting of propellershaft ps witnessed. Meetings with Messrs Zerrahn & Watermann.
1980 04 22	Check of fitting of starboard side rudder. Inspection of insulation. Bottom inspection.

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1980 04 23	Surveys for freeboard report.
1980 04 24	Check of fitting of port side rudder. General hull survey. Discussion with Mr Zerrahn about Sanea plant inspections. Air test of fore peak.
1980 05 05	Surveys in the car deck area "C" deck.
1980 05 09	Informal visit with Mr Arpe. Visit of Sanea plant parts.
1980 05 12	Air test of stern tank. Pressure tests of piping systems. Check of car deck insulation. Pressure test of Sanea boiler.
1980 05 14	General survey. Pressure test sprinkler system Inspection of Sanea thermal oil boiler plants.
1980 05 16	Pressure test of two Sanea collectors. Informal visit with Mr Kranz.
1980 05 21	Check of alignment of both shaft lines up to gears. Inspections in engine room.
1980 05 22	Surveys and meetings in different offices.
1980 05 27	Continuation of meetings 22 May 1980.
1980 05 28	Load test of car deck sections. Surveys and meetings. Discussion about insulation of thermal oil piping systems with Mr Bless.
1980 05 29	Load tests of car deck sections, insulation as before discussed.
1980 05 30	Load tests of car deck sections.
1980 06 02	Alignment of both main engines checked. Pressure test of thermal oil boilers (th. oil side).
1980 06 03	Different surveys. Meeting with Mr Breitschneider Siemens about load tests.
1980 06 04	Different surveys. Meeting with Mr Zerrahn. Pressure tests of thermal oil lines.
1980 06 05	Check of insulation below "C" deck. Further check of alignment of MEs. Check of water tight doors. Electrical load tests.
1980 06 06	Inspection of double bottom tanks for check of bottom plating after launching. Pressure test of steam lines in forward air cond. rooms. Air test of thermal oil lines. Load tests with all four auxiliary engine

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1980 06 09	Discussion about freeboard marks.
1980 06 10	Pressure test of CO2 lines. Check of free board marks.
1980 06 11	Inspection of side and centre houses on cardeck. Loads tests of boats and davits. Test of quick closing valves. Tel. conv. with Mr Lavaine about trials.
1980 06 12	Pressure test of CO2 lines. Boat and davit tests. Test of bilge lines and pumps.
1980 06 13	Test of bilge systems. Boat and davit tests. Load test of port side forward crane. Load test of starboard side forward car ramp.
1980 06 16	Load test of portside forward car ramp.
1980 06 18	Load test of car deck sections. Boat and davit tests. Load test of port side aft crane. Pressure test of different pipings.
1980 06 19	Load tests of boats and davits. Load tests of crane rails in ER. Load test of starboard side aft car ramp.
1980 06 20	Load test of crane rails. Test of emergency Diesel unit. Boat tests. Hose test of port side stern door.
1980 06 21	Inclining experiment with Mr Engelmann of FSS. Pressure test of starting air lines. Load tests of container lifts.
1980 06 23	Hose and function tests of passenger shell doors on C and D decks, port and starboard sides.
1980 06 25	Trip from Papenburg to Leer. Tests of watertight doors. Start of tests.
1980 06 26	Continuation of sea trials with tightness tests. Check of bow visor. Check of alarms.
1980 06 27	Start manoeuvers of main engines. Function tests of watertight doors from bridge console. Test of quick closing systems from car deck.
1980 06 28	Sea trials.

SURVEYS BY BUREAU VERITAS DURING CONSTRUCTION OF M/S ESTONIA

Survey dates	Locations, subjects & items surveyed
1980 06 29	Sea trials and arrival at Emden.
1980 06 30	Checks of main engines before departure from Emden for Mariehamm through Kiel canal. Tests according to trial programme.
1980 07 01 until	Tests according to trial programme.
1980 07 07	ditto
1980 07 30 until	Several AUT checks and tests during voyages between Finland and Sweden.
1980 08 02	AUT trials not completed.
1980 11-12	Several AUT trials after completion of remaining work on voyages between Stockholm and Turku. AUT Certificate handed over.

Enclosure 2.4.3.44.2

The German Group of Experts investigating the sinking of M/V "ESTONIA"

c/o AHLERS & VOGEL · Schaartor 1 D-20459 Hamburg · Telephone 49-40-371075

Confidential Memo

cc : Dr. Holtappels
T. Wilkendorf

Meeting with principal surveyor of B.V. Stockholm office,
Lars Olof Ålander on 19th June 1995

1. BV Organisation in Sweden/Finland up to 1990

   Head office for Sweden was and is Gothenburg.
   Manager: Hans Olsson
   Stockholm and Trelleborg/Malmö report to Gothenburg,
   Gothenburg reports to Paris.
   B.V.'s office for Finland was and is in Helsinki (plays no part in the "ESTONIA" matter),
   as of 1990 - Head office for the northern countries established in Copenhagen
   as of 1995 – B.V. office in Tallinn.

2. Reporting procedure

   - Hull
   - Machinery
   - Automatic systems (AUT)

   The system consists of surveys totalling 1500 items over a period of 5 years, i.e. 300 items every year.

3. Load Line Survey (annually)

Was executed for F.B.N. resp. Sjöfartsverket and consisted of survey resp. determining condition of car deck doors, staircases, scuppers, valves, etc. visor/bow ramp and stern ramps as well as the locking devices and rubber seals of same.

(The locking devices are not part of the Load Line Survey, although they should be).

The B.V. Report Form did not include the visor at that time because it was considered to be more of a breakwater.

It was clear to everyone that the bow ramp on all older ferries would not fulfil the SOLAS Regulation 10 requirement as upper extension of the collision bulkhead. However, it was not and is not the field surveyor's business to criticise this construction characteristic - evidently approved by the head office. The rubber sealings - also of the visor - are part of the L.L. Surveys. As the final item of an L.L. Inspection, the closed and locked visor should be hose tested.

4. Role of the F.B.N. and Sjöfartsverket Ship Safety Inspectors

- Examine all certificates
- Inspect social rooms / cabins / passenger accommodations
- Inspect life-saving and fire-fighting equipment
- Inspect navigation instruments
- Issue (PC) Passenger Ship Safety Certificate (annually), and thereby confirming that the vessel meets SOLAS requirements, although this is not the case.

5. The upper extension of the collision bulkhead above freeboard deck

- After the "ESTONIA" catastrophe the seasafety director of Sjöfartsverket, Bengt-Erik Stenmark, ordered an investigation within Sjöfartsverket to find out how many ferries on the Baltic did not meet the SOLAS Regulation 10 requirement for the upper extension of the collision bulkhead. There were a total of 40 vessels. The list with the names of these vessels is kept confidential within Sjöfartsverket, however, reportedly a copy was sent by fax to the Finnish Commission in Helsinki.

- Upon searching for an explanation for the above-mentioned it was discovered that apparently the bow ramp had been approved for the first time by a National Maritime Administration as the upper extension of the collision bulkhead for the ferries "PRINS BERTIL" and "PRINSESSAN CHRISTINA", built in Aarhus in 1960/61 - although the position of the upper extension of the collision bulkhead above bulkhead deck was already determined by SOLAS 1948 (probably with the restriction of no further than 20 sm away from the nearest land).
- In the course of the following years the National Maritime Administration of the countries surrounding the Baltic developed a practice by which this deviation from SOLAS Regulation 10 was accepted even on larger ferries, i.e. the far too short distance between the bow ramp as upper extension of the collision bulkhead and the forward perpendicular, of course mainly in compliance with owners' request.

6. "VIKING SALLY" - "WASA KING"

- Chief engineer Lars Karlsson was onboard from time of commissioning until the sale of the vessel and is the person best acquainted with this ship (now onboard "BIRKA PRINCESS").
- On repeated occasions the visor was closed with locking devices already in closed position. This led to damages of the lugs and bolts (also on "DIANA II").

  Visor and ramp always belong to the Chief Mate's duties on Swedish/Finnish ferries (on "ESTONIA" it was the boatswain's duty).
- He supervised the "VIKING SALLY" in Stockholm and took care of the normal survey items. She sometimes called at the yard Finnboda, Stockholm and sometimes at the Naantali or Turku yards. In latter case he left the surveys up to the BV Helsinki office.

He was not part of the building supervision (that belonged to Lohmann and Axe).

- When the ship came to Stockholm for the first time the Passenger Ship Safety Certificate (Interim) was issued by the F.B.N.
- He was onboard the "WASA KING" for the last time in 1992 to do a boiler survey. At this time a Nordström & Thulin captain was already onboard as a trainee because N&T did not have personnel with ferry experience.
- He knows that the sensors of the Atlantic lock had been changed several times. Also Anders Wirstam knows this. However, B.V. Paris had instructed them not to talk about it.

  If the class symbol would have contained the unrestricted AUT the sensors would be a class item. "VIKING SALLY" however only had a restricted (AUT), therefore it is not clear. Under no circumstances are the sensors a matter for the F.B.N.

  The class should have inspected the sensors, however this was never done in practice.
- All electrical systems were subjected to annual megger testing, therefore also the sensors of the bow visor locking devices.
- In his opinion the correct functioning of the sensors / control lamps are a pre-condition for the seaworthiness of the vessel.
- In his opinion the manual locking devices of the bow visor are "heavy weather securings", which have to be engaged in case heavy weather should be forecasted. Locking devices are a class item and not the responsibility of the F.B.N.
- The officers were not allowed to do any manoeuvres without the approval of the master on the "ESTONIA", especially no engine manoeuvres. Up to now, i.e. including the "MARE BALTICUM", they had not learned how to handle 2 x 12000 hp.
- From talks with Anders Wirstam he knows as well that from the time of taking over no further maintenance of the vessel had been carried out. They only painted for "the eye".

- At the time of the casualty the vessel did not have a valid stability manual (was completed only in April 1995).
- Due to the "Continuous Survey of Hull and Machinery" procedure - 58 tanks were to be inspected among others - Anders Wirstam was on board on the following days in addition to the taking over: 31.01.94; 17.03.94; 06.04.94; 11.05.94; 30.08.94; 21.09.94.
- One day before the disaster occurred Anders Wirstam went on his honeymoon. The first he heard upon arrival was about the sinking. He returned immediately and was afterwards 3 months in psychiatric treatment.
- During a meeting at Bureau Veritas head office in Paris Anders Wirstam and Hans Olsson expressed their opinion that the vessel had been too large and too complicated for the inexperienced crew.
- He has collected 20.000 negatives in the course of his job-life which he will now check for photographs of "VIKING SALLY".
- He was asked by the claims manager Sverker Jonasson of Trygg Hansa - the leading hull underwriter of "ESTONIA" - if there would be reasons to justify that the insurance amount of USD 60 million should not or not yet be paid, because he was pressed by Bergmann from N&T for payment already since shortly after the sinking. His reply was NO because the ship had clean certificates. Based on his knowledge of today, however, his reply would have been to the contrary.
- In his view "ESTONIA" departed from Tallinn on her last voyage with "suspended class" because she had problems to close the visor correctly. (When Lars Olof Ålander stated this, he still did not know our points).

  He has based his above conclusion on the statement of pilot Gerhard Stenhammar, who had observed - a few weeks before the catastrophe occurred - that only after about 15 minutes of opening and closing the visor - combined with hard shocks of visor and the entire foreship - the crew was able to close the visor. According to his view and the interpretation of the pilot this indicates that the visor must have been completely "out of geometry".

- After we had submitted the results of our investigation he was shocked in his capacity as representative of the class. He stressed that the following points - each separately – did affect respectively have affected the class:
  - condition of the sternpost
  - condition of the rubber packings
  - cracks in the visor hinges
  - poor repairs of the foundation of the port actuator of the visor
  - severe old damage at forward part and port side of the visor's shell plating
  - missing sensors at the Atlantic lock
  - missing/weak weldings at the lugs/bushings of the Atlantic lock
  - a not properly operated securing bolt of the bow ramp and consequently missing indicator lights on the bridge
  - changes of the visor lug of the Atlantic lock

  All these points should have been presented to the class. The repairs of the cracked lugs at the port cylinder on B-deck should have been carried out by a skilled shore company under the supervision of the class.

7. "ESTONIA"

- Upon instructions of Hans Olsson - chief executive Gothenburg office - Anders Wirstam exclusively looked after the "ESTONIA" in respect of her class and the safety matters for the Estonian Board of Navigation. This was also the case when the vessel had been in the shipyard at Turku. Wirstam reported directly to Hans Olsson, i.e. without using the official channel, viz. Lars Olof Ålander.
- He knew about the contract between Bureau Veritas/Estonian Board of Navigation, but the contents are strictly confidential.
- During taking over the "ESTONIA" in January 1993 Hans Olsson, Anders Wirstam and one borrowed Sjöfartsverket inspector were present. The ship was checked and found to be in order. However, he was excluded from all activities concerning the taking over of the "ESTONIA". The reason could

have been his aversion against Ulf Hobro, the technical Inspector of Nordström & Thullin in charge of the "ESTONIA".

- Already from the beginning it was known that the Estonian crew was very inexperienced and that Nordström & Thullin had to use a lot of Swedish advisers on board. Hans Olsson and Anders Wirstam as well as the surveyor for the hull and P&I underwriters accepted the crew more or less, at least no one raised any objections.
- He knows from talks with Anders Wirstam that he and Hans Olsson had spent a lot of thoughts on the total incompetence of the crew, especially of the navigators (2nd and 4th Officer were playing pinball machine on the bridge, 1st Officer was so immovable that he was not able to put on/take off a T-shirt without help).

8. <u>Other Information</u>

- The surviving passenger Pierre Thiger reported that he has been at the bar with his colleagues, when - at 23.47 hours (Swedish time) i.e. 00.47 hours Estonian and board time - the vessel was shaking seriously and "a sharp metallic bang" was heard. About 60 seconds later the same occurred again. After the 2nd shock the vessel fell into a wave trough and came up again, then heavy rolling started which finally ended with a starboard list.

  The passenger could not decide to go over board with the others and stayed on the port boat deck (more forward than amidships) as long as possible. He was probably one of the last to leave the ship. At this time the vessel was totally on her starboard side and seriously trimmed by the stern which, he believes, was already aground whilst the foreship was still afloat. This is possible due to the length of the ship and the water depth.

- On 05.06.95 in the morning broadcast of Radio 1 (presenter: Helena Groll; reporters: Erik Ridderstolpe and Lars Greipe) it was reported that the chairman of the Masters and Ship Officers Association, Christer Lindvall, had stated that the indications that the "ESTONIA" had left Tallinn in unseaworthy condition were becoming stronger. Cracks in the collision bulkhead below car deck and bow thruster room were mentioned.
- The key persons knowing everything about the condition of the "ESTONIA" are Anders Wirstam, the surveyor of Bureau Veritas and Åke Sjöblom, chief inspector of Sjöfartsverket's Malmö office, who had been temporarily lent to the Estonian Board of Navigation and trained apprentices. The training took place on board the "ESTONIA" until shortly before her last departure. Since the casualty occurred Sjöblom has been pressed by his superiors and the public to make a report. Up to now he has refused this with the argument that he worked for the Estonians. He is becoming more and more a drinker and also during the day shall not sober up anymore.

20.06.95 - Werner Hummel

Enclosure 2.4.3.45

Bureau Veritas

INTERNATIONAL REGISTER FOR CLASSIFICATION OF SHIPS · ESTABLISHED 1828
REGISTRO INTERNACIONAL PARA LA CLASIFICACION DE BUQUES · FUNDADO EN 1828

CERTIFICATE OF CLASSIFICATION
CERTIFICADO DE CLASIFICACION

Certificate / *Certificado* No. 037015

No. 35 P 387 in Register Book / *en el Registro*

~~[illegible]~~"
"W A S A   K I N G"
HULL / *CASCO*

This is to certify that the above named / *El abajo firmante certifica que el buque* steel motor ship has been / *ha sido* surveyed for renewal of the certificate at/*en* Stockholm in/*en* June/July 1990
by Surveyors to the Society, in accordance with the requirements of the Rules.
por el personal técnico de la Sociedad, de acuerdo con las prescripciones de Reglamento.

Owners/*Armador* : ~~Vasabåtarna/AB~~ Wasa Line Oy Ab

Flag/*Bandera* : Finnish   Port of Registry/*Puerto de matrícula* : ~~Mariehamn~~ (Vasa) Vaasa

Registered tonnage, Gross/*Arqueo bruto* : 15 566,89 RT   Net/*Neto* : 8 372,46 RT

Built at/*Construido en* : Papenburg   by/*por* : Jos. L. Meyer

Completed in/*Acabado en* : July 1980

The ship has been entered in the Register Book with the classification symbols :
El buque ha sido inscrito en el Registro con los símbolos de clasificación :

I 3/3 E

and the marks and notations : / *y las marcas y menciones*
✠ PASSENGER FERRY
DEEP SEA
~~Ice/Class/I/A~~ ICE CLASS I A
✠ (AUT)

This certificate, issued within the scope of the Bureau Veritas Marine Branch General Conditions, is valid
Este certificado, expedido con arreglo a las Condiciones Generales de la Rama Naval del Bureau Veritas, es válido
until / *hasta* JULY 15, 1995

The hull of the ship is surveyed under the continuous survey system
El casco del buque está sometido a la reclasificacion

Date of the two last periodical bottom surveys/*Fecha de las dos ultimas visitas periodicas de la carena* :
in drydock/*en dique seco* : May 1990   in water/*submarina* : May 1989

The validity of the assigned class is conditioned upon due compliance with the requirements of Chapter 2 of the Rules regarding maintenance of class.
La validez de la cota atribuida depende de la aplicación de las prescripciones del Capitulo 2 del Reglamento relativas al mantenimiento de clase.

At/*Expedido en* Stockholm , on/*el* July 16, 19 90

See VISA No. 2
Helsinki 4.2.1991
Tony Patterson
T. Patterson

For/*por el* Bureau Veritas,
By order of the Secretary
(Signature and stamp)
Firma y sello
Hans Olsson
Hans Olsson
Chief Surveyor for Sweden

BV Mod. Ad. MEH 407 b

2021

06/07 95 13:46 ☎-49 4961 81300 SK MEYER WERFT

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27113a meypo d
6315 algot sf
27113a meypo d
6315 algot sf
13.9.1979   10,57 hrs   pag/bl

newbuilding
-----------

re meeting with finnish board of navigation.

preliminary following arranged:
mr. janson and mr. haatainen will arrive at hamburg by air
25th september at 12,15 hrs and return 27th at 10,50 hrs.

it is not possible to arrange an earlier visit as
mr. janson will be in spain next week,

please confirm whether acceptable.

regards,
rederiaktiebolaget sally
b-a gustafsson

6315 algot sf
27113a meypo d
```

TELEX SNOW WHITE TELEX SNEEU

Enclosure 2.4.4.46

15/06 '95 16:46 FAX +49 4961 81298 MEYER WERFT TS 021

Hr. Jansen — Hr. Rockelmann — 22.9.79
Hr. Hellmann — Hr. Goschke
Hr. Brown
Hr. Ed.

Enclosure 2.4.4.47

Tagebuch Wahus (3)

1) Bemessung für Rettungsinseln Vorschriften S. 82 Regel 35 und d. SOLAS

2) Hr. Jansen gibt weitgehend Nachricht ob IMCO-Empfehlungen zur Erfüllung von SOLAS/74 (Kapitel III) erfüllt werden müssen.

!

3) Sicherungs ϕ-Stahl im Bereich der Staffeln.

4) Gibt es Vorschriften für Glasstärken im Bereich der Boote? Kommt Nachricht.

5) Wasserdruckauslöser 1 Stck für 3 Inseln Kommt Nachr.

6.) Erforderliche Ein Gasdampfsfläche: Kommt Nachricht.

7.) Welche Abnahmen während der Bauzeit von B.o.N. gefordert werden wird aufgegeben.

[8) Welche Zeichnungen eingereicht werden müssen Kommt Liste.]

9) C-Deck vorn: 150 Pers. u. unten
+ 208 " C-Deck
358 u.O.

10.) Treppen Aufgänge müssen ausreichend sein für 2628 Personen gesamt 1840 Achtern

Freie Treppen hinten 2 Stck fussg.

Enclosure 2.4.4.48

MERENKULKUHALLITUKSEN

TIEDOTUSLEHTI

23.10.1978 Helsinki No 10/78

APPLICATIONS FOR APPROVAL FOR INDIVIDUAL VESSELS

This information bulletin lists the data that shall be included when submitting to the Board of Navigation applications for approval concerning individual vessels.

Contents

1. DATA TO BE INCLUDED IN THE APPLICATION

The applications for approval shall be addressed to the Board of Navigation - not to a named person - and shall include the following data:

a) Name and address of applicant, and addressee of the resolution (if not the applicant himself).
b) Name of reference person for possible consultation.
c) The character of the application (i.e. what the approval would concern) shall be expressed in the heading.
d) In the text part the character of the application shall be specified.
e) If the application is in any way special or exceptional, this has to be mentioned.
f) All appendices and the number of them have to be mentioned, and, if necessary for clarity, also in what way they pertain to the application.
g) The application shall include the names of appliances for which the approval of the Board of Navigation is required and if the said appliance has not earlier been approved of by the Board of Navigation, test certificates and other documents on the basis of which approval can be granted

shall be attached.

h) Applications shall not be made for equipment not expressly mentioned in this information bulletin.

i) If a ship has been in correspondence with the Board of Navigation it has been given a code, which should be mentioned in the application.

j) Other data to be included in the application will be specified in the following.

The applications shall be sent under the address:

Board of Navigation
P.O. Box 158
00141 HELSINKI 14

2. ACCOMMODATION OF CREW

The following drawings of crew accommodation spaces shall be provided:

- General arrangement, showing also the deepest loadline
- Detailed drawing of accommodation spaces (on the scale 1:50, 1:25 or 1:20)
- Ventilation
- Heating
- Lighting

The general arrangement of the vessel shall be provided in one copy, other drawings in triplicate.

Several arrangements may be shown in the same drawing if this can be done without causing confusion.

The drawings and data provided shall provide information of the location of accommodation and other spaces, of the free height, the total and free floor space, breadth and area of free rectangular floor space, dimensions of berths and wardrobes and number and volume of drawers for each person. The furnishing of accommodation, eating and other living spaces shall also appear from the drawings. The scale used shall be indicated in the drawings.

The manning plan shall be attached to the drawings.

The Decree No. 518/76 (given on June 16, 1976) provides for the accommodation standards for crews. In the cases mentioned in Article 39 ("old vessels") of this Decree the old Accommodation Decree (Decree on the Accommodation of Seamen in Ships, No. 794/48, given on November 20, 1948) may be applied.

3. BRIDGE

A general arrangement of the bridge shall be provided in duplicate and it shall show the location of the manoeuvring and navigation equipment and other devices.

4. MAGNETIC COMPASSES

The positioning drawings of the magnetic compasses shall be provided in duplicate along with a specification of building materials and electrical appliances and cables located near to the compasses.

5. NAVIGATING LIGHTS

Positioning drawings of the navigating lights showing that the navigating lights and other lights (towing lights, manoeuvring lights a.s.o.) are placed so as to comply with the International Convention on the International Regulations fo Preventing Collisions at Sea, 1972, shall be provided in duplicate.

6. LIFE-SAVING EQUIPMENT

The following drawings shall be provided in duplicate:

6.1 Passenger ships

- general arrangement
- lifeboats and liferafts (name, number, volume, location)
- other life-saving equipment, location
- drawings showing the assembling spaces needed for use of the life-saving appliances
- spaces intended for the passengers (scale 1:50, 1:25, 1:20) for determining the number of passengers
- drawing showing exits and their marking
- general arrangement of alarm system
- other elucidating drawings and explanations

6.2 Cargo vessels falling under the Safety Convention

- general arrangement
- lifeboats and liferafts (name, number, volume, location)
- other life-saving appliances, location
- exits and their marking
- general arrangement of alarm system
- body plan of ships, in which one or several lifeboats are not situated in the midship section
- other elucidating drawings and explanations

6.3 Vessels not falling under the Safety Convention

- general arrangement
- lifeboats and liferafts (name, number, volume, location)
- exits and their marking
- general arrangement of alarm system
- other life-saving appliances, location
- other elucidating drawings and explanations

7. FIRE PROTECTION

The following information on the fire-fighting system on board shall be provided:

- general arrangement showing the main dimensions of the ship (L_{OA}, B, T, D, H, P_B), the volumes of the biggest spaces (engine room, cargo holds, car deck), and the names of the spaces
- method of protection
- main vertical and horizontal zones
- presentation of construction and fire classes of divisions which are

fire-classified (decks, bulkheads, doors)
- construction of openings in fire-classified divisions
- means of escape (exits, emergency exits)
- ventilation arrangements (ducts, fans, closing arrangements, stopping arrangements, through-runs)
- fire detection systems, fire alarm systems and explosive gas detection systems (names, location, functional description, main and emergency sources of power)
- presentation of remote control of closing devices of ventilation fans and ducts, fire-doors, fuel valves and other similar devices
- fire piping diagram showing fire hydrants, pipe bores and materials, closing devices, and location, pressure, and capacity of pumps, as well as fire hoses (name, length) and nozzles (name)
- fixed extinguishing systems: arrangement drawing, functional description, alarm devices, operating instructions, maintenance instructions
- portable and transportable fire extinguishers: name, size, fire class, location, also spare charges
- fireman's outfits (names, locations)
- fire control plan (text in Finnish, Swedish and English)

In the fire control plan, markings according to the standard TES 8091 shall be used.

Drawings and descriptions shall be provided in duplicate except for the fire control plan, which shall be provided in triplicate.

8. STABILITY

The following information shall be submitted in duplicate.

8.1 Ship, at least 24 Metres in Length

a) lines plan
b) general arrangement
c) capacity plan, or information on the weight and coordinates of centre of gravity for light ship and volumes and centres of gravity for holds and tanks
d) hydrostatic curves or tables
e) cross curves or $\overline{MS}$ curves or corresponding tables
f) flooding angle as function of the draught
g) moment of ice as a function of the draught
h) corrections to $\overline{GM}$ for the effect of free liquid surfaces in tanks
i) $\overline{KM}$ as function of draught, and of trim if the figures essentially change with the trim, as diagrams or tables
j) inclining test report
k) $\overline{GZ}$ curves and calculations for the in § 5 of stability provisions for ships, 1972, mentioned loading conditions
l) minimum $\overline{GM}$ curves or tables as function of draught, and of trim if the figures essentially change with the trim, with and without taking into account the possibility of icing.

8.2 Ship, at least 24 but not more than 70 Metres in Length

In addition to the in 8.1 above mentioned information, the following:
a) maximum rolling period curves or tables as function of draught, with

9.2 <u>Regulation 12 of Chapter VI of SOLAS-60</u>

When applying for a grain certificate with observance of regulation 12 of Chapter VI of SOLAS-60 Convention the following information shall be submitted to the Board of Navigation:

a) The information according to paragraph 9.1 as applicable
b) Information in accordance with the IMCO Resolution A.49 (III).

9.3 <u>IMCO Grain Rules or SOLAS-74 Chapter VI</u>

When applying for a grain certificate with observance of the IMCO Grain Rules, the following information shall be submitted to the Board of Navigation (SOLAS-74 Chapter VI Regulation 11):

1) curves or tables of grain heeling moments for every compartment, filled or partly filled, or combination thereof, including the effect of temporary fittings
2) tables of maximum permissible heeling moments or other information sufficient to allow the master to demonstrate compliance with the requirements of Regulation 4 (c)
3) details of the scantlings of any temporary fittings and where applicable the provisions necessary to meet the requirements of Section I(E) of Part C
4) typical loaded service departure and arrival conditions and where necessary, intermediate worst service condition
5) a worked example for the guidance of the master
6) loading instructions in the form of notes summarizing the requirements of this Chapter
7) ship's particulars
8) lightship displacement and the vertical distance from the intersection of the moulded base line and midship section to the centre of gravity ($\overline{KG}$)
9) table of free surface corrections
10) capacities and centres of gravity

10. LOAD LINE CERTIFICATES

a) Documents: "International Load Line Certificate (1966)", "International
b) Load Line Exemption Certificate (1966)"
The load line certificates are issued by the Board of Navigation on receipt of a provisionary certificate from the classification society, toghether with the calculations on which the data of the certificate are based.
c) For a ship not classified the data listed under item 10.1 c) shall, as far as possible, be sent to the Board of Navigation, in addition to those normally sent by the hull surveyor to be inspected at the Board.

11. TONNAGE CERTIFICATES

11.1 <u>The Convention of 1947 for a Uniform System of Tonnage Measurement of Ships</u>

a) Documents: Tonnage certificates 1, 1 A, 1 B, and the "Special Tonnage Certificate".
b) The tonnage certificate is issued when the ship has been measured and the measurement forms filled in by a ship admeasurer, and these

forms have been approved at the Board of Navigation.

c) The following data* shall be appended to the measurement forms which are sent to the Board of Navigation:

1) capacity plan
2) general arrangement
3) midship section
4) description of frames
5) steel structure drawing, profile and plan, drawings presenting the forepeak and afterpeak, the floor plates in the engine room, and that part of the ship which is fitted with a double bottom
6) body plan (possibly lines drawing)
7) laying-out tables, deck, tank top, waterlines, verticals and possible diagonals
8) accommodation plan
9) engine room arrangement
10) plans showing details of the conditions upon which the deduction of water ballast spaces is claimed:
    a. piping arrangement: bilge, ballast, fresh water, and fuel oil
    b. pumping installations
    c. manholes to water-ballast spaces outside the double bottom.
11) plans showing details of the conditions upon which the exemption of certain spaces is claimed, for instance drawings of the second deck (openings and closing arrangements).

11.2 The Constantinople Tonnage Measurement Regulations of 1873

a) Documents: The tonnage certificate "Suez Canal Special Tonnage Certificate"

b) The certificate is issued when the ship has been measured and a measurement form filled in by the tonnage surveyor, and approved by the Board of Navigation.

c) The data listed under item 11.1 c) shall be appended to the measurement documents which are sent to the Board of Navigation, if such data have not been delivered in connection with earlier measurements.

11.3 The Tonnage Measurement Regulations of the Panama Canal Authorities

a) Documents: The tonnage certificate "Panama Canal Tonnage Certificate"

b) As under item 11.2 b)

c) As under item 11.2 c)

11.4 The Decree No. 306/1955 on the Tonnage Measurement of Ships

a) Documents: The tonnage certificate "Tonnage Document of a Foreign Ship". The certificate is issued after necessary measurements by a ship admeasurer to certain foreign ships calling at Finnish ports. Further information concerning the issue of this certificate is to be

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* In view of the transition to the new tonnage measurement system (TM 69) it is advisable at this stage to determine the moulded volume in cubic metres below the uppermost complete deck of the ship.

found in the Board of Navigation information bulletin No. 5/78 (dated June 20, 1978).

— — — — —

This information bulletin shall supersede bulletin No. 5/69 (dated March 13, 1969), "Drawings to be submitted to the Board of Navigation".

Head of Maritime Division
Counsellor of Navigation Oso Siivonen

Mechanical Engineer Pertti Haatainen

KD 3841/78/301

Enclosure 2.4.4.50

FIRE PROTECTION

APPROVED WITH
REMARKS NOTED

BUREAU OF SHIPS, 25 7 1980

[illegible signature]

See the Board of Navigation
letter 1980-04-25 L346
KD 3965/79/301.[illegible]

11. 10. 1979

Nr.	Art der Änderung	Datum	Name
3			
2			
1			

Maßstab: 1:200	Jos. L. Meyer Papenburg (Ems) Schiffswerft, Maschinenfabrik, Dockbetrieb
Datum: 11.10.78	FIRE PROTECTION PLAN 1 vol 3961/79/3[illegible]

Gewerk.	Schiffs Nr.	Sektions Nr.	Zeichn. Nr.	Archiv Nr.
	590		021.8	G1

Enclosure 2.4.4.51

MERENKULKUHALLITUS
TARKASTETTU
GRANSKAT
SJÖFARTSSTYRELSEN

17. 10. 1979

Nr.	Art der Änderung	Datum	Name
3			
2			
1			

Maßstab: 1:200	Jos. L. Meyer Papenburg (Ems) Schiffswerft, Maschinenfabrik, Dockbetrieb
Datum: 17.10.79	EVACUATION PLAN 1

Gewerk.	Schiffs Nr.	Sektions Nr.	Zeichn. Nr.	Archiv Nr.
	590		021.14	G1

Enclosure 2.4.4.52

20. 2. 1980

Nr.	Art der Änderung	Datum	Name
3			
2			
1			

Maßstab: 1:100	Jos. L. Meyer Papenburg (Ems) Schiffswerft, Maschinenfabrik, Dockbetrieb			
Datum: 20.2.80	LATERNENPLAN SIGNAL-LIGHTS			
Gewerk	Schiffs Nr. 590	Sektions Nr.	Zeichn. Nr. 81/3	Archiv Nr. G.1

3961/79/317

Enclosure 2.4.4.53

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

Anl. 6.

YARD NO. 590
MS VIKING SALLY

TRIM AND STABILITY BOOKLET

Owner: Rederiaktiebolaget SALLY
Strandgatan 7

SF-22100 Mariehamn

Builders: Schiffswerft JOS. L. MEYER
Industriegebiet Süd

D-2990 Papenburg/EMS

MERENKULKUHALLITUS SJÖFARTSSTYRELSEN
APPROVED ~~WITH REMARKS NOTED~~
BUREAU OF SHIPS, 11.7.1980

The German Group of Experts investigating the sinking of M/V "ESTONIA"

c/o AHLERS & VOGEL · Schaartor 1 D-20459 Hamburg · Telephone 49-40-371075

Memo for Dr. Holtappels

re: 2nd Meeting with F.B.N. on 27.10.95

- Attendants: Muttilainen - Deputy General Manager
  Valkonen - Head of Maritime Dept.
  Makkonen - Head of Legal Dept.
  Fabritius - Naval Architect employed by F.B.N.
  H. Gahmberg - Lawyer Bützow & Co., Helsinki (HG)
  Dr. Holtappels -
  Werner Hummel (WH)

- Up-date by Dr. Holtappels on legal situation.

- HG: It was agreed to have a presentation of the facts.

- Dr. Holtappels
  : We want an open discussion about the situation in 1980 as to issuance of PSSC: a) Why no Exemption Certificate?
  b) Why not reported to IMO?
  : What does F.B.N. know about "Mariella" and "Viking Saga" incidents?
  : What is the F.B.N. opinion on the IHK?
  (Dr. Holtappels immediately submits his own opinion, viz. that IHK does not want to put the facts on the table) and also mentions the meeting with the EU Commission which is considering to constitute its own commission).

- Presentation of investigation results by WH and subsequent discussion

- Valkonen
  : F.B.N. has all the right to know the procedure of the IHK and this was expressed in writing to Kari Lethola together with copies of documents relating to "Viking Sally", "Silja Star", "Wasa King" (3-5 cm thick).
  : F.B.N. had no official knowledge of "Mariella" incident and have up-to-day not heard from "Viking Saga". They later found out that the course went over shallow water and right there she was struck. It has been established that around this shoal the waves rise tremendously under SW-ly wind conditions.
  As a consequence of the "Estonia" casualty they have issued a navigation warning to the effect that shoals might create enormous wave height and steepness. Soundings, however, subsequently revealed that the shoal effect did not play a role in the "Estonia" casualty.

- It turned out that the naval architect Fabritius had been working with Wärtsilä Shipyard in Turku - the builders of "Mariella" - at that time and knows lots of details about damage, repairs, etc. He stated that the vessel did not return to Helsinki - as we were told earlier - but proceeded to Stockholm at 3 kn, where the visor was temporarily repaired before next sailing.

- Upon presentation of the correspondence between von Tell AB/F.B.N. in connection with newbuilding "Viking Sally" and the F.B.N. requirements for drawings, etc. Mr. Valkonen confirmed that the reply of F.B.N. demonstrated exactly the attitude of those years. At that time there were 3 men in the technical department, who were basically busy with their own (F.B.N.) vessels. Valkonen was then head of the inspection department.

They never calculated required strength of locking devices, they had no means to do so at that time, it was part of the class responsibility and also of the yard.

- Valkonen confirmed that the bow ramp was the collision bulkhead in "Viking Sally".

F.B.N. 1980

Technical Bureau	Inspection Bureau
Edelmann	Valkonen
Haateinen	Jan Jansson
Wibeck	

- PSSC was at first issued temporarily for voyage Yard to Mariehamn, and thereafter the vessel got a restricted PSSC because not all passenger cabins were ready. The certificates were issued by his office and then submitted to the General Manager - then Muttilainen - for approval.

- He and Muttilainen signed an agreement to the effect that the trading area of "Viking Sally" was restricted to "not more than 20 nm from the nearest land" until all outstanding work would have been completed.

- When the vessel came the first time to Turku he and Gunnar Peper, their local surveyor from Kotka (now retired), had a severe car accident on the way to Turku, whereby both were injured. Finally in Turku they marked on a respective drawing all parts not to be used by passengers and limited the number of passengers to 700 stating that the 20 nm limit was valid until the vessel was totally completed. At a meeting on 19.7.80 it was decided that the vessel was now completed and the first real PSSC was issued, however, restricted to "Kustfart mellan Finland och Sverige" which related to manning requirements only, not to structural parts. The same PSSC was issued in 1982 and in 1983. Thereafter the term "Kustfart" disappeared.

- Valkonen stated that they were not aware that "Viking Sally" did not comply with SOLAS 1974, because all structural parts are - in their view - based on the 'Copenhagen Convention 1924' the responsibility of the class. According to Valkonen the recognised classification societies - DnV, LR, ABS, GL, but also BV - have to approve all structural matters including the SOLAS requirements as otherwise the Maritime Authorities would be forced to have own staff and equipment available to be able to carry out necessary calculations and inspections which the classification societies have anyway.

- Valkonen drew attention to the "Finnhansa" incident when half of the sliding doors were lost in heavy weather and to the "Fennia", which was built in Sweden 1964 with bow ramp - collision bulkhead and ever since has been sailing in unchanged condition.
He also pointed out that the bow ramp is a very strong part because 40-ts trucks can drive over it.

- "Viking 4" / "Earl of Granville" conversion discussed.

- F.B.N.. was not informed by owners and/or BV that "Wasa King" would be respectively was sold. They got if from the registrar after she was sold and renamed "Estonia". There have not been any discussions whatsoever between F.B.N. and BV concerning the take-over, also not concerning the new role of BV representing the flag state authority a/o in SOLAS matters.

- F.B.N. also carries out port-state-inspections onboard of Estonian vessels when in Finnish ports and not seldom have they found deficiencies onboard vessels which had just passed a special survey of the BV surveyor.

- Upon being confronted with the remarks, which the BV plan approver Desouza had made on drawing 1103, Valkonen stated: It is out of the question that they could ever have been able to calculate strength of locking devices or the like and they have to rely on the Copenhagen Convention.

- They promised to check the drawings they have for possible remarks.

- Jukka Häkämies is attending the meetings of the Finnish Commission and also attends the full Commission meetings at Tallinn. He keeps the informatin he obtaines confidential.

- Valkonen informs about rumours saying that the locking devices were constructed on basis of wrong drawings and therefore were under-dimensioned. WH explained actual situation based on recently taken statements from yard workers.

- Valkonen confirmed that due to the so-called "pumping effect" the water quantity inside the visor was continuously increasing due to the up-and-down movement of the bow in headseas and that model tests had confirmed that this effect was much larger with smaller openings compared to larger holes.

Werner Hummel

MATKUSTAJA-ALUKSEN TURVALLISUUSKIRJA
SÄKERHETSCERTIFIKAT FÖR PASSAGERARFARTYG

SUOMI
FINLAND

Enclosure 2.4.4.55

~~kansainväliselle~~ / lyhyelle kansainväliselle matkalle.

för ~~en~~ / kört internationell resa.

Annettu ihmishengen turvallisuudesta merellä vuonna 1960 tehdyn kansainvälisen yleissopimuksen määräysten mukaisesti
Utfärdat enligt bestämmelserna i internationella konventionen om säkerhet för människoliv till sjöss, 1960

Aluksen nimi Fartygets namn	Tunnuskirjaimet Igenkänningsbokstäver	Kotipaikka Hemort	Bruttovetoisuus Bruttodräktighet	Tiedot III luvun 27 säännön c) 7 kohdan mukaan ehkä sallituista matkoista Detaljer beträffande eventuella resor, tillåtna enl. kapitel III, regel 27 c) 7	Kölinlaskemispäivä Datum, då kölen sträcktes
VIKING SALLY	OIKH	Mariehamn	15566,89		1979

Minä, allekirjoittanut, todistan:

I. Että kysymyksessä oleva alus on asianmukaisesti katsastettu edellä mainitun sopimuksen määräysten mukaisesti.

II. Että katsastuksessa todettiin aluksen täyttävän sanottuun sopimukseen liittyvien sääntöjen vaatimukset, sikäli kuin kysymyksessä on:

1. aluksen rakenne, pää- ja apukattilat ja muut paineastiat sekä koneisto;
2. vedenpitävän osastoimisen järjestely ja yksityiskohdat;
3. seuraavat osastoimislastiviivat:

Jag, undertecknad, bestyrker:

I. Att ovan angivna fartyg undergått vederbörlig besiktning enligt bestämmelserna i ovannämnda konvention.

II. Att besiktningen utvisade, att fartyget uppfyllde fordringarna i de regler, som äro bifogade nämnda konvention, i vad avser:

1. konstruktionen, huvud- och hjälpångpannor och andra tryckkärl samt maskineri;
2. anordning och detaljer av den vattentäta rumsindelningen;
3. följande indelningsvattenlinjer:

Alukselle määrätyt ja sen kylkeen pituuden keskikohdalle merkityt osastoimislastiviivat (II luvun 11 sääntö) För fartyget fastställda och midskepps å fartygssidorna utmärkta indelningsvattenlinjer (Kap. II regel 11)	Varalaita Fribord	Käytettävä milloin matkustajia kuljetetaan seuraavissa vaihtoehtoisesti lastitiloina käytettävissä tiloissa Gäller då passagerare föras i följande, jämväl för last användbara rum
C. 1	2062 mm	
C. 2		
C. 3		

III. Että pelastusvälineitä oli riittävästi enintään 1288 henkilöä varten, nimittäin

10 pelastusvenettä (niihin luettuina 10 moottoripelastusvenettä), joihin mahtuu 692 henkilöä, ja – radiosähkötyslaitteilla ja valonheittimellä varustettua moottoripelastusvenettä (mitkä sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään) ja – vain valonheittimellä varustettua moottoripelastusvenettä (mitkä myös sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään), joissa veneissä tulee olla – hyväksyttyä pelastusvenemiestä;

12 pelastuslauttaa, joita varten vaaditaan hyväksytyt vesillelaskulaitteet ja joille mahtuu 300 henkilöä; ja

51 pelastuslauttaa, joita varten ei vaadita hyväksyttyjä vesillelaskulaitteita ja joille mahtuu 1275 henkilöä;

III. Att livräddningsredskapen voro tillräckliga för högst 1288 personer, nämligen

10 livbåtar (däri inräknade 10 motorlivbåtar) tillräckliga för 692 presoner, och – motorlivbåtar försedda med radiotelegrafinstallation och strålkastare (inräknade i det ovan angivna sammanlagda antalet livbåtar) ävensom – motorlivbåtar utrustade endast med strålkastare (också inräknade i ovan angivna sammanlagda antalet livbåtar), fordrande – godkända livbåtmän;

12 livflottar, för vilka fordras godkända sjösättningsanordningar, tillräckliga för 300 personer; och

51 livflottar, för vilka godkända sjösättningsanordningar icke fordras, tillräckliga för 1275 personer;

6 kellumavälinettä, jotka kykenevät kannattamaan 120 henkilöä;

18 pelastusrengasta;

2298 pelastusliiviä.

6 flytredskap, tillräckliga för 120 personer;

18 livbojar;

2298 livvästar.

IV. Että pelastusveneet ja pelastuslautat oli varustettu sääntöjen määräysten mukaisesti.

V. Että aluksessa oli sääntöjen määräysten mukainen nuoranheittolaite sekä pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite.

VI. Että alus täytti radiosähkötyslaitteita koskevat sääntöjen vaatimukset seuraavasti:

IV. Att livbåtarna och livflottarna voro utrustade enligt bestämmelserna i dessa regler.

V. Att fartyget var försett med linkastningsapparat och bärbar radioapparat för livbåtar och livflottar enligt bestämmelserna i dessa regler.

VI. Att fartyget uppfyllde fordringarna i dessa regler i vad avser radiotelegrafinstallationer, som följer:

	Sääntöjen vaatimukset Fordringar enligt reglerna	Todellisuudessa I verkligheten
Radiosähköttäjän kuuntelutuntien määrä Lyssningstimmar för radiotelegrafist	H8	H8
Radiosähköttäjien lukumäärä Antal radiotelegrafister	1	1
Onko automaattinen hälytin Finnes autoalarm	1	1
Onko pääradiolaitteet Finnes huvudinstallation	1	1
Onko vararadiolaitteet Finnes reservinstallation	1	1
Ovatko päälähetin ja varalähetin sähköisesti erilliset vai yhdistetyt Äro huvudsändare och reservsändare elektriskt separata eller kombinerade	erilliset separata	erilliset separata
Onko radiosuuntimislaite Finnes radiopejlapparat	1	1
Sallittu matkustajamäärä Tillåtet antal passagerare	lyhyillä kansainvälisillä matkoilla för kort internationell resa	1100

VII. Että moottoripelastusveneiden radiosähkötyslaitteet ja pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite, milloin sellainen on, toimivat sääntöjen määräysten mukaisesti.

VIII. Että alus täytti tulipalon havaitsemis- ja sammutuslaitteita koskevat sääntöjen vaatimukset ja että siinä oli valot ja merkkikuviot, luotsitikkaat sekä laitteet ääni- ja hätämerkkien antamista varten näiden sääntöjen määräysten ja kansainvälisten meriteiden sääntöjen mukaisesti.

IX. Että alus kaikissa muissa suhteissa täytti sääntöjen vaatimukset, mikäli ne ovat siihen sovellettavissa.

VII. Att radiotelegrafinstallationer i motorlivbåtar och bärbar radioapparat för livbåtar och livflottar, om sådan finnes, fungerade i överensstämmelse med föreskrifterna i dessa regler.

VIII. Att fartyget uppfyllde fordringarna i dessa regler i vad avser anordningar för upptäckande och släckning av brand samt var försett med ljus och signalfigurer, lotslejdare ävensom med anordningar för avgivande av ljudsignaler och nödsignaler enligt bestämmelserna i dessa regler och i de internationella sjövägsreglerna.

IX. Att fartyget i alla övriga hänseenden uppfyllde fordringarna i dessa regler, i den mån de äro tillämpliga å fartyget.

Tämä todistuskirja on annettu Suomen hallituksen puolesta.
Detta certifikat är utfärdat på finska regeringens vägnar.

Todistuskirja on voimassa / Certifikatet gäller intill den 21 päivään heinäkuuta/juli 80 19 .... saakka.

Annettu Helsingissä / Utfärdat i Helsingfors den 27 päivänä juni/kesä kuuta 19 80

Allekirjoittanut ilmoittaa olevansa mainitun hallituksen asianmukaisesti valtuuttama antamaan tämän todistuskirjan.
Undertecknad förklarar sig vara av nämnda regering behörigen bemyndigad att utfärda detta certifikat.

Leima / Stämpel 10,- mk.

HD N:o / HD N:r ....

Merenkulkuntarkastaja
Sjöfartsinspektör

Jan Janson

PASSENGER SHIP SAFETY CERTIFICATE

FINLAND

Enclosure 2.4.4.56

for ~~a~~ a short international voyage.

Issued under the provisions of the
International Convention for the Safety of Life at Sea, 1960

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	Particulars of voyages, if any, sanctioned under Regulation 27 (c) (VIII) of Chapter III	Date on which keel was laid
VIKING SALLY	OIKW	Mariehamn	15566,39		1979

I, the undersigned certify:

I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. That the survey showed that the ship complied with the requirements of the Regulations annexed to the said Convention as regards:
1. the structure, main and auxiliary boilers and other pressure vessels and machinery;
2. the watertight subdivision arrangements and details;
3. the following subdivision loadlines:

Subdivision loadlines assigned and marked on the ship's side at amidships (Regulation 11 of Chapter II)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C. 1	2062 mm	
C. 2		
C. 3		

III. That the life-saving appliances provide for a total number of 1280 persons and no more, viz.:

10 lifeboats (including 10 motor lifeboats) capable of accommodating 692 persons, and – motor lifeboats fitted with radiotelegraph installation and searchlight (included in the total lifeboats shown above) and – motor lifeboats fitted with serachlight only (also included in the total lifeboats shown above), requiring – certificated lifeboatmen;

12 liferafts, for which approved launching devices are required, capable of accommodating 360 persons; and

51 liferafts, for which approved launching devices are not required, capable of accommodating 1275 persons;

6 buoyant apparatus capable of supporting 120 persons;

18 lifebuoys;

2298 lifejackets.

IV. That the lifeboats and liferafts were equipped in accordance with the provisions of the Regulations.

V. That the ship was provided with a line-throwing appliance and portable radio apparatus for survival craft in accordance with the provisions of the Regulations.

VI. That the ship complied with the requirements of the Regulations as regards radiotelegraph installations, viz.:

	Requirements of Regulations	Actual provision
Hours of listening by operator	H8	H8
Number of operators	1	1
Whether auto alarm fitted	1	1
Whether main installation fitted	1	1
Whether reserve installation fitted	1	1
Whether main and reserve transmitters electrically separated or combined	separated	separated
Whether direction-finder fitted	1	1
Number of passengers for which certificated for a short international voyage 1100		

VII. That the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the Regulations.

VIII. That the ship complied with the requirements of the Regulations as regards fire-detecting and fire-extinguishing appliances and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals, in accordance with the provisions of the Regulations and also the International Collision Regulations.

IX. That in all other respects the ship complied with the requirements of the Regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the Finnish Government.

It will remain in force until the 21st day of July 19 80

Issued at Helsinki the 27th day of June 19 80

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

Inspector of Navigation

Jan Janson

Stamp 10,- mk.

HD N:o

MATKUSTAJA-ALUKSEN TURVALLISUUSKIRJA
SÄKERHETSCERTIFIKAT FÖR PASSAGERARFARTYG

SUOMI
FINLAND

Enclosure 2.4.4.57

~~kansainväliselle~~
lyhyelle kansainväliselle matkalle.

för ~~lång~~ / kort internationell resa.

Annettu ihmishengen turvallisuudesta merellä vuonna 1960 tehdyn kansainvälisen yleissopimuksen määräysten mukaisesti
Utfärdat enligt bestämmelserna i internationella konventionen om säkerhet för människoliv till sjöss, 1960

Aluksen nimi Fartygets namn	Tunnus-kirjaimet Igenkännings-bokstäver	Kotipaikka Hemort	Bruttovetoisuus Bruttodräktighet	Tiedot III luvun 27 säännön c) 7 kohdan mukaan ehkä sallituista matkoista Detaljer beträffande eventuella resor, tillåtna enl. kapitel III, regel 27 c) 7	Kölinlaskemispäivä Datum, då kölen sträcktes
VIKING SALLY	[illegible]	Maarianhamina Mariehamn	15566,99		1979

Minä, allekirjoittanut, todistan:

I. Että kysymyksessä oleva alus on asianmukaisesti katsastettu edellä mainitun sopimuksen määräysten mukaisesti.

II. Että katsastuksessa todettiin aluksen täyttävän sanottuun sopimukseen liittyvien sääntöjen vaatimukset, sikäli kuin kysymyksessä on:

1. aluksen rakenne, pää- ja apukattilat ja muut paineastiat sekä koneisto;
2. vedenpitävän osastoimisen järjestely ja yksityiskohdat;
3. seuraavat osastoimislastiviivat:

Jag, undertecknad, bestyrker:

I. Att ovan angivna fartyg undergått vederbörlig besiktning enligt bestämmelserna i ovannämnda konvention.

II. Att besiktningen utvisade, att fartyget uppfyllde fordringarna i de regler, som äro bifogade nämnda konvention, i vad avser:

1. konstruktionen, huvud- och hjälpångpannor och andra tryckkärl samt maskineri;
2. anordning och detaljer av den vattentäta rumsindelningen;
3. följande indelningsvattenlinjer:

Alukselle määrätyt ja sen kylkeen pituuden keskikohdalle merkityt osastoimislastiviivat (II luvun 11 sääntö) För fartyget fastställda och midskepps å fartygssidorna utmärkta indelningsvattenlinjer (Kap. II regel 11)	Varalaita Fribord	Käytettävä milloin matkustajia kuljetetaan seuraavissa vaihtoehtoisesti lastitiloina käytettävissä tiloissa Gäller då passagerare föras i följande, jämväl för last användbara rum
C. 1	2962 mm	
C. 2		
C. 3		

III. Että pelastusvälineitä oli riittävästi enintään 2267 henkilöä varten, nimittäin

19 pelastusvenettä (niihin luettuina 10 moottoripelastusvenettä), joihin mahtuu 692 henkilöä, ja – radiosähkötyslaitteilla ja valonheittimellä varustettua moottoripelastusvenettä (mitkä sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään) ja – vain valonheittimellä varustettua moottoripelastusvenettä (mitkä myös sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään), joissa veneissä tulee olla – hyväksyttyä pelastusvenemiestä;

12 pelastuslauttaa, joita varten vaaditaan hyväksytyt vesillelaskulaitteet ja joille mahtuu 300 henkilöä; ja

51 pelastuslauttaa, joita varten ei vaadita hyväksyttyjä vesillelaskulaitteita ja joille mahtuu 1275 henkilöä;

III. Att livräddningsredskapen voro tillräckliga för högst 2267 personer, nämligen

10 livbåtar (däri inräknade 10 motorlivbåtar) tillräckliga för 692 presoner, och – motorlivbåtar försedda med radiotelegrafinstallation och strålkastare (inräknade i det ovan angivna sammanlagda antalet livbåtar) ävensom – motorlivbåtar utrustade endast med strålkastare (också inräknade i ovan angivna sammanlagda antalet livbåtar), fordrande – godkända livbåtmän;

12 livflottar, för vilka fordras godkända sjösättningsanordningar, tillräckliga för 300 personer; och

51 livflottar, för vilka godkända sjösättningsanordningar icke fordras, tillräckliga för 1275 personer;

6 kellumavälinettä, jotka kykenevät kannattamaan 120 henkilöä;
18 pelastusrengasta;
2293 pelastusliiviä, + 200 lapsille
6 flytredskap, tillräckliga för 120 personer;
18 livbojar;
2298 livvästar. + 200 för barn

IV. Että pelastusveneet ja pelastuslautat oli varustettu sääntöjen määräysten mukaisesti.
V. Että aluksessa oli sääntöjen määräysten mukainen nuoranheittolaite sekä pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite.
VI. Että alus täytti radiosähkötyslaitteita koskevat sääntöjen vaatimukset seuraavasti:

IV. Att livbåtarna och livflottarna voro utrustade enligt bestämmelserna i dessa regler.
V. Att fartyget var försett med linkastningsapparat och bärbar radioapparat för livbåtar och livflottar enligt bestämmelserna i dessa regler.
VI. Att fartyget uppfyllde fordringarna i dessa regler i vad avser radiotelegrafinstallationer, som följer:

TUVA a – 3	Sääntöjen vaatimukset Fordringar enligt reglerna	Todellisuudessa I verkligheten
Radiosähköttäjän kuuntelutuntien määrä Lyssningstimmar för radiotelegrafist	[illegible]	[illegible]
Radiosähköttäjien lukumäärä Antal radiotelegrafister	1	1
Onko automaattinen hälytin Finnes autoalarm	1	1
Onko pääradiolaitteet Finnes huvudinstallation	1	1
Onko vararadiolaitteet Finnes reservinstallation	1	1
Ovatko päälähetin ja varalähetin sähköisesti erilliset vai yhdistetyt Äro huvudsändare och reservsändare elektriskt separata eller kombinerade	erilliset separata	erilliset separata
Onko radiosuuntimislaite Finnes radiopejlapparat	1	1
Sallittu matkustajamäärä Tillåtet antal passagerare	rannikkoliikenteessä Suomen ja Ruotsin välillä 2000 i kustfart mellan Finland och Sverige ; 2000	

VII. Että moottoripelastusveneiden radiosähkötyslaitteet ja pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite, milloin sellainen on, toimivat sääntöjen määräysten mukaisesti.
VIII. Että alus täytti tulipalon havaitsemis- ja sammutuslaitteita koskevat sääntöjen vaatimukset ja että siinä oli valot ja merkkikuviot, luotsitikkaat sekä laitteet ääni- ja hätämerkkien antamista varten näiden sääntöjen määräysten ja kansainvälisten meriteiden sääntöjen mukaisesti.
IX. Että alus kaikissa muissa suhteissa täytti sääntöjen vaatimukset, mikäli ne ovat siihen sovellettavissa.

VII. Att radiotelegrafinstallationer i motorlivbåtar och bärbar radioapparat för livbåtar och livflottar, om sådan finnes, fungerade i överensstämmelse med föreskrifterna i dessa regler.
VIII. Att fartyget uppfyllde fordringarna i dessa regler i vad avser anordningar för upptäckande och släckning av brand samt var försett med ljus och signalfigurer, lotslejdare ävensom med anordningar för avgivande av ljudsignaler och nödsignaler enligt bestämmelserna i dessa regler och i de internationella sjövägsreglerna.
IX. Att fartyget i alla övriga hänseenden uppfyllde fordringarna i dessa regler, i den mån de äro tillämpliga å fartyget.

Tämä todistuskirja on annettu Suomen hallituksen puolesta.
Detta certifikat är utfärdat på finska regeringens vägnar.

Todistuskirja on voimassa ~~26~~ päivään kesäkuuta/juni 19 ~~81~~ 82 saakka.
Certifikatet gäller intill den 24

Annettu Helsingissä ~~4~~ päivänä ~~juli/heinä~~ kuuta 19 80
Utfärdat i Helsingfors den 30 JUNI/KESÄ

Allekirjoittanut ilmoittaa olevansa mainitun hallituksen asianmukaisesti valtuuttama antamaan tämän todistuskirjan.
Underteckand förklarar sig vara av nämnda regering behörigen bemyndigad att utfärda detta certifikat.

15
Leima
Stämpel 10,- mk.

HD N:o
HD N:r

Merenkuluntarkastaja
Sjöfartsinspektör
Weimo Suikki

PASSENGER SHIP SAFFTY CERTIFICATE

Enclosure 2.4.4.58

FINLAND

for ~~an~~ / a short international voyage.

Issued under the provisions of the
International Convention for the Safety of Life at Sea, 1960

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	Particulars of voyages, if any, sanctioned under Regulation 27 (c) (VII) of Chapter III	Date on which keel was laid
VIKING SALLY	OIWW	Mariehamn	13566,80		1979

I, the undersigned certify:

I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. That the survey showed that the ship complied with the requirements of the Regulations annexed to the said Convention as regards:
1. the structure, main and auxiliary boilers and other pressure vessels and machinery;
2. the watertight subdivision arrangements and details;
3. the following subdivision loadlines:

Subdivision loadlines assigned and marked on the ship's side at amidships (Regulation 11 of Chapter II)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces
C. 1	2062 mm	
C. 2		
C. 3		

III. That the life-saving appliances provide for a total number of 2267 persons and no more, viz.:

10 lifeboats (including 10 motor lifeboats) capable of accommodating 692 persons, and – motor lifeboats fitted with radiotelegraph installation and searchlight (included in the total lifeboats shown above) and – motor lifeboats fitted with serachlight only (also included in the total lifeboats shown above), requiring – certificated lifeboatmen;

12 liferafts, for which approved launching devices are required, capable of accommodating 300 persons; and

51 liferafts, for which approved launching devices are not required, capable of accommodating 1275 persons;

6 buoyant apparatus capable of supporting 120 persons;

18 lifebuoys;

2298 + 200 for children lifejackets.

IV.* That the lifeboats and liferafts were equipped in accordance with the provisions of the Regulations.

V. That the ship was provided with a line-throwing appliance and portable radio apparatus for survival craft in accordance with the provisions of the Regulations.

VI. That the ship complied with the requirements of the Regulations as regards radiotelegraph installations, viz.:

	Requirements of Regulations	Actual provision
Hours of listening by operator	16	16
Number of operators	1	1
Whether auto alarm fitted	1	1
Whether main installation fitted	1	1
Whether reserve installation fitted	1	1
Whether main and reserve transmitters electrically separated or combined	separated	separated
Whether direction-finder fitted	1	1
Number of passengers for which certificated	For a short international voyage between Finland and Sweden	2000

VII. That the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the Regulations.

VIII. That the ship complied with the requirements of the Regulations as regards fire-detecting and fire-extinguishing appliances and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals, in accordance with the provisions of the Regulations and also the International Collision Regulations.

IX. That in all other respects the ship complied with the requirements of the Regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the Finnish Government.

It will remain in force until the ~~26th~~ 24 day of June 19 ~~81~~ 82

Issued at Helsinki the ~~4th~~ 30 day of ~~July~~ June 19 ~~80~~ 81

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

Inspector of Navigation

~~Heimo Suikki~~

Stamp ~~10,-~~ 15 mk.

HD N:o

Finnish Maritime Administration

27 June 1995

03. Juli 1995

Enclosure 2.4.4.59

Dr. Peter Holtappels
Ahlers & Vogel
Schaartor 1
20459 Hamburg
Germany

Dear Sir,

Referring to our discussions on 21 June 1995 I send a few certificate copies concerning Viking Sally.

The first certificate for short international voyage had a validity of one month in order to permit sailing from Germany to Finland. The following full period certificates have a note under para VI (number of passengers) 'for short international voyage betveen Finland and Sweden'. The opposite side of the certificate, which is in the official language of the flag state, says 'i kustfart mellan Finland och Sverige'. 'Kustfart' was definition as not south of latitude N 59 deg 30 min.

In 1983 we got a new decree on surveys of ships, where coastal traffic was limited to the domestic waters only. After that the certificates state 'på korta internationella resor mellan Finland och Sverige'. The change does not mean that a new traffic area was constituted.

After 1984 the certificates remain unchanged except the reference to the radiotelegraphy exemption and the change of the name of the ship to 'Wasa King'.

Yours Sincerely,

Jukka Häkämies

Head of Division
Jukka Häkämies

Visiting Address	Mailing Address	Telephone	Fax	Telex	Postal Cheque Account
Vuorimiehenkatu 1 00140 Helsinki	P.O. Box 158 SF - 00141 Helsinki Finland	+ 358 0 18081	+ 358 0 1808 355	121 471 mkh sf	3801-4

Statement

Lars Karlsson, born 11.9.43 states :

I obtained the Chief Engineers License in May 1965 at the Technical School in Mariehamn/Aland Islands. My time with AB Sally commenced during the summer vacation in 1963 when I sailed as 3rd engineer on a tanker. After obtaining the license I sailed on cargo vessels and tankers of AB Sally; since 1969 as Chief Engineer. In August 1970 I became 1st engineer onboard of "Viking 1" and from summer 1971 I was again chief engineer and remained in that position ever since on Viking 3, 4, 5, and finally on "Viking Sally".

For "Viking Sally" I was newbuilding supervisor as I had been already for "Viking 3, 4, 5". As I knew the yard - and classification people already from these 3 newbuildings and also speak some German - I was nominated "coordinator" of owners' supervisors.

Three days after signing of the contract I came to Papenburg together with Capt. Brunström (was relieved after 5 weeks by Lars Mäkki), 1st engineer Stig Strömberg and electrician Lars Sjögren. At the beginning I had only 1 small Ga-plan. Deck and Engine specification were shown to me.

Due to pressure of time we had to make a lot of compromises. In my opinion and experience the Meyer Werft was the only yard in Europe able to do such a job because of so little bureaucracy. This has, in my opinion, nothing to do with the catastrophe. Meyer Werft has very much experience. They have built all ships very strong, i.e. they were usually heavy. It is a well known fact that Meyer ships were stronger and behaved better in ice compared to e.g. Wärtsila ships.

With my team of supervisors I checked everything including, and in particular, weldings in close cooperation with BV surveyor Lohmann and his colleague. As far as I remember Lohmann was more active on Viking 1-5, whilst on "Viking Sally" he was the boss and the other one did the routine work. Anyway Lohmann was always present when major items, such as ramp and visor, were presented by the yard and tested.

My best contacts were Mr. Motikat and Mr. Wahnes. F.B.N representatives came from time to time, however, all paperwork was done by the Sally office in Mariehamn directly with F.B.N. Helsinki.

I did some inspections with F.B.N. representatives in Papenburg, e.g.

- stairways, lifts;
- boats, liferafts, etc.
- fire doors, fire-fighting equipment, etc.

Chief officer Lindström came about 3 months before delivery.

I also inspected visor/ramp etc. I checked the visor during building together with the 1st engineer. It was very hectic during the last days before launching because there were delays in delivery of equipment from Sweden due to a strike in this country. After launching the visor was lifted ashore again. It was before only welded to the vessel by steel-bars. At present I do not remember details of the bearing/bushing system of visor hinges.

In 1987 the upper bearing of the port side lifting cylinder was changed by MacGregor, Turku during normal operation. They started in the evening and finished next morning. The change of this bearing became necessary because during opening operations there was a squeaking noise which was reported to me by the deck officer on watch.

Probably in 1986 we experienced twice that the Nirosta bolt of one of the visor hinges, I believe the port side, broke the securing plate screws and moved out by ca. 1 cm. This was noted by the deck officer being on forecastle deck for berthing because he found the broken off screws. The bolt was hammered back into position, the screw holes in the steel bushing drilled out and the securing plate refitted. If it would have happened again we would have investigated the cause, however, during my time, it did not occur again.

We never had greasing problems. Once per month grease was pressed into the bolts.
We never welded at the lifting cylinders or visor hinges. I have never seen the bolts out.

After every stormy cruise I inspected all the parts in the bow area. Four times a year I inspected in detail all safety relevant parts. This included visual inspection of the visor hinges, its weldings, etc. and also the inside of the visor including locking devices and its welding seams.

During one such inspection I found cracks in way of the foundations of the hydraulic cylinders for the ramp bolts which were of fatique nature and not due to overload. We welded strengthening plates to the foundations to stop the crack development.

I never found such cracks in way of Atlantic lock or side locks.

The rubber packings of the visor were changed once a year. The packings were mainly damaged on A-deck and 1 m upwards front bulkheads because the final movement before closure is backwards - not downwards - which destroys the packings due to the rubbing effect. Therefore we have put grease (same as used for the hinges) on the packings and it became better.

At some time, probably after the strong ice winter 1985/86, we increasingly had problems with electrical failures, short circuits, etc. caused by the sensors for the indicator lights of the Atlantic lock. So I checked with other vessels, e.g. "Viking Song" and "Viking Saga" and also the market, and finally bought rather expensive magnetic limit switches which were installed by electrician Sjögren instead of the mechanical sensors, and we never had problems again. I have been many times with B.V. surveyor Lars Olaf Ålander inside the closed visor when water or light tests were made during loadline survey. I believe that at the same time also the indicator lights were checked.

I have made at least 1000 cruises and more than 100 times reduced the engine output by myself in the engine room when I considered it necessary in heavy weather. Last time was in July 1991 when the vessel was already sailing as "Wasa King" between Waasa and Umea/Sundsvall when we arrived once 1 ½ hours late and another time 2 ½ hours late, both due to bad weather and the fact that I had reduced the engine output.

It has to be remembered that "Viking Sally" has been built for the archipelago, not for open sea. This refers in particular to the flare of her bow. In heavy seas the bow is shaking strongly sideways. This is created by the recess in the shell plating aft of the visor which results in a very strong setting-in. When the vessel is proceeding against headseas the pressure on the visor is in the aft direction. (Force direction is aft.)

We were all the time running in a very tight schedule with all 4 main engines at 90% output.

Reduction of speed in heavy headseas is not only a question of reduction of stress on vessel's and visor's structure and fixing points, but also the comfort of passengers has to be taken into account. We never had complaints to the best of my knowledge.

Officers and engineers have their accommodation directly in front of the superstructure overlooking the forecastle deck including the visor and I feel it difficult to believe that on the night of the catastrophe none of them looked out of their windows. I have sailed on "Viking 5" for 5 years between Helsinki and Stockholm and met quite some heavy weather.

In the engine control room (ECR) there were 2 output regulators for the main engines which were normally at 90%. Output could by these regulators be changed from ECR without any pitch change from the bridge.

The engines could be run on "Combinator" or on "Constant Revolutions". In all my 12 years onboard, however, it was always "Combinator" except during yard trials in 1980.

If the main engines are on "Combinator" and pitch of the propellers is reduced the revolutions are being reduced automatically. In other words, if the revolutions have not been reduced also the pitch cannot have been reduced from the bridge.

The bow ramp was considered to be the collision bulkhead same as on all the predecessors built by Meyer Werft, but also the same as on e.g. Turella, Rosella, Viking Song, Viking Saga, and many other ferries.

All 3 hydraulic pumps broke down one after the other (normal pressure 185 bar) which was apparently not enough. We built in stronger pumps and operated them at 240 bar pressure. The 2 big pumps could produce 400 bar pressure whilst the smaller one could produce 280 bar.

In winter we had problems to open the visor.
It is easy to increase the pressure by just turning a wheel at the hydraulic pump (axial piston pump - make: Vickers). There was a lock nut to regulate the pressure.

In case of difficulties to open the visor, e.g. due to being frozen fast, it is the easiest thing to increase the hydraulic pressure.

Although impossible due to the electrical system the visor can be closed if the ramp is open when the valves are operated manually. In case the rails of the ramp should be deformed this is due to the lowered down visor for working purposes.

The observation of pilot Stenhammar, i.e. that the crew was opening and quickly closing the visor in short intervals (to make it fit over the pyramide most likely) is difficult to believe. There were valves directly at the lifting cylinders by means of which the speed of the oil flow could be regulated. This must be absolutely identical at both sides otherwise one side will open or close faster than the other side and the visor will get out of alignment. These regulating valves are fitted at the outside of the lifting cylinders at the lower side (B-deck).

When the vessel was sailing between Turku - Stockholm there had to be 2 officers + 1 AB on the bridge. When she was shifted to the Waasa/Umea trade, owners wanted to save 1 officer which was accepted by F.B.N. under the condition that the control panel for the indicator lights for visor and bow ramp was moved to the large operation panel in front of the bridge where the lights could be seen from the seats of master and watch officer. This was done some time in 1991.

The light on the steering aid on the forecastle was mostly out.

To my knowledge the manual sidelocks were never used. They were more for open sea, Atlantic or the like. I have no particular memory about any play between bolts and hinges of Atlantic lock and/or sidelocks.
Opening/closing of visor was always and only done by Chiefmate and boatswain together.

I do not know whether ever the visor was opened with still closed locking devices respectively closed with already closed locking devices.

Upon being shown some underwater pictures from the damaged hinge remains I am of the opinion that the rust on the Nirosta bolt could have been caused by the disappearance of the bronze bushing, i.e. steel bushing in contact with Nirosta bolt. Also in case of bad greasing a bronze bushing will disappear more quickly.

On cardeck there were 4 cameras installed i.e. 1 forward to the forward ramp, 2 at the sides and 1 looking aft to the stern ramp. The cameras could be moved and had also zoom ability.

Monitors were on the bridge (located at port side of the entrance to the chart room) and in the ECR above the instrument panel. The camera picture shown on the monitor could be changed to another camera either manually or automatically. The monitors on bridge and in ECR were showing the same picture. The main monitor with operating sticks was in the ECR, i.e. the bridge could not change to another camera.

After the "Estonia" catastrophe I have heard from a former colleague engineer who had trained "Estonia's" engineers after they had taken over the vessel that they had problems with water in the visor which caused short circuits in the no more watertight magnetic switches for the indicator lights of the Atlantic lock. As the electrical system for these switches and the indicator lights are switched to the same fuse also securing the controls for all hydraulic installations on the cardeck, i.e. ramps, visor, movable decks, etc, such a short circuit caused a general black-out on the cardeck. Thus if the fuse (located on 9th deck) is out you have no power and the cause has to be removed if such a problem occurs frequently, which it apparently did.

Consequently they removed the magnetic limit switches from the plate near the Atlantic lock and there was only the indicator light for open/closed visor left active. (It is unknown what happened to the sidelock indicators.)

We never had problems with hydraulic power in the aft, only forward. There were 3 hydraulic pumps port side forward, 3 starboard aft. One of the aft pumps got power from the emergency generator (when in operation).

The 30.4.90 was the last day as "Viking Sally". On 7.5.90 she commenced sailing as "Silja Star". She kept this name only for ½ year and then became "Wasa King". I left the vessel on 30.3.92, but returned in November 1992 for one week upon instructions of Ulf Hobro, Nordström & Thulin. I checked the inventory of the engine department, the maintenance - and spare part - computer system and took a copy of the computer program.

Finally I would like to mention that a vessel sailing for 20 months at full speed in the Baltic will have a lot of cracks everywhere.

The electricians sailing with me were Sjögren and Märtensen.

Mariehamn, 15.10.95

....

Lars Karlsson

Enclosure 2.4.5.61

Jos. L. Meyer
Schiffswerft - Maschinenfabrik
2990 Papenburg 1
Postfach 1120

D E L I V E R Y - C E R T I F I C A T E

this is to certify, that on this 29th day of June, 1980,
at 23^{30} hours local time,

the shipyard Jos. L. Meyer of Papenburg,
Federal Republic of Germany,

has delivered at the port of Emden, Federal Republic of Germany, to the

Rederiaktiebolaget Sally,
Mariehamn/Finland,

the Car/Passenger Ferry

"VIKING SALLY"

(Newbuilding S. 590)

as per terms and conditions of the contract signed in Mariehamn/ Finland, on 11th September, 1980.

On behalf of the Purchaser:	On behalf of the Builder:
Rederiaktiebolaget Sally, Mariehamn/Finland	Jos. L. Meyer Shipyard Papenburg 1 Federal Republic of Germany

Papenburg, 29th June, 1980

06/07 '95 13:14 ☎+49 4961 81300 SE MEYER WERFT 002

Jos. L. Meyer
Schiffswerft - Maschinenfabrik
2990 Papenburg 1
Postfach 1120

Jos. L. Meyer Schiffswerft as Builders, on the one part, and Rederiaktiebolaget Sally as Owners, on the other part, have at the delivery of the vessel "VIKING SALLY" on this day agreed on the following points:

1. The extra and minor costs have been finally settled as far as the scope of delivery is concerned. The deadweight according to contract will be 2740 t.

2. The uncompleted work on the vessel will be completed by the Builders at their cost as soon as it is practically possible according to contract, specification, drawings and subsequent agreements between the parties.

3. The question of penalties or premiums for speed and deadweight of the vessel will be settled according to the relevant clauses in the contract when results of the speed trials can be presented and the light weight of the vessel has been determined upon completion of the deliveries of specified inventories etc.

4. This agreement does not affect the scope of the contract in any respect not mentioned here or the scope of the guarantee.

Emden on the 29th day of June, 1980.

	Rederiaktiebolaget Sally
Jos. L. Meyer as Builders	Sven-Erik Johansson for the Owners

Jos. L. Meyer, Papenburg-Ems
Schiffswerft, Maschinenfabrik, Dockbetrieb

Car and Passenger Ferry "VIKING SALLY"
S. 590

Handing-Over Report

The car and passenger ferry "VIKING SALLY" will be handed over to the owner company AB SALLY, Mariehamn, by shipyard JOS. L. MEYER, Papenburg, on 29th June, 1980. The vessel will sail for the VIKING-LINE between Finland and Sweden, also serving the Aaland islands. The VIKING-LINE is operated by the Finnish owner AB SALLY, the Swedish owner AB SLITE and the Finnish owner company SF-LINE.

From 1970 to 1974, JOS. L. MEYER already delivered 6 car and passenger ferries to the VIKING-LINE, 4 of this series for owner AB SALLY and 2 for AB SLITE. Moreover the "DIANA II" was handed over to owner AB SLITE on June, 1979.

The confidence in the shipyard created by the good cooperation was the decisive criteria for the owner to conclude the contract for this modern and high-sophisticated vessel. Despite keen and in some cases government-subsidized competition the yard could book this order as a result of short delivery terms, an interesting design worked out by yard's engineers and high flexibility in meeting the owner's requirements.

On request of the Owners the ship was delivered on 29th June in order to be able to put the vessel into service within the scheduled time although some areas of the accommodation were not completed. The time for the voyage from Papenburg to Mariehamn as well as for the outfitting of the ship by the owner should be used to complete the unfinished areas.
The yard agreed to this solution although they would have had the right due to the late supplies of the materials from Sweden and Finland on account of the strike situation in these countries to keep the ship at the outfitting quay of the yard for some more time.

The owner's decision to order this vessel in Papenburg was in principle dependent on the very short construction and building period of approx. 9 months. In case of the 7 previous newbuildings JOS. L. MEYER showed their ability to strictly observe the delivery times stipulated by contract.

The main data of the vessel are as follows:

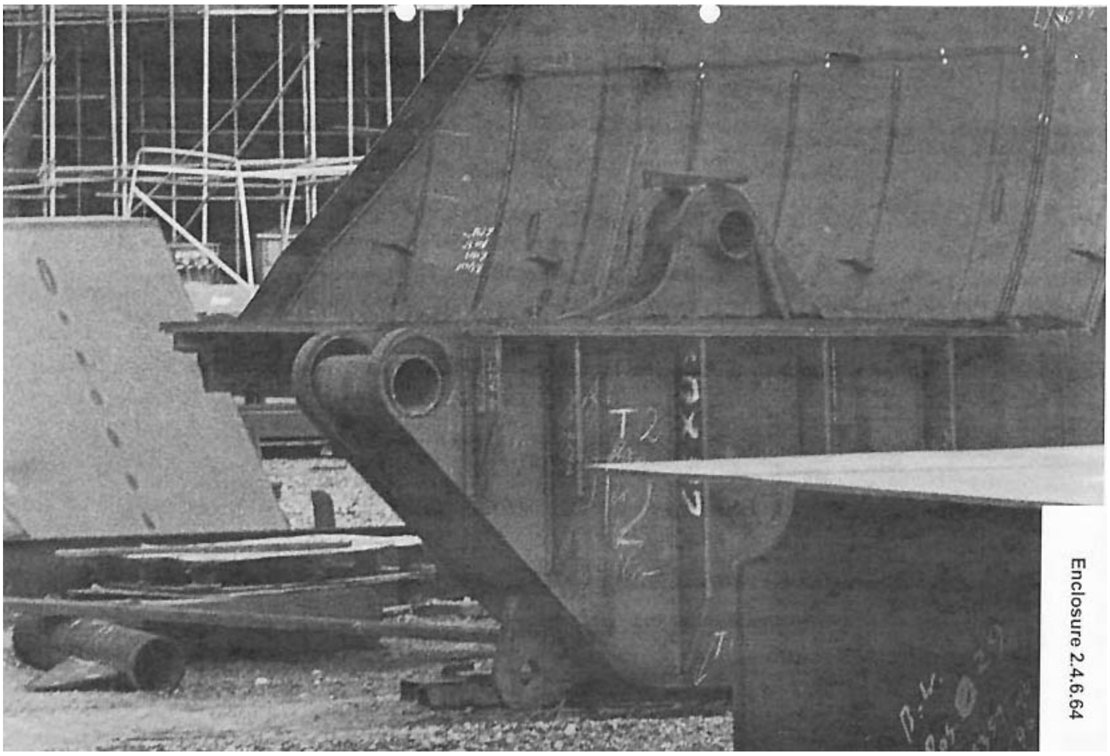
Length over all	155.40 m
Breadth	24.20 m
Draught, loaded	5.55 m
Deadweight	2,800 t
Tonnage	15,500 GRT
4 main engines (6,000 HP each)	24,000 HP
Speed	21.20 kn
Capacities	2,000 passengers
	1,186 cabin places
	110 officers and crews
	1,650 seats in restaurants, bars, clubs, etc.
	52 lorries w. trailers (18 m)
	or 460 passenger cars

The following facts may give an idea of the expenditure of work involved in the construction of such a big ferry:

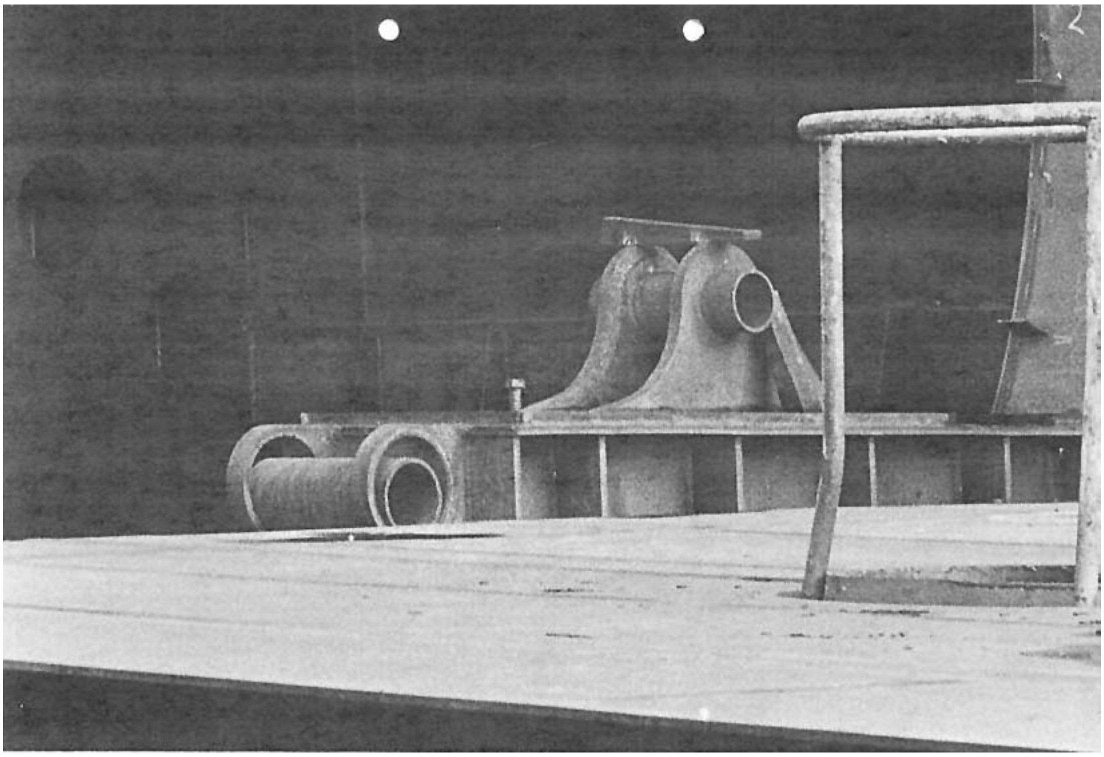
- About 280 km cables were laid out, i.e. 1.6 km cable/m of ship.
- About 30,000 m^2 areas were insulated, as much as 6 football fields or a small farm.
- 460 passenger cars can be transported on this vessel, i.e. a 2.1 km long line of cars.
- 1,300 beds and more than 1500 doors were installed.
- In addition to a main engine output of 17,600 kW, a generator capacity of 4,416 kW was provided - enough to supply a town with about 8,000 inhabitants.

To sum up it can be said that this ship is hotel, basement garage, power plant, means of transportation, canalisation, supermarket and place of entertainment in one.

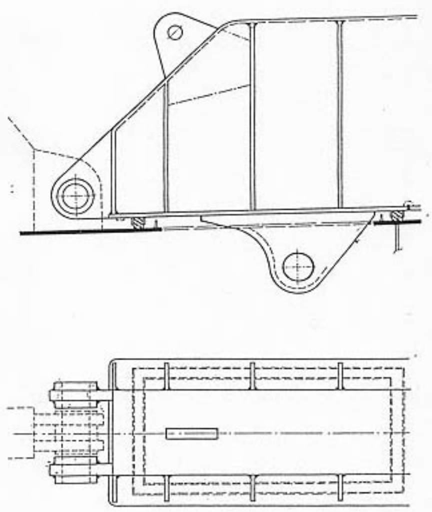
Enclosure 2.4.6.63



Enclosure 2.4.6.64



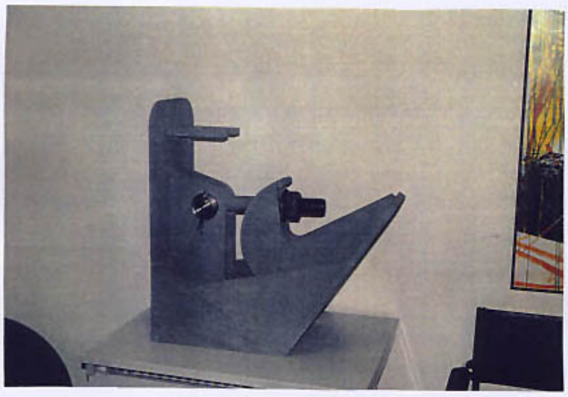
Enclosure 2.4.6.66



Arrangement of deck hinges

Enclosure 2.6.2.67

Enclosure 2.6.2.68



II. BOW VISOR

1) Construction

The visor has a weight of abt 54,5 tons and forms the W.T. front closure of the ship. The bow visor is pivoted at the upper deck. It opens in upward direction.

2) Maintenance

Under circumstances when temperature reaches 0° C or below check that the limit switches and other equipment on weather deck are not getting covered with ice. See also item I pos. 2).

All piston-rods and cylinders should be covered during painting. Dry paint spirts upon the surface of the piston-rod would spoil the cylinder packings within short time, what means undesirable leakages.

Check all hoses, hose connections and pipe connections to prevent leakages. Damaged components should be replaced if necessary in order to avoid interruption.

The hose connections should be painted, but not the hydraulic hoses.

The rubber packings should be treated with Tellin or similar mixture containing graphite and tallow in order to reduce the wear of the rubber. When a defect rubber packing is going to be replaced the packing channel has to be sufficiently cleaned before the new packing is fitted with glue. von Tell UK 2 glue or glue of the same quality has to be used.

3) Locking device (25)

In closed position the visor is locked by , locking pins which are operated by one hydraulic cylinder (12) each. As a reserve the visor can also be locked by two manually operated locking devices. There is also one hydraulic operated "atlantic locking device" (12).

In open position the bow visor is locked by 2 locking pins which are hydraulic operated with one hydraulic cylinder (12) each.

In closed position the rubber packing is compressed by the sole weight of the bow visor. The rubber packing is fixed with bolts.

4) Operation

For the operation of the bow visor a hand-operated electrical valve (pos 17) is used which is guiding an operating valve (19). An electrical blocking is built in to prevent faulty operation between bow visor and bow ramp.

The very operation of the visor is performed by two hydraulic cylinder (2) with spherical bearings. Two ice-breaking cylinders (8) assist the opening process when the visor starts opening. When the locking devices of the bow visor are released the ice-breaking- and operatin cylinders are put under pressure and the visor will open. When the visor is fully opened it will be locked.

When lowering the bow visor the top of the cylinder will be put under pressure. In the bottom of the cylinder a valve (15) is fitted which is controlling the lowering when a pressure arises in the cylinder which is higher than the adjusting pressure of the valve. The lowering speed is adjustable by throttle non-return valves (39) and they should also bo so adjusted that the cylinders get the same timing.

5) Control

Opening of the bow visor

1) Start both of the pumps.

2) Open the atlantic locking device and the cleats. Put the control levers (one by one) in position ÖPPNA until red lamp indicates ÖPPEN.

   If the manual locking device has been used this has to be opened.

3) Check that the lamp for the locking devices indicates ÖPPEN. If not, open up the locking devices which are locked.

4) Open the bow visor. The control lever will be in position UPP until green lamp indicates UPPE.

5) Close the locking device. The control lever will be in position LÅSA until green lamp indicates LÅST.

6) Lower the bow visor and let it rest on the locking device in order to release the hydraulic pressure in the operating cylinder.

7) Switch off the pumps.

Closing of the bow visor

(Check that the bow ramp is closed and locked.)

1) Start the pumps.

2) Check that red lamp indicates ÖPPEN for cleats and the atlantic locking device. If not, open up the cleats and the atlantic locking device.

3) Open up the bow visor. (The load on the locking device is released.)

4) Open up the locking device. Put the control lever on ÖPPNA until red lamp indicates ÖPPEN.

5) Close the bow visor. The control lever will be in position NER until green lamp indicates NERE.

6) Lock the cleats. The control lever will be in position LÅSA until green lamp indicates LÅST.

7) If the atlantic locking device is going to be used this should also be locked.

8) Switch off the pumps.

III. BOW RAMP

1) Construction

Dimensions: L = 8225 mm
B = 5500 mm between the tracks

Weight: abt 12,1 tons

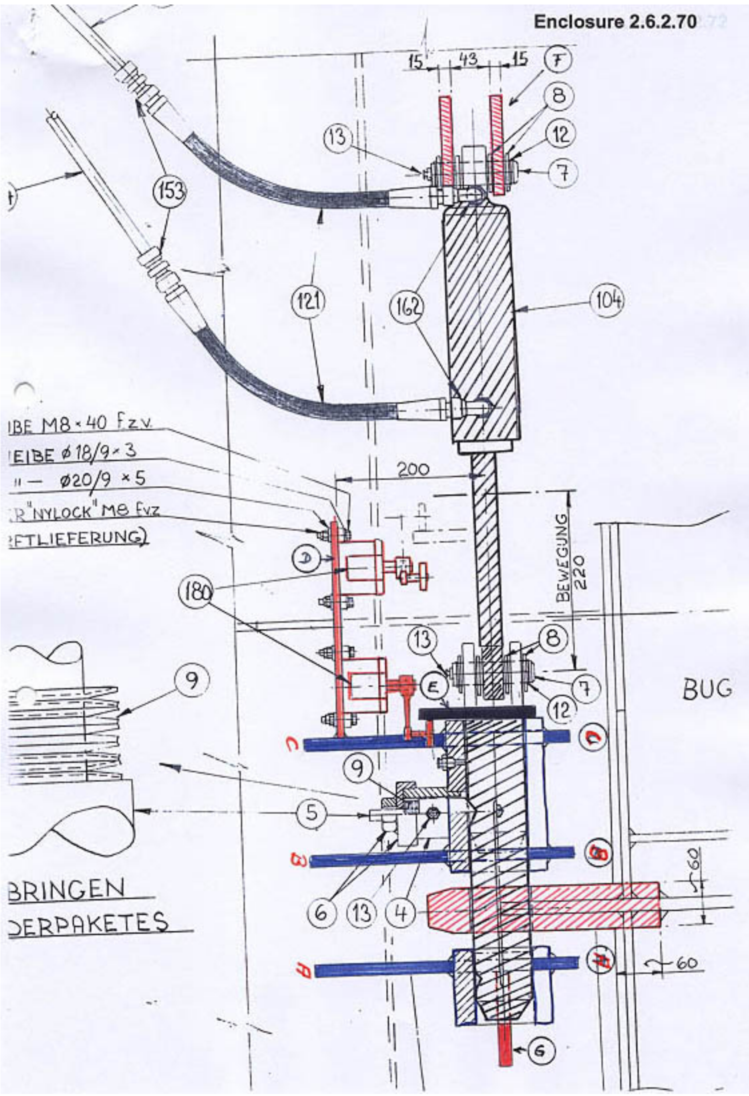
The fore-end part of the ramp is provided with 8 sloping flaps, which automaticly extend when the ramp is opening. Each sloping flap is working independently from the others in order to compensate for the heeling of the ship (2 degrees max.)

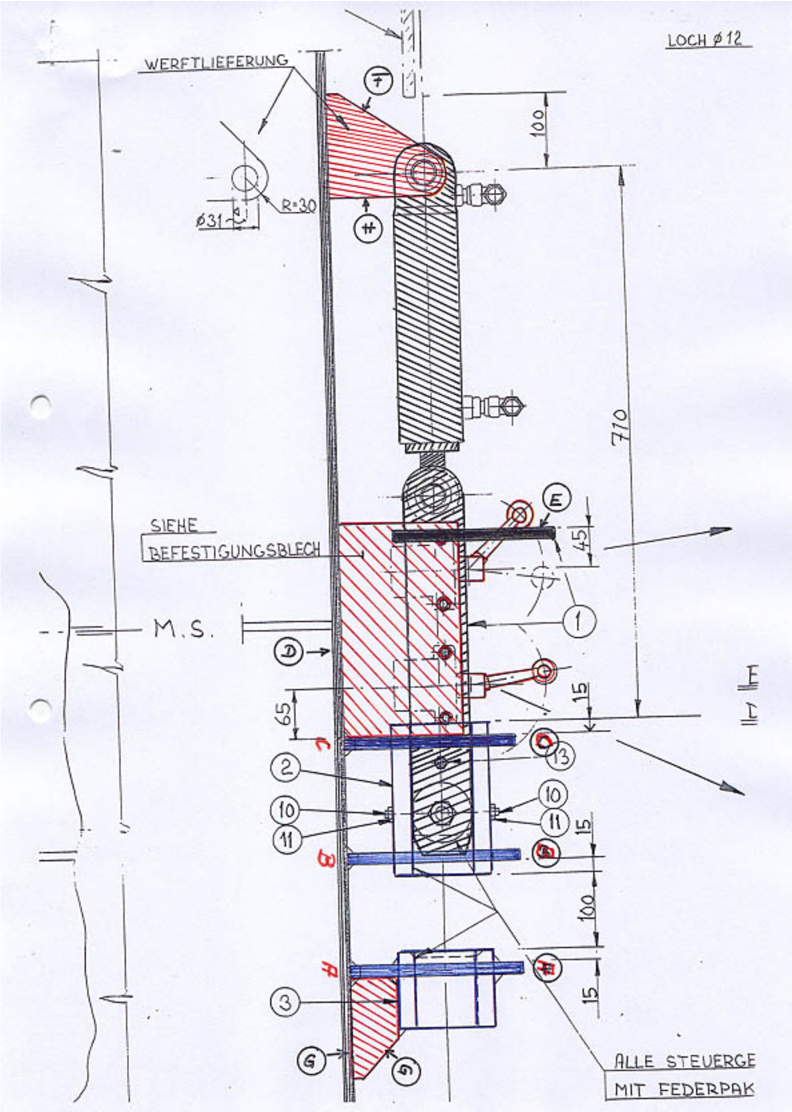
The ramp is pivoted to the ship with 4 hinges. The two outer hinges are provided with spherical bearings and the two inner with bronze bushes. The axles are of stainless steel.

The ramp is equipped with fastenings for preventer stays.

2) Maintenance

See item I. pos. 2).


15
43
15
F
8
12
7
13
153
121
162
104
IBE M8 × 40 F.z.v.
EIBE Ø18/9 × 3
— Ø20/9 × 5
R "NYLOCK" M8 Fvz
FTLIEFERUNG)
200
BEWEGUNG
220
180
D
E
9
C
BUG
5
B
6
4
60
A
G
BRINGEN
DERPAKETES


LOCH Ø12
WERFTLIEFERUNG
100
Ø31
R=30
710
SIEHE
BEFESTIGUNGSBLECH
45
M.S.
65
15
2
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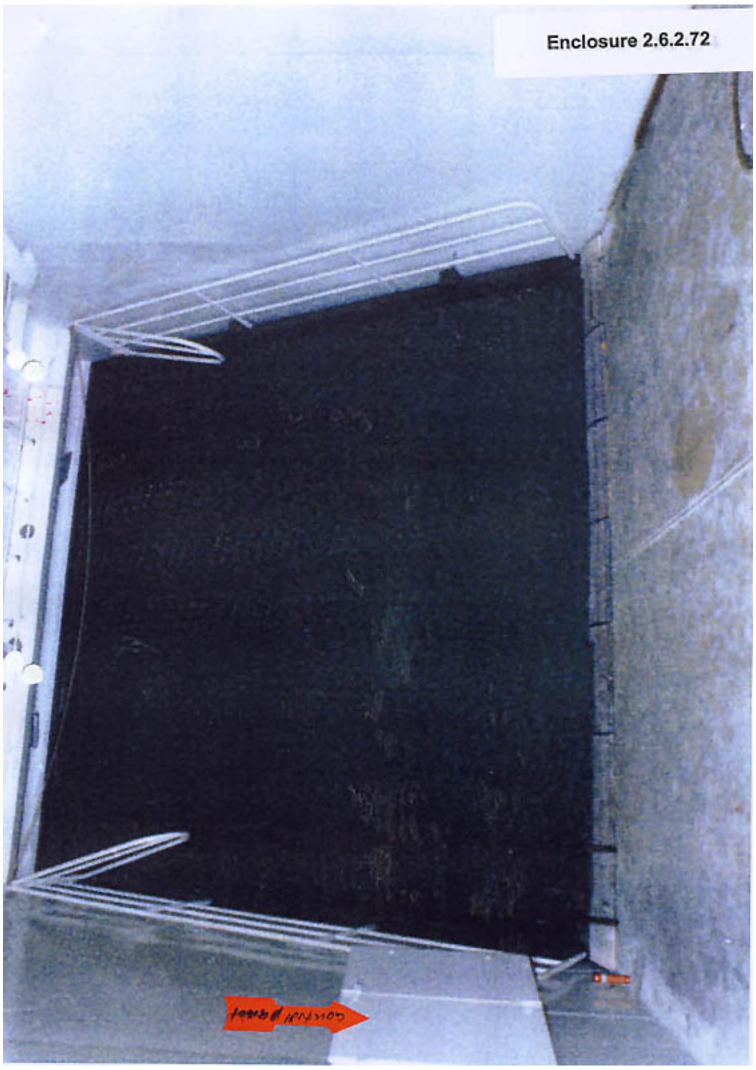
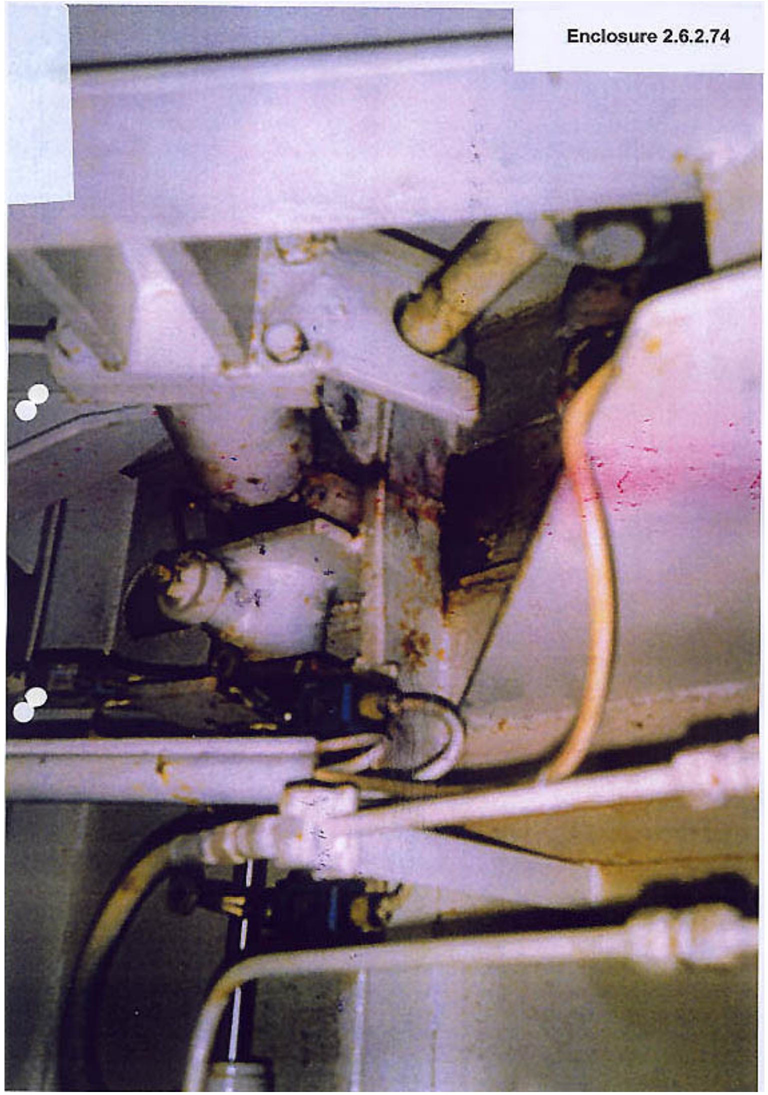
11
13
100
3
ALLE STEUERGE
MIT FEDERPAK

Enclosure 2.6.2.71

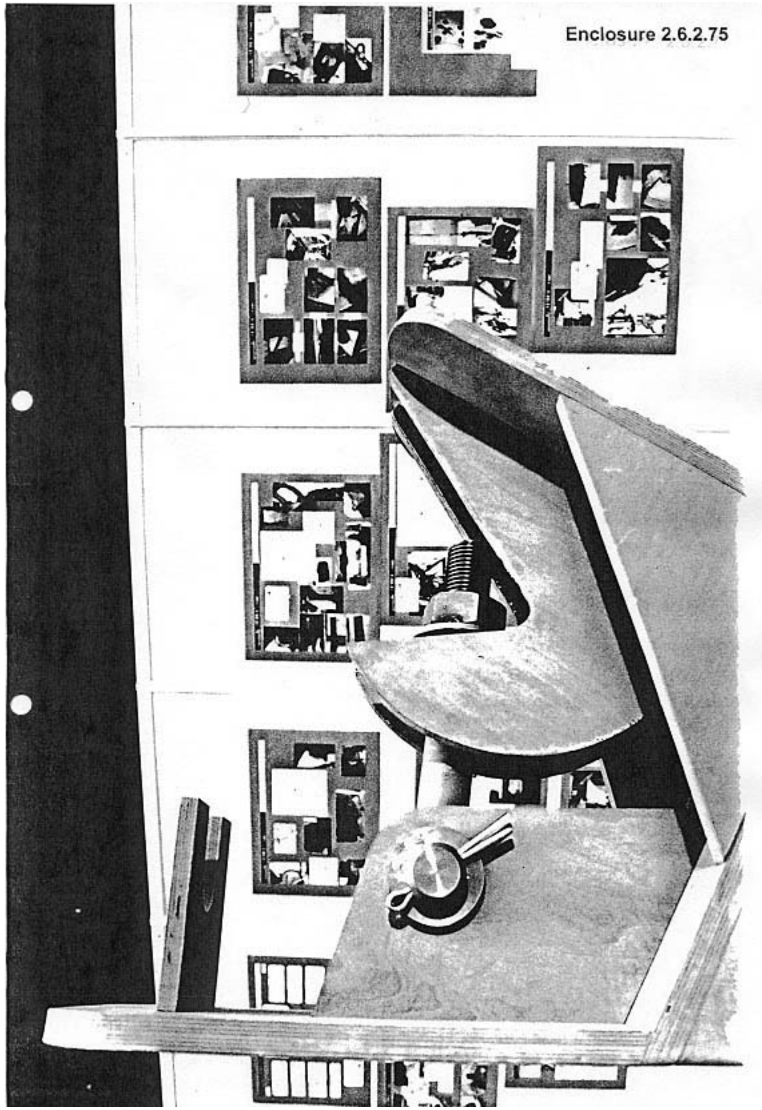
Enclosure 2.6.2.72



Enclosure 2.6.2.74



Enclosure 2.6.2.75



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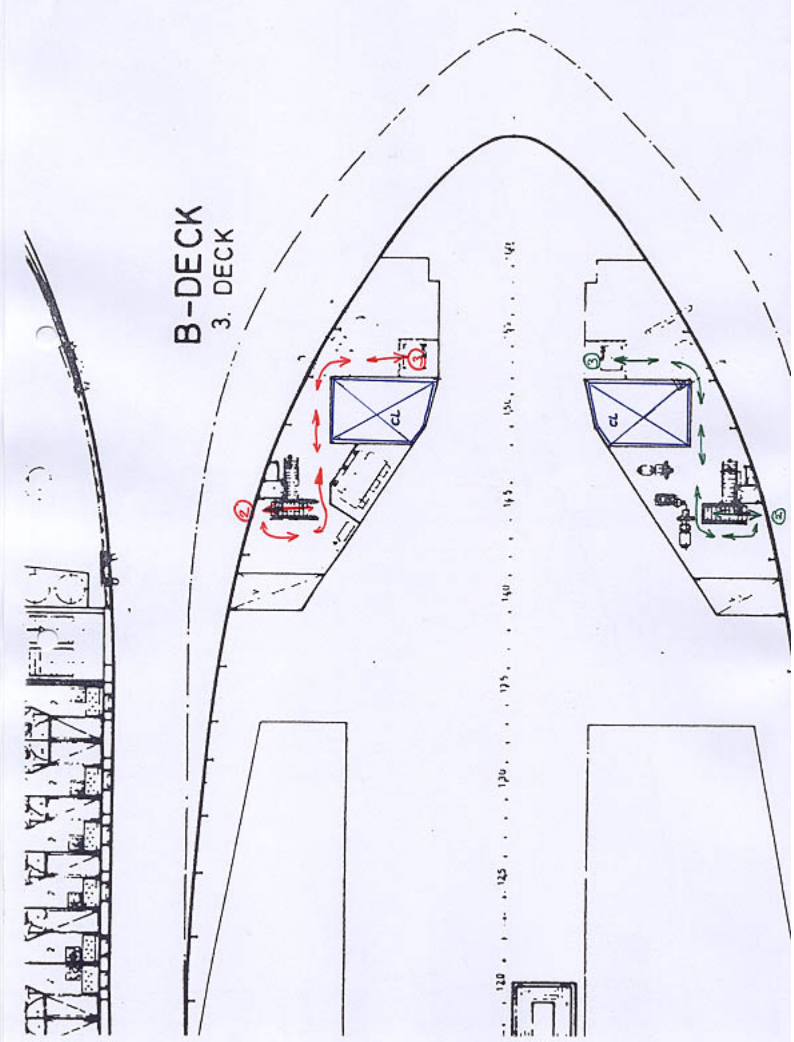
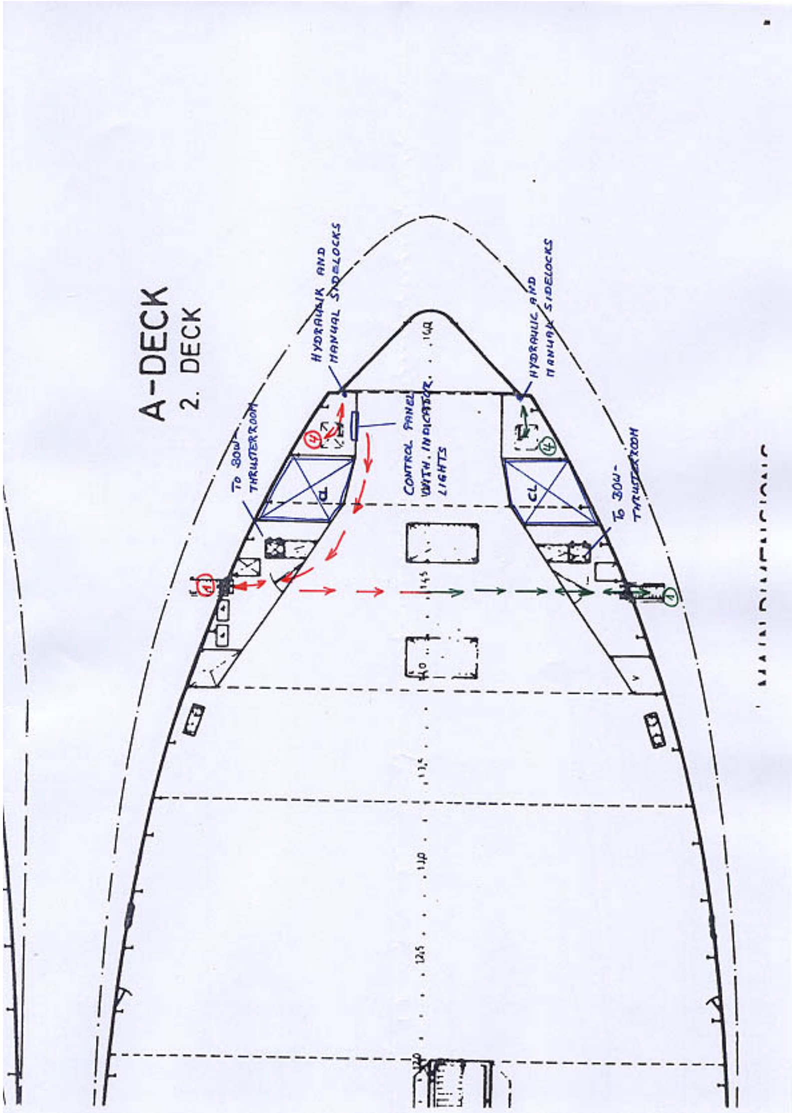
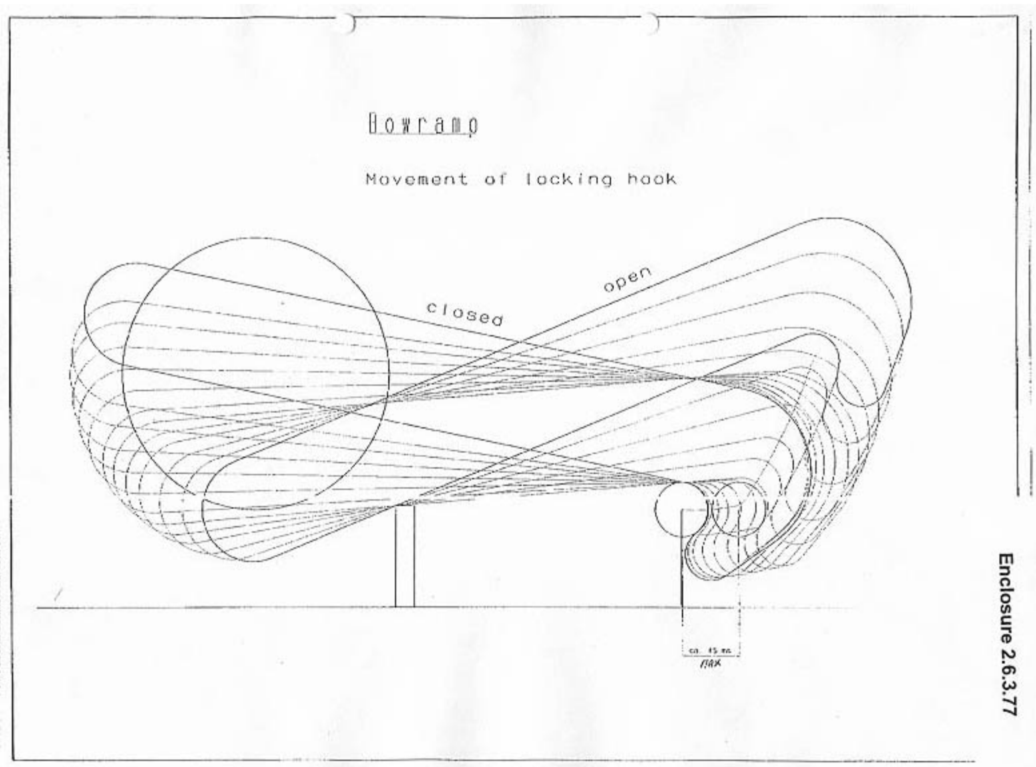
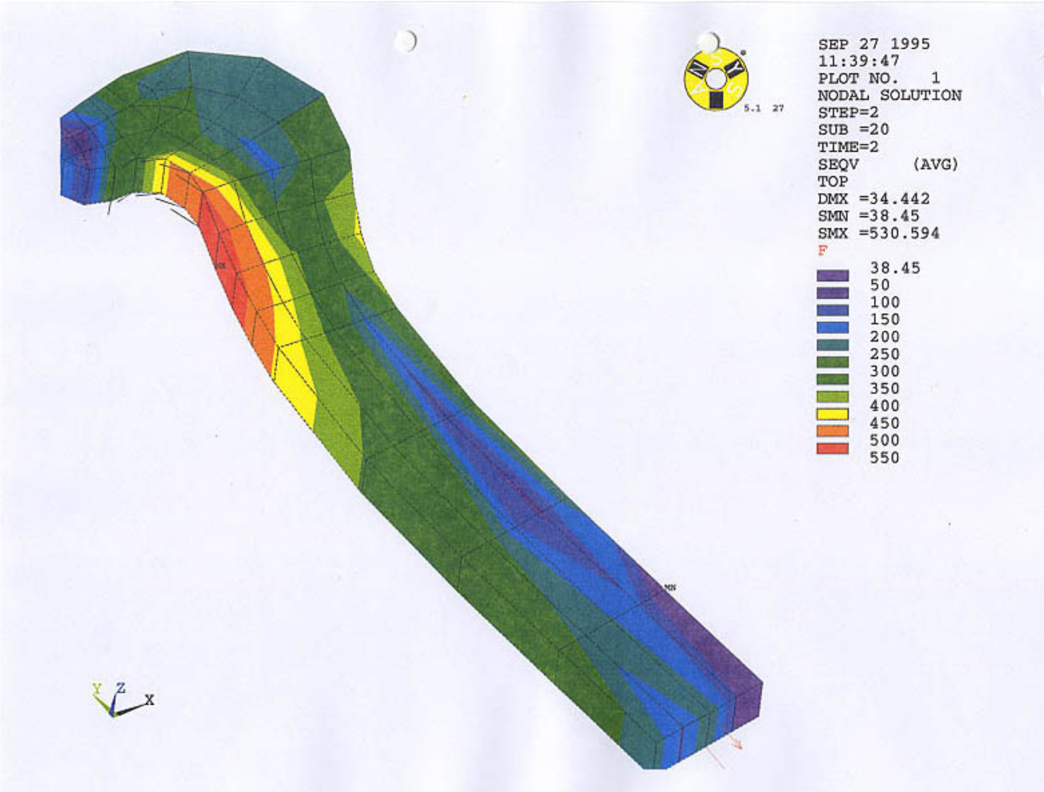


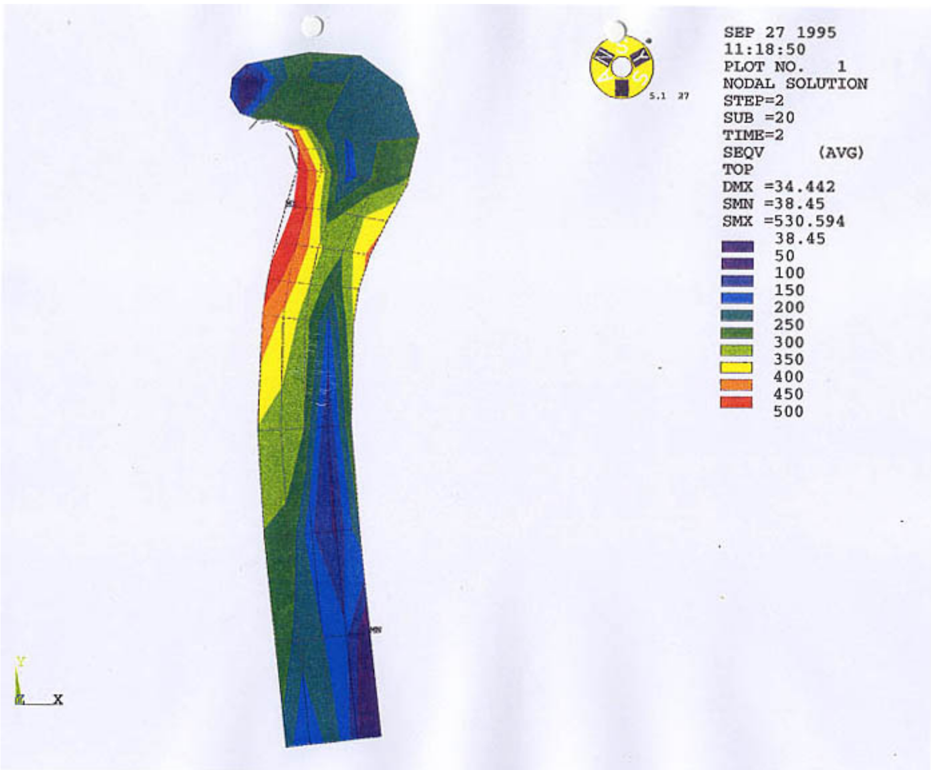




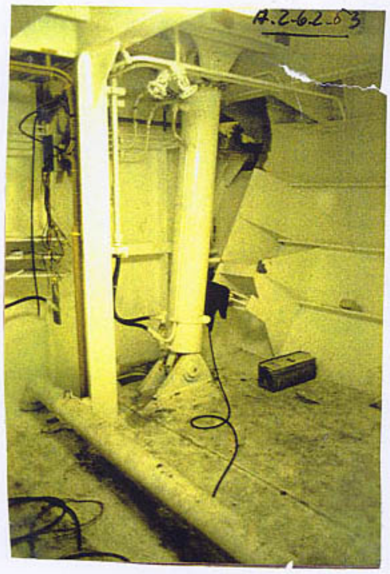
Enclosure 2.6.3.77



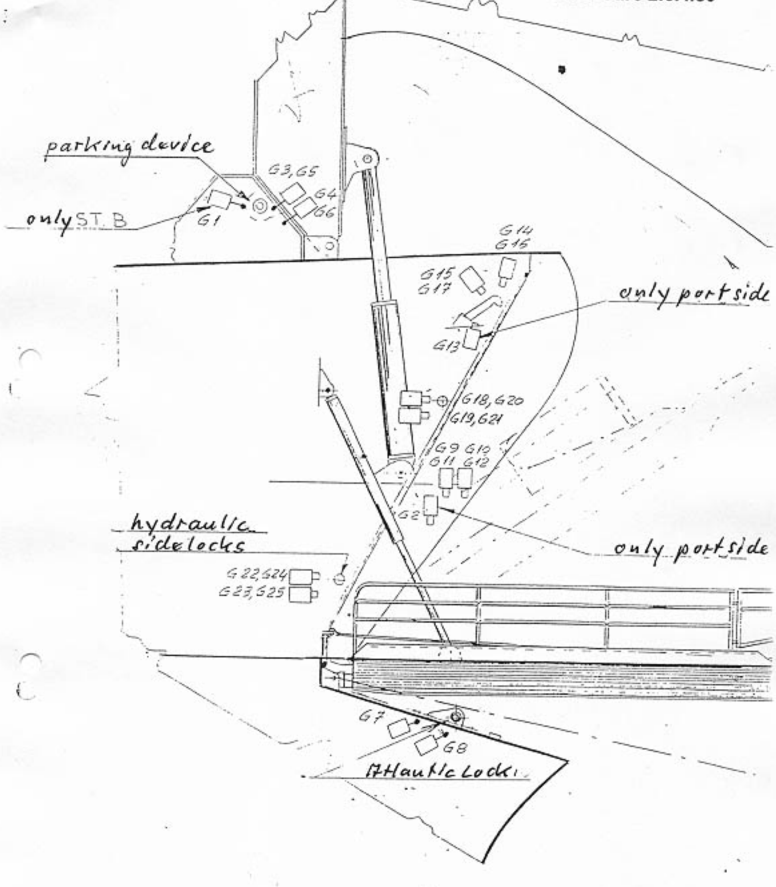
Enclosure 2.6.3.78



Enclosure 2.6.4.79



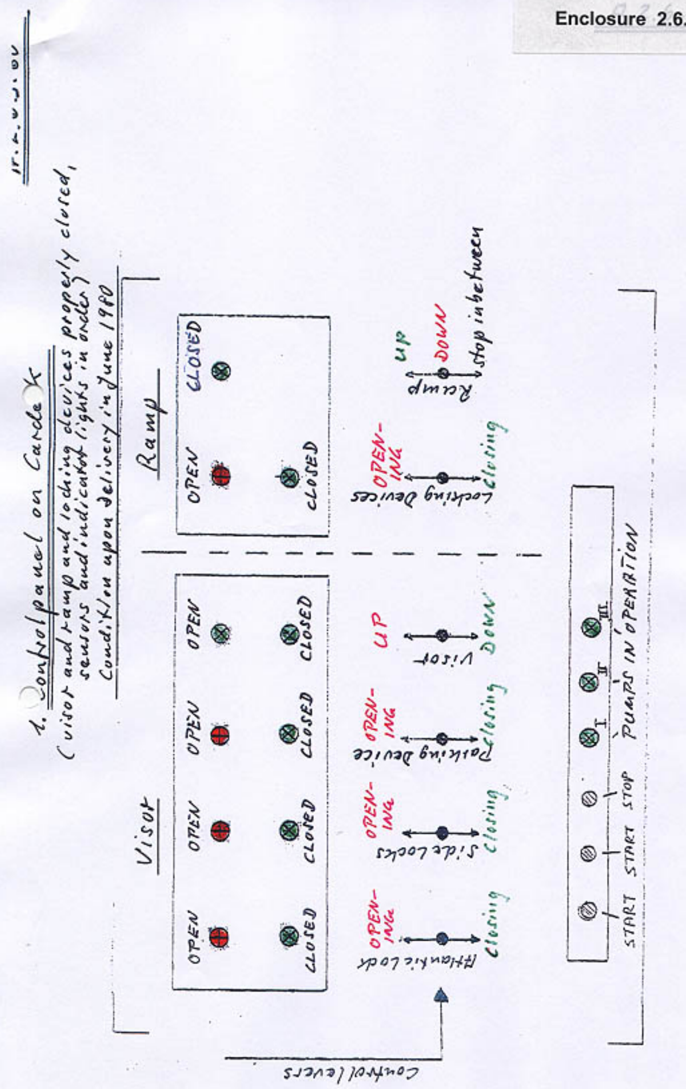
Enclosure 2.6.4.80



Bowvisor and Ramp

Part of drawing
49111-871

Enclosure 2.6.4.81



Enclosure 3.2.3.82

SOLAS

Consolidated Edition, 1992

INTERNATIONAL MARITIME ORGANIZATION

(d) Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the Contracting Governments concerned.

Regulation 5
Ice patrol service

(a) The Contracting Governments undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season the south-eastern, southern and south-western limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

(b) Ships and aircraft used for the ice patrol service and the study and observation of ice conditions may be assigned other duties by the managing Government, provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

Regulation 6
Ice patrol: Management and cost

(a) The Government of the United States of America agrees to continue the management of the ice patrol service and the study and observation of ice conditions, including the dissemination of information received therefrom. The Contracting Governments specially interested in these services undertake to contribute to the expense of maintaining and operating these services; each contribution to be based upon the total gross tonnage of the vessels of each contributing Government passing through the regions of icebergs guarded by the ice patrol; in particular, each Contracting Government specially interested undertakes to contribute annually to the expense of maintaining and operating these services a sum determined by the ratio which the total gross tonnage of that Contracting Government's vessels passing during the ice season through the regions of icebergs guarded by the ice patrol bears to the combined total gross tonnage season through the regions of icebergs guarded by the ice patrol. Non-contracting Governments specially interested may contribute to the expense of maintaining and operating these services on the same basis. The managing Government will furnish annually to each contributing Government a statement of the total cost of maintaining and operating the ice patrol and of the proportionate share of each contributing Government.

(b) Each of the contributing Governments has the right to alter or discontinue its contribution, and other interested Governments may undertake to contribute to the expense. The contributing Government which avails itself of this right will continue to be responsible for its current contribution up to 1 September following the date of giving notice of intention to alter or discontinue its contribution. To take advantage of the said right it must give notice to the managing Government at least six months before the said 1 September.

(c) If, at any time, the United States Government should desire to discontinue these services, or if one of the contributing Governments should express a wish to relinquish responsibility for its pecuniary contribution, or to have its contribution altered, or another Contracting Government should desire to undertake to contribute to the expense, the contributing Governments shall settle the question in accordance with their mutual interests.

(d) The contributing Governments shall have the right by common consent to make from time to time such alterations in the provisions of this regulation and of regulation 5 of this chapter as appear desirable.

(e) Where this regulation provides that a measure may be taken after agreement among the contributing Governments, proposals made by any Contracting Government for effecting such a measure shall be communicated to the managing Government which shall approach the other contributing Governments with a view to ascertaining whether they accept such proposals, and the results of the enquiries thus made shall be sent to the other contributing Governments and the Contracting Government making the proposals. In particular, the arrangements relating to contributions to the cost of the services shall be reviewed by the contributing Governments at intervals not exceeding three years. The managing Government shall initiate the action necessary to this end.

Regulation 7
Speed near ice

When ice is reported on or near his course the master of every ship at night is bound to proceed at a moderate speed or to alter his course

Enclosure 3.3.83

The German Group of Experts investigating the sinking of M/V "ESTONIA"

c/o AHLERS & VOGEL · Schaartor 1 D-20459 Hamburg · Telephone 49-40-371075

<u>Memo for Dr. Holtappels</u>

re: Interview of Juhani Luttunen, ex boatswain of "Viking Sally", "Silja Star" and <u>"Wasa King" from June 1980 to November 1992 on 6.9.96</u>

1. Lutttunen had killed another ex crew member of "Viking Sally", etc., the engine repairman Christer Koivisto, by shoöting him twice into the head onboard M.V. "Fennia" on the 12th June of this year whilst in the port of Wasa. This is why the interview took place in the prison of Wasa where Luttunen has been ever since. The interview, in the course of which also the underwater videos concerning the Atlantic lock area were viewed, took 4 hours. Participants were

   Daniel Allén - lawyer of Luttunen
   Henrik Gahmberg - Bützow & Co., Helsinki
   the Undersigned.

2. Christer Koivisto had been an engine repairman and 'ombudsman' (union representative) from the take-over of "Viking Sally" in Papenburg until June 1993 when the vessel was "Estonia, whilst Luttunen had been boatswain from the take-over in June 1980 to November 1992 when the vessel was "Wasa King". According to L., Koivisto had a very dominant/convincing personality, and we got the impression that there had been a certain rivalry between the two over the years. The exact times of Luttunen, Koivisto as well as of Göran Lindström and Bo Wesander, nominated by Luttunen as witnesses, can be taken from the attached copy of the crew register of the Finnish Board of Navigation.

3. L. is believed to be schizophrene and/or paranoid and will undergo mental examination shortly. During the interview, however, he made a completely normal impression on us, very calm and concentrated, only once did he become slightly excited, viz. when we could confirm that the visor lug possibly showed indications of manipulation which could not be explained by normal wear and tear, and elongation/stretching in service.

4. L. explained in detail:
   - his function as boatswain in connection with operating visor/bow ramp, i.e. standing at the control panel, he explained the different handles and also the indicator lights, remembered clearly the 2 hooks and 4 bolts of the bow ramp as well as
   - the sidelocks, the Atlantic lock, and also explained that they had never engaged the manual sidelocks.
   - At some time in 1982 they realized that the visor was no more closing properly because it was in a misaligned condition athwortships, he believes that the starboard corner was standing a bit up. It was for this reason that the Atlantic lock bolt could no more move through the visor lug. The matter was discussed with the engine people and it was considered what could be done. Engine repairman Koivisto considered himself to be the visor expert and offered to rectify the Atlantic lock to the effect that the bolt would fit again. L. believes that Koivisto was even called back from vacation to do the modification.
   - In the presence of L. and Göran Lindström Koivisto cut off the upper part of the lugs of the Atlantic lock and took off the bushings. Thereafter he welded extended parts on the lug remains and the holes in the lugs now looked like an ellipse (see drawing attached an enclosure no. 2), the bushings did not fit any more and were left out as still the bolt would not go smoothly through the visor lug, which was extending apparently too much aft or too much forward. In any event Koivisto cut something off

the inside of the visor lug, whereby L. is of the opinion it was from the forward part (see drawing attached as enclosure no. 3). After the repairs were completed by Koivisto L. together with Lindström looked at the result and realized at once that it was impossible. They decided to contact the inspector from shore, he does not recall the name, is however sure that it was not Röblom (whom he knows). He is very careful with names since Lindström and Wesander, whom he had called as witnesses, had testified that they did not remember. It was their intention to call in the inspector who normally inspected the visor.
Somebody came and realized the poor modification. About one week later Swedish speaking people came from the company von Tell AB, totally cut off all 3 lugs of the Atlantic lock and welded new ones to the A-Deck with bushings inserted. He believes also that it was then realized that there was something wrong with the hydraulic, which was adjusted. The visor lug remained - as far as he remembers - unchanged, i.e. should still be the original.
When the repairs were completed the von Tell people expressly prohibited Koivisto or anybody else from board to ever manipulate the Atlantic lock again.

5. We have promised to send photos of bolts and lugs from the Atlantic lock as well as from the visor lug and will also attach photos from the poorly welded fundament of the port actuator and the hinges, although he has already said that he does not remember anything in this respect.

6. The information from Luttunen will be cross-checked with von Tell and some people in Mariehamn.

7. According to L. Koivisto has repeated the poor modification of the Atlantic lock again on "Estonia" which might have caused the catastrophe.

8. L. has spoken several times to T. Karppinen before and after the murder, the first time in December 1995 when he visited the Finnish Commission on his own initiative. According to Karppinen, however, he did not express himself very clearly at the beginning and spoke more in a coded manner, which was confirmed by L. when we asked him respectively.

9. In summary it has to be concluded that in case it can be proved that L. is right the 3 lugs at vessel's side are not original which would explain the good looking but too thin welds at centre and port lugs, whilst the starboard lug had subsequently been repair welded. It would also explain the longer support bracket at the starboard lug when comparing it with the drawing.

Hamburg, 09.09.96 Werner Hummel

Encl.

Enclosure 3.4.86

WASA KING

TRIM AND STABILITY BOOKLET

approved by FBA
Edelu –
23.1.91

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20460 TURKU
F I N L A N D

TELEPHONE +358-21-471 281
TELEFAX +358-21-471 282
MOBILE +358-49-524 773
BANK OKOBANK FINLAND
ACCOUNT 571066-22441

CONTENTS

G E N E R A L   P A R T I C U L A R S

SHIP'S NAME :	WASA KING ex Silja Star ex Viking Sally	
SIGNAL LETTERS :	OIKW	
PORT OF REGISTRY :		
OWNERS NAME :		
BUILDERS NAME AND ADDRESS :	Jos. L. Meyer, Papenburg-Ems	
SHIP'S NUMBER :	590	
DATE OF KEEL LAID :		
MAIN DIMENSIONS :	Length over all	157.02 m
	Length between perp.	137.40 m
	Breadth mld	24.20 m
	Depth to A deck	7.65 m
	Draught	5.567 m
BLOCK COEFFICIENT :		0.681
DISPLACEMENT (1.025 t/m^3) : T = 5.567 M		12708 T

GENERAL

This Trim and Stability Booklet is based on Maierform's Hydrostatic Particulars 6891.06-171.120, Cross Stability Curves Values 6891.01-171.200 and Damage Stability Diagram 6891.01-115.600 and Inclining experiment 11.01. 1991.

The difference of Light Ship Weight between the two inclining experiments was 313 t. The largest parts in additional weights were 'Duck tail' and additional insulation between passenger cabins.

The Duck tail's volume and effect to KM is not included in hydrostatic particulars. (Reduced trim and give more stability). During inclining experiment the Duck tail was over water surface all the time.

In loading cases 4 and 5 there has been shown stability curve and GM-values in various numbers of passengers. In loading cases 6, 7 and 8 there has been shown GM-values in various numbers of trailers.

The damage stability diagram has been calculated with the following criterions:

- GM at least 0.05 m
- Max. heel in unsymmetrical cases not more than 7°
- Margin line not immersed in the final stage of flooding.

The following tanks and spaces are connected with cross-flooding ducts:

- Heeling tanks (Tank 13 and 14)
- Sauna fr 110 - 120 from CL-side P & S
- Fresh water tanks fr 120 - 132 P & S

COMBINATION TABLE FOR LOADING CASES

CASE NO	LOADING CONDITION	HFO T	FW T	PASS T	CARGO T	WB T	DWT T	MEAN DRAUGHT M	TRIM M	GM' M	GM_{REQ} M
1	LIGHT SHIP	-	-	-	-	-	-	4.47	-2.28	0.44	-
2	BALLAST CONDITION AT DEPARTURE	807	644	-	-	479	2307	5.33	-0.64	1.51	0.64
3	BALLAST CONDITION AT ARRIVAL	94	68	-	-	993	1248	4.95	-0.50	1.04	0.92
4	FULL BUNKERS +2000 PASS. AT DEPARTURE	807	644	200	-	479	2607	5.44	-0.51	1.49	0.62
5	FULL BUNKERS +2000 PASSENG. AT ARRIVAL	94	68	200	-	993	1555	5.06	-0.42	0.96	0.83
6	47 TRAILER & 2000 PASS. AT DEPARTURE	417	287	200	1692	-	2975	5.57	-0.84	1.14	0.66
7	47 TRAILER & 2000 PASS. 50 % B & S	208	137	200	1692	176	2658	5.46	-0.75	0.84	0.63
8	47 TRAILER & 2000 PASS. AT ARRIVAL	42	38	200	1692	567	2694	5.47	-0.12	0.85	0.63

LOAD CASE 1

LIGHT SHIP

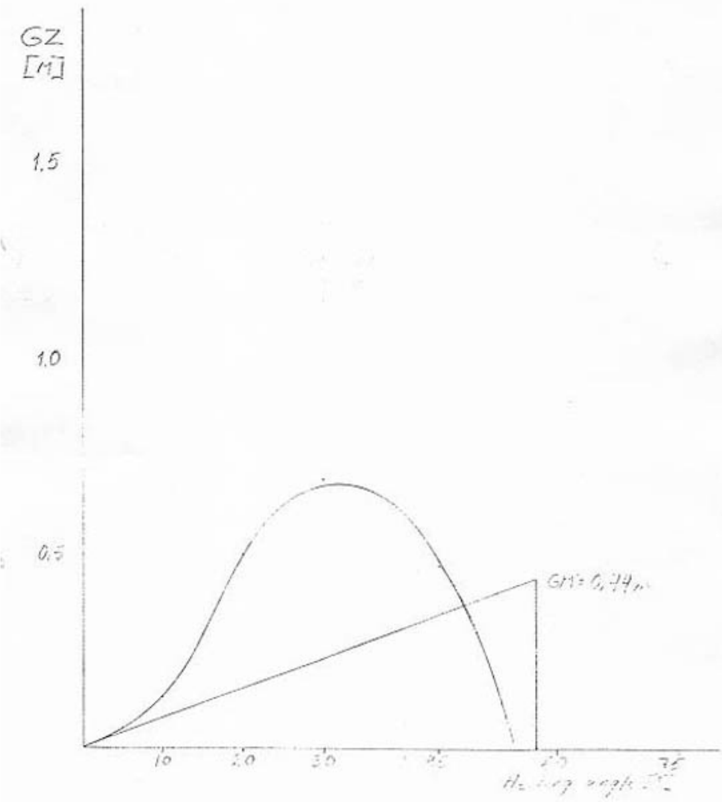
	Weight	VCG from BL	Mom	LCG from A_{PP}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	-
Dead weight	-					
Displacement	9733	11.56	112513	60.76	591377	

Mean draught	4.47 m	KM	12.00 m
Trim	-2.28 m	KG	11.56 m
Draught aft	5.41 m	GM	0.44 m
Draught forw	3.13 m	MM'	0.00 m
		GM'	0.44 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.14	4.45	6.47	8.64	9.53	9.13
KG'*sin	2.01	3.95	5.78	8.17	10.01	11.17
GZ	0.13	0.50	0.69	0.47	-0.48	-2.04

Ship Consulting Turku Finland	LOAD CASE 1 LIGHT SHIP	WASA KING 20.01.1991/VMJ



LOAD CASE 2

BALLAST CONDITION AT DEPARTURE

	Weight	VCG from BL	Mom	LCG from A_{PP}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	20	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
H tank 10	162	2.70		74.20		
H tank 11	162	2.70		74.20		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
DB tank 19	66	0.51		58.30		
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	807	1.70		68.70		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		
DB tank 20	18	0.57		59.87		
DB tank 47	39	0.65		26.62		248
DB tank 48	41	0.65		26.51		249
Day tank 41	13	2.91		31.03		
Total of DO	236	0.72		53.95		497
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

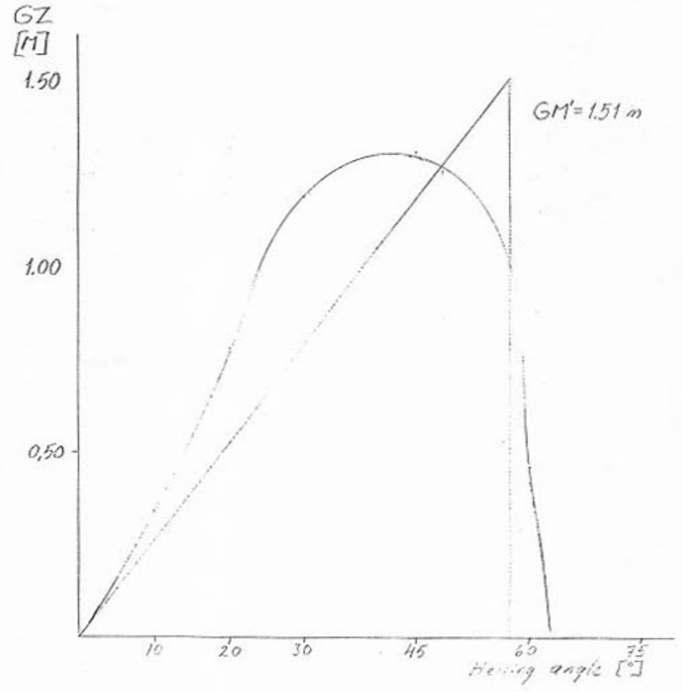
Fresh Water							
Tank 4a	75	2.79		114.25			
Tank 4b	75	2.79		114.25			
Tank 5	145	2.79		113.65			
Tank 56	156	3.07		9.46		353	
Tank 57	156	3.07		9.46		353	
Circulating tank 17	18	0.60		58.30			
Cool water tank 22	3	0.57		55.40			
Cool water tank 29	16	0.67		45.80			
Total of FW	644	2.80		59.82		706	
Water Ballast							
Fore peak tank 1	176	4.45		133.92			
Trim tank 2	303	4.69		121.40		2260	
Total of WB	479	4.60		126.00		2260	
Dead weight	2307	2.71	6247	75.17	173419	4331	
Displacement	12040	9.86	118760	63.52	764796	4331	

Mean draught	5.33 m	KM	11.73 m
Trim	-0.64 m	KG	9.86 m
Draught aft	5.65 m	GM	1.87 m
Draught forw	5.01 m	MM'	0.36 m
		GM'	1.51 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.28	6.30	8.54	9.31	8.95
KG'*sin	1.77	3.50	5.11	7.23	8.85	9.87
GZ	0.34	0.78	1.19	1.31	0.46	-0.92

Ship Consulting Turku Finland	LOAD CASE 2 BALLAST AT DEPARTURE	WASA KING 20.01. 1991/VMJ



LOAD CASE 3

BALLAST CONDITION AT ARRIVAL

	Weight t	VCG from BL m	Mom tm	LCG from A_{pp} m	Mom tm	Free surf tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	15	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	94	2.85		34.46		105
Diesel Oil						
DB tank 20	11	0.57		59.87		
Day tank 41	13	2.91		31.03		
Total of DO	24	1.74		45.45		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	45	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	68	2.06		92.96		166
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Heeling tank 13	183	2.63		77.53		
Heeling tank 14	183	2.63		77.53		
DB tank 54	60	0.66		19.14		
Total of WB	993	3.29		99.80		

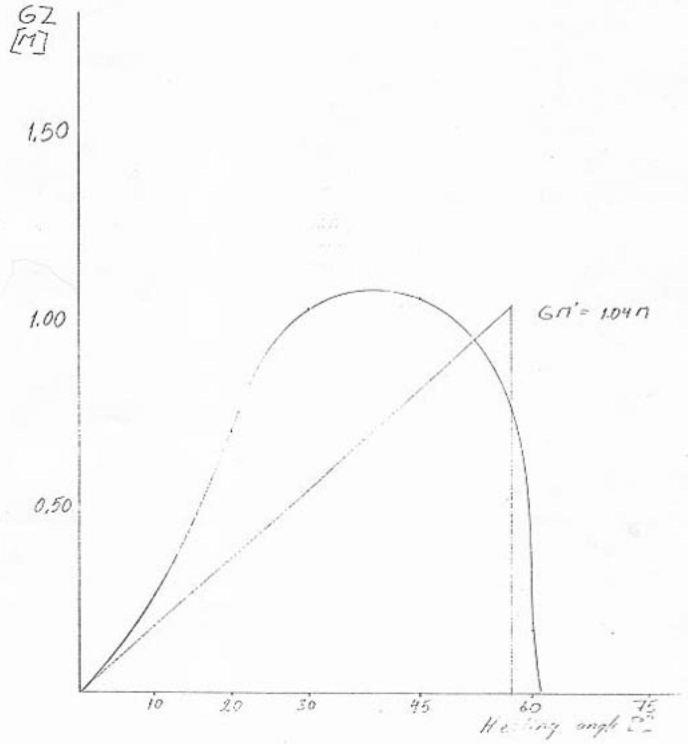
Dead weight	1248	3.46	4322	90.54	112988	310
Displacement	10981	10.64	116835	64.14	704365	310

Mean draught	4.95 m	KM	11.71 m
Trim	-0.50 m	KG	10.64 m
Draught aft	5.20 m	GM	1.07 m
Draught forw	4.70 m	MM'	0.03 m
		GM'	1.04 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.35	6.37	8.60	9.41	9.03
KG'*sin	1.85	3.65	5.34	7.54	9.24	10.31
GZ	0.26	0.70	1.03	1.06	0.17	-1.28

Ship Consulting Turku Finland	LOAD CASE 3 BALLAST AT ARRIVAL	WASA KING 20.01 1991/VMJ



LOAD CASE 4

SHIP WITH FULL BUNKERS & STORES + 2000 PASSENGER AT DEPARTURE

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	80	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
H tank 10	162	2.70		74.20		
H tank 11	162	2.70		74.20		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
DB tank 19	66	0.51		58.30		
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	807	1.70		68.70		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		
DB tank 20	18	0.57		59.87		
DB tank 47	39	0.65		26.62		248
DB tank 48	41	0.65		26.51		249
Day tank 41	13	2.91		31.03		
Total of DO	236	0.72		53.95		497
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

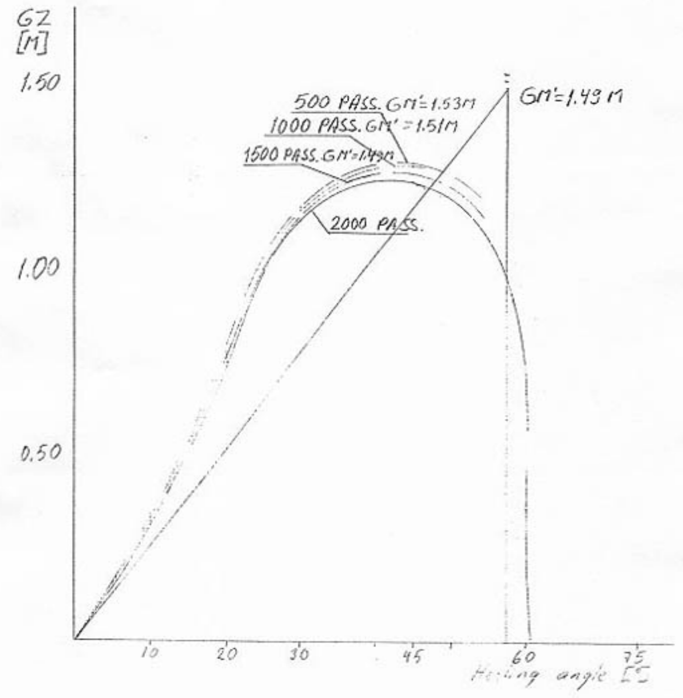
Fresh Water						
Tank 4a	75	2.79		114.25		
Tank 4b	75	2.79		114.25		
Tank 5	145	2.79		113.65		
Tank 56	156	3.07		9.46		353
Tank 57	156	3.07		9.46		353
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	644	2.80		59.82		706
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		2260
Total of WB	479	4.60		126.00		2260
2000 PASSENGER+LUGG	200	16.40		71.50		
Swimming pool	40	2.00		97.50		
Dead weight	2607	3.92	10207	74.56	194379	4331
Displacement	12340	9.94	122720	63.68	785756	4331

Mean draught	5.44 m	KM	11.78 m
Trim	-0.51 m	KG	9.94 m
Draught aft	5.70 m	GM	1.84 m
Draught forw	5.19 m	MM'	0.35 m
		GM'	1.49 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.27	6.28	8.52	9.27	8.92
KG'*sin	1.79	3.52	5.15	7.28	8.91	9.94
GZ	0.32	0.75	1.13	1.24	0.36	-1.02

Ship Consulting Turku Finland	LOAD CASE 4 FULL BUNKERS+2000 PASS. AT DEPARTURE	WASA KING 20.01. 1991/VM



LOAD CASE 5

SHIP WITH FULL BUNKERS AND STORES + 2000 PASSENGERS AT ARRIVAL

	Weight	VCG from BL	Mom	LCG from A_{PP}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	-
Crew + effects	20	22.00		55.00		
Provision + stores	60	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	94	2.85		34.46		105
Diesel Oil						
DB tank 20	11	0.57		59.87		
Day tank 41	13	2.91		31.03		
Total of DO	24	1.74		45.45		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	45	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	68	2.06		92.96		166
Bilge water 33	22	0.55		35.83		

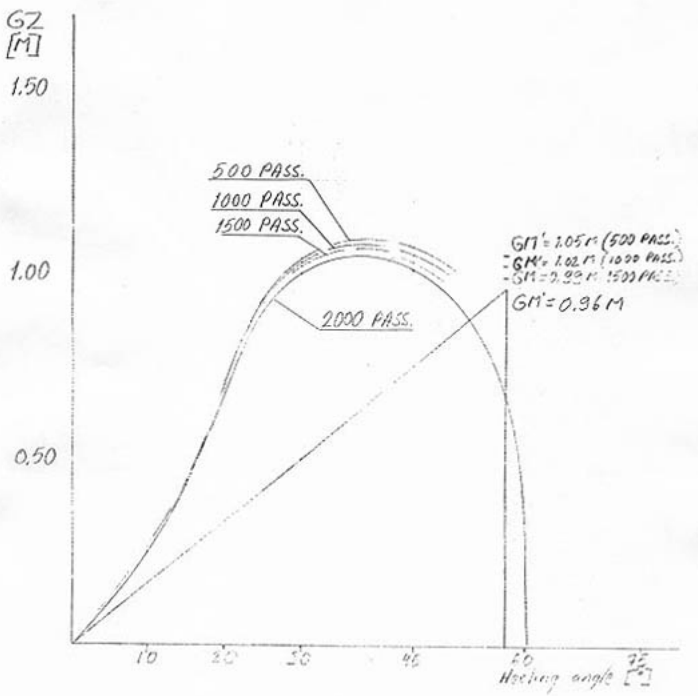
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Heeling tank 13	183	2.63		77.53		
Heeling tank 14	183	2.63		77.53		
DB tank 54	60	0.66		19.14		
Total of WB	993	3.29		99.80		
2000 passenger+lugg	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
Dead weight	1555	5.23	8132	85.72	133294	470
Displacement	11288	10.69	120646	64.20	724671	470

Mean draught	5.06 m	KM	11.69 m
Trim	-0.42 m	KG	10.69 m
Draught aft	5.27 m	GM	1.00 m
Draught forw	4.85 m	MM'	0.04 m
		GM'	0.96 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.35	6.37	8.60	9.41	9.03
KG'*sin	1.86	3.67	5.37	7.59	9.29	10.36
GZ	0.25	0.68	1.00	1.01	0.12	-1.33

Ship Consulting Turku Finland	LOAD CASE 5 FULL BUNKER +2000 PASS. AT ARRIVAL	WASH KING 20.01 1991/VMJ



LOAD CASE 6

FULLY LOADED TO DRAUGHT 5.567 47 TRAILERS AND 2000 PASSENGES AT DEPARTURE

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	80	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	417	1.11		66.08		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		245
Day tank 41	13	2.91		31.03		
Total of DO	138	0.78		69.06		245
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

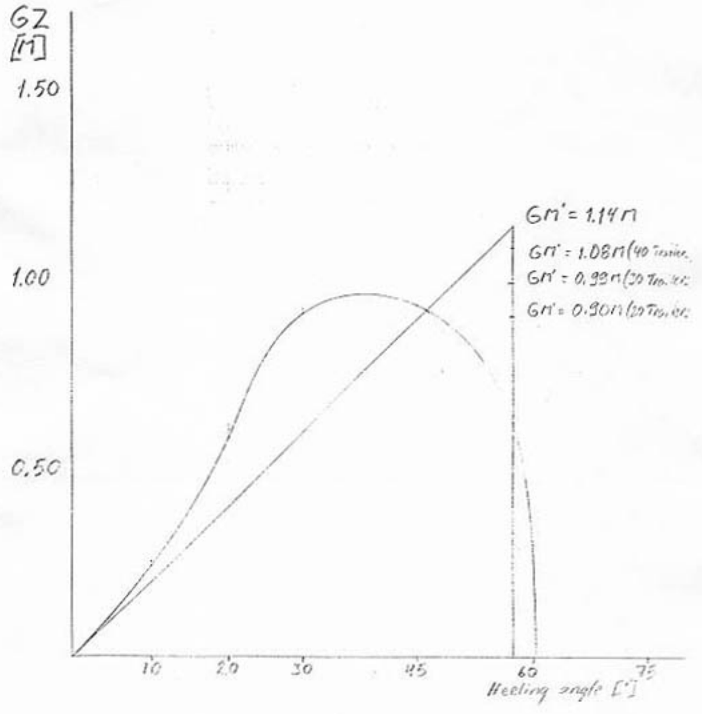
Fresh Water							
Tank 4a	75	2.79		114.25			
Tank 4b	75	2.79		114.25			
Tank 5	100	2.79		113.65		138	
Circulating tank 17	18	0.60		58.30			
Cool water tank 22	3	0.57		55.40			
Cool water tank 29	16	0.67		45.80			
Total of FW	287	2.51		106.10		138	
2000 PASSENGER+LUGG	200	16.40		71.50			
Swimming pool	40	2.00		97.50			
47 trailers a' 36 t	1692	9.50		66.50			
Dead weight	2975	7.40	22022	69.71	207381	1251	
Displacement	12708	10.59	134536	62.85	798758	1251	

Mean draught	5.57 m	KM	11.83 m
Trim	-0.84 m	KG	10.59 m
Draught aft	5.99 m	GM	1.24 m
Draught forw	5.15 m	MM'	0.10 m
		GM'	1.14 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.24	6.26	8.49	9.22	8.89
KG'*sin	1.86	3.66	5.35	7.56	9.26	10.33
GZ	0.25	0.58	0.91	0.93	-0.04	-1.44

Ship Consulting Turku Finland	LOAD CASE 6 FULLY LOADED TO DRAUGHT 5.567 M AT DEPARTURE	WASA KING 20.01 1991/VMJ



LOAD CASE 7

AS CASE 6 BUT 50 % OF BUNKERS AND STORES

	Weight t	VCG from BL m	Mom tm	LCG from A_{PP} m	Mom tm	Free surf tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	65	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
DB tank 16	45	0.60		72.20		434
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	208	1.62		58.76		434
Diesel Oil						
DB tank 8	56	0.60		86.60		236
Day tank 41	13	2.91		31.03		
Total of DO	69	1.04		76.13		236
Lubric. Oil						
Thermal oil tank 24	8	0.67		45.78		
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	3	0.71		15.06		
Total of LO	51	0.58		42.07		

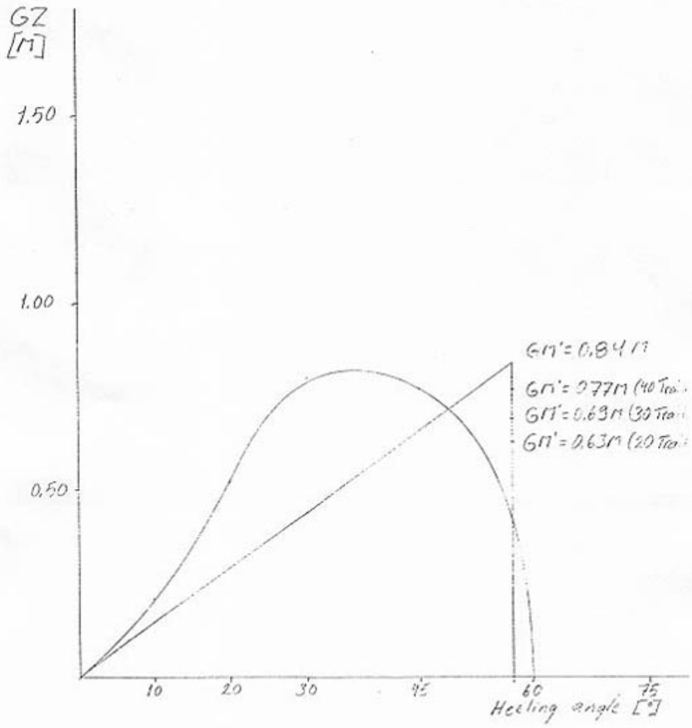
Fresh Water						
Tank 5	100	2.79		113.65		138
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	137	2.21		97.18		138
2000 PASSENGER+LUGG	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
47 trailers a' 36 t	1692	9.50		66.50		
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Dead weight	2658	8.29	22047	71.98	191311	968
Displacement	12391	10.86	134560	63.17	782688	968

Mean draught	5.46 m	KM	11.78 m
Trim	-0.75 m	KG	10.86 m
Draught aft	5.84 m	GM	0.92 m
Draught forw	5.09 m	MM'	0.08 m
		GM'	0.84 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.26	6.27	8.51	9.27	8.92
KG'*sin	1.90	3.74	5.47	7.74	9.47	10.57
GZ	0.21	0.52	0.80	0.77	-0.20	-1.65

Ship Consulting Turku Finland	LOAD CASE 7 FULLY LOADED TO DRAUGHT 5.567M BUT 50% BUNKERS	WASA KING 20.01 1991/VMJ



LOAD CASE 8

AS CASE 6 BUT 10 % OF BUNKERS AND STORES AT ARRIVAL

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provision + stores	60	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Total of HFO	42	2.82		36.40		105
Diesel Oil						
Day tank 41	13	2.91		31.03		
Total of DO	13	2.91		31.03		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	15	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	38	1.48		76.63		166
Bilge water 33	22	0.55		35.83		

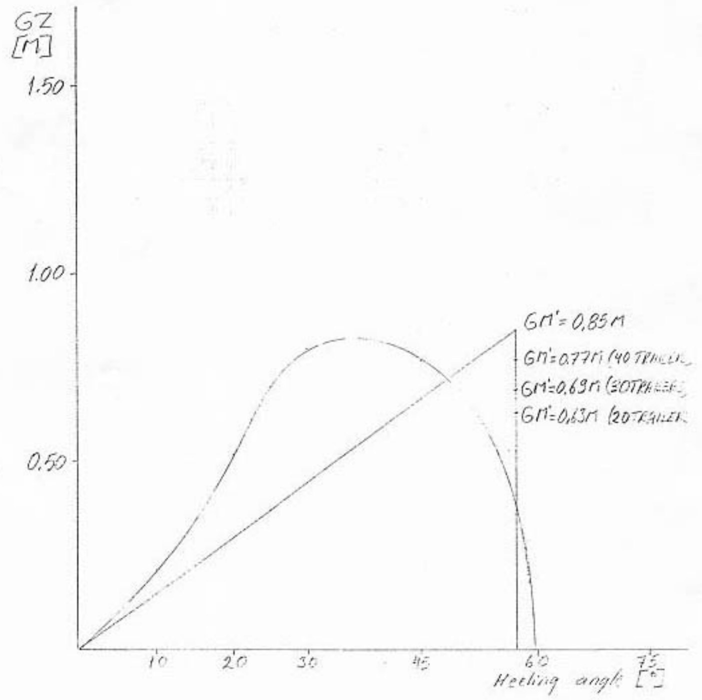
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Total of WB	567	3.99		122.72		
2000 passenger+lugg	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
47 trailers a' 36 t	1692	9.50		66.50		
Dead weight	2694	8.52	22959	77.87	209790	470
Displacement	12427	10.90	135473	64.47	801167	470

Mean draught	5.47 m	KM	11.79 m
Trim	-0.12 m	KG	10.90 m
Draught aft	5.53 m	GM	0.89 m
Draught forw	4.41 m	MM'	0.04 m
		GM'	0.85 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.26	6.27	8.51	9.26	8.91
KG'*sin	1.90	3.74	5.47	7.74	9.47	10.57
GZ	0.21	0.52	0.80	0.77	-0.21	-1.66

Ship Consulting Turku Finland	LOAD CASE 8 FULLY LOADED TO DRAUGHT 5.567 M AT ARRIVAL	WASA KING 20.01 1991/VMJ



YARD NO. 590

VIKING SALLY

Information for the master of the ship

YARD NO. 590

1. General

1.1 <u>Type and purpose of the ship</u>
Car and passenger ferry

1.2 Short international voyage

1.3 <u>Principal dimensions:</u>

Length overall	155,40 m	
Length between pp.	137,40 m	
Breadth moulded	24,20 m	
Draught	5,567 m	
Lightship	~~9419,67 t~~	9733 t
KG from basis	~~11,31 m~~	11.56 m
LCG from AP	~~61,68 m~~	60.76 m

Determination of stability on board

1. General

With the stability blank forms 1 - 3 and 5 - 7 it is possible, to effect a stability calculation at altered loading compared with the loading conditions calculated in advance.
The documents are composed that way, that the stability calculation may be effected schematically.

The forms 1-3 include in tables all necessary basic data for the calculations which have to be done on forms 5 and6

After calculation has been done, it may be controlled by means of form 7 whether the ascertained stability data are sufficient.

2. Instruction for calculation of stability according to these blank forms

2.1. Weight- and moment calculations, Form 5

a) Enter the individual weights (light ship, crew and provision, tank contents, cargo weights) into the column WEIGHT.
b) Ascertainment of the c.g. above base line of the individuel weights (see enclosed documents) and enter in the colums ⊖H
c) Multiplication of individual weight with the belonging to centers of gravity. Enter into column M_H.
d) Addition of the individual weights. Enter into column $\sum G = ①$
e) Addition of the vertical moments. Enter into column $\sum M_H = ②$
f) Division of $\frac{②}{①} = ⑤ =$ KG. Enter into column 5.

KG = C.g. above baseline of the loaded vessel.

g) Ascertainment of the longitudinal C.G.'s of the individual weights (see enclosed documents) and insert in column ΘL.

h) Multiplication of individual weight with the belonging to longitudinal c.g. Insert in column ML.

i) Additional of the longitudinal moments. Enter into column $\sum$ ML = ③

k) Division of $\frac{③}{①}$ = ⑥ = ΘL

Insert in column ⑥

ΘL = longitudinal center of gravity of the loaded vessel.

2.1.1. Explanation for ascertainment of the centers of gravity for loading and consumable tank contents

a) Totally filled consumable tanks:

Weight, vertical- and longitudinal moments directly to be taken from form 1

b) Partly filled consumable tanks:

Weight of tank contents to be ascertained, c.g. above base line to be estimated on the basis of the position of the center of gravity of the completely filled tank. Longitudinal c.g. of the totally filled tank to be taken.

2.1.2. Influence of free surfaces

a) For partly filled consumable tanks the value $i_b \times \gamma$ of form 1 to be overtaken on form 5 in the column $i_b \times \gamma$

b) Addition of the values $i_b \times \gamma$. Insert in the line $\Sigma\, i_b \times \gamma = (4)$

c) Division of $\frac{(4)}{(1)} = \Delta$ MG = (7)

Insert in the line.
Δ MG = Stability loss due to free durfaces.

2.2. Stability- and trim calculation/Form 6

2.2.1. Stability calculation

a) Overtake of weight of the loaded vessel from column (1) Form 5 in one of the columns (1) of Form 6, depending on the spec. density of water.

γ = 1,00 fresh water
γ = 1,025 seawater

b) Overtake KG column (5) and Δ MG column (7) of form 5 into form 6.

c) In the tabulated curves sheet Form 2 the displacement 1 according to Form 6 to be ascertained and the value "T" and "KM" belonging to to bé inserted on Form 6.
If a trim calculation shall be carried out, the belonging to values

displacement - Θ (of Form 2)
Weight - Θ_L (of Form 5)
D/MCT Values (of form 2)

will also have to be overtaken.

d) Calculation of MG and MG' according to the scheme stated on Form 6. The valves of MG' should always lie above the limit curve shown in the damage stability diagram.

e) Calculation of the leverarm curve

From Form 3 "Cross-curves(W-values)", the cross curves data available for the medium draught column 8 to be overtaken to Form 6 column 17. Calculation of the lever-arm values $h\varphi$(column 19) according to the scheme on form 6 The lever arm values $h\varphi$(column 19) to be reduced by Δ MG to $h\varphi'$(column 21) according to the scheme stated on form 6 For partly filled tanks, the lever arm values $h\varphi$ (column 19) to be reduced according to scheme by Δ MG free surfaces of the consumable tanks.

f) Drawing of the lever arm curve according to e)

MG from column 10 and MG'on the hatched MG-line to be drawn in from the base and the final points to be connected with 0° (MG-straight line resp. MG'-straight line). The lever arm values calculated according to e) $h\varphi$ to be drawn in on the degree lines of the diagram and to be connected by a curve line. Curve line and MG-straight line must touch each other at small inclinations. The MG'-straight line states the actual available initial stability.

JOS. L. MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.01-171.200

STABILITY CROSS CURVES VALUES

MAIN DIMENSIONS

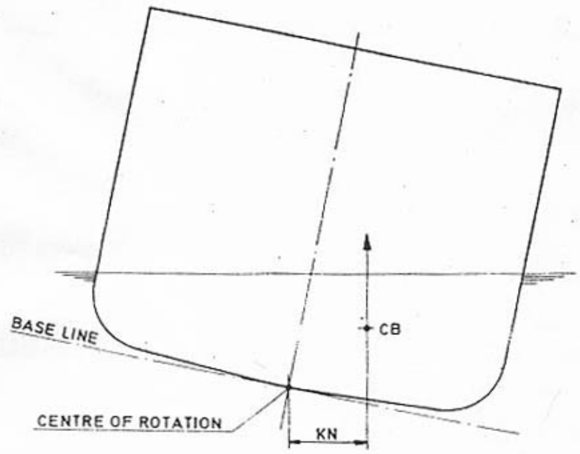
LENGTH OVER ALL	÷ m
LENGTH BETWEEN P.P.	137,40m
BREADTH MOULDED A-DECK	24,20m
DEPTH TO A-DECK	7,65m
DESIGN DRAUGHT	5,55m

REMARK:

THIS CALCULATION WAS CARRIED OUT WITH
MAIERFORM PROGRAM -PANTOBO-
ON COMPUTER SYSTEM CONTROL DATA CYBER 175
IT HAS BEEN CALCULATED WITH 49 FRAMES,
MEASURED ACCORDING TO CORRECTED LINES PLAN OF NB. Nº 592
DRAWG. Nº 6764.51-161.100
THE HULL HAS BEEN CONSIDERED UP TO C-DECK.

BREMEN 20TH SEPT. 1979

JOS.L.MEYER PAPENBURG EMS	BUILDING NO 590	MAIERFORM 6891.01-171.200 -1-



JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT BK (M)	DISPL. SEA-W. (T)	10	20	30	45	60	75
		INCLINATION (DEGREES)					
3.50	7256.	2.33	4.73	6.68	8.66	9.66	9.31
3.55	7377.	2.32	4.71	6.67	8.66	9.66	9.30
3.60	7498.	2.30	4.70	6.66	8.65	9.66	9.30
3.65	7619.	2.29	4.68	6.65	8.65	9.65	9.29
3.70	7741.	2.29	4.66	6.63	8.65	9.65	9.28
3.75	7863.	2.26	4.65	6.62	8.65	9.64	9.27
3.80	7985.	2.25	4.63	6.61	8.65	9.64	9.26
3.85	8108.	2.24	4.62	6.60	8.65	9.63	9.25
3.90	8231.	2.23	4.60	6.59	8.65	9.63	9.24
3.95	8355.	2.22	4.59	6.58	8.65	9.62	9.23
4.00	8479.	2.21	4.57	6.56	8.65	9.61	9.22
4.05	8604.	2.20	4.56	6.55	8.65	9.61	9.21
4.10	8729.	2.19	4.54	6.54	8.65	9.60	9.20
4.15	8854.	2.18	4.53	6.53	8.65	9.59	9.19
4.20	8980.	2.17	4.52	6.52	8.65	9.58	9.18
4.25	9106.	2.16	4.50	6.51	8.65	9.57	9.18
4.30	9233.	2.16	4.49	6.50	8.65	9.56	9.17
4.35	9360.	2.15	4.48	6.49	8.65	9.55	9.16
4.40	9487.	2.15	4.47	6.48	8.65	9.54	9.15
4.45	9615.	2.14	4.45	6.47	8.64	9.53	9.13
4.50	9743.	2.14	4.44	6.46	8.64	9.52	9.12
4.55	9872.	2.13	4.43	6.45	8.64	9.51	9.11
4.60	10001.	2.13	4.42	6.44	8.64	9.50	9.10
4.65	10131.	2.13	4.41	6.43	8.63	9.49	9.09
4.70	10262.	2.12	4.40	6.42	8.63	9.47	9.08
4.75	10394.	2.12	4.39	6.41	8.62	9.46	9.07
4.80	10526.	2.12	4.38	6.40	8.62	9.45	9.06
4.85	10659.	2.12	4.37	6.39	8.61	9.44	9.05
4.90	10793.	2.11	4.36	6.38	8.61	9.42	9.04
4.95	10927.	2.11	4.35	6.37	8.60	9.41	9.03
5.00	11063.	2.11	4.34	6.36	8.59	9.40	9.02
5.05	11198.	2.11	4.33	6.35	8.59	9.38	9.00
5.10	11335.	2.11	4.32	6.34	8.58	9.37	8.99
5.15	11472.	2.11	4.31	6.33	8.57	9.35	8.98
5.20	11610.	2.11	4.30	6.32	8.56	9.34	8.97
5.25	11749.	2.11	4.29	6.31	8.55	9.32	8.96
5.30	11888.	2.11	4.28	6.30	8.54	9.31	8.95
5.35	12028.	2.11	4.27	6.29	8.53	9.29	8.93
5.40	12169.	2.11	4.27	6.28	8.52	9.27	8.92
5.45	12311.	2.11	4.26	6.27	8.51	9.26	8.91

JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT BK (M)	DISPL. SEA-W. (T)	10	20	30	45	60	75
		INCLINATION (DEGREES)					
5.50	12455.	2.11	4.25	6.26	8.50	9.24	8.90
5.55	12599.	2.11	4.24	6.26	8.49	9.22	8.89
5.60	12744.	2.11	4.23	6.25	8.48	9.21	8.87
5.65	12889.	2.11	4.23	6.24	8.47	9.19	8.86
5.70	13035.	2.11	4.22	6.23	8.46	9.17	8.85
5.75	13182.	2.10	4.21	6.22	8.44	9.16	8.83
5.80	13330.	2.10	4.20	6.21	8.43	9.14	8.82
5.85	13478.	2.10	4.20	6.21	8.42	9.12	8.81
5.90	13627.	2.10	4.19	6.20	8.40	9.10	8.80
5.95	13776.	2.10	4.18	6.19	8.39	9.09	8.78
6.00	13926.	2.10	4.17	6.18	8.38	9.07	8.77
6.05	14077.	2.10	4.16	6.17	8.36	9.05	8.76
6.10	14229.	2.10	4.16	6.16	8.35	9.03	8.74
6.15	14381.	2.10	4.15	6.16	8.33	9.01	8.73
6.20	14534.	2.10	4.14	6.15	8.32	9.00	8.72
6.25	14688.	2.10	4.14	6.14	8.30	8.98	8.70
6.30	14842.	2.10	4.13	6.13	8.29	8.96	8.69
6.35	14997.	2.10	4.13	6.12	8.27	8.94	8.68
6.40	15153.	2.10	4.12	6.11	8.26	8.92	8.66

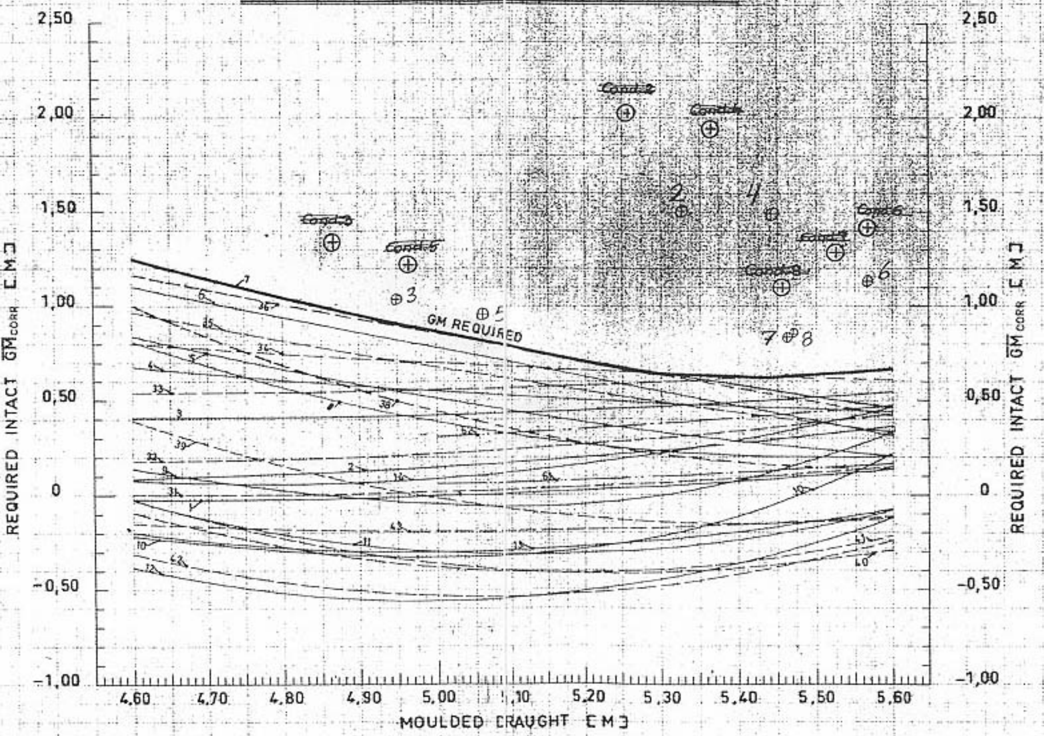
JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT BK (M)	DISPL. SEA-W. (T)	10	20	30	45	60	75
		INCLINATION (DEGREES)					
5.50	12455.	2.11	4.25	6.26	8.50	9.24	8.90
5.55	12599.	2.11	4.24	6.26	8.49	9.22	8.89
5.60	12744.	2.11	4.23	6.25	8.48	9.21	8.87
5.65	12889.	2.11	4.23	6.24	8.47	9.19	8.86
5.70	13035.	2.11	4.22	6.23	8.46	9.17	8.85
5.75	13182.	2.10	4.21	6.22	8.44	9.16	8.83
5.80	13330.	2.10	4.20	6.21	8.43	9.14	8.82
5.85	13478.	2.10	4.20	6.21	8.42	9.12	8.81
5.90	13627.	2.10	4.19	6.20	8.40	9.10	8.80
5.95	13776.	2.10	4.18	6.19	8.39	9.09	8.78
6.00	13926.	2.10	4.17	6.18	8.38	9.07	8.77
6.05	14077.	2.10	4.16	6.17	8.36	9.05	8.76
6.10	14229.	2.10	4.16	6.16	8.35	9.03	8.74
6.15	14381.	2.10	4.15	6.16	8.33	9.01	8.73
6.20	14534.	2.10	4.14	6.15	8.32	9.00	8.72
6.25	14688.	2.10	4.14	6.14	8.30	8.98	8.70
6.30	14842.	2.10	4.13	6.13	8.29	8.96	8.69
6.35	14997.	2.10	4.13	6.12	8.27	8.94	8.68
6.40	15153.	2.10	4.12	6.11	8.26	8.92	8.66

JOS.L.MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.01-115.600

DAMAGE STABILITY DIAGRAM



NOTES:
THE VESSEL'S CALCULATED AVAILABLE GM_{CORR} MUST ALWAYS BE ABOVE OF THE CURVE OF "GM-REQUIRED"
⊕ = GM VALUES AVAILABLE FOR INTACT VESSEL OF REPORT.

JOS.L.MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.06-171.120

HYDROSTATIC PARTICULARS

MAIN DIMENSIONS:

LENGTH OVER ALL	÷ m
LENGTH BETW. PP.	137,40 m
BREADTH MLD. A-DECK	24,20 m
DEPTH TO A-DECK	7,65 m
DRAUGHT	5,55 m

REMARK:

THIS CALCULATION WAS CARRIED OUT WITH
MAIERFORM PROGRAM – KUBLENG –
ON COMPUTER SYSTEM CONTROL DATA CYBER 175
IT HAS BEEN CALCULATED WITH 46 FRAMES.
MEASURED ACCORDING TO CORRECTED LINES PLAN
OF NB. Nº 592 DRAWG. Nº 6764.51-161.100
THE CORRECTED BOW THRUSTERS AND BULBOUS BOW HAVE BEEN CONSIDERED IN THE CALCULATION.

BREMEN 26TH JUNE 1980

JOS.L.MEYER
PAPENBURG EMS

HYDROS ATIC PARTICULARS

MAIERFORM GMBH
BREMEN
6891.06 - 171.120

SPEC.GRAVITY OF SEA W. = 1.025 T/CBM
COEFF.FOR DISPL.OF HELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED OR LPP/2

DRAFT BK	MOULDED VOLUME	DISPLACEM. FRESH-W.	DISPLACEM. SEA-W.	LCB	VCB	KM(T	KM(L)	WL-AREA	LCF	TMI	LMI	MCT BP	D/MCT	TPCI	AL-PHA (BP)	DEL-TA (BP)
METRES	M**3	METRIC-T.	METRIC-T.	METRES	METR.	METRE	METRES	M**2	METRES	M**4	M**4	MT/M	-	T/CM	-	-
4.30	8999.63	9062.63	9289.19	-3.19	2.30	12.1	298.81	2461.35	-4.73	88197.7	2668554.	19421.8	.478	25.41	.772	.656
4.35	9122.99	9186.85	9416.52	-3.21	2.32	12.0	297.31	2470.60	-4.84	88730.2	2691188.	19586.5	.481	25.50	.774	.657
4.40	9246.85	9311.58	9544.37	-3.23	2.35	12.0	295.90	2480.08	-4.96	89274.8	2714409.	19755.5	.483	25.60	.777	.658
4.45	9371.16	9436.76	9672.68	-3.25	2.38	11.9	294.60	2489.81	-5.08	89832.4	2738436.	19930.4	.485	25.70	.779	.659
4.50	9495.92	9562.39	9801.45	-3.28	2.41	11.9	293.41	2499.79	-5.20	90403.3	2763347.	20111.7	.487	25.80	.782	.660
4.55	9621.15	9688.50	9930.71	-3.30	2.43	11.8	292.34	2510.06	-5.32	90988.6	2789265.	20300.3	.489	25.91	.785	.661
4.60	9746.88	9815.11	10060.49	-3.33	2.46	11.8	291.41	2520.65	-5.45	91589.1	2816362.	20497.5	.491	26.02	.787	.662
4.65	9873.12	9942.23	10190.79	-3.36	2.49	11.8	290.63	2531.58	-5.59	92205.9	2844811.	20704.6	.492	26.13	.790	.663
4.70	9999.91	10069.91	10321.65	-3.39	2.52	11.[illegible]	290.00	2542.90	-5.72	92840.2	2874778.	20922.7	.493	26.25	.793	.664
4.75	10127.27	10198.16	10453.11	-3.42	2.55	11.[illegible]	289.53	2554.62	-5.86	93493.3	2906415.	21152.9	.494	26.37	.796	.665
4.80	10255.24	10327.02	10585.20	-3.45	2.57	11.6	289.24	2566.79	-6.00	94166.8	2939851.	21396.3	.495	26.49	.799	.665
4.85	10383.85	10456.54	10717.95	-3.48	2.60	11.4	289.12	2579.41	-6.14	94862.4	2975179.	21653.4	.495	26.62	.803	.666
4.90	10513.14	10586.73	10851.40	-3.52	2.63	11.2	289.18	2592.53	-6.29	95582.8	3012559.	21925.5	.495	26.76	.806	.667
4.95	10643.15	10717.65	10985.59	-3.55	2.66	11.1	289.39	2606.09	-6.44	96327.0	3051757.	22210.7	.495	26.90	.810	.668
5.00	10773.88	10849.29	11120.53	-3.59	2.69	11.0	289.71	2620.00	-6.58	97095.9	3092329.	22506.0	.494	27.04	.814	.669

SPEC.GRAVITY OF SEA-W. = 1.025 T/CBM
COEFF.FOR DISPL.OF SHELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED FOR LPP/2

DRAFT BK	MOULDED VOLUME	DISPLACEM. FRESH-W.	DISPLACEM. SEA-W.	LCB	VCB	KM(T)	KM(L)	WL-AREA	LCF	TMI	LMI	MCT BP	D/MCT	TPCI	AL-PHA (BP)	DEL-TA (BP)
METRES	M**3	METRIC-T.	METRIC-T.	METRES	METR.	METRES	METRES	M**2	METRES	M**4	M**4	MT/M	-	T/CM	-	-
5.00	10773.88	10849.29	11120.53	-3.59	2.69	11.70	289.71	2620.00	-6.58	97095.9	3092329.	22506.0	.494	27.04	.814	.669
5.05	10905.32	10981.66	11256.20	-3.63	2.71	11.69	290.11	2634.29	-6.73	97896.8	3134192.	22810.7	.493	27.19	.818	.670
5.10	11037.49	11114.75	11392.62	-3.66	2.74	11.69	290.64	2649.05	-6.89	98739.3	3177634.	23126.9	.493	27.34	.822	.671
5.15	11170.43	11248.62	11529.83	-3.70	2.77	11.69	291.30	2664.35	-7.05	99629.3	3223043.	23457.4	.492	27.50	.826	.672
5.20	11304.15	11383.28	11667.87	-3.75	2.80	11.69	292.10	2680.17	-7.22	100566.2	3270288.	23801.2	.490	27.66	.830	.673
5.25	11438.69	11518.76	11806.73	-3.79	2.83	11.70	292.98	2696.38	-7.40	101548.4	3318932.	24155.3	.489	27.83	.835	.674
5.30	11574.04	11655.06	11946.43	-3.83	2.86	11.72	293.91	2712.90	-7.57	102573.9	3368652.	24517.1	.487	28.00	.839	.675
5.35	11710.21	11792.18	12086.99	-3.88	2.88	11.73	294.86	2729.63	-7.75	103639.6	3419080.	24884.1	.486	28.17	.844	.677
5.40	11847.21	11930.14	12228.40	-3.92	2.91	11.75	295.79	2746.45	-7.92	104741.6	3469822.	25253.4	.484	28.35	.848	.678
5.45	11985.04	12068.94	12370.66	-3.97	2.94	11.78	296.68	2763.24	-8.09	105874.7	3520473.	25622.1	.483	28.52	.853	.679
5.50	12123.70	12208.56	12513.78	-4.02	2.97	11.80	297.49	2779.87	-8.25	107033.4	3570630.	25987.1	.482	28.69	.857	.680
5.55	12263.17	12349.01	12657.73	-4.07	3.00	11.82	298.19	2796.24	-8.40	108211.6	3619913.	26345.8	.480	28.86	.862	.681
5.60	12403.44	12490.27	12802.52	-4.12	3.03	11.85	298.77	2812.27	-8.53	109404.2	3668155.	26696.9	.480	29.03	.866	.682
5.65	12544.52	12632.33	12948.14	-4.17	3.06	11.88	299.19	2827.82	-8.65	110604.3	3714850.	27036.8	.479	29.19	.870	.683
5.70	12686.37	12775.17	13094.55	-4.22	3.09	11.90	299.42	2842.72	-8.75	111801.4	3759327.	27360.5	.479	29.34	.874	.685

SPEC.GRAVITY OF SEA-W. = 1.025 T/CBM
COEFF.FOR DISPL.OF SHELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED FOR LPP/2

DRAFT BK	MOULDED VOLUME	DISPLACEM. FRESH-W.	DISPLACEM. SEA-W.	LCB	VCB	KM(T)	KM(L)	WL-AREA	LCF	TMI	LMI	MCT BP	D/MCT	TPCI	AL-PHA (BP)	DEL-TA (BP)
METRES	M**3	METRIC-T.	METRIC-T.	METRES	METR.	METRES	METRES	M**2	METRES	M**4	M**4	MT/M	-	T/CM	-	-
5.70	12686.37	12775.17	13094.55	-4.22	3.09	11.90	299.42	2842.72	-8.75	111801.4	3759327.	27360.5	.479	29.34	.874	.685
5.75	12828.95	12918.76	13241.73	-4.27	3.12	11.92	299.44	2856.98	-8.83	112986.1	3801461.	27667.1	.479	29.49	.878	.686
5.80	12972.23	13063.04	13389.61	-4.32	3.15	11.95	299.29	2870.71	-8.90	114154.5	3841657.	27959.7	.479	29.63	.882	.687
5.85	13116.18	13208.00	13538.20	-4.37	3.18	11.97	299.03	2884.05	-8.96	115308.3	3880521.	28242.5	.479	29.77	.885	.688
5.90	13260.80	13353.62	13687.46	-4.42	3.21	11.99	298.69	2897.06	-9.00	116449.3	3918322.	28517.6	.480	29.90	.889	.689
5.95	13406.06	13499.90	13837.40	-4.47	3.23	12.00	298.26	2909.74	-9.04	117576.7	3955110.	28785.4	.481	30.03	.892	.691
6.00	13551.95	13646.81	13987.98	-4.52	3.26	12.02	297.76	2922.15	-9.06	118691.9	3991054.	29047.0	.482	30.16	.895	.692
6.05	13698.46	13794.35	14139.21	-4.57	3.29	12.04	297.22	2934.34	-9.08	119796.9	4026322.	29303.7	.483	30.29	.898	.693
6.10	13845.59	13942.51	14291.07	-4.62	3.32	12.05	296.64	2946.34	-9.09	120893.8	4061078.	29556.6	.484	30.41	.901	.694
6.15	13993.31	14091.27	14443.55	-4.67	3.35	12.07	296.03	2958.19	-9.09	121985.5	4095480.	29807.0	.485	30.53	.904	.696
6.20	14141.63	14240.63	14596.64	-4.72	3.38	12.09	295.40	2969.94	-9.09	123074.5	4129674.	30055.9	.486	30.65	.907	.697
6.25	14290.55	14390.58	14750.34	-4.76	3.41	12.10	294.78	2981.62	-9.08	124163.4	4163798.	30304.2	.487	30.78	.910	.698
6.30	14440.04	14541.12	14904.65	-4.81	3.44	12.12	294.15	2993.21	-9.07	125250.7	4197841.	30552.0	.488	30.90	.913	.699
6.35	14590.12	14692.25	15059.56	-4.85	3.47	12.13	293.55	3004.85	-9.05	126348.4	4232255.	30802.4	.489	31.02	.916	.700
6.40	14740.80	14843.98	15215.08	-4.89	3.50	12.15	293.00	3016.65	-9.03	127468.1	4267519.	31059.1	.490	31.14	.919	.702

SHIP CONSULTING

REPORT ON INCLINING EXPERIMENT

Ship :	M S W A S A K I N G	
Owner:	SALLY LINE AB MARIEHAMN	
Main dimensions:	LENGTH OVER ALL	155.40 m
	LENGTH BETWEEN PERP.	137.40 m
	BREADTH MOULDED	24.20 m
	DEPTH TO A DECK	7.65 m
	DEPTH TO C DECK	13.40 m
Date:	11.01 1991 betw. 16.00-19.00 o'clock	
Place:	MASA YARDS TURKU	
	- SPEC. GRAVITY OF SEAWATER 1.004 t/M^3	
	- TEMPERATURE	abt.-6 centigrade
	- TEMPERATURE OF WATER	abt. 0 centigrade
	- WIND	no wind
Present:	MR ALF ANDERSSON	MS WASA KING
	MR CARL GUNNAR EKSTRAND	MS WASA KING
	MR BO HENRIK STOLPE	MS WASA KING
	MR TIM R. E. AUTERO	Finnish Board of Navication
	MR VELI-MATTI JUNNILA	Ship Consulting

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READED DRAUGHTS

	DRAUGHT MARK		DISTANCE TO SEA-LEVEL		DRAUGHT	MEAN
d_{AP}				=		5.07
d_{ASB}				=		
d_{MP}	5.567	-	0.61	=	4.957	5.082
d_{MSB}	7.667	-	2.46	=	5.207	
d_{FP}	5.20	-	0.08	=	5.12	5.12
d_{FSB}	5.20	-	0.08	=	5.12	

TRIM $d_F - d_A = 5.12 - 5.07 = +0.05$ m

HOGGING CORRECTIONS
$Fo = d_M - \frac{1}{2}(d_F + d_A) =$
$= 5.082 - \frac{1}{2}(5.12 + 5.07) = 0.013$ m

CORRECTED MEAN DRAUGHT $= d_M + Cb \times Fo$
$= 5.082 + 0.667 \times 0.013 = 5.091$ m
Cb = block coefficient at draught of 5.10 m

Displacement at draught 5.091 m is 11132 t and LCG -3.657 m

TANKS TO BE SUBTRACTED

TK8	DB-TANK 8	53,55	86,60	0,00	0,55	236
TK41	DO DAY TANK	11,56	31,03	0,00	2,85	4
TK 45	OVERFLOW TANK 45	1,19	35,78	0,00	0,10	8
TK20	DB-TANK 20	3,49	59,87	0,00	0,25	27
TK10	H-TANK 10	42,75	74,20	0,00	1,30	150
TK11	H- TANK 11	27,55	74,20	0,00	1,28	150
TK38	SETTLING TANK 38	21,38	32,20	0,00	2,30	10
TK39	SETTLING TANK 39	13,59	33,84	0,00	1,85	7
TK36	HFO DAY TANK 36	17,29	36,23	0,00	2,20	8
TK37	HFO DAY TANK 37	19,79	36,62	0,00	2,81	6
TK40	OVERFLOW TANK	3,04	34,38	0,00	0,11	74
TK4A	TANK 4A	70,00	114,25	0,00	2,72	48
TK4B	TANK 4B	65,00	114,25	0,00	2,65	48
TK5	TANK 5	135,00	113,65	0,00	2,70	138
TK44	SLUDGE OIL	5,50	32,20	0,00	0,11	123
TK33	BILGE WATER	21,00	35,83	0,00	0,53	50
TK42	DIRTY OIL	6,20	33,85	0,00	0,35	12
TK17	FRESH WATER CIRCUL.	13,70	58,30	0,00	0,52	14
TK22	COOLING WATER	1,00	55,40	0,00	0,35	3
TK29	COOLING WATER	7,00	59,82	0,00	0,32	11
TK6	DB-TANK 6	87,95	104,84	0,00	0,64	0
TK2	TRIM TANK 2	303,06	121,40	0,00	4,69	0
TK1	FORE PEAK TANK 1	175,98	133,92	0,00	4,45	0
TK24	THERMAL OIL TANK 24	5,13	45,78	0,00	0,25	13
TK25	LUBR OIL TANK 25	11,88	45,40	0,00	0,45	3
TK26	LUBR OIL TANK 26	9,00	45,40	0,00	0,40	3
TK27	LUBR OIL TANK 27	9,90	45,40	0,00	0,42	3
TK28	LUBR OIL TANK 28	9,72	45,40	0,00	0,41	3
TK30	LUBR OIL SUPPLY TANK 30	5,85	50,15	0,00	0,32	7
TK32	LUBR OIL TANK 32	7,74	47,40	0,00	0,55	3
TK50	KAMEWA TANK 50	0,88	24,60	0,00	0,25	2
TK51	KAMEWA TANK 51	1,71	23,40	0,00	0,50	0
TK52	KAMEWA TANK 52	1,71	23,40	0,00	0,50	0
TK55A	STERN TUBE OIL	0,99	15,06	0,00	0,20	5
TK55	STERN TUBE TANK	0,59	15,10	0,00	0,30	1
	GEAR OIL STORAGE	1,35	39,40	0,00	3,50	0
TK13	HEELING TANK SB	28,60	78,10	0,00	0,52	193
TK14	HEELING TANK P	129,90	77,60	0,00	1,91	73
	TOTAL OF TANKS	1331,52	98,42	0,00	2,73	1436

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SUBTRACTED WEIGHT

CODE NUM.	WEIGHT T	NAME	FRAME NO	FROM DECK	FROM CL	DECK NO
	0.3	FORK LIFT PLATFORMS	5	0.2	0	2
	1.3	FORK LIFT	10	0.7	0	2
	0.5	VENEER	59	0.6	0	2
	16.0	WASTE CONTAINERS	53	0.8	0	2
	1.5	EMPTY CONTAINER	122	2.4	0	2
	0.1	CLEANING EQUIPMENTS	105	0.2	0	0
	0.1	CLEANING EQUIP.	100	0.2	0	1
	0.8	INSULATION MATERIALS	45	0.5	0	8
	1.5	FUEL FOR EMER. GENER.	76	0.9	0	8
	1.9	STEEL PLATES	57	0.6	0	8
	1.75	CARPETS	8	1.0	0	1
	1.0	GLASS	8	0.3	0	1
	0.5	MATERIALS	7	0.2	0	1
	2.8	MATERIALS	13	1.2	0	1
	1.0	FORK LIFT	25	0.5	0	1
	0.25	TOOLS	26	0.2	0	1
	1.5	PROVISIONS	35	0.8	0	1
	3.5	PROVISIONS	37	0.8	0	1
	0.05	CLEANING EQUIP.	118	0.2	0	9
	0.1	COPY MACHINE	110	0.7	0	7
	0.15	LINEN STORE	117	1.0	0	7
	0.1	OFFICERS DAY ROOM	110	0.8	0	7
	0.4	MISCELLANEOUS	95	0.5	0	7
	0.05	HOSPITAL	90	0.6	0	7
	1.3	MATERIALS	81	0.3	0	7
	2.0	MISCELLANEOUS	80	0.7	0	7
	0.15	MATERIALS	54	0.3	0	7
	0.3	MESS ROOMS	25	0.5	0	7
	0.15	SPORT ROOM	10	0.8	0	8
	0.4	MATERIALS	73	0.3	0	7
	0.2	LINEN STORE	28	0.7	0	6
	0.4	GALLEY	47	1	0	6
	0.24	CARPETS	81	0.4	0	6
	2.9	CARPETS	80	0.5	0	5
	0.15	WELDING MACHINE	40	0.5	0	5
	1.3	CARPETS	81	0.6	0	4
	0.6	INSULATION MATERIALS	82	0.8	0	4
	0.42	CARPETS	82	0.6	0	4
	0.1	STORES	42	0.6	0	4
	0.6	WASTE	75	0.3	0	4
	0.1	REFRIGERATOR	122	0.6	0	4
	5.6	PROPELLER SPARE PLADES	15	0.4	0	2
	0.2	U-PROFILES	25	0.2	0	2
	0.8	I-PROFILES	25	0.2	0	2
	0.3	WASTE	24	0.2	0	2
	0.9	WASTE	70	0.4	0	2
	1.1	ICE AND SNOW	80	0.0	0	7
	0.9	ICE AND SNOW	85	0.0	0	8
	0.1	ICE AND SNOW	120	0.0	0	10

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SUBTRACTED WEIGHT

CODE NUM.	WEIGHT T	NAME	FRAME NO	FROM DECK	FROM CL	DECK NO
	3.2	MATERIALS IN ENG ROOM	60	0.2	0	1
	1.65	22 PERSONS IN SHIP	80	1.1	0	5
	3.75	CREW'S PERS. GOODS	70	1.0	0	7
	66.96	TOTAL OF SUBTRACTED WEIGHT		40.12	12.22	

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PENDEL NUMBER 1 LENGTH OF PENDEL 4455 MM

NAME OF OBSERVERS: TOMI JUNNILA

LOCATION OF PENDEL: ON CARDECK AFTER

CASE NO	NUMB. OF OBS.	1	2	3	4	5	6	7	8	9	10	SUM	MEAN VALUE	LIST
I	1	2330											2330	0.00
II	1	2252											2252	1.00
III	1	2226											2226	1.34
IV	1	2324											2324	0.08
V	1	2388											2388	0.75
VI	1	2454											2454	1.59
VII	1	2511											2511	2.33
VIII	1	2415											2415	1.09
IX	1	2343											2343	0.17

SHIP CONSULTING

PENDEL NUMBER 2 LENGTH OF PENDEL 4470 MM

NAME OF OBSERVERS: BO HENRIK STOLPE

LOCATION OF PENDEL: ON CARDECK AFTER

CASE NO	NUMB. OF OBS.	1	2	3	4	5	6	7	8	9	10	SUM	MEAN VALUE	LIST
I	1	728											728	0.00
II	1	650											650	1.00
III	1	622											622	1.36
IV	1	723											723	0.06
V	1	788											788	0.77
VI	1	853											853	1.60
VII	1	910											910	2.33
VIII	1	813											813	1.09
IX	1	742											742	0.18

HEELING TANK SOUNDINGS AND VOLUMES

CASE NO	LIST	PORT SIDE SOUN cm	CORR cm	VOL m^3	WEIG t	TCG m	SB-SIDE SOUN cm	COR cm	VOL. m^3	WEIG. t	TCG m
I	.6°SB	450	452	129.7	129.9	-8.69	121	119	28.5	28.6	7.57
II	.4°P	485	483	141.8	142.3	-8.74	68	70	16.4	16.5	7.34
III	.7°P	491	494	146.1	146.8	-8.75	47	50	11.8	11.8	7.20
IV	.5°SB	453	455	130.9	131.4	-8.70	116	114	27.2	27.3	7.54
V	1.3°SB	422	427	120.0	120.5	-8.67	161	155	38.1	38.3	7.69
VI	2.2°SB	391	399	109.3	109.7	-8.59	206	199	48.6	48.8	7.95
VII	2.8°SB	365	375	100.2	100.6	-8.54	246	235	57.9	58.1	8.13
VIII	1.7°SB	411	417	116.2	116.7	-8.63	179	171	41.7	41.9	7.79
IX	.8°SB	446	449	128.5	129.0	-8.72	126	123	29.6	29.6	7.59

SHIP CONSULTING

D U R I N G   E X P E R I M E N T

MEAN MOULDED DRAUGHT	5.091	m
TRIM	+0.05	m
SEAWATER DENSITY	1.004	ton/m³
DISPLACEMENT	11132	t
HEIGHT OF METACENTER ABOVE BL	11.69	m

CASE NO	WEIGHT (TON)	INCLINING MOMENT (TONM)	TOTAL MOM (TONM)	INCLINING ANGLE DIFFER. (DEG)	TOTAL (DEG)	METACENTRIC HEIGHT GMI (M)
II	12.14	196.30	196.30	1.00	1.00	1.011
III	4.47	71.55	267.86	0.35	1.35	1.021
IV	15.36	-247.24	20.62	-1.28	0.07	0.994
V	10.94	-178.38	-157.76	-0.83	-0.76	1.068
VI	10.64	-174.96	-332.72	-0.84	-1.595	1.073
VII	9.24	-153.38	-486.10	-0.73	-2.33	1.073
VIII	16.16	267.44	-218.66	1.24	-1.09	1.032
IX	12.24	200.45	-18.21	0.92	0.17	1.127

METACENTRIC HEIGHT DURING EXPERIMENT	GM = 1.050 M
FREE SURFACE CORRECTION	GMC = 0.129 M
CORRECTED METACENTRIC HEIGHT	GMO = 1.179 M
HEIGHT OF METACENTER ABOVE BL	KM =11.690 M
CENTRE OF GRAVITY ABOVE BL	KG =10.511 M

L I G H T   S H I P

	WEIGHT (TON)	CENTRE OF GRAVITY FROM LPP/2 (M)	CL (M)	BL (M)
DURING EXPERIMENT	11132	-3.553	0.00	10.511
WEIGHTS TO BE ADDED	0	-0.000	0.00	0.00
WEIGHTS TO BE SUBTRACTED	67	-28.58	0.00	12.22
TANKS TO BE SUBTRACTED	1332	+29.72	0.00	2.73
LIGHT SHIP	9733	-7.934	0.00	11.564
INCLINING TEST 21.6 1980	9420	-7.02	0.00	11.31
DIFFERENCE	313	-0.914	0	+0.254

Bureau Veritas
Marine Division

15.06.1995

SURVEYS CARRIED OUT BY BUREAU VERITAS ON M/S "ESTONIA"

Place	Intervention dates	Class surveys	Statutory surveys	Observations
Papenburg	1980 07 01		ISLL	Issuance of Class and Load Line certificates to
				Messrs Meyerwerft Newbuilding S 590 VIKING SALLY
Hamburg	1981 02 12	OS AUT		Issuance of definitive AUT certificate
Stockholm	1981 04 13	CSH CSM		
Turku	1981 05 04 - 08	AS DOK CSH CSM	ASLL	
Stockholm	1981 4 23	CSM		
Turku	1981 9 3	OSAB		
Turku	1981 09 21 - 22	CSM ASAUT		
Turku	1981 10 20	OSH		Survey after minor collision
Turku	1982 5 13	ASM CSM		
Turku	1982 5 17	CSM		
Stockholm	1982 05 24 - 25	ASH CSH CSM		
Stockholm	1982 05 25 - 06 07	CSH AB	ASLL	
Turku	1982 11 8	ASAUT		
Turku	1982 12 9	OSAB		
Stockholm	1983 01 07	CSM		
Stockholm	1983 03 04	CSH		
Turku	1983 04 25 - 29	AS DOK CSH CSM	ASLL	CSH item Bow Door credited
Stockholm	1983 05 02 - 16	OSM		
Turku	1983 05 25	OSM CSM		
Stockholm	1983 10 24 - 1984 01 02	ASAUT		
Turku	1984 04 02	CSM		
Stockholm	1984 05 07	CSM		
Stockholm	1984 05 18	AS UWS CSH CSM ASAB	ASLL	
Mariehamn	1984 05 25	OSH		Survey after grounding ,voyage to Helsinki for repairs
Helsinki	1984 05 25 - 26	OSH		Temporary repairs of grounding damages
Turku	1984 11 23	OSM		Extension of tailshaft survey periodicity
Turku	1984 12 10	ASAUT		

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Place	Intervention dates	Class surveys	Statutory surveys	Observations
Stockholm	1984 12 17	OSH		Diver survey,postponement of grounding repairs
Turku	1985 02 15	OSM		
Stockholm	1985 03 25	OSH		Diver survey, postponement of grounding repairs
Helsinki	1985 04 22 - 05 06	DOK CSH TS CSM		Permanent repairs, stem modification
Stockholm	1985 05 24 - 07 15	AS CSH CSM ASAB ASAUT	PSLL	Renewal of class term and load line certificate
Turku	1986 04 10	CSM		
Stockholm	1986 04 25	CSH CSM		
Stockholm	1986 05 27		ASLL	
Stockholm	1986 08 18	CSM		
Stockholm	1986 09 01	CSM		
Stockholm	1986 09 24	AS UWS		
Stockholm	1986 09 24 - 12 08	ASAUT		
Turku	1987 01 13 - 21	DOK CSH		Repairs of cracks in rudder plating
Turku	1987 04 06 - 08	OSH OSM OSAB CSH		Bottom of bow door repaired/strengthened (ice
				damage)
Turku	1987 04 23 - 05 08	OSM		Repairs to main engine n°1
Stockholm	1987 06 10	CSM		
Stockholm	1987 07 23	AS ASAUT ASAB	ASLL	
Stockholm	1988 02 08	CSH ASAB		
Turku	1988 03 14	CSM		
Turku	1988 03 28	CSM		
Stockholm	1988 05 10	AS CSH CSM	ASLL	CSH item Bow Door credited
Stockholm	1988 05 25	CSH CSM		
Turku	1988 09 15	DOK CSM		
Turku	1988 09 26	ASAUT		
Stockholm	1988 11 06 - 12 09	DOK TS		Surveys after grounding and periodical surveys
Turku	1989 05 02 - 03	DOK ASAUT CSH CSM		
Turku	1989 05 29 - 30	AS CSH CSM	ASLL	
Turku	1990 04 30 - 05 07	DOK CSH CSM		Change of name to "SILJA STAR"

Place	Intervention dates	Class surveys	Statutory surveys	Observations
Stockholm	1990 06 14 - 07 03	AS CSH CSM ASAB AUT	PSLL	Renewal of class term and load line certificate
Turku	1990 11 21 - 12 14	DOK		
Turku	1991 02 04	OS		Change of name to "WASA KING"
Holmsund	1991 04 13 - 15	AS CSH CSM	ASLL	
Holmsund	1991 09 23	ASAUT CSM		
Holmsund	1992 06 17 - 18	AS ASAUT CSH CSM	ASLL	
Holmsund	1992 11 28	ASAB CSM		
Abo	1993 01 04 - 14	DOK TS CSH	PSLL IOPP PSCONS	Change of name to "ESTONIA" and of Owners/Flag
			PSEQ PSRAD	Issuance of: interim LL certif.; interim cargoship
				safety certificates.
Tallinn	1993 01 16 - 28		PSPS	Issuance of interim PSSC certificate (passenger ship)
Stockholm	1993 03 15	CSH CSM	OSIOPP	Issuance of interim IOPP certif.(definitive certificate
				issued on 07/04/1993)
Abo	1993 03 22 - 04 03	OSM		Change of outboard tailshaft sealings
Stockholm	1993 05 22 - 24	CSH CSM		Postponement of CSH/CSM items
Stockholm	1993 06 14		OSLL OSPS	Renewal of interim LL & PSSC certificates
Stockholm	1993 08 12 - 13	AS ASAUT	ASIOPP	
Stockholm	1993 10 18	CSH CSM		CSH item Bow Door credited
Stockholm	1993 11 11		OSLL OSPS	Renewal of interim LL & PSSC certificates
Stockholm	1993 11 16	ASAB		
Nadendal	1994 01 10 - 14	DOK		Installation of Stabiliser units
Stockholm	1994 01 27		PSPS	Periodical survey and renewal of interim PSSC certif.
Stockholm	1994 03 16	CSH CSM		
Stockholm	1994 04 11		OSLL	Renewal of interim LL certificate
Stockholm	1994 05 09 - 11	CSH CSM		
			Issuance of definitive PSSC (clerical mishandling) 23 june 1994	
Stockholm	1994 06 26		OSPS	Renewal of interim PSSC certificate
Stockholm	1994 08 23 - 25	AS ASAUT ASAB CSM	ASLL ASIOPP	
Stockholm	1994 09 09		OSLL	Renewal of interim LL certificate

SURVEY CODES USED IN THE TABLE					
	CLASS SURVEY CODES			STATUTORY SURVEY CODES	
AS	Annual survey (Hull & Machinery)		ISLL	Initial survey Load Line	
ASAB	Annual survey Boilers		ASLL	Annual survey Load Line	
ASAUT	Annual survey Automated installation		PSLL	Periodical survey Load Line	
CSH	Continuous survey Hull		ASIOPP	Annual survey Marpol	
CSM	Continuous survey Machinery		IOPP	Periodical survey Marpol	
DOK	Periodical bottom survey in drydock		PSPS	Periodical survey Passenger ship	
UWS	Underwater survey		PSCONS	Periodical survey Saf. construction	
TS	Tailshaft survey		PSEQ	Periodical survey Saf. equipment	
OSH	Occasional survey Hull		PSRAD	Periodical survey Saf. radio	
OSM	Occasional survey Machinery		OSLL	Occasional survey Load Line	
OSAB	Occasional survey Boilers		OSIOPP	Occasional survey Marpol	
OSAUT	Occasional survey AUT installation		OSPS	Occasional survey Passenger ship	

01/02/95 16:14 MERENKULKUOS. 358 0 1808500 → 05593584

Enclosure 3.4.88

KATSASTUS-/TARKASTUSPÖYTÄKIRJA

Nimi ja WASA KING Rek.paikka ja -nro VAASA 283 Tunnuskirjaimet OIKW

ent. nimi SILJA STAR Kotipaikka VAASA Aluksen laji AUTOLAUTTA

Rakennusvuosi: 1980 aine: TERÄS paikka: PAPENBURG Pituus: 157,02 m Leveys 24,23 m

Alus on avoin ☐ kannellinen ☒ Br.vetoisuus: 15598 Pääkoneiden lukumäärä: 4 Kokonaisteho: 17650 kW

Milloin viimeksi telakoitu: 11/90 Missä viimeksi telakoitu: NAANTALI

Laivanisäntä: Isännän LAIVANVARUSTAJANK. 72

WASALINE OY postinsoite: 65170 VAASA

HUOMAUTUKSIA SIVU 13 TUTKA RAYTHEON 1650 12 XR
POISTETTU SIVU 14 SIJAINTI/DECCA POISTETTU
SATELLIITTILAITE GPS ASENNETTU
ASTIAN TARKASTETTU 27.1.92

Kysessä oli:	Perus-	Määräaikainen	Väli-	Vuosi-	Ylimääräinen katsastus
Merikelpoisuudenkatsastus		X			
Koneistonkatsastus					
Rungonkatsastus					
Radiolaitteidenkatsastus					
Marpol-katsastus					

Katsastus/Tarkastus on toimitettu 25.5 ___/___ 1992

Enclosure 3.4.88

KATSASTUS-/TARKASTUSPÖYTÄKIRJA

Nimi ja WASA KING Rek.paikka ja -nro VAASA 283 Tunnuskirjaimet OIKW

ent. nimi SILJA STAR Kotipaikka VAASA Aluksen laji AUTOLAUTTA

Rakennusvuosi: 1980 aine: TERÄS paikka: PAPENBURG Pituus: 157,02 m Leveys 24,23 m

Alus on avoin ☐ kannellinen ☒ Br.vetoisuus: 15598 Pääkoneiden lukumäärä: 4 Kokonaisteho: 17600 kW

Milloin viimeksi telakoitu: 11/90 Missä viimeksi telakoitu: NAANTALI

Laivanisäntä: WASALINE Oy Isännän postiosoite: LAIVANVARUSTAJANK. 12 65170 VAASA

HUOMAUTUKSIA SIVU 13 TUTKA RAYTHEON 1650 12 XR POISTETTU SIVU 14 SKIPMATE/DECCA POISTETTU SAT-NAV LAITE GPS ASENNETTU [illegible] TARKASTETTU 27.1.92

Kysymessä oli:	Perus-	Määräaikainen	Väli-	Vuosi-	Ylimääräinen katsastus
Merikelpoisuudenkatsastus		X			
Koneistonkatsastus					
Rungonkatsastus					
Radiolaitteidenkatsastus					
Marpol-katsastus					

Katsastus/Tarkastus on toimitettu 25.5 __/__ 1992

Office translation

REPORT OF INSPECTION

Name of the vessel:	M/S Wasa King
Port of Registry:	Vaasa
Call sign:	OIKW
Former name:	Silja Star
Home port:	Vaasa
Ship type:	Car Ferry
Date of build:	1980
Material:	Steel
Place of build:	Papenburg
Length:	157,02 m
Breadth:	24,22 m
The vessel is Open/decked:	Decked
Gross tonnage:	15598
Number of Main Engines:	4
Total power:	17600 kW
Last drydocked:	11/90 in Naantali
Shipowner:	Wasaline Oy
Address:	Laivanvarustajankatu 1, 65170 Vaasa
Remarks:	Page: 13 Radar Raytheon 1650 12 x? removed. Page: 11 Shipmate/Decca removed. Satellite Navigation Device GPS installed. Medicines inspected 27.1.92.

Periodical Inspection of Seaworthiness.

Inspection carried out: 22.5.1992

KATSASTUSTODISTUS

M/S WASAKING .... VAASA .... OIKW
Aluksen nimi — Kotipaikka — Tunnuskirjaimet

Rakennusvuosi 1960. Paikka PAPENBURG Aine TERÄS Br.vetoisuus 15598 Pituus 137.02

Pääkoneiden lukumäärä ...4 Kokonaisteho 17600 kW Liikennealue ...LÄHILIIKENNE.................

Suurin sallittu henkilömäärä/matkustajamäärä ....

Rajoitukset ....

....

Katsastuksessa todetut puutteet ....

....

Puutteet korjattava ..../.... 19.... mennessä. (enintään 1 kk)

Puutteet todettu korjatuiksi ..../.... 19.... ....
Tarkastaja/katsastaja

Alus on tässä perus- ☐ määräaikais- ☒ väli- ☐ ylimääräisessä ☐ katsastuksessa hyväksytty käytettäväksi 28.5. 1993 saakka edellytyksellä, että vuosikatsastukset toimitetaan säädetyin välein.

VAASA	22.5. 1992	[signature]	VAASA
Paikka	Aika	Katsastaja	Katsastuspiiri

VUOSIKATSASTUKSET / NIIDEN SISÄLTÖISET KATSASTUKSET

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

....	..../.... 19....	....	....
Paikka	Aika	Katsastaja	Katsastuspiiri

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

....	..../.... 19....	....	....
Paikka	Aika	Katsastaja	Katsastuspiiri

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

....	..../.... 19....	....	....
Paikka	Aika	Katsastaja	Katsastuspiiri

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

....	..../.... 19....	....	....
Paikka	Aika	Katsastaja	Katsastuspiiri

Aluksella on luokituslaitoksen tai MKH:n todistus ilman jäissäkulkurajoituksia ☐ Ei ole ☐

Alus on hyväksytty talviliikenteeseen

talvikautena 19.... – 19....	.... Paikka	..../.... 19.... Aika	.... Katsastaja
talvikautena 19.... – 19....	.... Paikka	..../.... 19.... Aika	.... Katsastaja
talvikautena 19.... – 19....	.... Paikka	..../.... 19.... Aika	.... Katsastaja
talvikautena 19.... – 19....	.... Paikka	..../.... 19.... Aika	.... Katsastaja
talvikautena 19.... – 19....	.... Paikka	..../.... 19.... Aika	.... Katsastaja

Office translation

CERTIFICATE OF INSPECTION

Name of the vessel:	M/S Wasa King
Port of Registry:	Vaasa
Call sign:	OIKW
Date of build:	1980
Place of build:	Papenburg
Material:	Steel
Gross tonnage:	15598
Length:	157,02 m
Number of Main Engines:	4
Total power:	17600 kW
Traffic area:	Near traffic

The vessel has approved in this Periodical Inspection fit for use till 28/5 1993 subject to Yearly Inspection as required by the Rules.

Place and date:	Vaasa 22/5 1992
Inspector:	Signature
Inspection District:	Vaasa

Ote

Valvontakansio nro

Sivu nro 15

Aluksen nimi	Kotipaikka
M/S WASA KING	VAASA
Varustamo (nimi, osoite)	
WASALINES OY Laivanvarustajank. 1 65170 VAASA	
Päällikkö	
O. HUKKANEN	

VAASA 22.5.92

SUORITETTU MÄÄRÄAIKAINEN MERIKELPOISUUDEN KATSASTUS SEURAAVA MÄÄRÄAIKAINEN KATSASTUS 28.5.93 (-3KK) 1 KÄYNTI 2360,-

VAASA 22.5.1992

Suoritettu määräaikainen koneiston katsastus seuraava määräaikainen koneiston katsastus 28.5.1993-3kk 2 käyntiä 3540:-

Office translation

Extract

CONTROL FILE NO.

Page No.
15

Name of the vessel:	M/S Wasa King
Port of Registry:	Vaasa
Shipowner (name, Address):	Wasaline Oy Laivanvarustajankatu 1, 65170 Vaasa
Master:	O.Hokkanen

Vaasa 22.5.92

Carried out Periodical Inspection. Next Periodical Inspection
28.5.93 (- 3 months) 1 visit 2.300,-.

Signature

Vaasa 22.5.1992

Carried out Periodical Machinery Inspection. Next Periodical Machinery Inspection 28.5.1993 - 3 months.
2 visits 3.540,-.

Signature

Enclosure 3.4.89

TEKNOS

TELEFAX

PAGE 1 +

TO	ANDREW RAYNER
COMPANY	INTERNATIONAL PAINT
FAX NO.	990-44-191 438 3977
FROM	JARMO LAHTI
DATE	31.7.1995

RE: YOUR FAX TO BENGT SJÖBLOM 28 JULY

1.
ESTONIA, ex Viking Sally, Silja Star, Vasa King

-91 no docking report
-90 primered with INERTA 160 , viking blue

No other reports available.

2.
Specification done according the following:

Inlet ducts for waterjets PRELIMINARY

Preparation:

- Aluminium work grade: 05
- Degreasing, followed by fresh water cleaning to remove contamination
- Sandsweeping or grinding (sand papering)
- Surface roughness requirement. Coarse, according to ISO 8503-2.
- Abrasive material: Quartz sand, nickel slag or aluminium silicate

Product	Colour	Layers	DFT/µm
Baltoflake*	green	(1x)	1000
Intershield Newbuilding ENA301/ENA303 aluminium	alum.	(1x)	150
Intertuf JXA464/JXA465	black	(1x)	75
Interspeed extra BWA201	black	(2x)	150
			1000+375 µm

* In vicinity of the waterjet unit in inlet duct Baltoflake to be replaced with Belzona Ceramic R-metal DFT 2000 +-500 µm. Prior application of the subsequent coat Belzona surface to be sandsweeped. Exact defination for Belzona application areas to be done, when work will be carried out. (Total protection area ab. 5 sqm/ vessel).

0280E001 A

Best regards

Jarmo Lahti

TEKNOS WINTER OY
PRODUCT, LABORATORY & TECHNICAL SERVICE: FAX +358 0 506 095 00
PHONE +358 0 500 001
P.O. BOX 107
FIN-00371 HELSINKI, FINLAND

SHIP DETAILS SILVA STAR

OWNER/MANAGER : SALLY REDERI AB
SHIP TYPE : FERRY
TONNAGE : 15566
LLOYDS NO. : 7921033
EXECUTIVE POINT : HELSINKI
DELIVERY DATE : 1 JUN 80
SERVICE SPEED : 19 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P : 137.42
BEAM MOULDED : 24.21
ANTIFOULING HT (FWD) : 5.60
ANTIFOULING HT (AFT) : 5.60
BOOTTOP HT (AFT) :
BOOTTOP HT (FWD) :

SURFACE AREAS (SQ METRES)

HULL BELOW WATER : 3850
FLATS : 2300
BOOTTOP :
TOPSIDES :

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF REPORT
8009	FINLAND	HEM	100	DRYDOCK (M/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (M/S)
8304	FINLAND	HEM	100	DRYDOCK (M/S)
8505	VALMET VUOSAARI	INC	100	DRYDOCK (M/S)
		HEM	100	
		INC		DRYDOCK
870?	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK

COATING APPLICATION DRYDOCK:- MAY 95 VALMET VUOSAARI FHIS

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME	
*FLATS	1	T/U	80	JVA003 INTERTUF	VINYL TAR HS TINTED
	2	T/U	100	JVA007 INTERTUF	VINYL BLACK
*FLATS	1	T/U	500	ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE
PORT SIDE U/W STARBOARD SIDE U/W	1	FULL	500	ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE
PORT BOOTTOP					
STARBOARD BOOTTOP					

*=SPLIT AREA

PRODUCT & NAME		LITRES
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	2360
JVA003 INTERTUF	VINYL TAR HS TINTED	0
JVA007 INTERTUF	VINYL BLACK	0

SHIP DETAILS SILVA STAR

OWNER/MANAGER	:	SALLY REDERI AB
SHIP TYPE	:	FERRY
TONNAGE	:	15686
LLOYDS NO.	:	7921033
EXECUTIVE POINT	:	HELSINKI
DELIVERY DATE	:	1 JUN 80
SERVICE SPEED	:	18 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P	:	137.42
BEAM MOULDED	:	24.21
ANTIFOULING HT (FWD)	:	5.60
ANTIFOULING HT (AFT)	:	5.60
BOOTTOP HT (AFT)	:	
BOOTTOP HT (FWD)	:	

SURFACE AREAS (SQ METRES)

HULL BELOW WATER	:	3850
FLATS	:	2300
BOOTTOP	:	
TOPSIDES	:	

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF	REPORT
8006	FINLAND	HEM	100	DRYDOCK	(N/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK	(N/S)
8304	FINLAND	HEM	100	DRYDOCK	(N/S)
8505	VALMET VUOSAARI	INC	100	DRYDOCK	(M/S)
		HEM	100		
		INC		DRYDOCK	
8701	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(M/S)
		INC		DRYDOCK	
8909	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(N/S)
		INC		DRYDOCK	
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(M/S)
		INC		DRYDOCK	

COATING APPLICATION DRYDOCK:- JAN 87 KVAERNER MASA YARDS-TURKU FH04

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME
FLATS	1	FULL	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STERN	1	T/U	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
	2	T/U	500	ERA163 INTERSHIELD INERTA 160 BLACK BASE

PRODUCT & NAME		LITRES
BLA110 INTERSPEED	PREMIUM A/F RED	40
ERA163 INTERSHIELD	INERTA 160 BLACK BASE	120
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	1500

SHIP DETAILS SILVA STAR

OWNER/MANAGER	:	SALLY REDERI AB
SHIP TYPE	:	FERRY
TONNAGE	:	15566
LLOYDS NO.	:	7921033
EXECUTIVE POINT	:	HELSINKI
DELIVERY DATE	:	1 JUN 80
SERVICE SPEED	:	19 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P	:	137.42
BEAM MOULDED	:	24.21
ANTIFOULING HT (FWD)	:	5.60
ANTIFOULING HT (AFT)	:	5.60
BOOTTOP HT (AFT)	:	
BOOTTOP HT (FWD)	:	

SURFACE AREAS (SQ METRES)

HULL BELOW WATER	:	3050
FLATS	:	2300
BOOTTOP	:	
TOPSIDES	:	

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF	REPORT
8006	FINLAND	HEM	100	DRYDOCK	(N/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK	(N/S)
8304	FINLAND	HEM	100	DRYDOCK	(N/S)
8505	VALMET VUOSAARI	INC	100	DRYDOCK	(M/S)
		HEM	100		
		INC		DRYDOCK	
8701	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(M/S)
		INC		DRYDOCK	
8809	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(N/S)
		INC		DRYDOCK	
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK	(M/S)
		INC		DRYDOCK	

COATING APPLICATION DRYDOCK:- SEP 88 KVAERNER MASA YARDS-TURKU FH04

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME
PORT SIDE U/W	1	T/U	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STARBOARD SIDE U/W				
PORT BOOTTOP	1	FULL	330	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STARBOARD BOOTTOP				
STERN	1	FULL	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE

PRODUCT & NAME		LITRES
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	0

SHIP DETAILS SILVA STAR

OWNER/MANAGER	: SALLY REDERI AB
SHIP TYPE	: FERRY
TONNAGE	: 15566
LLOYDS NO.	: 7321033
EXECUTIVE POINT	: HELSINKI
DELIVERY DATE	: 1 JUN 80
SERVICE SPEED	: 19 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P	: 137.47
BEAM MOULDED	: 24.21
ANTIFOULING HT (FWD)	: 5.60
ANTIFOULING HT (AFT)	: 5.60
BOOTTOP HT (AFT)	:
BOOTTOP HT (FWD)	:

SURFACE AREAS (SQ METRES)

HULL BELOW WATER	: 3850
FLATS	: 2300
BOOTTOP	:
TOPSIDES	:

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF REPORT
8006	FINLAND	HEM	100	DRYDOCK (M/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (M/S)
8304	FINLAND	HEM	100	DRYDOCK (M/S)
8506	VALMET VUOSAARI	INC	100	DRYDOCK (M/S)
		HEM	100	
		INC		DRYDOCK
8701	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK

COATING APPLICATION DRYDOCK:- MAY 90 KVAERNER MASA YARDS-TURKU FHO4

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME
FLATS	1	T/U	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
PORT SIDE U/W				
STARBOARD SIDE U/W				

PRODUCT & NAME	LITRES
BJA450 INTERSPEED EXTRA A/F RED	(
ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE	0

WÄRTSILÄ MARINE
Åbo reparationsvarv

Avdelning Handläggare

FAKTURA

Datum
19.10.1987

Nr
24 1858

Köparens referens
Insp. Y. Röblom

Säljarens referens
AEP/lt

Godsmottagare

Beställare
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Enclosure 3.4.90

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 d. netto
*)

Dröjsmålsränta 0 %

Märke
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/87

Vid betalning av fakturan ber vi Er notera a konto inbetalningar
FIM 650.000,- 20.2.87,
FIM 350.000,- 15.7.87

20449 Specifikation		Mängd	Enhetspris	Totalpris
100	In- och utdockning av fartyget inkl. dockshyra 1 dygn.		23.886,-	
	Dockshyra för de följande 10 dygnen.		107.490,-	
101	Extra omändring av dockningsbädd.		8.640,-	
100	Smältning av is från fören med hett vatten, 2 smältbilar med manskap i arbete.		10.000,-	
102	Anslutning av elkabel ombord 1 ggr.		560,-	
	Anslutning av telefon 1 ggr.		305,-	
	Telefonavgift 3088 impulser		1.853,-	
	Hyra för värmefläktar.		3.140,-	
103	Anslutning av vattenslang 2 ggr.		1.120,-	
	Leverans av kylvatten undr 10 dygn.		2.750,-	
	Borttransport av avfall 7 ggr.		2.870,-	
104	Anslutning av brandslang 1 ggr.		560,-	
	Brandvakt 18 arbetsskift.		11.310,-	
	Till brandbekämpning 50 m2 aluminiumbekl. glasfiberväv.		2.830,-	

WÄRTSILÄ MARINE

Åbo reparationsvarv

Sivu Sida Page

MS VIKING SALLY

20449

300	Bultar förnyats till bogpropellerns tryckhuv. Borrning och gängning av hål.Löstagning av skyddsnuvan och maskinbearbetning av fördjupningar för låsbultar enl. ritning. Bultarna förnyats. Borrning samt gängning. Återmontering samt montering av låsningar. Ställningsarbete.	25.050,-
301	För reparation av SB och BB bottenventiler löstagits 2st NS300 rörkrökar. Ventilernas vridningsslider öppnats och förnyats kilar och stoppare. Kilarna svängts åt rätt håll och monterats på platsen. Täthet kontrollerats och ventilerna samt rören målats med Epoksifärg. Rörkrökarna återmonterats. 2st NS150 bordläggningsventiler översatts.	18.820,-
302	Mätniong av spel i roder och propelleraxelar.	3.450,-
303	Propellerbladens ytor fyllts med keramisk Belzona metall samt Prestolith blandning. Bladens ytterkantar slipats jämna och stötta kanter på båda propellrarna avrundats.	13.500,-
	Båda propellrarnas bladytor polerats.	9.600,-
304	Propelleraxlarna Cederwall-skydd (SB och BB) löstagits, öppnats samt granskats Cederwall-tätningarnas ytor och utbytts Sempak-tätning. Fastsättningsbultarna kontrollerats samt skydden återmonterats och svetsats. Ställningsarbete.	16.160,-
305	Helikopterdäckets Plexi-glas, räck samt belysning löstagits. Räckena kapats med slipskiva. Räckena sandblästrats Sa 2,5 samt målats 2 ggr med beställarens färg. Glasen tvättats och monterats Räck med glas återmonterats. Svetsning, elmontering samt fläckmålning. Övertidsersättning.	62.500,-
400	Reparation av yorcalbrorör enl. beställarens numrering. I arbetet använts material enl. följande. Rör 1 ø159 yorcalbrorör L-1500 2st yorcalbrokrökar ø159 2st nav ø159 2st Spännflänsar NS150.	5.500,-

M/S VIKING SALLY

10449

	Rör 17 ø323,9 yorcalbrorör 1-2000 1st yorcalbrokrök ø323,9 2st yorcalbrokrök ø323,9 2st spännfläns NS300 1st förgreningsstuts NS200 + fläns + nav NS200.	16.000,-
	Rör 17.A ø267 yorcalbrorör L-500 1st yorcalbronav ø267 1st spännfläns NS250	5.000,-
	Rör 18 ø76,1 yorcalbrorör L-500 2st yorcalbrokrök ø76,1 2st yorcalbronav ø76,1 2st spännfläns NS65 1st yorcalbronav NS40 1st spännfläns NS40.	3.020,-
401	Mellan trimtankar 13 och 14 monterats av beställaren levererad hydr. ventil. Erforderliga stålarbeten i mellanskott för montering av ventilen. Montering av ø12mm hydr.rör med Ermeto-koppling, 12m. Gamla gränslägesbrytarnas kablar avlägsnats och monterats nya gränslägesbrytare och nya kablar samt kabelrör.	36.000,-
402	Yorcalbrorör NS150 förnyats till SB isbrunn. Materialåtgång: 1300mm NS150 yorcalbrorör, 3st NS150 yorcalbrokrökar 2st NS150 yorcalbronav, 2st NS150 spännflänsar	4.830,-
500	Lager utbytts i maskinrumsfläktarnas elmotorer.	44.960,-
501	Elomändringsarbeten i bogpropellerns motor. Materialåtgång: 36m kabel NJEM 1x70 2m Cu-skena 60x10 5m Cu-skena 80x10 kopplingsskor, skruvar och muttrar.	15.120,-
600	I matsalens mellanvägg gjorts öppning i garnerat stålskott 1050x500mm. Öppningen inramats och garnerats med mässingsprofil. Ramarna beställarens.	9.130,-
700	Förvisirets och båda akterrampernas tätningar förnyats delvis, sammanl.22m.	14.110,-

MS VIKING SALLY

20449

Rör 2		
ø180 yorcalbrorör L-1200		
2st Yorcalbrokrökar ø180		
2st " nav ø180		
2st spännflänsar NS125		5.000,-
Rör 4		
ø133 Yorcalbrorör L-2000		
2st yorcalbro krökar ø133		
2st " " ø133		
2st spännflänsar NS125		6.000,-
Rör 5		
ø180 yorcalbrorör L-2100		
1st yorcalbronav ø180		
1st spännfläns NS175 (gammal standard)		
1st förgreningsstuts ø133 + krök ø133		
+ nav + fläns		
1st förgreningsstuts ø88,9 + nav + spänn-fläns		
1st förminskningskon ø180-ø159 + nav ø159		
+ fläns.		10.500,-
Rör 8		
ø125 yorcalbrokrökar 2st		
förminskning ø125-100		
2st flänsar + nav NS125		
1st flänsar + nav NS100		7.000,-
Rör 10		
ø267 yorcalbrorör L-1000		
1st yorcalbronav ø267		
1st spännfläns NS250		
1st Straub koppling ø267		9.000,-
Rör 11		
ø267 yorcalbrorör L-1000		
1st yorcalbronav ø267		
1st spännfläns NS250		
1st Straub koppling		9.000,-
Rör 16		
ø267 yorcalbrorör L-1000		
1st yorcalbrokrök ø133		
1st yorcalbronav ø133		
1st yorcalbronav ø267		
1st spännfläns NS250		
1st spännfläns NS125		
1st Straub koppling ø267		
(röret har NS125 förgreningsstuts.		10.000,-

MS VIKING SALLY

20449

701 Rodrens bottenpluggar öppnats. För BB rodret förnyats plåtar 2st 500x250x20mm 1st 630x600x20mm, bockats För SB rodret förnyats plåtar 1st 450x250x20mm 1st 550x350x20mm 1st 1700x650x20mm, bockats Svetssömmarna påsvetsats samt frätta ställen fyllts med Belzona Prestolith massa.	52.370,-
702 Frätta svetssömmar i bottnen påsvetsats.	7.280,-
703 Bottensilar öppnats och fastsatts. Svetssömmar reparationssvetsats.	6.480,-
704 Förnyats zinkanoder a 10kg i brunnar 5st, i förpropellertunneln 6st.	3.190,-
707 Till köket tillverkats vask och dräneringsränna av plåt 900x560x5mm, djup 100mm med galler 900x560mm. (Taket nedanför rivits av fartyget)	5.470,-
708 Förliga inkörsbanans klaffars gångjärn reparerats, förnyats 2st gångjärn. Gångjärnen jämte gångjärnstappar 6st förnyats för täckplåtar mellan inkörsbanan och fartyget Ställningsarbete.	25.270,-
709 Rullklysen för- och akterut reparerats enl. anvisning med beställarens delar. Ovanför klysen monterats 18st knän 300x250x15mm. Målningsarbete. Arbetet utförs på yttre bordläggningen med hjälp av krankorg.	24.080,-
900 Fartygets flatbotten sandblästrats SA 2,5 samt målats med Inerta 160, 1450 m2. (Beställarens färg)	116.000,-
Fartygets akterliga och förliga delar fläck- sandblästrats SA 2,5 samt fläckmålats med Inerta 160 (Beställarens färg) Förliga delen 50 m2 akterliga delen 300 m2.	29.750,-

WÄRTSILÄ MARINE

no

Sivu Sida Page 5

MS VIKING SALLY

20449

901	Rambernas och hyllornas vajrar samt block granskats visuellt.	810,-
903	Sötvattentank no 17 tvättats och rengjorts.	8.000,-
904	Smutsoljetankarna rengjorts och oljigt och fast avfall transporterats att förstöras.	42.000,-
905	Värmeväxlarens gavlar 4st sandblästrats SA 2,5 samt målats med Inerta 160.	2.000,-
	Saltvattenfilter 2st, brunnar 2st och rör 2st rengjorts samt målats 1 ggr med Antifouling.	6.620,-
907	Bottenbrunnarna rengjorts och målats 1 ggr med Antifouling .	3.150,-
909	Täckning av fartygsbottnen och värmning på grund av Inerta målning.	120.000,-
910	Fartygets däck och utsidor tvättats med hett vatten före utdockning.	32.810,-
	FIM	1.021.844,-

2.11-87

Ylitajasta veloitamme korkoa ... 16%

För övertid debiteras ränta

WÄRTSILÄ MARINE
Åbo reparationsvarv

Avdelning | Handläggare

FAKTURA

Datum: 19.10.1987 | nr 24 1860

Köparens referens: Insp. K. Röblom

Säljarens referens: A2P/lt

Godsmottagare

Beställare:
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor: 14 d. netto

Oms % 0

Märke:
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/37

20449 Specifikation	Mängd	Enhetspris	Totalpris
706 Spricka i yttre bordläggningen invid matsalen på BB-sida reparerats medels förnyande av skottplåt 830x300x12mm och däcksplåt 200x150x12mm samt svetsning, montering av garnerings- och inredningsskivor. Skyddande av golvet på inre sidan. - Ställningsarbete. Skydd på utsidan under reparationsarbetet.			17.620,-
104 Brandvakt på grund av haveriarbetet 2 arbetsskift.			1.740,-
		FIM	19.360,-

4.11 87

162.

Postadress | Telex | Telefon | Telecopier | Bank | Postgiro | Oms

WÄRTSILÄ MARINE
Åbo reparationsvarv

Avdelning

Handläggare

FAKTURA

Datum
19.10.1987

nr
24.1859

Köparens referens
Insp. Y. Röblom

Säljarens referens
ABP/lt

Godsmottagare

Beställare
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 d. netto

Oms %

Märke
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/87

20849 Specifikation	Mängd	Enhetspris	Totalpris
705 Fästöron 8st för huvudmotorernas avgasrörs ljuddämpare flyttats. Förnyats av beställaren levererade ljuddämpare. Ställningsarbete.			20.230,-
104 Brandvakt på grund av haveriarbetet 3 arbetsskift.			2.610,-
		FIM	22.840,-

4.11.87

162

Postadress	Telex	Telefon	Telecopier	Bank	Postgiro	Oms
Wärtsilä Marinindustri Ab Åbo reparationsvarv		Nat (921) 359 500		FBF		

WÄRTSILÄ MARINE
Åbo reparationsvarv

Avdelning | Handläggare

FAKTURA

Datum: 7.10.1987

nr: 24 1800

Köparens referens: Insp. Röblom

Säljarens referens: AEP/lt

Godsmottagare

Beställare:
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Enclosure 3.4.91

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor: 14 d. netto

Oms %

Märke

MS VIKING SALLY

20518

Dockning 6-8.4.1987

Pos. nr. specifikation	Mängd	Enhetspris	Totalpris
20518			
100 In- och utdockning av fartyget			
inkl. dockshyra för 1 dygn.			23.886,-
Dockshyra för de följande 2 dygnen			21.498,-
Bogseraasistans vid utdockning.			7.970,-
101 Omändring av dockningsbädd.			
Avlägsnande av is från dockan.			11.340,-
102 Anslutning av 2st telefoner.			610,-
Telefonavgift, 772 impulser.			309,-
103 Borttransport av fartygets avfall, 3 ggr.			1.230,-
104 Anslutning av brandslang ombord.			560,-
Brandvakt 5 arbetsskift.			4.350,-
Torv för uppsamling av olja.			210,-
300 Båda propelleraxlarnas Cederwall-skydd löstagits. BB- tätning utbytts (beställarens leverans). Gamla vitmetallringen maskinbearbetats. 800 l. spillolja tagits till vara. BB- propelleraxelspel mätts. BB akselns skyddsplåt 10x240x3500mm tillverkats och förnyats. Skydden återmonterats. Ställningsarbete.			31.320,-

~~MS VIKING SALLY~~

20518

301 Loggens ventil 1st NS300 utbytts (beställarens). I förliga tankens tak gjorts öppning och genomgångs-luckan förstorats. Fläns tillverkats och ventilen provtryckts från utsidan. Gjorda öppningar stängts.	12.580,-
303 Propellerblad på SB och BB propellrar utbytts 1 + 1 st. Beställaren levererat blad, tätningar och låsningar. Alla propellerblads låsningar granskats, 5st nya nya bladbultar samt låsningar (beställarens delar) monterats. Lösa pluggar i bladens lyfthål förnyats. Ställningsarbete.	28.640,-
700 Reparation av bordläggningen vid bogportens undre kant. - gamla plåtar avlägsnats genom skärbränning. - nya plåtar och profiler tillverkats, bockats, monterats och svetsats. 1st plåt 18x1280x4800mm 1770 kg 1st plåt 18x2900x3250mm 1357 kg P-stång 160x8 750kg Ställen med sprickor svetsats. Reparerat område maskinborstats på in- och utsida samt målats med beställarens färg. Kittning utförts med Prestoflex-massa. Visirets gummitätning förnyats.	137.070,-
701 SB slingerköl förnyats spt 84-95 material använts: - plåt 15x600x7300 mm 2st - plåt 15x600x2000 mm 2st - plåt 15x300x540mm 5st - rundjärn ø50 9500mm 1st. Bordläggningsskada reparerats invid slingerkölen spt 91-92, 1st plåt 12x500x500mm förnyats. 7st anodzinkar à 10 kg monterats. Den förnyade slingerkölen maskinborstats och målats med varvets färg.	32.790,-
702 SB slingerköl förnyats spt 71-95 material använts: - plåt 15x600x1900mm 2st - plåt 15x600x2000mm 2st - plåt 15x300x540mm 15st rundjärn ø50 21000 mm 1st. 5st anodzinkar à 10 kg monterats. Reparationssvetsning samt fastsvetsning av nål för bottenplugg.(pluggen saknats) Den förnyade slingenrkölen maskinborstats samt målats med varvets färg.	71.140,-

WÄRTSILÄ MARINE

Åbo reparationsvarv

no

Sida Sida Page 3

20513

801 Sikt för SB bottenbrunn löstagits, riktats, spricka svetsats.
Förnyats och svetsats mellanspjälor och plattjärn vid kanten.
Återmonterats. 4.990,-

FIM 390.493,-

Lasku erääntyy [illegible]
Fö[illegible] förfaller [illegible]
22.10.87
[illegible]
1070

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning Handläggare

FAKTURA
Datum nr
7.10.1987 24 1801
Köparens referens
Insp. Röblom
Säljarens referens
AEP/lt
Godsmottagare
Beställare

Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt
Leveransvillkor

Leveranstid

Betalningsvillkor
14 d. netto
Oms %
0

Märke

MS VIKING SALLY

20518

Dockning 6-8.4.1987

Pos. nr, specifikation	Mängd	Enhetspris	Totalpris
20518			
302 Hissaxeln transporterats från fartyget till maskinverkstaden och demonterats. Lagerställen besprutats med metall och slipats. 2st lager 6018 förnyats. Axeln ihopmonterats och transp. ombord. Sätesring för ventil, ø315x300x30 tillverkats, maskinbearbetats av beställarens material. Ventiltallrikens tätningsytor maskinbearbetats ø315mm.		FIM 7.870,-	

COPY

23.10 87 1670

Postadress Telex Telefon Telecopier Bank Postgiro Oms
Wärtsilä Marinindustri Ab

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning | Handläggare

FAKTURA
Datum
12.12.1988 | nr 24 4835
Köparens referens
Insp. Mickelsson
Säljarens referens
AEP/lt
Beställare

Godsmottagare

Enclosure 3.4.92

Sally Rederi Ab
Strandgatan 7

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 dgr netto

Oms % 0

Märke

MS VIKING SALLY

Dockning: 12-16.9.1988

Pos. nr, specifikation	Mängd	Enhetspris	Totalpris
Anbud WMTR1066/88			
20706			
0010 In- och utdockning av fartyget inkl. 1 dygns dockshyra.			23.886,-
Dockshyra för de följande dygnen			42.996,-
0020 Omändring av dockningsbädd.			8.640,-
0030 Anslutning av el ombord , 1 ggr			560,-
Leverans av 44440 kWh elström.			26.664,-
Anslutning av telefon			305,-
Telefonsamtal 995 impulser			398,-
0040 Anslutning av brandslang 1ggr			560,-
Brandvakt 5 arbetsskift			4.350,-
0050 Borttransport av avfall 2 ggr.			820,-

Postadress | Telex | Telefon | Telecopier | Bank | Postgiro | Oms
Wärtsilä Marinindustri Ab

MS VIKING SALLY

20706

0060	Fartygsbottnen högtrycksvattenspolats, 1000m2.	3.000,-
0070	Bottnen sandblästrats Sa2 och målats med lösningsmedelsfri Inerta 160 620 m2. Beställarens färg.	55.800,-
	Bottnen lättsandblästrats och målats med lösningsmedelsfri Inerta 160 800 m2. Beställarens färg.	43.280,-
	Målning av djupgångsmärken.	2.600,-
	Skyddande av propellrar och rodertappar	2.880,-
0080	Frätta svetsfogar påsvetsats på rodret och i bogpropellertunneln. Ställningsarbete.	
	På rodren monterats och fastsvetsats plåt 20x180x180mm 1st, 20x350x480mm 1st.	20.000,-
0090	Zinkanoder a 90kg förnyats - i bogpropellertunneln 8st - på skrovet 18st - på rodren 8st - på roderstockarna 4st	11.020,-
	Läckande ställen på slingerköl vid spt 85-86 BB-sida reparerats genom svetsning.	600,-
0100	Mätning av spelrum i roder och i propelleraxelns lager. Mätningsprotokoll uppgjorts och levererats till fartyget.	3.450,-
0110	SB propelleraxels yttre Cederwallaxeltätning öppnats och ihopmonterats med beställarens delar.	10.800,-
	Gamla Cederwallaxeltätningen iståndsatts, ytorna maskinbearbetats, levererats ombord. Låsningar inspekterats och reparerats samt nät avlägsnats från för- och akterpropellrar.	19.800,-
0120	Bottenbrunnarnas sikt öppnats och brunnarna rengjorts samt målats med Interspeed BLA110. Sikten återmonterats.	5.400,-
	Svetssömmar i bottensiktens galler utökats 4st	3.400,-
	Filterbrunnarna rengjorts, målats med Antifouling färg 3st.	11.250,-
	Snäckor bortskrapats från brunnarna.	5.400,-
	Färg från varvet: Interspeed BLA110 50 l.	1.675,-

10766

0130 SB akterligaste bottenventil NS250 öppnats och gummitätning levererad av beställaren förnyats. Rostfri kil tillverkats 12x50mm samt låsning ø50x100mm. Ventilen ihopmonterats och tätheten kontrollerats. 10.000,-

0140 Saltvattenrör mellan akterliga bottenventiler och filtren löstagits 3st NS250 och transporterats till rörverkstaden. Rören reparerats genom svetsning av flänsfogar och förnyande av förgreningar ø120x200x8mm, 3st. Rören målats på inre sidan med Antifouling färg och svetsfogarna med Galvex färg.
Transporterats till fartyget och monterats på platsen med nya packningar och bultar. 16.000,-

0150 I maskinrummet förnyats och reparerats yorcalbrokylrör enl. anvisning.
NS175 yorcalbrorör 1m
NS175 " krök 1st
NS125 " " 2st
NS200/150 " förminskning 3st
NS150/175 " " 2st
NS175 fläns + nav 1st
NS125 " " 1st
NS200 yorcalbrorör 0,3m
NS200 " krök 1st
NS200 fläns + nav 2st
NS150 yorcalbrorör 0,1m
NS150 fläns + nav 1st
NS50 yorcalbrorör 11m
NS50 " krök 9st
NS50 fläns + nav 15st
NS50 blindfläns 1st
NS100 galv.rör 0,3m
NS100 rörfläns 3st
Flänspackningar, bultar samt muttrar förnyats
Tillverkats och monterats 2st lödningsnipplar av brons
Viking koppling ø324 1st
" ø220 1st
vridventil NS150 2st
yorcalbromuff ½" 1st. 40.000,-

0160 2st fjäderbelastade bordläggningsventiler löstagits och transporterats till verkstaden samt demonterats. Ventilhusen och käglorna maskinbearbetats.
Förnyats stödflänsar för fjäder samt O-ringar.
Ventilerna slipats, ihopmonterats samt monterats på platsen. 10.000,-

0170 Plåtbeslagningar för HM avgaspannor 4st reparerats genom att jämna fogarna och monterats plåt på fogarna samt i botten och på hörnen i väggen, 8st L-järn 80x80 L=2100mm. Svetsningarna utförts. 32.880,-

	Avgasrören skvidats i pannorna med fanerskivor.	3.200,-
	Avgaspannan rengjorts (beställaren skött om öppnande och fastsättning av luckor.	9.150,-
0190	Spilloljetanken tömts med hjälp av tvätt-och sugbil samt högtrycks tvättats.	11.000,-
0200	Tillverkats enl. ritning samt svarvats 4st 6-kant skruvar och bultar 4st.	5.560,-
0210	Förliga hissens vajerhjul och axel transp. till verkstaden. Lagret utpressats från boet och från axeln. Axeln reparerats genom påsvetsning och slipats till angivet mått. Nya av beställaren levererade tätningar och lager monterats på axeln.	5.760,-
0220	Propellerbladens skadade och frätta kanter slipats och frätningarna fyllts med Belzona. Frätningar på rodren och på axelbärarna fyllts med Prestolith massa. Ställningsarbete.	14.000,-
0230	Bildäckets gångplattform på BB-sida invid maskinkappet reparerats genom förnyande av plåt 5x560x6050mm.	5.140,-
	FIM	472.224,-

27.12.81

162

WÄRTSILÄ MARINE
Åbo reparationsvarv

Avdelning	
Handläggare	
Godsmottagare	
Leveransadress	
Leveranssätt	

FAKTURA

Datum	22.6.1989
Nr	24 6794
Köparens referens	L Janlöv
Säljarens referens	AEP/lt
Beställare	Rederi Ab Sally Hamngatan 8 22100 MARIEHAMN
Anbudet giltigt t.o.m.	
Leveransvillkor	
Leveranstid	
Betalningsvillkor	14 d netto
Oms %	0

Enclosure 3.4.93

Märke

MS VIKING SALLY

Dockning 2.5.-3.5.1989

22734

Pos Art nr Specifikation		Mängd	Enhetspris	Totalpris
3010	Intagning av fartyget i docka samt utdockning inkl. 1 dygns hyra.			26.275,-
	Dockhyra för 1 dygn.			11.943,-
3011	Omriktning av dockningsbädd.			6.100,-
3020	Anslutning av telefon.			305,-
3040	Anslutning av brandslang.			560,-
3050	Byte av propellerblad inkl. anod.			75.100,-
3060	Tillverkning av 4 st [illegible] enligt modell från fartyget. Fartygets personal löstagit de gamla och monterad de nya rören.			
	Materialåtgång:			
	rör 133 x 2,5 CuZn20Al F33 DIN:17677	T 3,50	m	
	" 133 x 2,5 " " " 17671	TI ,50	m	
	" 219,1 x 3 " 17671	1,50	m	
	sexkantskruv M16 x 8,8m pass 421.3.2.	30	st	
	sexkantmutter M16 8 m pass. 452.3.2.	30	st	
	krök 90 [illegible] 133 x 2,5 R=1,5xD	3	st	
	" " " 219,1x3,0 "	1	st	

COPY

Postadress	Telex	Telefon	Telecopier	Bank	Postgiro	Oms
Wärtsilä Marinindustri Ab Åbo reparationsvarv		Nat (921) 359 600		FBF		

MS VIKING SALLY

20784

	lösfläns 200/219,1 DIN 2642 NP10 ST37-2	2 st	
	nav NS200/219,1 628.2.4. NP10 CuZn21A1	2 st	
	spännfläns NS125/133 628.9.2. NP10 ST/37-	4 st	
	" NS150/159 " "	2 st	
	nav NS125/133 628.2.4 NP10 CuZn21A12	4 st	
	" NS150/159 " " "	2 st	24.396,-
0070	**Löstagning och montering av axelskydd för mätning av spel i cederwall-tätningen på SB-sida.**		3.080,-
0080	Fartyget använt kran och lyftkorg för målning av utsidor.		7.000,-
0100	1 man som hjälp åt Kamewa-montör för undersökning av läckage i OD-box.		1.600,-
0110	Tenfjord rodermaskinens läckor undersökta och reparerat, tillsammans med tillverkarens representant.		8.251,-
0120	- Sprickor svetsats på SB-sidan i bottenbord-läggningen, längd ca 2,5 m. - Läcka i BB roderst svetsats fast, ett noren-nål fyllts med Prestolith - Zinkar monterats på slingerkölar SB och BB sammanl. 14st à 10 kg.		8.608,-
0130	Mätning av spelrum i roder och propelleraxel.		2.800,-
		FIM	176.018,-

6.7.85

Ylläpito ... 1676

Enclosure 3.4.94

TURUN
KORJAUSTELAKKA OY
Turku Repair Yard

FAKTURA nr 229/90
2.10.1990

Beställare

Sally Line Ab
Hamngatan 8

22100 MARIEHAMN

Köparens ref
Lars Karlsson Order 09-9440
Säljarens ref
AEP/ta

Betalningsvillkor	Oms
per omgående	0 %
Förfallodag	
Försäningsränta	18 %

Märke

M/S VIKING SALLY

916
969

COPY

Pos. nr	Specifikation	Totalpris
	Raparationer, som utförts i samband med dockningen av M/S Viking Sally under tiden 30.4. - 7.5.1990 enligt tidigare överlämnad specifikation	
	TOTALT	1.420.000,- ***********
	./. FÖRSKOTTSBETALNING	300.000,-
	ÅTERSTÅR TILL BETALNING	1.120.000,- ***********

8

TURUN
KORJAUSTELAKKA OY
Turku Repair Yard

SPECIFIKATION AV DE REPARATIONER SOM UTFÖRTS UNDER DOCKNINGEN AV M/S VIKING SALLY 30.4 - 7.5.1990 TILL FAKTURA NR. 229/90 av den 9.8.1990

0010	Dockning och sjösättning av fartyget inkl. dockshyra för 1 dygn	26.275,-
0011	Ändringsarbeten i dockningsbädden	7.100,-
0010	Dockhyra för 7 dygn	83.601,-
0010	Kostnader för övertidsarbete i samband med dockningen	8.930,-
0012	Anslutning av 4 st elkablar	2.240,-
0013	Anslutning av 3 st. brandslangar	1.680,-
	Brandvakt 16 arbetsskift	13.920,-
0014	Anslutning av färskvattenslang 1 gång	560,-
	Levererats 175 m^3 färskvatten	1.575,-
0015	Anslutning av telefon 1 st.	305,-
	Telefonsamtalsavgifter 3847 impulser	2.501,-
0016	Leverans av kylvatten till hjälpmaskiner 4 500 m^3 färskvatten, till havsvattens-pris à 3,- / m^3	13.500,-
0017	Borttransport av fartygets avfall 18 ggr.	7.380,-
0018	- -	
0019	Lyftkranshyra för att lyfta CO2-flaskor	1.200,-
0021	Färskvattenssköljning av utsidorna för att avlägsna salt. Kostnader för övertidsarbete.	9.680,-
0022	Sandblästring av bottnen SA 2,5 1800 m^2 och målning med INERTA 160 målfärg 1800 m^2	270.000,-
0024	Rullmålning av Boottop området 1 ggr 1050 m^2 med beställarens målfärg INERTA-70. Kostnader för övertids-arbete.	15.090,-

0025	Målning av djupgångs- och fribordsmärkena.	2.600,-
	Linjering av vattenlinjeområdet 300 m	2.700,-
0026	Lätt sandblästring av utsidorna samt blästring av rostiga ställen SA 2,5. Målning 3 ggr med beställarens färg. Målats 2 st. ca 1 m svarta ränder på utsidan.	130.000,-
	Breddning av ränderna från ca 1 m till 1,5 m.	3.120,-
0027	Slipning av rostiga ställen samt fläckmålning och övermålning av skorstenen, däcksbyggnadens skorsten, samt ställen på förskeppsskottet och kommandobryggan. Beställarens färg.	99.000,-
	Breddning av ränderna från ca 1 m till 1,5 m	432,-
0029	Utmärkning och målning av fartygets nya namn samt målning av Siljas logo på utsidorna. Beställarens färg.	63.000,-
	Namnet målat på två ställen på aktra bilporten.	1.640,-
0400	Utsidans sandblästring och målning 1 gång, slipning och fläckmålning av ställen där första strykningen flagat. Ställningsarbete	11.350,-
0410	Målning av Världsnaturfondens märken på SB- och BB-sidorna	10.830,-
	Målning av rederiets märke	2.040,-
	Bogportens insida, uppfartsbrons utsida och sidor samt avsatsen under uppfartsbron rengjorts, avskärmats samt målats. Rengörning, avskärmning och målning av akterrampen samt röda områden som kommit i dager efter att rampen öppnats. Beställarens färger	53.540,-
	Sönderslipning av ytan samt övermålning av akterspegelns vita del 150 m². Beställarens färg.	4.290,-

	Extra övermålning av blå rand på SB-sidan 20 m, på BB-sidan 60 m Ställningsarbete Beställarens färg	10.820,-
0031	Avskärmning av propeller och rodertappar	4.500,-
0041	- -	
0050	Zinkanoder à 10 kg förnyats - i skrovet 7 st. - i förpropellertunneln 7 st. - i bottenbrunnarna 2 st.	4.880,-
0060	Mätts spelrum i propelleraxlarna, uppgjorts och levererats mätnings- protokoll.	2.450,-
	Kontrollmätning utförts	1.260,-
0070	Mätts spelrum i rodren, uppgjorts och levererats mätningsprotokoll	1.550,-
0080	- -	
0090	Öppning och rengörning av bottenbrunnarna 3 st. samt målning av brunnarna 1 ggr antifouling	7.560,-
	Skada förorsakad av vattenflöde i samband med behandlingen av bottenbrunnarna	3.810,-
0100 0370	Transport av 7 st. havsvattenfilter från fartyget till plåtverkstad, reparation av filtrens ramar genom att förnya plattorna. 2 st φ 550 mm — 10 mm platta 3 st φ 400 mm — 10 mm platta 1 st φ 650 mm — 10 mm platta 1 st φ 600 mm — 3 mm rostfri platta Förnyats byglar 3 x 30 mm i plattstången. Förnyats siktens låsanordningar 20 st 10 x 70 x 100 mm Utförts fyllnadssvetsning av ramarna. Sandblästring och målning av filtren med INERTA 160 målfärg Installerats 6 st zinkanoder à 5,5 kg	26.130,-
0110	Reparation av Yorcalbro kylvattenrören enl. pos. 1-9 i specifikationen (beställaren lossar och monterar rören på plats.)	91.500,-

0360	Utöver offerten har Turun korjaustelakka Oy assisterat vid löstagningen av rören samt levererat 1 st. STRAUB-koppling 219,1. Därutöver har reparerats 3 st av beställaren löstagna Yorcalbro-rör, som ej ingått i offerten.	
	Material som använts vid reparationen:	
	1 m Calbro-rör NS 250 1 st Calbro-nav NS 250 1 st Calbro-nav NS 100 1 st Calbro-krök NS 100 0,3 m Calbro-rör NS 100 2 st spännfläns NS 250 1 st spännfläns NS 100	
	0,5 m Calbro-rör NS 250 2 st Calbro-krok NS 250 2 st Calbro- nav NS 250 2 st spännfläns NS 250 1 st svetsupphöjning 1/2 "	
	3 st Calbro-nav NS 50 3 st spännfläns NS 50 4 st Calbro-krok NS 50 1 m Calbro-rör ϕ 57 1 st tapp 2 " 1 st förminskningskon NS 50-40	55.610,-
0120	Tömning och rengörning av spilloljetanken	6.800,-
	Kostnader för behandling av 14 m³ spillolja	29.120,-
0160	Byte av 2 st BB-propellerblad	16.560,-
	Reparation av fartygets felaktiga bladbultsnyckel samt vridning av propellern med hjälp av talja	8.800,-
0170	SB-rodermaskins distansstång löstagits från hjärtstocken och fraktats till verkstad. Lager hålet gjorts större och mellanhylsa ϕ 120 x 60 mm tillverkats samt nytt av beställaren levererat lager monterats. Montering på plats och provkörning utförts.	16.770,-
0190	Ventilationskanalernas alla galler på utsidan löstagits, sandblästrats samt målats med beställarens färg.	38.000,-

0200	Utmärkning och målning av skorstenens nya märke	20.200,-
	Avlägsning av det gamla rederimärket från skorstenen.	12.540,-
0210	Avlägsning medelst skärbränning av namnet "Viking Sally" 4 st, samt utjämning av spåren	24.000,-
0220	Övertäckning av fartygsbottnen akterifrån 3/4 av längden, samt uppvärmingskostnader. Brännolja för uppvärmning 7950 l från varvet.	98.050,-
0250	Avlägsning av gamla landgångsfästen 8 st. samt tillverkning av 4 st. nya fästen på båda sidorna av fartyget. Ställningsarbete.	33.990,-
0260	Avlägsning av E3-skyltarna från fartygets båda sidor	3.520,-
0270	Högtryckstvätt och tvätt med upplösnings medel av oljiga fläckar på fartygets båda sidor	8.870,-
0280	Mätning av kompressionen i Cederwall-boxarna i SB- och BB-propelleraxlarna, uppgjorts och levererats mätningsprotokoll. Skydden lösgjorts och monterats på plats.	10.830,-
0290	Ändringsarbete på landgångarna på passagerardäck. Borttagning av ledstängerna samt breddning enligt instruktionerna.	6.580,-
0300	- -	
0310	Assisterat vid monteringsarbete av lysrör	11.230,-
0320	Reparation av läckage i rodren och roderkonsolerna genom att förnya en plåt 12 x 450 x 900 och svetsa korroderade ställen. Ställningsarbete.	24.510,-
0330	Reparerats läckage i SB-propellerns stävrör. Löstagits skyddskon och packring. Förnyats o-ringbandet ϕ 16 mm 1,9 m. Delarna monterade på plats.	25.660,-

0340	Utlånats gascentral och brännskärnings-aggregat för fartygsmanskapets bruk.	800,-
0350	- -	
0360	- -	
0370	- -	
0380	Uppsugning av oljeavfall från diesel-dagtanken samt rengöring av tanken	13.100,-
0390	Svetsning av bunkerluckans öra	880,-
0410	Skaffats billyftkran till varvet för att få allt extra arbete slutfört föröver.	40.445,-

Totalt: mk 1.511.404,-
****

Enclosure 3.4.95

TURUN KORJAUSTELAKKA OY
TURKU REPAIR YARD LTD

F A K T U R A nr 30014
1.2.1991

Beställare
Vaasanlaivat-Vasabåtarna Oy Ab
C. Rickhardsson
PL 213

65101 VASA

Köparens ref

Säljarens ref
ARP/SeR/TA

Betalningsvillkor
14 dagar netto

Oms
0 %

Förfallodag 15.2.1991
Försäningsränta 18 %

Märke

M/S WASA KING

107

Pos. nr	Specifikation	Totalpris
	Reparationer, som utförts i samband med dockningen av M/S Wasa King under tiden 20.11. - 23.11.1990 enligt bifogad specifikation	
	Totalt	mk 846.769,-
		*****************

Postosoite/ PL 430 20101 TURKU
Puhelin (921) 638711
Telefax (921) 6387250
Telex 62484 try sf
Pankki TYP 433110-19066 PSP Tu 227388
Lvv
Rek.

TURUN KORJAUSTELAKKA OY
TURKU REPAIR YARD LTD

M/S WASA KING

SPECIFIKATION FÖR REPARATIONER UTFÖRDA UNDER DOCKNINGEN I NÅDENDAL

Indockining 20.11.90
Utdockning 23.11.90
Avfärd från kajen 5.12.90

0100		
1.	In och utdockningen inkl. dockshyra för ett dygn	26.300,00
1.1.	Omändring av dockningsbädden	12.000,00
2.	Dockshyra för 3 dygn	35.850,00
	Kostnader för övertidsarbete i samband med indockningen	10.010,00
	Kostnader för övertidsarbete i samband med utdockningen	12.936,00
0120		
7.	Till och frånkoppling av telefon 2 ggr	610,00
7.1.	Samtalsavgifter 3.870 impulser	2.516,00
0130		
4.	Anslutning av kylvatten en gång	600,00
4.1.	Leverans av kylvatten för hjälp-maskiner 3 dygn	825,00
0140		
5.	Till och frånkoppling av brandslang 3 ggr	1.800,00
8.	Brandvakt 27 arbetsskift	26.190,00
	50 m² glasfibertyg med AL-yta för skyddning	2.940,00
0150		
6.	Anslutning av dricksvatten 2 ggr	1.200,00
6.1.	Leverans av färskvatten 109,4 m³	1.094,00
0160		
9.	Borttransport av avfall 14 ggr	5.740,00
0170		
10.	-	
0180		
15.	Färskvattenspolning av utsidorna, 780 m² BB 240 m² och SB 540 m²	4.680,00

Postiosoite/ PL 430 20101 TURKU | Puhelin (921) 638711 | Telefax (921) 6387250 | Telex 62484 try sf | Pankki TYP 433110-19066 PSP Tu 227388 | Lvv Rek.

0190 15.	Lätt sandblästring av sidorna	4.800,00
	Fläckning 2 x 210 m^2	2.940,00
	Målning 2 ggr 2 x 210 m^2	1.890,00
	Märkning och målning av logo Rederiets färg	63.000,00
	Kostnader för kranbil	11.070,00
	Sandblästring av bordläggningsöpningarnas kanter på utsidan, SA 2,5, samt målning med zinksilikatfärg och med ytfärg 2 ggr. Rederiets färger	2.360,00
0200 16.	-	
0210 17.	Högtryckstvätt av skorsten med tvätt-medel. Kostnader för övertidsarbete	5.650,00
	Skorstenens gamla målyta slipats med handslipmaskin. Nya blåa ränder har linjerats, märkts samt målats 2ggr. Det gamla sälmärket har övermålats med vit färg. Tillverkning av schablon för rederi-logon. Logon märkts och målats på båda sidorna av skorstenen.	48.780,00
	Kostnader för kranbil	18.680,00
0220 18.	Målning av EFFJOHN-logo på ena sidan av fartyget. Rederiets färg	2.500,00
	Målning av ramar runt EFFJOHN-logo på SB-sidan	2.250,00
0230 19.	Slipning av Panda-logons kantbitar och målning med vit ytfärg 2 ggr.	1.320,00
	Övermålning av Panda-logon med beställarens blå ytfärg 2 ggr.	800,00
	Kostnader för kranbil	1.150,00
0240 20.	Bortskärning av "Mariehamn" på båda sidorna i aktern	12.500,00

0250 21.	Märkning och målning av nytt namn "Wasa King" och hemort "Wasa". Tillverking av 3 st schabloner.	4.600,-
	Förutom i offerten nämnda arbeten har gamla namn bortslipatas med handslipmaskin samt ytorna målats 2 ggr med vit ytfärg.	7.850,00
	Två namn märkta och målade under akterkanten.	1.640,00
	Kostnader för kranbil	2.180,00
0260 22.	Avikerlisten	
	Avikerlistens övre del sandblästrad, SA 2,5 och nedre delen lättsandblästrad. Listen ca 80 m² målats 4 ggr med rederiets färg.	8.800,00
	Kostnader för kranbil	6.540,00
0270 23.	-	
0280 24.	-	
0290 31.	Mätning av propelleraxelspel	2.700,00
0300 32.	Mätning av roderspel	2.100,00
0310 33.	-	
320 34.	Förnyande av zinkanoder 10 kg Roder 2 + 2 st Bottenbrunnar 12 st	4.880,00
0330 35.	Bottenbrunnar öppnats, rengjorts och målats med antifouling 4 st	10.080,00
0340 36.	Byte av 2 st propellerblad BB sida	16.500,00
	I samband med byte av bladen har tätningsringar av brons lösmonterats och lyfts ut, 6 st lyftskruvar har tillverkats. O-ringarna förnyade. Hopmontering.	1.600,00

0350 41.	Reparation av 12 st yorcalbrorör.	79.900,00
	Tillverkning av delar till rör NS 175 av gammal standard och ihoppassning med rör NS 200.	2.160,00
0360 42.	Rengöring av slamtank, 20 m³ och bilgevattentank 22 m³	12.700,00
	Transport av oljeavfall till Ekokem och behandlingskostnader, 21.000 kg	46.430,00
0370 43.	Rören för djupgångsmätarna, 2 st φ 50 x 6 m, borrats öppna och krassats rena. Rören blindats och fyllts med Antifouling-färg, däreter avtappats. 20 l Antifouling-färg från varvet.	16.360,00
0380 51.	De gamla plastnamnen har avlägsnats genom uppvärmning och bortslipning. Namnskyltarna slipats och målats med ytfärg 2 ggr. Tillverkning av schablon för namnet samt märkning och målning av det nya namnet. Vid arbetet utförande har en saxhiss använts.	12.820,00
0390 52.	Löstagning av landgångsfästena på båda sidorna genom brännskärning och förflyttning till däck nr 4 enligt skiss. Rengöring och målning 3 ggr.	21.580,00
	Kostnader för kranbil	1.120,00
0400 53.	Reparation av bordläggningsskada spanter 122-140 för och akter i randningen enligt offert inkl. arbetena, plåttjocklek 10 mm, 2900 kg	147.370,00

Förnyade bordläggningsplåtarna,
tjocklek 10 mm:

spt 119 - 131	18 m²	1440 kg
spt 131 - 142	23,1 m²	1848 kg
spt 142 - 146,5	4,75 m²	380 kg
P-220 stång 4 x 2 m + 4 x 3 m		456 kg
Spant -5--7		
bordläggningsplåtar	2,12 m²	170 kg
däcksplåtar	0,46 m²	37 kg
balkbricka	0,08 m²	6 kg
sammanlagt		4.337 kg

	Debitering för extra kilon inkl. ställningsarbetena (4337 kg - 2900 kg) x 27,50	39.518,00
	Sandblästring av utsidan av skadade områden SA 2,5 samt målning med zinksilikatfärg och grundfärg samt ytfärg 2 ggr. Insidan rengjord och grundmålad 2 ggr.	37.860,00
0410	Öppning och påsvetsning av frätta svetssömmar på SB och BB rodren.	
	Dubleringsplåt 500 x 1200 x 23 mm monterats på BB-rodern. Ställningsarbete	17.980,00
0420	Nedre delen av BB propelleraxelskyddet löstagits och fisknät borttagits runtom propelleraxeln. Skyddet fastsatt. Ställningsarbete	2.640,00
0430	Slipning av BB propellerblad 2 st Ställningsarbete	4.830,00
0440	Skyddsrör och platta under SB sidoporten borttagna genom skärbrännning.	880,00
0450	Skyddsjärn för avrinningsrör på bildäcket tillverkad av rundstång och monterats på plats.	640,00
0460	Leverans och lyftning av asetylen- och syre-behållarepaket ombord på fartyget nära skorstenen för reparationer av pannor.	4.670,00
0470	Loss och fast av bottenpluggar 8 st. Montering och svetsning av en ny 3/4" muff och 1 st messingplugg.	2.860,00
	Totalt	846.769,00
		*********

25.9.1992

Enclosure 3.4.96

TELAKOINTI TURUSSA

M/S "VAASA KING"

1.	In och utdockningen inkl. en dag i docka	26.300,-
1.1.	Omändring av dockningsbädden	12.000,-
2.	Stående i docka, dockshyra/dygn	11.950,-/dygn
3.	Anslutning av el-kabel	660,-/anslutning
3.1.	Leverans av el-ström 1200 A, 18000.- NAANTALISSA	0,60/kWh
4.	Anslutning av brandslang	660,-/anslutning
5.	Anslutning av dricksvatten	660,-/anslutning
5.1.	Leverans av dricksvatten	11,-/m³
6.	Anslutning av telefon	405,-/kabel
6.1.	Samtalsavgifter	0,65/impuls
7.	Brandvakt	1.320,-/8 h skift
8.	Borttransport av avfall 150 l	410,-/gång
9.	Anslutning av kylvatten för hjälpmotorer	660,-/anslutning
9.1.	Leverans av kylvatten	275,-/dygn
10.	Anslutning av tryckluft	660,-/anslutning
10.1	Leverans av tryckluft 7 kp/cm²	450,-/ arbetsskift

Målning

1122 Täckning av fartygsbottnet – INDIKAATIO HINTA 200000,–
Uppvärmning – LÄMMITYSÖLJY FAKTAN MUKAAN

1222 Sandblästring fläckvis – HINTA KOSKEE YLI 500 m^2 MAALATTAVAA ALAA

1322 Målning med Inerta – ALLE 500 m^2 LASKUTYÖNÄ

145,–/m^2

1422 B.B. avvisarlist blästras och målas med Galvosil Hempel 1570, 127 m. 15500,–

1522 Ankarklys och ankaren blästras och målas med Galvosil 5900,–

1622 Färskvattentanken 4A och 4B ca 75 m^3 vardera samt 5, 145 m^3 rengöres och målas ca 10 – 20 %. 79200,–

- LASKETTU MAALAUS LAAJUUS 20 %
- KORKEAPAINEVESIPESU KOKO TANKKI
- MAALATTAVAT ALUEET Sa 2.5

1722 Ballasttanken TK 1, 175 m^3 ; TK 2, 300 m^3 ; TK 13 och TK 14, 183 m^3 vardera; TK 54, 54 m^3 ; TK 58, 220 m^3. Rengöres och målas 10 – 20 %. 178400,–

- LASKETTU MAALAUS LAAJUUS 20 %
- KORKEAPAINEVESIPESU KOKO TANKKI
- MAALATTAVAT ALUEET KEVYT HIEKKAPUHALLUS

1822 Förliga rampen, sidorna, blästras och målas ca 24 m^2. 3900,–

1922 Akterliga ramperna, sidorna, blästras och målas 2 x 12 m^2. 3900,–

VARUSTAMO TOIMITTAA MAALIT.

Bottenarbeten

31.28	Mätning av propelleraxelspel	2700,–
32.28	Cedervall tätningarna yttre / inre läcker olja reparerars – TILAAJAN VARAOSAT – TELINEET JA SUOJAN IRROITUS / ASENNUS LASKETTU POSITIOON 33.28	39500,– / AKSELI
33.28	Partiell axeldragning "klassning" SUORITETAAN MODIFIOITU AKSELINVETO	49000,– / AKSELI
34.28	Lyftning av propellerblad, byte av tätningar / blad	8250,– / LAPA
35.22	Mätning av roderspel	2100,–
36.22	Lyftning av roder (rodren har ett skrikande oljud när man svänger med dem, troligen är smörjrören till lagret stockade. EHDOTUS TYÖN SUORITTAMISEKSI: – VIRTAUSLEVYJEN POISTO / ASENNUS – ALATAPIN IRROITUS JA TARKASTUS – ALALAAKERIN TARKASTUS – ALALAAKERIN RASVAUSPUTKEN TOIMINNAN TARKASTUS JA PUHDISTUS. – PERÄSIMEN ALASOTTO LISÄHINTA 25000,–	28600,–
37.28	Täckning av propellrar och rodertappar	4500,–
38.22	Förnyande av zinkanoder 10 kg / st	325,– / KPL.
39.22	Bottenbrunnar upp och fast rengöres, målas.	3500,– / KPL.
40.22	Ankare med kätting firas ut, klassas.	7000 / KETJU 2 kpl

Maskinrumsarbeten

51.26 Bottenventiler överkalas 37200,–
DN 100, 9 st; DN 125, 3 st; DN 150, 2 st;
DN 200, 6 st; DN 250, 5 st; DN 300, 2 st;
DN 450, 1 st.
Samtliga ventiler fjädermanövrerade.

52.26 Aktra SW filterhusen förnyas 2 st. 36500,–
diam 700, längd 800.

53.26 Övrig filterhus rengöres och målas, 4 st. 7100,–

PESU, HARJAUS JA MAALAUS

54.26 Filterkorgar till dito filterhus förnyas eller repareras, om så behöves 5400,–/KPL.

LASKETTU UUSIMINEN

55.26 SW-kylvattenrör förnyas och repareras i maskin.

- PUTKET LASKETTU OHEISTEN SKISSIEN MUKAAN
- HINNAT SISÄLTÄVÄT POSITIOISSA MAINITUT STRAUB-LIITTIMET.
- MATERIAALI YORCALBRO
- HINNAT EIVÄT SISÄLLÄ MAHDOLLISIA OHEIS JA LUOKSEPÄÄSY TÖITÄ
- HINNAT POSITIOITTAIN SKISSEISSÄ

56.26 HJM FW kylvattenrörsystem förnyas och repareras.

- PUTKET LASKETTU OHEISTEN SKISSIEN MUKAAN
- HINTA SISÄLTÄÄ SKISSISSÄ № 4 OLEVAT VENTTIILIT
- MATERIAALI = TERÄSPUTKI
- HINNAT EIVÄT SISÄLLÄ MAHDOLLISIA OHEIS JA LUOKSEPÄÄSY TÖITÄ
- HINNAT POSITIOITTAIN SKISSEISSÄ

57.26 HJM FW Expansionstanken förnyas och flyttas upp till samma nivå som HUM expansionstankar.
Tanken 700 x 1220 x h 1220. 2 st rör L 15 m, diam 60 mm, tillopp och overflow.

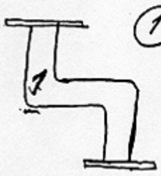
INDIKAATIO HINTA 50000,–

Dockningsspec 1992

55.26
1/5

55.26
:1)

Dubbel krok vid ~~inlopp~~ avlopp
till HM. 4 F.W kylare.



(1)

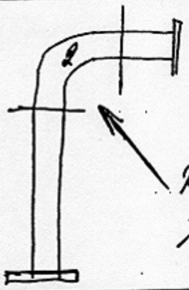
Y ϕ 175

L ca 1000

HINTA 8550,-

)

Krok på rör vid inlopp
till HM 4 F.W kylare.



(2)

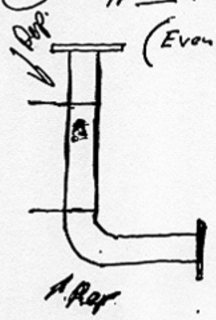
Y ϕ 175

Rep L ca 500

Ny krok 90°

HINTA 5490,-

(3) Avlopp Ju till HM 3 F.W kyla
(Eventuellt gör att repar.



Y ϕ 135

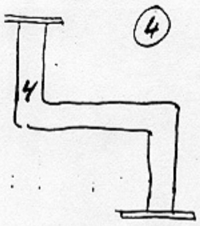
L ca 1700.

HINTA 5890,-

55.26
2/5

Dubbel krok vid HH 3
FW. kylare.

(4)



Yφ 175

L.ca 1000

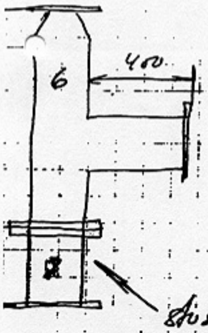
HINTA 8550,-

(5) Grova rörat efter. mixad Sea water vech. på SB. sida på hyllan

Borde gå att separera.

HINTA TARKASTUKSEN JÄLKEEN

(6+7) T-stycke + slus in HH HH. 4 SHO.C



Yφ 160.

L ca 1400.

stöss. under durk.

HINTA 11990,-

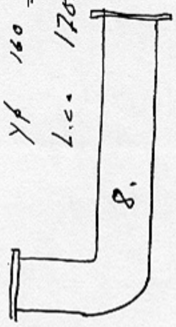
(8)

Slam ledning på SB. hylla (Tak)

Yφ 160

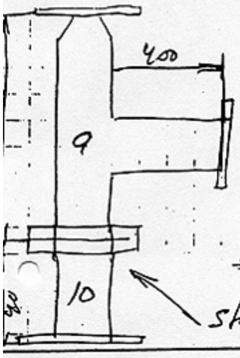
L.ca 1700.

HINTA 8780,-



55.26
3/5

(9+10) T-stycke + Stuss.
i.a. Kil HM 1 SHO. kyl.



Yφ 160
L ca 1400.

HINTA 11990.-

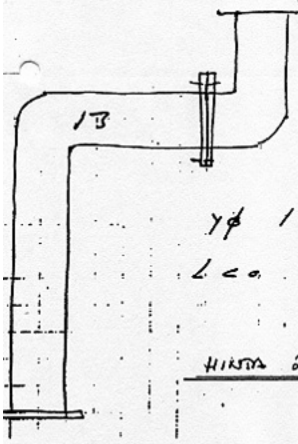
Stuss under durk.

(11) Stuss mellan HM 1 spollyftkylare och vent.

Yφ 135 — 1
L ca 200

HINTA 3870:-

(13) Rör för uppvärmning av bottenbrunnen på BB. sida HM. rum.



← Rördet kaga

straubor kopplic

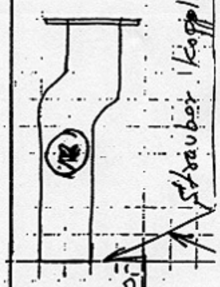
Stamledning vocal 1/s BB. växel.

Yφ 160
L ca 4200

HINTA 20460.-

Yφ 160
L ca 1200

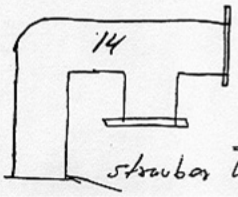
tilecka Straub. lit.



straubor koppling

HINTA 9960:-

(14) Rör för upp värmning av botten brunnen på SB. sida HH. rum.



14

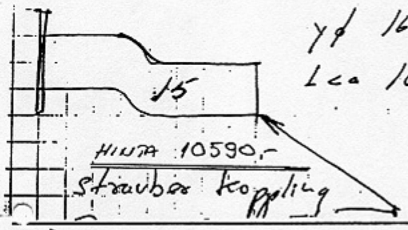
Y∅ 160

L ca 1300

HINTA 13470,-

straubar koppling

(15) Stamledning ovan för SB. växel.



15

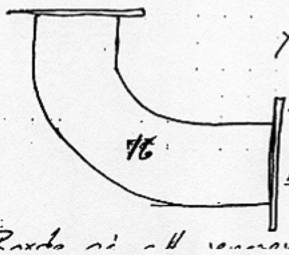
Y∅ 160

L ca 1000.

HINTA 10590,-

straubar koppling

(16) Sugsida HH. aktre salt vatten pum. SB. s.



16

Y∅ 330

L ca 2000.

UUDEN PUTKEN HINTA 19910,-

Borde gö att reparera

(17) Grova röret ∅ 330 ovan för HH. kylvatten pum under hyllan. SB. sida

LASKUTUS TYÖNÄ

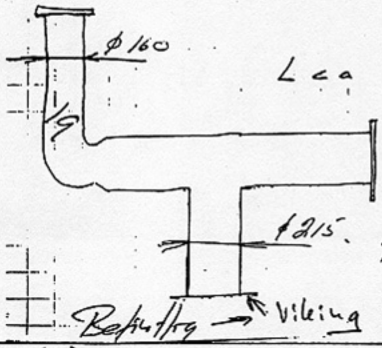
Borde gö att reparera

(18) Grova röret ∅ 330 ovan HH. kylvatten pumps under hyllan. SB. sida

LASKUTUS TYÖNÄ

Borde gö att reparera.

(19) Stamledning före Hjä kylare. 55.26 5/5



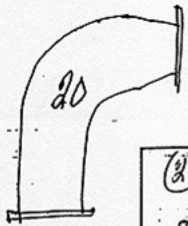
L ca 3000.

HINTA 17370,-

HINTA EI SISALLÄ VIKING KOPLINKIA.

---

(20) Krok före förliga Hjä Saltvatten pu.



ϕ 315

L ca 1000

HINTA 17770,-

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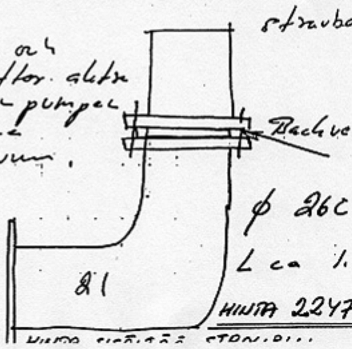
(21) Krok och stuss efter akter kylvatten pumpen BB. side HM. rum.



ϕ 26C

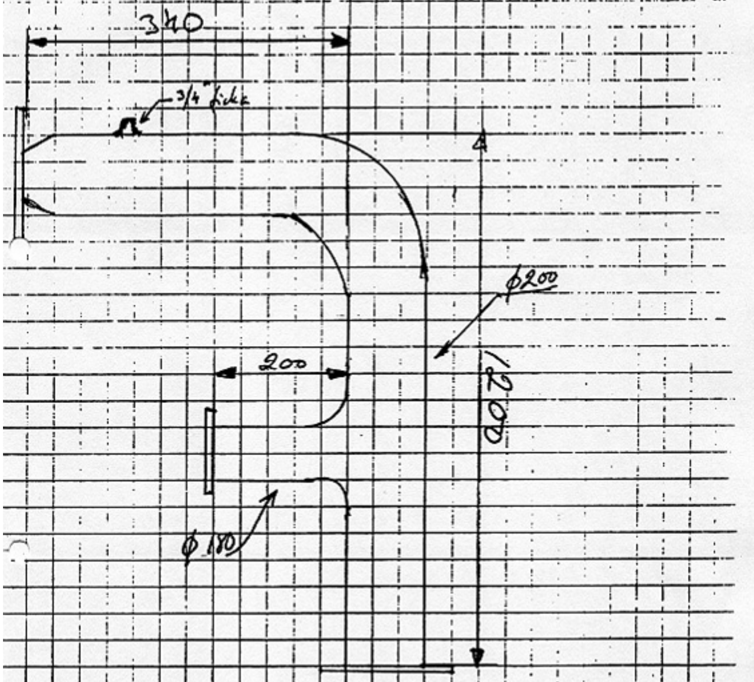
L ca 1.

HINTA 22470,-

5626
1/5

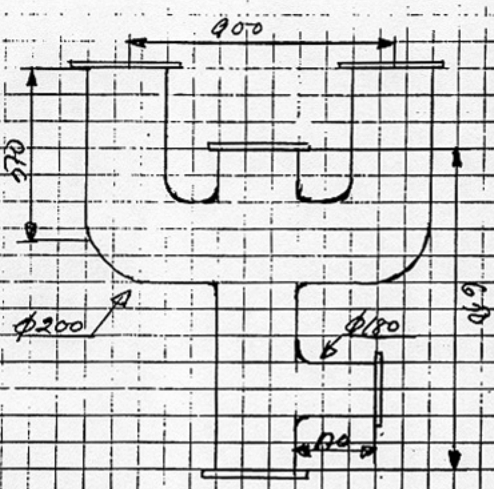
RÖR N:o 1 HJM kyl. syst FW

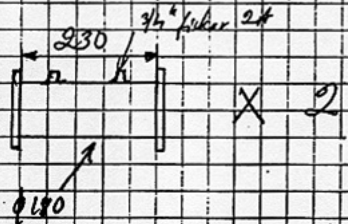
Punkt 6 på ritningen



HINTA 12640.-

RÖR N:o 2 [illegible] kyl. syst. FW 56.26 2/5

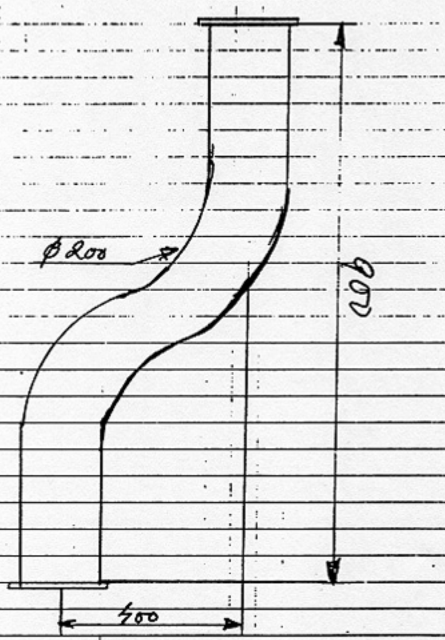




Hinta 24800.-

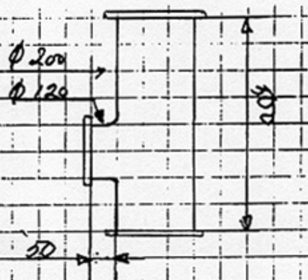
RδR №3 HJM kylv.syst FW

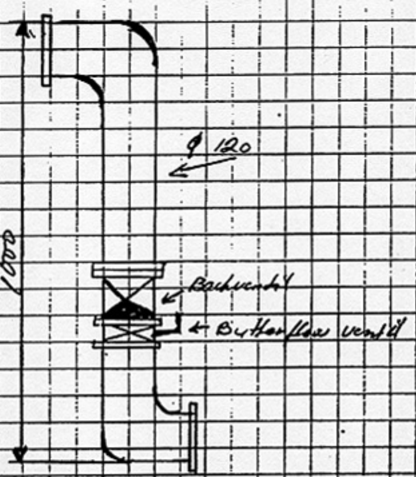
56.26
3/5



HINTA 7700,-

RÖQ №4 Hjm kylv. syst. FW 56.26 4/5

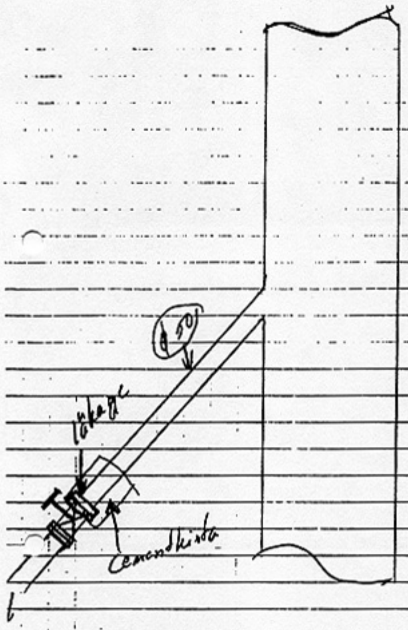




HINTA 17530 r

RÖR No 5 IHM kylv. syst FW 5/5

56.26.



Detta rör Φ200 går ej att Demontera

HINTA. 4360,-

u tank 29

58.26 Röret mellan fettavskiljningstanken i spritförrådet och gråvattentanken i separatorummet förnyas. Diam 110 mm, L 12 m, 4 st krökar 90° samt flänsar.

INDIKAATIO HINTA 37000,-

59.26 Bilgevattentank no 33, 22 m³, rengöring. 12700,-

60.26 Smutsoljetank no 42, 13 m³, rengöring. 8500
JÄTEÖLJYN HÄVITYS FAKTAN MUKAAN

61.26 Sludgetank no 44, 25 m³, rengöring.

HINTA TARKASTUKSEN JÄLKEEN

62.26 HJM Avgaspannor 4 st, Sanea 65 m² reparation, förnyande av bottnet.

INDIKAATIO HINTA 200000,-

63.26 Hisschakten på 2 provianthissar, skotten riktas, avståndet för stort till hisskorgen

HINNOITELLAAN KUN TYÖN LAAJUUS ON MÄÄRITELTY

64.26 Flexibel tryckslang med stålväv, diam 50 mm, längd 200 mm, 150°C, 8 st insättes i HUM H.O.fuel tryck och returrör.

65.26 Expansionstankar i HUM kylsystem rengöres och målas 2 st x 1,5 m³. 7000,-

Övrigt

70.22 Akterramperna, skalkningarna service samt förstärkningar 5200,-/kpl.

71.22 Akterramperna, gångjärn överhalas, nya bussningar. 46600,-

72.22 Förramp och Visir skalkningar överses förstärkes.
HINTA TARKASTUKSEN JÄLKEEN

73.22 Förramp, gångjärn överhalas eventuellt nya bussningar. 23300,-

74.22 Visir 15 m och ramp-packningar 10 m förnyas 18600,-

75.22 Vajerbyten på bildäckshyllorna (12 VAIJERIA) 54600,-

Enclosure 3.4.97

1/5

M/S Wasa King
Dockningsspecifikation 1993

Particulars
Passengership

LOA	157.00	Bureau Veritas	
LPP	137.40	DWT	3345
B.extr.	24.2	Gross	15598
Draft	5.55	Net	8394

Allmän del

01 Indockning, utdockning, 1 dag dockstående

02 Dockstående / dygn

03 Anslutning av elkablar
Leverans av el 1200 A, 380 V, 50 Hz

04 Anslutning av brandslangar

05 Anslutning av dricksvatten
Leverans av dricksvatten

06 Anslutning av telefon
Samtalsavgifter

07 Brandvakt

08 Avfall

Målning

1122 Täckning av fartygsbottnet
Uppvärmning

1222 Sandblästring fläckvis

1322 Målning med Inerta

1422 B.B. avvisarlist blästras och målas med Galvosil
Hempel 1570, 127 m.

1522 Ankarklys och ankaren blästras och målas med
Galvosil

1622 Färskvattentanken 4A och 4B ca 75 m^3 vardera
samt 5, 145 m^3 rengöres och målas ca 10 - 20 % .

1722 Ballasttanken TK 1, 175 m^3 ; TK 2, 300 m^3 ;
TK 13 och TK 14, 183 m^3 vardera; TK 54, 54 m^3 ;
TK 58, 220 m^3. Rengöres och målas 10 - 20 % .

1822 Förliga rampen, sidorna, blästras och målas
ca 24 m^2.

1922 Akterliga ramperna, sidorna, blästras och målas
2 x 12 m^2.

Bottenarbeten

31.28 Mätning av propelleraxelspel

32.28 Cedervall tätningarna yttre / inre läcker olja repareras

33.28 Partiell axeldragning "klassning"

34.28 Lyftning av propellerblad, byte av tätningar / blad

35.22 Mätning av roderspel

36.22 Lyftning av roder (rodren har ett skrikande oljud när man svänger med dem, troligen är smörjrören till lagret stockade.

37.28 Täckning av propellrar och rodertappar

38.22 Förnyande av zinkanoder 10 kg / st

39.22 Bottenbrunnar upp och fast rengöres, målas.

40.22 Ankare med kätting firas ut, klassas.

Maskinrumsarbeten

51.26 Bottenventiler överhalas
DN 100, 9 st; DN 125, 3 st; DN 150, 2 st;
DN 200, 6 st; DN 250, 5 st; DN 300, 2 st;
DN 450, 1 st.
Samtliga ventiler fjädermanövrerade.

52.26 Aktra SW filterhusen förnyas 2 st.
diam 700, längd 800.

53.26 Övrig filterhus rengöres och målas, 4 st.

54.26 Filterkorgar till dito filterhus förnyas eller repareras, om så behöves

55.26 SW-kylvattenrör förnyas och repareras i maskin.

56.26 HJM FW kylvattenrörsystem förnyas och repareras.

57.26 HJM FW Expansionstanken förnyas och flyttas upp till samma nivå som HUM expansionstankar.
Tanken 700 x 1220 x h 1220. 2 st rör L 15 m ,
diam 60 mm, tillop och overflow.

4/5

58.26 Röret mellan fettavskiljningstanken i spritförrådet och gråvattentanken i separatorummet förnyas. Diam 110 mm, L 12 m, 4 st krökar 90° samt flänsar.

59.26 Bilgevattentank no 33, 22 m^3, rengöring.

60.26 Smutsoljetank no 42, 13 m^3, rengöring.

61.26 Sludgetank no 44, 25 m^3, rengöring.

62.26 HJM Avgaspannor 4 st, Sanea 65 m^2 reparation, förnyande av bottnet.

63.26 Hisschakten på 2 provianthissar, skotten riktas, avståndet för stort till hisskorgen

64.26 Flexibel tryckslang med stålväv, diam 50 mm, längd 200 mm, 150°C, 8 st insättes i HUM H.O.fuel tryck och returrör.

65.26 Expansionstankar i HUM kylsystem rengöres och målas 2 st x 1,5 m^3.

Övrigt

70.22 Akterramperna, skalkningarna service samt förstärkningar

71.22 Akterramperna, gångjärn överhalas, nya bussningar.

72.22 Förramp och Visir skalkningar överses förstärkes.

73.22 Förramp, gångjärn överhalas eventuellt nya bussningar.

74.22 Visir 15 m och ramp-packningar 10 m förnyas

75.22 Vajerbyten på bildäckshyllorna

TURKU REPAIR YARD LTD
SF-20101 TURKU, FINLAND
Box 430
Tel. +358 21 638711 Telex 62484 try sf

TELECOPIER WORK ORDER

Telecopier No. +358 21 638 7250
638 7251 prod.

To:	VAASANLAIVAT OY	Date:	25.9.1992
No:	961-3260199	Ref:	
Attn:	C. RICKHARDSSON	No. of pages including cover sheet:	16
From:	B. KUJALA		

IF NOT CORRECTLY RECEIVED PLEASE REPORT IMMEDIATELY

Subject: M/S "WASA KING"

OHEISENA LÄHETÄMME TYÖ-
KAPPALEEN TARJOUKSESTAMME
KOSKIEN 18.9 PÄIVÄTTYÄ ERITTELYÄ
ALUKSELLA SUORITETTAVISTA TÖISTÄ
TAMMIKUUSSA -93.
PUHTAAKSIKIRJOITETUN TARJOUKSEN
LÄHETÄMME VIIKKO 40 ALUSSA.

YSTÄVÄLLISIN TERVEISIN

TURUN KORJAUSTELAKKA OY
MYYNTIOSASTO
Boris Kujala

Ei tarvitse lähettää
puhtaaksi kirjoitettua!
puh. kesk. 25.9
klo 11.40 ...aka man Ruukal-
...n kuluessa
asiaan!

Office Translation:

MacGREGOR-NAVIRE (FIN) Oy / No. / Date 22.9.92 / Our ref. T. Mäki / page 1/1
To: Turku Repair Yard, attn: Boris Kujala / Ref: M/S Wasa King, Offer

OFFER

Referring to your fax request for a tender, dated 19.9.92 we hereby offer spare parts and repair works as follows:

Pos 70.22 Stern ramps, service and strengthening of locking devices.

Price: Work FIM 3,500 / locking device, VAT 0%
Materials FIM 500 / locking device, VAT 0%

Pos 71.22 Stern ramps, exchange of end hinge bushings and hinge axles.

Price: Work FIM 33,000 / vessel, VAT 0%
Materials FIM 2,800 / vessel, VAT 0%

Pos 72.22 Bow ramp, exchange of end hinge bushings and hinge axles.

Price: Work FIM 16,500 / vessel, VAT 0%
Materials FIM 1,400 / vessel, VAT 0%

Pos 73.22 Bow visor, exchange of 15 metres and bow ramp 10 metres rubber sealing gasket.

Price: Work FIM 6,300 / 25 metres, VAT 0%
Materials FIM 8,000 / 25 metres, VAT 0%

Pos 74.22 Exchange of car deck wires.

Price: Work FIM 3,000 / wire, VAT 0%
Materials FIM 500 / wire, VAT 0%

Delivery time for: Work 1 week
Materials: 2 weeks from ordering

Delivery terms: Free Turku - 93
Payment terms: 30 days net
Other terms: NLM 84

Best regards

signed
Tomi Mäki

MacGREGOR NAVIRE — MacGREGOR-NAVIRE (FIN) Oy, Marine Services Unit	No.	Date	Our ref.	Page
		22.9-92	T.MÄKI	1/1

TO: TURKU REPAIR YARD
ATTN: BORIS KUJALA

REF: M/S WASA KING
TARJOUS

IF NOT CORRECTLY RECEIVED, PLEASE INFORM US.
TELEPHONE: +358-21-892111 TELEX: 62112, 62382 mgnfi sf
TELEFAX: +358-21-892517

TELEFAX

TARJOUS

VIITATEN TARJOUSPYYNTÖÖNNE FAX 19.9-92 TARJOAMME TEILLE EM. ALUKSEN VARAOSIA JA KORJAUSTYÖTÄ SEURAAVASTI:

POS. 70.22 PERÄRAMPPIEN LUKITUSLAITTEIDEN HUOLTO JA VAHVISTUS.

HINTA TYÖLLE : FIM 3500,-/LUKITUSLAITE, LVV 0%
HINTA MATERIAALILLE : FIM 500,-/LUKITUSLAITE, LVV 0%

POS. 71.22 PERÄRAMPIT, PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPIN VAIHTO

HINTA TYÖLLE : FIM 33.000,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 2800,-/ALUS, LVV 0%

POS. 72.22 KEULARAMPIN PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPPIEN VAIHTO

HINTA TYÖLLE : FIM 16.500,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 1400,-/ALUS, LVV 0%

POS. 73.22 KEULAVISIIRIN 15M JA KEULARAMPIN 10M TIIVISTEKUMIN VAIHTO

HINTA TYÖLLE : FIM 6.300,-/25, LVV 0%
HINTA MATERIAALILLE : FIM 8.000,-/25M. LVV 0%

M/S WASA KING - TARJOUS 2/2

POS. 74.22 AUTOKANNEN VAIJERIEN VAIHTO

HINTA TYÖLLE : FIM 3000,- /VAIJERI, LVV 0%
HINTA MATERIAALILLE : FIM 500,- / VAIJERI, LVV 0%

TOIMITUSAIKA TYÖLLE : 1 VIIKKO
— " — MATERIAALILLE : 2 VIIKKOA TILAUKSESTA

TOIMITUSEHTO: VAPAASTI TURKU -93
MAKSUEHTO : 30 PV NETTO
MUUT EHDOT : NLM 84 MUKAAN

YST. TERVEISIN

[illegible]

Office Translation

To: Vasanlaivat Oy, no: 961 - 3260199, attn: C. Rickhardsson, date 25.9.92
Fm: Turku Repair Yard, Boris Kujala
Telecopier Work Order

Subject: M/S Wasa King

Attached please find a draft of our offer regarding the specification dated 18.9 for works to be performed on the vessel in January -93.

We shall mail you a final offer at the beginning of week 40.

Best regards

Turku Repair Yard Oy
Sales Department

signed
Boris Kujala

Added text: Final version not necessary. Phone conference at 1140 on 25th September. Revert to the business in a months time.

TURKU REPAIR YARD LTD
SF-20101 TURKU, FINLAND
Box 430
Tel. +358 21 638711 Telex 62484 try sf

TELECOPIER WORK ORDER
Telecopier No. +358 21 638 7250
638 7251 prod.

To: VAASANLAIVAT OY
Date: 25.9.1992
No: 961-3260199
Ref:
Attn: C. RICKHARDSSON
No. of pages including cover sheet: 16
From: B. KUJALA

IF NOT CORRECTLY RECEIVED PLEASE REPORT IMMEDIATELY

Subject: M/S "WASA KING"

OHEISENA LÄHETÄMME TYÖ-KAPPALEEN TARJOUKSESTAMME KOSKIEN 18.9 PÄIVÄTTYÄ ERITTELYÄ ALUKSELLA SUORITETTAVISTA TÖISTÄ TAMMIKUUSSA -93.
PUHTAAKSIKIRJOITETUN TARJOUKSEN LÄHETÄMME VIIKKO 40 ALUSSA.

YSTÄVÄLLISIN TERVEISIN

TURUN KORJAUSTELAKKA OY
MYYNTIOSASTO
Boris Kujala

EI TARVITSE LÄHETTÄÄ PUHTAAKSIKIRJOITETTUA!
Puh. kesk. 25.9 klo 11.40
...OLAMAN RUUKAU-
...N KULUESSA
ASIAAN!

Enclosure 3.4.99

21/03 '97 PE 09:25 FAX +358 0 4550619 VTT/Laiva&Kone

Witness Statement

Central Criminal Police, Turku Thursday 20.03.1977 at 1100
Interrogator: Senior Constable Esko Vesanen
Witnessed by: Senior Constable Esko Ala-Hannula Present on signing X

Mäki, Tarmo Kalevi 290854-201K

Engineer Kaarina Parish
Koriston Rantatie 16 20780 Kaarina 02-243 7770 home
DNV Turku 02-273 7200 office

Re: Investigation into the Estonia accident

Others present: Special Expert VTT's special investigator Tuomo Karppinen

Witness Statement

I commenced working for Navire Cargo Gear (FIN) Oy in 1979. This company changed name into Mac Gregor-Navire (FIN) Oy in 1984, as I recall, and then again in 1992 into MacGregor (FIN) Oy.

At first in 1979 I worked as a designer and from November 1980 my assignment was changed and I was assigned the job of maintenance engineer. My term of service ended in the fall of 1995 when I started working as a DNV surveyor.

This assignment covered service and maintenance and modemisation of cargo handling gear of trading vessels. On being asked specifically about this cargo handling gear I will say that they comprised bow visors, bow ports, bow and stern ramps, hatches and car decks and also deck cranes, i.e. the gear necessary for loading and discharging a vessel. Everything which had to do with the servicing and other maintenance of the aforementioned gear was my responsibility.
On being asked how our company acquired these assignments I will say that either the vessel itself or a shipping line surveyor would always order the job to be done. In general our company was always informed in detail about 'problem' and we assumed the assignment as a 'general responsibility'.
In practice we boarded the object, i.e. the vessel, and discovered these 'problems', after which we prepared a maintenance plan to remedy the 'problem' after which we performed the job itself (in Finnish the wording used may also mean 'we ourselves performed the job').

On being asked I will say that that the company I represented also on request performed annual inspections of cargo handling gear on vessels. We issued our own certificates to the vessels regarding these inspections.

In addition to inspections performed by us the classification societies and maritime authorities performed their own inspections on ships, for which they issued their own certificates. These were so called 'official inspections'.

Work performed for Sally Line

The company I represented performed the above work for several shipping lines. Among these was Sally Line, which had its head offices in Mariehamn. On being asked I will say that Navire, which I represented, was the only company which alone performed the above service and maintenance work for Sally Line until this shipping line went into bankruptcy sometime in 1989. Even after this date Navire performed these same works for the ex vessels of the line, although the shipping line name had changed.

Sally Line also owned a vessel called Viking Sally, which had been launched in Germany in 1980.

On being asked I will say that the Viking Sally became a Navire customer for the first time in 1981 - 1982. In any event the guarantee period, which normally is one year, for that vessel had already expired. During the guarantee period the company I represented did no work onboard this vessel.

The first time the company I represented did any work on this vessel I was responsible for these works. Sven Olof Mäki was the shipping line's machinery superintendent, who ordered these first works.

When the company I represented had been assigned this first job I personally went onboard to familiarise myself with the vessel. I recall that we had been invited onboard the Viking Sally for maintenance work on the visor rubber sealing bands. The said rubber sealing band had become worn in use and had to be partly renewed.

On being asked I will say that when this vessel, which later became the Estonia, sank I was contacted by persons investigating the accident. It was then clarified what works the company I represented had then performed. All documents regarding these works, invoicing and orders for spare parts supplied onboard through us and installed onboard are all still available due to which all works we have performed on the Viking Sally can be checked from the records.

At first we thus performed the servicing of this rubber sealing band. The same sealing band on the bow visor then had to be exchanged several times, annually.

On being asked I will say that this rubber sealing band had to be exchanged because it was not water tight, which in turn led to water ingress between the visor and the ramp.

The reason for the sealing band wear was that the bow visor was resting on this sealing band, due to the visor having too few support blocks. There were only three support blocks, when in my opinion there should have been from six to eight support blocks.

On being asked I will say that I discussed this problem with representatives of the shipping line a few times over the years and I suggested installing these support blocks, but in the event the shipping line did not 'warm' to my suggestion.

The fore peak stem damage

On now being asked in relation to the rubber sealing band whether I did observe damages to the peak stem on the Viking Sally over the years that might have been due to the visor resting too heavily on this stem peak due to bad sealing bands I will say that I do not recall observing anything in this direction. I believe that had I observed this kind of issue I would have interfered in one way or the other.

These service and maintenance works were carried out by Navire on the Viking Sally annually ever since the guarantee period of the vessel had expired.

In addition I performed an annual survey onboard this vessel of her lifting gear, from 1984 until 1992. These inspections were so called official inspections which I personally had been authorised to perform although I performed them on behalf of the company I represented.

On being asked in general about these inspections and maintenance works I will state that in practice I was onboard the Viking Sally annually on a trip during which we inspected i.a. problems with other cargo handling gear on location. I thus obtained an idea of the problem at hand by observing the gear in actual operation. These inspections were performed annually, always in the beginning of May, before the summer season started.

Problems with the visor and the bow ramp

On now being asked what problems the visor itself or the bow ramp were suffering from I will state that in addition to the rubber packing problem there were no problems apart from one which was the exchange of a joint bearing on the upper part of the visor actuator which appeared in 1990.

The said bearing had broken and had also broken the stud inside the bearing. The bearing and stud were then replaced. The job was done in the spring of 1990 and the work itself was performed en route from Turku via Stockholm to Turku. At that time the vessel was already sailing as the Silja Star. The work was performed by Mac Gregor Navire. I was responsible for the performance of the job.

Visor locks

On being asked what service or maintenance works the company I represented performed on these over the years I will state there were none. In my opinion no works were ever performed on the visor locks through the years. As far as I know they developed no problems. Had there been problems with the visor locks I and the company I represented would surely have been advised, since our customer relationship with the shipping line was at all times very close and confidential. On being asked I will state that Sally Line related very 'respectfully' towards these locking devices and would therefore surely not by themselves have commenced working on them, had they developed problems, but the work would have been delegated to specialists in the field.

The Atlantic lock

On being asked whether the company I represented performed any service or maintenance work on the Atlantic lock of the visor I will state that we did not. No defect was ever observed with the Atlantic lock.

The company I represented still annually inspected this lock. No visual defect or defect in operation was found. The lock always worked without problems. On being asked I will state that these inspections also included inspecting the moving bolt of the locking device as well as the lower lugs which engage the bolt on closing.

During the inspection the signal lights of the locking devices and operation of the limit switches were also inspected. The inspection of lights and switches was performed and noted both on the bridge and on the car deck, at the operating panel close to the ramp. I do not recall ever encountering anything out of the ordinary at these inspections either. Had anything special appeared during these inspections the matter would certainly have been rectified.

I do, however, recall in relation to these signal lights that the mechanical limit switches, which signalled close or open visor locks, were replaced at some stage and exchanged for inductive switches, because the original limit switches did not stand up well to humidity which now and again was able to enter the space between the visor and the ramp past the visor.

I do not with certainty recall whether exchange of the above switches was performed by the company I represented or by the vessel's own electricians. This work was, however, done sometime in the mid 80'.

Inspections in general

As stated above the company I represented commenced performing the said inspections on the said vessel in 1981 - 1982 when the vessel was the Viking Sally. These inspections were always performed regularly and annually until the spring of 1992, when the vessel was called Wasa King. During 1990, before this, during a period of less than a year the vessel was also called Silja Star.

When the vessel was sold to Est-Line at the end of 1992 the service and maintenance works of the company I represented came to an end onboard the vessel. The company I represented performed no work on behalf of Est-Line.

Read, checked and accepted;	signature
Witnessed;	signature
Present;	signature
Heard by;	signature

Noted: The hearing was finished at 1255

Enclosure 3.4.100

22/09 92 09:09 ☎358 21 892517 358 9 455 0619 FIN MSE

MacGREGOR NAVIRE — MacGREGOR-NAVIRE (FIN) Oy Marine Services Unit	No.	Date	Our ref.	Page
		22.9-92	T.MÄKI	1/1

TO: TURKU REPAIR YARD
ATTN: BORIS KUJALA

REF: M/S WASA KING
TARJOUS

IF NOT CORRECTLY RECEIVED, PLEASE INFORM US.
TELEPHONE: +358-21-892111 TELEX: 62112, 62382 mgnfi sf
TELEFAX: +358-21-892517

TELEFAX

TARJOUS

VIITATEN TARJOUSPYYNTÖÖNNE FAX 19.9-92 TARJOAMME
TEILLE EM. ALUKSEN VARAOSIA JA KORJAUSTYÖTÄ SEURAAVASTI:

POS. 70.22 PERÄRAMPPIEN LUKITUSLAITTEIDEN HUOLTO JA VAHVISTUS.

HINTA TYÖLLE : FIM 3500,-/LUKITUSLAITE, LVV 0%
HINTA MATERIAALILLE : FIM 500,-/LUKITUSLAITE, LVV 0%

POS. 71.22 PERÄRAMPIT, PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPIN VAIHTO

HINTA TYÖLLE : FIM 33.000,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 2800,-/ALUS, LVV 0%

POS. 72.22 *) KEULARAMPIN PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPPIEN VAIHTO

HINTA TYÖLLE : FIM 16.500,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 1400,-/ALUS, LVV 0%

POS. 73.22 KEULAVISIIRIN 15M JA KEULARAMPIN 10M TIIVISTEKUMIN VAIHTO

*) Bogrampens ändgångjärnslager och gångjärnstopparna Byte

HINTA TYÖLLE : FIM 6.300,-/25, LVV 0%
HINTA MATERIAALILLE : FIM 8.000,-/25M. LVV 0%

Stig Lindström berättade vidare: När man befann sig på bryggan var det 2 faktorer som spelade en viktig roll i hur mycket man kunde se av fartygets för, för det första var man befann sig på bryggan och för det andra hur lång man var. Manöverpanelen täckte nästan hela "framkanten", men det fanns platser där man kunde komma ända fram till förskottet och gick man ända fram dit, så såg man en del av själva fören. Detta om man var av normallängd. Men, om man stod bakom instrumentpanelen så såg man i princip ingenting av fören, bara gösen.

Eftersom Viking Sally (sedermera Estonia) inte var byggd som "ett vanligt fartyg" utan hade bryggan förskjuten någon bakåt, var upsikten över fören sämre. Framför bryggan och 2 däck därunder fanns ett promenaddäck som delvis skymde.

Vid mörker kastades en del ljus från fartygets främre fönster fram mot fören och på den gös som fanns på bogvisiret fanns ett styrljus i toppen. Detta gjorde att man vid mörker kunde se något av fören.

Stig Lindström tror att det kan ha varit ganska vanskligt att från bryggan se om bogvisiret hade öppnat sig under färd utan att man direkt misstänkte detta. Han tror inte att man rutinmässigt kunnat se detta. Däremot fanns det lampor i en kontrollpanel på bryggan som visade om bogvisiret var öppet eller stängt. Man hade också bogvisiret under uppsikt med hjälp av dessa kontrollampor. Naturligtvis såg man vid angöring till kaj att bogvisiret öppnade sig, var öppet eller stängt, och ju mer öppet det var ju mer såg man av visiret.

Under den tid Sig Linström seglat på Viking Sally hade de enligt hans uppfattning inte haft några, som han ser det, problem med bogvisiret, men däremot hade man blivit tvugna att göra en förstärkning på en låsanordning vid ett tillfälle.

Några restriktioner eller direktiv över hur fartyget skulle framföras vid hårt väder med grov sjö fanns inte under den tid han seglade på Viking Sally. Däremot var man tvungen att dra ner på farten eftersom fartyget var så pass utsvängt i fören, annars hade

Enclosure 3.4.101

CENTRALKRIMINALPOLISEN
Ålands enhet

FÖRHÖRSPROTOKOLL
Vittne

FÖRHÖRSTILLFÄLLE:

CKP, Mariehamn fre 3.2.1995 kl.13.00
Förhörare: kriminalöverkonst. Olof Lindqvist
Förhörsvittne:
Andra närvarande:

VITTNETS PERSONUPPGIFTER:

Namn: LINDSTRÖM, Stig Eskil pb.061242-467E
Yrke: styrman
Befolkningsregister: Mareihamn
Adress: Knorringsgränd 1, 22100 Mariehamn

Telefon h/a 928-14243
Arbetsgivare:
Adress:

KOMPLETTERANDE UPPGIFTER:
Släktskap: -

ANTECKNINGAR: Brott: Utredning av sjöolycka
Anmälan nr: 7020/S/10964/94

DELGIVNING AV RÄTTIGHETER OCH SKYLDIGHETER:
Ställning i förundersökning (delgivits)
Rätt att tillkalla förhörsvittne.
(delgivits)
Rätt att vägra yppa omständighet, om han själv eller nära anhörig löper risk att utsättas för åtal (delgivits)
Rätt att vägra avge utsaga varigenom affärs- eller yrkeshemlighet skulle uppenbaras
Sanninghetsplikt samt påföljd om osann utsaga, SL 17:4 (delgivits)

TILLÄGSUPPGIFTER:

FÖRHÖRSBERÄTTELSE:

Antecknas, att den förhörde ej önskade förhörsvittnes närvaro vid förhöret.

Förhöret är upptaget på band och antecknat i referatform.

Stig Lindström berättade, att han arbetat på Viking Sally som sedermera döpts om till Estonia. Han hade varit anställd som överstyrman från 1980 fram tille 1990-91, då fartyget såldes.

Stig Lindström berättade vidare: När man befann sig på bryggan var det 2 faktorer som spelade en viktig roll i hur mycket man kunde se av fartygets för, för det första var man befann sig på bryggan och för det andra hur lång man var. Manöverpanelen täckte nästan hela "framkanten", men det fanns platser där man kunde komma ända fram till förskottet och gick man ända fram dit, så såg man en del av själva fören. Detta om man var av normallängd. Men, om man stod bakom instrumentpanelen så såg man i princip ingenting av fören, bara gösen.

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Stig Eriksson uppger slutligen, att under den tid han seglade på Viking Sally, när minns han inte, så hade man monterat en kamera på bildäck för att övervaka rampen i fören. Han vill också påpeka, att de uppgifter han lämnat gäller under den tid han seglade på Viking Sally, efter det att han slutade kan ombyggnader ha skett.

Förhöret avslutades kl.13.15

Antecknas, att avskrift av förhöret sänts Stig Lindström till kännedom.

Kriminalöverkonstapel Olof Lindqvist

Enclosure 3.4.102

TURUN KORJAUSTELAKKA OY
TURKU REPAIR YARD LTD

FAKTURA nr 31554
21.4.1993

Beställare
Wasa Line Ab
Box 213

65101 VAASA

Beställarens ref
C. Richardsson

Säljarens ref
EMd/HKA/TA

Betalningsvillkor
14 pv netto

Oms
0 %

Förfalloda 6.5.1993
Förseningsränta 18 %

Märke
M/S wasa king

428

COPY

Pos. nr Specifikation

Totalpris

Rerarationsarbeten enligt
bifogad specifikation som utförts
under dockingen 4 - 8.1.1993

mk 273.231,00
****

SPECIFIKATION TILL FAKTURA NR. 31554/21.4.1993 1(2)

M/S WASA KING

Projekt nr. 428

Indockning 4.1.1993
Utdocking 8.1.1993

0010	In- och utdockning	26.300,00
	Dockshyra 2,5 dygn à 11.950,-	29.875,00
0020	Inkoppling av brandlinjer 2 st à 660,-	1.320,00
0030	Inkoppling av telefon	405,00
	Samtalsavgifter 540 impulser à 0,65	351,00
0040	Tömning och borttransport av avfall 2 ggr à 410,-	820,00
0050	Mätning av propelleraxel	2.700,00
0060	Utbyte av Cederwall-tätningar	
	Inre tätning 1 st à 11.000,-	11.000,00
	Ytre tätning 2 st à 33.000,-	66.000,00
	Övertidsarbetskostnader	23.300,00
	Tätningar som levererats av varvet	38.530,00
0070	Mätning av roderspelet	2.100,00
0080	Reparation av elmotor Tagning av mätvärden, demontering, tvättning och torkning samt borttagning av lindningar och rengöring av spår. Tillverkning, packning och koppling av samt mellanmaskinbearbetning, dränkning och torkningav lindningar. Spårkullagrarna förnyats, igenmonterats, slutmaskinbearbetats och målats.	4.950,00
0090	Påsvetsning och provtryckning av SB- och BB-roder. Påsvetsning av SB- och BB-propelleraxelstöd. Reparation av bottengaller med plåt av 12 mm ca 0,5 m^2. Reparation av läckage på slingerköl.	

	Reparationssvetsning av 4 st BB- och 1 st SB-bordläggningsgenomföringar. Påsvetsning av skrovfogar 12 m i aktern. Ställningsarbete	47.610,00
0100	Reparationssvetsning av bogpropellernas dysor	16.985,00
0110	Slipning av 2 st BB-propellerblad.	985,00
	mk	273.231,00

****

Enclosure 3.4.103

TURKU REPAIR YARD LTD

INVOICE No. 31575

7th May, 1993

Buyer
Nordström & Thulin Ab
Shipowning Department
Box 1215
S-111 82 STOCKHOLM
Sweden

Buyer's ref.

Seller's ref.
EMd/HKA/TA

Terms of payment
14 days net

Sales tax
0 %

Due date 21.5.1993
Interest of overdue payment 18 %

Marks

M/S ESTONIA

Projectno.429

COPY

Pos. code Specification Total

Docking and repair work of M/S Estonia
as per the enclosed specification

FIM 357.632,00
****

./. Preinvoice No 44028 of 6th April, 1993 300.000,00

Remains to be paid FIM 57.632,00
****

Echo sounder:	Simrad DSN 450.
Log:	Raytheon Doppler Sonar Speed Log.
Course recorder.	Sperry.
Direction finder:	Debeg ADF 7410.
VHF:	Svenska Radio STR-40-ME70.
Transmitter:	Standard Radio ST-1680A.
Receiver.	Skanti AS SR-51.
Trial trip records:	On the bridge.
Stability information:	Stability Information Book on board the vessel
Antiroll system:	Roll-Nix.

Safety Installations

Fire pumps in the engine room according to the regulations.

Electrically operated emergency fire pump, capacity 93 m³/hour, which can be started either from bridge or from engine room.

Sprinkler system with 2 (drencher) pumps, capacity 150 m³/hour for cardeck and a manual sprinkler system for main engines and separator room.

Fire detector panel type Salvico with detectors at the accommodation spaces, engine room, and cardeck.

Emergency generator type MAN D254 MLE 312 kW 1500 rpm placed at deck No. 8. The emergency operator serves the sprinkler pumps, steering gear, navigation equipment, emergency bilge pumps, watertight doors, fuel booster pumps, radio station, etc.

Emergency stop of fuel oil for the main engines and auxiliary engines can be done by pneumatically operated valve, and for settling tanks and daytanks from a station situated on Starboard side in the cardeck space.

Ventilating fans and fuel oil pumps can be stopped also from the bridge.
66 bottles of CO_2 for the engine room situated on port side on the deck No. 8. The CO_2 can be discharged from a box by the CO_2 room. Separate number of bottles can be discharged to smaller rooms as for KaMeWa, steering gear, emergency generator, and boilers.

Running Hours of Main Engine and Auxiliary Engines

Main engine No. 1	67 755 hours
Main engine No. 2	66 865 hours
Main engine No. 3	67 217 hours
Main engine No. 4	68 559 hours
Auxiliary engine No. 1	60 910 hours
Auxiliary engine No. 2	62 731 hours
Auxiliary engine No. 3	63 240 hours
Auxiliary engine No. 4	60 284 hours

Overhaul interval 12 000 hours in general,
24 000 hours for connecting rods.

Crew

The crew consisted of in total 150 persons of which are 40 nautical-technical officers as well as deck and engine ratings and 110 are service personnel, the so-called hotel area. Master and officers as well as the engineers are said to have been educated in Leningrad according to the requirements of the STCW - Convention and allegedly should have sufficient licenses.

The following damages were found during dry-dock survey:

Starboard side

Small indents in way of D/E strakes between frames 96-120 under the anchor, just aft of the bow visor and aft of the fore end of the rubbing list up to 20 mm deep.

Several indents in way of the aft corner of the vessel, above the cardeck.

Starboard and Port side

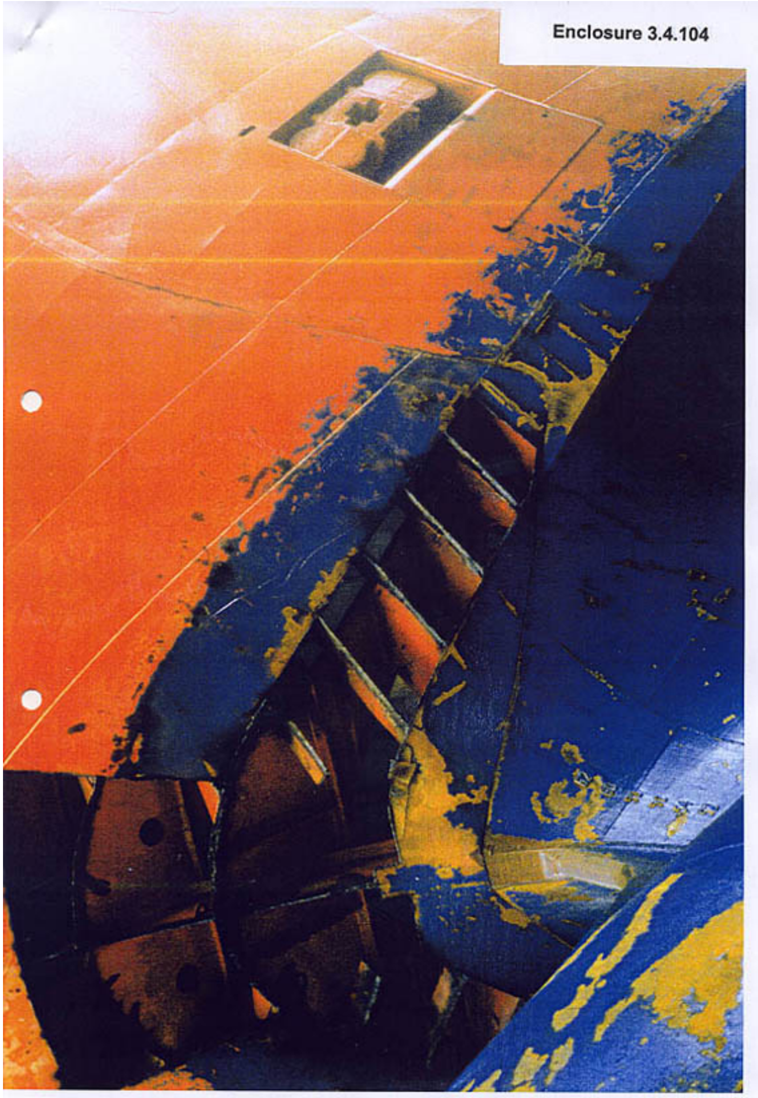
Heavy ice damage to shell plating in way of strakes A, B, and C from bow thruster to the fore ends of the bilge keels between frames 10-120 up to 20 mm deep.

General Remarks

- During loading - respectively discharging - it is not necessary to change the ballast water condition
- the GM figure is always around ca. 1 m
- the technical management is performed by Nordström & Thulin, the crew management by ESCO.

The surveyor stated to have no objections that the vessel could enter insurance by Hansa and Skuld.

Enclosure 3.4.104



Enclosure 3.4.105

Summary of Pre-Entry Condition Survey
on behalf of Hull and P&I Underwriters

One of the technical surveyors of Trygg Hansa, Stockholm - The Leading Hull Underwriters - carried out a pre-entry condition survey also on behalf of the new P&I Club - Assuranceforening Skuld, Stockholm office. The survey was performed afloat on 14th/15th January, 1993 and subsequently on 21st/22nd March, 1993 in dry-dock of Turku Shipyard (vessel had to be emergency dry-docked due to leaking stern tube seals). The following was established by the surveyor:

General

Ship:	"ESTONIA" of Tallinn, Estonian Flag, last ex-name: "WASA KING".
Owners:	EstLine Marine Co., Cyprus.
Management:	Estonia Shipping Co. (Nordström & Thulin, Stockholm).
Type:	Passenger/ Ro-Ro Cargo/ Ferry (2000 Passengers).
Year built:	1980 at Jos. L. Meyer, Papenburg.
Tonnage:	Gross: 15566 Dwt: 3345
Dimensions:	L.o.a.: 155,43 m Beam 24,21 m Draft: 5,55 m
Class:	BV + 1 3/3 E Ice 1A
Main Engine:	4 x MAN 8 LV 40/45 8 cyl. 4 x 4400 kW.

Nautical Equipment

Radars:	Raytheon 1660 12 SR Raycas, Raytheon 1660 12 SR and Atlas 8600 ARPA.
Gyro compass:	Sperry MK 36.

Magnetic compass: Plath.
Autopilot: Sperry Universal pilot and steermaster 2000.

Enclosure 4.106

M/S Estonia

a ship emanating from The Baltic Phenomenon

An historical overview made by

ADC SUPPORT AB
Box 100 75, S-100 55 Stockholm Sweden
Tel. +46 (0)8 664 08 00 -.Fax +46 (0)8 664 13 50

for

The Joint Accident Investigation Commission of Estonia, Finland and Sweden

Content

INTRODUCTION - M/S ESTONIA

M/S Estonia belonged to the type of ships noted *as Passenger/RoRo Cargo/Ferry* in ship registers. The ship was delivered in June 1980 by the shipyard Jos L. Mayer for Rederi ab Sally in Mariehamn situated on the island of Åland (part of the archipelago of Finland). The ship was designed and built according the rules of the classification society, Bureau Veritas. Bureau Veritas and the Finnish Board of Shipping and Navigation surveyed the design and the construction of the ship. Finally The Finnish Board of Shipping and Navigation issued a *Passenger Ship Safety Certificate*, certifying that the newbuilding fulfilled the international safety standard *Safety of Life at Sea*, SOLAS, for short international voyages

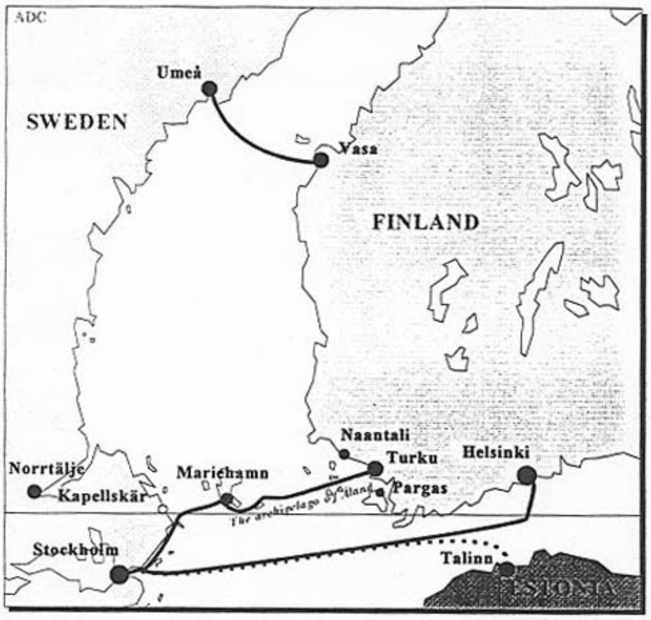
The ship was named *M/S Viking Sally* and commenced her service in Viking Line on July 5 1980 on the route Kapellskär (a small terminal Viking Line used about 90 km north of Stockholm) - Mariehamn - Naantali (about 20 km north of Turku, Finland). For eight months she belonged to the group of biggest ships ever seen in the ferry service between Finland and Sweden. In March 1981 Silja Line introduced the even bigger ship M/S Finlandia on the Stockholm - Helsinki route. M/S Viking Sally was after some time moved to the Stockholm - Mariehamn - Turku route.

The passenger- and general cargo trade between Sweden and Finland has since 1960 been dominated by two groups, the Silja Line and the Viking Line. The EffJohn group owned by the Swedish company Johnson Line and the Finnish company EFFOA, was the parent company of the Silja Line. In 1987 EffJohn acquired Rederi ab Sally with ships and interests in Viking Line included. The other owners of the marketing company Viking Line, Rederi AB Slite and SF Line then bought the shares of Rederi ab Sally in Viking Line from EffJohn. Rederi AB Slite chartered M/S Viking Sally back and the ship continued the service Stockholm - Mariehamn - Turku until Mars 1989. In February 1989 however, EFFOA bought the ship from EffJohn and chartered her to Rederi AB Slite. The ship continued the same service until April 1990. Then she operated under the name *M/S Silja Star* for Silja Line on the Stockholm - Turku route until she was transferred to the Vaasa-Umeå-traffic also belonging to the EffJohn group. The ship was renamed to *M/S Wasa King*. On 15 January 1993 the ship was sold to Estline Marine Co Ltd in Cyprus. The ship was renamed to *M/S Estonia* and bareboat chartered to E-Line Ltd and was put into the service of Estline on the route Stockholm - Tallinn. These companies were equally owned and controlled by the Swedish company Nordström & Thulin and Estonian Shipping Company in Estonia.

Although the history of M/S Estonia is more confusing than for most ships in the ferry service between Sweden and Finland it reflects the dynamic in this trade. This paper shall describe some of the circumstances behind the remarkable development of the ferry services between Sweden and Finland. In the worldwide shipping communities this is mentioned as *The Baltic Phenomenon*. Many questions have been raised; how can such an expansion of a ferry service occur so rapidly, how can the adoption and the development of new technic and concepts be so rapid, how can the high service level be maintained under the tough conditions in the Baltic Sea (confined waters, ice etc), how can the top class service concepts remain profitable.

The design of a ship is the final outcome of considerations and compromises in many different areas. Laws of nature, traditions/know-how, material & equipment, rules & regulations, ambient conditions etc. These are tools and/or limitations for the physical ship design. Software aspects i.e. atmosphere in the shipping industry when the ship is ordered is another important factor. The Owners purpose, vision, perspective etc. etc. are more dominating factors for the final result than the actual design and construction process. It should not be forgotten that the process is run by humans.

Hopefully it will be easier to understand the case of M/S Estonia when knowing the background to the Baltic Phenomenon from which M/S Estonia emanates.



THE PASSENGER/RORO CARGO/FERRY - M/S ESTONIA

M/S Estonia was built for satisfying the increasing demand for transportation capacity on the route Sweden through the Åland archipelago to the mainland of Finland. On this route the ships are making a round trip every 24 hours.

The ship was built to operate as a *day and night ferry* for *passengers and rolling cargo*. There were cabins of different categories. The Passenger Safety Certificate permitted the ship to carry 2 000 passengers. When the ship was introduced some passengers preferred to save money by just buying a "deck ticket" on the night trip, therefore the ship had just 1 223 beds arranged in 529 cabins and the deck passengers were offered to relax in comfortable chairs during the night hours.

The ship had dual purposes. Equally important with the transportation of the passengers was the transportation of cargo. To manage a round trip of about 250 nautical miles in 24 hours including port-calls, exchange of passengers and cargo, bunkering and handling of stores, only cargo rolling on wheels could be considered. On a *RoRo Cargo Ferry* the cargo is driven onboard and ashore either self-propelled or towed by so called tug-masters (a kind of tractor) e.g. trailers and containers on flat wagons (Mafis) are handled by tugmasters. Since on this route there was no time to turn or reverse the cargo flow, a drive-though concept with openings in both ends of the ship was the only solution.
Finally, with *ferry(service)* is meant a ship operating on a regular basis with fixed arrival- and departure times in defined ports. Normally this is associated to road-ferries. In this trade however, the ships are constructed for unrestricted service.

THE BALTIC PHENOMENON

The expression "The Baltic Phenomenon" alludes in shipping circles on the development of the ferry-services between Stockholm in Sweden and Turku and Helsinki in Finland. In the following explanations will be given to the amazing development of the ferry services in this region.

The tradition

To begin with, some characteristic factors of shipping will be discussed. The shipping industry is more complex than many other industrial activities. Experience and know-how are key factors tying progress of shipping to continuity. Shipping is a capital intensive industry, but also very flexible. There are many examples of steps in the development of shipping activities. In many such cases new technical solutions have been introduced enabling new superior commercial concepts. However, most new concepts in shipping fail due to underestimation of the complexity and/or lack of know-how.

Some aspects of shipping :

- Merchant ships should be regarded as individuals. In general just one or a few sister ships are built according to the same specification. Thus merchant ships are not standardised like cars, aircrafts or series of navy ships.
- The shipping industry can develop new technical concepts in shorter time than most other industries.
- Standard solutions in shipping are rare. Like all other transport services shipping has to adopt to varying conditions e.g. treatment of cargo, geography, infra-structures, customs of the trade etc.
- A ship is not just an autonomous movable production plant, but also a separated society.
- The production capacity of an established service (number-, performance- and size of ships in a fleet) can be changed in a short time through sale, purchase or various charter arrangements.
- In shipping rapid changes can be made; change of owners, flag, operator, crew, trade etc.
- The competition is normally unlimited, global.
- Supply of sea transport services adopt normally quickly to demand.
- Due to the complexity of shipping, tradition, experience, information and know-how takes more time to build up than in many other industries.

The story of the Baltic Phenomenon includes many of these factors. The introduction of the RoRo-technique was the initiation to the Baltic Phenomenon. Though the development was very fast it followed the traditions of the trade. The new technique just opened new business opportunities. There were several factors synchronously promoting the development of the traffic.

Influencing factors on traffic growth:

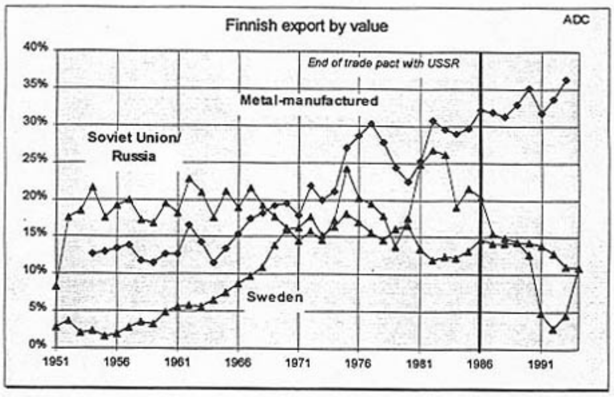
- Geographical conditions
- Cultural and historical background in Finland and Sweden
- Economical development in Finland and in Sweden
- Taxation in Finland and Sweden
- Ship-owners tradition in the region.
- The infrastructure of the shipping industry in the area, know-how, research, subcontractors, ship-yards etc.
- Etc. etc.

This traffic is entirely commercial. The competition and the profits have motivated the main operators Silja Line and Viking Line to develop new commercial concepts. Although the competition has always been intense it has been understood that safety- and environmental questions are of common interests for the traffic. Crew members from both lines has always maintained the good seaman tradition to exchange navigational experiences of the trade. The extensive newbuilding program kept the organisations updated with the development. The level of the discussions when ordering new ships was accordingly high. Thus the collected bank of technical navigational experiences from this trade is rich.

Before the Phenomenon

Some historical facts

In 1809 Sweden lost Finland and the archipelago of Åland to Russia. In Turku, which used to be the administrative centre, Swedish was the official language. The Finnish speaking Helsinki became capital in the Russian province. First in 1917, Finland became an independent country. In a cease-fire with Russia 1944 Finland was forced to pay war indemnity to the Soviet Union. Peace with the Soviet Union was settled three years later. Unlike most other countries in similar situations, Finland paid the indemnity in full. The last payment was done in 1986. Following that, trade pacts were signed between Finland and USSR which occupied large parts of the Finnish industrial capacity. The trade pact ended in 1986, initiating a need for expanding the Finnish trade with Western Countries From 1960 the development of the ferry traffic to/from Sweden has been an important contributing factor for the development of the Finnish industry. Since then the Finnish trade has developed towards more refined industrial products to/from the western countries.



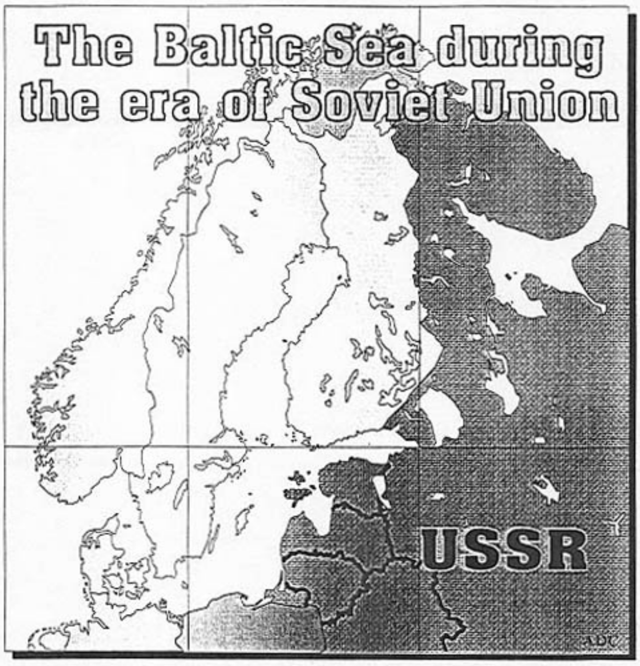
Sea traffic Finland - Sweden
The sea traffic can be separated into two main activities, full shiploads (e.g. forest-, oil products, etc.) and combined shiploads (e.g. general cargo, passengers & trucks, etc).

The ferry service handles mixed cargo and is performed on fixed published schedules. Except for dangerous cargo the service is offered on a general basis, a common transport service open to everyone. The cargo is normally standing on its own wheels and represents in general a high value per ton. Ships carrying such cargo e.g. a truck-load of TV-sets, require a lot of space. This type of transport services have become increasingly time sensitive, until todays just-in-time (J-I-T) logistic systems. Today J-I-T services are important elements for the competitiveness of modern industry.

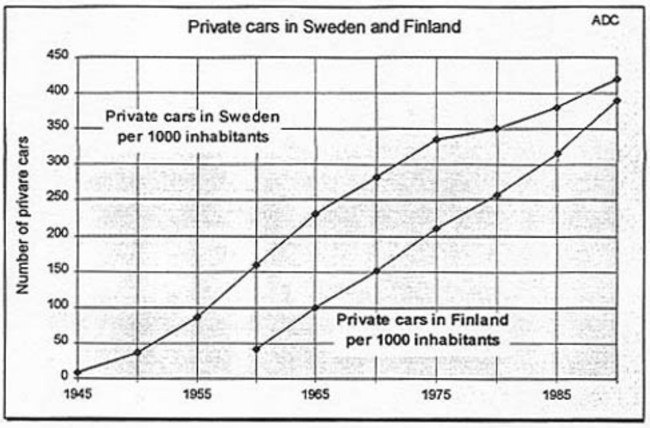
Late 1800 steamers were introduced on the trade to transport mail and passengers. The steamers were during the 60's replaced by diesel motor driven RoRo-ferries. In 1918 FÅA (the Finnish steamship company, later changed to the phonetic abbreviation EFFOA), the Finnish owner Bore and the Swedish owner Svea founded *De Samseglande Rederierna* (the jointly operating shipping companies). In the beginning they coordinated their services on the line Turku - Stockholm and in 1919 the line Helsinki - Stockholm was also included. These services were commonly called *The White Ships*. In 1957 the same owners founded Ab Siljarederiet. In 1970 the liner services were reorganised and the marketing company *Silja Line* was founded i.e. at that time Passenger/ RoRo Cargo/ Ferries had been used for about a decade in this trade.

The initiation

In the autumn 1957 the sea captain Gunnar Eklund returned home to Åland from sea service for vacation. Mr. Eklund got however unhealthy and the verdict of the doctors involved was that he must not go back to sea again. On the Åland island there are few alternatives to earn living than from the sea. At the hospital there was plenty of time for Mr. Eklund to find solutions on how he should fulfill his economical obligations to his family. He realised that car traffic had increased a lot and the way around the Baltic Sea between population centres in Sweden and Finland was very long.



The concept of the liner services between Sweden and Finland remained at this time about the same as in the beginning of the century. The ships had got a few private car positions on deck and the cars were hoisted onboard.



Mr. Eklund told his friend sea captian Henning Rudberg that he had the idea to use a carferry between Åland and Sweden. As Mr. Rudberg had similar thoughts he supported the idea and wanted to join an potential investment. In February 1959 a British steam ferry laid up in Dover, England was found. It was the train- passenger ferry S/S Dinard, built 1924 in Dumbarton, England. The ship was bought with brokerage assistance from a good friend in England.

In April the ship was taken to Aalborg Værft, Denmark, for refurbishment and necessary rebuilding. The ship was renamed as *S/S Viking* and the line was inaugurated in *June 1 1959*. The route was Gräddö (Sweden), over the Åland Sea - Mariehamn (Åland), through the Åland and Turku archipelago - Korpo (an island close to Turku with road-connection to mainland Finland). About the time for the introduction Mr. Algot Johansson, managing director and founder of Rederi Ab Sally, Mariehamn also joined the project. He had a strong belief in the new connection over the Åland Sea.

The monopoly they had created lasted 5 days. The shipowner Carl Bertil Myrsten, Rederi AB Slite from the Swedish island Gotland then introduced M/S Slite on the route Simpnäs, Sweden - Mariehamn, Åland. Instead of using the ship on the intended line Klintehamn, Gotland - Grankullavik, mainland Sweden, M/S Slite started to compete with S/S Viking.

M/S Slite was originally a dry cargo coaster of 950 tdw, built 1955 at the Sölvesborg Yard in Sweden. The ship was converted to a Passenger/ RoRo Car/Ferry . The arrangement was simple, a side ramp for cars on deck, and reclining seats and a bar for the passengers in the cargo hold.

The above competitors formed later on the joint marketing company Viking Line, for the three shipowners, Rederi Ab Sally (Algot Johansson, Henning Rudberg), SF-Line (Gunnar Eklund) and Rederi AB Slite (Carl Bertil Myrsten). A duopoly situation developed soon between this formation and what later on should be The Silja Line. The competitor Silja Line was formed by Bore Line (Turku), EFFOA (Helsinki), Rederi AB Svea (Stockholm) and the jointly owned Silja Rederiet (Turku) i.e. "The White Ships".

In this overview we will not go into the internal formations of the groups and to simplify, the groups will in the following just be called Silja and Viking Line.

In comparison with The White Ships, S/S Viking and M/S Slite were not impressing. Although the very introduction of the new service was a bit shaky the traffic very soon generated growing and stable profits. Already the second year in service (1960) the Viking Line transported 30% of the passengers, 60% of private cars and 100% of the trucks.

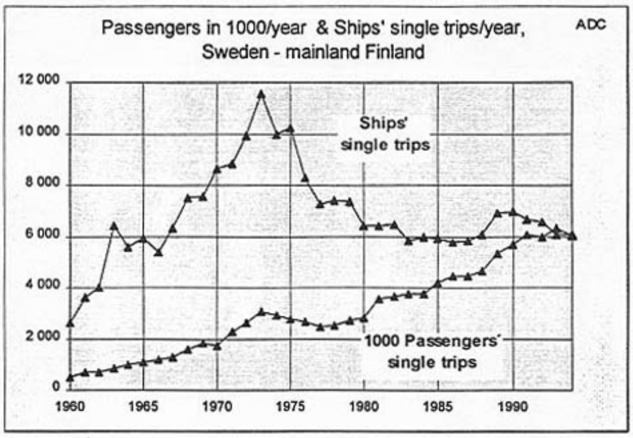
Silja Line couldn't deny that the new conceptual solution was a threat. Their philosophy that passenger and cargo traffic should be separated had to be revised. It wasn't a pleasant prospect that their passengers should be forced to go with "the newcomers" if they wanted to bring their car. It was however considered as a comfort that the loss of passengers market share was caused by a lot of new passengers that later on should hopefully realise that it would be worth while to spend some more money on the journey for the standard that Silja Line offered. The owners within Silja Line had previous long experience of project development. The technical departments had already for some time been studying RoRo-ferry concepts. Now they were assigned to develop a concept that should restore Silja Line's market position. In May 1961 M/S Skandia was delivered from Wärtsilä Ship-Yard and in May the following year the sister ship M/S Nordia was delivered to Silja Rederiet. These ships were the first purposely built Passenger/ RoRo Cargo/ Ferris for the trade between Sweden and Finland.

The development of the traffic

The diagrams below describes the development of the traffic between Sweden and the mainland of Finland from 1960 to 1994. During the following 30 years from 1960, the number of:

-	passengers grew from about 500.000 per year to about 7.500.000	+1.400%
-	number of private cars from about 30.000 to about 600.000	+1.900%
-	trucks from about 900 to about 140.000	+15.500%

During the same period, in addition to above figures, passenger cruise traffic in the area and traffic to/from Åland has grown substantially.



The number of passenger single trips exceeds today the entire population of Finland. The population in Finland is about 5,0 million people. The portion of passengers from Sweden, Finland and other countries varies with time and route. Today however the Finnish passengers are in majority.

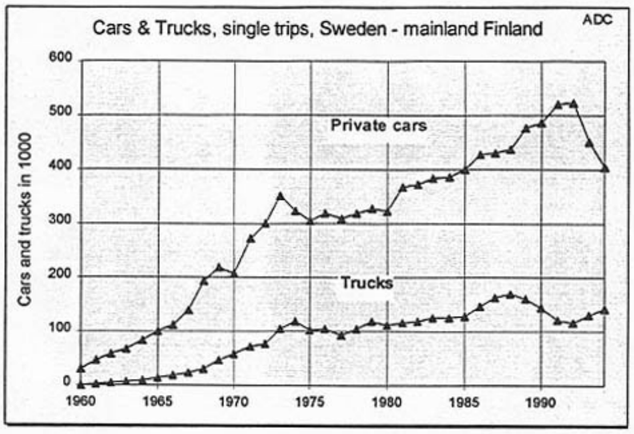
The diagram also shows that the number of ships' voyages culminates in 1973. Although the number of passengers grew, from that year the number of ships voyages have decreased and is now stabilising.

The reason is, competition has forced the traffic to be rationalised. Fewer and bigger ships made more transport work. This is not just an effect of economy of scale. The operators have also expanded their market by introducing new commercial concepts.

When this traffic began in about 1960 nobody could foresee the development. Required transport capacity had until about 1970 been covered by employing more ships in the trade. The ferry service began to play an increasingly important role for transportation of industrial goods and merchandises to/from Finland. The exp./imp. between Finland and Sweden (+transit W.Europe) was increasing. On the same time the way of transporting changed. Trucktransportation became increasingly frequent also for long distance transportation, rail-roads had difficulties to offer the required service quality. The different track width in Finland and Sweden discriminated also, at that time, the development of rail-road transportation. (Today there are two lines with rail-road services in the trade.)

The demand for improved service quality of the ferry transports also constantly increased. In the winter 1965/66 M/S Apollo maintained winter traffic on Kapellskär - Pargas. Earlier the traffic had been interrupted when the ice had been too difficult. In 1971/72 Silja Line continued the traffic during the winter on the Stockholm-Helsinki route. This was a test made with S/S Svea Jarl. The following winter 1973/74 Silja Line could offer the market a substantially improved service on the Stockholm- Helsinki Line by introducing the newbuildings M/S Aallotar and M/S Svea Regina. These ships, as well as M/S Apollo, were ice-strengthened to Swedish/Finnish ice class 1A. The ships had for that time, the impressive engine power of almost 12.000 kW (Maximum Continuous Rating) for forcing the ice. M/S Apollo had 5.880 kW. The ships were Passenger/RoRo Cargo/Ferries. The logistic transport infrastructure between Finland - Sweden (W.Europe) had improved a lot also on the Helsinki Line. The trucker could now offer door-to-door transports around the year.

It was important that the trucker could control the whole transport chain by having the same truck and the same driver all the way. When the ship carried the truck over the Baltic the driver got a proper rest.

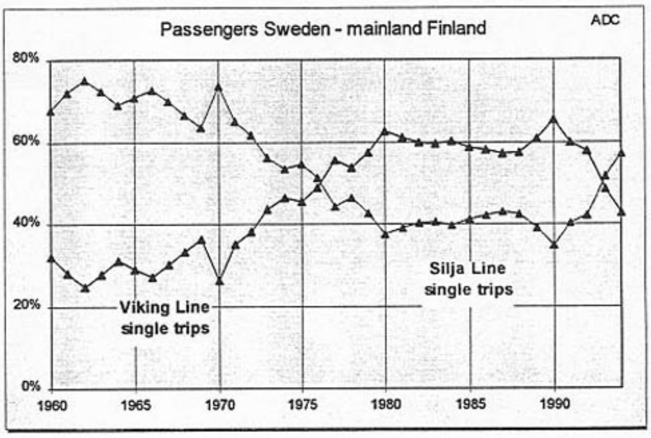


The diagram also shows a substantial increase of private cars. The combination of private cars and rolling cargo showed to work. In vacation periods when the trucking activities were low, space was available on RoRo-deck for private cars.

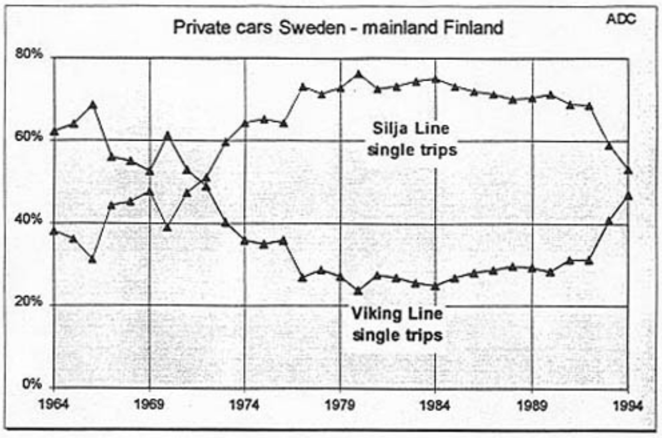
The increased number of ships in the trade was also the result of an escalating competition. In June 20 1973 Viking Line started a service Stockholm - Mariehamn - Turku i.e. in direct competition with Silja Line. In 1974 Viking Line also started to compete on the Stockholm - Helsinki route.

The fight for market shares

The two competitors approached the market in different ways. Silja Line followed their tradition to develop quality concepts. More and more specially designed newbuildings were delivered. Encouraged by what seemed to be the never ending success, Viking Line ran for capacity. Regarding the cargo Viking Line also aimed for quality. The different approaches reflected the dissimilar structures of the competitors. Viking Line was built on equal effort from the participating owners. This encouraged capacity grow, if one owner introduced a ship the others should also respond with the corresponding capacity. Silja Line on the other hand had a pool arrangement with economic compensation for efforts and profit charing.

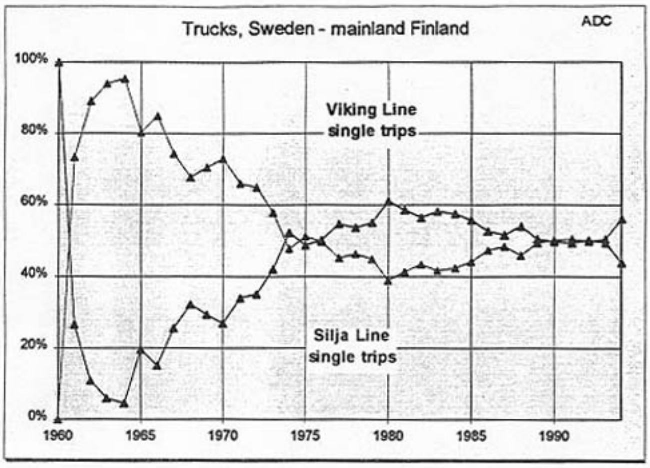


Although Viking Line almost immediately succeeded in gaining 30% of the passengers, Silja Line could defend their majority position until 1975. By chartering ships and an extensive new building-program Viking Line then took a bigger share than Silja Line. On the other hand it was some comfort to Silja Line that they could maintain somewhat higher prices for their services.



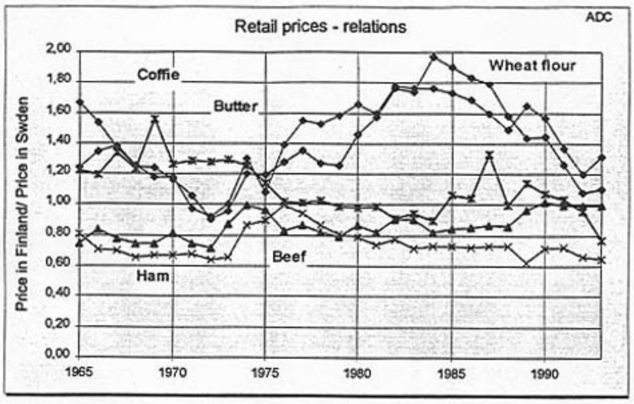
Viking Line got the initiative in the market of private cars. As seen in the diagram it took some time until the Silja Line passengers brought their cars over the Baltic. An explanation is that in the beginning the passenger with car selected the most affordable alternative for the transport. Later on the price for the car became less important for the customers choice of transport alternative. If the car was needed it was neither complicated nor expensive to bring it with on the ships.

When Viking Line started their traffic they surprised Silja Line with their cargo carrying capacity. The statistics in the enclosed figure doesn't reflect the substantial cargo carrying activity going on by pure cargo ships managed within the sphere of Silja Line. Silja Line however, regained soon a leading role as carrier of cargo also in the passenger ferry service. This was accomplished by introducing the purposely built Passenger/ RoRo Cargo/ Ferry M/S Skandia in 1961. Thus taking back the initiative for some years. The owners of Silja Line were in the beginning running RoRo cargo ferry services in parallel with the passenger service, since they considered that they complied better with the requirements of the market in that way. A reason was the difficulties to arrange a time table that was attractable for both passengers and cargo. It was also an inertia built in as the transport systems for cargo was there and had so far worked satisfactory. From mid 70's until late 80's Viking Line was however a bigger cargo carrier than Silja Line. A reason to that was their higher cargo carrying capacity over the Åland Sea.



Today all the diagrams of market shares converge momentarily to a 50/50 relation. The differences in capacity and product have diminished by the introduction of the so called Super Ferries. In 1992 the trend of growing passenger market was broken by the recession in Sweden and Finland. In addition to that the Estonia catastrophe suddenly changed the passengers attitude to the traffic. The instant loss of passengers caused by those two factors acting simultaneously, had never been experienced before in this traffic. By reducing ticket fairs the number of passengers has been restored, but still the economic result is not what it used to be.

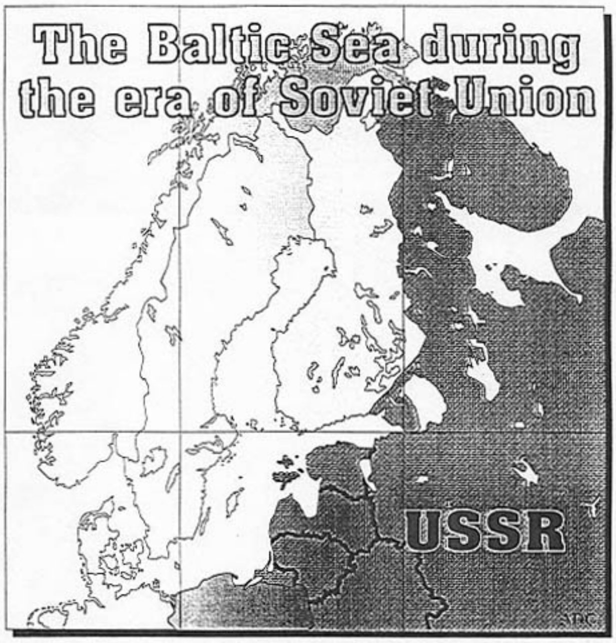
Economic factors



Explanations to the development are primary found in Finland and not so much in Sweden. Although this RoRo/Passenger traffic was started in the Åland Sea, the driving force in the traffic has been the development of the Finnish economy.

The traffic over Åland Sea between Sweden and Åland was elementary. The business idea was to make it easier to bring private cars between Sweden and Finland and to explore border trade. Border trade, meat and tax-free, soon made the traffic popular in Sweden. The Finnish people on the other hand were attracted by the low price of coffee and fruit-syrup in Sweden.

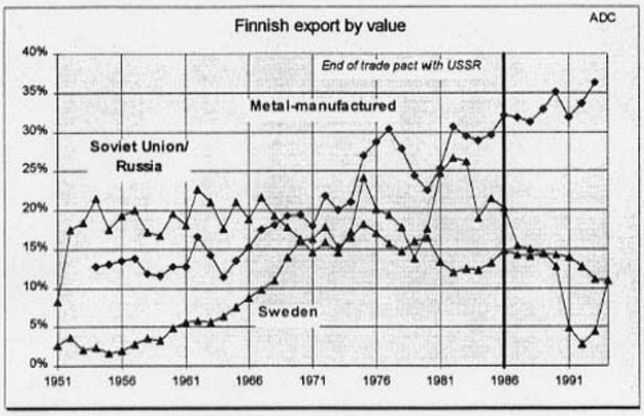
Fluctuations in currency exchange rates stimulates travelling in one or the other direction all the time.



When the traffic grew other economic factors got increasingly important. One was the "the big neighbour in East", Russia, that always had influenced the conditions in Finland.

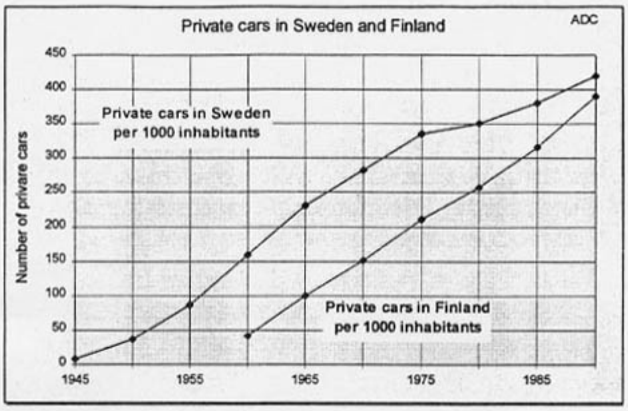
When this traffic started, Finland was from transport point of view blocked Eastward by the Soviet union. Conventional ships' services connected Finland with the rest of the world, including Sweden. The constantly increased integration of Western industry and trade made rational transports an important factor in the competition. Rail-roads and conventional shipping services had difficulties in offering the quality standard required by high valued cargo (merchandises, semi-manufactored products etc.). On short and medium distances door-to-door truck transportation in combination with the RoRo ferries could offer the required service quality. In this case quality was expressed in terms of reliability, flexibility and short transit times.

Thus a major infrastructural obstacle for the development of the Finnish trade and industry was solved by the frequent RoRo services over the Baltic Sea. Finland got by time a very reliable connection with Sweden and N.Europe.

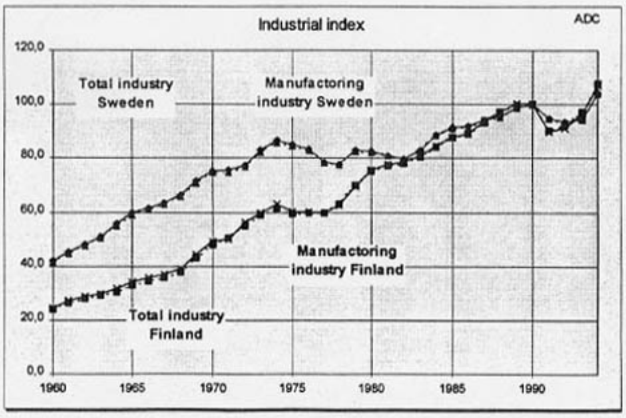


The diagram over Finnish export, shows how the trade grew with Sweden during the 60's. Then the industrial activity of Finland continued to increase. The Swedish share in % of the total volume declined however somewhat when other markets grew faster.

The diagram "Finnish export Soviet Union and Sweden excluded" on page 21 shows that Finland has an extensive trade with other countries than their close neighbours (60- 80%), still though most high valued cargo pass to/from N.Europe via the ferry services between Finland and Sweden. In the last decades export from the Finnish forest industry represents increasing values.

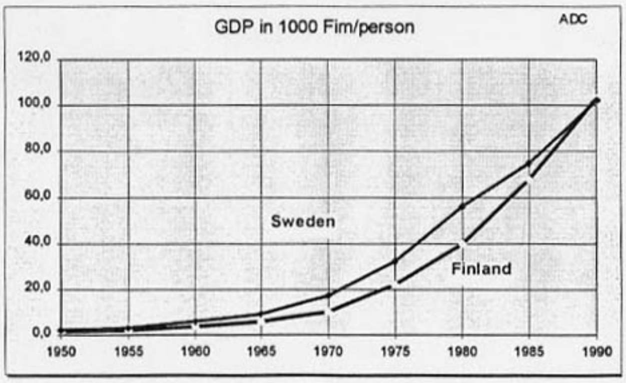


The increase of the truck fleet reflects to some extent the increased demand for flexible transports, but also the increased transport work that the highly specialised industries required.

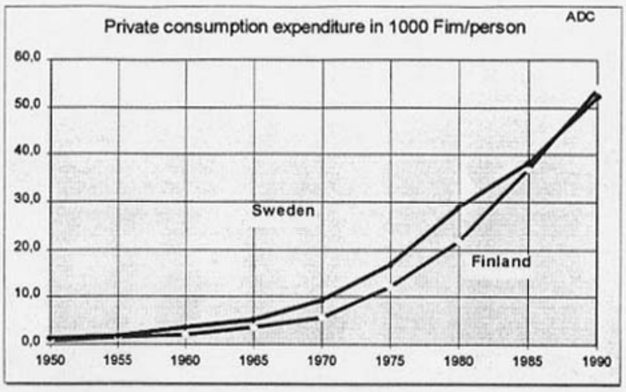


Industrial index (100% 1990) shows that industry in Finland had a faster expansion of the industrial sector than Sweden during the period 1978 to -82. During this time the quality of the transport service also improved a lot. In 1981 the reliability was close to what it is today.

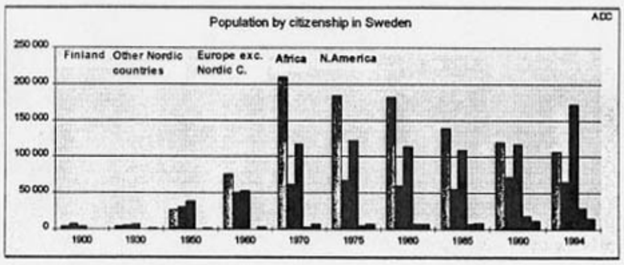
With the expansion of industry followed increased GDP. Sweden used to be ahead of Finland until today when GDP/person is practically the same for the two countries.



Private consumption expenditure /person shows a synchronised development curve.



Improved standard of living in Sweden and Finland in combination with prices within reach encouraged travelling. The lower price offered by Viking Line was a good supplement to the more expensive Silja Line standard. Though competition was hard there was a market for both lines.

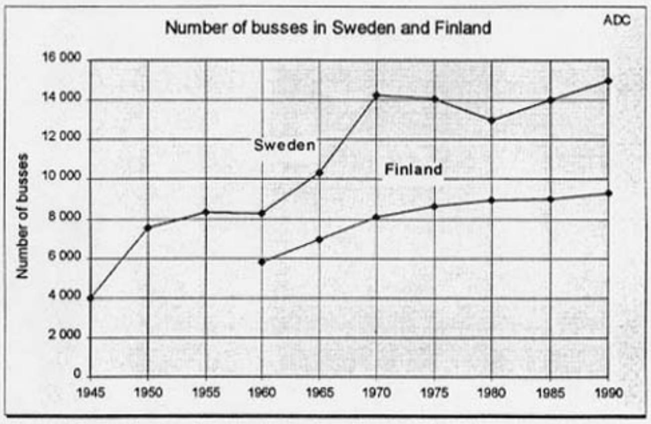


The Finnish colony in Sweden has always been big. Today the first and second generation of people originating from Finland living in Sweden is 443.000 persons. The improved ferry services made it much easier to see relatives and friends in the other country. Despite the big capacity the journeys before and after big holidays have to be booked long time in advance. Travelling to see relatives is however going on all the days of the whole year.

With the increased living standard, leisure trips for one or a couple of days to the other country became more frequent. The scheduling made it also possible to arrange attractive programs for tourist trips.

Taxation of tobacco- and alcoholic products in the Nordic Countries is high. To attract passengers by the low onboard tax-free prices was a part of the original business idea of Viking Line. Though tax-free still is important for the traffic, this argument has weakened by time and due to both countries membership in EU. Tax-free may be enjoyed in the future by including calls in Åland or Estonia. In Finland Estonia appears to be the new destination for tax-free travelling. Thus the Lines have for some time tried to focus on other attractions in order to maintain passenger volumes in the future.

Since 1960, almost every family has access to a private car, diagram page 20. When visiting the other country it was very convenient to bring the car onboard the ships. If the start and/or the end of the trip was not close to the ferry terminals this was a competitive alternative.



To travel by car became thus a common alternative. To bring the car on a ferry to Sweden and go further south in Europe became also an attractive alternative for the people living in Finland.

For those who didn't use a car various bus-trips were arranged in the neighbouring country.

Conceptual development

Almost all curves in the above diagrams show an upward trend from 1960 until today. The introduction of further developed passenger/ RoRo-cargo concepts has had good timing. Keeping in mind the difficulties to foresee the future, many great initiatives have been taken by the ship owners when building up this traffic.

An important factor for reducing the economical risks have been the circumstance that these ships have been attractive on the second hand market. The average life time of a ship in this trade used to be about seven years. After service in this trade the ships could in general be sold for the purchase prise. Thus the costs for the huge investment finally were relatively small. For many years the ships worked like gigantic saving boxes. Today many claim, that this rule is no longer valid with the huge capacity of a Super Ferry. This has been said before and it remains to be seen if the second hand market, once again, has grown to also receive the Super Ferries.

The competition between the two lines made it important to react quickly on market signals. The owners were also motivated and able to adopt new conceptual ideas. Thus the tonnage was replaced frequently, ships were often rebuilt even when still in service. By that more or less constant modernisation took place. New functions and conceptual ideas were tried out and refined in a high tempo.

The owners tradition and competence and the advantage of easy access to a supporting infrastructure of marine expertise in the region were important key elements for the development. The Lines developed the concepts they believed attracted their targeted market. Silja Line defended by tradition the upper segment of the market and had the initiative in conceptual development in that sector, while Viking Line concentrated on concept that could attract ordinary people.

Silja Line aspired to a quality profile and Viking Line focused on ordinary people's value for money. This was also reflected in the organisations of the lines. Silja Line made more internal development work than Viking Line. Although Viking Line introduced new concepts for the trade they could in general enjoy a more relaxed position by monitoring the outcome of Silja Line's novelties before they made up their mind.

The shipping industry, shipyards and subcontractors, realised soon that this traffic represented a big and quality conscious market. Thus the lines were offered developing resources, in general free of charge. Even if several first class shipyards in the region closed down in the early 80's, the network of first class makers still remained in the area and N.Europe still is the centre in the world for building high class cruise ships and passenger ferries.

In the beginning of the competition the activities of Silja and Viking Line were quite different. Silja Line was the traditional carrier in the trade. Viking Line focused on developing an economical and uncomplicated transport alternative by rolling cars on and off the ships and transport deck-passengers. It wasn't considered necessary to offer the passengers cabins during the trip. Soon however, due to competition it became necessary to arrange cabins for truck drivers.

Silja Line's idea was that the RoRo concept had to be combined with cabins of high standard and first class service for the passengers. By time the differences in prices and concepts of the two lines have diminished and today many have difficulties to see the differences.

Commercial concepts

The requirements have changed over the years and so also the response from the Lines market's. From the beginning the new-buildings have been purposely built in order to fit the particular market profiles of the Lines. Even though the ships accommodated several different commercial functions simultaneously, this shall not be associated with the ***multi purpose philosophy*** sometimes practised by ship owners who want to have the option to use a ship in alternative trades.

Passenger transport over The Åland Sea and the possibility to facilitate the transport of a car between Sweden and Åland/Finland were the primary objectives when Viking Line started. In the beginning border trade was important and e.g. the low coffee price in Sweden (see diagram page 17) generated numerous Finnish passengers for Viking Line. The main purpose was however to offer an uncomplicated transport alternative between the countries which could also be used by ordinary people for leisure travelling. Consequently the commercial concept was simplified.

In about 1970 Viking Line offered the same bed capacity as Silja Line, "calendar" page 28. To improve the passengers appreciation of the trip high quality food soon became important. The RoRo solution was a superior alternative compared with the lift on/ lift off concept. The market response on the new transport alternative introduced by Viking Line showed clearly that the market was elastic i.e. the right transport product generated more traffic. With more traffic the lines could use bigger ships and get benefits from economy of scale and then offer more competitive products to the market, and so on in a happy spiral.

The development in the countries created new demands on transports and the supply of transport services in the trade grew synchronously with the demand.

Silja Line was traditionally the main provider of sea transports between the countries. The option to bring a car on the passenger ship was for them in the beginning more a service than a sales point. Their passenger concept had then similarities with what was offered to travellers on the Atlantic Liners between Europe and USA; good cabin standard, excellent food- and service concepts and sometimes passengers were even divided into different classes.

Silja Line responded rapidly to Viking Line's introduction of the RoRo concept. In May 1961 Silja line introduced the first purposely built Passenger/ RoRo cargo/ Ferry in this trade, M/S Skandia. The next year the sister ship M/S Nordia came. Silja Line had noted the "newcomers" almost immediate success during the summer. On December 23 the same year (1959) the order of M/S Skandia was signed with Wärtsilä shipyard in Helsinki. The entire freeboard deck was reserved for truck- and car transportation. With hoistable car decks the cargo deck got two functions, increased deck area for private cars in high season and enough height for trucks in low season. In summertime the ships made so called double trips, a round trip in 24 hours, calling the ports of Norrtälje - Mariehamn - Turku. The service speed 18 knots made the time in port short. Consequently a drive trough solution with stern- and bow ramps was arranged for the cargo handling. This was also a convenient solution for the drivers, the frequency of damages to vehicles also showed to be low.

The number of passengers, 1000 persons, was impressing and still is when comparing with todays some 2500 passengers of a Super Ferry. There is however a big difference in standard. The reclinable seats for resting was at that time an appreciated standard for passengers travelling with M/S Skandia. Today most passengers have a private cabin on night trips. In the mid 80's Silja Line took the decision to not accept deck passengers any longer on night trips.

"Silja- and Viking Line" Calendar

	Birger Jarl	1959	(Viking (0), Slite (0))	
	SS Bore	1960		
	Skandia (106)	1961	(Boge (0))	
	Nordia (209), Svea Jarl (250)	1962		
	Ilmatar, Floria (cargo only)	1963	(Ålandsfärjan (0))	Kapellskär
		1964	Apollo (0) (Drotten (72))	
	(Holmia)	1965	(Visby)	Winter traffic Kapellsk.-Pargas
Silja to Värtan	Fennia (296)	1966		
	Botnia (162)	1967	Kapella (120), (Visby (245), Stena Baltica)	
		1968	(Viking 2 (0))	
		1969		
New name; Silja Line	Floria (186)	1970	Apollo (222), Viking 1 (206), Marella (172)	
		1971		
Winter traffic Stockholm-Helsinki	Aallotar (412), Svea Regina (412)	1972	Viking 3 (226), Diana (240)	
	Bore I (377) *The 1:st Oil Crisis*	1973	Viking 4 (198), Aurella (328)	New route for Viking Line -73 Stockholm- Mariehamn-Turku
		1974		New route for Viking Line Stockholm-Helsinki -74
	Svea Corona, Wellamo, Bore Star	1975	Viking 5 (410), (Viking 6 (432))	
	(810) (1175) (650)	1976	(Apollo III (500))	
		1977	(Ålandsfärjan)	
	The 2:nd Oil Crisis	1978		
		1979	Diana II (828), Turella (750)	
		1980	Rosella, Viking Song, Viking Sally, Viking Saga (740) (1223) (1190) (1452)	
	Finlandia (1544), Silvia Regina (1544)	1981		
		1982	(Aurella (328), Ålandsfärjan (0))	
		1983	(Ålandsfärjan(0))	
		1984	(Ålandsfärjan(0))	New name; Viking Line
	Svea (1625)	1985	Mariella (2447), (Ålandsfärjan (0))	
	Wellamo (1937)	1986	Olympia (2333)	
		1987	(Ålandsfärjan (0))	
		1988	Amorella (2112)	
		1989	Athena (1712), Cinderella (2766), Isabella (2004)	
	Silja Serenade (2626) (Silja Star)	1990	Kalypso (2165)	
	Silja Symphony (2626)	1991		
ABC Support AB	(3700) (2188)	1992		
Stockholm 1995	(Silja Europa, Silja Scandinavia)	1993		

Notes: Ships within brackets are not purpous built for the trade.
Figures in brackets are passenger bed capacity

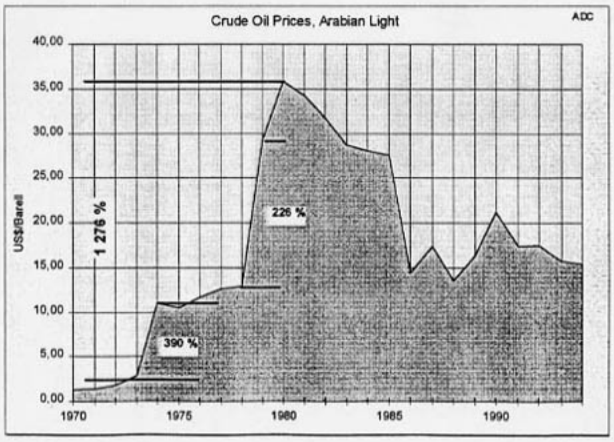
The easiest way to travel by sea between the region of Stockholm in Sweden, and Southern Finland has always been via the region of Turku in Finland. On the alternative route Helsinki - Stockholm, due to the distance, the ships can make just one single trip in 24 hours. The Turku route therefore has a character of transportation, whereas the Stockholm - Helsinki route has more of the glamour of connecting the two capitals.

The ships following after Skandia and Nordia had in principal the same basic arrangement. The difference was the increased space requirement, improved comfort, more service and entertainment i.e. cabins, more private cars, more restaurants, shops and bars etc.

The key to the development of the traffic has been ability to offer attractive services in low-season. In high season for passenger traffic, about three months a year, the market is less sensitive to commercial concepts. In the beginning and the end of vacation periods some trips are peaking then the matter is concentrated to transport capacity. Due to this unbalance in demand during the year it has been economically necessary to make the ships more attractive in low season. The option to charter ships in high season has always been there but then supply of suitable ships to acceptable prices is very restricted.

In 1964 Viking Line got the first purpose built ship M/S Apollo. That was the first ship with ice breaking capacity in the fleet of Viking Line. Thus in the winter 1965 -66 Viking Line also opened winter traffic, Kapellskär (Sw) - Pargas (Fi). At that time the traffic had pure transport character, as late as in the early 70's both Silja- and Viking Line gave discount on weekend trips.

During the 70's serious competition between Silja- and Viking Line started. Then both lines received a lot of new-buildings and Viking Line opened new services on Stockholm - Turku, Stockholm - Helsinki in direct competition with Silja Line. In order to feed the growing fleets, both lines also started to build up relatively extensive marketing organisations. At that time weekend trips became attractive, consequently the prices on weekend trips increased and discount was instead given on weekday trips.



During the 70's oil crises chocked the shipping world, so also the ferry traffic. The first chock came in 1973 and the second in 1978. Cost for bunker was suddenly a strategic important factor in shipping. From 1973 to 1974 price of bunker increased with almost 400% and from 1978 to -79 with about 200%. All together bunker prices increased from 1973 to 1980 with about 1.300%.

Late in the 70's, discussions in Sweden started about "the right of participation in decision-making". Employees should be informed and give their views on important decisions for the company/ organisation. That created a lot of meetings. The discussion had roots in the unique Swedish tradition of educating adults. Federal support for adult education had existed for decades. A similar system was now built up to finance employees education in joint decision making.

These ideas were after some time combined with similar ideas from management schools, learning that management and employees should come closer and develop coordinated and motivated acting. The human resources should be developed. To implement such philosophies it was no longer sufficient with meetings in the offices, conferences had to be held. Such conferences required thorough preparations and in many cases the social off duty, get-to-gather, was the most important object of the conference.

Conference trips shall not be mixed up with group travelling. Such travelling has been going on all the time and there is no significant traditional difference between the countries with regard to group travellers.

Although occupancy rates of the ships were stable and high, the drastic increase of the oil price eroded the profits of the lines. There was however no serious sign of weakening markets for the traffic. The possibilities to increase prices were limited. In this situation there were two options, one was to go for economy of scale and the other was to improve occupancy rates in low seasons by making the ships more attractive.

Silja Line tried to combine that with the ships they received in 1975, two years after the first oil crisis, "The French Sisters". The three newbuildings were considerably bigger and such a high standard had never been seen before in this RoRo trade. With these ships conference centre was for the first time in the trade arranged onboard, 143 seats distributed on 4 conference rooms. Certainly meeting rooms had been arranged onboard before but then it had just been a service item. Now conferences with hostess service and conference facilities were tested as a business concept. Two years later in 1977, the second oil crisis came. This time Viking Line was active, six new ships were ordered. In the design, economy of scale were applied. Two ships were delivered in 1979 and four in 1980. Among these were **M/S Diana II**, delivered 1979 nowadays M/S **Mare Balticum** in the Tallinn - Stockholm trade, and **M/S Viking Sally**, delivered 1980, she should later on become M/S **Estonia**. Both ships had extremely short delivery time, less than one year. This can be compared with the two years that is normal. M/S Viking Sally was an enlarged version of M/S Diana II. M/S Viking Sally was about 15 meter longer and had a different superstructure that gave the ship a gross tonnage of 15.566 m^3, to be compared with M/S Diana II's 11.537 m^3. The engine installation and the hull form except for the bulbous bow was the same. This massive introduction of new buildings aimed also to strengthen the market position of Viking Line against the competitor Silja Line.

Viking Line introduced conference facilities with the ships M/S Viking Song, -Sally and -Saga. This time however, the conference centre was a multipurpose area, in the evenings it was transformed to a night club.

Silja Line had three still relatively modern ships delivered in 1975. They took a cautious position and spent more time on developing their concept for the future. Two new ships for the Helsinki Line was ordered, M/S Finlandia and M/S Silvia Regina. With these ships the conference concept has further developed. The ships had a big "dining & dancing" saloon that should show to be a very good compliment to the conference centre.

The positive response from the Swedish conference market surprised most people in the trade. As a spill over effect conference groups also begun to fill up the meeting rooms that had always existed on the ships in the trade. The key to the Super Ferries was found.

Then the conference capacity was increased by retrofits on existing ships. In 1985 both lines received their first "conference" ships. Silja Line got M/S Svea for the Turku line and Viking Line got M/S Mariella for the Helsinki line.

The conference concept offered to the Swedish market was very competitive. Thus conference groups evened out fluctuations in occupancy rates over the year. The conference concepts was further developed to include exhibitions and even sometimes advancing to close to congress dimensions. At the same time cruise ferry concepts were developed. Some shares from the leisure market should also even out occupancy rates. This time also the market in Finland was addressed. This development resulted in the Super Ferries of today. Still though the ships provide a basic transport service between the countries. The various passenger concepts for low seasons made cost effective just-in-time transports possible. Thus this traffic has got the record of being the most reliable transport system in the region.

The Estonia catastrophe resulted in an immense loss of passengers on these routes. Conference groups disappeared almost instantly and still one year after, the big conference groups have not returned. Until recently conferences have been a typical Swedish activity but now the Finnish conference market is picking up and starts to use the ships.

Finally some about the cargo transport concept. Conventional RoRo ferries have served this trade all the time, thus balancing the flow of cargo. The economy of the RoRo Cargo/ Passenger Ferries is a symbiotic combination of three components 1/3 passenger tickets, 1/3 tax free and 1/3 cargo. The transportation of cargo has been "subsidised" by the two other activities. The concept for cargo once introduced by M/S Skandia is principally unchanged. The lines have found a compromise in the scheduling that truckers adopt to. Today the traffic is a high quality link in the industrial network of just-in-time door-to-door transports. This transport service for high valued products is an important factor for the effectiveness of the economy in the region. The drivers also appreciate their own specially designed spaces onboard.

The cargo carrying capacity of the ships have not increased as much as the passenger capacity. Supplementary RoRo services offers good transport alternatives, and so the requirements from the market are balanced.

The stagnation of cargo carrying capacity has to do with the planning of such ships and the requirements of efficient cargo handling. As passenger service always has had a high priority in this trade, a second deck for cargo above or below the freeboard deck have not been motivated. Sometimes such space has been arranged for private cars. A private car deck is however, much easier to arrange as the strength requirements of decks and ramps as well as the requirements of turning radius for cars are much less than for trucks. Compromises between different commercial functions and technical solutions have up to today resulted in the freeboard deck still being the cargo deck. For the latest generation of ships, the freeboard deck is not even fully utilised for cargo. Cabins are arranged along the outside on both sides. When these ships were designed the experiences from the catastrophe of The Herald of The Free Enterprise was discussed. The motive for such an arrangement to reduce the ships sensitivity for water on RoRo deck was important for the decision to reduce the width of cargo deck. This is an example of how a safety aspect has influenced the design.

Technical concepts

Design philosophies

The two lines had different backgrounds for their technical development. Within the Silja sphere there was a long tradition in the trade. They had accepted and aspired to fulfill the responsibility of being the main provider of sea transports between the two countries.

Behind Viking Line there were also experienced ship owners. But their experiences mainly came from other trades. Even though Viking Line started as a entrepreneurship over the Åland Sea they soon learned the trade by exchanging professional experiences with colleagues from the competitor . From a technical point of view, the design philosophy of Viking Line has been to apply good ship building standard. There were some reluctance to apply solutions exceeding existing rules and regulations. But if there were good reasons such solutions were adopted. Thus both Lines contributed to the technical development.

Silja Line's design philosophy was to focus on functions more than rules and regulations. They concentrated on what they believed was required in their traffic in order to maintain their own unwritten quality standard. It happened that such solutions didn't cope with the existing rules and regulations. This was in general solved when reasons and solutions had been presented to the Administration and approval within the scope of IMO was given as "equivalent or better solution". Silja Line has in this way had impact on e.g. the Finnish/Swedish Ice Class, IMO's rules for fire protection, structural strength of fore ships with bow opening etc.

Viking Line however, was more receptive for new technical solutions developed in the shipping industry e.g. in spite of the ice conditions in this traffic they took the initiative to use barge typed aft body lines, high lift rudders, resiliently mounted main engines etc.

The turn around of ships (see the above "Calendar") indicates the two Lines different philosophy. Viking Line had a quicker turn around and got more opportunities for testing whereas Silja Line relied more on their development inhouse.

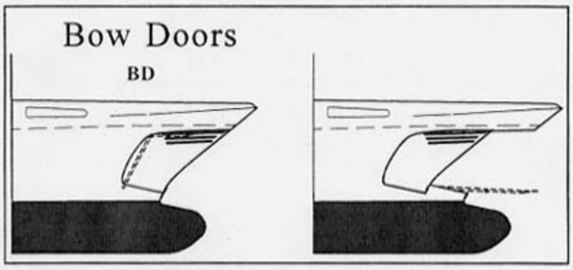
The cargo deck and -accesses

Ever since M/S Skandia the design of cargo decks is in general about the same only detail design has developed, thus improving cargo handling and safety and environmental conditions on cargo deck.

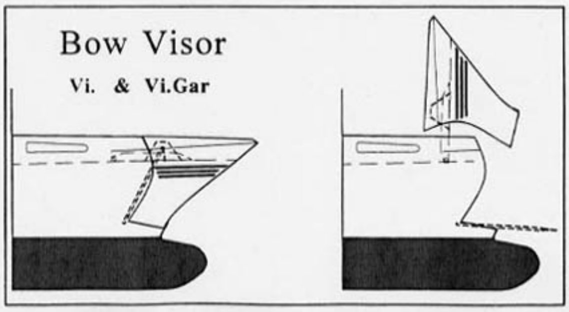
Stern ramps and stern openings have been improved but the design principal remain the same, i.e. in lowered position the ramp is a driving way and in the upper position the ramp seals the stern opening to cargo deck. This ramp is located in the aft most position of the ship with the aft collision bulkhead located forward of the stern ramp. The Joint Accident Commission will report about position of the forward collision bulkhead and the arrangement in the bow area of M/S Estonia. This overview will be limited to cargo deck accesses in fore ships.

On page 35 these is a scheme of the ships in the trade. There is indicated type of opening in the forward part of cargo deck. Bow openings can either be arranged by using a pair of doors or a so called visor.

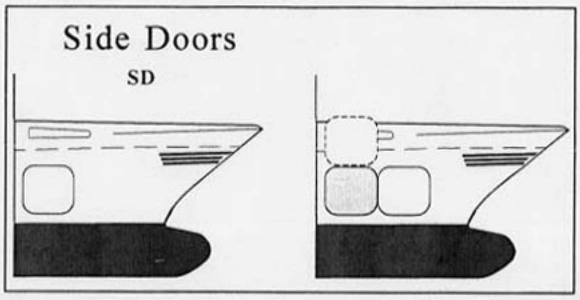
- **Bow doors** are normally hinged on heavy arms. The doors are opened by hydraulic cylinders moving the doors outside along the ship's sides. There are also some old designs where the doors are swinging. In closed position, pressure forces acting on the doors are transferred to the ship's hull via reinforced supports. Though the framework along the contours of the doors absorb some forces, the primary function is to keep the sea away from the space between the ramp and the doors. The primary function of locking devices is to prevent the doors from falling out from the ship.



- **A bow visor** forms the bow on a ship. The visor is normally hinged on the forecastle deck and is opened upwards by hydraulic cylinders. The visor's supporting structures in the hull doesn't prevent the visor from opening. Only the locking devices have that function. The space between the visor and the ramp is sealed to the sea along the visors contouring frame. Depending on the geometry of that frame and the elasticity of the visor the frame may absorb some of the forces acting on the visor.



- **Side door(-s)** are used for many purposes on ships. Side doors in closed position rest on a supporting and sealing framework in the hull. The doors are opened by hydraulic cylinders moving the doors horizontally or sometimes vertically to the outside of the ship.



In the scheme below **Vi** marked ships have a bow visor that from safety point of view is independent of the ramp. To get access to cargo deck, two barriers has to be passed.

Vi.Gar marked ships have a bow visor design including a garage for stowing the ramp. From safety point of view the visor and the ramp can be regarded as a single barrier, the design is integrated.

BD indicates bow doors, two independent barriers has to be passed to open the ship, the doors and the ramp.

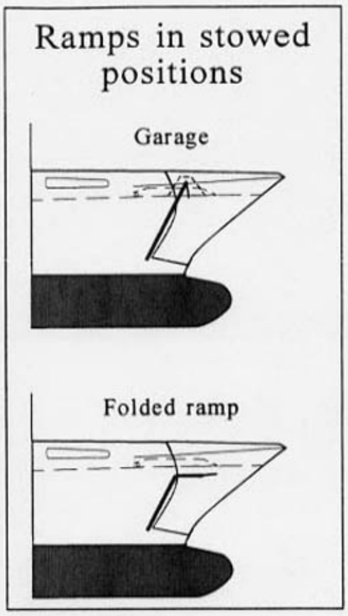
SD indicates side door, one barrier has to be passed to open the ship. The strength of the side door arrangement should be equal with the ship's side.

"Silja- and Viking Line" Bow Arrangements

	Birger Jarl, Lo/Lo	1959	(Viking Vi.Gar, Slite SD)	
	SS Bore SD	1960		
	Skandia Vi.	1961	(Boge SD)	
	Nordia Vi., Svea Jarl SD	1962		
	Ilmatar Vi.Gar, Floria, Lo/Lo	1963	(Ålandsfärjan Vi.Gar)	Kapellskär
		1964	Apollo Vi.Gar (Drotten Vi.Gar)	
	(Holmia Vi.Gar)	1965	(Visby Vi.Gar)	Winter traffic Kapellsk.-Pargas
Silja to Värtan	Fennia Vi.Gar	1966		
	Botnia Vi.	1967	Kapella Vi.Gar, (Visby Vi.Gar, Stena Baltica Vi.Gar)	
		1968	(Viking 2 Vi.Gar)	
		1969		
New name; Silja Line	Floria Vi.Gar	1970	Apollo Vi.Gar, Viking 1 Vi.Gar, Marella Vi.Gar	
		1971		
Winter traffic Stockholm-Helsinki	Aallotar BD, Svea Regina BD	1972	Viking 3 Vi.Gar, Diana Vi.Gar	
	Bore I Vi.Gar *The 1:st Oil Crisis*	1973	Viking 4 Vi.Gar, Aurella Vi.Gar	New route for Viking Line -73 Stockholm- Mariehamn-Turku
		1974		New route for Viking Line Stockholm-Helsinki -74
	Svea Corona, Wellamo, Bore Star	1975	Viking 5 Vi.Gar, (Viking 6 Vi.)	
	Vi. Vi. Vi.	1976	(Apollo III SD)	
		1977	(Ålandsfärjan Vi.)	
	The 2:nd Oil Crisis	1978		
		1979	Diana II Vi.Gar, Turella Vi.Gar	
		1980	Rosella, Viking Song, Viking Sally, Viking Saga Vi.Gar Vi. Vi.Gar Vi.	
	Finlandia Vi.Gar, Silvia Regina Vi.Gar	1981		
		1982	(Aurella Vi.Gar, Ålandsfärjan Vi.Gar)	
		1983	(Ålandsfärjan Vi.Gar)	
		1984	(Ålandsfärjan Vi.Gar)	New name; Viking Line
	Svea BD	1985	Mariella Vi.Gar, (Ålandsfärjan Vi.)	
	Wellamo BD	1986	Olympia Vi.Gar	
		1987	(Ålandsfärjan Vi.Gar)	
		1988	Amorella Vi.	
		1989	Athena BD, Cinderella BD, Isabella BD	
	Silja Serenade BD, (Silja Star)	1990	Kalypso BD	
	Silja Symphony BD	1991	*Notes:* SD = *Side Doors*, BD = *Bow Doors*	
	BD BD	1992	Vi.Gar = *Visir & Ramp-garage* Vi = *Indipendant Visir*	
ADC Support AB Stockholm 1995	(Silja Europa, Silja Scandinavia)	1993	Vi.Gar = *Visir & Ramp-garage and barrier*	

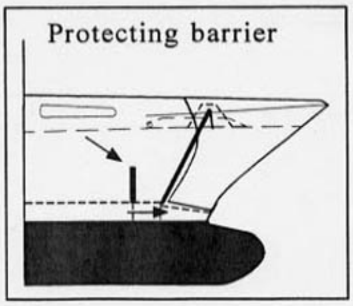
On the sketches of the openings the ship is shown with a bulbous bow. In the trade Apollo from 1964 was the first ship with a bulb. Without having specially designed landing ramps it was, for the ships with bulb necessary to arrange a longer bow ramp. Generally the hight in the fore-ship was not sufficient to accommodate the full length of the ramp when raised.

There were two possibilities to accommodate a long ramp, either to make the forward part of the ramp foldable or simply to increase the hight by arranging a garage on the above deck in which the ramp could be stowed.



In order to make the design simple and the operation uncomplicated the solution with the garage used to be more frequent. Then the garage was built on the deck of the visor. Consequently the two construction elements was integrated. Accordingly the ship had then in practice just one protecting barrier against the sea.

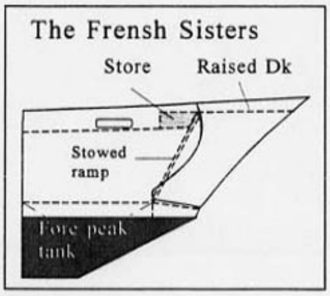
The other solution was to make the uppermost part of the ramp foldable forward under the mooring deck. The shapening of the bow limited the length of the folded part. This was also in practice an "integration" of the visor and the ramp. Thus if the visor for some reason was moved outside its normal track it could effect the folded part of the ramp.



There was also a solution aiming to reduce the required length of the ramp. The pivoting point of the ramp was simply forward and thus could the ramp be made shorter. Often this was not sufficient so this was often combined with the above described arrangements. When the ramp was moved forward the ramp couldn't in general fulfill the requirements as an extension of the forward collision bulkhead as specified in SOLAS. That had to be compensated. To arrange a 2,3 m high extra barrier behind the ramp was then considered as an equivalent solution to the rules in SOLAS.

M/S Estonia had a garage built on the visor to accommodate the upper part of the ramp. The ramp was moved forward and therefore did not fulfill the rules as an extension of the collision bulkhead. The arrangement could have complied with the rules of SOLAS if an additional barrier had been arranged.

The "French Sisters" Svea Corona, Wellamo and Bore Star had an interesting solution. Instead of the garage a store was arranged on the fore castle deck. The ramp was stowed towards the forward bulkhead of that store. The foremost part of the forecastle deck belonging to the visor was then raised to the same level as the roof of that store. Thus the ramp and the visor was no longer an integrated design.



From design point of view, visors and bow doors is shapening the bow of the ship. Properly designed the bow shape would contribute to good sea keeping performance. Although it is the ambition, it is practically impossible, to keep the space forward of the ramp completely dry, but the construction shall prevent rough sea from penetrating the space between the bow and the ramp. The ramp on the contrary, has to tighten against the frame. When under way it is normal that some water in certain sailing conditions is sloshing on the fore peak tank top in front of the ramp. If the sealing of the ramp does not work properly, an early warning will be given by a wet cargo deck. Then this is normally corrected by operational reasons as soon as possible, far before that water will be a safety issue.

From a safety point of view bow doors are a better design than a bow visor. The external forces on a visor are acting in an opening direction. That means that a failure can result in an unsafe situation. On a bow door design the heavy forces from the sea on the contrary are closing the doors. Thus a failure doesn't result in an unsafe situation.

Most bigger relatively new Passenger/ RoRo cargo/ Ferries have bow doors. In some cases the impact forces from sea have been underestimated and the supporting structures have not been strong enough. Consequently when such doors have been overloaded the construction has jammed making the doors difficult to open. This is an example of how a failure didn't result in an unsafe situation.

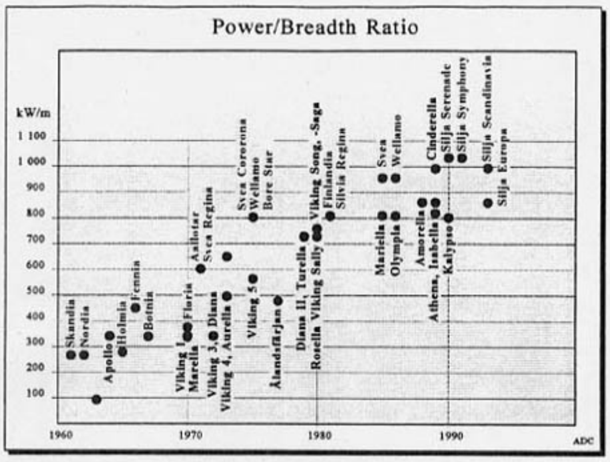
The consequence of a properly designed supporting structure for a bow door arrangement is often that the forward mooring deck is covered. Thus a stiff box construction provides the foundation of the supports absorbing vertical forces. It has not been difficult to get acceptance for such arrangements in this traffic as this reduce the problem with ice and snow on mooring deck wintertime. An other advantage is that the risk to ship "green water" on fore castle deck is avoided. The forces acting on the bow door's locking devices are not just the mass forces of the doors. Under some circumstances the water flow in the bow region can cause suction forces on the surface of the door. These forces, are however much less than the pressure caused by sea impacts on the bow.

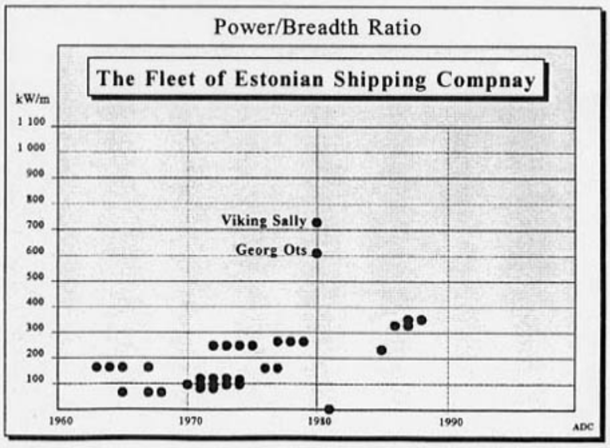
Safety and redundancy

After the second oil crisis the size of ships in the trade grew considerably . Also some of the tradition regarding suitable bow shapes for the Baltic Sea was lost. The challenging bow flare of M/S Estonia is an example of that. Another example is a small local knuckled flare some meter above the water line that M/S Finlandia/ Silvia Regina had when delivered. This was a cavity that captured waves. Very high pressure was built up in the cavity and when the energy was released water was shot far away from the ship. Even during normal sea conditions passenger experienced that as explosions and many had difficulties to sleep. This was quickly redesigned by Silja Line. That incident showed the importance passenger comfort. Ever since passenger comfort is a very important aspect when the route is planned. Silja Line also made efforts to soften bow shapes on the following ships.

During the 60's and 70's the conceptual development of deep sea shipping was very fast. In ship design the laws of nature was often violated when struggling for maxi-mising transport productivity. Also the ship yards wanted to offer high productive ships in terms of cargo carrying capacity and high trial speeds. Cost for bunker had at that time low priority an the marine engines available could deliver the required power. Ship engines were turbo charged already in the 50's, the car industry begun with that in the 80's. The design philosophy many times was to build a ship like a wrapping around the cargo with easy accesses for cargo handling. Thereafter the necessary power was installed. To improve productivity on the ship yards flat panels were used as much as possible. The result of all this was boxed shaped ships with low hydrodynamic efficiency and bad sea keeping performance.

Consequently most Owners in the West also learnt that the engine power of "modern" ships could endanger the ship if the power resource was not handled gently. The diagram below shows the ratio of ship power to breadth over the years, in this traffic. The ratio just mirrors the potential a ship has to maintain speed through rough sea. Since also other factors are influencing on the ships performance in rough sea the plotting in the diagrams shall just be regarded as indications.


Power/Breadth Ratio
kW/m
1 100
1 000
900
800
700
600
500
400
300
200
100
1960
1970
1980
1990
ADC
Skandia
Nordia
Apollo
Holmia
Fennia
Botnia
Viking 1
Marella
Floria
Aallotar
Svea Regina
Viking 3, Diana
Viking 4, Aurella
Svea Corona
Wellamo
Bore Star
Viking 5
Ålandsfärjan
Diana II, Turella
Rosella Viking Sally
Viking Song, -Saga
Finlandia
Silvia Regina
Mariella
Svea
Olympia
Wellamo
Amorella
Athena, Isabella
Kalypso
Cinderella
Silja Serenade
Silja Symphony
Silja Scandinavia
Silja Europa


Power/Breadth Ratio
The Fleet of Estonian Shipping Compnay
kW/m
1 100
1 000
900
800
700
600
500
400
300
200
100
1960
1970
1980
1990
ADC
Viking Sally
Georg Ots

The crew of M/S Estonia (M/S Viking Sally) was recruited from Estonian Shipping Company (ESCO). The diagram shows the corresponding power/breadth ratio of the ESCO fleet in early 1993.

Ships navigation and operation at sea was before The Estonia catastrophe not considered as a main risk factor. The routines were well proven and it was no doubt the ships should be seaworthy. Safety was focused on all the time. Checking lists for operation of the ships were made and followed as far as practical. The two competitors agreed on how the ships should cooperate in confined waters. A near accident report system was introduced but at the time it was no success due to that the integrity of individual persons could not be safely guaranteed. The seagoing personnel exchanged however a of lot vital information of how to handle the ships safely.

Until the mid 80's the technical development dominated the owners' efforts to make the ships safer. Redundancy and single point failure i.e. multi engine arrangements and back up solutions had been applied from the beginning. Techniques and routines to minimise risks for black out (powerless ship) were developed. In case of a black out there was a lot of technical systems available and prepared routines to assure safe handling of the ship. For the first time in commercial shipping computer aided navigation systems were introduced etc. etc.

Although safety against fire was improved for shipping in general, these operators took fire risks even more serious. The local fire brigade onboard the ships solved many fire incidences on the ships with minimal consequences. Serious fires occurred but in these cases the ships were out of traffic, docking etc. Thus the Lines had a leading position in preventing and fighting fires, both from hardware (structural and equipment) and software (routines and handling) point of view. To ensure safe handling of the ship in a damage condition extensive training programs were run onboard.

Cooperating accident training with land forces was routine both on the Swedish and the Finnish side. Some exercises were made in full scale e.g. including Swedish and Finnish helicopters, fire brigades from shore on road ferries etc. For example, the experiences from an exercise at Korpo in the Åland Archipelago contributed to the decision in Finland to renew the helicopter fleet.

In fact some of these exercises emanated from discussions from mid 80's about how the impossible accident should be handled. "The accident that couldn't happen", that happened M/S Estonia. This was concluded by stating; if it is hard weather it doesn't matter how many the ships are in the area. The only assistance they can give is to serve as On Scene Commander, and to receive and treat distressed people from helicopters. The ships had already at that time developed routines for sending sick passengers from the ships with helicopter to hospitals. A result of that discussion was however that it was decided to make the electrical motors for hoisting lifeboats stronger. Before, these motors were just able to lift the lifeboats onboard when exercising, now the motors should be able to lift a lifeboat filled with rescued people.

The list of safety measures can be made longer. In the end of the 80's both lines formalised the safety work by establishing permanent functions in the organisations.

Some major accidents as e.g. M/S Herald of the Free Enterprise, M/S Scandinavian Star put passenger safety into focus and the public pressure on authorities to do something increased. Thus a lot of the rules and regulations for ships were revised and for the first time requirements on ship owners organisation were formulated in the so called ISM-Code, the International Ship Management Code for safe ship operation.

The collective record of Silja- and Viking Line from 1960 to 1995 is five killed passengers on 107 million passenger single trips i.e. one casualty per almost 18 million single trips. This can be compared with the risk to be struck by the lighting when living in UK, that has been calculated to be 1 in 10 million. These five causalities was caused in one accident, it was one ship running into a cabin of another ship. The reason was that the captains had misunderstood how the ships should pass each other in a narrow section of a fairway.

EPILOGUE

The purpose with the description of The Baltic Phenomenon, from which M/S Estonia emanates, has been to mirror the atmosphere in which the ship were designed and operated. It is also an history of how competition force the two rivals to adopt to the market situation in the trade and thereby discovering new market segments.

The economical situation and the extensive know-how of the trade, formal and informal network of contacts between specialists in the region have contributed to give this ferry services a leading position in the world. This is not just concerning the commercial concept development but also from a safety and ship design point of view. The traffic has been pioneer in many safety areas e.g. navigation systems, fire systems, redundancy of vital technical systems, ships construction, onboard safety routines and training etc. Many of these ideas have later on been adopted by authorities as rules and regulations.

This overview with the explanations of the work with safety is contrasting to the Estonia catastrophe. The reason is that until this happened the design philosophy was that big volumes of water should not enter into cargo deck when the ship was properly closed at sea. When the catastrophe showed this was a false philosophy an intensive work started to make these ships safe regardless of water on cargo deck. In fact this work was already started after the catastrophe with the Herald of The Free Enterprise. Thus the latest purposely built ships in the trade manage to carry a lot of water on the cargo deck: M/S Silja Symphony and M/S Silja Serenade manage one meter and M/S Silja Europa has to sink before she capsizes.

Sea transportation is almost as important for the development of Estonia as it has been and still is for Finland. The Baltic Phenomenon is however not expected to be repeated in the Estonian trade. The different geographical situation of Estonia, is reason to expect a different development. The commercial development irrespectively, such traffic will be included in the discussions and the development of safety- and environmental standards for the region.

Stockholm in December 1995

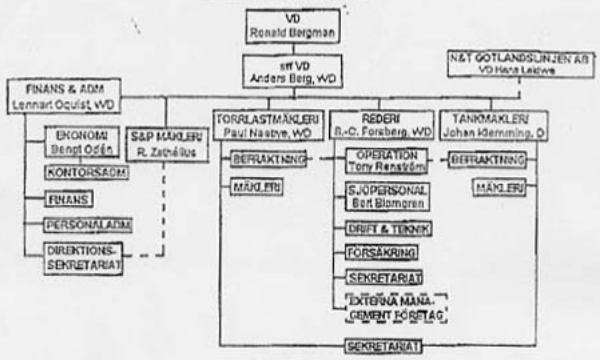
Hans Wermelin
Naval Architect M.Sc.

SOURCES

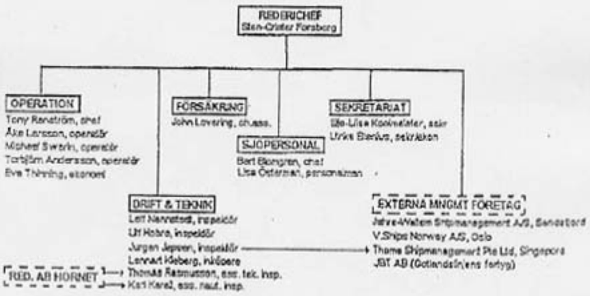
The Swedish Central Bureau of Statistics	National statistics
Statistics Finland Library	National statistics
Cruise & Ferry Info	Traffic statistics
Lloyds Register of Ships	Ships particulars
Club Maritime	Ships history

Enclosure 5.1.107

NORDSTRÖM & THULIN AB
Ledning och organisation



N&T REDERIAVDELNING



CURRICULUM VITAE

Carl Sten-Crister Forsberg

Född i Göteborg 450304-5413
Gift, inga barn
Ev. fritid ägnas åt segling, skidåkning, musik och litteratur

Utbildning

1965	Studentexamen, Reallinjen, Matematisk gren Hvitfeldtska HAL, Göteborg
1966--67	Plutonchefsskola, I17 Uddevalla
1968	Teoretisk Fysik med Kvantmekanik 1 betyg + del av Fysik 1 betyg Göteborgs Universitet
1972	Civilingenjör, Skeppsbyggnad (Skeppshydromekanik/Skeppbyggnadsteknik/Skeppsmaskinteknik/Industriell Ekonomi) Chalmers Tekniska Högskola, Göteborg

Anställningar

		LINDHOLMENS VARV AB, Göteborg
1965	sommar	Ritkontor, ritare
1968	sommar	Produktion, utrustningsplåtslagarhjälpare
1969	sommar	Produktion, utrustningsplåtslagare
1970--71	sommar	AIMS AB, Göteborg Projektassistent: dataprogrammering, tekniska illustrationer, fältmätningar
1972--74		GÖTAVERKEN CITYVARVET, Göteborg Biträdande reparatörsingenjör, skrov och maskin
1974--76		SALÉNREDERIERNA AB, Stockholm Torrlastdivisionen, biträdande inspektör
1976--77		GÖTAVERKEN CITYVARVET, Göteborg Reparatörsingenjör, skrov och maskin
1977--78		SALÉNREDERIERNA AB, Stockholm Torrlastdivisionen, inspektör
1978--82		SALÉNINVEST AB, Stockholm Fartygsdriftdivisionen, vice divisionschef
	1978--80	controller
	1980--82	teknisk chef
1982--84		SALÉN TANKER AB / SALÉN DRY CARGO AB, Stockholm Direktör med samlat ansvar för fartygsdrift (ship management)
1984--86		MONITOR SHIPPING AB, Stockholm Verkställande direktör
1987		ARGONAUT AB, Stockholm Fusion av Argonaut AB och Monitor AB organisationer. Koordinering av Argonaut AB fartygsdrift.
1987--88		CRISTER FORSBERG KONSULT AB, Stockholm Marinkonsult med engagemang i Nordia Shipping AB, Stockholm, Argonaut AB, Stockholm, Salén Agencies Singapore Pte Ltd, Island Navigation Ltd, Hong Kong
1988--		NORDSTRÖM & THULIN AB, Stockholm Direktör, från april 1993 vice verkställande direktör. Rederichef med ansvar för drift/teknik/sjöpersonal/operation/fartygsförsäkring

Styrelse engagemang

1980--84	SALÉN MARINE SUPPLIES AB, Göteborg
1985--87	SMS MARINE SERVICES AB, Göteborg (Ordförande)
1985--87	SALTECH CONSULTANTS AB,Stockholm (Ordförande)
1985--87	STOCKHOLM CHARTERING AB, Stockholm
1985--88	NORDIA SHIPPING AB, Stockholm (Ordförande)
1992--93	GVA CONSULTANTS AB, Göteborg
1993--	E-LINE LTD, Tallinn, Estland
1993--	ESTLINE AB, Stockholm
1993--	NORD-JAHRE TANKERS, LTD (Suppleant)
1994--	SKULD AB, Stockholm (Suppleant)

Andra engagemang

1988--		SVERIGES REDAREFÖRENING
	1988--92	Sjörättskommittén, ledamot
		Tekniska kommittén, ledamot
		Referensgruppen för tekniska färjefrågor, ledamot
		Tank- och bulk sektionsråd, ledamot, v.ordf.från 1994
1990--		LLOYD's REGISTER of SHIPPING
		Svensk teknisk kommitté, ledamot
1990--		DET NORSKE VERITAS
		Nordisk teknisk kommitté, ledamot
1993--		BUREAU VERITAS
		Nordisk teknisk kommitté, ledamot
1991--		STOCKHOLM SHIPPING LODGE, ledamot
	1991--93	Ordförande

CURRICULUM VITAE

Ulf Hobro

Född 1948-03-31

Utbildning

1966	Skolfartyget M/S RAUNALA, förb. maskinteknikerkurs
1968	Maskinteknikerexamen, Sjöbefälsskolan Stockholm
1970	Sjöingenjörs examen, Sjöbefälsskolan, Stockholm
1970	Skepparexamen, Sjöbefälsskolan, Stockholm
1988	Juridisk översiktskurs, Stockholms Universitet

Certifikat och behörigheter

1989	Begränsat radiotelefonistcertifikat
1977	Sjöingenjörsbrev
1972	Maskinteknikerbrev

Kurser

1971	Svetskurs med prov, ESAB
1971	Rationellt fartygsunderhåll, IKO Consult AB
1978	B&W Alpha traininging course
1979	Dator grundkurs, SIFU
1980	Uppriktning av maskiner och axlar i fartyg, STF ingenjör
1981	Underhållsteknik fartyg, Idshammar Konsult
1984	Släckledarkurs, Sjöfartens Brandskyddskommitté
1984	Arbetsmiljöutbildning, Arbetarskyddsnämnden
1987	Vardagsjuridik, upphandling konsulttjänster och entreprenadupphandling, Familjebostäder

Anställningar

	JOHNSON LINE
1965	Maskinelev
	GRÄNGESBERSBOLAGET
1966	Maskinbefälselev
	ÖSTKUSTENS ÖRLOGSBAS
1967	Varvspraktik maskin och el
	GRÄNGESBERGSBOLAGET
1968--69	2:e mask. jr. under sommaruppehållen från Sjöbefälsskolan
	WALLENIUS LINES
1970--73	4:e, 2:e, 1:e och maskinchef samt nybyggnadskontrollant M/S FIGARO
	REDERI AB GOTLAND
1973--87	1:e maskinist och maskinchef Nybyggnadsinspektör M/S GOTLAND 1973 M/S GUTE 1978--79 M/S VISBY 1980
	WALLENIUS LINES
1976	Maskinchef

1987--89	FAMILJEBOSTÄDER AB
	VVS-ingenjör
	SJÖFARTSVERKET, Stockholm
1989--90	Förste fartygsinspektör förordnad som expert i katastrofkommissionen i samband med branden på SALLY ALBATROSS
	NORDSTRÖM & THULIN AB
1990--	Inspektör

Enclosure 5.2.110

N&T/S C Forsberg - Skrivelse till Polismyndigheten i Stockholm 94-11-01

Kortfattad redogörelse avseende vissa bakgrundsfakta av intresse för utredningen om

M/S ESTONIA förlisning 28 september 1994

1. REDERIET/ÖVERGRIPANDE BOLAGSSTRUKTUR

1.1 Bolag och avtal

Nedanstående redogörelse avseende bolagsstruktur återfinns schematiskt i Bilaga 1.

M/S ESTONIA ägdes av det cypriotiska bolaget Estline Marine Company Ltd. Detta bolag ägdes med 50% vardera av Estonian Shipping Company Ltd (ESCO) respektive Nordthulin Luxembourg S.A., som är ett helägt dotterbolag till Nordström & Thulin AB (N&T). Fartyget var registrerat på Cypern med tillstånd för parallellregistrering i Estland.

Att fartyget var registrerat på Cypern beror på att långivaren, European Bank for Reconstruction and Development (EBRD), ställde som krav att fartyget skulle vara registrerat i register med för banken acceptabel inteckningssäkerhet, vilket man ej ännu bedömde fallet vara i Estland.

Fartyget var uthyrt från Estline Marine Company Ltd till Estline verksamhetens huvudman, det estniska bolaget E-Line Ltd (E-Line) på ett s.k. bareboat-certeparti. E-Line ägs med 50% vardera av ESCO respektive Nordthulin Luxembourg S.A.

M/S ESTONIA var registrerat i det estniska bareboat-registret och hade därigenom rätt och plikt att segla under estnisk flagg och med estnisk besättning.

En bareboat-befraktning innebär i korthet att fartyget hyrs ut utan besättning och att bareboat-befraktaren svarar för bemanning och för övriga normala redarfunktioner.

Bareboat-befraktaren, E-Line, överlät genom ett s.k. Ship Management avtal på ESCO att bemanna fartyget samt att svara för tekniskt underhåll/drift och försäkring. Skälet till detta var att ESCO, som är ett statligt helägt rederi med ett 50-tal egna fartyg, har betydligt bättre förutsättningar än E-Line att handha besättningsfrågor såsom anställning, kvalifikationskontroll, utbildning och uppföljning.

ESCO i sin tur överlät genom samma avtalsform tekniskt underhåll/drift på N&T som på det området har bättre kompetens och erfarenhet vad gäller stora passagerarfärjor än ESCO och därtill bättre tillgång till leverantörer av utrustning och reservdelar m.m. Även försäkringsupphandling och -administration överläts på N&T som har större erfarenhet från internationell fartygsförsäkring än ESCO.

E-line gav genom ett agentavtal uppdraget att sköta Estlines kommersiella operation (biljett- och fraktförsäljning, hotell och restaurangverksamhet ombord, terminalverksamhet etc.) till det svenska bolaget Estline AB, vilket ägs med 50% vardera av ESCO respektive N&T. Ett av

Estline AB helägt estniskt dotterbolag, Estonian Ferry Services Ltd (EFS), har svarat för biljett- och fraktförsäljning i Estland och terminalverksamheten i Tallinn.

1.2 Internorganisation

N&T som är ett svenskt börsnoterat rederiföretag har en rederiavdelning för vilken Sten-Crister Forsberg ansvarar. Avdelningen innefattar en operationsfunktion, en sjöpersonalfunktion, en drift & teknik funktion, en försäkringsfunktion samt ett sekretariat.

Under rederiavdelningen hanteras även sådana externa managementuppdrag som uppdraget avseende M/S ESTONIA utgjorde. Liknande uppdrag utföres också för OK Petroleum och Neste Oy.

Ulf Hobro, teknisk inspektör, och Lennart Kleberg, inköpare, är anställda inom rederiavdelningens drift & teknik funktion (se också avsnitt 6). N&T:s rederiavdelning har också använt sig av personal anställd hos ett fristående företag, Rederi AB Hornet, för bl.a. teknisk uppföljningsarbete ombord (se också avsnitt 6 och 7.3).

N&T:s respektive Estline AB:s organisationer återfinns schematiskt beskrivna i Bilaga 2 och 3.

2. ANSVAR - GRUNDLÄGGANDE REGLER

Den under föregående avsnitt beskrivna situationen är inte ovanlig. Inom rederibranschen är det snarare regel än undantag, att en del av redarens funktioner överlåts till management-bolag. Tanken är att låta specialiserade företag, med större erfarenhet och kunskap, sköta de arbetsuppgifter som i annat fall utförs av rederiet. Inblandningen av flera bolag motiverar en kommentar hur ansvarssituationen gentemot passagerare och andra skadelidande fördelas.

Beträffande M/S ESTONIA hade de huvudsakliga redarfunktionerna genom bareboat-certeparti överförts till E-Line som i sin tur köpte tjänster av ESCO (genom Ship Managementavtal) och av Estline AB (genom Agentavtal). ESCO har sedan genom Ship Managementavtal köpt in N&T:s tjänst beträffande tekniskt management.

Sjölagens regler om ersättningsansvar bygger för övrigt på oaktsamhet och det ankommer i princip på rederiet att visa att denna/dessa inte har varit vårdslösa vad avser orsaken till skadan. Sjölagens kapitel 6 innehåller regler om ersättningsansvar vid dödsfall, personskador och sakskador[1]. Dessa regler är tillämpliga bl.a. vid all passagerarbefordran till eller från Sverige oavsett om befordringen för övrigt är underlagd främmande rätt. Skadeståndsansvaret åvilar enligt grundregeln bortfraktaren. Bortfraktaren är definierad som "den som genom avtal ..... åtar sig att med fartyg befordra passagerare ....." (SjöL 171 §). Kontraherande bortfraktare, E-Line Ltd, är ansvarig för skada som drabbar passagerare (SjöL 188 §). Ansvaret är begränsat till visst belopp för varje passagerare (SjöL 192 §) och visst belopp för en och samma händelse (SjöL 238 §).

3. FARTYGET M/S ESTONIA

Fartyget M/S ESTONIA byggdes 1980 vid det tyska varvet Jos L Meyer i Papenburg till det åländska rederiet AB Sally, som då, tillsammans med svenska Rederi AB Slite och åländska SF-

[1] I detta sammanhang avses sjölagen i den lydelse den hade vid fartygets förlisning. Sjölagen fick den 1 oktober en helt ny redigering med annan kapitel- och paragrafindelning

Line, låg bakom marknadsföringsbolaget Viking Line. Hon fick namnet VIKING SALLY och sattes under finsk flagg i Viking Lines trafik mellan Stockholm, Mariehamn och Åbo. År 1987 övergick fartyget i svensk-finska rederiet EffJohns ägo som hyrde ut henne under fortsatt finsk flagg till Rederi AB Slite för fortsatt trafik inom Viking Line. När Rederi AB Slite tog leverans av sitt nybyggda fartyg "Kalypso" våren 1990, återtogs VIKING SALLY av EffJohn och insattes under namnet SILJA STAR i Silja Lines trafik mellan Stockholm, Mariehamn och Åbo. I februari flyttade EffJohn fartyget till sin Wasa Line trafik över norra Kvarken och döpte om henne till WASA KING.
I januari 1993 förvärvades fartyget av Estline Marine Company Ltd, fick namnet ESTONIA och estnisk flagg. I slutet av februari samma år insattes fartyget i Estlines trafik mellan Tallinn och Stockholm.

Fartyget hade 10 däck, en dräktighet på 15.567 brutto registerton (BRT), 504 passagerarhytter och 1.186 bäddplatser.

4. ALLMÄNT OM SÄKERHET, REGELVERK OCH KONTROLL

Av säkerhetsmässiga skäl finns detaljerade regelverk om fartyg, dess besättning och operation. Dessa regler har internationell karaktär. De finns i konventioner och andra mellanstatliga överenskommelser. I tillägg följer också nationella regler.

FN:s maritima organ, International Maritime Organisation (IMO), har utarbetat flera viktiga konventioner och regelverk beträffande fartygs tekniska konstruktion och utrustning, operationella handhavande och miljösäkerhet, däribland främst: SOLAS (Safety Of Life At Sea), vilken omhandlar konstruktion, sjövärdighet, utrustning, brandskydd, ombordorganisation, inspektioner etc., MARPOL (Marine Pollution), vilken omhandlar fartygs utrustning och operation för förhindrande av miljöpåverkande utsläpp, STCW (Standards of Training, Certification and Watchkeeping), vilken omhandlar normer för utbildning och certifiering av sjömän samt vakthållning ombord.

Sjöfartsmyndigheten i det land där fartyget är registrerat (flaggstaten), i detta fall Estland, utfärdar tillämpningsbestämmelser för de internationella säkerhetskonventioner till vilka landet ifråga anslutit sig och har ansvaret för kontroll av att dessa regler jämte ev. egna nationella tilläggsregler uppfylles på respektive fartyg. Genom en särskild mellanstatlig överenskommelse utför också respektive lands sjöfartsmyndighet kontroll av det internationella säkerhetsregelverkets efterlevnad på andra länders fartyg som anlöper landets hamnar, s.k. hamnstatskontroll.

Klassificeringssällskapen kontrollerar att tillståndet på fartygens skrov, maskineri och utrustning vidmakthålles i överensstämmelse med de regler som respektive klassificeringssällskap har givit och till vilka fartyget ifråga har konstuerats och byggts. För att erhålla försäkring krävs att fartyget uppfyller sådans regler. Respektive lands sjöfartsmyndighet kan också i varierande grad uppdraga/delegera sin egen myndighetstillsyn till klassificeringssällskap. Internationellt utför klassificeringssällskapen i allmänhet fribordsbesiktning/certifiering för respektive sjöfartsmyndighets räkning, vilket också är fallet i Sverige.

Klassificeringssällskap för M/S ESTONIA har varit det franska Bureau Veritas med huvudkontor i Paris. Bureau Veritas är klassificeringssällskap för bl.a. flera stora svenska och finska passagerarfärjor. Estniska Sjöfartsmyndigheten hade delegerat större delen av sin myndighetskontroll och certifiering av M/S ESTONIA till Bureau Veritas. Av praktiska skäl har Bureau Veritas svenska organisation svarat för kontrollarbetet (se vidare avsnitt 7.2)

5. FARTYGETS CERTIFIKAT

Fartyget hade vid förlisningen samtliga erforderliga certifikat giltiga och utan inskränkningar:

Myndighetscertifikat:
- SOLAS: Passenger Ship Safety Certificate (PSC)
- MARPOL: Oil Pollution Prevention Certificate (IOPP)
- Fribord: International Loadline Certificate 1966
- Certificate of Minimum Safe Manning

Klasscertifikat:
- Hull Certificate
- Machinery Certificate
- Boiler Certificate
- Automation Certificate

Utöver dessa huvudcertifikat finns certifikat på enskilda delar och utrustning som exempelvis livflottar, wirar, radioutrustning och maskindelar.

Fartygets radioutrustning uppfyllde svensk-finska krav för att få segla utan radiotelegrafist, men radiotelegrafist ingick likväl i fartygets permanenta bemanning.

6. TEKNISK TILLSYN ÖVER FARTYGET

N&T:S rederiavdelning har svarat för teknisk tillsyn av fartyget. Underställd rederichefen Sten-Crister Forsberg har Ulf Hobro hela tiden varit inspektör för fartyget och ägnat en stor del av sin arbetstid åt M/S ESTONIA. Hobro har regelbundet gått igenom fartygets kondition i olika avseenden med befälhavare, överstyrman och maskinchef.

Thomas Rasmusson, som är en av N&T:S egna maskinchefer, bistod N&T:s driftsorganisation i förberedelsearbetet under c:a två månader före fartygets övertagande och medföljde därefter fartyget för att bistå de estniska maskincheferna med uppdatering av fartygets databaserade underhållssystem samt utgöra del i N&T:s driftsorganisations tillsyn av maskinanläggningens hantering och underhåll. I början av 1994 har stationerades Rasmusson på Estline-terminalen i Stockholm och hans formella anställning överfördes till Rederi AB Hornet av administrativa skäl. Rasmussons uppgifter och operativa organisationstillhörighet var dock fortsatt oförändrade.

I N&T:s driftorganisation anställd inköpare, Lennart Kleberg, har varit stationerad på heltid i Estline-terminalen i Stockholm och svarat för upphandling och inköpsadministration beträffande reservdelar, surrningsmateriel och annan teknisk utrustning och förbrukningsmateriel till M/S ESTONIA.

Till hjälp i sin styrning, kontroll och dokumentation av det maskintekniska underhållet ombord hade maskincheferna ett administrativt datasystem/program (Amos-D). Från systemet hämtas information om när specificerade underhållsuppgifter skall göras och i systemet registreras när de gjorts samt därvid noterade anmärkningsvärda detaljer. Systemet är uppbyggt kring resp utrustnings tillverkares rekommendationer och klassificeringssällskapets krav och modifieras fortlöpande med vunna driftserfarenheter.

7. BESÄTTNINGEN

7.1 Urval och utbildning

Befäl och manskap utvaldes och anställdes av/var anställda i ESCO som skötte fartygets bemanning under managementavtal med E-Line. ESCO svarade för kompetenskontroll och kompletterande fartygsspecifik utbildning. Genom Sten-Crister Forsberg och Ulf Hobro tog N&T:s driftsorganisation aktiv del i urvalet av befälhavare, överstyrmän och maskinchefer. Utöver krav på formell och praktisk kompetens och lämplighet, ställde N&T krav på att dessa förhandsmän skulle kunna kommunicera på engelska samt, i synnerhet beträffande befälhavare och överstyrmän, ha erfarenhet från passagerarfärje-/RoRotrafik.

M/S ESTONIA övertogs från föregående ägare vid varv i Åbo, där den estniska besättningen tog fartyget i besittning, ombordorganisationen intrimmades samt erforderliga arbeten för anpassning till Estlines trafik utfördes. Varierande från 2,5 månader upp till 5,5 månader från starten i den nya trafiken under estnisk flagg inhyrdes från fartygets tidigare operatör, Wasa Line, viss finsktalande driftspersonal (överstyrman, 1:e maskinist, elingenjör och 2 reparatörer) som medföljde fartyget med uppgift att bistå sina estniska motsvarigheter med praktisk erfarenhetsöverföring i hantering av fartygets specifika system. Denna princip tillämpas alltid av N&T:s driftsorganisation vid övertagande av fartyg oavsett flagg och besättningens nationalitet.

En av N&T:s färjeerfarna kaptener, Anders Andersson, bistod N&T:s driftsorganisation i förberedelsearbetet under två månader före fartygets övertagande och medföljde sedan fartyget under 5,5 månader. Hans primära uppgift var att stå till de estniska befälhavarnas förfogande för praktisk rådgivning beträffande navigering i Stockholms skärgård och manövrering i hamn samt lastplanering/stuvning och andra trafikoperativa frågor.

7.2 Särskilt om säkerhetsutbildning och uppföljning

Fartygets säkerhetsplan och -organisation har byggts upp efter modell från Silja (Wasa) Line, vilken anpassats till fartyget i samarbete mellan N&T:s driftsorganisation och fartygets förste befälhavare Arvo Andresson, vilken också deltog i förberedelsearbetena under två månader före fartygets idrifttagande. Fartygets befälhavare har svarat för säkerhetsplanens vidmakthållande och säkerhetsorganisationens övning under tillsyn och assistans av N&T:s driftsorganisation. Fartygets besättning tjänstgjorde normalt i perioder om två veckor och var enskild besättningsmedlem övades normalt i sina säkerhetsuppgifter minst en gång under varje tjänstgöringsperiod.

Före fartygets tagande i trafik gjordes den 26 januari 1993 i Tallinn en omfattande operativ kontrollövning av fartygets säkerhetsorganisation för och under överinseende av Bureau Veritas (Hans Olsson, chef för Bureau Veritas i Sverige) i samverkan med Sjöfartsinspektionen i Stockholm, vilken protokollfört övningen. I januari 1994 var fartyget under ordinarie resa från Stockholm till Tallinn föremål för den hittills största RITS (Sjöräddningstjänstens Insatser Till Sjöss) samövning som gjorts i Östersjön med deltagande av brandförsvar, polis, helikopterdivisioner, sjöräddningen, sjöfartsverk m.m. med dokumenterat omdöme om fartygets besättnings agerande som "föredömligt snabbt och professionellt".

Myndighets- och klasstillsyn av fartyget sköttes tidigare av Bureau Veritas i Finland, men eftersom den tekniska tillsynen av M/S ESTONIA skulle hanhas av N&T i Stockholm, begärde N&T att fartyget i detta avseende skulle flyttas över till Bureau Veritas i Sverige. Huvudsakligen har sedan dess inspektör Anders Wirstam vid Bureau Veritas Stockholmskontor skött ombordkontrollerna.

I övningssyfte i samband med ett utbildningsprojekt för Estniska blivande fartygsinspektörer, utförde Överinspektör Åke Sjöblom och 1:e Fartygsinspektör Gunnar Zahlée från Sjöfartsinspektionen i Malmö en inspektion ombord på M/S Estonia på eftermiddag och kväll den 27 september 1994. Man kunde därvid ej konstatera några anmärkningsvärda brister avseende fartygets sjövärdighet och sjösäkerhet.

Skyltar och säkerhetsanvisningar ombord var tvåspråkiga (estniska och engelska) eller i form av internationellt standardiserade symboler. Besättningens orderspråk ombord var estniska.

7.3 Personal från Rederi AB Hornet som medföljde ombord på M/S ESTONIA

I verksamheten ombord på M/S Estonia har ingått viss svensk och finsk personal som av administrativa skäl varit formellt anställda av ett från verksamheten i övrigt fristående företag, Rederi AB Hornet, formellt på uppdrag av Estonian Shipping Company men operativt på uppdrag av:

a) N&T driftsorganisation

Två svenska nautiska befäl med såväl svensk som estnisk behörighet, Sjökapten Karl Karell och Styrman Juri Aavik, båda med svensk lotsbehörighet för M/S Estonia i såväl Sandhamnsleden som Furusundsleden.(Aavik fr.o.m. maj 1994 efter N&T:s ovannämnde sjökapten Anders Andersson, Karell fr.o.m. januari 1994).
Deras primära uppgift har varit att bistå fartygets befälhavare i träning och förberedelser för erhållande av svensk behörighet att föra fartyget utan obligatorisk kronolots i farlederna till och från Stockholm. Sådan behörighet beviljades såväl Kapten Arvo Andresson som Kapten Aavo Piht för Sandhamnsleden under våren 1994 (de första utomnordiska befälhavare som hittils någonsin lyckats med detta).
Eftersom kravet för framförande av ett passagerarfartyg i Estonias storlek utan kronolots i Stockholms farleder stipulerar två befäl på bryggan med lotsbehörighet, tjänstgjorde därefter Karell och Aavik som lotsstyrmän ombord i tillägg till sin fortsatta uppgift att bistå befälhavarna inför erhållande av lotsbehörighet för Furusundsleden.
Den 27 september 1994 hade kapten Arvo Andresson på resan från Stockholm till Tallinn och under hamnuppehållet i Tallinn framgångsrikt slutfört examinationen för detta inför Stockholms sjötrafikområdeschef Dan Myrberg och mästerlots Sundius samt skulle kapten Aavo Piht göra detsamma på resan från Tallin till Stockholm den 28 september 1994. Andresson, Piht, Myrberg, Sundius samt Aavik är samtliga befarade omkomna vid förlisningen (rapporterade saknade och ej återfunna). Karell var vid tillfället engagerad i övertagandet i Rostock av linjens tillkommande fartyg.

b) Estline AB

Från fartygets idrifttagande som:

Intendent
Restaurantchef
Hovmästare
Kökschef
Köksmästare
Kallskänkschef
Barchef
Butikschef
Lagerchef
ADB chef
Konferensvärdinna

Receptionschef

Med uppgift att leda och vidareutbilda den estniska hotell- och restaurangpersonalen i sina service färdigheter. Befälhavaren ansvarade för all estnisk ombordpersonals träning i säkerhetsorganisationen ombord. Den svenska och finska hotell- och restaurangpersonalen ingick ej i ordinarie positioner i fartygets säkerhetsorganisation utan hade i denna endast övertaliga hjälpfunktioner. Vissa av ovanstående funktioner har efterhand övertagits av estnisk personal.

Den 28 september 1994 tjänstgjorde i kvarvarande av ovannämnda befattningar:

Intendent
Två restaurangchefer (båda ombord denna resa pga hög beläggning)
Två hovmästare (båda ombord denna resa pga hög beläggning)
Kökschef
Lagerchef
ADB-chef

Samtliga befarade omkomna (rapporterade saknade och ej återfunna). Deras avlösande kollegor var vid tillfället engagerade i övertagandet i Rostock av linjens tillkommande fartyg.

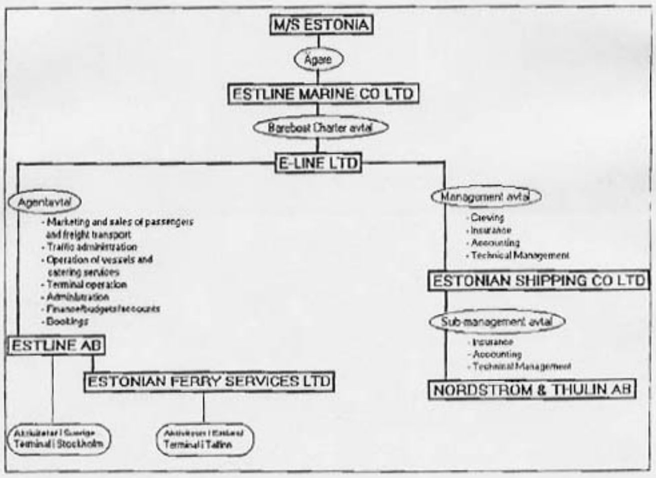
'95 11/30 17:26 FAX

BILAGA 1

ESTLINE Bolags- och organisationsstruktur

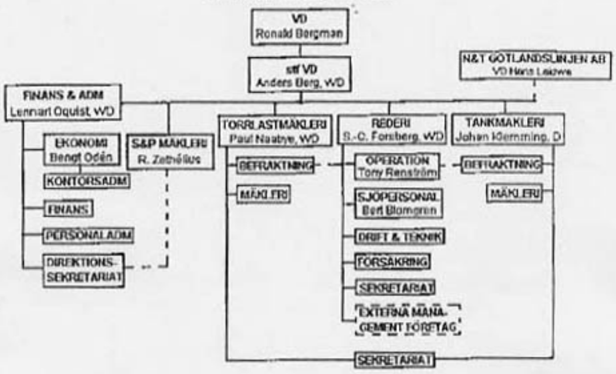
m.a.p. M/S ESTONIA

Bolag	Nationalitet	Ägare
ESTLINE MARINE CO LTD	Cypern	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
E-LINE LTD	Estland	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
ESTLINE AB	Sverige	50% ESTONIAN SHIPPING CO LTD 50% NORDSTRÖM & THULIN AB
ESTONIAN FERRY SERVICES LTD	Estland	100% ESTLINE AB
ESTONIAN SHIPPING CO LTD	Estland	100% Estniska Staten
NORDSTRÖM & THULIN AB	Sverige	Börsnoterat svenskt aktiebolag
NORDTHULIN LUXEMBOURG S.A.	Luxemburg	100% NORDSTRÖM & THULIN AB

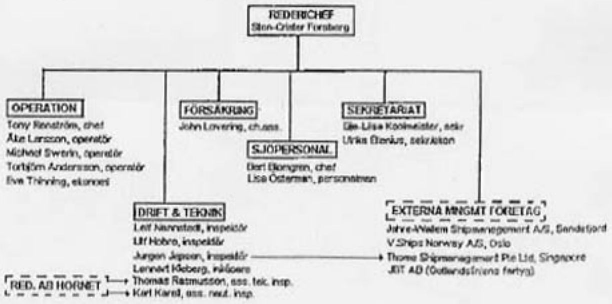


BILAGA 2

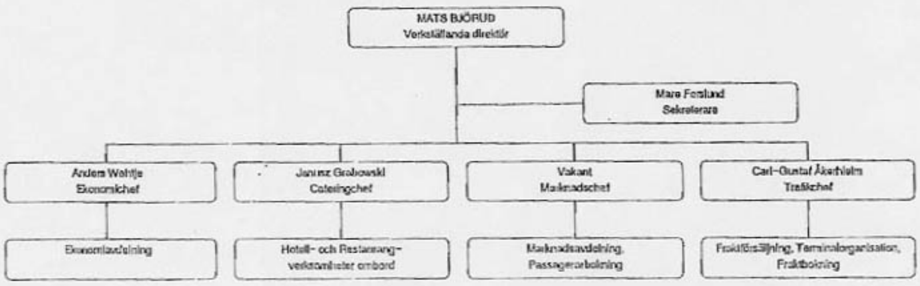
NORDSTRÖM & THULIN AB
Ledning och organisation



N&T REDERIAVDELNING



ESTLINE AB
Organisation



BILAGA 3

okt 1994

Office Translation

N+T / SC Forsberg - Letter to Police Administration in Stockholm, 1.11.94

Short statement concerning certain background facts of interest for the investigation of the sinking of M.V. "ESTONIA" on 28.9.94

1. Owners / Company structure

1.1. Company and Agreement

The statement below outlines the company structure which can also be found in enclosure no. 1 M.V. "ESTONIA" was owned by the Cyprus company Estline Marine Company Ltd. This company was owned 50% each by Estonian Shipping Company (ESCO) respectively Nordthulin Luxembourg SA, which is a wholly owned daughter company of Nordström & Thulin AB (N+T). The vessel was registered in Cyprus with permission for parallel registering in Estonia.

The reason why the vessel was registered in Cyprus was the demand of the mortgagee, the European Bank for Reconstruction and Development (EBRD), that the vessel had to be entered in a register with mortgage security acceptable to the bank, which was not the case with the Estonian register.

The vessel was chartered from Estline Marine Company Ltd. to Estline's main principal, the Estonian company E-Line Ltd. (E-Line) on basis of a so-called bareboat charter party. E-Line is owned 50% each by ESCO and Nordthulin Luxembourg.

M.V. "ESTONIA" was registered in the Estonian bareboat register and therefore had the right and obligation to sail under Estonian flag and with Estonian crew.

A bareboat charter agreement contains, in short, that the vessel is chartered but without crew and that the bareboat charterer is responsible for crew and all other normal function of a ship-owning company.

The bareboat charterer E-Line contracted on basis of a so-called Ship Management Contract ESCO to provide the crews for the vessel and take the responsibility for technical maintenance/operations and insurance. The reason for this was that ESCO, which is the government-owned ship company with some 50 own vessels, had considerable better possibilities than E-Line to deal with crew matters, such as employment, quality control, education/training and follow-up.
ESCO for their part left the technical maintenance/operation on basis of a respective contract to N+T, having better competence and experience in respect of larger passenger ferries than ESCO and also had better connection to suppliers of equipment and spare parts, etc. Also insurance matters and - administration was left to N+T having more experience than ESCO with the international insurance of vessels.

E-Line, under the agency agreement, gave instructions that the commercial activities of Estline (sale of tickets and freight, hotel - restaurant activities onboard, terminal activities, etc.) should be taken over by the Swedish company ESTLINE AB, which is owned 50/50 by ESCO and N+T.
One of Estline AB's Estonian sister companies, Estonian Ferry Services Ltd. (EFS), had the responsibility for the sale of tickets and freight in Estonia as well as the terminal activities in Tallinn.

1.2. <u>Internal Organisation</u>

N+T, which is a shipping company noted on the Swedish exchange, has a shipping department for which S.C. Forsberg is responsible. This department deals with the following functions:

- operation
- seagoing personnel
- technical inspection
- insurance

In addition there is a secretary's office.

In the shipping department we also deal with such external management contracts as the one which referred to the "ESTONIA". We also have similar contracts with OK Petroleum and Neste Oy. Ulf Hobro, technical superintendent, and Lennart Kleberg, buyer, are employed with the shipping department Operation & Technic (see also part 6). The shipping department of N+T has also engaged personnel from the independent entity Rederei AB Hornet, e.g. for technical follow-up work onboard. (See also parts 6 and 7.3).

N+T's respectively Estline AB's organisation you can find schematically explained in enclosures 2 and 3.

2. Responsibility - Basic Rules

The situation explained in the above paragraph is not unusual (uncommon). In the shipping business it is more the rule than the exception that part of owners' employees are engaged from ship management companies. The idea is that certain entities become specialized with vast experience and knowledge and take over the activities which otherwise the shipping company employees themselves would have carried out. The involvement of a number of companies requires a distribution of the liability towards passengers and other victims.

With reference to the "ESTONIA" E-Line, in their capacity as bareboat charterer, had taken over the main functions of a shipping company, however, had bought the services of ESCO (on basis of a ship management contract) and of ESTLINE AB (on basis of an agency agreement). ESCO thereafter bought the services of N+T in respect of technical management on basis of a ship management contract.

The rules of the maritime law concerning liability for compensation requires negligence and, in principle, the shipping company has to prove that they have not acted negligently as to the cause of the casualty.

The claims reserve in the Maritime Code is based in general on negligence and the owners have to prove that they have not proceeded carelessly. The Maritime Code, Chapter 6, contains rules regarding liability in case of death, personal injury, and physical loss. In this connection reference is made to the wording of the Maritime Code having been in force at the time of the casualty. The Maritime Code in October received a totally new wording with other chapter and paragraph distribution.

These rules are applicable, for example, for every passenger tranpsort to or from Sweden, irrespective if that transport may otherwise be governed by foreign law. The carrier is liable according to the general rule. The definition of a carrier is "who concludes a contract to perform a carriage of passengers by vessel ...." (the Maritime Code, see §171). The contractual carrier, E-Line Ltd., is liable for injuries caused to passengers (the Maritime Code, see §188). The liability is limited to a certain amount per each passenger (the Maritime Code, see § 192) and to a certain amount per each incident (the Maritime Code, see § 238).

3. <u>The vessel M.V. "ESTONIA"</u>

The vessel M.V. "ESTONIA" was built 1980 at the German shipyard Jos. L. Meyer in Papenburg for the Åland Island Shipping Company AB Sally, which at that time, together with the Swedish AB Slite and the Åland Island based SF-Line, were behind the market leader, Viking Line. She got the name "Viking Sally" and was put into the traffic of Viking Line between Stockholm, Mariehamn and Turku under Finnish flag. In 1987 the vessel was taken over by the Swedish/Finnish shipping company Effjohn, which chartered her still under Finnish flag to AB Slite and she continued trading in Viking Line Service. When AB Slite took delivery of their newbuilding "Kalypso" in 1990 "Viking Sally" was redelivered to Effjohn and put under the name "Silja Star" into Silja Line's traffic between Stockholm, Mariehamn and Turku. In February, Effjohn moved the vessel to its Wasa Line traffic across the Gulf of Botnia and changed her name to "Wasa King".

In January 1993 the vessel was bought by Estline Marine Company Ltd., received the name "ESTONIA" and the Estonian flag. At the end of February of the same year the vessel was employed in Estline's traffic between Tallinn and Stockholm. The vessel had 10 decks, 15 567 BRT, 504 passenger cabins and 1,186 beds.

4. General Information on Safety, Rules on Control

There are detailed rules concerning safety matters about the vessel, her crew and operation. These rules have international character. They can be found in conventions and other intergovernmental agreements. In addition, they are also following national rules/regulations.
The UN's Maritime Organisation, IMO, has issued many important conventions and regulations concerning vessel's technical construction and equipment, operational handling and safety of the environment; among others SOLAS, which deals with construction, seaworthiness, equipment, fire protection, board organisation, inspection, etc.; MARPOL, which deals with vessel's installations and operation to avoid damage to the environment STCW (Standards of Training, Certification and Watchkeeping), which deals with standards for training/education and certification of sailors as well as watchkeeping onboard.

The Shipping Authorities of the country, where the vessel is registered (flag/state), in this case Estonia, issue application regulations for the International Safety Conventions which have been ratified by the country in question and for which it has the control responsibility whether these regulations are being followed, possibly own national addenda for respective vessels. On the basis of a particular intergovernmental agreement the Shipping Authorities of the respective country also carry out controls whether the International Safety Rules are also being followed onboard of vessels of other countries calling at their ports, the so-called Port-State-Control.

The classification societies are checking whether the condition of vessel's hull, machinery and equipment is maintained in accordance to the rules of the respective classification society and according to which the vessel in question had been constructed and built. The vessel has to comply with these rules in order to comply with the requirements of the insurance. The Shipping Authorities of the respective country may also to a certain degree delegate their own obligations to classification societies. Internationally classification societies generally carry out the loadline surveys and certifications for respective Shipping Authorities' account, which is also the case in Sweden.

The classification society for the M.V. "ESTONIA" was the French Bureau Veritas (BV) with head office in Paris. BV is the classification society for a.o. several large Swedish and Finnish passenger ferries. The Estonian Shipping Authorities had delegated large parts of their obligations for control and certification in respect of M.V. "ESTONIA" to BV. Based on practical considerations the Swedish organisation of BV took over these control works (see also para. 7.2.).

5. Vessel's Certificate

The vessel had at the time of the casualty all necessary certificates valid and without restrictions.

Shipping Authority Certificates:

SOLAS	-	Passenger Ship Safety Certificate (PS)
MARPOL	-	Oil Pollution prevention Certificate (IOPP)
Load Line	-	International Load Line Certificate 1966

Certificate of Minimum Safe Manning

Class Certificate:
- Hull Certificate
- Machinery Certificate
- Boiler Certificate
- Automation Certificate

In addition to these main certificates there are numerous certificates for various equipment, such as e.g. life-rafts, wires, radio equipment and machinery parts.

Vessel's radio equipment complied with Swedish/Finnish requirements for sailing without radio operator, although a radio operator belonged to the permanent crew of the vessel.

6. Technical Supervision of the Vessel

N&T's shipping department had the responsibility for the technical supervision of the vessel. Under the manager of the shipping department, Sten-Crister Forsberg, was Ulf Hobro, the whole time inspector/ superintendent of the vessel and who spent a large part of his working time for M.V. "ESTONIA". Hobro had regularly checked the condition of the vessel, irrespective of what master, chief mate and chief engineer did.

Thomas Rasmusson, who is one of N&T's own chief engineers, assisted N&T operation organisation in preparation work under c.: 2 months before take-over of the vessel and the following month in order to assist the Estonian chief engineer in up-dating vessel's computer based maintenance program including establishing the part of N&T's organisation concerning supervision of handling and maintenance of the engine plant.

In the beginning of 1994 Rasmussen got an office in Estline Terminal Stockholm and his official employment was changed over to the Shipping Company Hornet AB for administrative reasons: Rasmusson's activities and organisational belonging, however, continued unchanged.

The purchaser, Lennart Kleberg, employed by N&T's organisation was the whole time located at Estline Terminal in Stockholm, and he was responsible for negotiating and purchasing of spare parts, lashing material and other technical equipment and consumables for M.V. ESTONIA".

To assist the chief engineer in steering, controlling, and documenting the machine technical maintenance onboard there was the administrative data system/ program (A-mos-D) available. The system delivers information concerning particular maintenance items to be dealt with and the system registers remarkable details. The system includes the recommendations of the manufacturers as well as the requirements of the classification society and modifies continuously the gained operation experience.

7. Crew

7.1. Selection and Education

The selection and employment of officers and ratings was performed by ESCO, who had to supply vessel's crew according to the management contract with E-Line. ESCO was responsible for competence control and for vessel-specific education. The N&T organisation took active part through Sten Crister Forsberg and Ulf Hobro in selecting the masters, chief mates and chief engineers. In addition to requiring formal and practical competence and qualification N&T also required that these top people should also be able to communicate in English, and in particular that the respective masters and chief mates had experience with passenger ferries / Ro-Ro traffic.

M.V. "ESTONIA" was taken over from her previous owners at the shipyard in Turku, there the Estonian crew took possession of the vessel, the onboard organisation was established and necessary work to adjust the vessel to Estline's traffic was carried out. Finnish speaking personnel from the previous owners Wasa Line (chief mate, 1st engineer, electrician and 2 repairmen) were hired from start of the new traffic for between 2½ and 5 months to assist their Estonian successors with practical advice in dealing with vessel's specific systems. This principle was always followed by the operations organisation of N&T when taking over vessels, independently of flag or nationality of crew.

One of N&T's ferry-experienced masters, Anders Andersson, assisted N&T's organisation in preparation work for about 2 months before the vessel was taken over and stayed onboard the vessel for the first 5½ months. His main task was to give practical advice to the Estonian master in respect of navigation in the Stockholm archipelago and manoeuvring in port, including cargo and stowage planning, and other traffic related questions.

7.2. Particulars concerning Safety Education and Training

Vessel's safety plan and organisation had been built up following the Silja (Wasa) model which was adjusted to the vessel in co-operation with N&T's operation organisation and vessel's first Master, Arvo Andersson, who also participated in the preparation work for 2 months before the vessel was taken over. Vessel's master was responsible for the compliance with vessel's safety plan and performance of safety drills under the supervision of N&T's organisation. Vessel's crew normally stayed 2 weeks onboard and 2 weeks ashore, and each individual crew member performed at least one safety drill per stay onboard.

Before the vessel took up the traffic there was on the 26th January 1993 at Tallinn an extensive operational control exercise of vessel's safety organisation for and under the overall supervision of BV (Hans Olsson, Head of BV Sweden) in co-operation with the Swedish Maritime Authorities, Stockholm, who drew up a protocol of the exercises. In January 1994 when the vessel was on normal voyage from Stockholm to Tallinn she was subject to, up to then, the biggest RESCUE exercise in the Baltic, whereby fire brigades, police, helicopter divisions, rescue, maritime authorities, etc. participated, which ended with the documented judgement to the effect that "vessel's crew had acted professionally and with exemplary speed ".

Earlier supervision of the vessel by maritime authorities and classification had been carried out by BV in Finland, however, since the technical supervision of the vessel was to be dealt with by N&T Stockholm, N&T demanded that the vessel in this respect should be moved to BV in Sweden. Thereafter mainly the inspector Anders Wirstan of BV's Stockholm office carried out the onboard inspection.

In connection with an education program for Estonian ship inspector aspirants chief inspector Ake Sjöblom and 1st ship inspector Gunnar Zahlée from the Maritime Authority Malmö carried out an inspection onboard the "ESTONIA" in the afternoon and evening of the 27th September 1994. Thereby no noteworthy deficiencies in relation to vessel's seaworthiness and safety at sea were discovered.

7.3. Personnel from Shipping Company AB Hornet onboard M.V. "ESTONIA"

Onboard of M.V. "ESTONIA" there was also Swedish and Finnish personnel which for particular administrative reasons was employed by an independent entity not engaged in the normal activities, Rederei AB Hornet, formally instructed by Estonian Shipping Company, however, practically instructed by a.) N&T operation organisation

Two Swedish nautical officers with Swedish as well as Estonian qualifications, Captain Karl Karell and mate Juri Aavik, both with Swedish pilot licenses for M.V. "ESTONIA" for both Sandhamnsleden as well as Furusundsleden (Aavik as from May 1994 after N&T's above-mentioned Captain Anders Andersson, Karell as from January 1994).

Their primary task has been to assist vessel's master in training and preparation to obtain the Swedish license to command the vessel without the obligatory state pilot in the fairways to and from Stockholm. These licenses were obtained by both Captain Arvo Andresson and Captain Arvo Piht for Sandhamnsleden in the course of 1994 (up to then the first non-nordic navigators ever successful with that).

According to the requirements for foreign flag passenger ferries of "ESTONIA's" dimensions to sail without state-pilot in the Stockholm fairways it was necessary to have two navigators with pilot licenses on the bridge. These were Karell and Aavik who were mate-pilots onboard in addition to their continuous assistance to the masters in order that they obtained the pilot qualification for Furusundsleden.

On the 27th September 1994 Captain Arvo Andresson had on the voyage from Stockholm to Tallinn and during the stay in Tallinn successfully passed the examinations by the Seatransport Area Chief Dan Myrberg and the Senior pilot Sundius whilst Capt. Arvo Piht should do the same on the voyage from Talllinn to Stockholm on the 28th September 1994. Andresson, Pikt, Myrberg, Sundius and Aavik all did not survive the casualty (reported missing and not yet found). Karell was at that time engaged with taking over the next vessel of the line in Rostock.

b.) Estline AB

From vessel's catering area:

Intendent
Restaurant chef
Chief-waiter
Chief-cook
Galley-master
Cold-food cook
Bar-chef
Boutique-chief
Store-chief
EDP-chief
Conference hostess

Their job was to guide and further educate the Estonian hotel and restaurant personnel in their serviceabilities. The master was responsible for the Estonian personnel onboard-training in safety matters. The Swedish and Finnish hotel and restaurant personnel did not have normal positions within the vessel's safety organisation nor did they even have surplus helping functions. Some of the above-mentioned functions had subsequently been taken over by Estonian personnel.

On the 28th September 1994 there were on duty in addition to the above-mentioned positions:

Intendant
2 restaurant chefs (both onboard on this voyage due to the high number of passengers)
2 chief waiters (same as above)
chief-cook
store-chief
EDP-chief

None of these survived (reported missing and not found). Their relief-colleagues were at that time engaged in Rostock to take over the next vessel of the line.

Statement

Captain Per Ringhagen, born 25.9.42 and living at Orienvägn 29,
Östraskär (near Stockhkolm),
Tel.: 46-8-540 86 306

I started my sea career in the Swedish Royal Navy between 1961 - 1963 and joined Johnson Line thereafter as a 3rd mate. I sailed on vessels of the conventional and container type in worldwide trades. In 1966 I passed the examination for master's license - unlimited foreign-going - but at the beginning only obtained the mate's license. Subsequently I became employed ashore by Johnson Line in their Stockholm headoffice as manager in charge of their reefer traffic, which was from 1967 to 1973.

In 1973 I signed on as 2nd mate on the M.V. "Montevideo" and became chief mate on her sister vessel "Santos" in 1977. On this ship I stayed for 3 years until 1980 when I was transferred to the containership "Margret Johnson". On this ship I stayed until 1984 as chief mate. Thereafter I changed over to Silja Line of which Johnson then owned 50%.

My first Silja vessel was the car/passenger ferry "Svea Corona" (the later Sundancer"), still as a chief mate.

In 1985 I signed on the newbuilding "Svea" as chief mate at Wärtsila Shipyard, Helsinki. With both vessels we were trading between Turku and Stockholm with occasional calls at Mariehamn (same as "Viking Sally" in those years, whom we met regularly).

As fas as I remember "Svea Corona" had a visor/bow-ramp-construction without additional upper extension of the collision bulkhead above cardeck and without recess on forecastle deck. She had no centre casing on cardeck but cabins on both sides. Reportedly when "Svea Corona" was transferred to Westcoast USA service and was renamed "Sundancer" the US Coast Guard at once required the upper extension of the collision bulkhead above cardeck in addition to the bow ramp by means of movable partial collision doors.

"Svea" had no visor but backwards sliding bow doors similar to "Silja Europa".

I came onboard in Helsinki when "Svea" was completed and we went straight into traffic Turku-Stockkholm. This was mid 1985 and I stayed on this vessel in the same trade until December 1989. During this time and until today I have never heard about the "Mariella" and "Viking Saga" incidents, i.e. the casualties in 1984 and 1985 when the visors of these vessels were severely damaged at sea due to wave impact.

In January 1990 I was employed by Estline AB Stockholm together with my colleague Sten Levander. We were both employed as masters for the already bought car/passenger ferry "Dana Regina", subsequently to be renamed "Nord Estonia". It was the intention of Nordström & Thulin to open a new ferry service between Stockholm and Tallinn and to run it at the beginning with one ship, the "Nord Estonia".

As far as I remember at that time Nordström & Thulin (N&T) owned 90% of Estline AB, Stockholm, whilst 10% was owned by the Estonian government-owned transport company Tallinn Autobussi Kondis (chairman Matti Mägi) and the Ministry of Transport. In Tallinn there was also a company by the name Estline EESTI registered which, however, was owned 90% by the above-mentioned Estonian shareholders and only 10% by N&T.

During the first 4-5 months of our employment with Estline, Stockholm it was our primary task to

1. organize terminal and berthing facilities in Tallinn;
2. select and employ two complete crews;
3. develop safety and other manuals for the ship.

as to 1) We had selected and assisted in the construction of ro-ro berths in the port of Tallinn, where at first "Nord Estonia" subsequently "Estonia" were berthing and now "Mare Balticum" is berthing. At that time Estonia was still under Russian Regime, but we had an excellent cooperation with Estline and Terminal employees.

as to 2) We had some rooms in the N&T office in Stockholm where we were working with the at first employed senior staff, i.e. officer, engineers, and catering. The chief officers came also from Silja. They were Karl Karell (still with N&T as nautical adviser on "Estonia" and now "Mare Balticum") and Kjell Kereby (now sailing on a Norwegian tanker). 2nd mates were Nils Wigström, Karl Rosen, Juri Aavik, Christian Nordström. Apart from Juri Aavik I don't know where the others are. Juri Aavik succeeded Anders Andersson as nautical adviser on the "Estonia" and did not survive.

One of the engineers we employed was Per Erik Kjellström. He sailed as chief engineer on her until she was finally sold as "Thor Hyderdahl". He is now probably technical inspector for "Mare Balticum".

as to 3) We developed completely new safety plans and all other arrangements necessary to operate a car/passenger ferry of the "Nord Estonia" dimension between 2 countries, one of which still being ruled by the USSR. We had absolutely no support from the owning company N&T, which were and are totally inexperienced in such matters. They were then, and are still, brokers and operators of bulkers and tankers.

The decision to buy "Dana Regina" was made already in October 1989, i.e. long time before we came into the picture. Otherwise we would have recommended against that vessel because

a.) she has no ice class;
b.) her cabin and alleyway layout is similar to that of the "Scandinavian Star", i.e. lots of deadends in the corridors, etc.;
c.) she has bad main engines.

I don't know whether N&T sighted class records with Bureau Veritas before they made the purchase decision, but I know that BV is the house class of N&T and that this was taken into consideration. In my opinion they did know that the vessel had bad main engines, but they speculated on cheap labour for necessary repairs in Tallinn. This was indeed the case, and after each arrival there came some 15 people from shore to work in the engine room and about the same number to work on deck. Before going into detail about - the "Nord Estonia" operation, performance, the co-operation onboard and with N&T, shore organisation, here are some remarks about persons involved:

Sten Christer Forsberg, age about 55, Technical Director N&T, graduated Marine Engineer from Chalmers University, Gothenborg. He cannot be a classmate of Börje Stenström, but they have probably worked together with Salen Shipping for a couple of years.

Ulf Hobro, age about 50/51, Marine Superintendent with N&T, responsible to Forsberg and senior to Tomas Rasmusson, having done the day-to-day work as technical superintendent together with Lennart Klevberg, responsible for spareparts. Hobro has been chief engineer on the car/passenger ferry "Visby" belonging to Gotland's Bolaget. "Visby" and 1 sister were built in Öresundsvall. "Visby" was renamed "Peter Wessel" and is now owned by Larvik Line (Larvik-Frederikshavn). Gotland's Bolaget had a concession for the traffic between

Visby and Nynashamn which was acquired by N+T in 1988. Before that time the "Visby" had a casualty with her bow visor. I don't know whether Hobro was then onboard or already employed with the Company. In any event he did leave Gotland's Bolaget and became inspector with Sjöfartsverket until he joined N&T mid 1990.

Ole Nord, ca. 50 years of age, is consultant to the commission and a friend of mine since Johnson Line times, where we sailed together for about 26 years. He is a good and honest guy.

Hans Rosengren, ca. 52/53 years is head teacher for navigation and seamanship in Kalmar.

Hans Laidwa, is an Estonian Swede, came from the marketing side of Silja to N&T and built up the ferry operations, his first job was establishing Gotland's Linen.

Anders Andersson, he was the first nautical adviser on the "Estonia" and at the beginning he was the only one. The reasons for his employment on the Estonian vessel with Estonian crew were:

- N&T wanted to know, what was going on onboard;
- at first none of her masters, Andersson and Piht, had pilot licenses, thus they had to take state pilots in the Stockholm archipelago, in addition one license holder had to be onboard;
- the Estonians were at the beginning inexperienced in almost every respect, i.e. loading of trucks, ballasting the tanks accordingly, safety matters, nautical matters, etc.

But he ended up with lot's of trouble with the Estonian officers, who pretended to know everything better. He was finally withdrawn from his function on demand of ESCO and left in the cold by N&T without any support, he was practically sacked.
He is now employed with Sembawang Ship Management, Singapore.
His home telephone number in Sweden is: 0123-40045.

After taking over of the "Dana Regina", I believe in March 1990, the vessel was shifted to Cityvarvet, Gothenburg, where she stayed for several weeks.

Lots of changes were made, among other things the bridge layout was changed to the effect that the vessel could be operated on the co-pilot system. The bridge had open wings.
From N+T Forsberg was in Gothenburg more or less all the time, whilst Hobro attended as Sjöfartsverket inspector.

The most important changes were made in respect of fire-fighting and smoke detection (this was only couple of months after the "Scandinavian Star" disaster and the maritime authorities were very sensitive). Both crews were onboard at Gothenburg and trained in fire-fighting escape etc. the ship had to pass numerous safety inspections by Sjöfartsverket in order to get the new PSSC. At sea between Gothenburg and Stockholm lifeboat and fire-fighting drills and evacuation exercises were carried out.

In Stockholm they got the new PSSC confirming that the vessel complied with SOLAS 1974 without any exemption, although it was also known to Sjöfartsverket that she would trade between Stockholm and Tallinn, i.e. more than 20 nm from the nearest land and despite her having no upper extension of the collision bulkhead as required by SOLAS, because this was the bow ramp which was located more forward than required by the rules.

So Forsberg went through the rather costly and lengthy procedure of fulfilling all requirements of Sjöfartsverket to obtain a new PSSC and change flag to Swedish registry, and Hobro was the responsible Sjöfartsverket inspector who confirmed that the vessel complied with SOLAS 1974, although she did not.

- "Nordestonia" had sliding doors / 1 bow and 1 stern ramp, 1 bow thruster, 2 propellers, 2 rudders.

- She left Stockholm on 16th June 1990 for the first voyage to Tallinn.

- Navigation:

  Stockholm: Frihamn Terminal, starboard side to berth, loading/discharging via stern ramp;

  - anchor use only in emergency cases - no tugs;
  - masters and mates had pilot licenses for all entrances to Stockkholm, so never used pilots;
  - speed inside archipelago: max. 12 kn, in certain areas down to 6 or 8 kn;
  - average time to Sandhamn 3 ½ hours
    average time to Söderarm 4 ½ hours;
  - in bad weather always Söderam entrance is used, because you were 1 hour more in archipelago to keep the passengers happy and also because Sandhamn entrance is difficult at winds of more than 20 m/sec from w-ly directions;
  - in good weather we always went via Sandhamn because the sea distance is almost the same and the time inside archipelago is 1 hour shorter;
  - from time to time we went via Söderarm in order not to forget the fairway lights, etc.;
  - Silja had a restriction of 15 m/sec. for Sandhamn, if more, the ferries had to go through Söderarm;
  - Sandhamn is very bad in SW / W-ly winds (lee coast);
  - at Söderarm the ferries can go on full speed the 1st hour inside the archipelago.

at Sea:

- same track westbound as well as eastbound;
- during our first year we were not allowed to go between the island Nayssaar and the mainland;
- we used about the same waypoint as "Estonia" did.

- worst Weather:
  We had several times 25/28 m/sec. winds. I remember one Christmas cruise to Riga when we had to slow down, my colleagues had worst weather a couple of times and the vessel arrived several hours delayed.
  In my experience the Baltic is more aggressive, i.e. has shorter, steeper seas than e.g. Kattegatt or North Sea.
  With "Svea" we met winds of 40 m/sec. and more.

- wind speeds and wave heights along the Swedish coast can be obtained from Meteorological Bureau, Norrköping;
- once there were wave heights of 12 m measured at Almagrundet;
- we generally reduced speed to 8-10 kn with headwinds or wind 3 points on port bow of 25-30 m/sec.

- On 17th June 1990 "Nordestonia" arrived on her first voyage at Tallinn.

Tallinn is a tricky port

- we were fortunate with NE, just little ice in the archipelago and ports, we used special technique to go alongside;
- we occasionally used tug boats in Tallinn, but always had to take pilots;
- the port is vulnerable to winds from directions between NNE - NNW;
- the port authorities promised to keep the opposite berths empty, which was more or less never the case;
- because discharging/loading was exclusively done via bow ramp the vessel always entered port bow first which was the easiest way;

- upon departure there were 2 possibilities depending on wind direction/force:
  - (a) if wind up to 15 m/sec. turned inside the basin (was always the wish of the pilot);
  - (b) otherwise go with speed astern and stern first through breakwater into the bay for some 3-4 ships length and turn vessel on course.

- we had to take pilots in and out - there were 6 approved pilots to take "Nordestonia" in/out but only 2 had the qualification;
- it happened once or twice that we had difficulties to open the securing devices of the sliding doors, then also the sliding doors could not be opened and the vessel berthed stern first also in Tallinn, the problem was subsequently repaired by crew, it was mostly leakages in hydraulic pipes;
- 12 m long trailers could turn around on our cardeck, but not 22 m long ones;
- discharging in Tallinn via stern ramp caused a delay of several hours;
- I have no information that "Estonia" ever berthed at Tallinn stern first;
- in Tallinn we normally berthed starboard side to shore.

- When we knew from the weather forecast that e.g. on voyage to Stockholm we would meet S or SW-ly winds, i.e. from port side, the heavier trucks were stowed at port side to have from the beginning a sort of counter weight to the wind pressure. Of course, this counter weight always had to be within controllable limits.

- The bow ramp of "Nordestonia" was only 5 m long and extended the bulbous bow only slightly. Therefore the particular berth construction was made at Tallinn, i.e. the bulbous bow could extend underneath the berth.

- We never lowered the ramp before we were berthed. But we once touched a stanchion of the berth in Tallinn with the starboard sliding door.

- I made several trips with "Estonia" as a passenger together with my wife, the last time was April or May 1994, but I have never been on deck during departure or berthing in Tallinn, also not on the bridge. I have only been on deck at sea.

- On "Nordestonia" we never had Estonian trainees.

- I was introduced to Arvo Andresson in the fall of 1992 when the whole ESCO management including him travelled with us to Stockholm. So far I had no idea that there were plans to relieve us. One of the ESCO managers told me that Andresson would be the master of the new ship which would replace "Nordestonia". I phoned the Estline office immediately and they said they did not know, whereafter I phoned N+T and, I believe, Forsberg also pretended to know nothing about it (today I know that at that time "Wasa King" had already been bought and all relevant decisions had been made to replace the Swedish flagged "Nordestonia" manned with Swedish crew by the Estonian flagged vessel "Estonia" manned with much cheaper Estonian crew).
  In the evening the ESCO managers returned together with Hans Laidwa, the managing director of Estline AB, and we spoke in words not suitable for printing. Laidwa continued to lie to me. He said Andresson was just a 'nautical adviser'. Andresson made a very nice and positive impression on me, but we have just met at social events, we never worked together. Thus I cannot judge him from the professional side.

- I have seen the March 1994 picture of the "Estonia" bow which clearly shows that the port anchor had been used several times. I was a couple of times without bow thruster on "Nordestonia" and managed without use of anchor to go into and out of Tallinn without problems.

- I think that they probably had a problem in stopping the vessel when entering Tallinn with strong N-ly winds because under such conditions you have to have speed when passing the breakwater (up to 9-10 kn), the tugs - pushing at leeside - are of little help, once you started to reverse the engines and bring her up against the berth fenders to use the friction effect there might not have been sufficient time to take the speed out of the vessel and they used the port anchor.

- Whenever the ship was alongside ca. 15 workers for the deck and another 15 for the engine department came on board. In the engine room they were basically working to keep it clean. On deck they did maintenance work like chiselling rust, painting, greasing, cleaning cardeck, practically sailor's work. They had one foreman who worked under the instructions of Chief mate and Chief engineer. I think they were not ESCO people, some private firm, I don't recall the name.
  I heard subsequently that these people were not hired by ESCO to work on the "Estonia".

- Nordström & Thulin organization

Areas of activity:	- Chartering and broking
	- Shipowning
	- Passenger traffic
Board of Directors:	1. Ronald Bergmann
	2. Anders Berg
	3. Sten-Christer Forsberg - Fleet manager
	4. Lennart Ökvist - Finance

  The managing director of Estline, Hans Laidwa, was some sort of adviser to the Board. He initiated the Stockholm-Tallinn service.

- Estline AB is owned 50/50 by N+T and ESCO.
  There are 6 board members, 3 from N+T and 3 from ESCO.

The 3 from N+T are: Ronald Bergmann
Anders Berg
Sten-Christer Forsberg

- Sten-Christer Forsberg is professional, but he has no background in passenger shipping. I am surprised that he is involved in all these things.

- The N+T office is at Skipsbronn, Stockholm (old city), with about 50 people working there.

- Estline has an own office at Frihamn Terminal. Managing director is now Mats Björud, who used to be with Stena UK before.

- Fleet manager Sten-Christer Forsberg was and is responsible directly to Ronald Bergmann/Anders Berg.
  Below him were 2 inspectors, one of which was Ulf Hobro, among other things responsible for the technical performance of "Nordestonia" and, in particular, of "Estonia" to S.C. Forsberg.
  Below the 2 inspectors was Lennart Klevberg, mainly working with spare parts.
  After the "Estonia" casualty Ulf Hobro was transferred to non-ferry activities within N+T group and Lennart Klevberg has left the group.

- "Nordestonia" was the first Swedish ship with own shipboard management, i.e. all things normally done by shorestaff were done from board, including e.g. personnel matters like hiring and firing, and the like.
  We had own budgets for deck and engine departments which were approved by Estline, i.e. Sten-Christer Forsberg. Deck department mostly managed to stay within the budget, engine department very seldom due to the many unexpected things happening with the badly constructed main engines (BMW).

Onboard was just 1 extra purser who did the administrative extra work. We paid salaries, taxes, social insurance fees, etc., everything which was normally done by the shore organisation was done onboard. It is for this reason that the shore organisation could remain quite small. Only the financial department paid what we told them to pay.
Each of the 3 departments onboard was represented by department managers, i.e. :
- Chief mate for deck department
- Chief engineer for engine department
- Chief purser for catering/restaurant department

As a result of the necessary close co-operation the whole crew became a motivated and good team.
Both crews were employed by Estline AB.

- The ship was probably owned by PRIBA AB.

- My boss was Hans Laidwa, the then managing director.

- My contact to N+T was Ulf Hobro, who came onboard ca. every 2 weeks. If there were bigger things to decide which cost a lot of money I spoke directly to S.C. Forsberg, who took the final decision anyway.

- The entire crew was not changed at the same time. Master/Chief mate and Chief engineer /1st engineer never left at the same time. There was basically some crew change whenever we came to Stockholm.
2 weeks on / 2 weeks off.

- When Hobro was onboard he spent most of the time with the Chief engineer. I saw him because we were old friends (we grew up together in the archipelago). I spoke last time with Hobro at the memorial service but will never do it again.

- The traffic manager of Estline AB to the end of 1993 was William Dumstead. He is a good friend of mine now employed with Star Cruise, Stockholm. He will certainly talk openly to us.

- It was not required by Estline or N+T that we report in writing in regular intervals. We had to report only on important matters, e.g.:
    - delay due to heavy weather,
    - engine problems,
    - if extra people were needed,
    - if somebody was ill or the like.

- There was no formal organisation established to handle "Nordestonia", there were no manuals telling us what to do in emergencies (all what we had, we had done ourselves). All this changed when we came into traffic for Larvik-Line. Then such manuals came onboard.
  I don't know whether they had anything like that on "Estonia", but I doubt it.

- By law damage of a certain dimension or importance has to be reported to Sjöfartsverket by telephone and in writing, also if you have an accident with passengers or crew member. The ship reports directly to Sjöfartsverket because the Master is responsible by law.

- After we had come onboard on "Nordestonia" we developed manuals for routine matters, maintenance and control guidelines for deck and engine departments.

- We had a PC-monitoring system, into e.g. the following was put:
- Maintenance guidelines which were followed day by day and were brought up-to-date day by day.
  Whoever wanted a copy could get a print-out.
  (I don't think we gave copies ashore).
  The same system existed in the engine department.

- In case we needed shore assistance, e.g. repair firms to carry out something which we could not do ourselves, we had to fill out so-called "Requisition Forms" which were printed in Sweden (I don't remember whether we ordered them from N+T or directly from the printing company). On these forms it was printed at the top "Nordstöm & Thulin".

Company	:	
vessel	:	
deck	:	
engine	:	It was stated in printing:
catering	:	"copy to Technical Department"
subject	:	
quotation	:	

  There was 1 original + yellow, green, blue copies. The original was sent to the repair firm, the yellow copy to N+T, green and blue came into ship's file.

- I think that they had onboard of "Estonia" the "Öberg Data System" which was developed by Capt. Jan Öberg of Lion's Ferry in Varberg. Ca. 200 vessels are equipped with this system. Among other things you just print out repeatedly what is called "Working List". In a subsequent telephone conversation with Jan Öberg he informed me as follows:
  - Name of the system is "Onboard Data System"
  - Estline had and have the system, but he believes ashore, one for deck and one for engine department, budget control and the like.
  - System includes the above explained type of requisition.
  - probably all the interesting information are still available in the office.

- I don' remember names of repair companies in Stockholm which were used by N+T.

- We had weekly meetings onboard with Master / Chief mate / Chief engineer / 1st engineer / Chief purser attending. Protocols of the items discussed were made and copy sent to H. Laidwa ashore. In case items relating to the ship were discussed (which was mostly the case) copies were also sent to N+T - Hobro.

- We all came basically from Silja, where there are very strict routines, in particular as to safety matters. When we came to N+T there was absolutely nothing in this respect. It was quite a different atmosphere to come into. They (N+T) were simply not used to operating a passenger service. Much of their information was based on verbal things, they spoke a lot over the phone. They were not used to handling so many people, e.g. on "Nordestonia" (2 crews) we had employed more than 300 people, which was more than N+T had on their entire fleet.

- Ronald Bergmann and his wife went from time to time with us, his wife with friends more often, they brought second-hand hospital equipment and medicine to "Estonia".

- We had - I thought - quite a good family relationship, which was wrong, as it turned out after the catastrophe.

- Forsberg came down to the ship once a month, Hobro whenever required. Also Hobro's office was in the N+T office in the old town. It was located next to the office of Forsberg.

- Anders Wirstan was our BV contact. He came onboard in Stockholm, stayed for 2 or 3 trips and followed up the continuous survey items.

- We had very good co-operation with the inspectors of Sjöfartsverket. We used them as helpers in safety matters against owners to get things done. Sjöfartsverket never attended in Tallinn, also not during our time at the yard.

- <u>Cargo documentation</u>
  - at the beginning there was nothing on the Estonian side, the few papers which were finally presented, were mostly wrong;
  - it took about 1 year until we received relatively proper loading list, we were, of course, most interested in correct weights and dangerous cargo declarations;

- on the Swedish side we received proper cargo documentation, i.e. loading list, d/c manifest, etc. from the beginning;
- ship's documents, B/L, etc. we took with us after completion of loading;
- in Estline AB, Stockholm office ca. 30 people were working, their job was sales and marketing both for passengers and conferences/seminars (the latter part was the job of my wife), ticket sales, cargo, passport and visa questions, and the like;

- at the beginning plenty of trucks were declared empty but very heavily loaded with scrap, which we noted and consequently rejected. We were also afraid that the scrap came from nuclear power plants in Russia. We got a radio activity measuring device, but never traced radio activity to my knowledge, although we were told that certain scrap parts shipped with us had been in contact with radio active material.

- Watch plan:

  bridge: Master / pilot officer / AB

  departure: 15-20 minutes after departure chief mate came up, checked stability calculation and dangerous cargo stowage plan (1 copy stayed on bridge and 1 copy was given to the chief engineer).

  sailing through Stockholm archipelago:

  2 ABs on watch now: 1 on bridge as lookout, 1 went continuous fire rounds (1 round ca. 30 minutes) including cardeck, ABs relieved each other every hour;

  - there were control clocks at relevant locations which the AB had to activate, the prints were taken out and controlled every morning (never was there any question raised by N+T whether we went safety rounds at all, not to mention whether we did it regularly and whether we made sure that the ABs really went the rounds);
  - never did N+T check whether they did proper stability calculations, nor did they check the log books for entries concerning safety drills, speed in fog or heavy weather or in ice;

- we steered all the time by autopilot

-

Stockholm		Tallinn	
arrival	departure	arrival	departure
08h30	17h30	08h00	19h00

- when we had left the Stockholm traffic area the pilot officer had his own watch until midnight
- at 00h00 he was relieved by the 2nd mate who stayed on the bridge until 1 hour before arrival Tallinn;
- then came master, pilot officer, and chief mate came ca. 0.5 hours before arrival;
- we had no radio officer;
- there were 2 types of handy onboard:
  - (a) 1x UHF which penetrates metal for use in engine room, cardeck and inside accommodation.
  - (b) 1x VHF (5 watt) for lifeboats, liferafts, which has to be able to operate on channel 16 - these handies were always in the charging devices on the bridge

  (one of these sets must have been used on the "Estonia" for the 'Mayday' - messages);
- Chief mate works all day in port and takes care of cargo matters, whilst the 2nd mates share the day and mainly work on safety matters;
- 1.5 - 2 hours before sailing the loading of trucks started at Tallinn, at about the same time came the loading list onboard.

Experience with Tallinn Yard

- The workers could not do any sophisticated work.
- They could burn but qualified welding was not possible.
- They did rather well with overhauling one of the generators and also did some piping work not so badly.

- The superstructure above boatdeck is of aluminium. There was a leak and we had to replace 2 liferaft crates in that area which they were unable to do, so we had aluminium welders come from Sweden.

- They turned all lifeboat runners on the winches, but did not re-tighten the clips properly. Consequently at the subsequent lifeboat test the runner of 1 boat slipped through and the boat was hanging upside down, the equipment fell out and was stolen in less than one hour.

- When we came to Sweden and went into drydock I informed Sjöfartsverket respectively and they ordered a general check which was criticized by Hobro by saying: "Is that really necessary?" My answer was: "Yes, we cannot do anything else after what has happened in Tallinn."

- We had in each passenger cabin safety instructions on a sort of plastic sheet placed on the inside of the entrance door with arrows indicating the way to the nearest exit and written instructions explaining what to do in the case of fire or abandon ship alarm.

<u>Some comments on the "Estonia":</u>

- On the "Estonia" all Swedish officers, engineers and ratings - including the technical superintendent and chief engineer Tomas Rasmusson - came from HORNET AB, Stockholm (Tel.: 8 - 704 02 10) - Jan Engström. HORNET is a ship management company basically for ro-ro vessels and ferries. It was founded after the Salen crash and was subsequently taken over by Ugland, London. They still supply all Swedish crew members to N+T. Tomas Rasmusson left Hornet already at the beginning of 1995.

  His home address is:

  Tomas Rasmusson
  Hag Häppe Vägen 197
  61042 GRYT
  Tel.: 0123 - 403 82

and he is now something like a consultant travelling around in Sweden. He is a friendly guy, easy to talk to. He told me that he had been questioned about 1 month after the casualty by the criminal police and the Havariekommission.

I have obtained and studied the stability booklet of "Wasa King" dated 20.1.91. I was surprised to note that it does not contain any damage stability case at all, just some load cases.

It also does not contain any instructions to masters concerning free surface restrictions, trim, etc.
This, according to my experience, should be part of the stability booklet.
I have noted with surprise that all calculations are based on stern trim, which is contrary to my previous experience.
On the "Svea", e.g. we were instructed to load 2-3 dm down by the head. The reason is that stern trim is creating GM problems related to damage stability requirements due to the almost square stern construction, which "Estonia" also had.

The "Wasa King" stability booklet as well as the new "Estonia" stability booklet were calculated and made by Ship Consulting Oy, Turku. So I telephoned the owner, Veli Mattil Jumila. He told me the following:

- The stability booklet for "Wasa King", which he completed in January 1991, was just an update of the one made by Meyer Werft using the yard's hydrostatics and not taking into account the ducktail, which, in the opinion of owners, was just improving the stability. He did not use his computer to do these calculations.

- Upon my question why damage stability cases were missing, he answered that he just brought the stability booklet made by the yard up to date and owners never required anything in addition.

- Upon my question why the vessel had to have ca. 0.5 m trim by the stern, he replied that already on even keel the margin line would be submerged (margin line = 3 inches below freeboard deck which might not go below water level under damage stability requirements).

- On instruction of N+T in co-operation with BV he made damage stability calculations to establish the A/Amax index which was found to be 95%. The respective requirement came into force only on 1.10.94.

- He was instructed a couple of weeks before the casualty to make up a new stability booklet which, however, was not completed at the time of casualty.

Finally I would like to make some general statements in connection with the "Estonia" casualty:

- In my view the Estonian crew members have acted wrongly, too late or not at all, however in my opinion they cannot be blamed for this, bearing in mind the Russian cultural system they were exposed to since World War II. Under this system everybody was immediately punished who did not follow orders, stood-up and/or criticised given orders from a supervisor. So they were educated to follow what the supervisors had instructed them to do. That's why the mates did not reduce speed on their own or did not even dare to suggest it to the master. At the beginning of the "Estonia's" service restaurant staff or the reception phoned to the bridge after having received complaints from passengers because the vessel was breaking too hard against headseas. They were simply brushed off by those on the bridge and consequently did not do it again.

Recently I had the visit of the Estonian journalist MADLI VITISMANN (lady), who told me that some Estonian officers / engineers are trying to build a similar association like ours. She also told me that one of the two chief officers of "Mare Balticum" - Jüri Lember - wanted to become the chairman of the newly founded officers' union. When, however, his employers ESCO got this information they warned him that he would not become master unless he dropped his plans. He did not do so and stayed as a chief mate.

- Apart from the bad seamanship aspect the reason why a vessel should never leave her berth with open visor is because in case you should have difficulties in closing it, you have to turn your ship around and return to berth. This is sometimes very difficult, if not impossible. In any event, it is a considerable but avoidable risk.

- I believe that N+T is co-operating with the Bendreus group because in an interview with a commercial magazine R. Bergmann told the reporter that he had received Christmas greetings from one of the two Support Groups stating that the accident was not his fault, which was his best Christmas present. As Lennart Berlund did not send the Chrismas greetings, it must have been G. Bendreus.

- About 3 weeks ago the Swedish Masters & Ship Officers Association (ca. 3000 members) officially wrote to the Minister of Transport and Communication, Inez Uzmann, stating:
  "We herewith withdraw from being observers to the investigation of the 'Estonia' casualty carried out by Statens Havarie Kommission because the Commission does not perform in line with its legal obligations and does not perform well. There will certainly be lots of backfire after publication of the investigation results and we would not like to be involved with this.
  Instead of being properly informed by the Commission in accordance with their legal obligations we are reading things in the newspaper which we do not like at all.

We are also protesting against covering the wreck by concrete and by this destroying evidence."

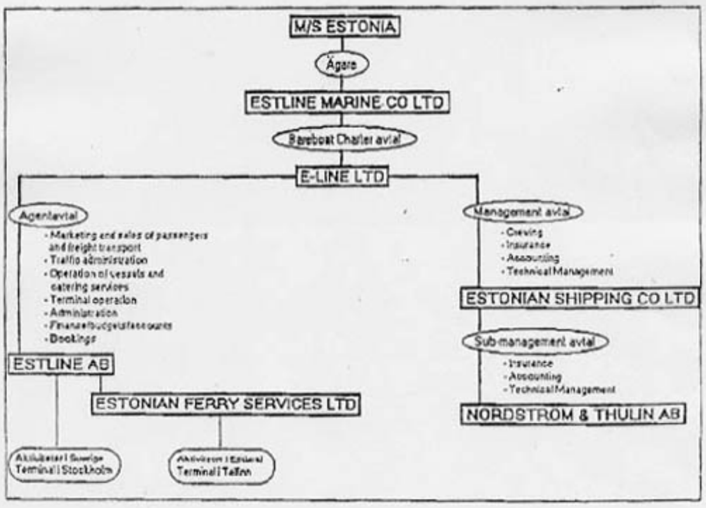
- The letter went out 3 weeks before the date that this statement was taken (21.11.95) and by that time no reply had been received.

21.11.95 ....
Per Ringhagen

ESTLINE Bolags- och organisationsstruktur

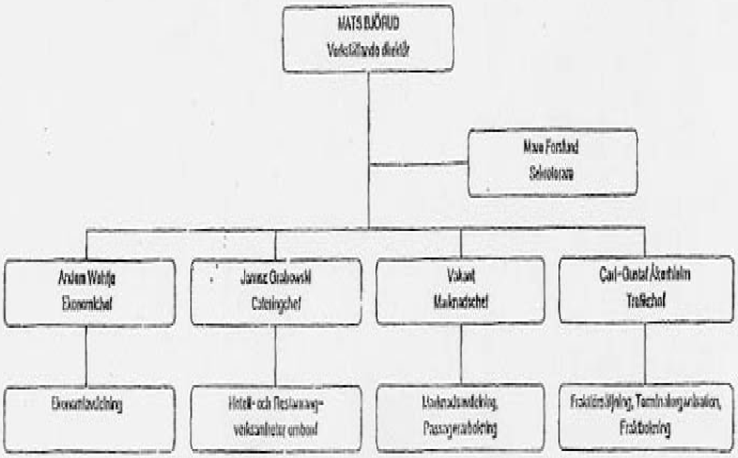
m.a.p. M/S ESTONIA

Bolag	Nationalitet	Ägare
ESTLINE MARINE CO LTD	Cypern	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
E-LINE LTD	Estland	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
ESTLINE AB	Sverige	50% ESTONIAN SHIPPING CO LTD 50% NORDSTRÖM & THULIN AB
ESTONIAN FERRY SERVICES LTD	Estland	100% ESTLINE AB
ESTONIAN SHIPPING CO LTD	Estland	100% Estniska Staten
NORDSTRÖM & THULIN AB	Sverige	Börsnoterat svenskt aktiebolag
NORDTHULIN LUXEMBOURG S.A.	Luxemburg	100% NORDSTRÖM & THULIN AB



ESTLINE AB

Organisation



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Enclosure 6.2.114

AGREEMENT

BETWEEN THE ESTONIAN NATIONAL MARITIME BOARD AND BUREAU VERITAS

Whereas

the Estonian National Maritime Board

and

Bureau Veritas

hereinafter referred to as "the Society", desire to clarify and make uniform their relationships, it is hereby agreed by and between the Administration and the Society as follows :

1. This Agreement consists of the subscribed text of 3 pages, together with Annexes I and II thereto , and organize the authorization contained in previous letters of appointment from the Administration to the Society.

2. The Administration recognizes the Society on a non-discriminatory basis as Agents of Estonia for the purpose of surveying Estonian-Flag vessels during and after construction in order to determine the compliance of such vessels with the mandatory requirements of certain international conventions referred to in Annex I hereto ; and for the purpose of issuing and/or withdrawing Estonian convention certificates according to the results of such surveys.

3. This Agreement applies to ships registered in Estonian Ship Register, and with classification certificates issued or intended to be issued by the Society.

4. The Administration and the Society will consult together on a regular basis, to consider revision or amendment of the Annexes hereto, and to resolve and agree as necessary to uniform interpretations and acceptable equivalents to satisfy compliance with the Administration's responsibilities under the various international safety conventions to which Estonia is a Party.

5. In the exercise of its responsibility under Estonian law and under international laws, including the treaties and conventions to which Estonia is a Party, the Administration may suspend, modify or revoke any documents or certificates issued to any Estonian-Flag vessel by the Society as Agents. The Society may deal with matters of interpretation and agreed equivalent acceptable arrangements but any waivers of or exemptions from the normal requirements of such laws, treaties, or conventions shall be issued and certified directly by the Administration on the basis of technical advice as and when required from the Society.

6. In the performance of the duties and responsibilities herein assumed, no fees shall be payable by the Society to the Administration, or vice-versa.

7. This Agreement, or extracts therefrom, by mutual agreement, may be made available to appropriate organs of international agencies concerned with maritime safety.

8. Representatives from the Administration and from the Society shall formulate and establish the Annexes to this Agreement. The representatives may propose, and shall likewise review and comment upon maritime safety measures proposed for implementation by the Administration, as these relate to vessels and equipment.

9. Modifications or amendments to this Agreement shall only be adopted after consultation with all parties thereto.

10. Any party to this Agreement may withdraw therefrom upon 90 days written notice to the other parties thereto. In witness whereof, the parties have on the 18th of August 1992 set their authorized signatures as follows.

Tarmo Ojamets

Eesti Vabariigi Riiklik Veeteede Amet

Gérard Moré

ANNEX I

ASSOCIATED WORK TO BE PERFORMED BY THE SOCIETY AS AGENTS OF THE ADMINISTRATION

1.1. International Convention on Load Lines, 1966.

1.1.1. Computation of load lines, approval, survey and verification of initial conditions of assignment.

1.1.2. Confirmation that the general structural strength of the hull is sufficient for the draught corresponding to the freeboards assigned.

1.1.3. Verification of inclining experiments and approval of the form of intact stability documentation.

1.1.4. Approval of damage stability and other characteristics of those special types of ships entitled to reduce freeboards in accordance with Regulation 27 of the Convention.

1.1.5. Issue of an International Load Line Certificate with a maximum period of validity of five years on completion of a satisfactory initial survey before the vessel is put into service as an Estonian-Flag ship.

1.1.6. Subsequent issue of an International Load Line Certificate with a maximum period of validity of five years on completion of each satisfactory periodical survey.

1.1.7. Periodical Inspections carried out annually, within three months before or after the anniversary of the date of initial or periodical survey, and endorsement of the Certificate in the space provided on completion of each satisfactory inspection.

1.1.8. Additional surveys after a casualty or discovery of defects, or whenever such repairs or renewals are made as could affect the validity of the existing certificate.

1.2. International Convention on the Safety of Life at Sea 1974/78.

1.2.1. Passenger Ships.

1.2.1.1. Initial survey of ship structure, machinery, electrical arrangements and equipment before the vessel is put into service as an Estonian-Flag ship. Approval of subdivision and stability in accordance with required criteria.

1.2.1.2. Approval and survey arrangements for fire protection, detection and extinction, life saving appliances, lights and sound signals and radio installations.

1.2.1.3. Issue of a Passenger Ship Safety Certificate with a maximum period of validity of 12 months on completion of a satisfactory initial survey.

1.2.1.4. Periodical surveys at least once every 12 months and issue of a new Certificate with a maximum period of validity of 12 months on completion of satisfactory survey.

1.2.2. Cargo Ships.

1.2.2.1. Safety Construction.

1.2.2.1.1. Initial survey of hull, machinery and equipment as required for issue of a Cargo Ship Safety Construction Certificate, in association with the requirements of a Special Survey for classification with the Society concerned.

1.2.2.1.2. Issue of a Cargo Ship Safety Construction Certificate with a maximum period of validity of five years on completion of a satisfactory initial survey.

1.2.2.1.3. Special Surveys, Periodical and other occasional surveys as required by the Society for continuance of classification, and Annual and Intermediate Surveys for continuance of validity of Cargo Ship Safety Construction Certificate.

1.2.2.1.4. Issue of subsequent Cargo Ship Safety Construction Certificate with a maximum period of validity of five years on completion of a satisfactory survey for renewal.

1.2.2.2. Safety Equipment.

1.2.2.2.1.. Initial survey of life saving appliances and other equipment, as required for the issue of a Cargo Ship Safety Equipment Certificate.

1.2.2.2.2. Issue of a Cargo Ship Safety Equipment Certificate with a maximum period of validity of 24 months on completion of a satisfactory initial survey.

1.2.2.2.3. Subsequent surveys for continuance of validity and renewal of Certificate with a maximum period of validity of 24 months on completion of a satisfactory survey.

1.2.2.3. Safety Radio.

1.2.2.3.1. Initial and subsequent surveys of radio installations as required for the issue of a Cargo Ship Radiotelegraphy or Radiotelephone Certificate.

1.2.2.3.2. Issue of the appropriate certificate with a maximum period of validity of 12 months on completion of a satisfactory survey.

1.2.2.4. Grain Loading.

1.2.2.4.1. Approval and certification of grain Loading arrangements and documents in accordance with relevant I.M.O. recommendations.

1.2.3. International Convention for the Prevention of Pollution from Ships, 1973/78, Annex I and Annex II.

1.2.3.1. Initial Surveys, before entry into service or before the Certificate is first issued, including survey of structure, equipment, systems, fittings, arrangements and material insofar as the ship is covered by the Convention, to ensure that in such respects there is, full compliance with the applicable requirements.

1.2.3.2. Issue of International Oil Pollution Prevention Certificate with maximum period of validity of 5 years and with expiration date concurrent with the Safety Construction Certificate.

I.2.3.3. Issue of International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk or its equivalent issued under the terms of Regulation 12A of Annex II, with maximum period of validity of 5 years.

I.2.3.4. Subsequent surveys for continuance of validity and renewal of Certificate.

I.2.4. Passenger and Cargo Ships.

I.2.4.1. Additional surveys after a casualty or discovery of defects, or whenever important repairs or renewals are made such as could affect the validity of the existing certificates.

I.3. Uniform Procedures Relating to Certificate in Accordance with SOLAS 74/78 & LL 66.

I.3.1. The Society will only extend the validity of certificates within the terms laid down in the applicable Conventions.

I.3.2. New permanent certificates are not issued until a satisfactory survey as required by the applicable Convention has been completed.

I.3.3. In certain extreme cases, however, if the circumstances are unavoidable, the Society may at their discretion, and after due consideration of the particular case, issue a conditional certificate on expiry of the existing certificate for a very short period of time, on completion of a satisfactory on board examination commensurate with the period of grace requested.

I.3.3.1. Immediately the conditional certificates are issued in these cases the Administration will be advised by telex.

I.3.4. All exceptions and approvals for experimental purposes, and all exemptions referred to in any of the Conventions will be dealt with and certificated, as necessary, directly by the Administration. The Society will, however, bring any requests for such consideration to the attention of the Administration, and will give technical advice as and when required on the advisability of granting any such dispensation.

I.4. I.M.O. Codes and Estonian Certificates.

I.4.1. Verification and issue of certificates or statements at request of Owners as to the extent of compliance with the following, where applicable :

I.4.1.1. Code for the Construction and Equipment of Mobile Off-shore Drilling Units.

I.4.1.2. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.

I.4.1.3. Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.

I.4.1.4. Code for Existing Ships Carrying Liquefied Gases in Bulk.

I.5. Tonnage Regulations

I.5.1. *Measurement and computation of gross and net registered tonnages in accordance with Estonian Law for registration purposes, and subsequent issue of Estonian Tonnage Certificates.*

I.6. Certificates

I.6.1. *The Society will ensure that one copy is promptly forwarded to the Administration :*

i) any initial certificates issued pursuant to this Annex upon Registration or Re-registration of a vessel, and

ii) any renewals of permanent certificates issued pursuant to this Annex.

I.6.2. Upon issuance of any interim or conditional certificate the Society will promptly advise the Administration by telex and by letter, and upon request will issue a copy or copies of any such certificate of the Administration by the most expeditious means. Upon the extension of the validity of any certificate issued pursuant to this Annex the Society will promptly advise the Administration in writing.

I.6.3. The Society will promptly advise the Administration by telex and by letter on all occasions when Change of Flag Surveys are carried out from Estonia to another flag, and on all occasions when statutory certificates are issued under a changed name of Port of Registry.

ANNEX II

CLASSIFICATION PROCEDURES

II.1. Initial Classification

II.1.1. Both new and existing vessels, having completed the specified surveys for compliance with the Rules and Regulations of the Society , will be issued with all necessary interim or final certificates. The ship is then considered to be effectively classed and the Administration will be so advised accordingly, together with one copy of the certificate or statement recommending classification.

II.1.2. When the surveyors reports of such surveys have been approved by the Society, classification is confirmed and all necessary documents will be issued. One copy of the certificate or statement confirming classification shall be forwarded to the Administration.

II.1.3. On occasions confirmation of class may be withheld by the Society if there is a serious shortfall, but when all has been satisfactorily remedied, class will be automatically backdated to the date of the preceding certificate.

II.1.4. As Registration of a vessel is conditional upon confirmation of class, the Administration will be advised of any difficulties in confirming class which appear likely to cause serious delay.

II.2. Maintenance of Classification

II.2.1. Continuance of classification with the Society is dependent upon compliance with the Rules and Regulations of the Society, and registration under the Estonian Flag is conditional upon such continuance.

II.2.2. The Society will promptly advise the Administration of those case where the original classification status of the vessel is temporarily change of certain material restrictions are imposed.

II.2.2.1 Such cases are deemed to be those involving surveys of defects, and if necessary temporary repairs thereto, which enable a ship to sail for only a limited period, e.g. :

(a) in specified ballast and/or loading conditions ;
(b) at reduced speed and/or machinery output ;
(c) with reduced availability of power for essential power consumption ;
(d) in restricted areas of navigation or on specific voyages only ;
(e) for operation in specified weather conditions ;
(f) under tow or under escort.

II.2.2.2. The Administration will be advised of such cases when the ship has been made fit for sailing and the copies of any amended certificates which may have been issued are being forwarded to the Administration for record.

II.3. Serious Casualties

II.3.1. Within this category the Administration will be advised by the Society of those losses which are brought to their notice, together with the stated cause where known, and which would normally result in automatic disclassification.

II.4. Cessation of Classification and/or Registration

II.4.1. The Administration will be promptly advised by the Society of any occasion when the classification of any Estonian-Flag vessel has been withdrawn, cancelled or suspended for any reason.

II.4.2. The Society concerned will similarly be promptly advised by the Administration of any occasion when independent action is taken to suspend or remove any classed ship from Estonian Registry for any reason.

II.4.3. The Society will promptly advise the Administration by telex and by letter whenever they receive information from an owner that a change of flag from Estonia has occured.

II.4.4. At the request of the Administration the Society will assist in ensuring the withdrawal of applicable statutory certificates.

II.5. Periodically Unattended Machinery Space Notations.

II.5.1 Upon request of the shipowner, the Society will carry out the various prescribed surveys and tests for verification of the conditions for the assigned notation relating to periodically unattended machinery spaces.

II.5.2. Certificates or certifying statements attesting to the continued assignment of the notation will be issued to the Administration and Owners of Estonian vessels on request.

II.5.3. The Society will advise the Administration on each occasion such notation is suspended for any cause, and when it is reinstated.

II.6. Plans and Records.

II.6.1. To assist in such matters as vessel casualty or marine offence investigations, the Administration will have access to those documents which are held by the Society and which deal with certification emanating from the survey work delegated to the Society by the Administration.

II.6.2. Copies of all statutory certificates issued by the Society will be supplied to the Administration at the time of issue.

II.6.3. All other documentation including copies of surveyors' reports will be retained by the Society.

II.7 Transfer to Estonian Flag.

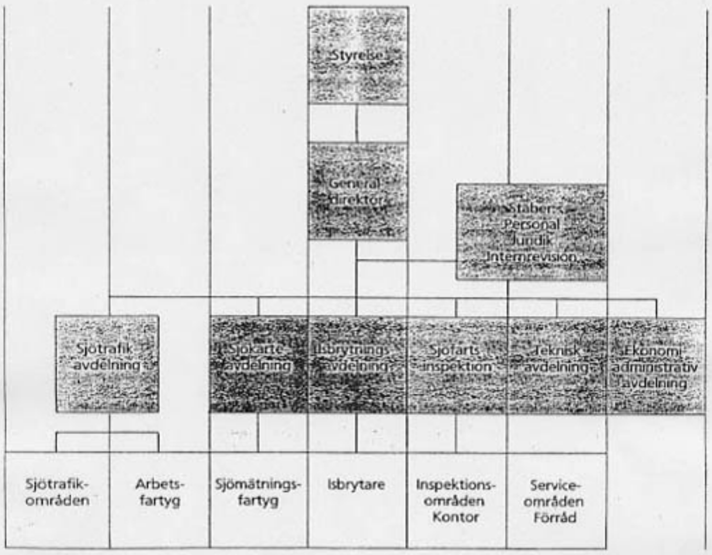
II.7.1. The Society concerned will satisfy itself on initial registration of an existing ship by Estonia and falling within this Agreement that the ship is classed and is entitled to have all Convention Certificates issued at registration.

II.7.2. It is also agreed by the Society that all plans and documents necessary for the issue of these Convention Certificates will be made available in the event of these being required by the Administration for any future casualty or marine offense investigation.

II.7.3. If vessels have previously been classed with a Society not recognized by the Administration, and transfer of class is thus envisaged at the time of registration, the issue of Convention Certificates is to be based on the requirements of the applicable Convention initial surveys.

Enclosure 6.3.115

Sjöfartsverkets organisation



Enclosure 6.3.116

MINISTRY OF COMMUNICATIONS

REPORT

on maritime safety work by the
Marine Surveying Department

Report by specially-appointed Government Investigator
Magnus Sjöberg

To the Government

By its decision of 3 October 1994, the Government commissioned former Justice of the Supreme Court Magnus Sjöberg, as its special investigator, *inter alia* to produce an account of reporting routines and certain other matters relating to the maritime safety work of the Marine Surveying Department.

An account of the assignment is attached.

Stockholm, March 1995

Magnus Sjöberg

/Björn Hansen

1 Introduction

The assignment here described has been defined by the government decision of 3 October 1994 as follows:

On 28 September 1994, the passenger ferry Estonia foundered south-west of Utö in Finland en route from Tallinn to Stockholm. The vessel was flying the Estonian flag.
On 29 September 1994, the Government commissioned the Board of Accident Investigation to assist in the accident inquiry. A joint accident board was then formed, with representatives from the Estonian , Finnish and Swedish authorities. One of the main functions of this board is to establish the reason for the accident.
Survivors of this maritime disaster have stated that the vessel's bow "visor" was torn away, which is supposed to have been an important cause of the sinking.
Information has since emerged to the effect that incidents and problems with bow doors had arisen previously with ferries of the same type as the Estonia. A high standard of safety at sea demands that the necessary conclusions are regularly drawn from incidents and accidents that occur. In addition to the investigation now being carried out by the joint accident board, other matters should be dealt with, including the reporting routines within the Marine Surveying Department.
The Government commissions former Justice of the Supreme Court Magnus Sjöberg to carry out such a survey. As part of this, the investigator is to examine how information relevant to maritime safety is analysed and promulgated within the Department, and where necessary put forward proposals for improvements. The investigator is also to look at the options for and the frequency of exchange of relevant maritime safety information between maritime safety authorities and other bodies that have important functions in the field of maritime safety, such as classification societies, insurers and shipowners' associations. Finally, the investigator should examine how such information exchange takes place between marine surveying departments or corresponding bodies within our local region, and where necessary put forward proposals as to how this might be improved.
The investigator shall carry out his work in contact with the international accident inquiry and in co-operation with the special committee on increased maritime safety for ferry services that the Government will be setting up.
The Government authorises the Minister of Communications to appoint a secretary or other assistant to the investigator.
The work of the investigation shall be completed with the utmost dispatch.

There follows an account of national legal regulations in the field of maritime safety (section 2) and of international organisations and agreements of interest in this context (section 3). Next comes a description of the Marine Surveying Department's organisation and functions (section 4). This is followed by a section about the organisation of the Nordic countries in the same field (section 5) and one concerning the activities of the international classification societies (section 6). Then come the deliberations and proposals of the investigator (section 7), followed by a special section dealing with roll-on roll-off vessels (section 8) and a summary (section 9).

During the work of the assignment, viewpoints have been taken from various members of staff of the Marine Surveying Department, on visits to the three marine surveying areas

(Stockholm, Gothenburg and Malmö) and the office in Rotterdam, and on visits to the central authority. The investigator has also met representatives of the Swedish Mercantile Marine Officers' Association, the Swedish Seamen's Union, the Swedish Shipowners' Association, the Swedish Steamship Assurance Club and the classification society Det Norske Veritas Classification AS. Consultation has also taken place with experts appointed by the Government to aid relatives of those lost in the M/S Estonia disaster, representatives of the National Accounting and Audit Bureau, the international accident investigation board and the committee appointed with the brief of creating a plan of action to improve maritime safety.

2 Maritime Safety Legislation

2.1 Introduction

The following presentation concerns itself chiefly with such regulations as may affect the flow of information within the work of maritime safety. This means that otherwise central parts of the legislation dealing purely with safety issues must here make way for matters of reporting duty and various forms of authorisation.

2.2 The Seamen's Act (1994:1009)

The Seamen's Act (1994:1009), which came into force on 1 October 1994, contains the basic provisions relating to the safety of vessels and the responsibility of owners and masters for such safety. Therefore Chapter 1 Section 9 subsection 1 prescribes that a vessel being operated must be seaworthy, which means that it must have the devices needed to prevent ill health and accident, be properly manned, adequately provisioned and equipped and so loaded or ballasted that the safety of the vessel, life or goods is not endangered.

The second paragraph of the same subsection points out that special provisions exist governing safety on vessels (see below for the Safety of Shipping Act).

As compared with the terminology of the previous Seamen's Act (1891:35 p.1) the concept of seaworthiness has been expanded. In the old Act, this expression referred only to a vessel's seaworthiness in its technical or restricted sense. It therefore did not include particular elements relevant to a vessel's condition such as crewing and victualling ("voyageworthiness") or the capacity of the hold to carry cargo ("cargoworthiness"). Instead, the "due condition" of a vessel was used as a blanket term. In Danish and Norwegian terminology, on the other hand, the concept of seaworthiness does include voyage- and cargoworthiness. With the aim of rendering the Nordic Seamen's Acts as similar in content as possible, the seaworthiness concept was therefore adapted to that used in Denmark and Norway. Indeed, all of the new maritime legislation has been arrived at in co-operation with Denmark, Finland and Norway. The concept of seaworthiness is therefore no longer absolute, but is, in the sense used in the Seamen's Act, relative, and must be determined by the context, so that it may involve the internal safety of the vessel as well as its voyage- and cargoworthiness. However, the new terminology results in no material change in terms of the shipowner's duty to keep his vessel in a seaworthy condition (prop. 1993/94:195 p. 166).

Chapter 6 Section 1 subsection 1 of the Seamen's Act also states that it is the master who must ensure that the vessel is seaworthy before a voyage commences. The master is also to see that the vessel is kept in a seaworthy state during the voyage and be responsible for its propulsion and handling in a manner consistent with good seamanship.

The penal provisions in Chapter 20 of the Seamen's Act state *inter alia* that, if a master fails to ensure that the vessel is seaworthy as above, he may be sentenced to fines or imprisonment. The same penalty applies in the case of an owner who fails to remedy faults or deficiencies in seaworthiness, if he knew, or ought to have known, of such faults or deficiencies.

If an owner should fail, despite having had the option, to prevent a vessel going to sea when an imminent voyage, because of a fault or deficiency in seaworthiness, may involve grave danger to those on board, he may be sentenced to fines or imprisonment. A master may also be sentenced to fines if he fails to inform the owner of a fault or deficiency in seaworthiness.

The Seamen's Act also contains regulations carrying penalties in respect of masters' duty to report events that are of importance for maritime safety (Chapter 6 Section 14). The equivalent rule in the previous Seamen's Act was Section 70, so that it has been customary to speak of "Section 70 reports". Under Chapter 6 Section 14 of the Seamen's Act, the master of a Swedish merchant, fishing or government vessel must immediately report, to the authority prescribed by the Government, when

1. someone has, or may be assumed to have died or suffered severe physical injury in connection with the operation of the vessel,
2. someone performing other duties on board has, or may be assumed to have died or suffered severe physical injury,
3. someone otherwise than as specified in 1 or 2 has or may be assumed to have drowned from the vessel or died on board and been buried at sea,
4. serious poisoning has or may have taken place on board,
5. the vessel has collided with another vessel or run aground,
6. the vessel has been abandoned at sea,
7. the vessel, its cargo or property outside the vessel has or may be assumed to have suffered serious damage in connection with the operation of the vessel, or
8. the cargo has been significantly displaced.

Under the second paragraph of the subsection referred to, the Government may prescribe that events of importance to maritime safety are to be reported in cases additional to those listed above. The third paragraph states that the master shall notify the National Administration of Shipping and Navigation when a maritime declaration is to take place under Chapter 18 Section 7 as a result of an event that has, or may be assumed to have occurred in connection with the vessel's operation. Further provisions governing the master's duties in the event of a maritime declaration are dealt with in Chapter 18.

A maritime declaration is a court procedure that aims to clarify an event – e.g. a grounding – and its causes. Other than in certain situations more precisely defined in the Act, a maritime declaration, in the case of a Swedish vessel, may be held as a result of an event that has or may be assumed to have occurred in connection with the vessel's operation, if the National Administration of Shipping and Navigation so orders or if other parties, e.g. the owner or master, think it called for (see Chapter 18 Section 7).

In Chapter 18 Section 20 it is pointed out that provisions exist for the investigation from a safety perspective of maritime accidents and other events that affect shipping in the Accident Investigation Act (1990:712), see below.

2.3 The Safety of Shipping Act (1988:49, most recently amended by 1995:69) etc.

The Safety of Shipping Act, like the previous Act (1965:719) concerning safety on vessels, is very much a skeleton law containing rather broad provisions and authority for the Government and other authorities to issue more detailed regulations. The Act was reworked primarily in order to bring legislation on the working environment at sea up to the level that applies to the working environment on land. Its character as a skeleton law has also been enhanced (prop. 1987/88:3 p. 49 ff.). The Safety of Shipping Ordinance was issued at the same time (1988:594).

The marked international character of navigation is reflected *inter alia* by the large number of international agreements that exist in this field (see also below). This applies not least to questions dealt with in the Safety of Shipping Act and its predecessors. These often highly-detailed international regulations are not, however, referred to in the Safety of Shipping Act, but they are normally found in implementing regulations issued by various bodies, chiefly the National Administration of Shipping and Navigation.

The Safety of Shipping Act contains more detailed provisions governing vessels' seaworthiness, certification, manning, loading, passenger vessels, working environment, protective work, superintendence, rules dealing with legal restrictions on the use of vessels and liability provisions.

The introductory provisions of the Act make it clear that the main rule governing application is that all vessels within Swedish territory should be covered, and Swedish vessels also when outside that territory.

There are rules in Chapter 2 of the Safety of Shipping Act for determining the seaworthiness requirements that are generally discussed in the Seamen's Act. Thus in Chapter 2 Section 1 it is stated that a vessel is seaworthy only if it is so designed, built, equipped and maintained that it offers satisfactory safety from accidents in the context of its purpose and the trade in which it is used or intended to be used. Chapter 2 Section 5 also confers on the Government, or the authority appointed by the Government, authorisation to issue regulations as to how a vessel shall be designed, built, equipped and maintained in order to be considered seaworthy under Chapter 2 Section 1.

The Safety of Shipping Act also contains provisions on the certification of vessels. The certificates here referred to are trading certificates, freeboard certificates and passenger vessel certificates. Authority is also conferred on the Government, or the authority appointed by the government, to determine the appropriateness of a certificate relating to a particular circumstance governed by the Act or by regulations issued in pursuance of the Act, over and above the certificates specified by the Act. Certificates may therefore be of several kinds, and may, for example, constitute proof that a vessel has been found seaworthy on inspection, that the freeboard marks have been properly applied, or that the vessel has been found suitable to carry passengers, and of the maximum number of passengers that the vessel may carry. The definition of each certificate also states which vessels, e.g. in terms of size, the certificates shall be issued for. Certificates are issued by the National Administration of Shipping and Navigation, unless otherwise prescribed by the Government. However, Chapter 1 Section 6 subsection 1 of the Act directly transfers certification duties to a number of named classification societies, always provided that the state and the society in question have entered into an agreement for the issue of certificates for Swedish vessels. The classification societies so named are the American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register of Shipping, Registro Italiano Navale and the classification society of the Union of Soviet Socialist Republics (Register of Shipping of the USSR). A more detailed account of the work of the classification societies and the agreements entered into by the National Administration of Shipping and Navigation with the different societies will be presented in a later section. However, it is worth quoting at this point from what was said by the Secretary of State on the introduction of this provision. "The activities of the classification society and its confirmation of vessel condition have long been used as the basis for assessing a vessel. In terms of the practical work of inspection, this means that the classification society's activities and assessments as regards hull and machinery do not undergo additional checking by the National Administration of Shipping and Navigation. The supervision exercised by the Administration in these respects consists in practice of issuing the official certificates that a vessel is to have on the basis of a report from the society" (prop. 1987/88:3 p. 58). Concerning the classification societies listed in Chapter 1 Section 6 subsection 1, the Secretary of State also noted that these all had good reputations and the required expertise in the field. "However, the circumstances may change. It is therefore important that the Swedish authority that is most directly responsible, the National Administration of Shipping and Navigation, is given the opportunity regularly to monitor the operations of the societies, in order to check that adequate quality levels are adhered to. Matters affecting such a monitoring function must be adjusted by agreement with the societies. Certain other questions should also be decided by agreements, e.g. liability in the event of error or neglect by the societies" (prop. 1987/88:3 p. 59). Which questions should be decided by agreement in this manner is therefore a matter left to the judgement of the Administration. The areas left open for agreement delegation to the societies are inspection, issue of certificates and establishment of minimum permitted freeboard (Safety of Shipping Ordinance Chapter 1 Section 4, Chapter 3 Section 1 and Chapter 7 Section 10).

This skeleton law character is also clearly evident in the section on inspection in Chapter 10. The previous Safety of Shipping Act contained a large number of detailed provisions as to when inspection proceedings should take place and what they should include. Since these regulations to a greater and greater extent reflect the content of international conventions, which are revised relatively often, and since the rules also deal mostly with the kind of matters with which it would hardly be appropriate for parliament to concern itself on each occasion, the Secretary of State felt that these provisions might with advantage be incorporated in statutes of a lower level (prop. 1987/88,3 p. 102). It is therefore assumed that more detailed provisions as to how the inspection of vessels etc. shall take place in the future are mainly to be issued through supplementary regulations. The principal responsibility for inspection rests with the National Administration of Shipping and Navigation. However, in matters that affect the working environment, such inspection shall take place in co-operation with the National Board of Occupational Safety and Health.

In connection with what has been stated concerning duty to report under Chapter 6 Section 14 of the Seamen's Act, the National Administration of Shipping and Navigation, through Chapter 13 Section 5 subsection 2 of the Safety of Shipping Act, cf. Safety of Shipping Ordinance Chapter 9 Section 2, been authorised to prescribe duty on the part of owners and masters not only to report accidents, incidents or cases of sickness over and above what is stated in the Seamen's Act, but also damage that has occurred or measures that have been taken that are of importance for a vessel's seaworthiness. Statutory duty to report to the National Administration of Shipping and Navigation is also incumbent on other staff. Under Chapter 6 Section 1 of the Safety of Shipping Ordinance, the employer must therefore submit a report if an accident or any injurious effect of work has led to death or severe personal injury, or simultaneously affected several persons working on board a ship. The same applies to incidents that have involved a serious danger to life or health. Under Chapter 6 Section 2 of the same Ordinance, it is incumbent on a doctor who in the practice of his profession becomes aware of diseases that may have a connection with work on board ship to report this to the National Administration of Shipping and Navigation. Should a vessel cease to be classified by any of the classification societies listed in Chapter 1 Section 6 subsection 1 of the Safety of Shipping Act, the owner shall immediately, under Chapter 7 Section 7 of the Safety of Shipping Ordinance, report this to the National Administration of Shipping and Navigation or, if the vessel is abroad, to the Administration or to the Swedish foreign authority in the port at which it is estimated that the vessel will next call.

At present, a proposal is being circulated for consideration to the bodies concerned for a change in maritime safety legislation in order to implement the new international provisions of the International Safety Management Code (ISM).

2.4 The ISM Code

Most of the regulations and provisions that have been drawn up, both international and national, have traditionally been of a technical nature. However, various studies have shown that accidents are caused by "the human factor" in 70 to 80 percent of cases. This circumstance has attracted more and more attention. It is against this background that operative checks have been considered more and more important. The well-known accident with fire on board the vessel Scandinavian Star in April 1990 threw the matter into relief, and the development work within IMO was intensified, in particular through initiatives by the Nordic navigation authorities. This work has led to the production of the so-called ISM code - the International Management Code for Safety, Operation and Pollution Prevention. Another reason for the introduction of this code is that the shipowners thereby gain a tool for checking on the achievement of objectives as regards safety. This type of quality assurance work has a long tradition in industrial and institutional arenas, for example the ISO 9 000 system. Similar questions have also been dealt with in the past, e.g. in the safety legislation on air traffic and nuclear power. The regulations of the ISM code are based on an aggregate view - and co-operation between - shipowners, shore personnel, vessel and crew. The code stresses the owners' responsibility for the best possible safety organisation on board. There must be a safety officer at management level. Requirements are also posed for the shipping company to have a safety system, a safety policy and an anomaly reporting system in which accidents and incidents are documented and reported within the organisation. Requirements therefore exist for incident reporting over and above that which follows from Chapter 6 Section 14 of the Seamen's Act. There are also requirements for procedures to prevent the occurrence of emergency situations, for emergency situations that have already arisen, and for internal safety audits to be carried out. When a shipping company has introduced provisions in accordance with the ISM code, the National Administration of Shipping and Navigation - or following delegation, a classification society - shall check and verify that the work, both on the shipping company premises and on its vessels, takes place in accordance with the intentions of the ISM code. When this has been checked and approved, the supervising authority or classification society shall issue a "Document of Compliance" to the shipping company and a "Safety Management Certificate" for each individual vessel within that company. The Convention becomes internationally binding in 1998, with a staged implementation for different types of vessel up to 2002. In the case of Swedish shipping companies and vessels, and of certain foreign shipping companies having vessels that operate regularly in Swedish ports, it is however intended that these provisions shall become effective as from 1 July 1995.

2.5 The Accident Investigation Act (1990:712), most recently amended by 1995:77) etc.

In the Act and in the Ordinance on the investigation of accidents (1990:717) issued in association with it, there are regulations governing the investigation of accidents and near-accidents from a safety standpoint.

Among the accidents that are to be investigated under the Act are mentioned maritime accidents. These are defined in Section 2, subsection 2 (2) of the act as accidents in the use of merchant vessels, fishing vessels or government vessels, the result of which has been that

a) several persons have died or been seriously injured,

b) the vessel or property not carried by the vessel has been comprehensively damaged, or extensive damage has occurred to the environment, or

c) the vessel has disappeared or been abandoned at sea.

Under Section 2 paragraph 2, near-accidents of the kind just mentioned are to be investigated, if the incident involved serious danger of an accident, or if the incident suggest a substantial defect in the vessel, or other substantial defects in terms of safety. Under Section 3, the Government may prescribe, or decide in individual cases, that an investigation under the Act shall be carried out even if an accident or incident is not of such a serious nature as that referred to in Section 2, but an investigation is still called for from the safety standpoint. One explicit aim of an investigation under the Act - in addition to clarifying the course of events and the cause - is to obtain data for deciding on measures intended to prevent a recurrence of the event, or to limit the effect of similar events (Section 6, 2).

Investigation under the Accident Investigation Act is carried out by the authority appointed by the Government. The Government may also prescribe that the authority may appoint someone else to carry out the investigation. In the Accident Investigation Ordinance, the Government has prescribed that investigations of accidents and near-accidents under Section 2 of the Accident Investigation Act shall be carried out by the Board of Accident Investigation. Under the Ordinance, the Board of Accident Investigation also enjoys the right of delegation for events where a safety investigation is called for under the Act, but which are not of the kind referred to in Section 2 of the Act. In the case of events that affect shipping other than military shipping, such an investigation shall, under the Ordinance, be carried out by the National Administration of Shipping and Navigation. The Ordinance prescribes that the Board of Accident Investigation shall deliver a report of its investigation to the supervisory authority whose area of responsibility is affected by the event. However, it is the National Administration of Shipping and Navigation that is responsible for reporting to IMO under provisions governing the investigation of accidents in those international agreements to which Sweden is party. Section 20 subsection 1 of the Ordinance prescribes that "Section 70 reports" must be communicated to the supervisory authority at once. From Section 20 subsection 2 it follows that a master shall, at the request of the supervisory authority, also report in cases other than those referred to by the first subsection, if an event has occurred or may be assumed to have occurred that may be of importance for maritime safety. It is also stated in Section 20 subsection 3 that more detailed regulations on reporting under the first or second subsections may be issued by the supervisory authority following consultation with the Board of Accident Investigation. Persons who intentionally or through lack of care infringe subsections 1 or 2 of Section 20 or regulations issued in pursuance of subsection 3 of Section 20 will be sentenced to fines, unless such infringement is to be regarded as trivial (Section 27). Under Section 21 of the Ordinance, the police authority, customs authority and coastguard must inform the supervisory authority immediately on becoming aware of accidents such as those referred to in Section 2 subsection 1 of the Accident Investigation Act. A duty is also imposed on the same authorities to inform the National Administration of Shipping and Navigation of accidents to pleasure vessels, if such accidents have involved death or severe physical injury. In the case of events involving Swedish vessels abroad, Section 23 of the Ordinance imposes on salaried Swedish foreign authorities the duty to report to the supervisory authority, where appropriate. Where foreign vessels founder inside Swedish maritime territory, the National Administration of Shipping and Navigation shall immediately inform the nearest consulate of the foreign state or, if a consulate does not exist, its diplomatic representation. In the case of events referred to in Section 2 subsection 1 (1-3) of the Accident Investigation Act, the supervising authority shall also satisfy itself that the event is known to the police authority, and see that the police authority is informed as to who is investigating the event. The supervising authority shall also inform the Board of Accident Inspection of such events. If the Board so decides, the authority shall also inform the Board of other events that might be considered to be of importance to maritime safety.

In pursuance of Section 20 subsection 3 of the Accident Investigation Ordinance, the National Administration of Shipping and Navigation has issued a decree containing regulations governing the reporting of maritime accidents and notice of maritime declaration (SJÖFS 1991:5).

In one of its service regulations (3/92), the Marine Surveying Department has also issued instructions for investigation and reporting of maritime accidents by the National Administration of Shipping and Navigation.

According to the decree, reporting is to take place of events under Section 70 of the Seamen's Act (now Chapter 6 Section 14 of the 1994 Seamen's Act), and in certain other cases specified in the decree. Such a report shall immediately, in the most rapid and convenient manner, be delivered to the nearest marine surveying department area, or to the marine surveying department area within which the vessel has its home port. Where vessels find themselves on the other side of a certain line, the report may instead be delivered to the Head Office, Investigation Section, of the National Administration of Shipping and Navigation. Following the first report, a written report shall be sent to the Head Office, Investigation Section of the Administration as quickly as possible. This report shall be drawn up using a special form. Annexes to the decree contain various forms, together with instructions as to how they are to be completed.

Service regulation 3/92 provides a large number of supplementary provisions on reporting and investigation. Under this regulation, the Board of Accident Investigation and the National Administration of Shipping and Navigation have reached an agreement in which the expressions "several persons" and "extensive damage" in the Accident Investigation Act are defined as "c. 5" and "a value greater than 20 Mkr.". This is in order to provide a rule of thumb for which of the authorities would normally be responsible for investigation.

Of special interest for this investigation are also those sections in service regulation 3/92 called *Examination and analysis*, section 5, *Creation of investigation reports*, section 9, and *Prosecution of decisions*, section 12.

Section 5 states *inter alia* that the Investigation Section shall examine and analyse investigation material received from a maritime safety standpoint. The section's investigating officers shall draw up an investigation report that is to include a description of events, relevant facts relating to vessels, persons and external circumstances involved, analyses of factors important to the event, probable courses, which provisions and norms have been infringed, measures taken and proposals for action arising from the accident.

One of the consequences of part 9 is that the investigation report is created by Director of Marine Safety, or following delegation, by the head of the Investigation Section. Investigation reports from the Board of Accident Investigation and other important reports shall be delivered at a meeting with the section heads of the Marine Surveying Department (safety meeting). Such a safety meeting shall also be attended by representatives of the departments within the National Administration of Shipping and Navigation that may be affected, or be capable of throwing more light on the matter. The individual who drew up the report or took part in the Board of Accident Investigation inquiry will deliver the report. Safety meetings shall also be held in order to check up on what measures have been taken arising from the recommendations of previous investigation reports.

Safety meetings will be called by the head of the Investigation Section.

Under part 12, the head of the Investigation Section will be responsible for following up recommendations etc. in reports, and decisions taken at the safety meetings, unless otherwise agreed at the meetings. The head of the Investigation Section is also responsible for following up matters passed to the prosecuting authority for possible action. The Director of Marine Safety shall be informed of the results.

3 International Organisations and Agreements

3.1 Introduction

By its very nature, navigation as such poses requirements for international provisions in matters such as maritime safety and prevention of marine pollution. International work is carried on chiefly by two bodies, namely the International Maritime Organisation (IMO) and the International Labour Organisation (ILO).

3.2 The International Maritime Organisation (IMO)

The decision to form IMO had been taken as early as 1948, but the first meeting of the Organisation was not held until 1959. Originally it was known as IMCO. IMO has its headquarters in London, and consists today of 149 member states. Its supreme decision-making body is its Assembly, which meets every other year. Between these Assembly meetings, the Council meets three times a year. 32 countries are elected to this Council and Sweden is a member for the sixth year in a row. There are a number of committees subordinate to the Council, two of the most important of which are the Maritime Safety Committee (MSC) and the Marine Environment Committee (MEPC). MSC deals with various technical aspects of navigation and its work is in turn subdivided between several sub-committees, e.g. those dealing with life-saving, stability and safety matters. It may also be mentioned that MSC has recently appointed a special expert panel to review the maritime safety of roll-on roll-off ferries (ro-ros). This work is to be presented at the meeting of the Maritime Safety Committee in May 1995. It is the brief of MEPC to co-ordinate IMO's activities in respect of preventive measures and checks on oil emissions and other emissions at sea. Agreements within IMO are reached via conventions and resolutions. IMO has no powers of sanction, but all member countries that ratify a convention undertake to incorporate it into their national codes. This may take place either through a direct implementation of the convention or through separate regulations. Sweden uses the latter solution almost exclusively. In certain IMO conventions, ratification also involves a commitment that all vessels flying the flag of the country are to comply with the rules stipulated by the convention in question. Since 1959, IMO has approved more than 40 conventions and 700 resolutions. The most important conventions are SOLAS (International Convention for the Safety of Life at Sea, 1974), MARPOL (International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto), COLREG (Convention on the International Regulation for Preventing Collisions at Sea, 1972), LOADLINE (International Convention on Load Lines, 1966) and STCW (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978). SOLAS deals with such matters as vessel design, outfitting and certification from a safety standpoint. SOLAS also includes the new ISM (International Safety Management) code. This code, which is dealt with in more detail above, aims to provide an international standard for safe management and operation of vessels and for protecting the environment. A draft bill on this matter has just been circulated for consideration, and it is expected that a government bill will come before parliament proposing amendments to the Safety of Shipping Act at the end of March 1995. MARPOL deals with various forms of marine pollution, while COLREG concerns itself with rules governing sea traffic (rules of the road at sea). LOADLINE regulates load-line provisions (freeboard) and STCW contains norms for training, certification and watch-keeping for seamen. Sweden has adopted all the above conventions. The decisive work of formulating proposals and regulation texts is carried out in the various member countries. As an example, we may mention that the work of the ISM code was to a great extent done by the Nordic navigation authorities. A problem today is that many countries fall short as regards incorporation of and compliance with ratified conventions. MSC has a sub-committee that works exclusively on questions of how the conventions passed by IMO might better be complied with and incorporated into the legislation of the various countries. These deficiencies have in fact led to certain countries, which required stricter regulations, introducing their own special provisions, e.g. USA, Great Britain and the Nordic countries.

3.3 International Labour Organisation (ILO)

The UN body ILO has its headquarters in Geneva. In ILO, matters dealt with include the social conditions of persons employed on board ships, which is, of course, of great importance to maritime safety. The most important convention in this respect is No. 147 (Convention concerning Minimum Standards in Merchant Ships). This convention prescribes a number of minimum norms for merchant vessels relating to such matters as dwelling standards, hygiene and health protection. Sweden has adopted this convention. It became effective on 28 November 1981. At present, work is going on within ILO on matters including working hours and the importance of the fatigue factor in accidents.

3.4 EU

The fact that matters of navigation (and primarily those that affect safety and environmental protection) are given a high priority by the EU is illustrated *inter alia* by a document dated 24 February 1993, "A common policy on Safe Seas" (COM93/66). This refers to the EU's dependence on reliable, cost-effective and safe navigation, for which reason its maritime transport policy must ensure that such services are carried out at a minimum level of risk for everyone directly or indirectly involved and for the marine environment. To this end, the EU has produced a programme of measures:

- measures to establish a uniform implementation of existing international rules within the EU,
- measures towards a tougher and more effective port control system, including a uniform enforcement of the international provisions - for all vessels, irrespective of flag - by the coastal states in respect of navigation in EU waters,
- measures to promote a coherent and harmonised development of navigation systems and traffic superintendence, in order to bring maritime safety into the electronic age, with special reference to traffic measures in environmentally sensitive areas,
- measures to support international organisations in order to reinforce their primary role as legislators at an international level.

Just as important are measures to improve the training and qualifications of crews in order to tackle the human error problem, which remains the main cause of accidents. An intensive research programme can also contribute to the general aim of greater maritime safety.

The EU Council of Ministers has also reached a decision on a regulation for the coasting trade, under which it will become successively easier for member state' vessels to transport goods by sea within the EU. The Council of Ministers has also adopted a resolution on measures that should be taken to increase the safety of ro-ro ferries. One of the recommendations of this resolution is that member states should intensify the work of IMO in a number of fields. Many of the current EU Commission proposals are concerned with maritime safety matters.

3.5 Organisation for Economic Co-operation and Development (OECD)

As late as 24 May 1994, OECD issued a statement to the effect that its member states wished to maintain an open market for international shipping based on the principles of free and just competition. One of the conditions of this was said to be that vessels must comply with internationally agreed rules and provisions affecting safety on ships, persons on board and protection of the marine environment. It was also stated that the operation of vessels that do not comply with the above provisions might involve inappropriate favouritism and thereby an unacceptable competitive distortion.

3.6 Regional co-operation

One example of international co-operation at regional level is that of the Helsinki Commission (HELCOM). Part of the Commission's work deals with the prevention of marine pollution by vessels in the Baltic. The Convention was applied by Sweden in Swedish maritime territory from the beginning of 1977.

3.7 Port state control

As one of several European countries, Sweden in 1982 signed the "Paris Memorandum of Understanding on Port State Control", which is a port state control agreement. This co-operation includes the maritime authorities of Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden and Great Britain. Representatives and observers from the IMO, IMO, EU and the maritime authorities of the USA and Canada also take part.

This agreement arises from the fact that the parties to it had noticed that certain flag states (i.e. states in which vessels were registered) were flouting their obligations in terms of inspecting the vessels registered in those countries.

Through the agreement, the participating countries have undertaken to check foreign vessels frequenting their ports by "port state control". The objective is that 25% of the foreign vessels calling at the port state during the course of the year are to be inspected. The primary purpose of the checking is to discover whether vessels comply with the requirements of a number of conventions, e.g. SOLAS, which constitute internationally accepted safety standards. Checking includes verification of whether the vessel has valid certificates. If such is not the case, or there are other reasons for believing that the vessel substantially fails to comply with standard requirements, a more detailed inspection is carried out. If deficiencies or faults are discovered, this may result in an injunction to carry out measures within a certain time, or use of the vessel will be prohibited. The checks carried out, together with any remarks, are reported in code form to a central computer in St. Malo, France. The countries participating in port state control have access to the information in the data system.

In 1991, the IMO adopted a resolution in which, with reference to the "Paris Memorandum", states in other parts of the world are encouraged to enter into corresponding agreements. Such accords now exist in Latin America, the Asia/Pacific region and in the Caribbean. The resolution (682) states that implementation is primarily the responsibility of the flag states, but in certain cases it may be difficult for the flag states to exercise full and regular control over certain vessels that fly their flag, e.g. such vessels as do not regularly call at the ports of the flag state.

As a consequence of the ISM code, the IMO has also adopted resolution A.742(18), Procedures for the Control of Operational Requirements Related to the Safety of Ships and Pollution Prevention, under which operative checks on the capacity of the crew to maintain satisfactory safety standards on board is also to be checked by means of port state control.

Since 1998, operative checks have been carried out on all passenger vessels that regularly serve Swedish ports. These checks are carried out both by agreement and entirely without warning. At a conference of ministers in Copenhagen in September 1994 on port state control co-operation, it was stressed that port state control must be intensified to weed out inferior vessels. However, the point was underlined that the responsibility for the fulfilment of maritime safety requirements by a vessel is, and remains, that of the flag state.

4 Organisation and functions

4.1 The National Administration of Shipping and Navigation

The forerunner of the National Administration of Shipping and Navigation, the National Board of Shipping and Navigation, was set up in 1956 through an amalgamation of the then National Administration of Pilotage, Lighthouses and Buoys and the National Hydrographic Office. The new authority was also given certain areas of jurisdiction that had formerly been the province of the Swedish Board of Commerce and the then National Road Board. The National Administration of Shipping and Navigation, which was given its existing name in 1969, was converted into a public utility in 1987 and was re-organised in 1988. Since 1975, its central administration has been located in Norrköping, where some 400 of the Administration's c. 1,400 staff now work. The Administration forms part of the total defence system and is the authority responsible for preparedness planning in the field of maritime transport.

The National Administration of Shipping and Navigation is managed by a board that includes the Director General of the Administration. In addition to certain staff bodies, the Administration has six departments, namely the Marine Traffic Department, the Hydrographic Department, the Ice-breaking Department, the Marine Surveying Department, the Technical Department and the Financial/Administrative Department (see also chart A).

In regional terms, the country is divided into 13 marine traffic areas, which have pilot stations and other installations, and three marine surveying areas. There is also a Marine Survey Department office in Rotterdam.

Under its current brief (1988:14, most recently amended 1994:1349), the Administration is to concentrate its work primarily on merchant shipping, but it is also to consider the interests of fishing, the Navy and pleasure boat traffic. Sources of finance for its activities include charges levied on shipping.

One of the Administration's tasks is to be responsible for the superintendence of maritime safety. As we saw in the previous section, this activity is regulated primarily by the Safety of Shipping Act and the Safety of Shipping Ordinance issued in association with it, by the Accident Investigation Act and by the brief of the Administration. Legislation on the carriage of dangerous goods and on measures to deal with water pollution from shipping also plays a part. The inherently international nature of shipping means that safety at sea is also regulated through international accords and through the Administration's participation in international organisations concerned with navigation questions.

4.2 The Marine Surveying Department

As stated above, the Marine Surveying Department is one of six departments of the National Administration of Shipping and Navigation. In terms of organisation, the Department is answerable to the Administration's Director General. However, the Director of Marine Safety, who is head of the Department has, through a number of Acts and decrees, been given a range of decision-making powers, and the Department therefore has, to a great extent, an independent status, in particular within the work of maritime safety.

The Director of Marine Safety is appointed by the Government on the recommendation of the board of the Administration. Authority to deputise for the Director of Marine Safety is also conferred by the Government at the suggestion of the board.

The Marine Surveying Department carries on its activities at its head office in Norrköping, in the three regional surveying areas and at the Rotterdam office. The staff number about 120, of which 60 or so work at the Head Office and about the same number divided between the different surveying areas. The marine surveying areas have area offices in Stockholm, Gothenburg and Malmö.

The Marine Surveying Department is centrally organised in sections with varying areas of responsibility. These are the Planning Section, the Marine Technology Section, the Marine Operation Section and the Investigation Section (see also chart B). The Department also has an international secretariat that is responsible for international questions relating to vessel safety and environmental protection, and contacts with international organisations, e.g. IMO. Although the operation is divided into sections in organisational terms, the intention is that much of the work is to take place through co-operation between officers with differing expertise from different sections.

At present, the sections of the Marine Surveying Department have the following areas of responsibility. The Planning Section is responsible for operational planning, budget, personnel, organisation, jurisprudence, ADP and tonnage measurement of ships. The area of responsibility of the Marine Technology Section relates to the safety design, outfitting and maintenance of vessels, including stability, freeboard, strength, fire protection, accommodation, supplies storage, life-saving and navigation equipment and the carriage of hazardous goods and industrial safety. The Marine Operation Section deals with questions of manning, the rights of those employed on board, crew roster and working environment matters. Finally, the area of responsibility of the Investigation Section is investigation of maritime accidents and personal injuries suffered in the course of service on board, accident statistics and matters relating to suspicion of infringements of safety and environmental protection regulations.

According to investigations, new general service regulations for operations by the Marine Surveying Department are being drawn up. The organisation and areas of responsibility may be modified in some respects.

The brief of the National Administration Of Shipping and Navigation prescribes that the Director of Marine Safety shall be responsible for and determine questions involving the establishment of technical safety standards for vessels, life-saving organisation standards on board vessels and safety standards for the sailing arrangements of the Administration and others for which the Administration is responsible.

This also applies to questions of superintendence of compliance with established safety standards, and the matters concerned with maritime accident investigation for which the Administration is responsible.

The brief also permits the Director of Marine safety to delegate his right of decision to other officers of the Administration to be degree that is appropriate.

The National Administration of Shipping and Navigation working programme (approved on 20 December 1989) prescribes that the organisation of the Administration shall be based on a system of far-reaching decentralisation and delegation, *inter alia* in order to achieve the Abstraction's objectives as a safety authority. The Working programme also contains more detailed regulations dealing with the area of responsibility of the Marine Surveying Department. It is thus prescribed that the following matters are the responsibility of the Department.

- Issue of regulations in pursuance of the maritime safety, water pollution, manning and seamen's social legislation

- Inspection of vessels under the above legislation
- Type testing of pleasure boats
- International matters, to the extent that these are not the responsibility of another department or staff
- The Seamen's Register
- Questions of authority
- Crewing regulations for pleasure vessels
- Tonnage measurement of ships
- Investigation of maritime accidents
- Safety standards for channels and sailing arrangements
- Superintendence of compliance with the regulations on the reporting of maritime accidents and ordering of maritime declarations
- Infringement of Acts or other statutes on safety at sea
- Examination, analysis and statistics of maritime accidents that have taken place and cases of accident in seamanship.

The working programme also draws attention to the powers of decision specially vested in the post of Director of Marine Safety under the Safety of Shipping Act, the brief of the Administration and the Act (1980:424) dealing with water pollution by vessels.

5 Scandinavian Relations

5.1 Introduction

Against the background of that part of the present assignment that deals with examination of how the exchange of information takes place between marine surveying departments or corresponding bodies in the field of maritime safety in our local region, we here present brief details of the organisation and operation of the Nordic maritime authorities in those contexts that may be relevant in the present context.

5.2 Finland

The organisation of the Finnish Board of Shipping is very similar to that of its Swedish opposite number. The organisation of the Finnish Board of Shipping may be seen in chart C. As this indicates, the Board comes under the Ministry Of Traffic. One of the five operational departments of the Board - the Marine Department - includes the Marine Surveying Office. At regional level, there are four independently-functioning maritime districts. These districts are also divided into sectors, one of which carries on inspection activities (the Marine Surveying Sector). However, unlike the situation in Sweden, the districts are not subordinate to the Marine Department, but are directly answerable to the Director General.

Inspection of newly-built or newly-registered shipping takes place centrally through a basic survey team appointed by the Board of Shipping. However, the periodic surveys and all port state control are carried out by the regional bodies. Deficiencies revealed during these checks are normally reported to the central body only if they are so serious that the use of the vessel is prohibited. Relevant remarks are also entered in a data register, which may also be accessed by the central authority. All certificates are issued by the central authority on the basis of the regional bodies' survey reports.

Agreements have been concluded or are in the process of being concluded with the five large classification societies for various kinds of survey. The Board of Shipping has made it a requirement that the societies sign a liability clause before the right to carry out official assignments is conferred on them. The Board also poses certain minimum requirements of the societies in accordance with a resolution adopted by IMO. Thus, a certain number of vessels must have been classified by the society. Furthermore, the society shall have a worldwide organisation, with "exclusive surveyors", and the society shall draw up its own technical regulations.

5.3 Denmark

The organisation of the Danish Board of Shipping may be seen in chart D. The Board is subject to the Ministry of Industry and Co-ordination and is - primarily through various councils and committees - considerably more closely connected with the Ministry than any of the other Nordic equivalents. In regional terms, there are two districts, East and West, with a total of nine local offices, one in the Faroes and one in Greenland.

The Board of Shipping directs its work towards five different principal objectives, namely safety, working environment, ship registration, training and preparedness. In 1993, training activities accounted for nearly 60 percent of the Board's financial resources. The figure for safety work was c. 20 percent.

Broadly speaking, activities at the Head Office of the Board of Shipping are organised as follows. The *Regulations Office* draws up and develops rules and technical regulations, and produces directions to help with the interpretation of various technical regulations. The Office also monitors the co-operative agreements with the recognised classification societies. Much of the regulations work takes place through IMO and EU, but the Office also follows up observations made in the course of its own inspection work. The *Technical Office* organises the surveying of newly-built and newly-registered vessels of a gross registered tonnage greater than 20. Surveys are carried out by the regional offices, but the Technical Office might, for example, undertake a survey abroad. The Technical Office also organises the port state control carried out by the regional offices. The Office also monitors compliance with current technical regulations, and deals with the type approval of safety devices etc. The *Legal Office* provides the Board with legal and general advice. If necessary, the Office can also assist the prosecuting authorities in matters of prosecution. In addition, the Office prepares legislation and deals with co-ordination with EU regulations and other international undertakings.

The Office is also responsible for general directions, and provides interpretation advice on various matters. The *Register of Shipping* comprises two registers, one general and one international. The *Training Office*, which organises training at a large number of marine training institutions and superintends a small number of private schools of navigation, issues seaworthiness certificates and lays down minimum crew requirements, though only from the safety standpoint. There is also a special crew committee competent to examine these questions.

The *Nautical Office* is responsible for such matters as rules of the road at sea, upkeep of training ships and ice-breaking service. The unit that is perhaps of most interest for this investigation is the *Detection and Control Unit*. This unit, made up of some eight persons, is wholly independent within the Board of Shipping, and directly answerable to the Director of Marine Safety. The Unit's area of responsibility includes investigating and dealing with maritime accident cases, management of maritime declarations and maritime accident statistics and recommendations for new rules or directions. The Unit is also responsible for the internal quality control of the Board of Shipping. In the investigation of maritime accidents and incidents, the Unit functions almost like an accident investigation board, collecting on its own initiative such information from authorities and others as may be of interest in the work of investigations. The investigation work of the Unit is intended to clarify what has happened, how it happened and why it happened. The Unit must also reach an opinion as to what can be done to prevent similar events, e.g. through some form of regulation amendment. The investigation work is carried out by the Unit's inspectors, who act independently of other control operations. The Unit is entitled to take part in maritime declarations and put questions. The Unit participated during most of the 85 maritime declarations that took place in 1993. In recent years, there has been an increase in the number of accidents investigated. This may be to some extent due to the fact that the Unit has begun to take a more active role, partly through routine checking of the accident details published in Lloyd's List. If a crime is suspected, the matter is passed to the legal department. In addition to a description and explanation of the event in question, the Unit's shipwreck reports contain pointers and recommendations, and it is these that may lead to new regulations or give rise to new directions, e.g. to the local surveying offices. An important part of the Unit's work is to ensure that the recommendations issued are put into practice, e.g. in the case of introduction of a rule amendment or implementation of checks. Under Danish law, maritime accidents shall be reported by shipowners and masters. Other sources of information are the press, the police and the military frontier guard. In order to obtain information - e.g. through the trade unions - the Board of Shipping always seeks to protect the anonymity of its sources. There is a contact person in each union on both the employer and the employee side, and these are obligated to observe secrecy. Every accident investigated receives a special heading in the Board of Shipping "News from the Board of Shipping", which is published four times a year. The accident reports are also used as teaching material at the schools of navigation. Since the Unit also functions as an internal control body for alleged abuses within the entire area of work of the Board of Shipping, its free and independent position is extremely important.

Approved classification societies may issue most types of certificate, e.g. for hulls, machinery and loadlines. At present, six societies have been approved: the five that are generally recognised and the Japanese Nippon Kaiji Kyokai. The requirements regularly posed for approval are that the society should have offices in the country and maintain at least one exclusive surveyor. In addition, a Danish vessel shall have been classified with the society, and the Board of Shipping shall have a seat on the society's technical committee. The Board carries out an annual review of the approved societies and if necessary one or more societies may be summoned to attend special meetings.

5.4 Norway

From 1994, the Norwegian Directorate of Shipping and Navigation was reorganised, as shown in diagram form in chart D.

Since 1988, the Directorate has been under the control of the Ministry of Foreign Affairs. In matters affecting the prevention of marine pollution by vessels and the protection of the marine environment, the Directorate is also responsible to the Department of the Environment. Actual monitoring of vessels takes place through the regional organisation, consisting of 18 ship control stations divided into six districts. There are also ship control offices in Rotterdam, Miami and St. Nazaire.

The Head Office of the Directorate is organised as follows. The Director General has a staff at his disposal. There is also a separate quality chief, who is responsible for internal quality control, including audits and follow-ups. Then there is an Administrative Department and a Seamen's Department dealing *inter alia* with matters affecting certification and training.

The Inspection Department, with its operative and strategic units, administers and co-ordinates port state control and inspection of the fleet registered in the Norwegian international register of shipping (the NIS Fleet), draws up checklists, develops methods of monitoring, creates statistics and follows up the inspection reports. Otherwise, the new structure has departed from a traditional form of organisation divided by profession and instead - partly as a result of experience gained from the Alexander Kjelland accident - created departments each of which are responsible for a particular vessel category, namely fishing vessels, cargo vessels, passenger vessels and offshore units.

Much as in Denmark, the marine surveyors - who investigate maritime accidents etc. - have an independent position directly under the Director General. These inspectors, who are seven in number and located at six centres have, for the exercise of their authority, been given both police powers and the right to initiate prosecutions. As in Denmark, Norway also has an international register of shipping (NIS). When the register was introduced in 1987, discussion took place as to the extent to which delegation to the classification societies was desirable. The Directorate has a right prescribed in law to make use of personnel from recognised classification societies for its superintendence, and it also follows from the legislation that the superintendence exercised by classification personnel in place of the Directorate is carried out under the same responsibility as for a government officer. This development has led to all surveying and certification being delegated to the five recognised societies for cargo vessels of a gross registered tonnage over 500 and registered in NIS. The sole exception is the fixing of safe manning levels, which is carried out by the Directorate. Since the authority considers that it has neither the resources nor the expertise to replace the classification societies, it has been thought a better solution to exercise control by quality assurance of the societies and by carrying out spot checks on vessels. The Directorate has a right fixed by agreement to superintendence in all circumstances that affect the societies' performance of the official checks delegated to them. The Directorate carries out annual, unannounced inspections on 25 percent of all NIS vessels, and the classification societies are also audited annually in one area or another, sometimes at the Head Office and sometimes at one of the regional offices.

For example, twenty or so system audits were carried out during 1993. The Directorate has agreed with the societies that only so-called negative information, which means reports of faults and deficiencies and other anomaly reports, need be submitted to the authority. This selection has been applied so that the authority is not swamped with documents. The Directorate also has an online connection with Det Norske Veritas.

The agreement with the classification societies has been updated, and from April 1994 includes extra requirements, e.g. that the societies must have a system of quality assurance, such as ISO 9,000 or equivalent. The Directorate summons the classifications societies to a joint annual review, at which past and current events and experiences are discussed.

6 The Classification Societies

In recent years, the classification societies have been subjected to increased criticism, and the integrity and quality of their inspection work in particular. The question of the role of the classification societies in matters of maritime safety as such is outside the frame of reference of the present investigation assignment. But since it may be of importance as a source of information in the work of maritime safety within the Swedish National Administration of Shipping and Navigation, reasons can nevertheless be found for giving some account of the background to the societies and their chief functions.

The breakthrough of industrialism and world trade during the liberalism of the 19th century led to maritime safety, as in the case of much technical and financial development, being left mainly to commercial forces. The seaworthiness of vessels was therefore a matter for shipping's financial interests, such as owners, shippers, cargo owners and insurers. The insurers more than anyone else needed an independent and technically competent organisation objectively to assess a vessel's seaworthiness and thereby to assist in estimating the risks of commercial ventures.

The oldest classification society, Lloyd's Register of Shipping, was formed as early as 1760, and most of the other large societies were established during the nineteenth century. The activities of the societies have been successively expanded, and other areas of work have been added, e.g. offshore operations. Certain societies have long been active in equipment and structural testing and approval, as well as in certain sectors of manufacturing industry and road transport. Nowadays, the societies also concern themselves with quality assurance work and risk analyses. There are now more than 40 different societies. Eleven of these form an international body, the International Association of Classification Societies (IACS) which has, *inter alia*, observer status within IMO. A quality assurance programme for the societies that are members of the co-operative organisation has also been implemented through IACS. Among IACS members are the five societies considered acceptable by all shipping nations, namely the American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd and Lloyd's Register of Shipping.

The classification societies are often run in the form of foundations, etc. and it is also characteristic that there are no requirements for the operation to be profit-making.

The classification societies carry on their operations by agreement with the owners. A vessel is classified in accordance with its area of use and the trade for which it is intended. In these respects, the vessel shall comply with the requirements in such matters as hull and propulsion machinery as the classification society concerned may require. It is the function of the societies to check that vessels are built and fitted out in accordance with these requirements, and that the standard so determined is maintained during the vessel's use in accordance with the classification.

The rules of the societies - which to a great extent mirror the convention regulations and recommendations drawn up within IMO - are continually updated in accordance with experience gained and developments in terms of technology and materials. A more detailed account of the activities of the international classification societies may be found in reports such as *Samordnad säkerhetstillsyn av fartyg* ["Co-ordinated safety inspection of vessels"] (Ds K 1981:17) and *Tillsyn av fartyg* ["Inspection of vessels"] (Ds K 1984:4).

The large societies have more than adequate resources for their technical safety work, and their research and development departments are highly qualified. In addition, they have access to experience from a worldwide survey organisation. It is against the background of this "superfluity" of resources as compared to the national superintendence authorities that the societies' calculations, measures and confirmations of a vessel's condition are regularly accepted and used as a basis for the assessment of a classified vessel. In practical terms, this means that the societies' assessments, primarily as regards hull and machinery, are normally subject to no further checking by the national authorities responsible for superintendence.

Many countries, including those that lack an independently-functioning navigation authority, have given up all vessel superintendence to the classification societies.

The National Administration of Shipping and Navigation has entered into agreements with all the five recognised societies with respect to certain international conventions.

These agreements deal with survey and inspection in accordance with MARPOL, Loadline and SOLAS, and the issue of international oil protection certificates, national freeboard certificates and structural safety certificates. The agreements ensure that the Administration is provided with such facilities as access to all relevant information that is used as a basis for the society's work under the agreement.

7 Deliberations and proposals

7.1 Introduction

Against the background of serious maritime accidents in our local region, maritime safety has lately become an issue. The Government's decision to commission this report is an expression of this.

Maritime safety is regulated by a comprehensive body of statutes. In addition to the Seamen's Act, we may mention the Safety of Shipping Act and the Safety of Shipping Ordinance issued in association with it, the Accident Investigation Act and the Ordinance on the same subject. The safety regulations, which are often based on international conventions, concern themselves with requirements and standards in respect of vessels' design and outfitting, and requirements dealing with the competence of maritime personnel etc. The Safety of Shipping Act and the Safety of Shipping Ordinance also contain rules concerned with the working environment at sea, which is an important factor in good maritime safety. Much of the regulatory system is also concerned with monitoring compliance with maritime safety rules.

In recent years, greater and greater attention has also been paid to the integration of matters that affect the technical design and outfitting of vessels on the one hand with matters affecting the competence and working conditions of crews and shipping company organisation and general policy in safety matters on the other. The best illustration of this - an integration of human factors, technology and organisation - is the development and introduction of the international ISM code for general guidance in safety work. It is expected that proposals for amendments to the Safety of Shipping Act in this respect will be put before parliament during spring 1995.

However, the maintenance of good maritime safety demands more than a comprehensive system of regulations and monitoring devices. Essential for successful safety work are sound organisation of the bodies that deal with maritime safety questions, access to a satisfactory and varied body of information, and appropriate use of such information. In this respect, this assignment itself has a bearing on maritime safety work. But it is worth pointing out once again that actual safety questions are outside its scope. In order to arrive at a co-ordinated strategy for Swedish action, *inter alia* within IMO, and to throw light on safety questions of special interest for the traffic in our local region, the Government has set up a special maritime safety committee (dir. 1994:154). Part of the Committee's brief is to draw up a plan of action for improved maritime safety with special reference to carriage by passenger ferries. According to its directives, the committee is expected to report on the results of its work not later than 1 November 1995. The Government also intends commissioning a review of the present organisation of inspection activities by such bodies as the National Administration of Shipping and Navigation (prop. 1994/95:100 Annex 7 p. 59).

In this context we may also mention the work of the international shipwreck investigation arising from the loss of M/S Estonia, and the committee appointed on 24 November 1994 with the aim of establishing a long-term navigation policy (dir. 1994, 132).

By their very nature, navigation activities are extraordinarily strongly influenced by international rules and conventions. The importance of dealing with maritime safety questions through international co-operation has also become clearer and clearer. National regulatory systems with too many special provisions tend to impede navigation, which in its turn tends to result in negative effects for international trade. One of the most important platforms for intentional maritime safety work is the UN's navigation organisation, the International Maritime Organisation (IMO). IMO, with its 149 member states, draws up standards for vessel safety and environmental protection. Agreements are adopted in the form of conventions or recommendations. Rules that are drawn up by IMO are normally regarded as internationally accepted even if they are only recommendations. The most important conventions for maritime safety, which undergo constant renewal, are the SOLAS Convention, which regulates vessel building and outfitting and which now also contains regulations for monitoring shipping companies' safety organisation, the so-called ISM code, the Loadline Convention (regulating the freeboard of vessels) and the MARPOL Convention (including regulations to reduce the negative environmental effects of shipping).

Inter-nordic co-operation is also intensive and widespread. This will be dealt with in more detail below.

The international navigation market has many actors, authorities, organisations and other institutions, with functions that have been developed over long periods and that may also play a part in safety at sea. Although most of these actors represent various special interests, there is a degree of co-operation on several levels and in various respects. The groups and associations most important here - apart from the authorities - are owners, insurers, shippers, classification societies and professional organisations. When we come to more formal co-operation, anything of this nature - as far as Sweden is concerned - takes place only between the National Administration of Shipping and Navigation and certain of the classification societies. This co-operation is based on agreements. Mention of co-operation between authorities should include the Administration's co-operation with the Waterguard Branch of Customs. For example, the Administration has reached agreement with the Branch as regards this authority's co-operation in certain kinds of vessel inspection. Under the Safety of Shipping Act, the superintendence of the Administration, in matters that affect the working environment, shall be exercised in co-operation with the National Board of Occupational Safety and Health.

7.2 The Marine Surveying Department and its activities

By statute, the overall responsibility for the superintendence of maritime safety devolves upon the National Administration of Shipping and Navigation. This superintendence takes place through the Marine Surveying Department, which has a central administration, three inspection areas and an office in Rotterdam. As far as the central administration is concerned, the Investigation Section is of particular interest in the present context. Activities within the Departments are markedly decentralised. This is entirely in accordance with the guidelines that have been issued in the working programme of the Administration. These state *inter alia* that the organisation of the Administration is based on the principles of far-reaching decentralisation and delegation in order that the Administration's objectives as a public utility and a safety authority may be achieved.

In the Administration's three-year plan for activities during the period 1995-1997, it is stated concerning the Marine Surveying Department that the Department's overall operation is aimed at ensuring that the requirements for vessel safety and protection against water pollution by vessels are complied with in respect of international standards in developed countries.

The Department's overall objectives are stated as to minimise the risk of accidents and, should accidents occur, minimise the consequences and prevent a recurrence. The Department is therefore to carry out safety checks and verify the safety organisation of shipping companies and various other interests that have influence on vessels, including their operation.

That part of the duties of the National Administration of Shipping and Navigation that involves ensuring, through a system of checks, that satisfactory maritime safety is maintained is composed of varied and complex work. This is due both to the international character of navigation, and its increased complexity. As an example of the latter, we may mention the large number of interests that influence operations to varying degrees, e.g. classification societies, professional organisations and industrial organisations. At the same time, vessels as objects of inspection are becoming more and more technically complicated. Unlike in other parts of the transport sector, e.g. road and air traffic, each vessel is usually individually designed; even so called sister vessels display many individual differences. This means that general conclusions based on technical faults or deficiencies in a particular object of inspection are more difficult to draw in the case of vessels than where other means of transport are concerned. Overall, requirements are more stringent both for a good selection of objects of control and correct judgments in the work of control itself.

Pure maritime safety assessments and questions relating to trends in operation are outside the scope of this assignment. However, it is fairly clear that, as vessels become more and more sophisticated in terms of design and technology, it becomes more difficult to maintain the quality of control operations with available resources. In its turn, this has led to a gradual movement in the direction of checks on totalities instead of individualities, and checks on operations and organisations instead of on individual vessels and employees. Through the introduction of the ISM code, shipping companies are also required to carry out their own control procedures. The intention of this quality assurance is to induce the shipping companies to formulate and document what is involved in their own monitoring work, and to clarify their responsibility for maritime safety. The trend of inspection is therefore in the direction of more "audits" of the shipping companies and operative checks on crews of vessels. This trend, like that of continued development of ADP systems for information management in connection with the superintendence of vessels, forms part - as already stated - of the Administration's three-year plan for operations 1995 - 1997.

7.3 Information available and monitoring activities

An efficient control system for the purposes of an adequate level of maritime safety requires good access to information.

The necessary information may be obtained in various ways. For example the areas and offices gain some of their information in the course of observations during surveys and inspections, and in the near future will also do so through the ISM code's requirements for anomaly reporting. The Head Office obtains information *inter alia* via reports under Chapter 6 Section 14 of the Seamen's Act, and through conclusions drawn from incidents and accidents. These sources of information may all be regarded as "internal" or statutory. However there are also a number of "external" actors processing information that may be of great interest in a maritime safety context. Part of the present assignment is to investigate the incidence of exchange of relevant maritime safety information between maritime safety authorities and other bodies having important functions in the field of maritime safety. Selected for special mention in this context have been classification societies, insurers and associations of owners.

The role of the classification societies is so special, partly because of the fact that in some respects they exercise public authority, that they are examined in more detail in a separate section. In the case of associations of owners, the Department has arrived at the view that while owners as a class vary widely, the Swedish owners are essentially serious and safety-conscious. In addition to the fact that the individual owners act as administrative/legal counterparts in various matters dealt with by the Department, through which the Department obtains certain information, there is an annual meeting with the technical committee of the Swedish Shipowners' Association. There is also a degree of exchange with the Swedish Shipowners' Association for Small Passenger Vessels (SWEREF). The underwriters (insurers) and shippers are now regarded as more active than in the past, and their activities include their own vessel inspections. Most of the shippers that pose requirements are oil companies. However, there is no organised co-operation directly between the Department and the underwriters or shippers.

The Maritime Fire Protection Committee is a co-operative organisation for owners, seagoing personnel, underwriters, coastal fire services and the Department. Its main functions are training of seagoing personnel in fire protection and research prioritisation, but other maritime questions are also dealt with. We may also mention the Maritime Working Environment Board, which is the co-operative body of the parties to the labour market, and to which the Department is co-opted.

In addition to the bodies just referred to, there are, of course, many other potential sources of information which - to different degrees in different areas or centrally – play, or ought to play a large role in providing the Department with relevant information. These might include the marine traffic areas, the Waterguard Branch of Customs, the police, pilots, personnel organisations, Nordic colleagues, seagoing personnel, the mass media and private persons.

A standard argument against a more formalised and regulated duty to provide information that was expressed during the work of this assignment is that the market actors are made up of such a restricted group that much of the information exchange, at different levels, takes place via personal contacts. There is no reason to suppose that such is not the case, and through such contacts much reliable knowledge concerning individual events or circumstances may certainly be obtained.

Although the Department must be said to have an extremely good general knowledge of its field, the lack of routines for documentation, reporting paths and monitoring of external information flows may mean that this body of information is not fully utilised. The Department should formulate a policy for the guidance of staff as to how such documentation and reporting is to take place.

In addition, the Department should consider providing the interests involved with some form of feedback, in order to reinforce the inclination to submit information, e.g. through information sheets containing accounts of current shipwreck investigations, details of ongoing inspection campaigns, news concerning trends or other analysis results. The Department might consider entering into agreements on information exchange, for example with organisations representing influential shippers. In the same way, the Department might also consider entering into agreements with other possible "information bearers", for example with organisations representing seagoing personnel, owners and underwriters. It would probably be possible to suggest a number of other ways - e.g. through mutual agreement or via seminars, practical discussions and other open forums - of finding new paths to fruitful maritime safety co-operation.

A particular problem is the disinclination of seagoing personnel, and others directly affected, to report incidents in navigation. The estimates given to the investigator indicate a volume of reporting to the Department amounting to one report per hundred actual incidents. Allowing for possible exaggeration, the fact remains is that the will to report is strikingly low. One explanation put forward during the investigation was the suggestion that it is felt that incidents that take place largely lack significance for general conclusions, *inter alia* because all vessels are so different from each other. However, one undoubted reason for the lack of inclination to report incidents is that those inherently qualified to do so do not wish to expose themselves to the risk of action on the part of employers or authorities. There would, therefore, be a natural reluctance to provide information, if for example an incident were due to one's own mistake, or that of a workmate. Another reason for the lack of will to report put forward from several quarters is the lack of "feedback" from the Department. It has been seen as extremely important that some form of reaction or follow-up take place if it is to be considered worthwhile to report irregularities that are observed. This view has been expressed both by those under obligation to report events under various regulations and by others. In this context, it is worth mentioning that special requirements to ensure anomaly and incident reporting will be set up through the introduction of the ISM code. A special system for disruption reporting has long been in use in air traffic.

This lack of incident reporting must be considered to constitute a problem for the maritime safety work of the Department. The basis for risk analysis is insufficient, which means that this means of monitoring cannot be used to the extent that would otherwise be possible. However, great hopes of improvements are attached to the introduction of the ISM code. The investigator will refer where appropriate to what has been stated above regarding the possibility of increasing information from external sources. Nevertheless, the Department should also consider other methods of encouraging the will to report. It may be worth considering trying out an anonymous reporting system.

A particular form of lack of follow-up on information provided that was pointed out during the course of the investigation by representatives of both the Department and several of the trade associations, is that legal measures are seldom undertaken against what are considered clear breaches of maritime safety. It is said that this lack of action spreads the idea that there is no point in reporting abuses, since nothing happens. The view is also held that there has been a marked decline in the number of prosecutions brought since the days when there was a special maritime prosecutor. This official was originally an officer of the Swedish Board of Commerce, then of the Board of Shipping and finally in the then Stockholm prosecution district, with the official title of First Maritime Prosecutor. The job of the maritime prosecutor was to investigate, and institute legal proceedings against infringements of regulations affecting maritime safety etc. The special maritime prosecutor scheme has now been abolished. It is said that it is now extremely difficult, even in cases that are considered unambiguous, to induce prosecutors to bring actions in various kinds of maritime safety infringements. This in its turn is considered to arise from the fact that these cases are now divided between a large number of prosecutors, each of whom receives only individual instances. Because of this, and of the fact that maritime safety is hedged about by a relatively extensive, and not always easy-to-understand regulatory system, the prosecutor may experience difficulties. During the investigation, cases have emerged that do not conflict with the conclusions drawn above. In view of the lack of testing in the courts, and the inhibition of the will to report abuses, it is the opinion of the investigator that it should be considered whether criminal cases that affect the Accident Investigation Act in those parts that relate to navigation - as is now the case with infringements of the Seamen's Act and the Safety of Shipping Act - should also be dealt with exclusively by the prosecuting authorities in places where courts of maritime law exist, in order thereby to concentrate and promote knowledge and experience. In any event, some form of in-depth training in this field should be made available to prosecutors and police.

7.4 Viewpoints and proposals on regional operation

7.4.1 Introduction

The work of the areas and office are strongly characterised by the authority's policy, referred to above, of decentralisation and deregulation. All survey execution and all certification therefore takes place regionally, where such matters have not been delegated to the classification societies. The three areas are also responsible for port state control.

7.4.2 The vessel survey system (FTS)

Starting in the first half of 1993, a computer-based vessel survey system (FTS) has been introduced in stages. This system is intended to simplify access to vessel data and rationalise routines for procedures and invoicing. A system objectives description states *inter alia* that it is intended to make easier staff functions such as planning, statistics, documentation and reporting in connection with vessel procedures, and to improve procedure documentation for both external and internal use. The planning of survey work will also be made easier and the need for manual vessel dossiers reduced through access to factual information in the system.

The inspection reports that were previously available only via the relevant regional authority will now, through the FTS system, become available to everyone within the organisation. So far, the system is entirely vessel-based, in the same way as the vessel dossiers. But the intention is that the FTS system should also facilitate access to vessel data using parameters other than the vessel name.

Since the actual monitoring work in the form of surveys and inspections takes place via the different areas and the office, the actions of these authorities are extremely important for the development of safety work. Rulings in certification questions or regarding the detention of a vessel may also have large-scale financial consequences. It is therefore very important to maintain the requirements in terms of professionalism, knowledge and experience that this work demands. The activities also pose requirements in terms of professional and impartial exercise of authority, and it is very important that the checks are carried out and recorded in a uniform manner in the different districts. Uniform control increases reliability and means that the probability of deficiencies being detected is the same wherever the vessel calls. Uniform documentation is also a prerequisite for using the report for an effective analysis and follow-up work. If the same kind of procedure in different areas produces a different scope and content, this also results in differences in fee debiting, which may be considered unjust and reduces confidence in the operations of the authority.

7.4.3 Investigator's observations and assessment

Internationally speaking, maritime safety in that part of navigation that is under the superintendence of Swedish authorities would seem to be of extremely high standard. This may be considered to be the case both technically and operatively. In recent years, maritime safety work has been based on a comprehensive view, as expressed in the ISM code. Together with other Nordic maritime authorities, the National Administration of Shipping and Navigation has - in particular through its Marine Surveying Department - been particularly active in an international context.

However, what has just been stated does not mean that present operations, as seen by the investigator, do not suffer from certain deficiencies in various respects. This applies chiefly to the management and control of practical survey activities in the areas and the office, the procurement and promulgation of information of interest for maritime safety and centrally - in addition to the control function - to the processing and analyses of available information material, and follow-up of measures that have been decided on.

Certain of these deficiencies have already been noted by the Department, *inter alia* through the results of an audit of administrative routines in the different inspection areas that was carried out in spring 1994. A number of working parties are looking at these problems in depth. In this context we may specifically mention the important work of integrating documentation with (and further developing the area of use of) the computerised FTS system, and a working party for the design of common checklists.

As we have already seen more than once, regional operations are characterised by decentralisation and independence. There is little to object to in such a policy, but decentralisation and independence must not lead to activities that are carried out regionally displaying great variations between the regions, less still between different officials in one and the same regional authority. This does not merely create legal uncertainty, but may also affect maritime safety itself. The results of this investigation work indicate that practical survey activities are essentially dealt with by the areas at their own discretion. The areas have therefore expressed the view that the methods used in exercising superintendence, and the assessments, vary a good deal from inspector to inspector. The areas have also stated that there is a lack of information and interpretation directions from the Head Office. Further observations indicate the proliferation of a plethora of forms, checklists and types of documentation, and that only one area has a functioning routine for reminders and some form of result follow-up. According to the information received, centrally-initiated specific inspections, directed towards a particular question or area, take place rarely or not at all.

The unwarranted differences in scope and content between the exercise of authority by the areas has led the investigator to the view that substantially stricter control by the central authority is called for. There is a need for definite directions, for example by using checklists for direct monitoring and protocol rules or equivalent documentation of survey procedures. Unevenness in survey activities between different regions may, as already suggested, erode confidence in the operation as such. The investigator would therefore strongly recommend that the scheme using checklists etc. should, as far as practically possible, be resumed as soon as possible, and that the survey procedures be recorded so that observations and comments made, and measures taken, are documented uniformly and clearly. In this context it should be noted that an expanded FTS system may, to no inconsiderable extent, come to influence survey operations towards greater uniformity, and compel a clearer and more comprehensive documentation. As the investigator sees it, implementation of the planned expansion of the FTS system is therefore especially appropriate.

The need for follow-up and evaluation of the Department's monitoring activities as a whole is great. At present, there is no systematic reporting to the central authority or follow-up by that authority of the areas' monitoring activities. As a result, the Department does not obtain a clear picture of the scope and direction of these activities, nor of the deficiencies noted during the procedures, all of which renders effective control more difficult.

The conclusion must be that the areas' monitoring activities are not effectively utilised in long-term safety work. The lack of a coherent picture of what emerges during monitoring activities therefore makes it difficult to direct these operations to the areas in which monitoring may be expected to be of greatest importance. This also restricts the options for efficient use of resources. Ongoing follow-up and assessment of the work carried out "in the field" should therefore be initiated.

Another observation made by the investigator in visiting the regional bodies is that the comments on deficiencies in the objects of survey made during a procedure and dealt with before departure of the vessel are not documented in any way. This too would be a valuable source of information, e.g. in revealing common technical deficiencies, lack of maintenance or other neglect on the part of owners. The investigator is well aware that we should not create a system in which the central authority ends up "drowning in reports", but with the help of the FTS system and with centrally issued directions, based on an ongoing dialogue with the officials at area level, a reasonable compromise should be possible. In any event, it should be feasible to create access to information through which various trends might be detected, to the benefit of maritime safety.

What has been stated concerning deficiencies in documentation of survey procedures may also be considered to apply to continual follow-up of new vessel construction. Comments leading to subsequent measures are not recorded here either. As in the case of survey procedures, important ongoing observations made during the building of a vessel should be noted and passed to the central authority.

Effective control requires both control instruments and the follow-up of operations. Forms of control may be of several different kinds. At present, chief inspectors' meetings take place with some regularity, and these involve a degree of follow-up, co-ordination and uniformity between the areas in their work. Other possible means of control are advisory policy decisions and other standards creation. The Department carries out comprehensive and important work through its international commitments. This may be another reason why policy and standards creation have been neglected. A joint effort towards the creation of the implementing regulations, interpretation information and common routines in general sought by the areas would, however, contribute towards reducing the unevenness between them.

Another way of improving available information for safety and analysis work - and one which may also be seen as a function of information already obtained - would be to make more extensive use of inspections for particular purposes, or other examinations on particular themes, in order to reveal where the weak points are. The survey procedures must, of course, cover certain basic areas, but this should not prevent special attention, in some situations, being paid to particular questions or areas. In particular in the case of inspections, which are a form of extraordinary survey, these are often carried out "on instinct" rather than following systematic considerations. With close and ongoing contacts between the central authority and the areas, the former ought to be able to find out about such trends as relate to maritime safety deficiencies that merit special attention as part of survey activities. The investigator feels that routines for such a co-ordination between the central authority and the regional authorities should be created. There should also be regular contact between these bodies for the interpretation of and information about relevant provisions in the field of maritime safety.

In his visits to the areas, the investigator has also noted that the imposition of fines is not used as part of the procedures. In reply to questions about this he has been informed that this action is regarded as awkward and alien.

Although most of those affected have great respect for the safety work carried out by the Department and the areas, and are therefore happy to take action on the comments made, any form of superintendence does require access to some form of compulsion in order to give it "teeth", if only for preventive purposes. Options available to the Department include revoking or refusing to renew the certificate, handing over the case for possible prosecution, and restricting the right of use of the vessel. The last of these also includes the power to impose fines, cf. Chapter 11 Sections 1 and 6 of the Safety of Shipping Act. The most potent form of compulsion used is prohibition of use in the form of vessel detention. Such a ruling, which must be referred to the Director of Marine Safety, is certainly very effective, but it is probably much too powerful a measure for many small infringements and deficiencies. In other contexts, the imposition of fines is a highly effective measure, so that it is rather surprising that it is so seldom resorted to by the Department. If the option of imposing fines is not invoked at all, there may be a risk that the more severe form of compulsion will be used where it is not needed, or that a form of compulsion that is justified in itself is not used at all. In any event, as the legislator intended, there should be a degree of latitude in the imposition of fines with reference to Swedish vessels.

In order to dispel the uncertainty that clearly exists in the areas in the matter of when to impose fines, the Department should consider developing a policy governing the use of different sanctions in various situations. Development by the Department at central level of some form of application guidelines or directions for the management of fine matters would also be appropriate.

The investigator will return to the organisational proposals to which the views expressed in this section may give rise.

7.5 Viewpoints and proposals on the activities of the Investigation Section

7.5.1 The work of the Investigation Section

The area of responsibility of the Investigation Section covers investigation of maritime accidents and personal injuries suffered in service on board, accident statistics and suspected infringements of safety and environmental provisions. Only two investigators are attached to the investigation department, but in both theory and practice there is also a regular dialogue with various experts in the other Head Office sections, e.g. with shipbuilders in matters of stability. All reports under Chapter 6 Section 14 of the Seamen's Act are examined by the section, and every year the section also deals with 10 or so maritime accidents, for which authority is delegated by the Board of Accident Investigation under the Accident Investigation Act. The maritime accidents delegated in this way usually concern fishing boats. In 1993, a total of 359 cases was referred to the Investigation Section. These vessel cases are filed in a dossier for each vessel, and the dossier is marked with the vessel's name. When a case has been closed, the dossier is bound and filed in day-book number order or in chronological order. As we have already seen, service regulation 3/92 of the Department contains more detailed rules governing the contents of an investigation report. Under these, a report shall include a description of the event, analysis of factors important to the event, probable causes, measures taken and proposed measures arising from the accident. The investigation report is approved by the Director of Marine Safety or, through delegation, by the head of the Investigation Section. The more important reports are to be presented at a "safety meeting", to which the section heads of the Department, and representatives of the other affected departments of the National Administration of Shipping and Navigation are summoned. Safety meetings are also to be held to monitor the measures taken on the basis of recommendations made in previous investigation reports. For assistance in the work of finding events that have not been reported under Chapter 6 Section 14 of the Seamen's Act, the investigation subscribes to the periodical Lloyd's List, and to a fax service dealing with Swedish or Swedish-owned vessels called Lloyd's press. A Swedish press information service is also used.

7.5.2 Investigator's observations and assessment

An extremely important prerequisite for good maritime safety it is that accidents or incidents that occur should be regularly investigated, analysed and followed up. The job of dealing with such activities devolves primarily upon the Investigation Section. The cases of the Investigation Section come into being mainly through reporting under various statutes (primarily the Seamen's Act) and through the section's own monitoring of various sources of information. Some information may also be gained through the FTS and DAMA systems, as well as through announcements or notices from, so to speak, external quarters such as authorities, organisations, institutes and individuals.

The number of cases received by the Investigation Section is substantial, and the section has a very heavy workload. Despite this the investigations, as far as the investigator can determine, are dealt with in a manner that is in itself highly creditable.

As regards the way in which cases come to the attention of the section and the way its tasks are structured, it is natural that the investigations have concentrated mainly on individual instances and the analyses and recommendations associated with them. The case management of the Investigation Section is therefore more a matter of dealing with individual cases than with taking an overall comparative view. In other words, the results of a previous investigation are not automatically considered in the investigation and assessment of the next event. This is obviously a failing in the system, which will be illuminated to some extent in the following account of certain accidents and incidents with ro-ro vessels. Methods of record creation and filing of past investigations may also be considered to contribute to this deficiency. This is because the only way of finding a correlation or parallel with a particular accident or incident is that the individual investigator or other person - for example an official working at area level - has knowledge of the previous event and of which vessel was involved in it. In this context we may also note that the dossiers of the various vessels are in some respects difficult to follow as regards the presentation of material received or created, ongoing case management and decisions taken. For example, day-book pages are not used, nor are the documents appended as annexes.

As stated above, the more important reports are to be presented at safety meetings. Such safety meetings are also to be held to monitor recommendations made in investigation reports.

According to information gained when visiting the Investigation Section, such meetings have not been held since the reorganisation that was carried out in 1988. The information section has also stated that there is no real feedback on the part of the management to the section as regards the section's work.

In the opinion of the investigator, the analysis and follow-up functions should be developed and strengthened substantially within the Department. Under the present system, the investigation results and analyses that emanate from the Investigation Section are not fully taken into account. Nor, with the extremely limited resources presently at the disposal of the section, is it reasonable that the section should carry out a more extensive analysis function and an ongoing comprehensive follow-up of recommendations that have been made. In any case, it might be questioned whether such tasks are appropriate for the Investigation Section which, were this to come about, would have to receive extra resources. The investigator's view is that it would be more natural that these tasks, which are very closely associated with the management and control functions that should devolve upon the head of the Department, should be entrusted to a staff body associated with him. Only in such a way would it seem likely that systematic and comprehensive processing can take place of all the information material that is supplied, or may be supplied to the Department with respect to accidents and incidents that have taken place, or that originate from observations reported.

Such a staff body might also, as already suggested, systematically and regularly follow up the decisions or recommendations made in connection with material such as the reports of the Investigation Section. The investigator would therefore suggest that an organisation consistent with this be considered. Such an organisation would, of course, require the necessary ADP support.

Finally in this context the investigator would recommend - at any rate while the present organisation continues - that the "safety meetings" be resumed, and that the management should provide regular feedback to the Investigation Section on its work. The routines for management and presentation of investigation material created or acquired should also be improved, and the principles of documentation for measures taken and decisions made should be reviewed so that existing material and the development of the case are presented clearly and unambiguously. Nor does record creation based only on vessel names seem satisfactory. It seems appropriate to consider record creation in more detail when the FTS system is expanded in connection with existing plans.

7.6 Co-operation with the classification societies

7.6.1 General information

The current system with the classification societies as superintendents of vessel building and exercisers of regular monitoring of classified vessels during their period of use is one of ancient authority. The societies' own structural requirements are not infrequently the same as those of SOLAS and other conventions. The areas traditionally dealt with by classification are hull, machinery and other means of propulsion. The societies listed in the Safety of Shipping Act are highly comprehensive organisations with massive resources and a broad operational base. They have considerable technical resources, large research and development departments and often worldwide survey organisations. In view of the societies' broad range of knowledge and well-developed monitoring apparatus, it is not difficult to understand why the national supervisory authorities have long regularly accepted the societies' requirement specifications and survey work. The Swedish Marine Surveying Department is privy to the work of the societies by virtue of the fact that the Director of Marine Safety sits on the Nordic technical committees of the American Bureau of Shipping, Bureau Veritas and Det Norske Veritas. All amendments in classification rules are submitted to such committees for consideration.

Through the Marine Surveying Department, the National Administration of Shipping and Navigation has reached the following agreements with the classification societies.

MARPOL, IOPPC

Agreements on survey and inspection under the international oil protection convention (MARPOL) and on entitlement to issue international oil protection certificates (IOPPC) have been reached with the American Bureau of Shipping (ABS), Bureau Veritas (BV), Det Norske Veritas (DNV), Germanischer Lloyd (GL) and Lloyd's Register of Shipping (LR). These agreements were signed and became effective during the period June-October 1989.

Load Line, ILLC

Agreements on survey and inspection in accordance with the international load line convention and protocol ("Load Line") and on entitlement to issue national freeboard certificates (ILLC) have been reached with BV, DNV, GL and LR. The agreements with BV, DNV and LR were signed in December 1992 and became effective on 1 January 1993. The agreement with GL was reached and became effective on 1 March 1994.

SOLAS, KC

Agreements regarding survey and inspection in accordance with SOLAS and on entitlement to issue structural safety certificates have been entered into with ABS, BV, DNV, GL and LR. These agreements were reached during the period March-September 1994 and became effective during the period May-November 1994. The agreements in respect of SOLAS have been drawn up using a template recommended by IMO.

Since the societies are authorised through agreements to exercise official authority, the agreements include liability clauses for the exercise of authority involved in classification survey and certification entitlement. The Department has also been given entitlement to view all the documents used by the societies for their work under the agreements, and the societies' internal instructions, circulars and directions are also to be available to the Department. Under the SOLAS agreements, the authority's superintendence shall be directed towards the societies' organisation and routines, and the Department shall, either under its own auspices or through another body, carry out classification audits.

7.6.2 Investigator's observations and assessment

The draft bill for the 1988 Safety of Shipping Act (prop. 1987/88:3) would seem to indicate that parliament and the Government were working on the assumption that the classification societies listed in the Act would continue to be entrusted with essential monitoring functions and that the measures and assessments of these societies, at any rate as regards hulls and machinery, would normally be acceptable without more detailed checking by the Marine Surveying Department. At the same time, it was pointed out that circumstances may change in relation to the societies in question, so that it is important to keep abreast of and monitor their activities regularly. Subsequent events should be seen against the background of the debate that has taken place is in recent years concerning the relationship of the Marine Surveying Department to the classification societies.

It seems to the investigator completely unrealistic that the Department should take over all the services currently offered by the classification societies. The Department has neither the personnel, technical or administrative resources to take over these tasks. The role of the Department in this context must be seen against this background. However, what has just been said does not mean that the Marine Surveying Department does not have essential functions in this context. After all, the Department bears the ultimate responsibility for the monitoring of maritime safety and therefore a responsibility to ensure that all aspects of maritime safety are properly served and monitored in the work carried out by the classification societies. In addition, as noted already, it is assumed by the Government that the Department will monitor the societies are an ongoing basis.

In both Denmark and Norway, the relevant supervisory authority organises annual meetings between the authority and the classification societies. Events of interest are reviewed at these meetings, and if the authority finds that abuses are taking place in any respect, it draws attention to these abuses. In Norway, an audit of the societies actually already takes place.

Unlike the situation in Denmark and Norway with their extremely comprehensive international registers, there are only a small number of Swedish-registered vessels that are classified. They number some 300 vessels. The Swedish Marine Surveying Department has therefore chosen a method of monitoring the classification societies different from the auditing method used in Denmark and Norway. In the Department's recently issued service regulation 3/1995, dated 1 February 1995, directions are given for the performance of integrated inspection with respect to Swedish classified vessels. To put it briefly, this integrated inspection may be said to involve a combination of operative checking, on-board audits, visual survey and checking of the vessel's documents. The Department's monitoring to a great extent duplicates the tasks that the societies are expected to carry out. However, this is a conscious strategy on the part of the Department. Firstly, the Department does not wish to relinquish any part of operative monitoring to the societies, and secondly there are few enough Swedish classified vessels to make is a reasonable proposition to monitor the societies' work by inspecting every one of the classified vessels.

The present organisation of the Department's survey activities, and its access to technical and personal resources must, in the view of the investigator, be seen against the background of the system that has hitherto existed, namely that the classification societies' measures and assessments as regards (primarily) hull and machinery are normally accepted without further checking. Future developments must show whether the Marine Surveying Department, instead of going down its present road - or in addition - should exercise an ongoing and systematic monitoring of the societies' activities in the same way as in Denmark and Norway. But in any case, the system now prescribed for scrutiny of the classification societies must include routines for systematic and uniform reporting from the areas, and above all a centrally actuated analysis and follow-up of the information material that should be accessible in this way. Without this, the classification societies' activities and place in the maritime safety system will not, in accordance with the intentions of the Government when the 1988 Safety of Shipping Act came into being, be susceptible of overall evaluation. If in accordance with what is recommended above a special staff body is created under the Director of Marine Safety, it would seem natural that the analysis and follow-up function just referred to should be dealt with by this body.

7.7 Nordic co-operation

7.7.1 Various forms of co-operation

Inter-nordic co-operation as regards maritime safety rules and practical work is of an extremely wide extent. In the descriptions of this co-operation provided by representatives of the maritime safety authorities in Denmark, Finland, Norway and Sweden, it was stated that informal contacts take place on a more or less daily basis between marine surveying department officers with various responsibilities. A number of concrete and continual co-operation projects are also proceeding in survey activities, e.g. an agreement for the operational monitoring of passenger ferries between Sweden and Finland. Under this agreement, the Finnish authority is responsible for operational monitoring of the Swedish ferries, and the Swedish authority carries out corresponding monitoring of the Finnish-registered ferries. An annual meeting is the Nordic marine safety directors' meeting, which deals with common questions of a general character. Several more informal meetings take place between these annual meetings. Generally speaking, the Nordic Directors of Marine Safety normally act jointly in both international maritime safety work and in the introduction of specifically Nordic regulations. Prior to IMO assemblies, joint preliminary meetings are often held, at which Nordic representatives of owners, seagoing personnel, insurers, other authorities etc. may take part.

7.7.2 DAMA

Since 1990, a special Nordic co-operation project has also existed, known as DAMA. This involves a common data system for the reporting of maritime accidents and statistical compilation. The common Nordic database of incidents and maritime accidents has been prepared in co-operation with Det Norske Veritas and the Norwegian Waterguard Branch of Customs.

Technically, the system is based on a Norwegian database program, FICS, which is an integrated programme comprising database, spreadsheet, report generator and word processor. The reports are sent on diskette to the Norwegian Directorate of Shipping and Navigation by the central navigation authorities of the other Nordic countries. In Norway on the other hand, a network version of DAMA is used, making it possible to feed in data directly from the Norwegian navigation areas. DAMA includes coded information, e.g. details of vessel type and weather conditions, but the system also accepts fully written out text in free form. The coded information makes it relatively easy to draw up common Nordic statistics.

The view has been expressed in several quarters that the DAMA system is rather a "blunt instrument" and not particularly suited to its purpose. An example of this is criticism of the composition of the codes, where a desire for a clearer focus on the effects of the human factor has been expressed. There has also been criticism of the system's software and compatibility. Nevertheless, all the critics agree on the importance of a common database for following up maritime accidents, not least because a statistical database for each individual country might be too small to be used as the basis for any meaningful analysis. It should also be mentioned that development work is going on in IMO on an international "Ship Casualty Database". This work will certainly affect the development of regional and national maritime accident databases.

7.7.3 Investigator's observations and assessment

Other than the annual meeting of the Directors of Marine Safety and DAMA, there is no organised co-operation for the exchange of information between the Nordic countries. However, as we have seen, there is an extremely close informal co-operation between the Nordic countries in the field of maritime safety. This takes place at both central and regional level, and between both authorities as such and individual officers. This co-operation relates not only to direct survey activities and questions of information exchange and the development of rules but also, not least, to international questions, primarily those dealt with inside the framework of the IMO. This informal Nordic co-operation seems to function smoothly and efficiently. To formalise information exchange by special conventions or otherwise seems neither necessary nor practical. Such a scheme would also lead to complications in international work in general. According to what has emerged in conversation with representatives of the inspection authorities in Denmark, Finland and Norway, the general view amongst them is that the existing co-operation, broadly speaking, functions exceptionally well and that any formalisation of information exchange is neither necessary nor appropriate.

The investigator therefore finds no reason to propose that the information exchange between the inspection authorities of the Nordic countries should be crystallised by formal agreements. It should therefore continue to depend on the authorities in question to determine in more detail the thrust and scope of their information exchange.

In this context, it should finally be pointed out that an expansion of the Swedish FTS system for vessel survey may open up further options for information exchange. Similar computer systems are under construction in the other Nordic countries, e.g. the KATJA register in Finland. If these data registers are made compatible, the options for revealing trends and correlations in relevant respects - *inter alia* on the basis of the increased amount of data available - should therefore increase in the same way as for the common accident register, DAMA.

8 Specifically about ro-ro vessels

8.1 Introduction

For many years now, transport systems have been in a process of rapid development. Increased requirements for capacity and efficiency have led to the introduction of new cargo carriers, cargo handling systems etc. In the field of maritime transport, one way of meeting these needs has been the introduction of the so-called roll-on roll-off vessels (ro-ro). However, experience of ro-ro services has shown that, although in itself the concept represents a modern and effective maritime transport system, it suffers from certain weaknesses from the safety angle. For example, the occurrence of free liquid surfaces on the large cargo decks of ro-ro vessels involves risks of reduced stability. Furthermore, difficulties in securing vehicles and containers - in particular if the loads in such carriers are not themselves satisfactorily secured - involves a risk of cargo displacement.

Following the loss of M/S Estonia, there have been allegations that incidents and problems with bow doors had occurred previously on ferries of the same type as M/S Estonia. Since these allegations are an underlying reason for this investigation assignment, the investigator has made certain inquiries concerning accidents or incidents with ro-ro vessels. Because of the fact that the Marine Surveying Department's files and registers for accidents are entirely vessel-based, the job of tracing a particular type of previous accident or incident has been a difficult one, and the results have been unavoidably incomplete. Nevertheless, during his work the investigator has obtained certain details through what has been recalled by individual officers concerning vessels or events. Their follows (a) some brief accounts of certain previous accidents and incidents of special interest in the present context and (b) a similarly brief resume of how matters were dealt by the Marine Surveying Department.

8.2 Visby

8.2.1 Sequence of events

The passenger ferry Visby was built in 1972 and had a gross tonnage of 6,665 registered tonnes. On 12 November 1973 on its ordinary run between Nynäshamn and Visby, the forebody of the ship was struck by some heavy seas. The result was that the foreword bow door was opened and water was shipped on the vehicle deck. The master therefore decided to turn the vessel back to Nynäshamn. This event took place after the vessel had come out into the open sea. There was a high wind and heavy sea at the time.

8.2.2 Damage

On survey of the damage, it was found that both of the locking hooks of the bow door had been broken off and impressions left on the door. As a provisional measure, the foreword bow door and cargo ramp were welded to the hull. After the repair had been water-tested and surveyed by the relevant classification society, Lloyds Register of Shipping, the vessel received temporary permission to continue voyaging until the next yard inspection. In February 1974, a permanent repair was carried out, in which the bow door received new locking hooks of heavier gauge than previously, and the locking device was further reinforced by shroud screws with lashing attachments.

8.2.3 Cause

The Department's conclusion about the course of the accident, as stated in the investigation report dated 1 November 1974, was that the bow door locking devices were of too slight a construction.

8.2.4 Procedure by the Department

Once the investigation department had become aware of the accident, presumably through its press services, a "Section 70" report was requested. This was received at the end of January 1974. The Department wrote to the shipping company in February 1974 to demand a maritime declaration, on grounds including the following.

"The National Administration of Shipping and Navigation takes the view that shell plating doors must be as strong as the plating in which they are fitted, and regards weather damage to bow doors in a serious light. From the maritime safety viewpoint, it is therefore essential that the course of such accidents is investigated as fully as possible. A maritime declaration should accordingly be held."

In the investigation material, there were also statements from the master to the effect that the locking device had failed on a previous occasion, and there were also allegations that another Gotland ferry, Thjelvar (formerly Gotland), had suffered a similar mishap during severe weather some years previously.

The Department also sent a memorandum to Lloyd's Register of Shipping arising from the event involving the Visby and a similar event involving the passenger vessel Svea Star (see below). This memorandum includes the following. In introduction, it is mentioned that the National Administration of Shipping and Navigation had approved the classification society's check on strength and tightness for shell plating doors, but that the Administration had examined and carried out inspections of the door hoist devices, since this was not covered by the society's survey. The Department then pointed out that a general reduction in the number of battening-down devices had been observed, and queried this development from a maritime safety viewpoint. For example, it was pointed out that if one fitting were to break, the increase in stress on the remainder would become so great that these too would be at risk of failure. In view of the maritime accidents involving the Visby and Svea Star, the Department finally queried a number of the assumptions of load that the classification society had used as a basis for its requirements for the gauge of battening-down devices, e.g. the way in which wind and sea were calculated to exert stress on the door.

Lloyd's Register of Shipping replied in May 1974, and it was revealed *inter alia* that an internal investigation was in progress, but that the strength requirements had been temporarily almost tripled, and that new locking devices would soon be fitted. It was further stated that the dimensioning for Visby and Svea Star was of the same order of size as for other ferries. The society therefore raised the question of whether these vessels' rapidly declining bows, together with their high degree of flare, had had a disadvantageous effect.

On 17 July 1974, a maritime declaration was held at Stockholm City of Court. In the investigation report of November 1974, in which the Department stated that the cause of the accident was the insufficiently-strong locking devices of the bow door, it was noted that the classification societies had been informed of the need for locking devices of heavier gauge, and that the Department, in its future safety work, should carry out a review of the classification societies' rules governing bow doors etc.

On 17 December 1974, a joint memorandum was drawn up dealing with the events involving Visby, Stena Sailer (see below) and Svea Star. This includes the following statement.

"In view of the fact that accidents at sea took place during autumn/spring 1973/74 to the foreword bow doors on a number of Swedish passenger vessels, in which battening-down devices were broken and the bow doors of the above vessels torn open, the Safety Section finds compelling reason to question whether the standards applied to such equipment - in particular the battening-down devices - are satisfactory from a maritime safety viewpoint.

It may be remarked that, in addition to the accidents referred to above, other cases of such accidents have come to the attention of the National Administration of Shipping and Navigation.

The Safety Section finds these accidents to be of such a nature as to call into question the principles of certification for trading areas, possibly leading to the reassessment of certificates already issued, in particular for vessels holding North Sea and ocean-going certificates."

It was intended to deal with this matter at a chief inspectors' meeting, and in addition to reports that had been drawn up and existing correspondence, a compilation was appended to the memorandum of viewpoints on safety in certain vessels of the ro-ro type. It was also intended to discuss at the meeting whether the rules of IMCO (as the IMO was then called) governing doors should be reviewed. It should also be ascertained whether responsibility for monitoring and survey of battening-down and locking devices etc. was satisfactorily regulated between the Department and the classification societies.

From the compilation concerning certain ro-ro vessels appended to the memorandum, the following may be quoted. "Door tightness testing is carried out in a scarcely realistic manner by spraying water on a door that is not under stress. Substantial forces would presumably be acting on the door in heavy seas. These forces seem not to have been estimated or calculated."

The Visby case was closed, it appears from the documents, on 20 March 1975 with the following official annotation: "The report on this case was presented at a chief inspectors' meeting on 18.03.75 in Stockholm, when certain decisions were reached. Regarding these and other measures, see 'Svea Star' 33.21-2512/74 and 'Stena Sailer' 3321-452/74".

8.3 Stena Sailer

8.3.1 Sequence of events

The dry-cargo ship Stena Sailer was built in 1973 and had a gross registered tonnage of 2,872. On a voyage between Zeebrügge and Dover on 16 January 1974 with a cargo of trailers and transport lorries, the vessel encountered heavy weather with increasing opposing seas. The vessel reduced its speed, but the strong sea broke apart the locking devices of the foreword bow door, and lifted it out of closed position. The space between the bow door and the bow ramp was filled with water. The ramp was therefore secured using six chains. In order to avoid additional damage, the vessel put about and sought emergency harbour in Rotterdam, where a temporary repair was also carried out.

8.3.2 Damage

The locking mechanism and hoisting arms of the bow door had been damaged, and the port-side ramp operating hydraulics had become unusable after the failure of the operating rod attachment.

8.3.3 Cause

The investigation report dated 12 December 1974 stated that the cause of the accident was that the ramp and bow door closing devices were of too slight a construction.

8.3.4 Procedure by the Department

Having had access to the "Section 70 report", received on 24 January 1974, the Department realised that this was the sort of damage that, under the rules, should have led to an immediate report. The Department also demanded that a maritime declaration should be held.

A maritime declaration was held on 13 February 1974 on board Stena Sailer in Zeebrügge.

On 2 May 1974, a report was received from the Gothenburg marine surveying area of a meeting dealing with examination of bow door locking devices. From this report it emerged that Stena Sailer's bow door had come open during a previous voyage. It also appeared that the bow door of Stena Sailer's sister ship, the Union Wellington under the New Zealand flag, despite having been reinforced, had been opened during heavy weather. Another sister ship, the Sea Trader, had crossed the Atlantic in bad weather, but on this vessel the bow door had been welded closed. The following may also be found in the report.

"During the meeting, it emerged that very little is known about the forces that affect the bow door. However, through the trials conducted by G.L. (note by Germanischer Lloyd investigator), some slight understanding of this has been gained. It appeared that more or less all the locking devices on existing vessels with bow doors are of too slight a construction.

That matters have gone as well as they have so far is due to the fact that vessels with bow doors are for the most part used in more confined waters, where they do not normally meet such heavy weather.

I propose that the Administration investigate how locking devices on bow doors ought to be placed, designed and constructed, and that there should then be a check on the locking devices of existing vessels.

This presumably will not be done by the classification institutions, since after all these have already approved existing locking devices."

On 8 May 1974, the Department wrote to Bureau Veritas, with which Stena Sailer was classified, and sent the society the same memorandum and questions as had formerly been submitted to Lloyd's Register of Shipping in connection with Visby and Svea Star. Bureau Veritas was given the chance to respond to the questions in the memorandum and to put its views on the accident in question. It was then asked what maritime safety measures Bureau Veritas intended to undertake in connection with the bow door accidents that had happened.

Bureau Veritas replied at the end of July 1974, and this response indicated *inter alia* that the society intended to make its requirements for bow door locking devices stricter.

The summarising memorandum mentioned in connection with the Visby and dated 17 December 1974 also covered Stena Sailer.

The final annotation is from 25 June 1975, and this states that a journal had been drawn up and passed to "affected parties". An official had also been commissioned to do further work and refer the safety problem with bow doors to IMCO, in order to put this on their agenda.

8.4 Svea Star

8.4.1 Sequence of events

Svea Star, a passenger vessel built in 1968 with a gross registered tonnage of 9,963, was registered with Lloyd's Register of Shipping. Between Travemünde and Helsingborg on 5 May 1974, the vessel encountered heavy weather and rising seas. A particularly heavy sea struck the vessel, tearing lose the foreword locking devices and extra battening and lifting up the bow door. Water collected between the forward door and the flap. The vessel returned to Travemünde so that the damage could be inspected.

8.4.2 Damage

All three hydraulic battening-down device guides were completely demolished, and even the extra battening with two 2-inch shroud screws had been torn apart. No damage was evident to the actual door or flap. The locking device was stored temporarily and surveyed two days later in Helsingborg by both the classification society and the Department.

8.4.3 Cause

The investigation report dated 12 December 1974 states that the opinion of the master, classification society and Department was that the accident was due to the too-slight construction of the bow door battening-down devices.

8.4.4 Procedure by the Department

It appears from the documents that the Department found out about the accident through a press cutting and then instituted a "Section 70 report". This report was received on 14 May 1974.

A letter was sent to Lloyd's Register of Shipping, with an inquiry concerning its dimensioning policy in the same way as had previously taken place with the Visby accident. On 28 May 1974, the society replied as specified in more detail in the Visby case; it was stated that the requirements were to become stricter, and that the flare design of the bow had been a contributory cause.

The summarising memorandum mentioned in connection with the Visby case and dated 17 December 1974 also related to Svea Star.

In a letter received on 3 April 1975, Lloyd's Register of Shipping sent its rule proposal on the dimensioning of bow doors, which involved a tripling of the locking device strength requirements. The society also stated that to the best of its knowledge, these were the first official rules for the dimensioning of bow door locking devices.

The Svea Star case was concluded with an official annotation dated 9 April 1975. It emerges from this annotation *inter alia* that the case had been presented at a chief inspectors' meeting on 18 March 1975, where one of the decisions taken was that an official should monitor the handling of the case (cf. the Visby case). It was also pointed out that the relevant classification society had submitted its new rules to the Administration regarding bow door dimensioning on 4 April 1975, so that the matter required no further action by the Department.

8.5 Saga Star

8.5.1 Sequence of events

The cargo and passenger vessel Saga Star, with a gross registered tonnage of 8,226, was built in 1981. On 6 May 1982 the vessel was about to sail from Travemünde to Helsingborg. The weather was calm. When the bow visor was being shut, the hinge on the port side snapped, so that the port side of the visor fell down four meters. The fluid-power lines broke and oil leaked out. Immediately afterwards the starboard hinge snapped too and the entire visor fell downwards. Having been surveyed by Lloyd's Register of Shipping, the vessel was given a permit to proceed to Helsingborg – via Malmö – without its bow visor.

8.5.2 Damage

Damage to the visor and its attachments to the hull, and plate damage to the hull between ramp and visor.

8.5.3 Cause

It was stated in the investigation report that the accident was probably due to the visor hinges being of insufficient dimensions.

8.5.4 Procedure by the Department

After a survey and decision by the chief inspector of the Malmö marine surveying district on 17 May 1982, Saga Star was given permission to sail without the bow visor until the end of May, provided that the weather was good, that the voyages were undertaken at reduced speed, that due attention was paid to the other factors that might affect the seaworthiness of the vessel and that log extracts were submitted to the Department of Marine Surveying after each voyage.

It was further decided that complete drawings, together with calculation material for "bow door", hinges and fluid-power arrangements should immediately be submitted to the Department of Marine Surveying. Following survey on 17 May 1982, Lloyd's Register of Shipping awarded an interim classification certificate in accordance with the Department's decision.

A new bow visor was surveyed and approved on 14 June 1982.

The classification society submitted the requested calculation material, and the then Safety Section drew up its own highly comprehensive memorandum with computation sheets. This memorandum is dated 14 July 1982 and was intended to form the basis of discussions at a safety meeting. The memorandum proposes that the Administration should determine how various forces are to be calculated. There are also references to the accidents referred to above, and the fact that these led to changes in the rules of the classification societies. It was alleged also that the calculations submitted by the societies indicated inadequate engineer input on the calculation and design side, and it was said to that the classification society did not monitor this aspect sufficiently. In example, it was mentioned that the bow doors on both the Visby and a vessel named Wasa Star had had to be subsequently strengthened. The author of the memorandum expressed a desire for further classification society and yard calculation material, and proposed that the Administration should take measures to prevent further accidents of the kind in question.

As far as is indicated by the documents, processing was completed when the then acting Director of Marine Safety wrote to Lloyd's Register of Shipping on 21 September 1982, including in his letter criticism of the society's calculations and superintendence. This letter concludes as follows. "The Administration requests that you test the suggestions made regarding the present version and indicate the reinforcements that you consider necessary. In view of the fact that the bow visor battening-down devices were forced open in bad weather on a number of vessels, the Administration also requests that you provide an account of the dimensioning of the battening-down devices on this vessel."

8.6 Stena Jutlandica

8.6.1 Sequence of events

The passenger ferry Stena Jutlandica was built in 1983, with a gross registered tonnage of 15,811. On 12 October 1984, Stena Jutlandica lay by the quay in Fredrikshamn. When the bow door was opened, the hinge attachment of the port bow door snapped, and the bow door fell downwards about 2 metres. Having been lifted back into position, the door was welded in place. A permanent repair was carried out on a later occasion.

8.6.2 Damage

When the bow door was inspected, cracks were found in the hinge attachment welds. The attachment plate was also partly split.

8.6.3 Cause

The reason for the downward fall of the bow door given in the investigation report was that the welding of the hinge attachment was inferior, resulting in crack formation.

8.6.4 Procedure by the Department

In a letter dated 15 October 1984, the shipping company reported on the accident to Stena Jutlandica to the Gothenburg marine surveying district, which in its turn passed on the report to the Safety Section (now the Investigation Section). Further details indicated by the report were that the repair work was continually monitored by Det Norske Veritas, and that reinforcement work on the other hinges had also been carried out on a sister ship, Stena Danica.

After repair had been carried out, the bow door was surveyed by Det Norske Veritas on 30 October 1984. According to the society's "Survey Report", the results were satisfactory.

On 11 February 1985, the Gothenburg marine surveying area inspected the bow door, which was found to function without complaint.

On 27 February 1985, the case was concluded with the annotation that the reinforcement work on the hinges of Stena Jutlandica's - and also Stena Danica's - bow doors had been carried out and checked without complaint.

8.7 Zenobia

8.7.1 Sequence of events

The ro-ro vessel Zenobia was built in 1979 with a gross registered tonnage of c. 8,920. The vessel was classified by Det Norske Veritas. After an accident at sea on 2 June 1980, a severe heeling that led to a list, the vessel foundered on the roads outside Larnaca, Cyprus on 7 June 1980. On 12 June 1980, the Government appointed a special investigation Commission to investigate this event and its causes. The Commission submitted its investigation report in July 1981. The sequence of events and the cause of the accident are complex. The following account does not claim to provide anything other than a resume of the investigation.

8.7.2 The Board of Accident Investigation

The Board stated that the Zenobia's heeling on 2 June 1980 was caused by the fact that the vessel did not possess sufficient stability, so that during a rapid yaw it heeled and cargo displacement took place. Contributory causes referred to were that the shipping company had not sufficiently informed the officers in charge of the small safety margins in loading and ballasting, and that a directive to the master concerning the economic operation of the vessel had been in conflict with safe propulsion from a stability standpoint. Furthermore, it was considered that a previous accident to Zenobia, on 14 February 1980, had not been satisfactorily investigated, so that measures to prevent a repetition had not been taken.

As regards the foundering of the ship on 7 June 1980, the Board stated that this was caused by the port pilot door being kept open after the vessel's wing tanks had been counter-filled with water to bring it onto an even keel. Certain contributory causes were considered to be relevant to this also. For example, it was stated that ballast filling had not been commenced in the double-bottom tanks and subject to continual stability checking, and that during counter-filling of the wing tanks on the starboard side, attention had not been paid to the fact that the reliability of the connecting valve would be tested.

8.7.3 The recommendations of the Board

The Board stated that ro-ro vessels, as a matter of experience, suffer from certain weaknesses and that they require careful handling, *inter alia* because the safety margins are often not the same as those of earlier general cargo vessels. Training questions were considered to be particularly important. The Board stressed the risk of the occurrence of free liquid surfaces on the large cargo decks of ro-ro vessels, with consequent risks of deterioration in stability. The Board considered that the unfavourable international accident statistics of ro-ro vessels, together with certain incidents involving damage to cargo, including some in the North Sea, showed that measures needed to be taken to improve the safety of transport using these vessels. Using the 1981 statistics, the Board found that during the three most recent years there had been 91 accidents, with 38 total losses involving ro-ro vessels.

The Board recommended the following:

A safety committee for ro-ro vessels including representatives of the National Administration of Shipping and Navigation, owners, yards, classification institutions, insurers and seagoing personnel should be created as soon as possible to examine the options of

a. improving the design, building and outfitting of ro-ro vessels
b. improving the training and drilling of ro-ro vessel crews with reference to cargo handling, stability and safety questions in general

c. intensifying research and development for the securing of both vehicles and vehicle loads etc.

It was considered that the results of this work might with advantage be disseminated to interested parties and used as a basis for Swedish proposals to the IMCO maritime safety committee. The Board saw a model for the proposed safety committees in a tank operation committee administered by the Administration, which came into being as a result of tank explosions in large tanker vessels at the end of 1969 and beginning of 1970.

8.7.4 Procedure by the Department

After IMCO had expressed a wish to the Government to be informed of the Board of Accident Investigation report, and this request had been passed on to the Administration, the then acting Director of Marine Safety, in a letter to the Ministry of Communications dated 3 December 1981, stated that the Administration considered that the Board's report should be furnished with certain additions and viewpoints before it was used as the basis of any measures. A brief summary of the report, with the additions and viewpoints referred to, was attached to the letter.

On 22 September 1983, a meeting was held at the Department of Marine Surveying for the purpose of co-ordinating measures taken as a result of the Board of Accident Investigation's recommendations arising from the Zenobia accident. It was noted in the minutes that the question of safety and ro-ro vessels was now attracting much attention. The classification societies were said to be considering this question as part of their rule development work, a quoted example of this being a project description from Det Norske Veritas. Regarding work with direct Swedish connections, a project called the TFD Project, dealing with buoyancy, leakage stability and safety criteria for General Cargo vessels, was mentioned. The objective of this project was stated to be the formulation of guidelines for the assessment of reasonable safety measures applicable to all dry-cargo ships.

The project work was broken down under five headings:

1. Listing of currently-applied safety criteria or regulations.
2. Studies intended to illuminate the relevance of various parameters for vessel survival.
3. Statistical assessment of survival safety from the viewpoint of the effect of environmental parameters.
4. Further processing of existing statistical material intended to clarify design reasons for foundering.
5. Compilation of guidelines for technical processing of assessments of structural vessel design, with a view to arriving at survival criteria in terms of buoyancy and stability properties.

As regards training, the Administration considered that the existing ship's officers training was adequate for cargo handling etc. on ro-ro vessels. In-service training courses in ro-ro handling were said to be available for previously-trained personnel. It was noted that these courses would be run as long as there were pupils to take them.

In relation to the securing of goods vehicles on vessels, reference was made to a research report generated by the TFD Project, "Safe Stowage and Securing of Cargo on board Ships". The project was stated to be undergoing monitoring, with preparation of mathematical models for calculation of stresses on trailer lashings in vessels. It was also stated that project work was going on for the manufacture of trailers better adapted to maritime transport.

Reference was also made to a project for the drawing-up of directions for the securing of loads in transport with trailers.

It was also stated that the National Administration of Shipping and Navigation had taken part in reference groups for all the projects just referred to, and that it was carrying on a goal-directed work within IMO aimed at an improved international standard in this field. This section referred to an IMO resolution A. 489 (VII) "Safe Stowage and Securing of Cargo Units and other Entities in Ships other than Cellular Container Ships", which was said to be based on a Swedish proposal.

The minutes closed by stating that the Administration, taking into account what has been noted above, considered that the Board of Accident Investigation report on the Zenobia had been finally dealt with.

8.8 Certain other accidents to vessels

16 March 1987, the British ro-ro ferry Herald of Free Enterprise sailed from Zeebrügge. As the vessel passed the outer mole, both the inner and outer bow doors were open. When the vessel yawed, it rapidly shipped water on the vehicle deck. The free liquid service affected the vessel's stability so that it capsized, ending up in a position with one side of the hull above the surface of the water.

150 passengers and 38 crew perished in this accident.

The decisive cause of the accident was attributable to the human factor.

The accident involving Herald of Free Enterprise led the Department of Marine Surveying immediately to carry out a review of all Swedish-flagged ferries from the stability angle. Letters were also written to the owners with questions about such matters as their routines for operation and checking of bow and stern doors.

During this investigation assignment, details have also been obtained of previous bow door damage to Finnish passenger ferries. For example, it has been stated that the Finnish vessel Finlandia received damage to its bow in 1981 which also led to a structural alterations of its sister ship Silvia Regina, later Stena Saga. It has also been revealed that the Finnish vessel Mariella suffered bow door damage in 1986. On this occasion also, the damage was of such a nature that a structural alterations was carried out on a sister ship, Olympia, that was still being built. Concerning this event, it has been stated that the fault was that the bow design had too much flare, which had resulted in extreme bow stresses.

As a result of the disaster involving M/S Estonia, one of the actions taken in autumn 1994 was a specific inspection of passenger ferry bow visors by the Gothenburg marine surveying area. Of twelve ships examined within the Gothenburg area, eleven showed deficiencies. These ranged from the formation of cracks in locking devices to operating system deficiencies. One vessel, the Lion Prince, was prohibited from use, while certain other vessels were made subject to heavy weather restrictions. Since then, the owners and classification societies have been required to submit complete documentation relating to vessel bow designs and operating control programmes.

Finally, the following should be noted in this context. Information has emerged in the mass media to the effect that M/S Estonia's sister ship Diana II came near to losing its bow visor while voyaging between Trelleborg and Rostock on the same stormy night in January 1993 as the Polish ferry Jan Heweliusz had foundered. However, no Section 70 report in

1993 as the Polish ferry Jan Heweliusz had foundered. However, no Section 76 report, in accordance with current rules, has been submitted to the Department's Investigation Section. Nor was this event, so far as is known, brought to the attention of the central authority in any other way until after the loss of M/S Estonia. The Department subsequently submitted the

question of the master's conduct for possible prosecution, but the prosecutor has decided not to bring an action.

8.9 Investigator's assessment

It is worth emphasising once more that the account here presented of accidents that have taken place is not the result of a complete or systematic review of the archives of the Department of Marine Surveying. In view of the system of document and file storage in use, this has not been possible, nor has it been considered necessary for the carrying out of the assignment. In relating the above cases, no claim is therefore made to present a complete picture of accidents involving bow visors etc. that may have been reported to the Department. The material presented here should be seen rather as a following-up of information recalled by individual officers in conversation with the investigator.

However, the account presented does indicate that an accident register based entirely on vessel names is not serviceable as a point of departure for retrospective investigations concerning causes. Nor does it appear serviceable as a basis for an ongoing forward-looking analysis work in which new events could be compared with incidents or accidents that have already taken place.

Technically speaking, it seems clear from the cases presented that the "concept" of the ro-ro vessel suffers from many weak points, not least the fixing and locking devices for bow doors and bow visors, and that this had been noticed as early as the beginning of the 1970s in various contexts. Attempts at more general analyses may be found in the documents. On the other hand, it does not appear from these documents, or from other information that the investigator has managed to obtain, that the reported events led to a more systematic examination of ro-ro vessels, for example in the form of orders to regional bodies for specific inspections. However, it should be pointed out that, immediately following the Herald of Free Enterprise accident, the Department acted at central level to implement a review of Swedish-flagged passenger ferries from the stability angle, and that the then Stockholm maritime district, by application to some of the larger ferry owners within the district, informed itself about routines involving such matters as ballasting and trimming, the opening and closing of doors and the securing of these. But the investigator has not been able to find that the measures decided on in the form of representations to classification societies involved, or to IMO, were systematically followed up. Generally speaking, superintendence seems to have been based on the specific rather than the general.

What has just been said about the lack of systematic follow-up might also be applied to the treatment of the report submitted to the Government (Ministry of Communications) in 1981 concerning the foundering of the ro-ro vessel Zenobia. This took up the question of the reliability of ro-ro vessels as regards maritime safety in its entirety, and voiced a large number of additional considerations, together with general and forward-looking measures. As far as the Ministry was concerned, the case seems to have been concluded by a decision to file the papers on 17 October 1983. In the case of the Department of Marine Surveying, the report seems not to have led to any systematic review of - and connection with - events reported to the Department.

9. Summary

Swedish maritime safety work and maritime safety within that part of navigation that falls under the superintendence of Swedish authorities may essentially be claimed to maintain an extremely high quality. This is probably even more the case when seen from an international perspective.

However, this does not mean to say that present operations, as the investigator sees it, are not subject to certain deficiencies in various respects. This applies both to the regional and central activities in themselves, as well as to co-operation between them.

In the view of the investigator, these deficiencies are primarily associated with the management and control of practical survey operations by the areas and the office, procurement and promulgation of information of interest for maritime safety and, centrally - in addition to the control function - the processing and analysis of available material or such material as ought to be made available, and follow-up of measures decided on.

One feature of regional operations is that unjustified differences occur between the areas - and individual inspectors - as regards the scope and content of their exercise of authority. This may be assumed to be due to shortcomings in management and control of practical survey activities at area and office level. To combat this, it is recommended that there should be definite directions, e.g. through checklists for direct control operations and rules for how protocols or equivalent documentation of survey procedures are to be drawn up.

The checking activities of the areas are not communicated systematically to the central authority, which still carries out no follow-up or evaluation of those activities. The central authority therefore lacks a coherent picture of what has taken place during checking work, which restricts the options for achieving an effective use of resources and of directing checking activities towards those areas where they may be expected to produce maximum results. An ongoing evaluation of the work carried out "in the field" should be brought about.

Matters to which attention is drawn during various procedures at area level that are dealt with before the vessel sails are not documented. This material too might provide important information. Forms should therefore be created to facilitate the preservation and passing on to the central authority of important observations during procedures and in the monitoring of new construction.

In order to promote the submission of reports on events that may be of interest from the maritime safety standpoint, the investigator recommends that the Department considers setting up a discussion with certain organisations concerning various measures aimed at stimulating their members to provide such information.

Implementing regulations and interpretation directions may also help to provide guidance in operations at area level. This is something that the areas are calling for.

The investigator also proposes that specific inspections or other theme-based examinations should be made greater use of.

In order to dispel the uncertainty that the investigator found in the areas as regards the imposition of fines, the Department should consider developing a policy to determine the situations in which various sanctions would normally apply. The Department should also draw up implementing directions for dealing with matters relating to fines.

The investigator also recommends that all criminal cases that affect maritime safety should be referred to the maritime courts.

As far as the work of the Investigation Section is concerned, this is carried out - as far as the investigator can determine - in a manner that is in itself highly creditable. As regards the

In terms of information exchange at Nordic level, the investigator has found that an extremely close informal co-operation is already taking place. It would also seem to be the general understanding of representatives of the superintending authorities of Denmark, Norway and Finland that this co-operation functions exceptionally well and that formalisation of information exchange is neither necessary nor appropriate. The investigator accordingly finds no grounds for proposing that Nordic information exchange should be crystallised through formal agreements. It should therefore continue to be a matter for the authorities concerned to determine in more detail the thrust and scope of information exchange.

The information in the report regarding events involving certain ro-ro vessels shows, in the view of the investigator, whose brief was not to examine questions dealing purely with safety, that analysis, assessment and follow-up should be essential ingredients of the activities of the Department of Marine Surveying.

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Organisation of National Administration of Shipping and Navigation

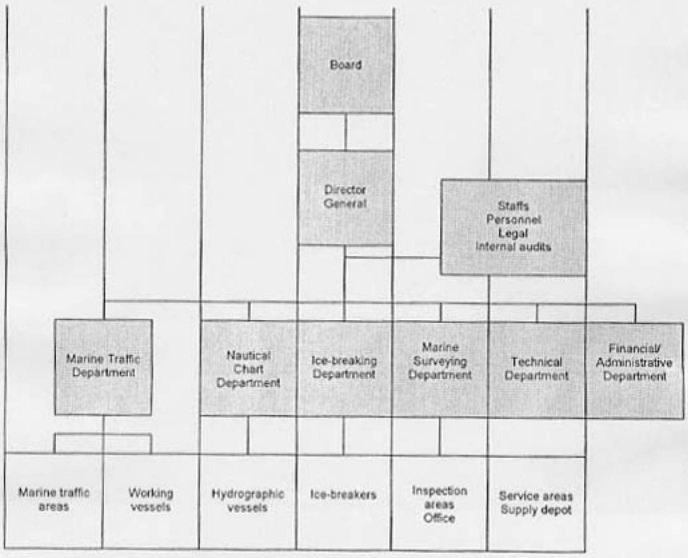
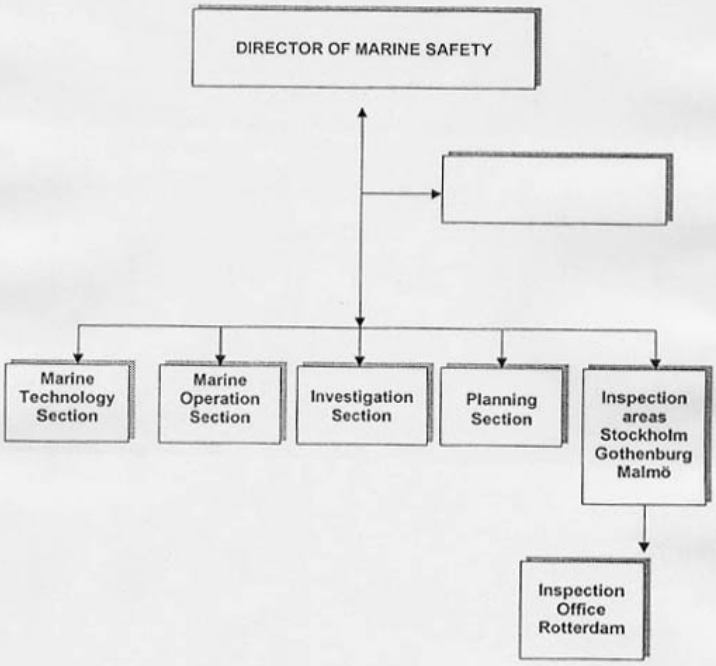


Chart B

NATIONAL ADMINISTRATION OF SHIPPING AND NAVIGATION
MARINE SURVEYING DEPARTMENT



BOARD OF SHIPPING ORGANISATION

Chart C

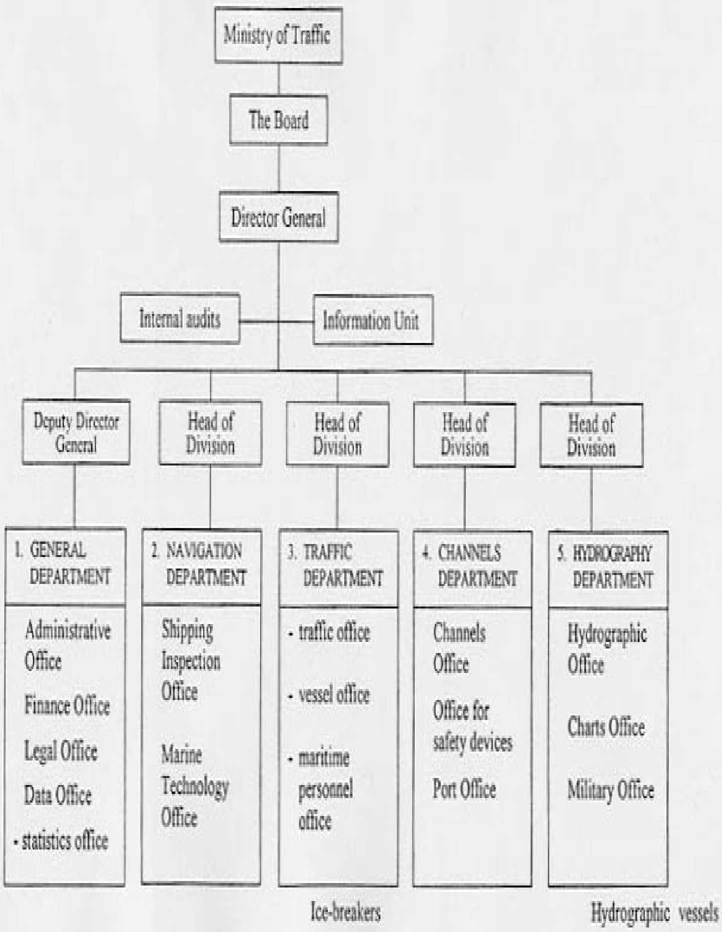
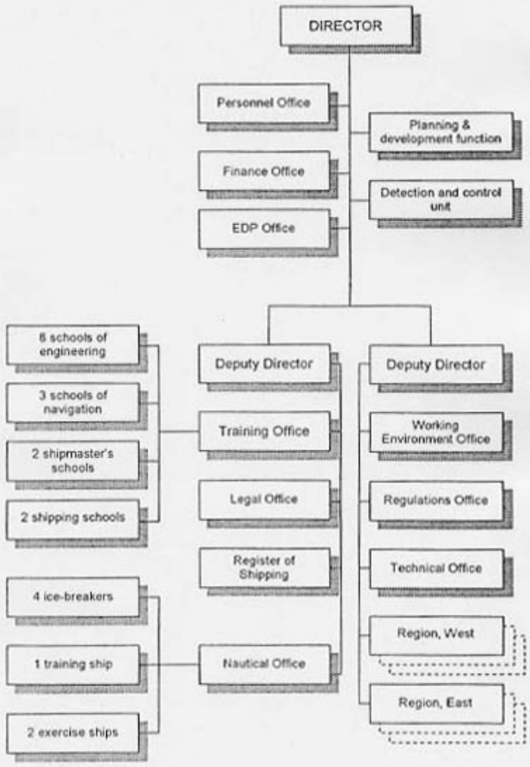


Chart D

Board of Shipping Organisation Plan



Erhållen av Kommunikationsdep.
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Enclosure 6.3.116.1

KOMMUNIKATIONSDEPARTEMENTET

RAPPORT

avseende sjösäkerhetsarbetet inom Sjöfartsinspektionen

Rapport av regeringens särskilt utsedde utredare

Magnus Sjöberg

1 Inledning

Det uppdrag som här redovisas har i regeringsbeslut av den 3 oktober 1994 getts följande innehåll.

> Den 28 september 1994 förliste passagerarfärjan Estonia sydväst om finska Utö vid färd från Tallinn till Stockholm. Fartyget förde estnisk flagg.
> Regeringen uppdrog den 29 september 1994 åt Statens haverikommission att biträda i haveriutredningen. En gemensamhaverikommission har därefter bildats med företrädare för estniska,finländska och svenska myndigheter. En huvuduppgift för kommissionen är att klarlägga orsaken till olyckan.
> Överlevande vid fartygskatastrofen har hävdat att fartygets bogvisir slitits bort vilket skulle kunna vara en viktig orsak till förlisningen.
> Uppgifter har därefter framkommit att incidenter och problem med bogportar förekommit tidigare på färjor av samma typ som Estonia. God sjösäkerhet förutsätter att nödvändiga slutsatser fortlöpande dras av inträffade incidenter och olyckor. Utöver den utredning som genomförs av Estonias haveri av den gemensamma haverikommissionen bör bl.a. rapporteringsrutiner inom Sjöfartsinspektionen nu kartläggas.
> Regeringen uppdrar åt f.d. regeringsrådet Magnus Sjöberg att göra en sådan kartläggning. Utredaren skall därvid undersöka hur för sjösäkerheten relevant information analyseras och vidareförs inom inspektionen och vid behov lämna förslag till förbättringar. Utredaren skall även undersöka möjligheterna till och förekomsten av utbyte av relevant sjösäkerhetsinformation mellan sjösäkerhetsmyndigheter och andra organ som har viktiga funktioner på sjösäkerhetsområdet, såsom klassningssällskap, försäkringsgivare och sammanslutningar av redare. Utredaren bör slutligen undersöka hur informationsutbytet sker mellan sjöfartsinspektioner eller motsvarande organ på sjösäkerhetsområdet inom vårt närområde samt vid behov lämna förslag till hur detta kan förbättras.

Utredaren skall bedriva sitt arbete i kontakt med den internationella haveriutredningen och i samarbete med den särskilda kommitté om ökad sjösäkerhet i färjetrafiken som regeringen senare kommer att tillkalla.

Regeringen bemyndigar chefen för Kommunikationsdepartementet att besluta om sekreterare eller annat biträde åt utredaren.

Utredningsuppdraget skall genomföras med största skyndsamhet.

I det följande lämnas först en redogörelse för den nationella rättsliga regleringen inom sjösäkerhetsområdet (avd. 2) och för internationella organisationer och överenskommelser av intresse i sammanhanget (avd. 3). Därefter redogörs för Sjöfartsinspektionens organisation och uppgifter (avd. 4). Vidare följer avsnitt om de nordiska ländernas organisation på motsvarande område (avd. 5) och om de internationella klassificeringssällskapens verksamhet (avd. 6). Utredarens överväganden och förslag presenteras därefter (avd. 7) varpå följer en särskild redovisning avseende roll on-roll off-fartyg (avd. 8) samt en sammanfattning (avd. 9).

Under arbetet med uppdraget har synpunkter inhämtats från olika befattningshavare inom Sjöfartsinspektionen dels vid besök hos de tre sjöfartsinspektionsområdena – i Stockholm, Göteborg och Malmö – samt kontoret i Rotterdam, dels vid besök hos den centrala myndigheten. Utredaren har vidare besökt tillsynsmyndigheterna i Danmark, Finland och Norge. Vidare har utredaren sammanträffat med företrädare för Sveriges Fartygsbefälsförbundet, Svenska Maskinbefälsförbundet, Svenska Sjöfolksförbundet, Sveriges Redareförening, Sveriges Ångfartygs Assuransförening samt Klassificeringssällskapet Det Norske Veritas Classification AS. Samråd har dessutom skett med den av regeringen utsedde sakkunnige till hjälp för anhöriga till de omkomna vid M/S Estonia katastrofen samt företrädare för Riksrevisionsverket, den internationella haverikommissionen och kommittén med uppdrag att utforma ett handlingsprogram för ökad sjösäkerhet.

2 Sjösäkerhetslagstiftning

2.1 Inledning

Den följande framställningen tar främst sikte på sådana regler som kan inverka på informationsflödet inom sjösäkerhetsarbetet. Detta medför att eljest centrala delar av lagstiftningen som rör rena säkerhetsfrågor i denna framställning fått stå tillbaka för frågor om rapporteringsskyldighet och olika former av bemyndiganden.

2.2 Sjölagen (1994:1009)

Sjölagen (1994:1009), som trädde i kraft den 1 oktober 1994, innehåller de grundläggande bestämmelserna angående fartygs säkerhet och redares och befälhavares ansvarighet härför. I 1 kap. 9 § första stycket föreskrivs sålunda att ett fartyg skall, när det hålls i drift, vara sjövärdigt, vari också innefattas att det är försett med nödvändiga anordningar till förebyggande av ohälsa och olycksfall, bemannat på betryggande sätt, tillräckligt provianterat och utrustat samt så lastat eller barlastat att säkerheten för fartyg, liv eller gods inte äventyras.

I andra stycket samma paragraf erinras om att det finns särskilda bestämmelser om säkerheten på fartyg (se nedan om fartygssäkerhetslagen).

I förhållande till terminologin i den tidigare sjölagen (1891:35 s.1) har sjövärdighetsbegreppet utvidgats. Uttrycket betecknade i den gamla lagen endast ett fartygs sjöduglighet i teknisk eller inskränkt mening. Det innefattade sålunda inte särskilda moment i fartygets skick som exempelvis bemanning och proviantering, den s.k. resevärdigheten, eller lastrummens lämplighet att föra last, den s.k. lastvärdigheten. Som överordnat begrepp användes i stället termen fartygets "behöriga skick". I dansk och norsk terminologi omfattar däremot sjövärdighetsbegreppet också rese- och lastvärdigheten. I syfte att göra de nordiska sjölagarna innehållsmässigt så lika som möjligt anpassades sjölagens sjövärdighetsbegrepp till vad som gäller i Danmark och Norge. Hela den nya sjölagstiftningen har för övrigt tillkommit i samarbete med Danmark, Finland och Norge. Sjövärdighetsbegreppet är således inte längre något absolut begrepp utan sjövärdigheten i sjölagens mening är relativ och måste bestämmas beroende på sammanhanget, varför det även kan komma att omfatta fartygets inre säkerhet samt rese- och lastvärdigheten. Den nya terminologin innebär dock ingen materiell förändring med avseende på redarens skyldighet att hålla fartyget i sjövärdigt skick (prop. 1993/94:195 s. 166).

Av 6 kap. 1 § första stycket sjölagen framgår vidare att det är befälhavaren som skall se till att fartyget är sjövärdigt innan en resa påbörjas. Befälhavaren skall även vaka över att fartyget hålls i sjövärdigt skick under resan och svara för att fartyget framförs och handhas på ett sätt som är förenligt med gott sjömanskap.

Av straffbestämmelserna i sjölagens 20 kapitel framgår bl.a. att, om en befälhavare försummar att se till att fartyget är sjövärdigt enligt ovan, han kan dömas till böter eller fängelse. Till samma straff döms en redare som försummar att avhjälpa fel eller brist i sjövärdigheten, om han ägt eller bort äga kännedom om felet eller bristen.

Om en redare underlåter att, trots att det är möjligt för honom, hindra fartyget att gå till sjöss när en förestående resa på grund av fel eller brist i sjövärdigheten kan bli förenad med allvarlig fara för de ombordvarande, kan han dömas till böter eller fängelse. Vidare kan en befälhavare dömas till böter om han försummar att underrätta redaren om fel eller brist i sjövärdigheten.

Sjölagen innehåller även straffsanktionerade regler om befälhavares rapporteringsskyldighet av händelser som är av betydelse för sjösäkerheten, 6 kap. 14 §. Denna regel är känd från den tidigare sjölagen som 70 §. Man brukar tala om s.k. § 70-rapporter. Enligt 6 kap. 14 § sjölagen skall befälhavaren på ett svenskt handelsfartyg, fiskefartyg eller statsfartyg genast, till den myndighet som regeringen föreskriver, rapportera

1. när någon i samband med fartygets drift har eller kan antass ha avlidit eller har fått svår kroppsskada,
2. när någon ombordanställd i annat fall har eller kan antas ha avlidit eller ha fått svår kroppsskada,
3. när någon i annat fall än som avses i 1 eller 2 har eller kan antas ha drunknat från fartyget eller avlidit ombord och begravts i sjön,
4. när allvarlig förgiftning har eller kan ha inträffat ombord,
5. när fartyget har sammanstött med ett annat fartyg eller stött på grund,
6. när fartyget har övergetts i sjön,
7. när i samband med fartygets drift skada av någon betydelse har eller kan antas ha uppkommit på fartyget eller lasten eller på egendom utanför fartyget, eller
8. när förskjutning av någon betydelse har inträffat i lasten.

Regeringen får, enligt andra stycket i nämnda paragraf, föreskriva att rapportering av händelser som är av betydelse för sjösäkerheten skall ske även i andra fall än som angetts ovan. I tredje stycket sägs att befälhavaren skall rapportera till Sjöfartsverket när sjöförklaring skall hållas enligt 18 kap. 7 § i anledning av en händelse som har eller kan antas ha inträffat i samband med fartygets drift. Ytterligare bestämmelser om befälhavarens skyldigheter vid sjöförklaring finns i 18 kap.

Sjöförklaring är ett domstolsförfarande som syftar till att klarlägga en händelse - t.ex. en grundstötning - och dess orsaker. Utöver i vissa i lagen närmare angivna situationer kan sjöförklaring, för ett svenskt fartyg, hållas med anledning av händelse som har eller kan antas ha inträffat i samband med fartygets drift, om Sjöfartsverket förordnar om detta eller om bl.a. befälhavaren eller redaren finner det påkallat, 18 kap. 7 §.

I 18 kap. 20 § erinras om att det finns bestämmelser om undersökning från säkerhetssynpunkt av sjöolyckor och andra händelser som berör sjöfarten i lagen (1990:712) om undersökning av olyckor, se nedan.

2.3 Fartygssäkerhetslagen (1988:49, ändrad senast 1995:69) m.m.

Fartygssäkerhetslagen är liksom den tidigare lagen (1965:719) om säkerheten på fartyg en utpräglad ramlag med ganska allmänt hållna bestämmelser och bemyndiganden för regeringen och andra myndigheter att utfärda närmare föreskrifter. Den nya lagen omarbetades främst med sikte på att bringa lagstiftningen om arbetsmiljön till sjöss i nivå med vad som gäller för arbetsmiljön på land. Karaktären av ramlag har dessutom förstärkts (prop. 1987/88:3 s. 49 ff). I anslutning till fartygssäkerhetslagen utfärdades även fartygssäkerhetsförordningen (1988:594).

Sjöfartens utpräglat internationella karaktär återspeglas av bl.a. det stora antal internationella överenskommelser som finns på området (se även nedan). Detta gäller inte minst frågor som behandlas i fartygssäkehetslagen och dess föregångare. Dessa ofta mycket detaljerade internationella regler tas emellertid inte upp i fartygssäkerhetslagen utan de finns vanligen i tillämpningsföreskrifter utfärdade av främst Sjöfartsverket.

I fartygssäkerhetslagen ges närmare bestämmelser om fartygs sjövärdighet, certifikat, bemanning, lastning, passagerarfartyg, arbetsmiljö, skyddsverksamhet, tillsyn, regler om inskränkningar i rätten att använda fartyg samt ansvarsbestämmelser.

I lagens inledande bestämmelser slås fast att huvudregeln för dess tillämpning är att den skall gälla alla fartyg inom svenskt territorium och svenska fartyg även utanför territoriet.

Till ledning för bestämmandet av det sjövärdighetskrav som generellt omtalas i sjölagen finns regler i 2 kap. fartygssäkerhetslagen. I 2 kap. 1 § sägs sålunda att ett fartyg är sjövärdigt bara om det är så konstruerat, byggt, utrustat och hållet i stånd att det med hänsyn till sitt ändamål och den fart som det används i eller avses att användas i erbjuder betryggande säkerhet mot olyckor. I 2 kap. 5 § ges vidare regeringen eller den myndighet som regeringen bestämmer bemyndigande att meddela sådana föreskrifter om hur ett fartyg skall vara konstruerat, byggt, utrustat och hållet i stånd för att det enligt 2 kap. 1 § skall anses sjövärdigt.

Fartygssäkerhetslagen innehåller också bestämmelser om vilka certifikat som ett fartyg skall ha. De certifikat som på så sätt omnämns är fartcertifikat, fribordscertifikat och passagerarfartygscertifikat. Vidare ges bemyndigande till regeringen eller den myndighet som regeringen bestämmer att, utöver de certifikat som anges i lagen, bestämma om certifikat avseende något visst förhållande som regleras i lagen eller i föreskrifter som utfärdats med stöd av lagen. Certifikaten kan alltså vara av flera slag och utgör bevis för t.ex. att ett fartyg vid tillsyn befunnits sjövärdigt, att fribordsmärken är anbragta på ett riktigt sätt eller att ett fartyg befunnits lämpligt att transportera passagerare och om det högsta antalet passagerare som fartyget får medföra. I definitionen för respektive certifikat anges även för vilka fartyg, t.ex. i storlekshänseende, som certifikatet skall finnas. Certifikat utfärdas av Sjöfartsverket om inte regeringen föreskriver något annat. Certifieringsuppgiften har emellertid direkt i lagen, 1 kap. 6 § första stycket, överlåtits till ett antal namngivna klassificeringssällskap, dock under förutsättning att det mellan staten och sällskapet i fråga har träffats avtal om utfärdande av certifikat för svenska fartyg. De på så sätt angivna klassificeringssällskapen är American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd, Lloyd's Register of Shipping, Registro Italiano Navale och klassificeringssällskapet i De socialistiska rådsrepublikernas union (Register of Shipping of the USSR). En närmare redogörelse för klassificeringssällskapens arbete och de avtal som Sjöfartsverket ingått med respektive sällskap kommer att lämnas i ett senare avsnitt. Det förtjänar emellertid att redan här återge delar av vad departementschefen anförde vid tillkomsten av denna bestämmelse. "Sedan länge läggs klassficeringssällskapets åtgärder och bekräftelser av fartygets tillstånd till grund för bedömningen av ett klassat fartyg.

Beträffande det praktiska tillsynsarbetet innebär detta att klassificeringssällskapets åtgärder och bedömningar vad gäller skrov och maskineri inte närmare kontrolleras av sjöfartsverket. Den av verket utövade tillsynen i dessa delar består i praktiken av att på grundval av en rapport från sällskapet utfärda de officiella certifikat som fartyget skall ha." (prop. 1987/88:3 s. 58). Departementschefen anförde vidare angående de klassficeringssällskap som anges i 1 kap. 6 § första stycket att de alla var välrenommerade och hade erforderlig kompetens på området. "Förhållandena kan emellertid ändras. Det är därför viktigt att den närmast ansvariga svenska myndigheten, sjöfartsverket, ges tillfälle att fortlöpande följa verksamheten vid sällskapen för kontroll av att den kvalitetsmässigt håller tillräcklig nivå. Frågor som rör en sådan kontrollverksamhet måste regleras i avtal med sällskapen. Avtalsvägen bör vidare vissa andra frågor regleras, t.ex. ansvaret vid fel eller försummelser från sällskapens sida" (prop. 1987/88:3 s. 59). Vilka frågor som på så sätt borde regleras avtalsvägen överlämnades till Sjöfartsverkets bedömnade. De områden som lämnas öppna för avtalsdelegation till sällskapen är tillsyn, utfärdande av certifikat samt fastställande av minsta tillåtna fribord, fartygssäkerhetsförordningen 1 kap. 4 §, 3 kap. 1 § och 7 kap. 10 §.

Karaktären av ramlag framträder också tydligt i avsnittet om tillsyn, kap 10. Den tidigare sjösäkerhetslagen innehöll en mängd detaljerade bestämmelser om när tillsynsförrättningar skulle ske och vad de skulle omfatta. Eftersom dessa regler i allt större omfattning återspeglar innehållet i internationella konventioner, vilka ändras relativt ofta, och då reglerna även i övrigt är sådana som det knappast finns anledning att varje gång underställa riksdagen ändringsförslag, fann departementschefen att bestämmelserna med fördel kan tas in i författningar av lägre dignitet (prop 1987/88:3 s. 102). Det förutsattes således att närmare bestämmelser om hur tillsynen av fartyg m.m. skall gå till i fortsättningen huvudsakligen skall meddelas genom tillämpningsföreskrifter. Huvudansvaret för tillsynen åligger Sjöfartsverket. I frågor som avser arbetsmiljön skall dock tillsynen ske i samverkan med Arbetarskyddstyrelsen.

I anslutning till vad som angivits om rapporteringsskyldighet enligt 6 kap. 14 § sjölagen har Sjöfartsverket, genom fartygssäkerhetslagen 13 kap. 5 § andra stycket jämfört med fartygsäkerhetsförordningen 9 kap. 2 §, bemyndigats att föreskriva skyldighet för redare och befälhavare att anmäla dels inträffade olycksfall, olyckstillbud eller sjukdomsfall utöver vad som anges i sjölagen dels uppkomna skador eller vidtagna åtgärder som har betydelse för ett fartygs sjövärdighet. Författningsstadgad rapporteringsskyldighet till Sjöfartsverket föreligger även för andra befattningshavare. Enligt 6 kap.1 § fartygssäkerhetsförordningen åligger det sålunda arbetsgivaren att rapportera, om olycksfall eller annan skadlig inverkan i arbetet föranlett dödsfall eller svårare personskada eller samtidigt drabbat flera som utfört fartygsarbete. Detsamma gäller vid tillbud som har inneburit allvarlig fara för liv eller hälsa. Enligt 6 kap. 2 § samma förordning åligger det läkare som i sin verksamhet får kännedom om sjukdomar som kan ha samband med fartygsarbete att anmäla detta till Sjöfartsverket. Om ett fartyg upphör att inneha klass i något av de klassficeringssällskap som anges i 1 kap. 6 § första stycket fartygssäkerhetslagen skall redaren enligt 7 kap. 7 § fartygssäkerhetsförordningen genast anmäla detta till Sjöfartsverket eller, om fartyget är utomlands, till verket eller till svensk utlandsmyndighet i den hamn som fartyget beräknas komma att anlöpa närmast.

För närvarande remissbehandlas ett förslag om ändring i fartygsäkerhetslagstiftningen avseende implementering av de nya internationella bestämmelserna i International Safety Management Code (ISM).

2.4 ISM-koden

De flesta regler och bestämmelser som utarbetats, såväl internationellt som nationellt, har traditionellt varit av teknisk natur. Olika undersökningar har dock visat att orsaken till olyckor beror på "den mänskliga faktorn" i 70 till 80 procent av fallen. Detta förhållande har rönt allt större uppmärksamhet. Det är mot denna bakgrund som operativa kontroller alltmer vunnit terräng. Den kända olyckan med brand ombord på fartyget Scandinavian Star i april 1990 satte förhållandet i fokus och utvecklingsarbetet inom IMO intensifierades, särskilt genom insatser av de nordiska sjöfartsmyndigheterna. Arbetet har lett till framtagandet av den s.k. ISM-koden, International Management Code for the Safety Operation and for Pollution Prevention. Ett annat skäl för införandet av koden är att rederierna härigenom får ett verktyg för uppföljning av uppställda mål vad gäller säkerheten. Den här typen av kvalitetssäkringsarbete har en lång tradition inom industriell och institutionell verksamhet, som exempel kan nämnas systemet ISO 9 000. Likadana frågor har även tidigare behandlats i bl.a. säkerhetslagstiftningarna rörande luftfart och kärnkraft. ISM-kodens regelsystem bygger på en helhetssyn på – och ett samspel mellan – rederi, landpersonal, fartyg och besättning. I koden betonas redarnas ansvar för att organisationen ombord är så säker som möjligt. Det skall finnas en säkerhetsansvarig på ledningsplanet. Vidare ställs det bl.a. krav på att rederiet har ett säkerhetssystem och en säkerhetspolicy samt ett avvikelserapporteringssystem där olyckor och tillbud dokumenteras och anmäls inom organisationen. Det ställs således krav på en incidentrapportering som går utöver vad som följer av 6 kap. 14 § sjölagen. Det ställs även krav på procedurer för att förhindra uppkomsten av nödsituationer, för redan uppkomna nödsituationer samt för de interna säkerhetsrevisionerna som skall genomföras. När ett rederi infört bestämmelserna i enlighet med ISM-koden skall Sjöfartsverket, eller efter delegation ett klassificeringssällskap, kontrollera och verifiera att arbetet såväl vid rederiet som på fartygen sker i enlighet med ISM-kodens intentioner. Vid godkänd kontroll skall den kontrollerande myndigheten eller klassificeringssällskapet utfärda ett "Document of Compliance" för rederiet och ett "Safety Management Certificate" för varje enskilt fartyg inom rederiet. Konventionen blir bindande internationellt 1998 med en stegvis implementering för olika fartygstyper fram till 2002. För svenska rederier och fartyg och för vissa utländska rederier, med fartyg som går i regelbunden trafik på svenska hamnar, är dock avsikten att bestämmelserna skall träda i kraft redan den 1 juli 1995.

Vem [illegible]
Sjöfv. el. Klass
?

2.5 Lag om undersökning av olyckor (1990:712, ändrad senast 1995:77) m.m.

I lagen och den i anslutning därtill utfärdade förordningen om undersökning av olyckor (1990:717) finns föreskrifter om undersökning från säkerhetssynpunkt av olyckor och tillbud till olyckor.

Bland de olyckor som skall undersökas enligt lagen omnämns sjöolyckor. Dessa definieras i lagen, 2 § första stycket 2, som olyckor vid användningen av handelsfartyg, fiskefartyg eller statsfartyg som har medfört att

a) flera människor har avlidit eller blivit allvarligt skadade,
b) fartyget eller egendom som inte transporteras med fartyget har fått omfattande skador eller omfattande skador har uppkommit i miljön, eller
c) fartyget har försvunnit eller har övergetts i sjön.

Enligt 2 § andra stycket skall även tillbud till sådana olyckor som nyss omnämnts undersökas enligt lagen om tillbudet inneburit allvarlig fara för att en olycka skulle inträffa eller om tillbudet tyder på ett väsentligt fel hos fartyget eller andra väsentliga brister i säkerhetshänseende. Vidare får, enligt 3 §, regeringen föreskriva eller i enskilda fall besluta att en undersökning enligt lagen skall göras även när en olycka eller ett tillbud inte är av så allvarlig art som anges i 2 § men en undersökning ändå är påkallad från säkerhetssynpunkt. Ett uttalat syfte med en undersökning enligt lagen - utöver klarläggande av händelseförlopp och orsak - är att få underlag för beslut om åtgärder som har som mål att förebygga en upprepning av händelsen eller att begränsa effekten av liknande händelser, 6 § 2.

Undersökning enligt lagen om undersökning av olyckor görs av den myndighet som regeringen bestämmer. Regeringen får också föreskriva att den myndigheten får överlåta åt någon annan att göra undersökningen. Regeringen har i förordningen om undersökning av olyckor föreskrivit att undersökningar av olyckor och tillbud enligt 2 § i lagen om undersökning av olyckor skall göras av Statens haverikommission. Statens haverikommission har vidare i förordningen fått delegationsrätt för händelser som från säkerhetssynpunkt är påkallade att undersökas enligt lagen men som inte är av den art som anges i lagens 2 §. För händelser som berör annan sjöfart än militär sjöfart skall enligt förordningen en sådan undersökning göras av Sjöfartsverket. Statens haverikommission skall enligt förordningen lämna rapport över sin undersökning till den tillsynsmyndighet vars ansvarsområde händelsen berör. Sjöfartsverket fullgör däremot den rapporteringsskyldighet gentemot IMO som följer av bestämmelser om undersökning av olyckor i sådana internationella överenskommelser som har biträtts av Sverige. I förordningens 20 § första stycket föreskrivs att "§ 70-rapportering" omedelbart skall göras till tillsynsmyndigheten. Av 20 § andra stycket följer att en befälhavare på begäran av tillsynsmyndigheten skall rapportera även i andra fall än som avses i första stycket, om en händelse har inträffat eller kan antas ha inträffat som kan vara av betydelse för sjösäkerheten. Vidare sägs i 20 § tredje stycket att närmare föreskrifter om rapportering enligt första eller andra stycket får meddelas av tillsynsmyndigheten efter samråd med Statens haverikommission. Den som uppsåtligen eller av ovarsamhet bryter mot 20 § första eller andra stycket eller mot föreskrifter som har meddelats med stöd av 20 § tredje stycket döms till böter om inte överträdelsen är att bedöma som ringa fall, 27 §. Enligt förordningens 21 § åligger det polismyndighet, tullmyndighet och kustbevakningen att vid kännedom om sådana olyckor som anges i 2 § första stycket lagen om undersökning av olyckor omedelbart underrätta tillsynsmyndigheten. Vidare ges samma myndigheter en skyldighet att underrätta Sjöfartsverket vid olyckor med fritidsfartyg, om olyckan medfört att någon avlidit eller fått svår kroppsskada. Vid händelser med svenska fartyg utomlands ges, i förordningens 23 §, lönad svensk utlandsmyndighet skyldighet att rapportera till tillsynsmyndigheten, om det lämpligen kan ske. I fråga om främmande fartyg som förliser inom svenskt sjöterritorium skall Sjöfartsverket utan dröjsmål underrätta den främmande statens närmaste konsulat eller, om sådant inte finns, dess beskickning. Tillsynsmyndighet skall vidare vid händelser som avses i 2 § första stycket 1 - 3 lagen om undersökning av olyckor förvissa sig om att händelsen är känd för polismyndigheten och se till att polismyndigheten får kännedom om vem som undersöker händelsen. Om sådana händelser som nyss omnämndes skall tillsynsmyndigheten även underrätta Statens haverikommission. Myndigheten skall även, om kommissionen bestämmer det, underrätta kommissionen om andra händelser som kan antas vara av betydelse för sjösäkerheten.

Med stöd av bemyndigande i 20 § tredje stycket förordningen om undersökning av olyckor har Sjöfartsverket utfärdat en kungörelse med föreskrifter om rapportering av sjöolyckor och anmälan av sjöförklaring, SJÖFS 1991:5.

Sjöfartsinspektionen har vidare i en tjänsteföreskrift, 3/92, utfärdat instruktion för Sjöfartsverkets undersökning och rapportering av sjöolyckor.

Enligt kungörelsen skall rapportering ske av händelser enligt 70 § sjölagen (numera 6 kap. 14 § 1994 års sjölag) samt i vissa andra i kungörelsen angivna fall. Sådan rapport skall omedelbart på snabbaste och lämpligaste sätt lämnas till närmaste sjöfartsinspektionsområde eller till det sjöfartsinspektionsområde inom vilket fartyget har sin hemmahamn. I fråga om fartyg som befinner sig bortom en viss linje får i stället rapporten avges till Sjöfartsverkets huvudkontor, utredningssektionen. Efter den första rapporten skall utan dröjsmål en skriftlig rapport sändas till Sjöfartsverkets huvudkontor, utredningssektionen. Rapporten skall upprättas på särskilt formulär. I bilagor till kungörelsen finns olika formulär samt ges anvisningar för hur de skall fyllas i.

I tjänsteföreskriften 3/92 ges ett stort antal kompletterande bestämmelser om rapportering och undersökning. Enligt nämnda föreskrift har mellan Statens haverikommission och Sjöfartsverket träffats en överenskommelse där begreppen "flera människor" och "omfattande skador" i lagen om undersökning av olyckor definierats som "ca 5" respektive "värde av mer än 20 Mkr". Detta för att få en tumregel för vilken av myndigheterna som normalt skall ha utredningsansvaret.

Av särskilt intresse för denna utredning är vidare de avsnitt i tjänsteföreskriften 3/92 som benämns *Granskning och analys*, avd. 5, *Fastställande av utredningsrapporter*, avd. 9, samt *Uppföljning av beslut*, avd. 12.

I avd. 5 sägs bl.a. att utredningssektionen skall från sjösäkerhetssynpunkt granska och analysera inkommet utredningsmaterial. Utredande tjänstemannen vid sektionen skall upprätta en utredningsrapport som skall innehålla händelsebeskrivning, relevanta fakta rörande berörda fartyg, personer och yttre omständigheter, analys av för händelsen betydelsefulla faktorer, sannolika orsaker, redovisning av vilka bestämmelser och normer som överträtts, vidtagna åtgärder samt förslag till åtgärder i anledning av olyckan.

Av avd. 9 följer bl.a. att utredningsrapporten fastställs av sjösäkerhetsdirektören eller efter delegation av chefen för utredningssektionen. Utredningsrapporter från Statens haverikommission och andra rapporter av större vikt skall föredras vid sammanträde med Sjöfartsinspektionens sektionschefer (säkerhetssammanträde). Till sådant sammanträde skall kallas även representanter för de avdelningar inom Sjöfartsverket som kan komma att beröras eller som kan bidra till att ärendet blir allsidigt belyst. Den som färdigställt rapporten eller deltagit i Statens haverikommissions utredning är föredragande. Säkerhetssammanträde skall också hållas för att följa upp vilka åtgärder som vidtagits med anledning av de rekommendationer som getts i tidigare utredningsrapporter.

Kallelse till säkerhetssammanträde utsänds av chefen för utredningssektionen.

Enligt avd. 12 ansvarar chefen för utredningssektionen för uppföljning av rekommendationer m.m. i rapporter och av beslut fattade vid säkerhetssammanträden, såvida inte annat överenskommits vid sammanträdet. Chefen för utredningssektionen ansvarar även för uppföljning av ärenden som lämnats till åklagarmyndigheten för åtalsprövning. Resultatet av dessa uppföljningar skall redovisas till sjösäkerhetsdirektören.

3 Internationella organisationer och överenskommelser

3.1 Inledning

Det ligger i sakens natur att sjöfarten som sådan ställer krav på internationella bestämmelser i frågor om bl.a. sjösäkerhet och förebyggande av havsföroreningar. Det internationella arbetet sker främst inom två FN-organ, nämligen International Maritime Organization, IMO och International Labour Organisation, ILO.

3.2 International Maritime Organization, IMO

Beslutet att bilda IMO togs redan 1948, men organisationens första möte hölls först 1959. Organisationen hade till en början beteckningen IMCO. IMO har sitt säte i London och består idag av 149 medlemsstater. Det högsta beslutande organet är församlingen, the Assembly, som sammanträder vartannat år. Mellan församlingens möten sammmanträder rådet, the Council, tre gånger per år. Till detta råd väljs 32 stater och Sverige är medlem för sjätte året i rad. Under rådet finns ett antal kommittéer, varav några av de mest betydelsefulla är The Maritime Safety Committee, MSC, och The Marine Environment Committee, MEPC. Inom MSC avhandlas olika tekniska aspekter på sjöfarten och dess arbete bedrivs i sin tur i ett flertal underkommittéer, t.ex. för livräddning, stabilitet och säkerhetsfrågor. Det kan även nämnas att MSC nyligen tillsatt en särskild expertpanel i syfte att se över s.k. roll on-roll off-färjors (ro-ro) sjösäkerhet. Detta arbete skall presenteras vid sjösäkerhetskommitténs möte i maj 1995. MEPC har till uppgift att koordinera IMO:s aktiviteter avseende förebyggande åtgärder och kontroll av oljeutsläpp och andra utsläpp till sjöss. Överenskommelser inom IMO träffas genom konventioner och resolutioner. IMO saknar sanktionsmöjligheter, men alla medlemsländer som ratificerar en konvention åtar sig att införliva den i sitt nationella regelsystem. Detta kan antingen ske genom en direkt implementering av konventionen eller genom separata föreskrifter. I Sverige tillämpas nästan uteslutande tekniken med separata föreskrifter. I vissa av IMO:s konventioner innebär en ratificering också en utfästelse att alla fartyg som för landets flagga skall följa de regler som den aktuella konventionen stipulerar. Sedan 1959 har IMO antagit mer än 40 konventioner och 700 resolutioner. De viktigaste konventionerna är *SOLAS* (International Convention for the Safety of Live at Sea, 1974), *MARPOL* (International Convention for the Prevention of Pollution from ships, 1973, as Modified by the Protocol of 1978 Relating thereto), *COLREG* (Convention on the International Regulation for Preventing Collisions at Sea, 1972), *LOADLINE* (International Convention on Load Lines, 1966) samt *STCW* (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978). SOLAS avser bl.a. fartygs konstruktion, utrustning och certifiering från säkerhetssynpunkt. I SOLAS ingår även den nya ISM-koden (International Safety Management). Denna kod, vilken behandlats utförligare ovan, avser att tillhandahålla en internationell standard för säker ledning och drift av fartyg samt för att bevara miljön. Ett lagförslag i frågan har just remissbehandlats och en proposition till riksdagen med förslag till ändringar i fartygssäkerhetslagen väntas i slutet av mars 1995. MARPOL behandlar olika former av havsföroreningar och COLREG avhandlar regler för sjötrafiken, så kallade sjövägsregler. LOADLINE reglerar lastlinje-bestämmelser, fribord, och STWC innehåller normer för sjöfolks utbildning, certifiering och vakthållning. Sverige har tillträtt alla nu nämnda konventioner. Det helt avgörande arbetet med att utforma förslag och regeltexter görs i de olika medlemsländerna. Som exempel kan nämnas att arbetet med ISM-koden till stor del utförts av de nordiska sjöfartsmyndigheterna. Ett problem i dag är att många länder brister när det gäller att införliva och efterleva ratificerade konventioner. Det finns en underkommittée till MSC som enbart arbetar med frågor om hur de konventioner som antas av IMO bättre skall kunna efterlevas och införlivas med de olika ländernas lagstiftning. De nämnda bristerna har även medfört att vissa länder, som krävt striktare bestämmelser, har infört egna särbestämmelser, t.ex. USA, Storbritannien och de nordiska länderna.

3.3 International Labour Organisation, ILO

FN organet ILO har sitt säte i Geneve. Inom ILO behandlas bl.a. frågor som rör de ombordanställdas sociala förhållanden, vilka naturligtvis har stor betydelse för sjösäkerheten. Den viktigaste konventionen i nu berört hänseende benäms, nr 147 (Convention concerning Minimum Standards in Merchant Ships). Konventionen ger ett antal miniminormer för handelsfartyg avseende bl.a. bostadsstandard, hygien och skydd mot ohälsa. Sverige har tillträtt konventionen. Den trädde i kraft den 28 november 1981. För närvarande arbetar man inom ILO med bl.a. frågor om arbetstider och trötthetsfaktorns betydelse för inträffade olyckor.

3.4 EU

Att sjöfartsfrågor - och då främst sådana som rör säkerhet och miljöskydd - prioriteras inom EU framgår av bl.a. ett dokument från den 24 februari 1993, "A common policy on Safe Seas" (COM 93/66). Häri talas om bl.a. EU:s beroende av en pålitlig, kostnadseffektiv och säker sjöfart, varför sjötransportpolicyn måste försäkra att sådan service utförs på en minimal risknivå för alla direkt eller indirekt involverade och för den marina miljön. I detta syfte har EU tagit fram ett åtgärdprogram:

- Åtgärder för att etablera en likartad implementering av existerande internationella regler inom EU,
- åtgärder för en hårdare och mer effektiv hamnstatskontroll, inkluderande ett likartat hävdande av de internationella bestämmelserna – för alla fartyg oavsett flagg – av kuststaterna när de seglar på EU:s vatten,
- åtgärder för att främja en sammanhängande och harmoniserad utveckling av navigeringssystem och trafikövervakning, för att få sjösäkerheten in i elektronikåldern, med speciell hänsyn tagen till trafikåtgärder i miljökänsliga områden,
- åtgärder för att stödja internationella organisationer för att förstärka deras primära roll som lagstiftare på ett internationellt plan.

Lika viktigt är åtgärder för att förbättra besättningens utbildning och kvalifikationer för att komma åt problemet med mänskliga misstag, vilket kvarstår som huvudorsaken till olyckor. Ett intensivt forskningsprogram kan också bidraga till det allmänna målet med en utökad sjösäkerhet.

EU:s ministerråd har även fattat beslut om en förordning om sjöfartscabotage, vilket innebär att det succesivt blir fritt för medlemsstaternas fartyg att utföra inrikes sjötransporter inom EU. Vidare har EU:s ministerråd antagit en resolution om åtgärder som bör vidtagas för att öka ro-ro-färjors sjösäkerhet. Resolutionen uppmanar medlemsstaterna att bl.a. intensifiera arbetet inom IMO på flera områden. Flera av de förslag från EU-kommissionen som för närvarande är aktuella behandlar sjösäkerhetsfrågor.

3.5 Organisation for Economic Co-operation and Development, OECD

Så sent som den 24 maj 1994 uttalade OECD att dess medlemsstater önskade bibehålla en öppen marknad för internationell sjöfart baserad på principerna om en fri och rättvis konkurrens. Detta sades bl.a. kräva att fartyg skall uppfylla internationellt överenskomna regler och bestämmelser som rör säkerhet på fartyg, personerna ombord och skyddet av den marina miljön. Vidare sades att ett framförande av fartyg som inte uppfyller de tidigare omnämnda bestämmelserna kunde innebära ett obehörigt gynnande och därmed en oacceptabel snedbelastning i konkurrenshänseende.

3.6 Regionalt samarbete

Vad gäller internationellt samarbete på regional nivå kan bl.a. nämnas samarbetet inom Helsingforskommissionen (*HELCOM*). Kommissionen arbetar med bl.a. förebyggande av havsföroreningar från fartyg i Östersjön. Med början 1977 tillämpas konventionen av Sverige inom svenskt sjöterritorium.

3.7 Hamnstatskontroll

Sverige undertecknade 1982 bland ett av flera europeiska länder "the Paris Memorandum of Understanding on Port State Control", vilket är en överenskommelse om hamnstatskontroll. I samarbetet ingår sjöfartsmyndigheterna i Belgien, Danmark, Finland, Frankrike, Tyskland, Grekland, Irland, Italien, Holland, Norge, Polen, Portugal, Spanien, Sverige och Storbritannien. I samarbetet deltar vidare representanter och observatörer från IMO, ILO, EU samt från sjöfartsmyndigheterna i USA och Kanada.

Bakgrunden till överenskommelsen är att avtalsparterna ansåg sig kunna konstatera att vissa flaggstater, dvs. den stat där fartyget är registrerat, uppenbarligen negligerade att utföra vad som ankommer på dem när det gäller tillsyn av de fartyg som är registrerade i länderna i fråga.

De deltagande länderna har genom avtalet åtagit sig att kontrollera utländska fartyg som trafikerar medlemmarnas hamnar genom s.k. hamnstatskontroll. Målet är att 25 procent av de utländska fartygen som anlöper hamnstaten under ett år skall inspekteras. Kontrollen avser i första hand att utröna om fartygen uppfyller kraven i ett antal konventioner, t.ex. SOLAS, vilka utgör internationellt vedertagna säkerhetsnormer. Vid kontrollen undersöks om fartyget har giltiga certifikat. Om så inte är fallet eller det finns andra skäl att anta att fartyget inte väsentligen uppfyller normkraven, så företas en mer noggrann inspektion. Om brist eller fel uppdagas kan detta resultera i åläggande att inom viss tid vidtaga åtgärder eller att fartyget beläggs med nyttjandeförbud. Utförda kontroller, med eventuella anmärkningar, rapporteras i kodform till en centraldator i S:t Malo, Frankrike. De i hamnstatskontrollen deltagande länderna har tillgång till informationen i datasystemet.

IMO har 1991 antagit en resolution i vilken, under hänvisning till "Paris Memorandum", stater i andra delar av världen uppmanas till motsvarande överenskommelser. Sådana finns nu i Latinamerika, Asien - Stilla havs-regionen och i Karibien. I resolutionen med nummer (682) sägs att implementering först och främst är flaggstatens ansvar, men i vissa fall kan det vara svårt för flaggstaten att utöva full och regelbunden kontroll över vissa fartyg som för deras flagga, t.ex. sådana fartyg som inte regelbundet besöker flaggstatens hamnar.

Som en följd av ISM-koden har IMO också antagit resolutionen A.742(18), Procedures for the Control of Operational Requirements Related to the Safety of Ships and Pollution Prevention, enligt vilken operativa kontroller av besättningens förmåga att upprätthålla en god säkerhetsstandard ombord skall kontrolleras också genom hamnstatskontroller.

Sedan 1990 utförs operativa kontroller på alla passagerarfartyg i regelbunden trafik på svenska hamnar. Kontrollerna utförs såväl efter överenskommelse som helt oannonserat. Vid en ministerkonferens i Köpenhamn i september 1994 om samarbetet om hamnstatskontroll, betonades att hamnstatskontrollen måste skärpas för att motverka undermåliga fartyg. Det betonades dock särskilt att ansvaret för att ett fartyg uppfyller sjösäkerhetskraven är och förblir flaggstatens.

4 Organisation och uppgifter

4.1 Sjöfartsverket

Motsvarigheten till nuvarande Sjöfartsverket, Sjöfartsstyrelsen, inrättades 1956 genom en sammanslagning av dåvarande Lotsverket och Sjökarteverket. Den nya myndigheten tillfördes även vissa ansvarsområden som tidigare legat under Kommerskollegium och dåvarande Väg- och vattenbyggnadsstyrelsen. Sjöfartsverket, som fick denna benämning 1969, ombildades 1987 till affärsverk och fick 1988 en ny organisation. Sedan 1975 är centralförvaltningen lokaliserad till Norrköping och där arbetar ca 400 av verkets ca 1 400 anställda. Verket ingår i totalförsvaret och är ansvarig myndighet för beredskapsplanering inom sjötransportområdet.

Sjöfartsverket leds av en styrelse i vilken bland andra verkets generaldirektör ingår. Utöver vissa stabsorgan finns det inom verket sex avdelningar, nämligen sjötrafikavdelningen, sjökarteavdelningen, isbrytningsavdelningen, sjöfartsinspektionen, tekniska avdelningen och ekonomiadministrativa avdelningen, se även tablå A.

För den regionala verksamheten är landet indelat i 13 sjötrafikområden, till vilka hör lotsstationer och andra anläggningar, samt tre sjöfartsinspektionsområden. Dessutom finns ett sjöfartsinspektionskontor i Rotterdam.

Enligt gällande instruktion (1988:14, senast ändrad 1994:1349) skall verket huvudsakligen inrikta sitt arbete på handelssjöfarten. Men även fiskets, marinens och fritidsbåtstrafikens intressen skall beaktas. Verksamheten finansieras bl.a. genom avgifter från sjöfarten.

Bland Sjöfartsverkets uppgifter ingår bl.a att svara för tillsyn över sjösäkerheten. Som framgått av tidigare avsnitt regleras denna verksamhet främst i fartygssäkerhetslagen och den i anslutning därtill utfärdade fartygssäkerhetsförordningen, lagen och förordningen om undersökning av olyckor samt i Sjöfartsverkets instruktion. Vidare kan nämnas lagstiftning om transport av farligt gods och om åtgärder mot vattenföroreningar från fartyg. Sjöfartens utpräglat internationella karaktär gör att säkerheten till sjöss även regleras genom internationella överenskommelser och genom verkets deltagande i internationella organisationer som arbetar med sjöfartsfrågor.

4.2 Sjöfartsinspektionen

Som nämnts ovan ingår Sjöfartsinspektionen som en av sex avdelningar inom Sjöfartsverket. Inspektionen är organisatoriskt underställd generaldirektören för verket. Sjösäkerhetsdirektören, som är avdelningens chef, har emellertid i olika lagar och förordningar givits ett flertal beslutsbefogenheter och inspektionen har därigenom i stora delar en självständig ställning, särskilt inom sjösäkerhetsarbetet.

Sjösäkerhetsdirektören tillsätts av regeringen efter anmälan av styrelsen för Sjöfartsverket. Även förordnande att vara ställföreträdare för sjösäkerhetsdirektören meddelas av regeringen efter förslag av styrelsen.

Sjöfartsinspektionen bedriver sin verksamhet dels centralt vid huvudkontoret i Norrköping dels inom de tre regionala inspektionsområdena samt vid kontoret i Rotterdam. Personalen uppgår till ca 120 personer, varav ett sextiotal är anställda vid huvudkontoret och ungefär lika många fördelade på de olika inspektionsområdena. Sjöfartsinspektionsområdena har områdeskontor i Stockholm, Göteborg respektive Malmö. Cheferna för inspektionsområdena och inspektionskontoret har tjänstebenämningen överinspektör och lyder under sjösäkerhetsdirektören.

Sjöfartsinspektionen är centralt organiserad i sektioner med olika ansvarsområden. Dessa är planeringssektionen, fartygstekniska sektionen, fartygsoperativa sektionen samt utredningssektionen, se även tablå B. Inspektionen har även ett internationellt sekreteriat som svarar för internationella ärenden i fråga om säkerhet och miljöskydd för fartyg samt kontakter med internationella organisationer, t.ex. IMO. Även om verksamheten organisatoriskt är indelad i sektioner är avsikten att mycket av arbetet skall ske genom samarbete mellan tjänstemän med skilda specialiteter från olika sektioner.

Sjöfartsinspektionens sektioner har för närvarande följande ansvarsområden. Planeringssektionen svarar för verksamhetsplanering, budget, personal, organisation, juridik, ADB och skeppsmätning. Den fartygstekniska avdelningens ansvarsområde avser fartygs säkra konstruktion, utrustning och vidmakthållande såsom stabilitet, fribord, hållfasthet, brandskydd, bostäder, ekonomilokaler, livräddnings- och navigationsutrustning samt transport av farligt gods och arbetarskydd. Den fartygsoperativa sektionen skall svara för frågor om fartygsbemanning, ombordanställdas behörigheter, sjömansregister samt frågor om arbetsmiljö. Slutligen omfattar utredningssektionens ansvarsområde utredning av sjöolyckor och personskador i skeppstjänst, olycksstatistik samt frågor om misstanke om brott mot säkerhets- och miljöskyddsbestämmelser.

Enligt vad utredarna inhämtat är nya allmänna tjänsteföreskrifter för verksamheten vid Sjöfartsinspektionen under utarbetande. Organisationen och ansvarsområdena kan komma att förändras i vissa hänseenden.

I instruktionen för Sjöfartsverket föreskrivs att sjösäkerhetsdirektören ansvarar för och beslutar i frågor om fastställande av tekniska säkerhetsnormer för fartyg, av normer för räddningsorganisationen ombord på fartyg och av säkerhetsnormer för Sjöfartsverkets och andras farledsanordningar som ankommer på Sjöfartsverket.

Detsamma gäller frågor om tillsyn över efterlevnaden av fastställda säkerhetsnormer samt sådana frågor om undersökning av sjöolyckor som ankommer på Sjöfartsverket.

Enligt instruktionen får sjösäkerhetsdirektören även i lämplig utsträckning delegera sin beslutanderätt till andra tjänstemän i verket.

Av Sjöfartsverkets arbetsordning (beslutad den 20 december 1989) framgår att verkets organisation skall bygga på en ordning med långtgående decentralisering och delegering, bl.a. för att verkets mål som säkerhetsmyndighet skall uppnås. I arbetsordningen ges också närmare föreskrifter om Sjöfartsinspektionens ansvarsområde. Sålunda föreskrivs att följande frågor ankommer på inspektionen.

- Utfärdande av föreskrifter enligt bemyndigande i fartygsssäkerhets- vattenförorenings-, bemannings- och sjömanssociala lagstiftningen
- Tillsyn av fartyg enligt den nämnda lagstiftningen
- Typprovning av fritidsbåtar
- Internationella ärenden i den mån dessa inte ankommer på annan avdelning eller stab
- Sjömansregistret
- Behörighetsfrågor
- Bemanningsföreskrifter för förande av fritidsfartyg
- Skeppsmätning
- Utredning av sjöolyckor
- Säkerhetsnormer för farleder och farledsanordningar
- Tillsyn av efterlevnaden av bestämmelserna om rapportering av sjöolyckor samt förordnanden om sjöförklaring
- Brott mot lag eller annan författning om säkerheten till sjöss
- Granskning och analys av samt statistik över inträffade sjöolyckor och olycksfall inom sjömansyrket.

I arbetsordningen erinras även om de beslutsbefogenheter som är särskilt knutna till sjösäkerhetsdirektörens befattning enligt fartygssäkerhetslagen, verkets instruktion och lagen (1980:424) om åtgärder mot vattenföroreningar från fartyg.

5 Nordiska förhållanden

5.1 Inledning

Mot bakgrund av den del av förevarande uppdrag som gäller undersökning av hur informationsutbytet sker mellan sjöfartsinspektioner eller motsvarande organ på sjösäkerhetsområdet inom vårt närområde lämnas här i korthet några uppgifter om de nordiska sjöfartsmyndigheternas organisation och verksamhet i de hänseenden som kan vara aktuella i förevarande sammanhang.

5.2 Finland

Organisationen av den finska Sjöfartsstyrelsen liknar mycket den svenska. Den finska Sjöfartsstyrelsens organisation framgår av tablå C. Som kan utläsas av denna lyder styrelsen under trafikministeriet. Inom en av styrelsens fem verksamhetsavdelningar – sjöfartsavdelningen – inryms bl.a. sjöfartsinspektionsbyrån. På det regionala planet finns det fyra självständigt arbetande sjöfartsdistrikt. Distriktens organisation är i sin tur sektorindelad varav en för inspektionsverksamhet, benämnd sjöfartsinspektionssektorn. Till skillnad från förhållandet i Sverige är distrikten emellertid inte underställda sjöfartsavdelningen utan svarar direkt under generaldirektören.

Besiktningen av nybyggda eller nyregisterade fartyg sker centralt genom ett av Sjöfartsstyrelsen sammansatt grundbesiktningsteam. Denna verksamhet omfattar alla fartyg för internationell fart samt fartyg för inhemsk fart som överstiger 500 bwt. De periodiska besiktningarna och all hamnstatskontroll utförs däremot av de regionala organen. Brister som upptäcks vid dessa kontroller rapporteras till det centrala organet normalt endast om de är så allvarliga att fartyget beläggs med nyttjandeförbud. Därjämte förs dock förekommande anmärkningar in i ett dataregister som även centralmyndigheten har tillgång till. Alla certifikat utfärdas av centralmyndigheten på grundval av de regionala områdenas besiktningsrapporter.

Avtal har slutits eller är på väg att slutas med de fem stora klassificeringssällskapen för olika slag av tillsyn. Sjöfartsstyrelsen har ställt som krav att sällskapen undertecknar en ansvarsklausul innan de ges rätt att få utföra myndighetsuppgifter. Styrelsen ställer även vissa minimikrav på sällskapen i enlighet med vad IMO antagit i en resolution. Det skall sålunda finnas minst ett visst antal fartyg klassade hos det aktuella sällskapet. Vidare skall sällskapet ha en världsomfattande organisation med s.k. exclusive surveyors och sällskapet skall självt utveckla sina tekniska regler.

5.3 Danmark

Den danska Sjöfartsstyrelsens organisation framgår av tablå D. Styrelsen lyder under Industri- och Samordningsministeriet och är - framför allt genom olika råd och nämnder - betydligt närmare knuten till ministeriet än någon av de övriga nordiska motsvarigheterna. Regionalt finns två distrikt, öst och väst, med sammanlagt nio lokalkontor, varav ett på Färöarna och ett på Grönland.
Sjöfartsstyrelsen inriktar sitt arbete efter fem olika huvudmål, nämligen säkerhet, arbetsmiljö, skeppsregistrering, utbildning och beredskap. År 1993 tog utbildningsverksamheten närmare 60 procent av styrelsens ekonomiska resurser i anspråk. Motsvarande andel för säkerhetsarbetet var ca 20 procent.

Verksamheten vid Sjöfartsstyrelsens huvudkontor är i stora drag organiserad enligt följande. *Regelkontoret* utformar och utvecklar regler och tekniska föreskrifter samt utarbetar anvisningar till hjälp för tolkning av olika tekniska regler. Kontoret följer även upp samarbetsavtalen med de erkända klassificeringssällskapen. Mycket av regelarbetet sker genom IMO och EU, men man följer även upp vad iakttagelser vid den egna tillsynen kan föranleda. Det *tekniska kontoret* administrerar tillsynen av nybyggda och nyregistrerade fartyg, som överstiger 20 bwt. Tillsynen utförs av de regionala kontoren, men det tekniska kontoret kan t.ex. företa tillsyn i utlandet. Tekniska kontoret administrerar även den hamnstatskontroll som de regionla kontoren utför. Kontoret administrerar vidare efterföljandet av de gällande tekniska reglerna och sköter typgodkännande av säkerhetsutrustning m.m. *Juridiska kontoret* ger styrelsen juridisk och allmän rådgivning. Kontoret kan även vid behov ge hjälp åt åklagarmyndigheterna i åtalsfrågor. Vidare förbereder kontoret lagstiftningsärenden och sköter koordineringen med EU-regler och andra internationella åtaganden. Kontoret svarar även för generella anvisningar och ger tolkningsbesked i olika frågor. *Skibsregistret* omfattar två register, ett allmänt och ett internationellt. *Uddannelsekontoret*, som förestår undervisningen på ett stort antal marina utbildningsanstalter och svarar för tillsynen av ett par privata sjöfartsskolor, utfärdar sjövärdighetsbevis och fastställer minimibesättningar, dock endast utgående från säkerhetsynpunkt. Det finns även en särskild besättningsnämnd som kan pröva dessa frågor.

Det *nautiska kontoret* svarar för bl.a. sjövägsregler, skötsel av skolskepp samt isbrytartjänst.Den för denna utredning kanske mest intressanta enheten är *opklarings- og kontrollenheden*. Denna enhet, om ca åtta personer, är en helt självständig del inom Sjöfartsstyrelsen och svarar direkt under sjösäkerhetsdirektören. Enhetens ansvarsområde omfattar utredning och handläggning av sjöolyckor, handläggning av sjöförklaringar och sjöolycksstatistik, rekommendationer av nya regler eller anvisningar. Därutöver svarar enheten för Sjöfartsstyrelsens interna kvalitetskontroll. Vid utredningen av sjöolyckor och tillbud agerar enheten närmast som en haverikommission och inhämtar på egen hand sådana uppgifter från myndigheter eller andra som kan vara av intresse i utredningsarbetet. Enhetens utredningsarbete har till syfte att klarlägga vad som skett, hur det skett och varför det skett. Enheten skall vidare ta ställning till vad som kan göras för att förhindra liknande händelser, t.ex. genom någon regeländring. Utredningsarbetet utförs av enhetens - från övrig kontrollverksamhet - fristående inspektörer. Vid sjöförklaringar har enheten rätt att deltaga och ställa frågor. Av 85 sjöförklaringar under 1993 deltog enheten vid de flesta tillfällena. På senare år har det skett en ökning av antalet undersökta olyckor. Detta kan till viss del bero på att enheten övergått till en mer "uppsökande" verksamhet, bl.a. genom att rutinmässigt ta del de olycksupplysningar som publiceras i Lloyd´s list. Vid misstanke om brott överlämnas ärendet till den juridiska avdelningen. Enhetens haverirapporter innehåller - utöver en beskrivning och förklaring av händelsen i fråga - påpekanden och rekommendationer och det är dessa som kan leda till nya bestämmelser eller ge upphov till nya anvisningar t.ex. till de lokala inspektionskontoren. En viktig del i enhetens arbetet är också att följa upp att de rekommendationer som lämnas verkställs, t.ex. införande av en regeländring eller genomförande av någon kontroll. Enligt dansk lag skall sjöolyckor anmälas av redare och befälhavare. Andra upplysningskällor är pressen samt polis och den militära gränsbevakningen. För att få information - t.ex. genom fackförbunden - försöker sjöfartsstyrelsen alltid att skydda anonymiteten för sina uppgiftslämnare. Det finns en kontaktperson hos varje förbund på såväl arbetsgivare- som arbetstagare sidan och dessa har tystnadsplikt. Varje utredd olycka refereras under en särskild rubrik i Sjöfartsstyrelsens tidning "Nyt fra Söfartstyrelsen", vilken utkommer med fyra nummer per år. Olycksrapporterna används även som undervisningsmaterial vid sjöfartsskolorna. Eftersom enheten även fungerar som ett internt kontrollorgan för påstådda missförhållanden inom hela Sjöfartsstyrelsens arbetsområde är dess fristående och oavhängiga ställning av mycket stor vikt.

Godkända klassificeringssällskap får utfärda de flesta typer av certifikat, t.ex. för skrov, maskineri och loadline. För närvarande är sex sällskap godkända; utöver de fem allmänt erkända även det japanska Nippon Kaiji Kyokai. De krav som regelmässigt ställs för godkännande är att sällskapet har kontor i landet och håller sig med minst en exclusive surveyor. Vidare skall något danskt fartyg vara klassat hos sällskapet och Sjöfartsstyrelsen skall även ges plats i sällskapets tekniska kommitté. Styrelsen har en årlig genomgång med de godkända sällskapen och vid behov kan även ett eller flera sällskap kallas till särskilda möten.

5.4 Norge

Det norska Sjöfartsdirektoratet har från 1994 fått en ny organisation, vilken schematiskt framgår av tablå E.

Direktoratet lyder sedan 1988 under Utrikesministeriet. I frågor som rör förebyggandet av havsförorening från fartyg och skydd för den marina miljön är direktoratet även underordnat Miljödepartementet. Den egentliga kontrollen av fartyg sker genom den regional organisationen bestående av 18 skeppskontrollstationer fördelade på sex distrikt. Det finns också skeppskontrollkontor i Rotterdam, Miami och S:t Nazaire.

Sjöfartsdirektoratets huvudkontor har organiserats enligt följande. Generaldirektören har en stab till sitt förfogande. Vidare finns det en särskild kvalitetschef. Denne förestår arbetet med den interna kvalitetskontrollen bl.a. genom auditeringar och uppföljningar. Vidare finns en administrativ avdelning och en sjömansavdelning, som bl.a. har hand om frågor som rör certifiering och utbildning.

Inspektionsavdelningen, med sina operativa- och strategiska enheter, administrerar och koordinerar hamnstatskontrollen och inspektionen av den i det norska internationella skeppsregistret registrerade flottan (NIS-flottan), utformar checklistor, utvecklar kontrollmetoder, upprättar statistik samt följer upp rapporterna från inspektionerna. I övrigt har man med den nya organisationen frångått en traditionellt fackindelade organisationsform och istället - bl.a. mot bakgrund av erfarenheter från Alexander Kjelland-olyckan - tillskapat avdelningar som var och en svarar för en viss fartygskategori, nämligen fiskefartyg, lastfartyg, passagerarfartyg och offshoreenheter. Varje sådan avdelning är i sin tur är indelad i en operativ- och en strategisk enhet. De nya avdelningarna har tillförts juridisk kompetens från den administrativa avdelningen och vidare har den operativa och tekniska kompetens som tidigare var samlad på två särskilda avdelningar nu integrerats i de olika fartygsavdelningarna. Organisationen innebär sålunda att varje avdelning har ett samlat ansvar för sin fartygskategori i tekniskt, operativt och författningsmässigt hänseende. Med denna ordning har man främst avsett att vinna fördelar i analys- och styrningsarbetet och att eliminera risken för att någon fråga skall kunna hamna mellan olika ansvarsområden.

På liknande sätt som i Danmark har sjöfartsinspektörerna - vilka utreder sjöolyckor m.m. - en självständig ställning direkt under generaldirektören. Dessa inspektörer, som är sju till antalet och finns på sex orter, har för sin myndighetsutövning givits både polisiära befogenheter och rätt att initiera åtal. Liksom i Danmark finns det även i Norge ett internationellt fartygsregister (NIS). I samband med registrets införande, 1987, diskuterades i vilken utsträckning delegation borde ske till klassen. Direktoratet har en lagstadgad rätt att använda personal från erkända klassificeringssällskap för sin tillsyn och av lagen följer även att den tillsyn som klasspersonalen utför i direktoratets ställe sker under samma ansvar som för en statstjänsteman. Utvecklingen har lett till att all besiktning och certifiering delegerats till de fem erkända sällskapen såvitt avser lastfartyg som överstiger 500 bwt och som är registrerade i NIS. Det enda undantaget är fastställande av säkerhetsbemanning, vilket utförs av Sjöfartsdirektoratet. Eftersom myndigheten anser sig inte ha vare sig resurser eller kompetens att ersätta klassificeringssällskapen har det ansetts bättre att i stället sköta kontrollen genom att kvalitetssäkra klassens verksamhet och för egen del utföra stickprov på fartygen. Direktoratet har en avtalsfäst rätt till insyn i alla förhållande som rör sällskapens utförande av den till dem delegerade myndighetskontrollen. Sjöfartsdirektoratet genomför årligen oanmälda inspektioner på 25 procent av alla NIS-fartyg och klassificeringssällskapen auditeras även årligen på något område; ibland vid huvudkontoret och ibland vid något regionalt kontor.

Under 1993 genomfördes exempelvis ett tjugotal systemrevisioner. Direktoratet har överenskommit med klassen att endast s.k. negativ information, varmed menas rapporter om fel och brister samt andra avvikelserapporter, behöver ges in till myndigheten. Detta urval har gjorts för att inte myndigheten skall överhopas med dokument. Direktoratet har även en on-line-förbindelse med Det Norske Veritas.

Avtalen med klassen har uppdaterats och från april 1994 ställs t.ex. krav på att sällskapen har ett system för kvalitetssäkring, som ISO

9 000 eller motsvarande. Direktoratet samlar klassificeringssällskapen till en gemensam årlig genomgång, varvid gångna och aktuella händelser och erfarenheter diskuteras.

6 Klassificeringssällskapen

Klassificeringssällskapen har under senare år utsatts för en ökad kritik och det är särskilt integriteten och kvaliteten i klassens tillsynsarbetet som har ifrågasatts. Frågan om klassificeringssällskapens roll när det gäller sjösäkerheten faller i och för sig utanför ramen för förevarande utredningsuppdrag. Men eftersom de kan ha betydelse som informationskälla i sjösäkerhetsarbetet inom Sjöfartsverket kan det likväl finnas skäl att något redogöra för bakgrunden till sällskapen och deras huvudsakliga funktioner.

Industrialismens och världshandelns genombrott under liberalismens 1800-tal ledde till att sjösäkerheten liksom stora delar av den tekniska och ekonomiska utvecklingen i första hand lämnades åt de kommersiella krafterna. Fartygens sjövärdighet kom därför att åvila sjöfartens ekonomiska intressenter såsom redare, befraktare, lastägare och försäkringsgivare. Framförallt försäkringsgivarna behövde en fristående och tekniskt kompetent organisation som objektivt bedömde ett fartygs sjövärdighet och därigenom medverkade till att sätta ett pris på riskerna i den kommersiella verksamheten.

Det äldsta klassificeringssällskapet, Lloyd´s Register of Shipping, bildades redan 1760 och ett flertal av de övriga större sällskapen etablerades under 1800-talet. Sällskapens verksamhet har succesivt utvidgats och andra arbetsområden har tillkommit, t.ex. offshore-verksamhet. Vissa sällskap har under lång tid varit verksamma inom materiel- och konstruktionskontroll samt inom vissa sektorer av tillverkningsindustri och landtransporter. Numera ägnar sig sällskapen även åt kvalitetssäkringsarbete och riskanalyser. I dag finns det ett drygt fyrtiotal olika sällskap. Av dessa ingår elva i en internationell sammanslutning International Association of Classification Societies, IACS, som bl.a. har observatörsstatus inom IMO. Genom IACS har även genomförts ett kvalitetssäkringsprogram av de sällskap som är medlemmar i samarbetsorganisationen. Bland IACS medlemmar ingår de fem sällskap som anses accepterade av alla sjöfartsnationer, nämligen American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanischer Lloyd och Lloyd´s Register of Shipping.

Klassificeringssällskapen drivs ofta i stiftelseform eller liknande och utmärkande är också att det inte ställs krav på att verksamheten skall vara vinstgivande.

Klassificeringssällskapen driver sin verksamhet efter avtal med redarna. Ett fartyg klassas alltefter dess användningsområde och vilken fart det är avsett för. Fartyget skall därvid uppfylla de krav på exempelvis skrov och framdrivningsmaskineri som vederbörande klassificeringssällskap ställer upp. Det är sällskapens uppgift att kontrollera att fartyget byggs och utrustas enligt dessa krav och att den sålunda bestämda standarden bibehålls under fartygets nyttjande i enlighet med klassningen.

Sällskapens regler - som i stor utsträckning motsvarar de konventionsregler och rekommendationer som utarbetas inom IMO - uppdateras kontinuerligt allt efter erhållna erfarenheter och utvecklingen i fråga om teknik och materiel. En närmare redogörelse för de internationella klassificeringssällskapens verksamhet finns i bl.a. betänkandena Samordnad säkerhetstillsyn av fartyg (Ds K 1981:17) och Tillsyn av fartyg (Ds K 1984:4).

De stora sällskapen har omfattande resurser för det tekniska säkerhetsarbetet och deras forsknings- och utvecklingsavdelningar är mycket kvalificerade. Härutöver har de tillgång till erfarenheter från en världsomspännande besiktningsorganisation. Det är mot bakgrund av detta "övertag" i fråga om resurser gentemot de nationellt verkande tillsynsmyndigheterna som sällskapens beräkningar, åtgärder och bekräftelser av ett fartygets tillstånd regelmässigt godtas och läggs till grund för bedömningen av ett klassat fartyg. I praktiskt hänseende innebär detta att sällskapens bedömningar, främst i vad gäller skrov och maskineri, normalt inte närmare kontrolleras av de nationella myndigheter som ansvarar för tillsynen.

Många länder, bl.a. sådana som saknar en egen fungerande sjöfartsmyndighet, har överlämnat all fartygstillsyn till klassificeringsssällskapen.

Sjöfartsverket har träffat avtal med alla de fem erkända sällskapen angående vissa internationella konventioner.

Dessa avtal rör besiktning och inspektion enligt MARPOL, Load-Line och SOLAS samt utfärdande av internationellt oljeskyddscertifikat, nationellt fribords certifikat och konstruktionssäkerhetscertifikat. I avtalen tillförsäkras Sjöfartsverket bl.a. att få tillgång till all relevant information som ligger till grund för sällskapets arbete i anledning av avtalet.

7 Överväganden och förslag

7.1 Inledning

Sjösäkerheten har mot bakgrund av svårartade sjöolyckor inom vårt närområde under senare tid kommit i fokus. Bl.a. är regeringens beslut att låta genomföra denna utredning ett uttryck för detta.

Kring sjösäkerheten finns en omfattande författningsreglering. Vid sidan av sjölagen kan nämnas fartygssäkerhetslagen och den i anslutning därtill utfärdade fartygssäkerhetsförordningen, lagen om undersökning av olyckor samt förordningen i samma ämne. Säkerhetsreglerna, som ofta är baserade på internationella konventioner, tar sikte på krav och standard avseende fartygs konstruktion och utrustning samt krav beträffande sjöpersonalens behörighet m.m. I fartygssäkerhetslagen och fartygssäkerhetsförordningen finns även regler som tar sikte på arbetsmiljön till sjöss, vilket är en viktig fråga för en god sjösäkerhet. En betydande del av regelsystemet gäller också kontrollen av att sjösäkerhetsreglerna efterföljs.

Under senare tid har också allt större uppmärksamhet ägnats åt en integrering av frågor som rör fartygens tekniska utformning och utrustning, å ena sidan, med frågor rörande manskapets kompetens och arbetsförhållanden samt rederiernas organisation och allmänna policy i vad avser säkerhetsfrågor, å andra sidan. Den bästa illustrationen till detta - en integrering av människa, teknik och organisation - är utvecklandet och införandet av den internationella ISM-koden till allmän ledning för säkerhetsarbetet. Förslag till ändringar i fartygssäkerhetslagen i detta hänseende avses komma att överlämnas till riksdagen under våren 1995.

Upprätthållandet av en god sjösäkerhet fordrar emellertid mer än både omfattande regelverk och kontrollapparater. En förutsättning för ett framgångsrikt säkerhetsarbete är också en god organisation hos de organ som handhar sjösäkerhetsfrågor ävensom tillgång till ett gott och varierat informationsunderlag samt ett ändamålsenligt utnyttjande av tillgänglig information. I så måtto har även detta uppdrag bäring på sjösäkerhetsarbetet. Det förtjänar emellertid att ånyo påpekas att egentliga säkerhetsfrågor ligger utanför uppdraget. För att få en samlad strategi för det svenska agerandet, bl.a. inom IMO, och för att få belyst sjösäkerhetsfrågor av speciellt intresse för trafiken i vårt närområde har regeringen tillsatt en särskild sjösäkerhetskommitté (dir. 1994:154). Kommittén skall bl.a. utarbeta ett handlingsprogram för ökad sjösäkerhet med särskild inriktning på transporter med passagerarfärjor. Enligt sina direktiv förväntas kommittén redovisa resultatet av sitt arbete senast den 1 november 1995. Regeringen avser även att låta se över den nuvarande organisationen för inspektionsverksamheten vid bl.a. Sjöfartsverket (prop. 1994/95:100 bilaga 7 s. 59).

I sammanhanget kan även nämnas arbetet i den internationella haveriutredningen med anledning av M/S Estonias förlisning samt den av regeringen den 24 november 1994 tillsatta kommittén med uppgift att utreda en långsiktig sjöfartspolitik (dir. 1994:132).

Verksamheten inom sjöfarten är av naturliga skäl utomordentligt starkt präglad av internationella regler och konventioner. Vikten av att driva sjösäkerhetsfrågor genom internationellt samarbete har också alltmer framträtt. Nationella regelsystem med alltför många särbestämmelser skulle försvåra sjöfarten, vilket i sin tur skulle medföra negativa återverkningar för den internationella samfärdseln. En av de viktigaste plattformarna för det internationella sjösäkerhetsarbetet är FN:s sjöfartsorganisation International Maritime Organization, IMO. Inom IMO med dess 149 medlemsstater utarbetas normer för fartygs säkerhet och skyddet för miljön. Överenskommelser antas i form av konventioner eller rekommendationer. Regler som utarbetats inom IMO anses allmänt som internationellt vedertagna även om det endast är fråga om rekommendationer. De viktigast konventionerna för sjösäkerheten, vilka undergår en ständig förnyelse, är SOLAS-konventionen som reglerar fartygs byggnad och utrustning och som nu även innehåller regler för kontroll av rederiers säkerhetsorganisation, den s.k. ISM-koden, Load Line-konventionen, som reglerar fartygs fribord, samt MARPOL-konventionen, bl.a. med regler för att minska sjöfartens negativa miljöpåverkan.

Även det internordiska samarbetet är intensivt och omfattande. Detta behandlas närmare i det följande.

Den internationella sjöfartsmarknaden har många aktörer, myndigheter, organisationer och andra institutioner, med uppgifter som utvecklats under lång tid och som också kan ha funktioner när det gäller säkerheten till sjöss. Även om flertalet av aktörerna företräder olika särintressen så sker ett visst samarbete på flera plan och i olika hänseenden. De grupper och sammanslutningar som här närmast avses är, utöver myndigheterna, redare, assuradörer, befraktare, klassificeringssällskap och fackliga organisationer. Vad gäller en mer etablerad samverkan så förekommer något sådant - för svenskt vidkommande - endast mellan Sjöfartsverket och vissa av klassificeringssällskapen. Detta samarbete vilar på avtalsrättslig grund. Vad gäller samverkan mellan myndigheter så bör här nämnas

Sjöfartsverkets samarbete med Kustbevakningen. Sjöfartsverket har t.ex. träffat avtal med Kustbevakningen vad gäller denna myndighets medverkan vid viss tillsyn av fartyg. Enligt fartygssäkerhetslagen skall dessutom Sjöfartsverkets tillsyn, i frågor som avser arbetsmiljön, utövas i samverkan med Arbetarskyddsstyrelsen.

7.2 Sjöfartsinspektionen och dess verksamhet

Det övergripande ansvaret för tillsynen av sjösäkerheten åvilar författningsenligt Sjöfartsverket. Tillsynen sker genom Sjöfartsinspektionen som har en central förvaltning, tre inspektionsområden och ett kontor i Rotterdam. Vad gäller den centrala förvaltningen är, såvitt nu är i fråga, utredningssektionen av särskilt intresse. Verksamheten inom inspektionen är starkt decentraliserad. Detta är helt i linje med de riktlinjer som är angivna i arbetsordningen för Sjöfartsverket. Där stadgas det sålunda bl.a. att organisationen för Sjöfartsverket bygger på principen om långtgående decentralisering och delegering för att verkets mål som affärsverk och som säkerhetsmyndighet skall uppnås.

I Sjöfartsverkets treårsplan för verksamheten under perioden 1995-1997 har beträffande Sjöfartsinspektionen anförts att inspektionens samlade verksamhet syftar till att tillse att kraven på fartygs säkerhet samt skydd mot vattenföroreningar från fartyg uppfylls med beaktande av internationell standard i utvecklade länder.

Inspektionens övergripande mål är angivna till att minimera risken för olyckor samt, om olyckor sker, minimera konsekvenserna och förhindra ett upprepande. Inspektionen skall därvid bl.a. utföra säkerhetskontroller samt verifiera säkerhetsorganisationen hos rederier och en del andra intressenter som har inflytande över fartyg, inkluderande deras drift.

Den del av Sjöfartsinspektionens uppgifter som innebär att genom kontroller se till att en tillfredställande sjösäkerhet upprätthålls är ett omfattande och komplext arbete. Detta beror både på sjöfartens internationella prägel och verksamhetens ökade komplexitet. Som exempel på det senare kan nämnas det stora antalet intressenter som i varierande omfattning utövar inflytande på verksamheten, t.ex. klassificeringssällskap, fackliga organisationer och branschorganisationer. Samtidigt blir fartygen som tillsynsobjekt alltmer tekniskt komplicerade. Till skillnad från vad som gäller för andra delar av transportsektorn, t.ex. inom väg- och lufttrafik, så är som regel varje fartyg individuellt utformat; även s.k. systerfartyg uppvisar många enskilda olikheter. Det gör att generella slutsatser, grundade på tekniska fel eller brister hos ett visst tillsynsobjekt, är svårare att dra när det gäller fartyg än när fråga är om andra transportmedel. Sammantaget ställer uppgiften stora krav på både ett gott urval av kontrollobjekt och korrekta bedömningar vid själva kontrollarbetet.

Rena sjösäkerhetsbedömningar och frågor avseende inriktning av verksamheten ligger utanför ramen för detta uppdrag. Det torde dock kunna konstateras att allt eftersom fartygen blir alltmer sofistikerade i fråga om konstruktion och teknik, det blir svårare att med tillgängliga resurser vidmakthålla kvaliteten i kontrollverksamheten. Detta har i sin tur medfört en succesiv övergång mot kontroller av helheter i stället för av enskildheter och kontroller av verksamheter och organisationer istället för enstaka fartyg och befattningshavare. Genom införandet av ISM-koden ställs också krav på rederierna om egenkontroll. Avsikten med denna kvalitetssäkring är att få rederierna att formulera och dokumentera vad deras egenkontroll innebär och även att förtydliga deras ansvar för sjösäkerheten. Inspektionens inriktning blir således att i ökad utsträckning utföra s.k. audits av rederierna och operativa kontroller av fartygsbesättningarna. Denna inriktning, liksom en fortsatt utveckling av ADB-system för informationshantering i samband med tillsyn av fartyg, ingår som tidigare nämnts i sjöfartsverkets treårsplan för verksamheten 1995-1997.

7.3 Informationsunderlaget och kontrollverksamheten

En effektiv kontrollverksamhet, syftande till god sjösäkerhet, förutsätter ett gott informationsunderlag.

Nödvändig information kan därvid nås på olika sätt. Områdena och kontoret får t.ex. information genom iakttagelser vid besiktningar och inspektioner och i en nära framtid även genom ISM-kodens krav på avvikelserapportering. Huvudkontoret får t.ex. information via rapporter enligt 6 kap. 14 § sjölagen och genom slutsatser dragna av incidenter och olyckor. De nu omnämnda informationskällorna kan alla betraktas som "interna" eller författningsreglerade. Det finns emellertid även ett flertal "externa" aktörer vilka innehar information som kan vara av stort intresse i sjösäkerhetshänseende. I förevarande uppdrag ingår att undersöka förekomsten av utbyte av relevant sjösäkerhetsinformation mellan sjösäkerhetsmyndigheter och andra organ som har viktiga funktioner på sjösäkerhetsområdet. Därvid har särskilt nämnts klassificeringssällskap, försäkringsgivare och sammanslutningar av redare.

Klassificeringssällskapen har en så speciell roll, bl.a. på grund av att de i vissa delar handhar myndighetsutövning, att de behandlas närmare i ett eget avsnitt. Vad så gäller sammanslutningar av redare har inspektionen framfört den uppfattningen att även om redarkollektivet har en stor spännvidd så är de svenska redarna, i allt väsentligt, seriösa och säkerhetsmedvetna. Utöver att de enskilda redarna förekommer som förvaltningsrättsliga motparter i olika ärenden som handläggs inom inspektionen, varigenom inspektionen tillförs viss information, sker en årlig sammankomst med Sveriges Redareförenings tekniska kommitté. Det sker även ett visst utbyte med Sveriges Redareförening för mindre passagerarfartyg, SWEREF. Assuradörerna (försäkringsgivarna) och befraktarna upplevs nu som mer aktiva än förr och de företar bl.a. egna fartygsinspektioner. De befraktare som ställer krav är närmast oljebolagen. Det förekommer emellertid inte något organiserat samarbete direkt mellan inspektionen och assuradörerna eller befraktarna.

Sjöfartens brandskyddskommitté är en samverkansorganisation för redare, ombordanställda, assuradörer, kustbrandförsvar och inspektionen. Huvuduppgiften är utbildning av ombordanställda i brandskydd och forskningsprioritering, men även andra sjösäkerhetsfrågor omfattas av verksamheten. Vidare kan nämnas Sjöfartens arbetsmiljönämnd, vilket är arbetsmarknadsparternas samarbetsorgan och där inspektionen är adjungerad.

Vid sidan av nu nämnda organ finns givetvis många andra potentiella informationskällor som - i olika grad vid olika områden eller centralt - spelar eller borde spela stor roll när det gäller att tillföra inspektionen relevant information. Här kan nämnas sjötrafikområdena, kustbevakningen, polisen, lotsar, personalorganisationer, nordiska kollegor, ombordanställda, massmedia och privatpersoner.

Ett vanligt återkommande argument mot en mer formaliserad och regelstyrd informationsplikt som kommit till uttryck under arbetet med detta uppdrag har varit att marknadens aktörer utgörs av en så begränsad grupp att mycket av informationsutbytet, på olika nivåer, sker via personliga kontakter. Det saknas anledning att ifrågasätta att så är fallet, och genom sådana kontakter kan säkerligen mycket goda kunskaper om enskilda händelser eller förhållanden inhämtas.

Även om inspektionen får sägas ha en mycket god allmän kunskap om sitt område så kan dock avsaknaden av rutiner för dokumentation, rapporteringsvägar och uppföljning av de externa informationsflödena medföra att detta informationsunderlag inte tillvaratas fullt ut. Inspektionen bör utforma en policy till ledning för de anställda för hur en sådan dokumentation och rapportering skall ske.

Härutöver borde inspektionen överväga att ge berörda intressenter någon form av återkoppling - för att därmed stärka intresset för att lämna information - t.ex. genom informationsblad med referat av aktuella haveriutredningar, upplysningar om pågående inspektionskampanjer, besked om utvecklingstendenser eller andra analysresultat. Inspektionen kunde överväga att träffa överenskommelser om informationsutbyte med exempelvis organisationer för inflytesrika befraktare. På samma sätt kunde inspektionen vidare överväga att träffa liknande överenskommelser med andra möjliga "informationsbärare", exempelvis med organisationer som företräder ombordanställda, redare och assuradörer. Det torde även gå att påvisa ett flertal andra sätt - t.ex. genom ömsesidiga avtal eller via seminarier, praxisdiskussioner och andra öppna fora - att finna nya vägar till ett för sjösäkerheten berikande samarbete.

Ett särskilt problem är obenägenheten hos ombordanställda och andra direkt berörda att rapportera incidenter inom sjöfarten. De uppskattningar som utredaren tagit del av talar om en rapporteringsvolym till inspektionen uppgående till en rapport per ett hundra faktiskt inträffade incidenter. Även om denna uppgift skulle vara överdriven så kvarstår det faktum att rapporteringsviljan är påfallande låg. En förklaring som framhållits under utredningen skulle kunna vara att den uppfattningen råder att inträffade incidenter i stort sett saknar betydelse för generella slutsatser, bl.a. utifrån åsikten att alla fartyg är sinsemellan så olika. En otvetydig orsak till den låga rapporteringsviljan är dock att den som i och för sig kunde rapportera inte vill utsätta sig för risken att drabbas av sanktioner från arbetgivares eller myndigheters sida. Det torde sålunda finnas ett naturligt motstånd mot att lämna uppgifter, om exempelvis en incident beror på egna eller arbetskamraters misstag. En annan orsak till den bristande rapporteringsviljan som framförts från flera håll är bristen på "feed back" från inspektionen. Det har framhållits som mycket angeläget att någon form av reaktion eller uppföljning sker för att det skall upplevas som meningsfullt att rapportera iakttagna missförhållanden. Denna uppfattning har framförts såväl av dem som enligt olika bestämmelser är skyldiga att anmäla händelser som av andra. I sammanhanget förtjänar dock nämnas att genom införandet av ISM-koden särskilda krav på ett säkerställande av avvikelse- och incidentrapportering kommer att ställas upp. Ett särskilt system för störningsrapportering har sedan lång tid varit i bruk inom flyget.

Den bristfälliga incidentrapporteringen måste sägas utgöra ett problem för inspektionens sjösäkerhetsarbete. Underlaget för riskanalyser blir otillräckligt, vilket medför att detta medel för kontrollverksamheten inte kan användas i den utsträckning som annars vore möjligt. Stora förhoppningar till förbättringar knyts dock till

införandet av ISM-koden. Utredaren vill hänvisa i tillämpliga delar till vad som anförts ovan angående möjligheten att öka informationen från externa källor. Inspektionen bör emellertid även överväga andra metoder för att uppmuntra rapporteringsviljan. Ett försök med ett anonymt rapporteringsystem kanske är värt att övervägas.

En särskild form av bristande uppföljning av lämnad information, som under utredningens gång påtalats av företrädare för såväl inspektionen som flera av fackförbunden, är att rättsliga åtgärder sällan vidtas mot vad som upplevs som klara brott mot sjösäkerheten. Det sägs sålunda att denna brist på ingripande sprider uppfattningen att det inte är någon mening med att påpeka missförhållande eftersom ingenting sker. Det påstås också att det nu föreligger en markant nedgång i antalet utförda åtal jämfört med tiden då det fanns en särskild sjöåklagare. Denne var från början en tjänsteman inom Kommerskollegium sedermera i Sjöfartsstyrelsen och slutligen inom dåvarande Stockholms åklagardistrikt med den officiella titeln förste sjöfiskal. Sjöåklagaren hade till uppgift att undersöka och beivra förseelser mot föreskrifter rörande sjösäkerheten och dylikt. Ordningen med en särskild sjöåklagare har sedermera avskaffats. Det sägs sålunda att det numera är ytterst svårt, även i vad som upplevs vara otvetydiga fall, att förmå åklagare att väcka åtal för olika sjösäkerhetsbrott. Detta anses i sin tur bero på att dessa fall nu fördelas över ett stort antal åklagare som var och en får endast enstaka fall. På grund härav och då sjösäkerheten är omgärdad av ett relativt omfångsrikt och inte alltid lättöverskådligt regelsystem kan svårigheter för åklagaren uppkomma. Under utredningen har framkommit fall som inte talar mot de slutsatser som ovan anförts. Vad gäller avsaknaden av rättslig prövning som hämsko på viljan att rapportera missförhållanden är det utredarens bedömning att det borde övervägas om även brottmål som rör lagen om undersökning av olyckor i de delar som avser sjöfarten, liksom fallet nu är med brott mot sjölagen och fartygssäkerhetslagen, uteslutande skall handläggas av åklagarmyndigheterna vid de orter där sjörättsdomstolarna finns för att på så sätt kunna koncentrera och befrämja kunskap och erfarenhet. I allt fall borde någon form av fördjupad utbildning på området erbjudas åklagare och polis.

7.4 Synpunkter och förslag beträffande den regionala verksamheten

7.4.1 Inledning

Områdenas och kontorets arbete präglas starkt av myndighetens ovan nämnda devis om decentralisering och delegering. Alla tillsynsförrättningar och all certifiering sker sålunda regionalt i de fall dessa frågor inte delegerats till klassificeringssällskapen. Det är också de tre områdena som utför hamnstatskontrollen.

7.4.2 Särskilt om fartygstillsynssystemet (FTS)

Med början under första halvåret 1993 har ett databaserat fartygstillsynssystem (FTS) succesivt tagits i drift. Systemet är avsett att förenkla åtkomsten av fartygsdata och rationalisera rutinerna för förrättningar och fakturering. I en målbeskrivning för systemet har bl.a. angivits att det skall avlasta personal vad avser planering, statistik, dokumentering samt rapportering i samband med fartygsförrättningar. Det skall förbättra dokumentationen av förrättningar för både externt och internt bruk. Vidare skall planeringen av tillsynsarbetet underlättas och behovet av de manuella fartygsdossierna minskas genom tillgången av faktaredovisning i systemet.

De tillsynsrapporter som tidigare funnits att tillgå endast vid respektive regionala myndighet blir nu genom FTS-systemet tillgängliga för alla inom organisationen. Systemet är än så länge helt fartygsbaserat, på samma sätt som fartygsdossierna. Men avsikten är att FTS-systemet även skall möjliggöra åtkomst av fartygsdata efter andra parametrar än fartygens namn.

Eftersom det faktiska kontrollarbetet i form av tillsyn och inspektioner sker vid de olika områdena och kontoret, är dessa myndigheters agerande av stor betydelse för utvecklingen av säkerhetsarbetet. Beslut i certifieringsfrågor eller angående ett kvarhållande av ett fartyg kan också få stora ekonomiska konsekvenser. Det är därför av stor vikt att vidmakthålla de krav på professionalism, kunskap och erfarenhet som detta arbete kräver. Verksamheten ställer också krav på en saklig och opartisk myndighetsutövning. Det är vidare av stor betydelse att kontrollerna utförs och dokumenteras på ett enhetligt sätt vid de olika distrikten. En enhetlig kontroll ökar trovärdigheten och medför att sannolikheten för uppmärksammandet av brister är densamma oavsett var fartyget anlöper. En enhetlig dokumentation är dessutom en förutsättning för att kunna använda rapporterna för ett effektivt analys- och uppföljningsarbete. Om samma slags förrättning vid olika områden ges olika omfattning och innehåll medför detta också olikheter i avgiftsdebiteringarna, vilket kan upplevas som orättvist och minska förtroendet för myndighetens verksamhet.

7.4.3 Utredarens iakttagelser och bedömning

Sjösäkerheten inom den del av sjöfarten som står under svenska myndigheters tillsyn torde internationellt sett hålla en mycket god standard. Detta får anses gälla både i tekniskt och operativt hänseende. Under senare år har också sjösäkerhetsarbetet bedrivits med utgångspunkt i en helhetssyn sådan den kommit till uttryck i ISM-koden. Sjöfartsverket har - särskilt genom dess sjöfartsinspektion - tillsammans med övriga nordiska sjöfartsmyndigheter också varit synnerligen aktivt i internationella sammanhang.

Det nu sagda motsäger emellertid inte att den nuvarande verksamheten, som utredaren ser det, är behäftad med vissa brister i olika hänseenden. Detta gäller främst ledning och styrning av den praktiska tillsynsverksamheten ute på områdena och kontoret, inhämtande och vidarebefordran av information av intresse för sjösäkerheten samt, centralt - utöver styrningsfunktionen - bearbetning och analys av tillgängligt informationsmaterial och även uppföljning av beslutade åtgärder.

Vissa av dessa brister är redan tidigare uppmärksammade av inspektionen, bl.a. genom resultatet av en audit av administrativa rutiner vid de olika inspektionsområdena som genomfördes under våren 1994. Olika arbetsgrupper arbetar intensivt med problemen. Här kan särskilt nämnas det viktiga arbetet med att integrera dokumentationen med - och ytterligare utveckla användningsområdet för - det datoriserade FTS-systemet samt vidare en arbetsgrupp för utformande av gemensamma checklistor.

Som flera gånger noterats i det föregående präglas den regionala verksamheten av decentralisering och självständighet. Mot en sådan grundsyn finns inte mycket att invända. Men decentralisering och självständighet får inte leda därhän att den verksamhet som utövas regionalt uppvisar stora variationer regionerna emellan, och än mindre mellan olika befattningshavare hos en och samma regionala myndighet. Detta skapar inte bara rättsosäkerhet utan kan också gå ut över sjösäkerheten som sådan. Vad som framkommit under detta utredningsarbete tyder på att den praktiska tillsynsverksamheten i allt väsentligt sköts av områdena efter eget gottfinnande. Det har sålunda framförts från områdena att metoderna vid utövandet av tillsynen liksom bedömningarna i hög grad skiftar mellan de olika inspektörerna. Områdena har vidare upplyst att man saknar information och tolkningsanvisningar från huvudkontoret. Ytterligare iakttagelser ger vid handen att det förekommer en mycket vildvuxen flora av blanketter, checklistor och former för dokumentation och endast vid ett område finns det en fungerande rutin för påminnelser och någon form av resultatuppföljning. Enligt uppgift förekommer centralt initierade riktade inspektioner, avseende någon särskild fråga eller område, sällan eller aldrig.

De omotiverade skillnaderna i omfattning och innehåll mellan områdenas myndighetsutövning har lett utredaren till uppfattningen att en betydligt starkare styrning från centralmyndigheten är påkallad. Det behövs bestämda anvisningar genom exempelvis checklistor för den direkta kontrollen och regler för protokoll eller motsvarande dokumentation av tillsynsförrättningar. Ojämnhet i tillsynsverksamheten mellan olika regioner kan, som redan antytts i det föregående, rubba tilltron till verksamheten som sådan. Utredaren vill alltså bestämt förorda att ordningen med checklistor eller motsvarande, så långt det är praktiskt möjlig, snarast återupptas och att tillsynsförrättningarna dokumenteras så att gjorda iakttagelser och påpekanden samt vidtagna åtgärder redovisas enhetligt och klart. I sammanhanget bör anmärkas att ett utbyggt FTS-system kan komma att i icke oväsentlig mån styra tillsynsverksamheten mot större enhetlighet och tvinga fram en tydligare och mera omfattande dokumentation. Som utredaren ser det är därför ett genomförande av den nu planerade utbyggnaden av FTS-systemet synnerligen angeläget.

Behovet av uppföljning och utvärdering av inspektionens samlade kontrollverksamheten är stort. För närvarande sker ingen systematisk redovisning till centralmyndigheten eller uppföljning där av områdenas kontrollverksamhet. Till följd härav får inspektionen ingen tydlig bild av kontrollverksamhetens omfattning och inriktning eller av de brister som uppmärksammas vid förrättningarna, vilket allt försvårar en effektiv styrning.

Slutsatsen blir att områdenas kontrollaktiviteter inte effektivt utnyttjas i det långsiktiga säkerhetsarbetet. Avsaknaden av en samlad bild av vad som framkommit vid kontrollaktiviteterna försvårar sålunda möjligheten att orientera kontrollverksamheten till de områden där kontrollen kan förväntas få störst betydelse. Detta begränsar även förutsättningarna för ett effektivt resursutnyttjande. En fortlöpande uppfölj ning och utvärdering av det arbete som utförs "på fältet" bör därför komma till stånd.

En annan iakttagelse som utredaren gjort vid besök hos de regionala organen är att de påpekanden om brister hos tillsynsobjekten, som görs vid en förrättning och som åtgärdas innan fartyget avlöper, inte dokumenteras på något sätt. Även här bör kunna utvinnas värdefull information. Exempelvis sådan som tyder på allmänt förekommande tekniska brister eller bristande underhåll eller annan försummelse från redares sida. Utredaren är väl medveten om att man inte får tillskapa en ordning där den centrala myndigheten "drunknar i rapporter", men med hjälp av FTS-systemet och med centralt utfärdade anvisningar, byggda på en fortlöpande dialog med befattningshavarna ute på områdena, borde en rimlig avgränsning vara möjlig. Under alla förhållanden borde här kunna skapas tillgång till information genom vilken olika trender skulle kunna avläsas till gagn för sjösäkerheten.

Vad som här sagts om brister i dokumentationen vid tillsynsförrättningar kan gälla även för den kontinuerliga uppföljningen vid nybyggnad av fartyg. Inte heller vid dessa tillfällen noteras sådana påpekanden vilka senare åtgärdas. På motsvarande sätt som ovan angetts bör även de fortlöpande iakttagelser av betydelse som görs under byggandet av ett fartyg noteras och vidareföras till den centrala myndigheten.

En effektiv styrning förutsätter både styrinstrument och uppföljning av verksamheten. Formerna för styrningen kan vara av flera olika slag. För närvarande förekommer s.k. överinspektörsmöten med viss regelbundenhet och dessa innebär en viss uppföljning, samordning och ensning mellan områdena i deras arbete. Andra medel för styrning kan utgöras av vägledande policybeslut och annan normbildning. Inspektionen utför ett omfattande och viktigt arbete genom sitt internationella engagemang. Detta kan också vara en förklaring till att policy och normbildning blivit eftersatt. En kraftsamling till utformandet av de tillämpningsföreskrifter, tolkningsbesked och gemensamma rutiner i övrigt som områdena efterfrågar skulle dock bidra till att dämpa ojämnheten mellan dessa.

Ett annat sätt att förbättra informationsunderlaget för säkerhets- och analysarbetet - samtidigt som det kan ses som en funktion av redan vunnen information - är att i större utsträckning använda sig av riktade inspektioner eller andra slags temagranskningar för att finna "sjuka punkter" och dylikt. Visserligen måste tillsynsförrättningarna täcka vissa grundläggande områden. Detta bör emellertid inte hindra att särskild uppmärksamhet i vissa lägen kan behöva ägnas åt speciella frågor eller områden. Särskilt när det gäller inspektionerna, som är en form av extra ordinär tillsyn, företas dessa enligt vad som inhämtats ofta mera "på känn" än efter systematiska överväganden. Med en nära och fortlöpande kontakt mellan den centrala myndigheten och områdena borde den förra myndigheten kunna få kännedom om sådana trender när det gäller brister i sjösäkerhetshänseende som bör föranleda särskild uppmärksamhet i tillsynsverksamheten. Rutiner för en sådan samordning mellan den centrala myndigheten och de regionala myndigheterna bör enligt utredarens mening tillskapas. En fortlöpande kontakt mellan dessa organ bör också ske vad gäller tolkning av och information om aktuella bestämmelser på sjösäkerhetens område.

Utredaren har vid sina besök hos områdena vidare konstaterat att vitesförelägganden inte används vid förrättningarna. Det har på fråga härom upplysts att hanteringen upplevs som svår och främmande.

Även om flertalet av dem som berörs har stor respekt för det säkerhetsarbete som inspektionen och områdena utför och därför frivilligt åtgärdar de påpekanden som görs, fordrar varje effektiv tillsynsverksamhet tillgång till någon form av maktmedel för att kunna sätta kraft bakom sin verksamhet, om inte annat så i preventivt syfte. Inspektionen har bl.a. möjlighet att återkalla eller avstå från att förnya certifikaten, överlämna till åtalsprövning samt meddela inskränkningar i rätten att använda fartyget. Vid föreläggande om rättelse föreligger även rätt till utsättande av vite, 11 kap. 1 och 6 §§ fartygssäkerhetslagen. Det mest ingripande maktmedlet som används är nyttjandeförbud i form av kvarhållande av fartyg. Ett sådant beslut, vilket skall underställas sjösäkerhetsdirektören, är visserligen synnerligen effektivt, men det torde vara en alltför kraftfull åtgärd vid många smärre överträdelser och brister. Utsättande av vite är en i andra sammanhang mycket effektiv åtgärd, varför det är något förvånande att det så sällan används inom inspektionen. Om möjligheten att förelägga vite överhuvudtaget inte utnyttjas kan det finnas en risk att det strängare tvångsmedlet kommer till användning i fall där det inte behövs eller att något tvångsmedel, där det i och för sig är befogat, inte alls kommer till användning. I vart fall beträffande svenska fartyg torde det, såsom lagstiftaren förutsatt, finnas ett visst utrymme för användning av vitesföreläggande.

För att skingra den osäkerhet som uppenbarligen råder vid områdena i fråga om användandet av vitesföreläggande bör inspektionen överväga att utveckla en policy för i vilka situationer olika sanktioner normalt bör komma ifråga. Vidare vore det lämpligt om inspektionen på central nivå utformade någon form av tillämpningsanvisning eller instruktion för handläggning av vitesfrågor.

I det följande återkommer utredaren till de förslag i organisatoriskt hänseende som de i detta avsnitt anförda synpunkterna kan föranleda.

7.5 Synpunkter och förslag beträffande verksamheten vid utredningssektionen

7.5.1 Om utredningssektionens arbete

Utredningssektionens ansvarsområde omfattar utredning av sjöolyckor och personskador i skeppstjänst, olycksstatistik samt misstanke om brott mot säkerhets- och miljöskyddsbestämmelser. Till utredningssektionen är knutna endast två utredningmän, men det är förutsatt och förekommer också fortlöpande en dialog med olika sakkunniga vid huvudkontorets övriga sektioner, t.ex. med skeppsbyggare när det gäller stabilitetsfrågor. Alla rapporter enligt 6 kap. 14 § sjölagen granskas av sektionen och varje år handlägger sektionen också ett tiotal sjöolyckor, beträffande vilka handläggningen delegerats från Statens haverikommission enligt lagen om undersökning av olyckor. Oftast rör de på sätt delegerade sjöolyckorna haverier med fiskebåtar. År 1993 inkom sammanlagt 359 ärenden till utredningssektionen. Fartygsärenden läggs upp i en dossier för varje fartyg. Dossiern utmärks med fartygets namn. När ett ärende är avslutat skall dossiern bindas in och arkiveras i diarienummerordning eller i kronologisk ordning. Som tidigare omnämnts innehåller inspektionens tjänsteföreskrift 3/92 närmare regler för vad en utredningsrapport skall innehålla. Den skall sålunda inrymma bl.a. en händelsebeskrivning, analys av för händelsen betydelsefulla faktorer, sannolika orsaker, vidtagna åtgärder samt förslag till åtgärder i anledning av olyckan. Utredningsrapporten fastställs av sjösäkerhetsdirektören, eller efter delegation, av chefen för utredningssektionen. Vidare skall rapporter av större vikt föredras vid ett s.k. säkerhetssammanträde, till vilket inspektionens sektionschefer samt även representanter för övriga berörda avdelningar inom Sjöfartsverket kallas. Säkerhetssammanträde skall också hållas för att följa upp vilka åtgärder som vidtagits med anledning av de rekommendationer som getts i tidigare utredningsrapporter. Till sin hjälp i arbetet med att finna händelser som inte blivit rapporterade enligt 6 kap.14 § sjölagen prenumererar utredningssektionen på tidningen Lloyd's list samt på en faxservice, såvitt avser svenska eller svenskägda fartyg, benämnd Lloyd's press. Vidare anlitas en svensk presstjänstservice.

7.5.2 Utredarens iakttagelser och bedömning

En mycket viktig förutsättning för en god sjösäkerhet är att inträffade olyckor eller incidenter fortlöpande blir föremål för utredning, analys och uppföljning. Uppgiften att handha en sådan verksamhet ankommer i första rummet på utredningssektionen. Ärendena hos utredningssektionen anhängiggörs främst genom inrapportering enligt olika författningar, främst sjölagen, och genom sektionens egen bevakning av olika upplysningskällor. Viss information kan också tillföras genom FTS- och DAMA-systemen samt genom anmälningar eller underrättelser från s.a.s. externt håll såsom myndigheter, organisationer, institut och enskilda personer.

Tillströmningen av ärenden till utredningssektionen är betydande och sektionen är mycket hårt belastad. Trots detta genomförs, så vitt utredaren kan bedöma, utredningarna på ett i och för sig mycket för tjänstfullt sätt.

Med hänsyn till det sätt på vilket ärendena tillförs sektionen och till strukturen på arbetsuppgifterna är det naturligt att utredningarna främst kommit att inriktas på de enskilda fallen och därtill anslutande analyser och rekommendationer. Utredningssektionens ärendehantering sker sålunda mer in casu än efter en jämförande helhetssyn. Med andra ord tillvaratas inte resultatet av en tidigare utredning med automatik i utredningen och bedömningen av nästa händelse. Detta är uppenbarligen en brist i systemet, vilket bl.a. blir åskådliggjort genom den i det följande lämnade redovisningen av vissa olyckor och incidenter med ro-ro-fartyg. Sättet för aktbildning och arkivering av genomförda utredningar kan också antas bidra till den här påtalade bristen. Den enda möjligheten att finna ett samband eller en parallell med en aktuell olycka eller incident är nämligen att den enskilde utredaren eller annan person, exempelvis någon befattningshavare ute på områdena, har kännedom om den tidigare händelsen och vilket fartyg som berörts av denna. I sammanhanget kan också anmärkas att dossierna för de olika fartygen i vissa stycken är svåröverskådliga vad gäller redovisningen av tillfört eller upprättat material, den löpande handläggningen och fattade beslut. Dagboksblad används exempelvis inte och handlingarna aktbilageras inte heller.

Som antecknats i det föregående skall viktigare rapporter anmälas vid säkerhetssammanträde. Sådant sammanträde skall också hållas för uppföljning av rekommendationer som lämnats i utredningsrapporter.

Enligt vad som upplysts vid besök hos utredningssektionen har sådana sammanträden inte hållits efter den omorganisation som genomfördes år 1988. Vidare har från utredningssektionen gjorts gällande att någon egentlig återkoppling eller "feed back" från ledningens sida till sektionen inte förekommer vad gäller det arbete som där utförs.

Som utredaren ser det behöver analys- och uppföljningsfunktionerna utvecklas och stärkas betydligt inom inspektionen. Med det nuvarande systemet tas de utredningsresultat och analyser som emanerar från utredningssektionen inte till vara fullt ut. Med de mycket begränsade - resurser som nu är knutna till sektionen är det inte heller rimligt att ett mera övergripande analysarbete och en fortlöpande eller heltäckande uppföljning av lämnade rekommendationer skall göras i sektionen. Det kan för övrigt ifrågasättas om sådana uppgifter lämpligen bör ligga på utredningssektionen, som, om så sker, måste tillföras ökade resurser. Enligt utredaren ter det sig naturligare att dessa uppgifter, som har mycket nära anknytning till de lednings- och styrfunktioner som bör ankomma på chefen för inspektionen, anförtros ett till chefen knutet stabsorgan. Först därigenom synes man kunna få till stånd en systematisk och övergripande bearbetning av allt det informationsmaterial som tillförs eller kan tillföras inspektionen vad gäller inträffade olyckor och incidenter eller som överhuvudtaget härrör från iakttagelser som inrapporteras. På ett sådant stabsorgan bör också, som redan antytts, ankomma att systematiskt och fortlöpande följa upp de beslut eller rekommendationer som tagits i anslutning till bl.a. utredningssektionens rapporter. Utredaren vill alltså förorda att en organisation i enlighet med det nu anförda tas under övervägande. En sådan organisation måste givetvis förses med erforderligt ADB-stöd.

Slutligen vill utredaren i detta sammanhang förorda att, i allt fall så länge den nuvarande organisationen består, de s.k. säkerhetssammanträdena återupptas och att fortlöpande en återkoppling sker från ledningens sida gentemot utredningssektionen i vad avser dess arbete. Vidare bör rutinerna för hanteringen och redovisningen av upprättat eller tillkommande utredningsmaterial förbättras, och även principerna för dokumenteringen av vidtagna åtgärder och fattade beslut bör ses över så att befintligt material och handläggningens gång redovisas klart och tydligt. En aktbildning som endast följer fartygen synes inte heller tillfredsställande. Hur aktbildningen skall ske synes lämpligen kunna övervägas närmare när FTS-systemet blir utbyggt i enlighet med nu föreliggande planer.

7.6 Samarbete med klassificeringssällskapen

7.6.1 Allmänt

Den rådande ordningen med klassificeringssällskapen som kontrollanter vid fartygsbyggen och som utövare av fortlöpande kontroll av klassade fartyg under deras brukningstid har gammal hävd. Sällskapens egna konstruktionskrav är inte sällan desamma som följer av SOLAS och andra konventioner. De områden som traditionellt legat under klassen är skrov, maskineri och andra framdrivningsarrangemang. De i fartygssäkerhetslagen angivna sällskapen är mycket omfattande organisationer med stora resurser och en bred verksamhetsbas. De har ansenliga tekniska resurser, stora forsknings- och utvecklingsavdelningar samt ofta världsomspännande besiktningsorganisationer. Mot bakgrund av sällskapens breda kunskapsbas och väl utbyggda kontrollapparat är det inte svårt att förstå att de nationella tillsynsmyndigheterna sedan lång tid regelmässigt godtagit sällskapens kravspecifikationer och tillsynsarbete. Den svenska Sjöfartsinspektionen har insyn i sällskapens arbete genom att sjösäkerhetsdirektören ingår i de nordiska tekniska kommittéerna hos American Bureau of Shipping, Bureau Veritas och Det Norske Veritas. Alla klassens regeländringar remitteras till sådana kommittéer.

Sjöfartsverket har genom Sjöfartsinspektionen träffat följande avtal med klassificeringssällskapen.

MARPOL, IOPPC

Avtal angående besiktning och inspektion enligt den internationella oljeskyddskonventionen (MARPOL) samt om rätt att utfärda internationellt oljeskyddscertifikat (IOPPC) har träffats med American Bureau of Shipping (ABS), Bureau Veritas (BV), Det Norske Veritas (DNV), Germanischer Lloyd (GL) och Lloyd's Register of Shipping (LR). Dessa avtal tecknades och trädde i kraft under perioden juni - oktober 1989.

Load Line, ILLC

Avtal angående besiktning och inspektion enligt den internationella lastlinjekonventionen jämte protokoll ("Load Line") samt om rätt att utfärda nationellt fribordscertifikat (ILLC) har träffats med BV, DNV, GL, och LR. Avtalen med BV, DNV och LR träffades i december 1992 och trädde i kraft den 1 januari 1993. Avtalet med GL träffades och trädde i kraft den 1 mars 1994.

SOLAS, KC

Avtal angående besiktning och inspektion enligt SOLAS samt om rätt att utfärda konstruktionssäkerhetscertifikat har ingåtts med ABS, BV, DNV, GL och LR. Dessa avtal träffades under perioden mars - september 1994 och trädde i kraft under tiden maj - november 1994. Avtalen avseende SOLAS har upprättats enligt en av IMO rekommenderad mall.

Eftersom sällskapen genom avtalen auktoriseras att utföra myndighetsuppgifter innehåller överenskommelserna bl.a. ansvarsklausuler för den myndighetsutövning som klassens tillsyn och certifieringsrätt innebär. Vidare ges inspektionen bl.a. rätt till insyn i alla de handlingar som sällskapen lägger till grund för sitt arbete enligt avtalen, och även sällskapens interna instruktioner, cirkulär och anvisningar skall vara tillgängliga för inspektionen. Enligt SOLAS-avtalen skall myndighetens övervakning inriktas på sällskapens organisation och rutiner och inspektionen skall, antingen på egen hand eller genom annat organ, utföra auditeringar av klassen.

7.6.2 Utredarens iakttagelser och bedömning

Av propositionen med förslag till 1988 års fartygssäkerhetslag (prop. 1987/88:3) synes kunna utläsas att riksdagen och regeringen utgått från att de klassificeringssällskap som anges i lagen även framdeles skall anförtros väsentliga kontrollfunktioner och att dessa sällskaps åtgärder och bedömningar i allt fall i fråga om skrov och maskineri som regel skall kunna godtas utan närmare kontroll från Sjöfartsinspektionens sida. Samtidigt framhölls emellertid att förhållandena kan ändras beträffande de ifrågavarande sällskapen, varför det är viktigt att fortlöpande följa och kontrollera deras verksamhet. Vad sålunda förekommit förtjänar nämnas mot bakgrund av den debatt som förts

under senare tid kring Sjöfartsinspektionens förhållande till klassen.

Det synes enligt utredaren helt orealistiskt att låta Sjöfartsinspektionen ta över utförandet av alla de tjänster som klassificeringssällskapen i dag erbjuder. Inspektionen har varken personella, tekniska eller administrativa resurser för att överta dessa sällskapens uppgifter Inspektionens roll i sammanhanget får ses mot bakgrund av detta. Vad som nu sagts innebär emellertid inte att Sjöfartsinspektionen inte har väsentliga funktioner i sammanhanget. Inspektionen har nämligen det yttersta ansvaret för övervakningen av sjösäkerheten och därmed ett ansvar för att sjösäkerheten i alla hänseenden blir tillbörligt tillgodosedd och övervakad i det arbete som klassificeringssällskapen utför. Det har också, som ovan antecknats, förutsatts av statsmakterna att inspektionen skall utöva en fortlöpande kontroll av sällskapen.

I såväl Danmark som Norge har vederbörande tillsynsmyndighet årligen möten mellan myndigheten och klassificeringssällskapen. Vid dessa möten genomgås i sammanhanget intressanta händelser, och finner myndigheten att missförhållande råder i något hänseende påtalas detta av myndigheten. I Norge förekommer dessutom redan nu auditering av sällskapen.

Till skillnad från vad som är förhållandet i Danmark och Norge med deras mycket omfattande internationella register finns det endast ett mindre antal svenskregistrerade fartyg som är klassade. Antalet uppgår till ca 300 fartyg. Den svenska inspektionen har därför valt en annan metod för kontroll av klassen än den auditeringsmetod som nyttjas i Danmark och Norge. I inspektionens nyligen, den 1 februari 1995, utfärdade tjänsteföreskrift 3/1995 ges anvisningar för genomförandet av integrerad inspektion avseende svenska klassade fartyg. Denna integrerade inspektion kan i korthet sägas innebära en kombination av operativ kontroll, ombord audit, okulär besiktning samt kontroll av fartygets dokumentstatus. Inspektionens kontroll innebär i stora delar ett dubbelarbetet gentemot de uppgifter som sällskapen förväntas utföra. Detta är emellertid en medveten strategi från inspektionens sida. Dels vill inspektionen inte släppa någon del av den operativa kontrollen till sällskapen, dels är de svenska klassade fartygen inte fler än att man anser sig kunna kontrollera sällskapens arbete genom inspektion på vart och ett av de klassade fartygen.

Den nuvarande organisationen för inspektionens tillsynsverksamhet och dess tillgång till tekniska och personella resurser måste enligt utredaren ses mot bakgrund av den ordning som hittills gällt, nämligen att klassens åtgärder och bedömningar i fråga om, främst, skrov och makineri som regel godtagits utan närmare kontroll. Den framtida utvecklingen får utvisa om Sjöfartsinspektionen i stället för den nu valda linjen - eller som komplement till denna - bör utöva en fortlöpande och systematisk kontroll av klassens verksamhet på motsvarande sätt som sker i Danmark och Norge. Men under alla förhållanden måste den den nu föreskrivna ordningen för granskning av klassen inrymma rutiner för systematisk och ensartad rapportering från områdena och, framförallt, en centralt bedriven analys och uppföljning av det informationsmaterial som sålunda bör finnas att tillgå. Utan detta kommer inte klassificeringssällskapens verksamhet och plats i sjösäkerhetssystemet att, i enlighet med vad statsmakterna förutsatt vid tillkomsten av 1988 års fartygssäkerhetslag, kunna bedömas i stort. Om det i enlighet med vad som förordats i det föregående tillskapas ett särskilt stabsorgan hos sjösäkerhetsdirektören, faller det sig naturligt att den här berörda analys- och uppföljningsfunktionen läggs här.

7.7 Nordiskt samarbete

7.7.1 Olika former för samarbete

Det internordiska samarbetet avseende sjösäkerhetsregler och praktiskt arbete har en mycket vidsträckt omfattning. I de beskrivningar över samarbetet som lämnats av företrädare för sjösäkerhetsmyndigheterna i Danmark, Finland, Norge och Sverige har uppgivits att det i stort sett dagligen förekommer informella kontakter mellan inspektionernas tjänstemän med skilda befattningar. Det pågår även ett flertal konkreta och kontinuerliga samarbetsprojekt i tillsynsverksamheten, t.ex. finns det en överenskommelse vad gäller den operativa kontrollen av pas0sagerarfärjorna mellan Sverige och Finland. Överenskommelsen innebär att den finska myndigheten utför den operativa kontrollen av de svenska färjorna och den svenska myndigheten gör motsvarande kontroll av de finskregistrerade färjorna. Ett årligen återkommande möte är det nordiska sjösäkerhetsdirektörsmötet. På detta avhandlas gemensamma frågor av allmän karaktär. Mellan årsmötena förekommer det regelmässigt ett flertal mer informella möten. Överhuvudtaget uppträder de nordiska sjösäkerhetsdirektörerna oftast gemensamt såväl i det internationella sjösäkerhetsarbetet som vid införandet av specifikt nordiska föreskrifter. Inför IMO:s sammankomster hålls ofta gemensamma förmöten och vid dessa kan även delta nordiska representanter för redare, ombordanställda, försäkringsgivare, andra myndigheter m.fl.

7.7.2 DAMA

Sedan 1990 förekommer även ett särskilt nordiskt samarbetsprojekt benämnt DAMA. Detta omfattar ett gemensamt datasystem för inrapportering av sjöolyckor och statistiksammanställning. Den samnordiska databasen över incidenter och sjöolyckor har utarbetats i samarbete med Det Norske Veritas och den norska kustbevakningen.

Tekniskt grundar sig systemet på ett norskt databasprogram, FICS, vilket är ett integrerat program omfattande databas, räkneark, rapportgenerator samt ordbehandling. Rapporterna översänds på diskett till det norska Sjöfartsdirektoratet från de övriga nordiska ländernas centrala sjöfartsmyndigheter. I Norge används däremot en nätversion av DAMA, vilket gör det möjligt att mata in data direkt från de norska sjöfartsdistrikten. I DAMA ingår kodad information, t.ex. uppgifter om fartygstyp och väderförhållanden, men systemet ger även möjlighet till klartext i fri form. De kodade uppgifterna gör det relativt lätt att utarbeta en samnordisk statistik.

Det har från flera håll framhållits att DAMA-systemet upplevs som "trubbigt" och mindre ändamålsenligt. Exempel härpå är kritik mot kodernas sammansättning, där det efterlyses en bättre fokusering på den mänskliga faktorns inverkan. Vidare kan nämnas kritik mot systemets programvara och kompatibilitet. Kritiken till trots är dock alla eniga om vikten av en gemensam databas för uppföljning av sjöolycker, inte minst för att ett statistiskt underlag för varje enskilt land riskerar att bli för litet för att kunna läggas till grund för en meningsfull analys. Det skall också tilläggas att det inom IMO pågår ett utvecklingsarbete med en internationell "Ship Casualty Database". Detta arbete kommer med säkerhet att påverka utvecklingen av regionala och nationella databaser för sjöolyckor.

7.7.3 Utredarens iakttagelser och bedömning

Utöver det årliga sjösäkerhetsdirektörsmötet och DAMA förekommer inte något närmare organiserat samarbete för utbyte av information de nordiska länderna emellan. Som framgått av det föregående förekommer emellertid ett mycket nära informellt samarbete mellan de nordiska länderna på sjösäkerhetens område. Detta sker både på central och regional nivå och såväl mellan myndigheterna som sådana som mellan enskilda befattningshavare. Samarbetet avser både den direkta tillsynsverksamheten och frågor om informationsutbyte och regelutveckling samt, inte minst, internationella frågor, främst dem som behandlas inom ramen för IMO. Detta informella nordiska samarbete verkar fungera smidigt och effektivt. Att formalisera informationsutbytet med särskilda konventioner eller på annat sätt synes varken påkallat eller praktiskt. En sådan ordning skulle dessutom kunna leda till komplikationer i det internationella arbetet i övrigt. Enligt vad som framkommit vid samtal med företrädare för inspektionsmyndigheterna i Danmark, Finland och Norge är också den allmänna uppfattningen hos dem att samarbetet i stort fungerar utmärkt och att någon formalisering av informationsutbytet varken är behövlig eller lämplig.

Utredaren finner alltså inte skäl att föreslå att informationsutbytet mellan de nordiska ländernas inspektionsmyndigheter binds upp genom formella överenskommelser. Det bör sålunda alltjämt ankomma på vederbörande myndigheter att närmare bestämma inriktningen och omfattningen av informationsutbytet.

I sammanhanget bör slutligen påpekas att en utbyggnad av det svenska FTS-systemet för fartygstillsyn kan komma att öppna ytterligare möjligheter till informationsutbyte. Liknande datasystem är under uppbyggnad även i övriga nordiska länder, t.ex. KATJA-registret i Finland. Om dessa dataregister görs kompatibla skulle därmed möjligheter att se trender och samband i relevanta hänseende - bl.a. på grund av det ökade statistiska underlaget - öka på samma sätt som för det gemensamma olycksfallregistret, DAMA.

8 Särskilt om Ro-Ro-fartyg

8.1 Inledning

Transportsystemen har under en lång följd av år genomgått en snabb utveckling. De ökade kraven på kapacitet och effektivitet har lett till introduktion av nya lastbärare, lasthanteringssystem m.m. På sjötransportsidan har dessa krav bl.a. mötts med införandet av de s.k. roll on-roll off-fartygen (ro-ro). Erfarenheter av ro-ro-trafiken har emellertid visat att även om den i sig representerar ett modernt och effektivt sjötransportsystem den är behäftat med vissa svagheter från säkerhetssynpunkt. Uppkomst av fria vätskeytor på ro-ro-fartygens stora lastdäck innebär t.ex. risker för försämrad stabilitet. Vidare kan svårigheten att säkra fordon och containrar - särskilt om lasten i dessa lastbärare inte är tillfredställande säkrad - innefatta risk för förskjutningar i lasten.

Efter förlisningen av M/S Estonia har påståenden gjorts om att incidenter och problem med bogportar förekommit tidigare på färjor av samma typ som M/S Estonia. Eftersom dessa påståenden är en bakomliggande orsak till detta utredningsuppdrag har utredaren genomfört vissa efterforskningar i fråga om olyckor eller incidenter med ro-ro-fartyg. På grund av att Sjöfartsinspektionens arkiv och register för olyckor är helt fartygsbaserat har uppgiften att spåra en viss typ av tidigare olyckor eller tillbud varit svår och resultatet har oundvikligen blivit ofullständigt. Under utredningsarbetet har emellertid utredaren fått vissa upplysningar genom enskilda befattningshavares redovisade minnesbilder beträffande fartyg eller händelser. Här följer dels några korta referat av vissa tidigare inträffade olyckor och incidenter av speciellt intresse i förevarande sammanhang, dels en likadeles kort genomgång av ärendenas handläggning hos Sjöfartsinspektionen.

8.2 Visby

8.2.1 Händelseförlopp

Passagerarfärjan Visby byggdes 1972 och hade en bruttodräktighet på 6 665 registerton. Den 12 november 1973, på ordinarie rutt mellan Nynäshamn och Visby, träffades fartyget i förskeppet av ett par kraftiga sjöar. Följden blev att den förliga stävporten (bogporten) öppnades och vatten kom in på bildäck. Befälhavaren fann därför för gott att låta fartyget återvända till Nynäshamn. Händelsen ägde rum sedan fartyget kommit ut i öppen sjö. Vid tillfället rådde hård vind och grov sjö.

8.2.2 Skador

Vid besiktning av skadorna befanns att båda låsningshakarna till stävporten brutits av och att intryckningar uppkommit på porten. Som en provisorisk åtgärd svetsade man fast förliga stävporten och lastrampen till skrovet. Sedan reparationen vattenprovats och besiktigats av vederbörande klassificeringssällskap, Lloyd's Register of Shipping, fick fartyget ett temporärt tillstånd att fortsätta sina resor till nästa varvsöversyn. I februari 1974 utfördes därefter en permanent reparation, varvid stävporten fick nya låsningshakar av grövre dimension än tidigare och låsningsanordningen förstärktes ytterligare med vantskruvar och surrningsfästen för dessa.

8.2.3 Orsak

Inspektionens slutsats om haveriorsaken, såsom den anges i utredningsrapporten, daterad den 1 november 1974, var att låsanordningarna för stävporten var för klent dimensionerade.

8.2.4 Ärendets gång inom inspektionen

Sedan utredningssektionen varseblivit olyckan, troligen genom sin presservice, infordrades s.k. § 70-rapport. Sådan inkom i slutet av januari 1974. Inspektionen tillskrev rederiet i februari 1974 och påfordrade sjöförklaring med bl.a. följande motivering.

1972 "Sjöfartsverket som anser att bordläggningsport skall vara jämnstarkt med berörd bordläggning ser allvarligt på fall av väderskada på bogport. Från sjösäkerhetssynpunkt är därför angeläget att orsaken till sådana haverier så vitt möjligt blir utredda. Sjöförklaring bör därför hållas."

I utredningsmaterialet fanns också uppgifter från befälhavaren att låsningsanordningen brustit vid ett tidigare tillfälle och vidare fanns påstående om att en annan gotlandsfärja, Thjelvar (fd Gotland), haft liknande missöde under ett svårt oväder några år tidigare.

Inspektionen översände även en promemoria till Lloyd's Register of Shipping med anledning av händelsen med Visby och en liknande händelse med passagerarfartyget Svea Star (se nedan). Av denna promemoria framgår bl.a. följande. Inledningsvis nämns att Sjöfartsverket godtagit klassens kontroll av styrka och täthet för bordläggningsportar, men att verket granskat och utfört inspektion av lyftanordningarna till portarna eftersom dessa inte omfattats av klassens tillsyn. Inspektionen påpekade härefter att man observerat en generell minskning i antalet skalkningsanordningar och ifrågasatte denna utveckling ur sjösäkerhetssynpunkt. Det nämndes att det t.ex.i händelse av att ett beslag brister, belastningsökningen på det återstående blir så stor att även detta löper risk att brista. Mot bakgrund av sjöolyckorna med Visby och Svea Star efterfrågade inspektionen slutligen ett antal av de olika belastningsantaganden som klassificeringssällskapet lagt till grund för dess krav på dimensionering av skalkningsanordningen, t.ex. hur vind och sjö beräknats belasta porten.

Lloyd's Register of Shipping svarade i maj 1974 och härav framgick det bl.a. att en intern utredning pågick, men att styrkekravet temporärt nästan tredubblats samt att nya låsanordningar snart skulle inmonteras. Vidare framgick att dimensioneringarna för Visby och Svea Star var i samma storleksordning som för andra färjor. Sällskapet ifrågasatte därför om inte dessa fartygs kraftigt fallande stävar med stort flare inverkat ofördelaktigt.

Den 17 juli 1974 hölls sjöförklaring vid Stockholms tingsrätt. I sin utredningsrapport från november 1974, där inspektionen slog fast att haveriorsaken var de klent dimensionerade låsanordningarna till stävporten, anmärktes dels att klassificeringssällskapen uppmärksammats på behovet av kraftigare dimensionerade låsanordningar, dels att inspektionen i det fortsatta säkerhetsarbetet borde genomföra en översyn av klassificeringssällskapens regler för stävportar etc.

Den 17 december 1974 upprättades en gemensam promemoria för händelserna med Visby, Stena Sailer (se nedan) och Svea Star. I denna sägs bl.a. följande.

"Med anledning av att under hösten/våren 1973/74 haveri under resa uppstått på förliga stävportar å ett antal svenska passagerarfartyg, varvid bl.a. skalkningsanordningarna brustit och stävportarna till ovannämnda fartyg slagits upp, har säkerhetssektionen funnit starka skäl att ifrågasätta om de normer som tillämpas för sådan utrustning - särskilt beträffande skalkningsanordningarna - från sjösäkerhetssynpunkt är betryggande.

Anmärkas kan att utöver rubricerade haverier har även andra fall av sådana haverier kommit till sjöfartsverkets kännedom.

Säkerhetssektionen finner ifrågavarande haverier av sådan art att även principerna för certifiering för fartområde aktualiseras och kan föranleda omprövning av redan utfärdade certifikat, särskilt för fartyg med fartcertifikat gällande nordsjöfart och oceanfart."

Ärendet avsågs att avhandlas på ett överinspektörsmöte och utöver upprättade rapporter och förekommande korrespondens bifogades till promemorian en sammanställning med synpunkter på säkerheten hos vissa fartyg av ro-ro-typ. Vid mötet avsågs även att avhandlas om inte reglerna inom IMCO (dåvarande benämning för IMO) för portar borde ses över. Vidare borde utrönas om ansvaret för kontroll och tillsyn av skalknings- och låsningsanordningar etc. var tillfredställande reglerat mellan inspektionen och klassificeringssällskapen.

I den ovan nämnda, till promemorian fogade, sammanställningen om vissa ro-ro-fartyg kan bl.a. utläsas följande. "Portens täthetsprovning sker på ett föga realistiskt sätt medelst vattenpåsprutning av obelastad port. Betydande krafter torde påverka bogporten vid gång i svår sjö. Dessa krafter synes ej ha uppskattats eller beräknats."

Ärendet Visby avslutades, såvitt framgår av akten, den 20 mars 1975 med följande tjänsteanteckning "Föredragning i detta ärende har ägt rum vid överinspektörsmöte 750318 i Stockholm. Vissa beslut fattades då. Beträffande detta och andra åtgärder se ´Svea Star´ 33.21-2512/74 och ´Stena Sailer´ 3321-452/74".

8.3 Stena Sailer

8.3.1 Händelseförlopp

Torrlastfartyget Stena Sailer byggdes 1973 och hade en bruttodräktighet på 2 572 registerton. På resa mellan Zeebrügge och Dover, den 16 januari 1974, med last av trailers och långtradare kom fartyget in i hårt väder med växande motsjö. Farten reducerades men den kraftiga sjön slog sönder låsanordningarna till den förliga stävporten och lyfte denna ur stängt läge. Utrymmet mellan stävporten och bogrampen vattenfylldes. Rampen säkrades därför med sex kättingar. För undvikande av ytterligare skador vändes fartyget på kontrakurs och söktes nödhamn i Rotterdam där även provisorisk reparation utfördes.

8.3.2 Skador

Stävportens låsmekanism och lyftarmar hade skadats och dessutom hade babords hydraulmanöver av rampen blivit obrukbar genom att manöverstångens fäste brustit.

8.3.3 Orsak

I utredningsrapporten av den 12 december 1974 angavs haveriorsaken vara för klent konstruerade stängningsdon till ramp och stävport.

8.3.4 Ärendets gång inom inspektionen

Efter att ha tagit del av "§ 70-rapporten", som inkom den 24 januari 1974, konstaterade inspektionen att detta var fråga om en sådan skada som enligt reglerna bort föranleda en omedelbar rapport. Inspektionen påyrkade vidare att sjöförklaring skulle hållas.

Sjöförklaring hölls den 13 februari 1974 ombord på Stena Sailer i Zeebrügge.

Den 2 maj 1974 inkom en rapport från Göteborgs sjöfartsinspektionsområde från ett möte angående undersökningar av låsanordningar till bogport. Av denna rapport framgick att Stena Sailers bogport gått upp under en tidigare resa. Vidare framgick att Stena Sailers systerfartyg, Union Wellington under Nya Zeeländsk flagg, trots extra förstärkningar fått bogporten uppslagen i hårt väder. Ett annat systerfartyg, Sea Trader, hade gått över Atlanten i dåligt väder men på det fartyget var bogporten igensvetsad. I rapporten står även att läsa följande.

"Under mötet framkom att man vet väldigt lite om vilka krafter som påverkar en bogport. Genom de försök som gjorts av G.L. (Germanischer Lloyd utredarens anmärkning) har man dock fått en liten uppfattning om detta. Det framkom att så gott som samtliga låsanordningar på existerande fartyg med bogportar, är för klent dimensionerade.

Att det trots detta gått så bra som det gjort hittills beror på att de fartyg som har bogportar mestadels används i inskränktare farvatten, där de normalt inte möter så hårt väder.

Jag föreslår att Sjöfartsverket utreder hur låsanordningar på bogportar bör vara placerade, konstruerade och dimensionerade och att det därefter sker en kontroll av existerande fartygs låsanordningar.

Detta kommer troligen inte att göras av klassanstalterna, då ju dessa redan godkänt existerande låsanordningar."

Den 8 maj 1974 tillskrev inspektionen Bureau Veritas, där Stena Sailer hade klass, och tillställde sällskapet samma promemoria och frågor som tidigare översänts till Lloyd's Register of Shipping, med anledning av Visby och Svea Star. Bureau Veritas bereddes tillfälle att besvara frågorna i promemorian och inkomma med synpunkter på det ifrågavarande haveriet. Vidare efterfrågades vilka åtgärder från sjösäkerhetssynpunkt som Bureau Veritas avsåg att företa med anledning av de inträffade bogportshaverierna.

Bureau Veritas svarade i slutet av juli 1974 och av det svaret framgick bl.a. att sällskapet avsåg att skärpa sina krav på bogportarnas låsanordningar.

Den vid ärendet angående Visby omnämnda sammanfattande promemorian av den 17 december 1974 omfattade även Stena Sailer.

Den sista anteckningen är från den 25 juni 1975 och av den följer att en memorial upprättats och delgivits "berörda parter". Vidare uppdrogs åt en tjänsteman att vidareutveckla och hänvända säkerhetsproblemet med stävportar till IMCO för att få upp det på dagordningen.

8.4 Svea Star

8.4.1 Händelseförlopp

Svea Star, ett passagerarfartyg byggt 1968 med en bruttodräktighet på 9 963 registerton, var registrerat hos Lloyd's Register of Shipping. På färd mellan Travemünde och Helsingborg, den 5 maj 1974, mötte fartyget hårt väder och växande sjö. En mycket grov sjö träffade fartyget, varvid förliga låsanordningar och extra skalkningar slets loss och stävporten lyftes upp av sjön. Mellan förporten och klaffen samlades vatten. Fartyget återvände till Travemünde där skadorna kunde inspekteras.

8.4.2 Skador

Samtliga tre hydrauliska skalkningsanordningars styrningar var helt demolerade och även den extra skalkningen med två stycken två tums vantskruvar var sönderslitna. Inga skador kunde upptäckas på själva porten eller klaffen. Låsningsanordningen lagades provisoriskt och besiktigades två dagar senare i Helsingborg av både klassificeringssällskapet och inspektionen.

8.4.3 Orsak

I utredningsrapporten från den 12 december 1974 anges att uppfattningen hos befälhavaren, klassificeringssällskapet och inspektionen var att haveriet berodde på för klen konstruktion av bogportens skalkningsanordningar.

8.4.4 Ärendets gång inom inspektionen

Inspektionen fick, såvitt framgår av akten, kännedom om olyckan genom ett pressklipp och infordrade därefter "§ 70-rapport". Rapporten inkom den 14 maj 1974.

Lloyd's Register of Shipping tillskrevs med en förfrågan om dess dimensioneringsfilosofi på samma sätt som tidigare skett vid olyckan med Visby. Den 28 maj 1974 svarade sällskapet på sätt som närmare angetts i ärendet om Visby; kraven avsågs att skärpas och stävens utformning med flare ansågs ha haft en bidragande orsak.

Den vid ärendet angående Visby omnämnda sammanfattande promemorian av den 17 december 1974 avsåg även Svea Star.

I en den 3 april 1975 inkommen skrift översände Lloyd's Register of Shipping sitt regelförslag beträffande dimensioneringen av bogportar, vilket innebar en tredubbling av styrkekravet på låsanordningarna. Sällskapet anförde vidare att, såvitt det var bekant för sällskapet, detta var de första officiella reglerna för dimensionering av bogportars låsanordningar. (Hur kan man "tredubbla" något som inte varit känt?)

Ärendet Svea Star avslutades med en tjänsteanteckning från den 9 april 1975. Av denna anteckning framgår att ärendet bl.a. föredragits vid ett överinspektörssammanträde den 18 mars 1975, varvid bl.a. beslöts att en tjänsteman skulle följa upp ärendets handläggning (jfr. ärendet med Visby). Vidare konstaterades att vederbörande klassificeringssällskap den 4 april 1975 tillställt verket sina nya regler rörande dimensioneringen av bogportar, varför ärendet inte föranledde någon vidare åtgärd från inspektionens sida.

8.5 Saga Star

8.5.1 Händelseförlopp

Last- och passagerarfartyget Saga Star med en bruttodräktighet på 8 226 registerton var byggd 1981. Den 16 maj 1982 skulle fartyget avgå från Travemünde till Helsingborg. Vädret var stilla. När bogvisiret skulle stängas brast gångjärnet på babordsida, varvid visirets babordsida föll fyra meter. Hydraulledningarna brast och olja läckte ut. Strax därefter brast styrbords gångjärn och hela visiret föll ner. Efter besiktning av Lloyd's Register of Shipping fick fartyget tillåtelse att gå till Helsingborg - via Malmö - utan bogvisiret.

8.5.2 Skador

Skador på visiret och dess infästningar i skrovet samt plåtskador i skrovet mellan ramp och visir.

8.5.3 Orsak

I utredningsrapporten har angivits att haveriet sannolikt berodde på att visirets gångjärn var underdimensionerade.

8.5.4 Ärendets gång inom inspektionen

Saga Star fick, efter besiktning och beslut av överinspektören i Malmö sjöfartsinspektiondistrikt den 17 maj 1982, tillstånd att segla utan bogvisiret intill utgången av maj månad, under förutsättning att vädret var gott, att resorna gjordes med reducerad fart, att vederbörlig hänsyn togs till övriga faktorer som kunde påverka fartygets sjövärdighet samt att journalutdrag inskickades till Sjöfartsinspektionen efter varje resa.

Vidare bestämdes att fullständiga ritningar, jämte beräkningsunderlag för "bogport", gångjärn och hydraulikarrangemang omedelbart skulle insändas till Sjöfartsinspektionen. Lloyd's Register of Shipping meddelade, efter besiktning den 17 maj 1982, ett interimistiskt klasscertifikat i enlighet med inspektionens beslut.

Ett nytt bogvisir besiktigades och godkändes den 14 juni 1982.

Klassificeringssällskapet kom in med det begärda beräkningsunderlaget och dåvarande säkerhetssektionen upprättade en egen mycket omfattande promemoria med beräkningsblad. Promemorian är daterad den 14 juli 1982 och avsågs att bilda underlag för diskussion vid ett säkerhetsmöte. I promemorian föreslås att verket skall fastställa hur olika krafter skall beräknas. I promemorian hänvisas även till de olyckor som omnämnts ovan och att dessa lett till ändringar i klassificeringssällskapens regler. Det påstods vidare att de av klassen ingivna beräkningarna indikerade otillräcklig ingenjörsinsats på beräknings- och konstruktionssidan och det sades vidare att klassen inte utövade tillräcklig kontroll i detta avseende. Som exempel nämndes att bogportarna på såväl Visby som ett fartyg med namnet Wasa Star fått förstärkas i efterhand. Promemorieförfattaren ville ha in ytterligare beräkningsmaterial från klass och varv och föreslog att verket skulle vidtaga åtgärder för att förebygga vidare haveri av förevarande slag.

Handläggningen, såvitt framgår av akten, avslutades med att dåvarande tjf sjösäkerhetsdirektören den 21 september 1982 tillskrev Lloyd's Register of Shipping bl.a. med kritik mot sällskapets beräkningar och tillsyn. Brevet avslutas enligt följande. " Verket hemställer att Ni snarast prövar de anmärkningar, som angivits beträffande det nu aktuella utförandet och anger de förstärkningar Ni finner anledning till. Med hänsyn till att skalkningsanordningarna till visirportar brutits upp i dåligt väder på ett antal fartyg önskar verket dessutom att Ni redogör för dimensioneringen av skalkningsanordningarna på detta fartyg."

8.6 Stena Jutlandica

8.6.1 Händelseförlopp

Passagerarfärjan Stena Jutlandica byggdes 1983 och hade en bruttodräktighet på 15 811 registerton. Den 12 oktober 1984 låg Stena Jutlandica vid kaj i Fredrikshamn. Vid öppnandet av bogporten brast gångjärnsfästet till babords bogport och bogporten föll ner ca två meter. Sedan porten lyfts på plats svetsades den fast. En permanent reparation utfördes vid ett senare tillfälle.

8.6.2 Skador

Vid inspektion av bogporten fann man sprickor i svetsarna till infästningen av gångjärnen. Infästningsplåten var också delvis uppfläkt.

8.6.3 Orsak

Den i utredningsrapporten angivna orsaken till att bogporten föll ner var att svetsningen till infästningen av gångjärnen var undermålig med sprickbildning som följd.

8.6.4 Ärendets gång inom inspektionen

I en den 15 oktober 1984 dagtecknad skrift rapporterade rederiet om Stena Jutlandicas haveri till Göteborgs sjöfartsinspektionsdistrikt, som i sin tur överlämnade rapporten till säkerhetssktionen (nuvarande utredningssektionen). Av rederiets rapport framgick vidare dels att reparationsarbetet kontinuerligt följdes upp av Det Norske Veritas, dels att förstärkningsarbeten på de övre gångjärnen även utfördes på ett systerfartyg, Stena Danica.

Efter utförd reparation besiktigades bogporten av Det Norske Veritas den 30 oktober 1984. Enligt sällskapets "Survey Report" var resultatet tillfredställande.

Den 11 februari 1985 inspekterade Göteborgs sjöfartsinspektionsområde bogporten, varvid den befanns fungera utan anmärkning.

Den 27 februari 1985 avslutades ärendet med den noteringen att förstärkningsarbeten på gångjärnen till Stena Jutlandicas - och även Stena Danicas - bogportar utförts och kontrollerats utan anmärkning.

5/6

8.7 Zenobia

8.7.1 Händelseförlopp

Ro-ro-fartyget Zenobia byggdes 1979 och hade en bruttodräktighet på ca 8 920 registerton. Fartyget var klassat hos Det Norske Veritas. Efter ett haveri till sjöss den 2 juni 1980, en svår krängning som ledde till slagsida, förliste fartyget på redden utanför Larnaca, Cypern, den 7 juni 1980. Den 12 juni 1980 tillsatte regeringen en särskild undersökningskommission för att utreda händelsen och dess orsaker. Kommissionen avgav sin utredningsrapport i juli 1981. Händelseförloppet och orsaken till olyckan är komplicerade. Den följande redogörelsen gör inte anspråk på att utgöra annat än ett koncentrat av utredningen.

8.7.2 Haverikommissionen

Kommissionen konstaterade att Zenobias krängning den 2 juni 1980 orsakades av att fartyget inte haft tillräcklig stabilitet varigenom fartyget under hastig gir krängt och lastförskjutning skett. Bidragande orsaker ansågs vara att rederiet dels inte i tillräcklig grad informerat ansvarigt befäl om de små säkerhetsmarginaler som förelåg vid lastning och barlastning, dels genom direktiv till befälhavaren angående fartygets ekonomiska drift kommit att motverka fartygets säkra framförande ur stabilitetssynpunkt. Vidare ansågs ett tidigare haveri med Zenobia, den 14 februari 1980, ej tillfredställande utrett, till följd varav åtgärder för att förhindra ett upprepande inte vidtagits.

Beträffande förlisningen den 7 juni 1980 konstaterade kommissionen att denna orsakats av att babords lotsport hållits öppen sedan fartygets vingtankar motfyllts med vatten för att få det på rätt köl. Även i detta fall ansågs det föreligga vissa bidragande orsaker. Som en sådan orsak angavs att barlastfyllningen ej påbörjats i dubbelbottentankarna och under kontinuerlig stabilitetskontroll samt att man vid motfyllning av vingtankarna på styrbords sida inte beaktat att förbindelseventilens tillförlitlighet skull komma att sättas på prov.

8.7.3 Kommissionens rekommendationer

Kommissionen konstaterade att ro-ro-fartygen erfarenhetsmässigt är behäftade med vissa svagheter och att de kräver omsorgsfull hantering, bl.a. eftersom säkerhetsmarginalerna ofta inte är desamma som för de tidigare styckegodsfartygen. Utbildningfrågorna ansågs som speciellt viktiga. Kommissionen betonade risken för uppkomst av fria vätskeytor på ro-ro-fartygens stora lastdäck med påföljande risker för försämrad stabilitet. Kommissionen ansåg att ro-ro-fartygens ogynnsamma internationella haveristatistik tillsammans med vissa inträffade lastskador på bl.a. Nordsjön visade att åtgärder måste vidtas för att höja säkerheten vid transporter med ro-ro-fartyg. Kommissionen fann med ledning av 1981 års statistik att det under de dåvarande tre senaste åren inträffat 91 haverier med 38 totalförluster avseende ro-ro-fartyg.

Kommissionen rekommenderade följande:

En säkerhetskommitté för ro-ro-fartyg med representanter för Sjöfartsverket, redare, varv, klassificeringsanstalter, assuradörer och ombordanställda borde snarast tillskapas för att pröva möjligheterna att

a. förbättra ro-ro-fartygens konstruktion, byggnad och utrustning
b. förbättra utbildningen och träningen av ro-ro-fartygens besättningar såvitt avsåg lasthantering, stabilitet och säkerhetsfrågor i övrigt
c. intensifiera forskning och utveckling såvitt avsåg säkring av såväl fordon som last på fordonen m.m.

Resultatet av arbetet ansågs på lämpligt sätt böra spridas till intressenterna och läggas till grund för svenska förslag till IMCO:s sjösäkerhetskommitté. Kommissionen såg en förebild till den föreslagna säkerhetskommittén i en av Sjöfartsverket administrerad tankoperativ kommitté, vilken tillkommit i anledning av tankexplosioner i stora tankfartyg i slutet av 1969 och början av 1970.

8.7.4 Ärendets handläggning vid inspektionen

Sedan IMCO hos regeringen framfört önskemål om att få ta del av haverikommissionens rapport och denna hemställan vidarebefordrats till Sjöfartsverket anförde dåvarande tjf sjösäkerhetsdirektören, i en den 3 december 1981 dagtecknad till Kommunikationdepartementet ställd skrivelse, bl.a. att Sjöfartsverket ansåg att haverikommissionens rapport borde förses med vissa tillägg och synpunkter innan den lades till grund för några åtgärder. Till skrivelsen bifogades en nedkortad redogörelse av rapporten med sådana tillägg och synpunkter som nämnts.

Den 22 september 1983 hölls ett möte inom Sjöfartsinspektionen som avsåg bl.a. en avstämning av åtgärder vidtagna med anledning av haverikommissionens rekommendationer i anledning av haveriet med Zenobia. I protokollet antecknades att frågan om säkerheten hos ro-ro-fartyg numera fått en bred uppmärksamhet. Klassificeringssällskapen sades överväga denna fråga som ett led i sitt regelutvecklingsarbete, varvid som exempel återgavs en projektbeskrivning från Det Norske Veritas. I fråga om arbeten med direkt anknytning till Sverige anfördes ett pågående projekt benämnt TFD-projektet, som avsåg flytbarhet, läckstabilitet och säkerhetskriterier för General Cargo-fartyg. Projektets målsättning angavs vara att utforma riktlinjer för bedömning av rimliga säkerhetsåtgärder tillämpliga för alla torrlastfartyg.

Genomförandet beskrevs i fem punkter.

1. Inventering av nu tillämpade säkerhetskriterier eller föreskrifter.
2. Studie i avsikt att klarlägga olika parametrars relevans för fartygs överlevnad.
3. Statistisk bedömning av överlevnadssäkerhet med utgångspunkt från inverkan av omgivningsparametrar.
4. Vidarebearbetning av existerande statistiskt material i avsikt att klarlägga konstruktionsmässiga orsaker till förlisningar.
5. Sammanställning av riktlinjer för teknisk handläggning av bedömning av fartygs konstruktiva utformning med avseende på överlevnadskriterier för flytbarhet och stabilitetsegenskaper.

I fråga om utbildning ansåg verket att den rådande sjöbefälsutbildningen väl täckte behoven rörande lasthantering m.m. på ro-ro-fartyg. För tidigare utbildad personal sades det finnas fortbildningskurser i ro-ro-hantering. Det antecknades att dessa kurser skulle ges så länge det fanns ett elevunderlag.

Beträffande säkring av lastfordon i fartyg hänvisades till en i TFD-projektet framtagen forskningsrapport. "Safe stowage and securing of cargo onboard ships". Projektet angavs vara under uppföljning med utarbetande av matematiska modeller för beräkning av påkänningar på trailersurrningar i fartyg. Vidare anfördes att det pågick ett projektarbete med framtagande av trailers som är bättre anpassade för sjötransport. Det hänvisades även till ett projekt för utarbetande av anvisningar för lastsäkring vid transport med påhängsvagn.

Det anfördes vidare att Sjöfartverket deltog i referensgrupperna till alla nu omnämnda projekt och därjämte bedrev ett målmedvetet arbete inom IMO syftande till en förbättrad internationell standard på detta område. I denna del hänvisades till IMO-resolution A.489 (VII) "Safe stowage and securing of Cargo Units and other Entities in Ships other than cellular Container Ships", vilken uppgavs bygga på ett svenskt förslag.

Protokollet avslutas med konstaterande att verket med anledning av vad som ovan antecknats ansåg haverikommissionens rapport om Zenobia vara slutbehandlad.

8.8 Vissa andra fartygsolyckor

Den 6 mars 1987 avgick den engelska ro-ro-färjan Herald of Free Enterprise från Zeebrügge. När fartyget passerade den yttre vågbrytaren var både den inre och yttre bogporten öppna. Efter det att fartyget girat kom det snabbt in vatten på fordonsdäck. Den fria vätskeytan påverkade fartygets stabilitet så att fartyget kantrade. Fartyget blev liggande med ena sidan av skrovet ovanför vattenytan.

Vid olyckan omkom 150 passagerare och 38 besättningsmän.

Den avgörande orsaken till olyckan var att hänföra till den mänskliga faktorn.

Olyckan med Herald of Free Enterprise föranledde Sjöfartsinspektionen att omedelbart göra en genomgång av alla svenskflaggade färjor utifrån stabilitetshänseende. Vidare tillskrevs rederierna, varvid bl.a. efterfrågades deras rutiner för manövrering och kontroll av bog- och akterportar.

Under utredningsuppdraget har även erhållits uppgifter om tidigare inträffade bogportsskador på finska passagerarfärjor. Sålunda har upplysts att det finska fartyget Finlandia år 1981 fick en skada på bogen som även föranledde en ombyggnad av systerfartyget Silvia Regina sedermera Stena Saga. Vidare har det uppgivits att att det finska fartyget Mariella 1986 erhöll skador på bogporten. Även vid detta tillfälle var skadornas art sådan att en ombyggnad gjordes på ett ännu inte färdigbyggt systerfartyg, Olympia. Om denna händelse har det upplysts att felet bestod i att stävkonstruktionen hade ett allt för stort flare, vilket medfört mycket svåra påfrestningar på bogen.

Som en följd av katastrofen med M/S Estonia genomfördes under hösten 1994 bl.a. vid Göteborgs sjöfartsinspektionsområde en riktad inspektion avseende passagerarfärjors bogvisir. Av tolv undersökta fartyg inom Göteborgsområdet uppvisade elva brister. Allt från sprickbildningar i låsanordningarna till brister i manövereringssystemen kunde iakttagas. Ett fartyg, Lion Prince, fick nyttjandeförbud medan vissa andra fartyg fick restriktioner för hårt väder. Senare har rederierna och klassificeringssällskapen avkrävts att inkomma med en fullständig dokumentation avseende fartygens bogkonstruktioner samt program för den operativa kontrollen.

Slutligen bör i detta sammanhang följande antecknas. I massmedia har förekommit uppgifter om att M/S Estonias systerfartyg Diana II skulle ha varit nära att förlora bogvisiret på färd mellan Trelleborg och Rostock samma stormnatt, i januari 1993, som den polska färjan Jan Heweliusz förliste. Någon s.k. § 70-rapport, i enlighet med gällande

Vilket alltså innebär att Diana II – med samma utr. som Estonia – var ute i område > 20 Nm från land.

regler, har dock inte ingivits till inspektionens utredningssektion. Inte heller har denna händelse på annat sätt, såvitt framkommit, bringats till centralmyndighetens kännedom förrän efter M/S Estonias förlisning. Inspektionen har sedermera överlämnat frågan om befälhavarens agerande till åtalsprövning. Åklagaren har dock beslutat att inte väcka åtal.

8.9 Utredarens bedömning

De förtjänar ånyo att understrykas att de här ovan lämnade redovisningarna av inträffade haverier inte är resultatet av en fullständig eller systematisk genomgång av arkiven hos Sjöfartsinspektionen. Med hänsyn till det system för uppläggning av akter och arkiv som används, har detta inte varit möjligt och det har för övrigt inte heller bedömts erforderligt för uppdragets genomförande. Med återgivandet av ovan redovisade fall görs därför inte anspråk på att därmed visas den fullständiga bilden av vilka olyckor angående bogvisir och dylikt som kan finnas rapporterade till Sjöfartsinspektionen. Det här presenterade materialet är snarare att se som en uppföljning av vad enskilda befattningshavare vid samtal med utredaren dragit sig till minnes.

Den lämnade redovisningen ger emellertid vid handen att ett helt fartygsbaserat olycksfallsregister inte är tjänligt som utgångspunkt för orsaksinriktade retrospektiva undersökningar. Det synes inte heller tjänligt som bas för ett fortlöpande framåtriktat analysarbete i vilket nya händelser prövas mot tidigare inträffade incidenter eller olyckor.

I sakligt hänseende synes av de redovisade fallen dock kunna utläsas att ro-ro-fartygens s.k. koncept rymmer många svaga punkter, inte minst fäst- och låsanordningar för bogportar och bogvisir, och att detta uppmärksammats redan i början av 1970-talet i olika sammanhang. Ansatser till mera generella analyser kan återfinnas i akterna. Däremot framgår inte av akterna, eller av vad utredaren i övrigt kunnat inhämta, att de rapporterade händelserna föranlett en mera systematiskt bedriven granskning av ro-ro-fartygen, exempelvis i form av order till de regionala organen om riktade inspektioner. Det skall dock påpekas att inspektionen centralt i omedelbar anslutning till olyckan med Herald of Free Enterprise genomförde en genomgång av svenskflaggade passagerarfärjor utifrån stabilitetshänseende samt att dåvarande Stockholms sjöfartsdistrikt genom hänvändelse till några av de större färjerederierna inom distriktet underrättade sig om rutiner vid bl.a. barlastning och trimmning samt öppning och stängning av portar ävensom säkring av sådana. Inte heller har utredaren kunnat finna att beslutade åtgärder i form av hänvändelser till berörda klassificeringssällskap eller till IMO följts upp systematiskt. Allmänt sett präglas hanteringen av en s.a.s. in casu-inriktad tillsynsverksamhet.

Vad som nu sagts om bristande systematisk uppföljning kan också sägas i viss mån gälla behandlingen av den till regeringen, Kommunikationsdepartementet, år 1981 avlämnade rapporten i anledning av ro-ro-fartyget Zenobias förlisning. I denna togs frågan om ro-ro-fartygens tillförlitlighet i sjösäkerhetshänseende upp i hela sin vidd och efterlystes ett stort antal vidare överväganden samt generella och framåtsyftande åtgärder. För det berörda departementets del synes ärendet avslutats genom ett beslut om ad acta-läggning den 17 oktober 1983. Hos Sjöfartsinspektionen synes rapporten inte ha föranlett någon systematisk genomgång av - och sammankoppling med - tidigare till inspektionen rapporterade händelser.

9 Sammanfattning

Det svenska sjösäkerhetsarbetet och sjösäkerheten inom den del av sjöfarten som står under svenska myndigheters tillsyn får i allt väsentligt sägas hålla en mycket hög kvalitet. Detta torde i än högre grad gälla sett ur ett internationellt perspektiv.

Detta förhållande motsäger dock inte att den nuvarande verksamheten, som utredaren ser det, är behäftad med vissa brister i olika hänseenden. Detta gäller såväl för de regionala och centrala verksamheterna i sig som för samarbetet dem emellan.

Såsom utredaren ser det gäller bristerna främst ledning och styrning av den praktiska tillsynsverksamheten vid områdena och kontoret, inhämtande och vidarebefordran av information av intresse för sjösäkerheten samt, centralt - utöver styrningsfunktionen - bearbetning och analys av tillgängligt material eller sådant material som bör göras tillgängligt samt uppföljning av beslutade åtgärder.

I den regionala verksamheten förekommer det bl.a. omotiverade skillnader mellan områdena - och enskilda inspektörer - i fråga om omfattning och innehåll i deras myndighetsutövning. Detta kan antas bero på att det brister i ledning och styrning av den praktiska tillsynsverksamheten ute på områdena och kontoret. Därför förordas i denna del bestämda anvisningar genom exempelvis checklistor för den direkta kontrollen och regler för hur protokoll eller motsvarande dokumentation av tillsynsförrättningar skall utformas.

Områdenas kontrollverksamhet redovisas inte systematiskt till centralmyndigheten och där sker fortlöpande inte någon uppföljning eller utvärdering av områdenas kontrollverksamhet. Centralmyndigheten saknar sålunda en samlad bild av vad som framkommit vid kontrollarbetet, vilket försvårar möjligheterna att uppnå ett effektivt resursutnyttjande och att styra kontrollverksamheten till de områden där den kan förväntas få störst resultat. En fortlöpande utvärdering av det arbete som utförs "på fältet" bör komma till stånd.

Sådana påpekanden vid olika förrättningar ute på områdena som åtgärdas innan fartyget avlöper dokumenteras inte. Även ur detta material borde kunna utvinnas viktig information. Former bör därför tillskapas för att viktiga iakttagelser vid förrättningar och vid uppföljning av nybyggen tas tillvara och vidareförs till den centrala myndigheten.

För att främja inrapportering av händelser som kan vara av intresse ur sjösäkerhetssynpunkt förordar utredaren att inspektionen överväger att ta upp en diskussion med vissa organisationer om olika åtgärder i syfte att stimulera deras medlemmar att lämna sådan information.

Till ledning för verksamheten på områdena kan också behövas centralt utfärdade tillämpningsföreskrifter och tolkningsbesked. Detta är något som områdena efterfrågar.

Utredaren föreslår vidare att riktade inspektioner eller andra slags temagranskningar används i större utsträckning.

För att skingra den osäkerhet som utredaren funnit råda vid områdena inför användandet av vitesföreläggande bör inspektionen överväga att utveckla en policy för i vilka situationer olika sanktioner normalt bör komma i fråga. Inspektionen bör också utforma tillämpningsanvisningar för handläggning av vitesfrågor.

Utredaren förordar även att alla brottmål som rör sjösäkerheten skall hänföras till sjörättsdomstolarna.

Vad gäller arbetet på utredningssektionen så utförs detta, så vitt utredaren kan bedöma, på ett i och för sig mycket förtjänstfullt sätt. Med hänsyn till det sätt på vilket ärendena tillförs sektionen och till strukturen på arbetsuppgifterna är det dock naturligt att utredningarna främst kommit att inriktas på de enskilda fallen och därtill anslutande analyser och rekommendationer. Utredningssektionens arbete sker sålunda mer in casu än efter en jämförande helhetssyn. Med andra ord tillvaratas inte resultatet av tidigare utredningar med automatik i efterföljande utredningar och vid bedömning av senare händelser. Detta är uppenbarligen en brist i systemet. Sättet för aktbildning och arkivering av genomförda utredningar kan antas bidra till den påtalade bristen. Med nuvarande i huvudsak fartygsbaserade system är det nämligen svårt att finna paralleller eller samband mellan olika händelser, om inte utredaren själv har kännedom om tidigare likartade händelser och om vilka fartyg de gällt. I sammanhanget kan också anmärkas att dossierna för de olika fartygen i vissa stycken är svåröverskådliga vad gäller redovisningen och kronologin av tillfört eller upprättat material, den löpande handläggningen och fattade beslut. Exempelvis används inte dagboksblad och handlingarna aktbilageras inte heller.

De i inspektionens egna tjänsteföreskrifter föreskrivna säkerhetssammanträdena för anmälan och genomgång av viktigare rapporter har efterhand upphört och utredningssektionen anser sig inte heller på annat sätt få någon återkoppling från ledningen till det arbete som sektionen utför. Enligt utredarens mening måste analys- och uppföljningsfunktionerna utvecklas och stärkas betydligt inom inspektionen. Med nuvarande system tillvaratas inte fullt ut de utredningsresultat och analyser som utredningssektionen presterar. Utredningssektionens begränsade resurser medger inte heller att den i nuvarande form skall utföra ett mera övergripande analysarbete och en fortlöpande eller heltäckande uppföljning av lämnade rekommendationer. Det kan för övrigt ifrågasättas om sådana uppgifter lämpligen bör ligga på utredningsektionen, även om den förstärktes. Enligt utredaren ter det sig mer naturligt att dessa - till ledning och styrning näraliggande - uppgifter läggs på ett till chefen knutet stabsorgan. Först därigenom torde man kunna få till stånd en sytematisk och övergripande bearbetning av allt det informationsmaterial som tillförs eller kan tillföras inspektionen vad gäller inträffade olyckor och incidenter eller som överhuvudtaget härrör från iakttagelser som inrapporteras. På ett sådant stabsorgan borde också ankomma att systematiskt och fortlöpande följa upp de beslut eller rekommendationer som tagits i anslutning till bl.a. utredningssektionens rapporter. Utredaren vill sålunda förorda att en organisation i enlighet med det nu anförda tas under övervägande. En sådan organisation måste givetvis förses med erforderligt ADB-stöd.

I allt fall så länge den nuvarande organisationen består vill utredaren förorda att de s.k. säkerhetssammanträdena återupptas och att det fortlöpande sker en återkoppling från ledningens sida gentemot utredningssektionen i vad avser dess arbete. Vidare bör rutinerna för hanteringen och redovisningen av upprättat eller tillkommande utredningmaterial förbättras, och även principerna för dokumentering av vidtagna åtgärder och fattade beslut bör ses över så att befintligt material och handläggningens gång redovisas klart och tydligt. En aktbildning som endast följer fartygen är inte tillfredställande. Närmare övervägande avseende aktbildningen kan lämpligen ske när FTS-systemet blir utbyggt i enlighet med nu föreliggande planer.

För verksamheten inom inspektionen, såväl centralt som regionalt, synes en utbyggnad och utveckling av FTS-sytemet överhuvudtaget synnerligen angelägna.

Vad gäller relationen till klassen, där den svenska myndigheten valt en egen linje i förhållande till i vart fall Danmark och Norge, framhåller utredaren vikten av en centralt bedriven analys och uppföljning av klassens verksamhet.

Vad avser informationsutbyte på nordisk nivå har utredaren funnit att det redan nu förekommer ett mycket nära informellt samarbete. Det synes också vara den allmänna uppfattningen hos företrädare för tillsynsmyndigheterna i Danmark, Norge och Finland att samarbetet fungerar utmärkt och att någon formalisering av informationsutbytet varken är behövlig eller lämplig. Utredaren finner därför inte skäl att föreslå att det nordiska informationsutbytet binds upp genom formella överenskommelser. Det bör sålunda alltjämt ankomma på vederbörande myndigheter att närmare bestämma inriktningen och omfattningen av informationsutbytet.

Vad i rapporten redovisats beträffande händelser med vissa ro-ro-fartyg visar enligt utredaren, som inte haft att gå in på renodlade säkerhetsfrågor, att analys, utvärdering och uppföljning bör vara ett väsentligt inslag i Sjöfartsinspektionens verksamhet.

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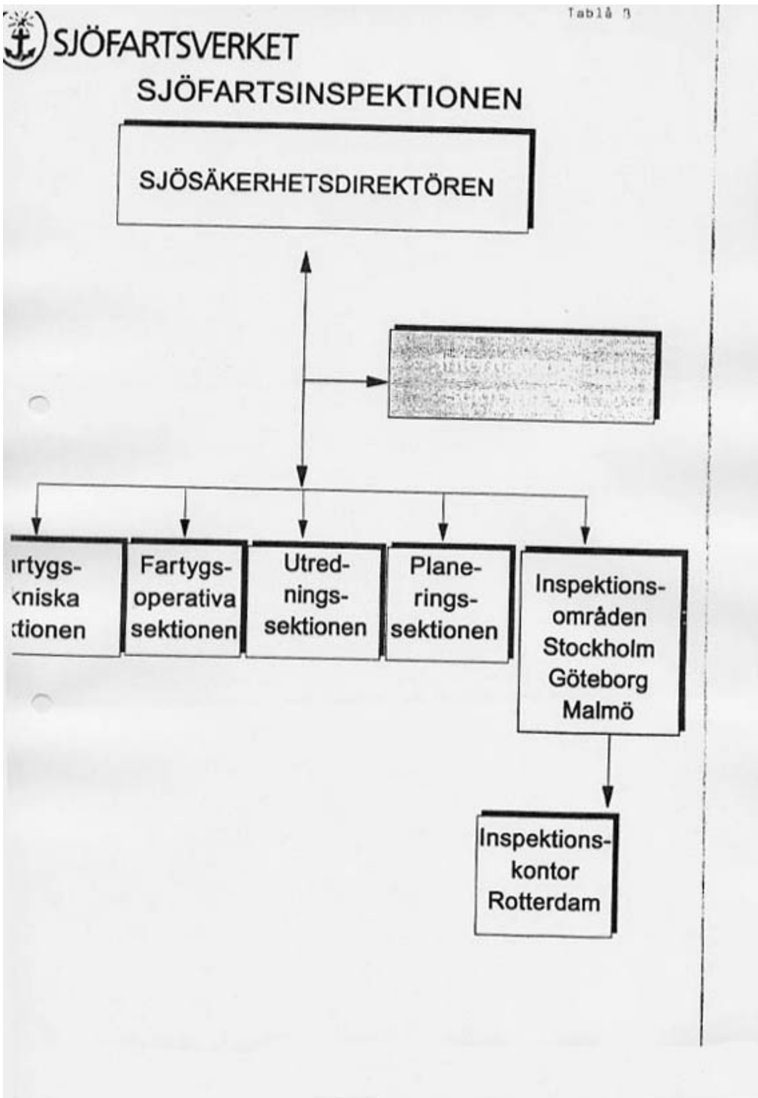
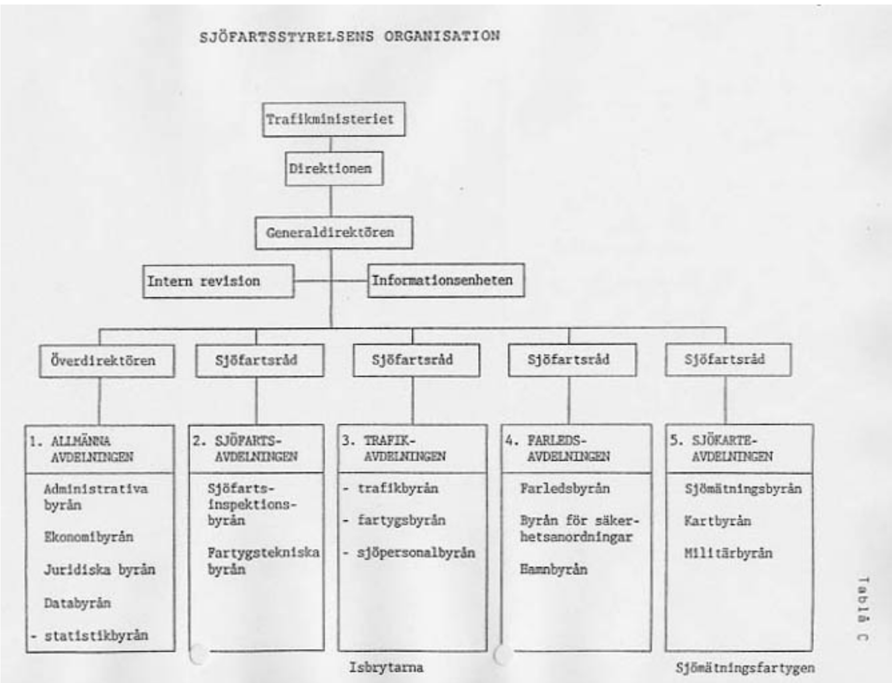
Innehållsförteckning



Tablå B
SJÖFARTSVERKET
SJÖFARTSINSPEKTIONEN
SJÖSÄKERHETSDIREKTÖREN
ırtygs-
ˊkniska
ˊtionen
Fartygs-
operativa
sektionen
Utred-
nings-
sektionen
Plane-
rings-
sektionen
Inspektions-
områden
Stockholm
Göteborg
Malmö
Inspektions-
kontor
Rotterdam

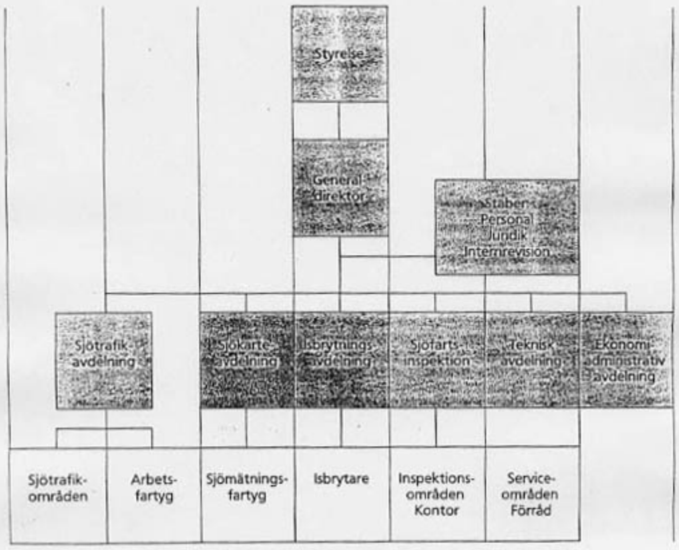


SJÖFARTSSTYRELSENS ORGANISATION
Trafikministeriet
Direktionen
Generaldirektören
Intern revision
Informationsenheten
Överdirektören
Sjöfartsråd
Sjöfartsråd
Sjöfartsråd
Sjöfartsråd
1. ALLMÄNNA AVDELNINGEN
Administrativa byrån
Ekonomibyrån
Juridiska byrån
Databyrån
- statistikbyrån
2. SJÖFARTS-AVDELNINGEN
Sjöfarts-inspektions-byrån
Fartygstekniska byrån
3. TRAFIK-AVDELNINGEN
- trafikbyrån
- fartygsbyrån
- sjöpersonalbyrån
Isbrytarna
4. FARLEDS-AVDELNINGEN
Farledsbyrån
Byrån för säker-hetsanordningar
Hamnbyrån
5. SJÖKARTE-AVDELNINGEN
Sjömätningsbyrån
Kartbyrån
Militärbyrån
Sjömätningsfartygen
Tablå C

Søfartsstyrelsens organisationsplan

Tablå A

Sjöfartsverkets organisation



SCHIFFBAU

SCHIFFSMASCHINENBAU
SCHIFFAHRTSTECHNIK

Die »Hansa« ist das Organ:
Germanischer Lloyd
Verband der Deutschen Schiffbauindustrie e.V.
Normenausschuß Schiffbau (HNA) im DIN

Auto-und Passagierfähre „…king Sally“

Erbaut von Jos. L. Meyer, Papenburg, für die Reederei AB Sally, Mariehamn

Am 29. Juni 1980 wurde von der Schiffswerft Jos. L. Meyer in Papenburg die Auto- und Passagierfähre „Viking Sally“, Bau-Nr. 590, an die Reederei AB Sally, Mariehamn, übergeben. Die Reederei hat dieses Schiff im Rahmen der Viking-Line im Verkehr zwischen Finnland und Schweden eingesetzt, wobei auch die Aaland-Inseln bedient werden. Die finnische Reederei AB Sally betreibt zusammen mit der …wedischen Reederei AB Slite und der finnischen Ree- … SF-Line die Viking-Line.

… Werft Jos. L. Meyer lieferte von 1970 bis 1974 bereits sechs Auto-/Passagierschiffe an die Viking-Line ab, von denen vier für die Reederei AB Sally bestimmt waren und zwei für die Reederei AB Slite. Für diese Reederei wurde im Juni 1979 auch die „Diana II“ abgeliefert.

Das durch die gute Zusammenarbeit entstandene Vertrauen war ausschlaggebend dafür, daß die Reederei am 11. September 1979 den Vertrag für das hochmoderne und technisch komplizierte Schiff unterzeichnete. Trotz scharfer und teilweise staatlich unterstützter Konkurrenz konnte die Werft wegen der kurzen Lieferzeit, wegen des von der Werft ausgearbeiteten interessanten Entwurfs und der hohen Flexibilität der Werft gegenüber den Wünschen der Reederei diesen Auftrag buchen.

Ein Dank ist auch an dieser Stelle an das Land Niedersachsen zu richten. Durch eine gewährte Landesbürgschaft konnte die Finanzierung dieses Projektes erst abgesichert werden.

Die Konstruktions- und Bauzeit von nur ca. neun Monaten war ein entscheidender Moment für die Reederei, dieses Schiff in Papenburg zu bestellen. Die Liefertreue war durch die sieben Vorbauten bewiesen worden, die auch bei ähnlich kurzen Lieferzeiten vertragsgemäß pünktlich abgeliefert wurden.

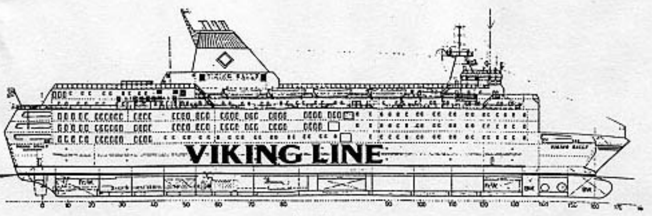
Welcher Arbeitsaufwand in einer solchen Großfähre steckt, beweisen folgende Fakten:

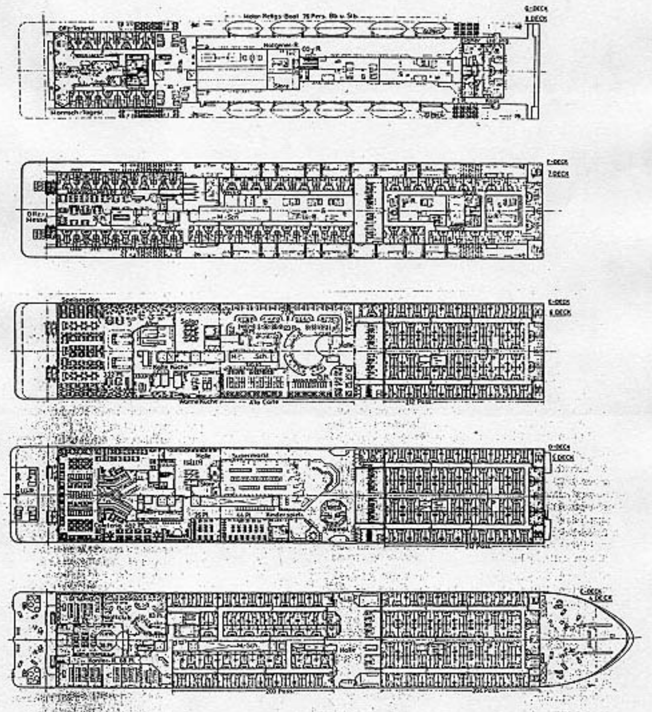
- Es wurden ca. 280 km Kabel eingebaut, d. h. 1,6 km Kabel pro Meter Schiff.
- Es wurden ca. 30 000 m^2 Flächen isoliert, soviel wie sechs Fußballfelder oder ein kleiner Bauernhof.
- Das Schiff faßt 460 Pkw, was einer 2,1 km langen Autoschlange entspricht.
- Es wurden 1300 Betten und über 1500 Türen eingebaut.
- Das Schiff ist 44,5 m hoch, mit seinen 11 Decks höher als manches Hochhaus oder mancher Kirchturm.
- Neben der Hauptmaschinenleistung von 17 600 kW wurden 4416 kW Generatorleistung eingebaut. Damit ist eine Stadt von rund 8000 Einwohnern leicht zu versorgen.

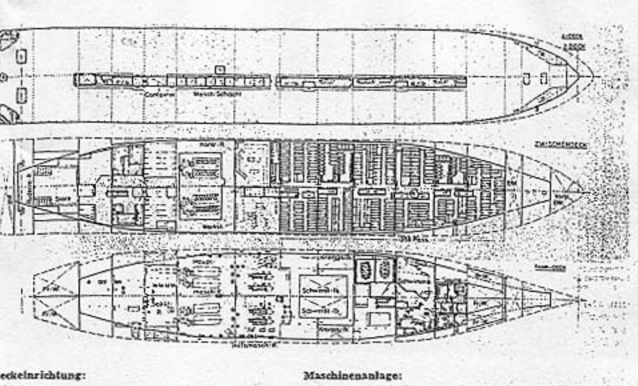
Zusammenfassend kann gesagt werden, dieses Schiff ist Hotel, Tiefgarage, Kraftwerk, Fortbewegungsmittel, Kanalisation, Kaufhaus und Vergnügungszentrum in einem.

Hauptabmessungen:

Länge über alles	155,40 m
Länge zwischen den Loten	137,40 m
Breite im Wagendeck	24,20 m
Breite in der Wasserlinie	23,60 m
Höhe bis Wagendeck	7,65 m
Tiefgang	5,55 m
Tragfähigkeit	2 800 t
Vermessung	15 500 BRT 8 380 NRT
Geschwindigkeit	21,20 kn
Maschinenleistung (4×6000 PS)	4×4 400 kW
Ladefähigkeit	52 Lkw à 18 m, oder 460 Pkw einschl. auf Hängedecks







Wagendeckeinrichtung:

Wagendeckbelastung	Achslast 18 t
Freie Höhe unter hochgezogenem Hängedeck	4,50 m
1 Bugvisier, 1 Bugrampe, 2 Heckrampen Hängedecks	

Passagiere und Besatzung:

Insgesamt	2000 Personen
in Doppel-Kabinen mit Naßzelle	704 Personen
in 4-Mann-Kabinen mit Naßzelle	124 Personen
in 2-Mann-Kabinen	126 Personen
in 4-Mann-Kabinen mit gemeinsamen Wasch- und WC-Räumen	232 Personen
	1186 Personen in Kabinen
Offiziere und Mannschaften	110 Personen

Öffentliche Räume:

Speisesalon	333 Sitzplätze
Cafeteria mit Grillraum	402 Sitzplätze
Tanzsalon	276 Sitzplätze
Konferenzräume, Nightclub	235 Sitzplätze
A-La-Carte-Raum	100 Sitzplätze
Lounge	30 Sitzplätze
Schlafsesselraum	70 Sitzplätze
Hallen und Arkaden	128 Sitzplätze
Swimming-Pool, Bar	40 Sitzplätze
Konferenzraum	27 Sitzplätze
Supermarkt, Saunas, Kinderspielraum.	

Maschinenanlage:

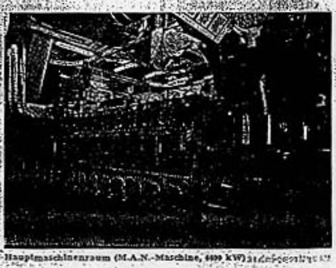
4 Hauptmotore M.A.N., Type 8 L 40/45, mit je 4400 kW (6000 PS) bei 600 U/min = total 24 000 PS
4 Diesel-Drehstrombordaggregate, Type B & W, mit je 1104 kW (1500 PS), Generatorleistung 1040 kW/1311 kVA
1 Notaggregat von 300 kW.

Nachfolgend wird das Schiff beschrieben, und zwar vom „Maschinenraum unten bis oben zum Schornstein".

Maschinenräume

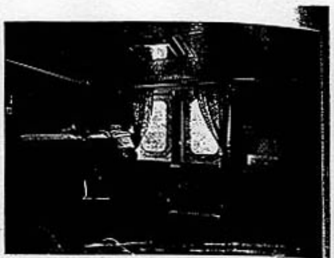
Die gesamte Maschinenanlage ist konzipiert für wachfreien Betrieb. Sie ist aufgeteilt in fünf Räume. Im Hauptmaschinenraum befinden sich vier M.A.N.-Motore der Type 8 L 40/45 mit je 4400 kW (6000 PS) bei 600 U/min. Je zwei Motore werden über ein Untersetzungsgetriebe der Firma Renk auf eine Wellenleitung zusammengefaßt, so daß max. 12 000 PS auf jeden der zwei Verstellpropeller abgegeben werden. Die Verstellpropelleranlage wurde von der Firma KaMeWa als scew-back-Propeller geliefert, um die Schwingungen vom Propeller zu minimieren, was mit Erfolg erreicht wurde. Die max. Geschwindigkeit des Schiffes liegt bei 21,2 Knoten. Im Hilfsmaschinenraum befinden sich vier Diesel-Drehstromaggregate mit je 1050 kW der Firma B & W. Die erzeugte Spannung beträgt 380/220 V bei 50 Hz. Die gesamte E-Anlage wurde von der Firma Siemens geliefert und von werfteigenen Monteuren installiert. Das Notstromaggregat, das von der Firma Rolf Jansen, Aurich, geliefert wurde, erzeugt 300 kW und ist auf

Maschinen-Kontrollraum mit Hauptfahrpult



Hauptmaschinenraum (M.A.N.-Maschine, 4400 kW)

Steuerbordseite Wagendeck, im Vordergrund Containerlift zu den Storeräumen



Luxus-4-Bett-Kabine

dem G-Deck angeordnet. Im Separatorenraum werden das Schweröl, Dieselöl und Schmieröl in acht Separatoren der Firma Alfa-Laval aufbereitet. Die Hauptmotore und die Hilfsdiesel sind für Schweröl von max. IF 180 konzipiert. Die Wärmeversorgung des Schiffes und die Beheizung der Schweröltanks erfolgen über eine Thermalölanlage. Das Thermalöl wird durch die Abgase der Hauptmotore in vier Abgaskesseln und in vier Abgaskesseln durch die Abgase der Hilfsdiesel und in zwei automatischen, ölgefeuerten Kesseln der Firma Sanea erhitzt. Die drei Hochdruckkompressoren für die Steuerluft wurden von der Firma Jos. L. Meyer selbst hergestellt. Die gesamten Abwässer des Schiffes werden in zwei biologisch arbeitenden Abwasseranlagen der Firma Format-Chemie aufbereitet. Die Vakuumtoiletten lieferte die Firma Evak. Die hohe Manövrierfähigkeit des Schiffes wird garantiert durch die zwei Halbschweberuder achtern und zwei Bugstrahlruder der Firma KaMeWa mit 1 × 10 und 1 × 12 t Schub im Vorschiff. Die Rudermaschinen wurden von der Firma Tenfjord geliefert.

Versorgung

Zur Belieferung der Proviantstoreräume im Zwischendeck wurde am hinteren Ende des Mittelschachtes auf dem Wagendeck ein großer Lift angeordnet, um Proviantcontainer zum Zwischendeck zu befördern. Zwei Versorgungslifte verbinden die Storeräume auf dem Zwischendeck mit der Küche auf dem E-Deck und dem Supermarkt auf dem D-Deck. Je ein Personenlift befindet sich im Mittschiffsbereich (Hallen) sowie vorne im Kabinenbereich. Zu den Storeräumen auf dem Zwischendeck gehören auch große Proviantkühlräume, damit ausreichend Getränke und Nahrungsmittel gelagert werden können.

Wagendeck

Das Hauptdeck kann 52 Lkw zu je 18 m Länge fassen. Statt Lkw können auch in zwei Lagen Pkw auf dem Wagendeck geladen werden, so daß die Gesamt-Pkw-Kapazität bei 460 Pkw liegt. Zwei Spuren sind aber ausschließlich für Lkw vorbehalten. Die Roll-on/Roll-off-Einrichtung besteht aus einer wasserdichten Bugklappe, einer Bugrampe und zwei wasserdichten Heckrampen mit hydraulischer Betätigung. Die gesamte Hydraulik der Hängedecks und der Roll-on/Roll-off-Einrichtung wurde von der Firma von Tell geliefert. Die Stahlarbeiten wurden von der Werft ausgeführt. Alle Wagendecks sind durch eine Wassersprühflutanlage zur Feuerbekämpfung ausgerüstet.

Kabinen

In 352 Kabinen mit Naßzelle für zwei Personen und 31 Kabinen mit Naßzelle für vier Personen sowie 63 Kabinen für zwei Personen und 58 Kabinen für vier Personen mit gemeinsamen Wasch- und WC-Räumen können insgesamt 1186 Personen untergebracht werden. Alle Kabinen ohne eigene Naßzelle befinden sich im Zwischendeck. Die Kabinen mit Naßzelle wurden auf dem C-, D- und E-Deck im vorderen Bereich des Schiffes angeordnet. Für die Besatzung und für das Bedienungspersonal sind Außenkabinen, alle mit Naßzelle, für 110 Personen vorgesehen.

Öffentliche Räume

Die öffentlichen Räume wurden im hinteren Bereich des Schiffes, verteilt auf drei Decks, angeordnet. Auf dem C-Deck befindet sich ein Mehrzweckraum für insgesamt 235 Personen. Durch den Einbau von Schiebewänden wurde dieser Raum sehr variabel gestaltet und kann aufgeteilt

Haupttreppenhaus

5. Deck, Selbstbedienungsstraße der Cafeteria

werden in Nightclub, Kino mit Vorführraum und mehrere kleine und große Konferenzräume. Die Cafeteria mit Selbstbedienungseinrichtung sowie Grillraum für insgesamt 402 Passagiere wurde auf dem D-Deck eingerichtet. Im Speisesalon auf dem E-Deck mit Sitzplätzen für 332 Passagiere wird ein skandinavisches Buffet serviert. Wer nach einer individuellen Speisekarte essen möchte, kann dieses in dem A-La-Carte-Restaurant tun, wo 100 Personen Platz finden. Die Küche auf dem E-Deck ist aufgeteilt in kalte und warme Küche und Spülküche. Ausreichend Provianträume befinden sich auch im Bereich der Küche. Auf dem E-Deck kann der Passagier sich in dem Barsalon mit Tanzfläche und 276 Sitzplätzen amüsieren. Natürlich befinden sich an Bord ein Mutter-und-Kind-Raum und ein Spielzimmer. Neben der Empfangshalle auf dem D-Deck befindet sich ein großer Supermarkt. Auf der Tankdecke wurde ein Swimming-Pool mit Bar (40 Sitzplätze), drei Saunas sowie ein Konferenzraum mit 27 Sitzplätzen vorgesehen.

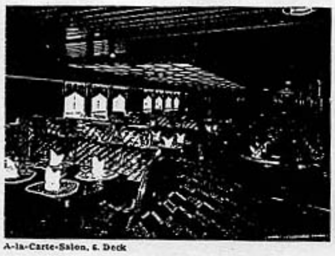
Klimaanlage

Auf dem D-, F- und G-Deck befinden sich die Räume für die Klima- und Lüftungsanlage der Firma Hi-Press. Mit dieser Anlage werden alle Räume des Schiffes voll klimatisiert. In jeder Kabine kann die Anlage entsprechend den Wünschen des Passagiers individuell über einen Thermostat reguliert werden.

Brücke

Auf dem H-Deck befinden sich die sehr großzügig angelegte Brücke mit ausgebauten und überdachten Nokken. An nautischer Ausrüstung wurde vorgesehen:

1 Magnetkompaß	1 Geschwindigkeitslog
1 Kreiselkompaß	1 Tiefgangsmeßanlage (vorne und hinten)
1 Selbststeueranlage	1 Funkpeiler
3 Radargeräte TM	1 FT-Anlage
1 Echolot	



A-la-Carte-Salon, E. Deck

Vorschriften

Das Schiff und die Maschinenanlage wurden gebaut nach den Vorschriften und unter Aufsicht von Bureau Veritas für das Klassenzeichen I 3/3 E + Deep Sea Ice Class IA Car/Passenger Ferry.

Ferner wurden folgende Vorschriften erfüllt:

1. SOLAS 1974 für kurze internationale Fahrt (2-Abteilungs-Status).
2. Internationale Vorschriften zur Vermeidung von Kollisionen auf See — 1972.
3. Internationale Freibordkonvention von 1966.
4. Internationale Vermessungsvorschriften.
5. Internationale Konvention zur Vermeidung von Umweltverschmutzung durch Schiffe 1973 (Annex I, IV und V).
6. Internationale Konvention zur Vermeidung von Umweltverschmutzung der See durch Öl 1954, einschließlich Änderungen von 1969 und 1971.

Enclosure 9.1.134

Polismyndigheten i Stockholms län
City polismästardistrikt
Våldsroteln.

Förhör hållet med Lars -Olof Ålander 310204-7812, Fogdevägen 31, 152 40 Södertälje.
Förhöret hållet i Ålanders bostad den 1998-02-03 med början klockan 10.40.
Färhörsledare krkom Bo Wide. Med vid förhöret var Cå Tomas Lindstrand.
Förhöret avsåg Ålanders befattning med fartyget samt hans kännedom om eventuellt begärda kostnadsförslag på reparationer eller förstärkningar på M/S Estonia innan fartyget flaggades över till Estland.

Ålander berättade, att han varit anställd av Bureau Veritas med befattning som principal surveyor. Han hade uppgiften att vara klassman för fartyget från och med den tid som fartyget togs i bruk och fram tills dess att fartyget övergick i Estlands ägo.

Ålander tillfrågades om han under sin tid som klassman fick någon kännedom om att fartygets ägare begärt kostnadsförslag för förstärkning av visirlåsningarna. Ålander svarar omedelbart att det inte är någonting som han känner till.

Skulle det ha varit något fel som åtgärdats eller som skulle åtgärdas skulle klassen ha fått reda på det. Har rent allmänt något kostnadsförslag begärts in borde maskinchefen Lasse Karlsson vid Sallyrederiet veta om det.

Enligt Ålander är det mycket viktigt att Visiret håller tätt mot fartyget i övrigt och att inget vatten tränger in. Vatten i visiret kan komma i rörelse av fartygets rörelser i sjön varvid visiret påverkas inifrån av de krafter som blir när vattnet rör sig framåt i visiret. Visiret är en vågbrytare medan rampen är den del av fartyget berättade Ålander.

Vid en hamnstsadskontroll skall fartyget kontrolleras och eventuella brister noteras på därför avsedd handling/handlingar. Bristerna åsätts en kod. Vilken kod som sätts beror på vad som måste göras med bristen. Ålander överlämnade en fotostatkopia på en kodlista med förklaringar om vad koderna innebär. Han sade att Estonia hade brister med kod 17 men att fartyget ändå avlöpte från hamnen utan att bristerna var åtgärdade. Listan med bristerna skulle finnas hos sjöfartsverket i Malmö. Ålander trodde också att listan skulle finnas hos internationella haverikommissionen.

Kodlistan bifogas som bilaga.

Förhöret utskrivet efter gjorda anteckningar och översänds till Ålander för godkännande.

Mottagen av Lars-Olof Åhlander 980203 i Södertälje. TL

C8-1-397-98

codes for actions taken

ÅKLAGARMYNDIGHETEN STOCKHOLM 1998-02-04 Dnr.........

00	no action taken
10	deficiency rectified
12	all deficiencies rectified
15	rectify deficiency at next port
16	rectify deficiency within 14 days
17	master instructed to rectify deficiency before departure
20	grounds for delay
25	ship allowed to sail after delay
30	grounds for detension
35	ship allowed to sail after detension
36	ship allowed to sail after follow-up detention
40	next port informed
45	next port informed to re-detain
50	flag state/consul informed
55	flag state consulted
60	region state informed
70	classification society informed
80	temporary substitution of equipment
85	investigation of contravention of discharge provisions (MARPOL)
95	letter of warning issued
96	letter of warning withdrawn
99	other (specify in clear text)

1994-11-23

ESTONIA-olyckan

Väderförhållandena 27 och 28 september 1994

ALLMÄNT

Väderförhållandena den 27 september dominerades av ett kraftigt och omfattande lågtrycksområde med flera dellågtryck som täckte norra Skandinavien och Norska havet. Se väderkartan för Europa i bilaga 1 från kl 12 UTC den 27 september.

Ett av dessa mindre lågtryck fördjupades den 27:e och rörde sig snabbt österut via södra Norge och östra Svealand till södra Finland. Lågtrycket blev relativt kraftigt och hade den 27/9 kl 12 UTC sitt centrum nära Oslo med djup 995 HPA, 28/9 kl 00 UTC över sydostligaste delen av Bottenhavet med djup 980 HPA och 28/9 kl 12 UTC över östra Finland med djup 985 HPA. En tillhörande varmfront med kortvarigt regn passerade under kvällen den 27:e snabbt österut över norra Östersjön. Syd och sydväst om lågtrycket följde en vindvridning från SW till W och den västliga vinden blev mycket byig.

VÄDRET PÅ NORRA ÖSTERSJÖN/FINSKA VIKEN DEN 27 SEPTEMBER

Vädret kan beskrivas enligt en "analyskarta" med observationerna från olika platser plottade.
I bilaga 2-6 visas analyskartor för den aktuella perioden.

Observationer utförs i samtliga länder var 3:e timma med början kl 00 UTC. Svensk vintertid är lika med UTC-tid plus 1 timma.

Finsk och estnisk vintertid är lika med UTC-tid plus 2 timmar.

I fortsättningen används endast svensk vintertid. Observera att i en del av bilagorna används tidsbegreppet z-tid, dvs det gamla uttrycket för UTC-tid. På dessa tider skall alltså läggas till 1 timma för att få svensk vintertid.

Vindarna på kartan beskrivs med en pil som visar varifrån det blåser tillsammans med långa eller korta tvärstreck som visar hur mycket det blåser. Ett kort streck motsvarar 2,5 m/s, ett långt streck motsvarar 5 m/s.

T ex visar följande symboler:  SW (sydväst) 12.5 m/s

 W (väst) 20.0 m/s

Sveriges meteorologiska och hydrologiska institut
601 76 Norrköping. Tel 011-158000. Telex 64400 smhi s.

I bilaga 7 visas en karta med ett antal utvalda väderobservationsplatser som funnits lämpliga för att verifiera förhållandena på norra Östersjön. Dessa platser är Söderarm, Svenska Högarna, Bogskär, Utö, Russarö, Bagaskär och Ristna.

Observationer utförs även i Tallinn men dessa observationer ger ej representativa värden p.g.a stora läeffekter. T ex rapporterades från Tallinn aldrig vindstyrkor på mer än 7 m/s under den mycket blåsiga perioden som rådde den 27-28/9.

I bilaga 8 presenteras observationerna från de utvalda platserna i tabellform för var 3:e timma under den aktuella perioden.

Definition av vind

Internationell standard som används av alla länder för att ange vinden är den medelvind som registreras under de 10 minuter som föregår själva observationstillfället. Vinden mäts i de flesta fall med en vindgivare som kalls anemometer och skall gälla på 10 m höjd över jordytan. I Sverige noterar vi även den maximala medelvind som rått sedan föregående observationstillfälle 3 timmar tidigare. På den finska fyren Bogskär finns en meteorologisk automatstation som även registrerar maximala medelvinden samt byvindarna.

Även på den estniska observationsplatsen Ristna mäts den maximala medelvinden samt byvindarna. Se tabellen i bilaga 8.

För att visa vindens variation timma för timma bifogas även kopior på orginalregistreringarna av vinden från Söderarm och Svenska Högarna. Se bilaga 9 och 10. Tidsskalan här avser UTC-tid, dvs för att få svensk tid, lägg till 1 timma. Här syns tydligt att de maximala vindarna först inträffade efter förlisningen mellan kl 02 och 04.

Kommentar till tabellen

Vindobservationerna från de angivna platserna är relativt representativa för det öppna havsområdet men vinden bromsas alltid upp något även vid en fyr i kustbandet. Vid vissa fyrplatser råder det dessutom stor läeffekt vid vissa vindriktningar. Observationerna från Bogskär och Ristna bedöms i denna vädersituation som de mest representativa.

För att eliminera läeffekterna används på SMHI en datorbaserad tolkningsmodell där hänsyn tas till samtliga observationer plus den olikartade uppbromsningen som blir av vinden över land, vid kustbandet och över hav. I modellen tas även hänsyn till vilken luftmassa som är aktuell plus ytvattentemperaturen. Dessa fysikaliska samband är väl kända och på detta sätt kan man få en bättre representativ bild av hur det blåser vid ett bestämt tillfälle över olika delar av havsområdet. I bilaga 11, 12, 13 och 14 visas sådana datorbaserade tolkningskartor från kl 19, 22, 01 och 04 den 27-28/9.

VÅGOR

Definition av vågor

Med våghöjden menas avståndet från dal till topp. Internationell standard är att mäta och beskriva vågorna som signifikant våghöjd eller som maximala vågor. Med signifikant våghöjd menas medelvärdet av högsta tredjedelen av vågorna. Detta begrepp har införts för att få en bättre jämförelse mellan uppmätta vågor med instrument och manuellt uppskattade vågor. Det visar sig nämligen att ett mänskligt öga alltid överskattar "medelvåghöjden" och med begreppet signifikant våghöjd erhåller man en bättre överensstämmelse mellan manuella och instrumentellt utförda observationer.

Begreppet maximal våghöjd har införts därför att vågorna på grund av interferens relativt regelbundet skapar enstaka vågor som blir betydligt högre än de signifikanta våghöjderna.

Statistiskt sett blir mellan var 500:e och var 1000:e våg en markant högre våg, oftast 70-80 % högre men i extremfall 100 % högre. I det här fallet skulle detta inträffa mellan varannan och var tredje timma.

Om vågorna passerar grundbankar så ökar frekvensen av detta interferensfenomen. Detsamma gäller då en markant vindkantring på mer än 45 grader har skett som medför att vågorna korsar varandra och att den nya vindriktningen varat minst ett par timmar.

Vågmätningar saknades vid det aktuella tillfället i norra Östersjön. Den enda vågmätning som görs operativt i detta område är vid Almagrundet. Observationerna därifrån har tyvärr saknats en längre period på grund av tekniska problem. I det här aktuella fallet är heller ej vågobservationer från Almagrundet representativa för det aktuella området från Finska vikens mynning till syd om Finska Utö, särskilt inte med vindar mellan syd och sydväst följt av västliga.

För de dagliga vågprognoserna som SMHI utför används en numerisk vågmodell där vågorna beräknas utifrån vindens styrka, riktning och varaktighet samt havsdjupet. Dessa fysikaliska samband är väl kända och vågmodellen är verifierad mot mätningar både i svenska och tyska farvatten med mycket gott resultat. Beräkningarna från vågmodellen görs i form av signifikant våghöjd.

För att beskriva vågförhållandena på ett så korrekt sätt som möjligt har SMHI i efterhand låtit den datorbaserade tolkningsmodellen för vädret initialt även ligga till grund för beräkningar i vågmodellen. På så sätt får man en beräkning av vågorna baserat på de vindar som bör ha förekommit under 27-28 september i det aktuella området och angränsande havsområden.

I bilaga 15, 16 och 17 visas de beräknade vågorna kl 19, 01 och kl 07 baserat på tolkningsmodellen för vädret.

I denna utredning bifogas i bilaga 18 även en teoretisk studie av våghöjderna för detta aktuella fall samt en bedömning av sannolikheten för att några extremt höga vågor kan ha förekommit.

LUFTTEMPERATUR

Lufttemperaturen till sjöss varierade mellan 11 och 13 grader på dagen den 27:e. Bakom den smala fronten som passerade österut under kvällen sjönk temperaturen till 10-11 grader, efter vindkantringen till W från efternatten till 8-9 grader.

YTVATTENTEMPERATURER

Ytvattentemperaturen i våra omgivande hav kartläggs varje dag på SMHI utifrån mätningar från färjor och handelsfartyg samt beräkningar från den infraröda kanalen ombord på vädersatelliterna.

I det aktuella området uppmättes fram till natten mellan 27-28:e ytvattentemperaturer på 12-13 grader. Från den 28:e sjönk vattentemperaturen till 10-11 grader. Se bilaga 19.

STRÖMMAR

Strömmar mäts ej regelbundet i Östersjön. Däremot körs dagligen på SMHI en numerisk modell som beräknar strömmarna, vilka framförallt används för oljedriftsberäkningar eller vid beräkningar vid sjöräddningsinsatser. Eftersom det är väderförhållandena som helt styr strömmarna, kan man liksom för vågorna, även erhålla bra och användbara teoretiska beräkningar av strömmarna baserade på SMHIs vädermodell.

De beräkningar av strömmarna som är utförda för 5 meters djup i det här aktuella fallet visar att under början av kvällen förekom inga kraftiga strömmar på Estonias rutt.

Från strax före midnatt beräknas strömmarna ha tilltagit till ca 0.5 knop och med en riktning mellan ost- och nordostgående, från omkring kl 02-03 vridande till sydostgående och fortfarande omkring 0.5 knop.

RAPPORTER FRÅN ÖGONVITTNEN

Information om vind och vågor har inhämtats från:

* Färjorna Silja Europa och Mariella som nästan gick parallellt med Estonia och anlände till haveriplatsen kort efter förlisningen.
* Färjan Finnjet som låg ca 25 nm bakom Estonia som anlände till haveriplatsen kl 02.20.
* Färjorna Silja Symphony och Isabella som gick från Stockholm mot Helsingfors och bör ha nått olycksområdet 2-3 timmar efter förlisningen.
* De båda svenska handelsfartygen Westön och Ingrid Gorthon som nådde olycksområdet 3-4 timmar efter förlisningen.
* Flygvapnets och Marinens räddningshelikoptrar som deltog i räddningsarbetet och nådde haveriplatsen 3-5 timmar efter förlisningen.

Vind och vågor

Fartyg

Samtliga fartyg angav medelvinden under början av kvällen till först omkr S 10-15 m/s, senare ytterligare ökande till S 15-20 m/s, 2-3 timmar före midnatt vridande till omkring SW 15-20 m/s. Från efternatten, dvs efter förlisningen, omkring W 20-25 m/s, i byarna 26-30 m/s. Fram på morgonen avtagande W till ca 20 m/s, på f.m. ca 15 m/s.

Vågorna har bedömts till 4-5 m med enstaka maxvågor på 6-7 m före förlisningen och 5-6 m med enstaka vågor upp till 7-8 m efter förlisningen.

Vindmätarna ombord på färjorna är placerade på mellan 40-50 meters höjd men värdena reduceras för att gälla på 10 meters höjd. Befälet ombord på färjorna anser att de efter många års erfarenhet och jämförelse att denna reducering är riktig och mycket väl överensstämmer med verkligheten.

Handelsfartygen har alltid observerat vind och vågor genom att uppskatta dessa. Kaptenerna ombord på dessa framhöll att det enligt deras erfarenhet ej var mer än högst 5-6 m höga vågor, jämfört med de 6-10 m som förekommit i pressen.

Helikoptrar

De svenska helikoptrarna från Flygvapnet respektive Marinen som anlände till haveriplatsen mellan kl 02.50 och 05.00 har gjort följande uppskattningar:

Vind omkring W 25 m/s, byar upp till 30 m/s. En helikopter angav 40 m/s i byarna.

Vad gäller vågorna har bedömningarna från helikoptrarna varierat mer än vinduppgifterna. Majoriteten har angivit 5-6 m eller 6-8 m, en helikopter angav 6-9 m, en annan 6-10 m.

En helikopterrapport talar till och med om en jättevåg på 12 m.

Kommentar till observationerna från fartyg och helikoptrar

De vind- och vågförhållanden som är intressanta i det här fallet är de som inträffade före förlisningen. Här råder det stor samstämmighet mellan informationen från de meteorologiska observationsplatserna, observationer från fartyg samt beräknade vindar och vågor baserat på den numeriska tolknings-modellen. Detsamma gäller förhållandena efter förlisningen bortsett från de vågobservationer som gjorts av helikoptrarna. Det kan vara svårt att värdera de olika iakttagelserna, men SMHI vill ändå kommentera dessa eftersom det förekommit spekulationer om mycket extrema förhållanden i pressen.

Vind

Före förlisningen föreligger endast rapporter om vinden från färjor och handelsfartyg. Här råder samstämmig uppfattning om att vinden var omkring SW 15-20 m/s, vilket även stöds av observationer från observationsplatserna samt beräkningar gjorda i den ovan beskrivna tolkningsmodellen.

Efter förlisningen, dvs under efternatten och morgonen är både fartyg och helikoptrar i stort sett överrens om att vinden var omkring W 20-25 m/s med byar upp mot 30 m/s.

En helikopter avviker genom att ange byar upp till 40 m/s.

Även dessa uppgifter stämmer i stort sett med de väderobservationer som utförts samt de beräkningar som erhållits från den sk tolkningsmodellen, där beräkningen av byarna ger upp till 30-34 m/s.

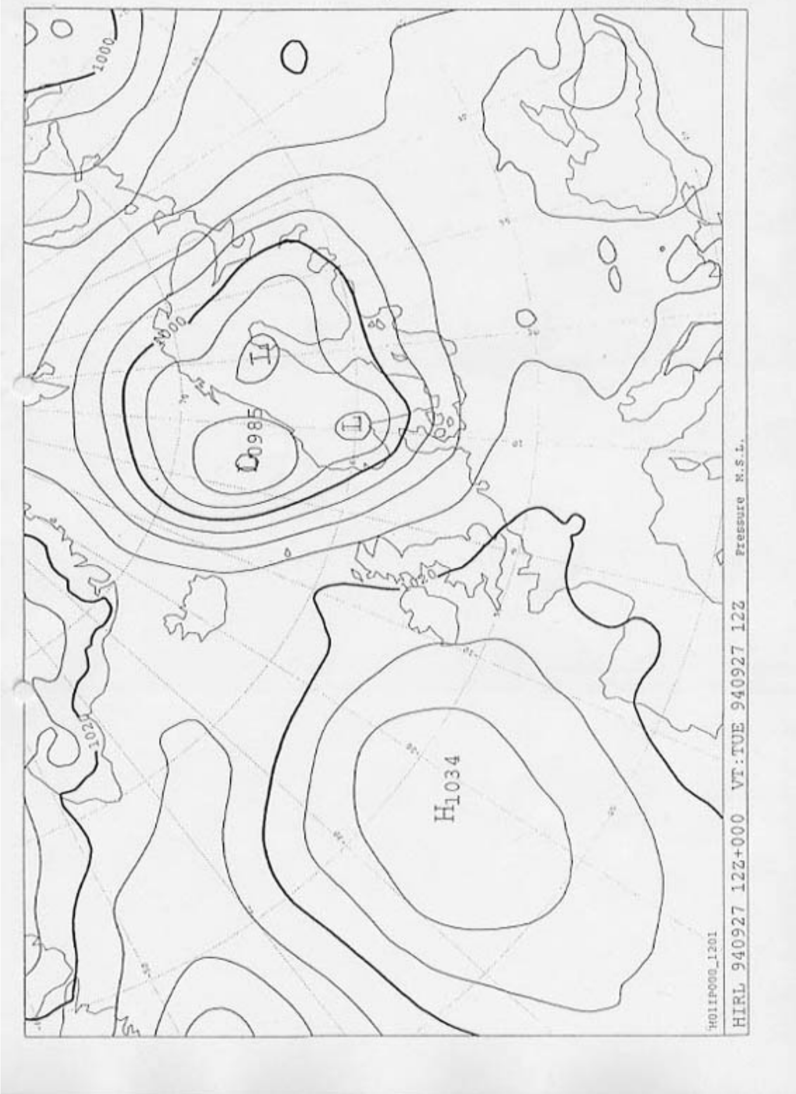
Signifikant våghöjd

Vad gäller vågorna råder samstämmighet för tiden före förlisningen mellan observationer och beräkningar på 3.5-4.5 m. För tiden efter förlisningen så råder den markanta skillnaden att samtliga fartyg anger 5-6 m medan helikoptrarna anger allt från 5-6 m till 6-10 m.

Man får utgå från att helikoptrarna ej särskiljer mellan signifikant och maximal våghöjd och därmed spänner deras rapporter över stora intervall.

Eftersom observationerna av signifikant våghöjd från färjor och handelsfartyg efter förlisningen väl sammanfaller med de numeriskt beräknade våghöjderna samt den teoretiska studien som utförts, finner SMHI det som mest troligt att signifikanta våghöjden före förlisningen varit 3.5-4.5 m och först ökat ytterligare 2-3 timmar efter förlisningen till 5.0-6.0 m.

Bilaga 1.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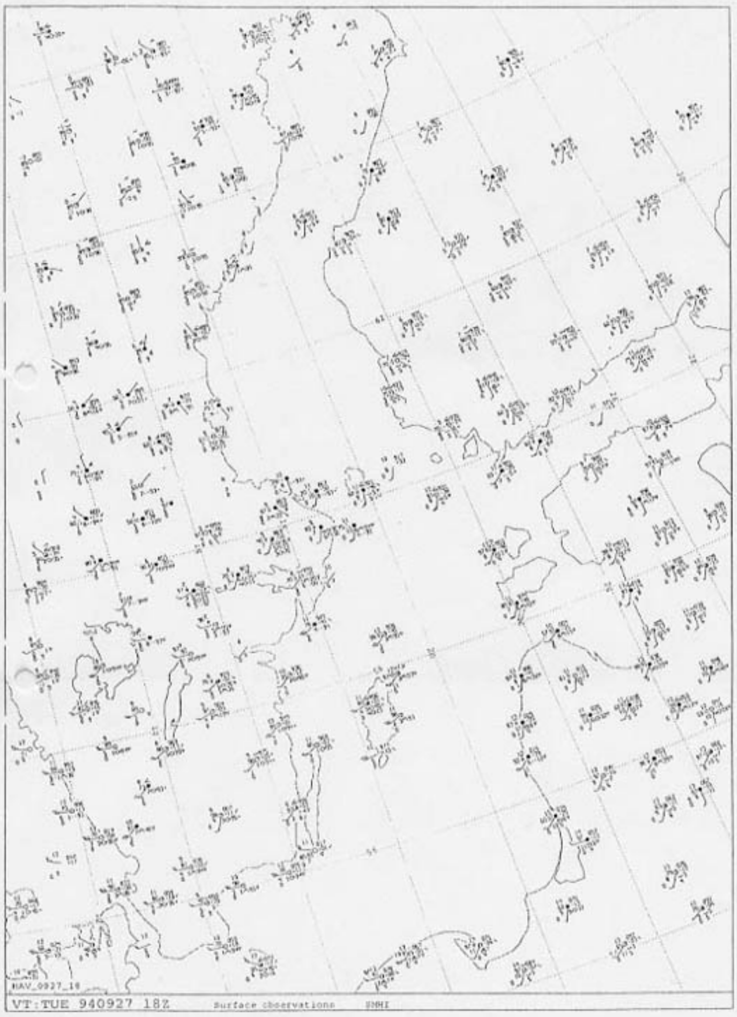
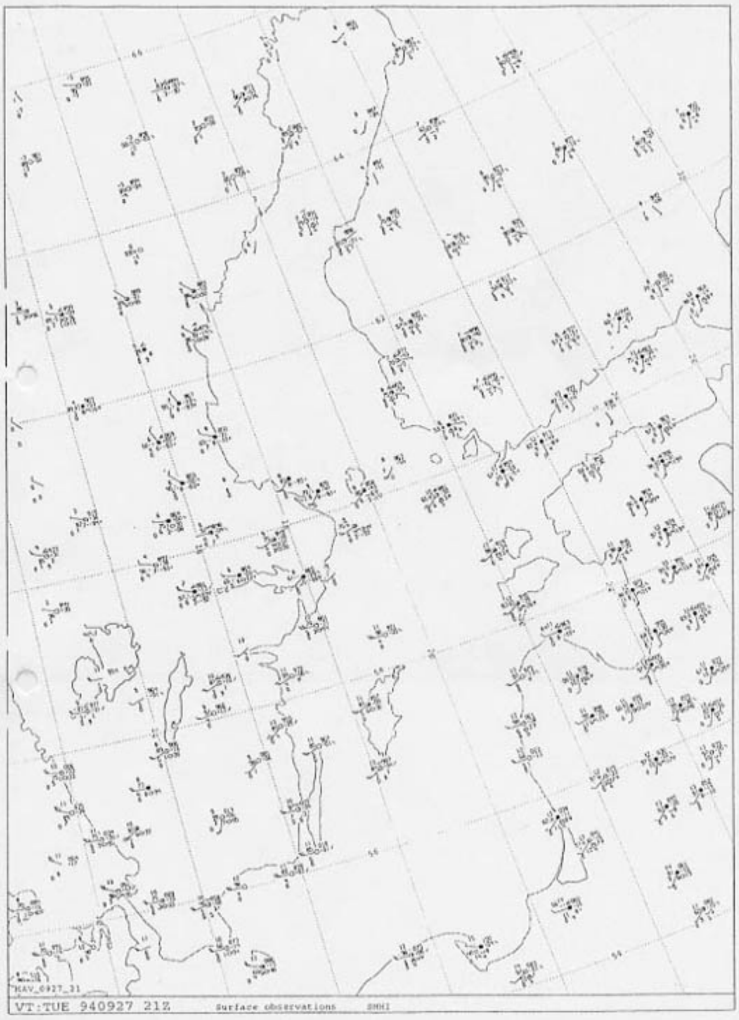
Pressure M.S.L.
H01IP000_1201
H1034
L0985
1000
1020



VT:TUE 940927 18Z Surface observations SMHI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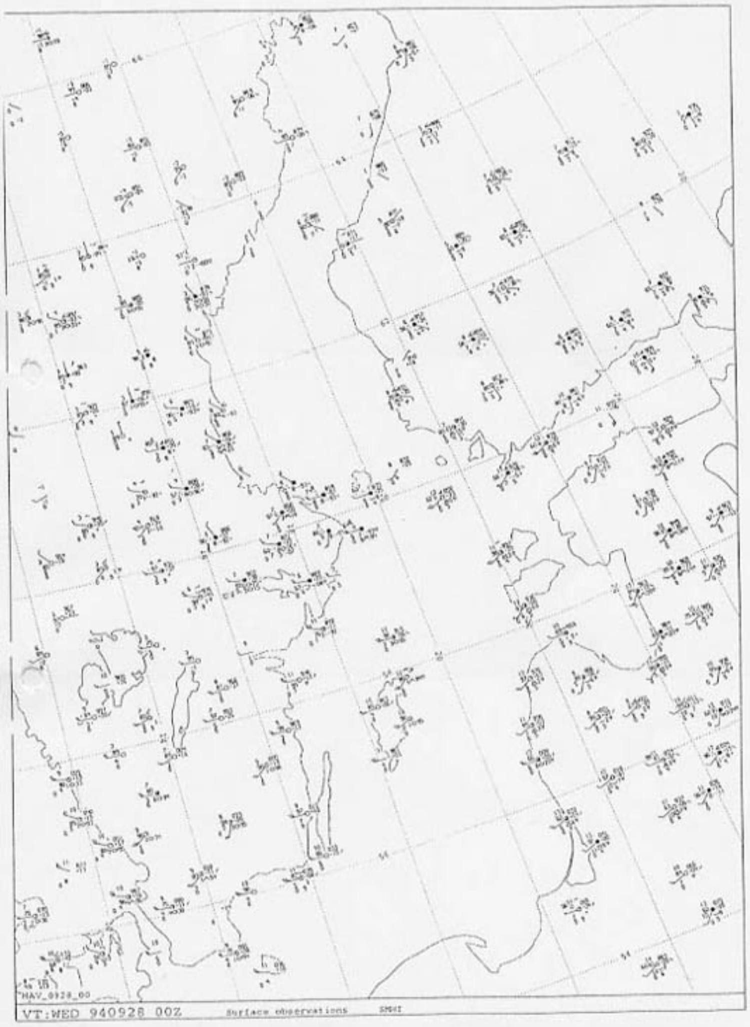
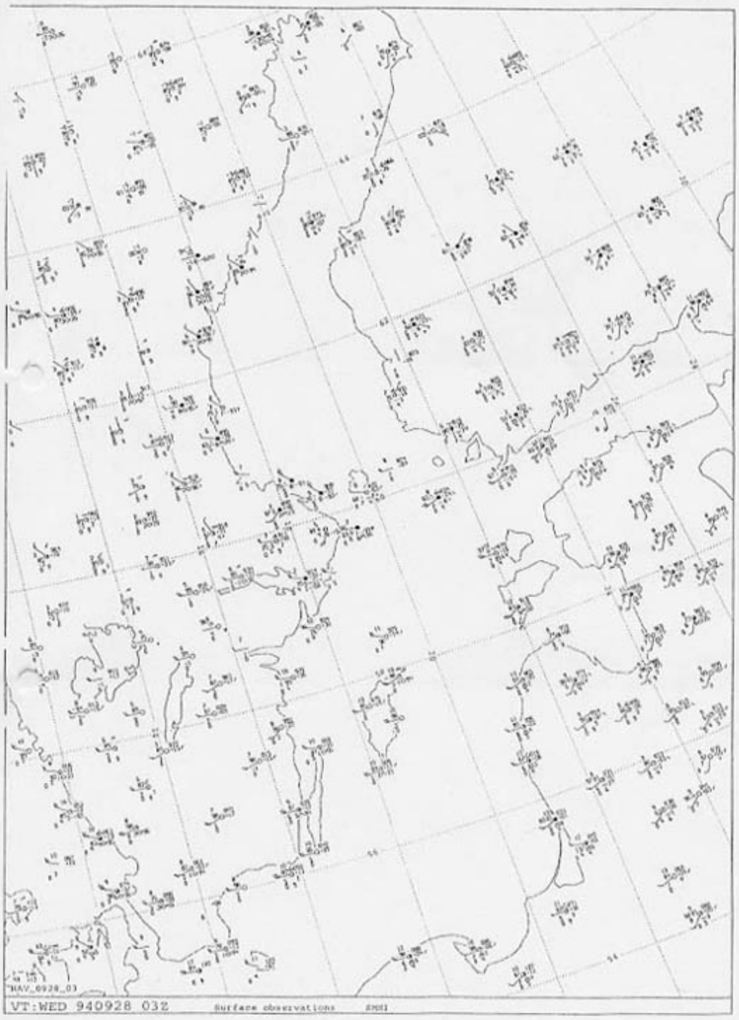
VT:TUE 940927 21Z
Surface observations
SMHI

Bilaga 4.

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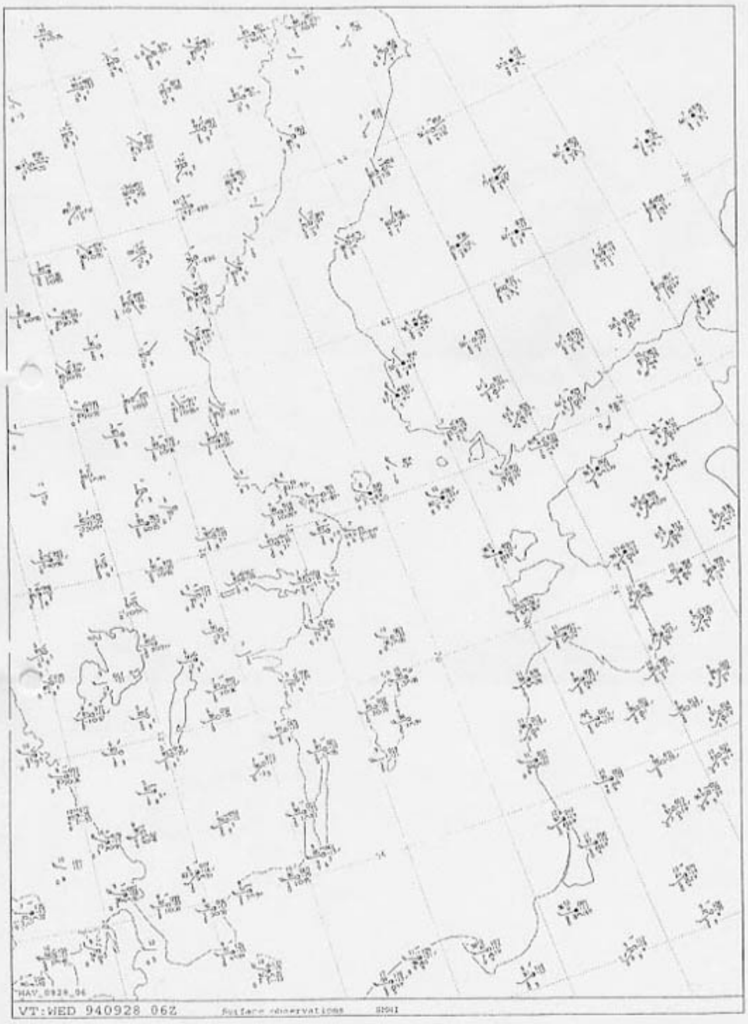
VT:WED 940928 03Z
Surface observations
SMHI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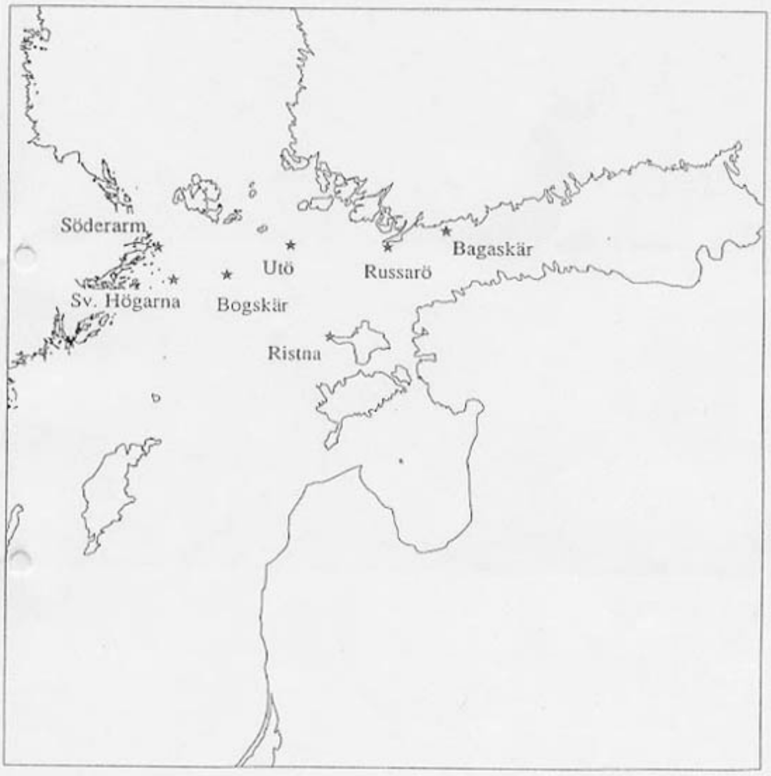
Surface observations
SMHI


Söderarm
Sv. Högarna
Utö
Bogskär
Russarö
Bagaskär
Ristna

OBSERVATIONER

Nedan visas de observationer av medelvind till riktning respektive hastighet som noterades 27-28 september.
Endast de svenska stationerna plus den finländska automatstationen Bogskär anger vilka maximala medelvindar man noterat sedan förra observationen, 3 timmar tidigare. Notera att man aldrig mäter vindhastigheten i byarna vid någon av dessa stationer förutom vid Bogskär och Ristna.
Tiden är svensk vintertid.

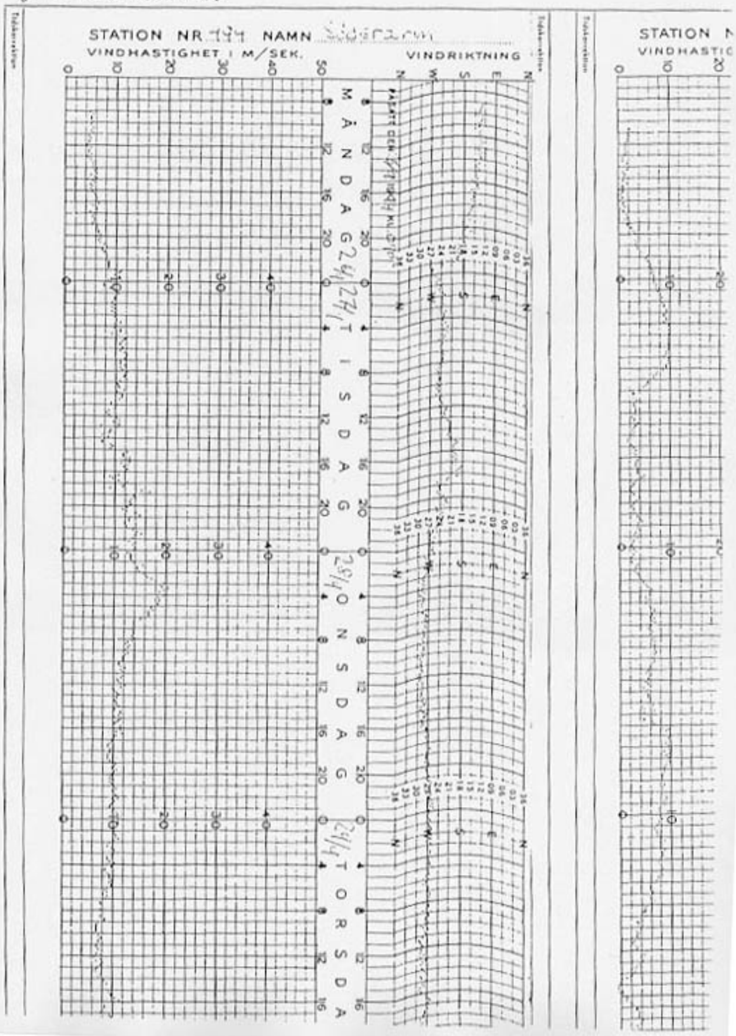
Dag/ kl	Söderarm riktning medel/max (m/s)	Svenska Högarna	Bogskär byvindar, se Not.	Utö	Russarö	Ristna / bymax	Bagaskär
27/kl 16	SW 09 /12	SW 12 /14	SW 13 /14	SW 09	WSW 09	SW 08 /12	SW 12
27/kl 19	SW 11 /13	SSW 14 /16	S 14 /17	SSW 13	SW 08	SSW 08 /14	SW 09
27/kl 22	S 13 /17	SW 16 /18	SW 17 /18	SW 15	S 16	WSW 16 /21	S 15
28/kl 01	SW 14 /15	W 17 /18	SW 20 /21	SW 15	SW 12	WSW 15 /22	SW 16
28/kl 04	W 20 /20	WNW 24 /24	W 19 /22	WSW 15	WSW 12	W 18 /29	SW 18
28/kl 07	WNW 17 /20	WNW 18 /25	WNW 21 /24	WNW 13	WNW 09	W 17 /26	W 04
28/kl 09	WNW 12 /17	WNW 14 /18		W 15	WNW 11	W 12	W 10

Not.
Bogskär uppmätte de högsta byvindarna:
27 september kl 22.46 till 24.6 m/s.
28 september kl 06.25 till 27.7 m/s.

Däremellan var bymax betydligt lägre.

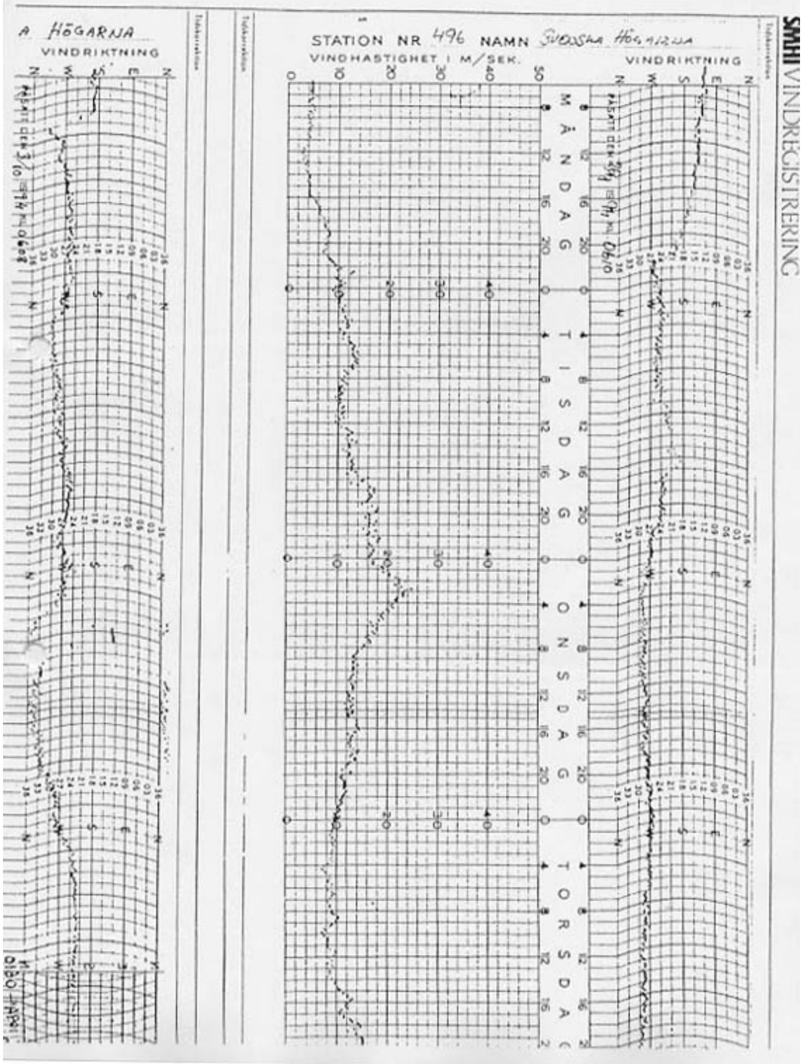
SÖDERARM

Bilaga 9.

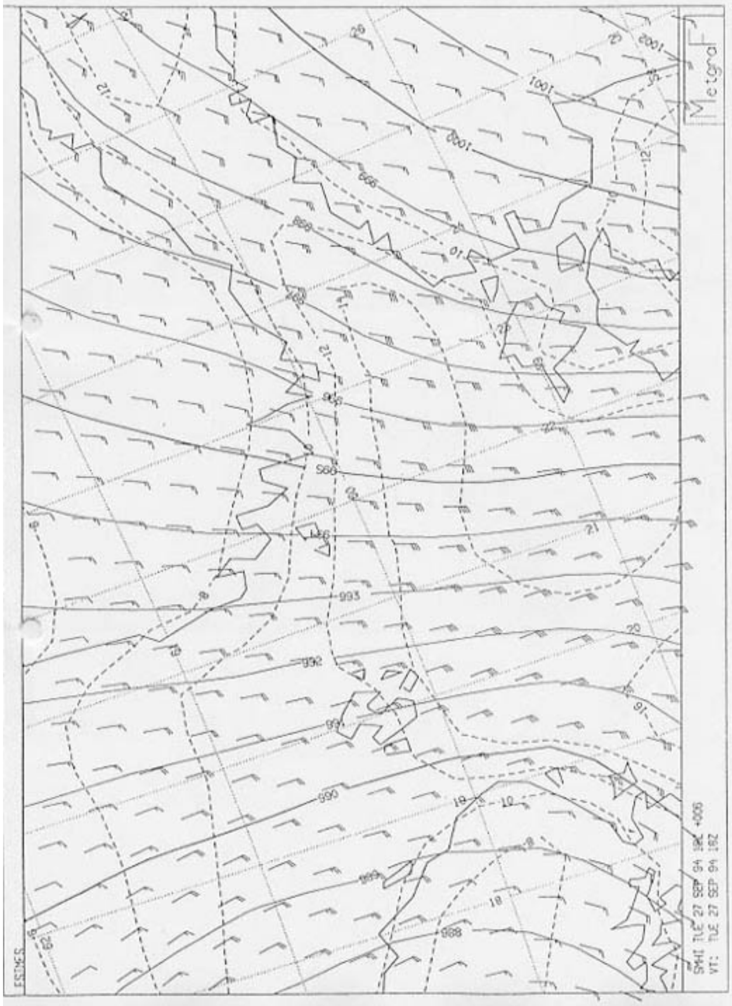


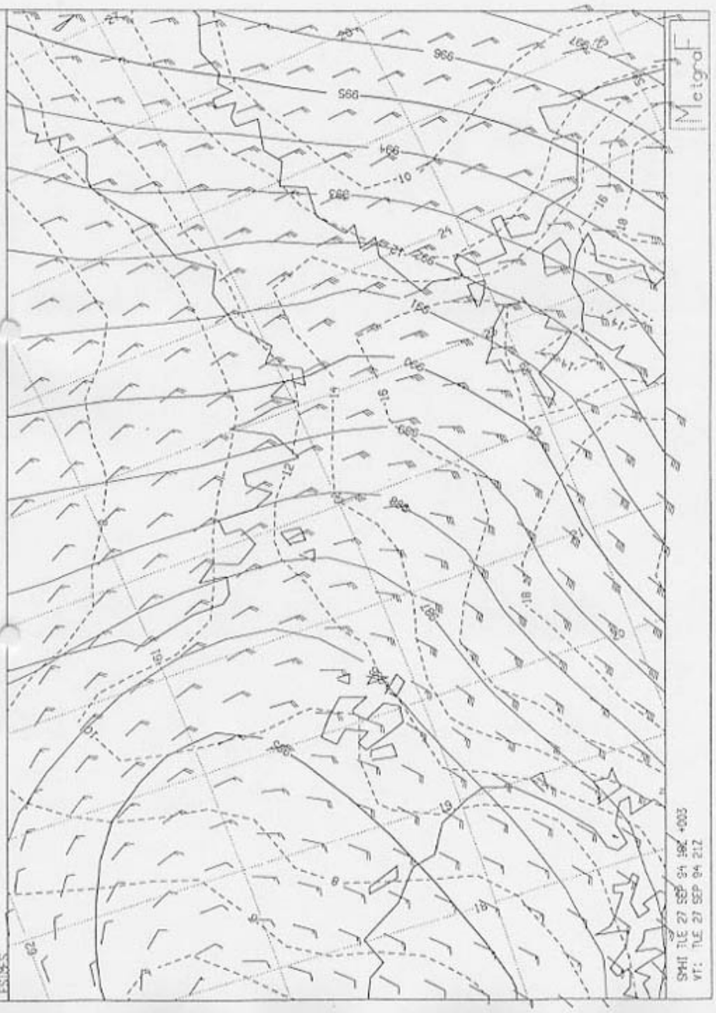
SVENSKA HÖGARNA

Bilaga 10.

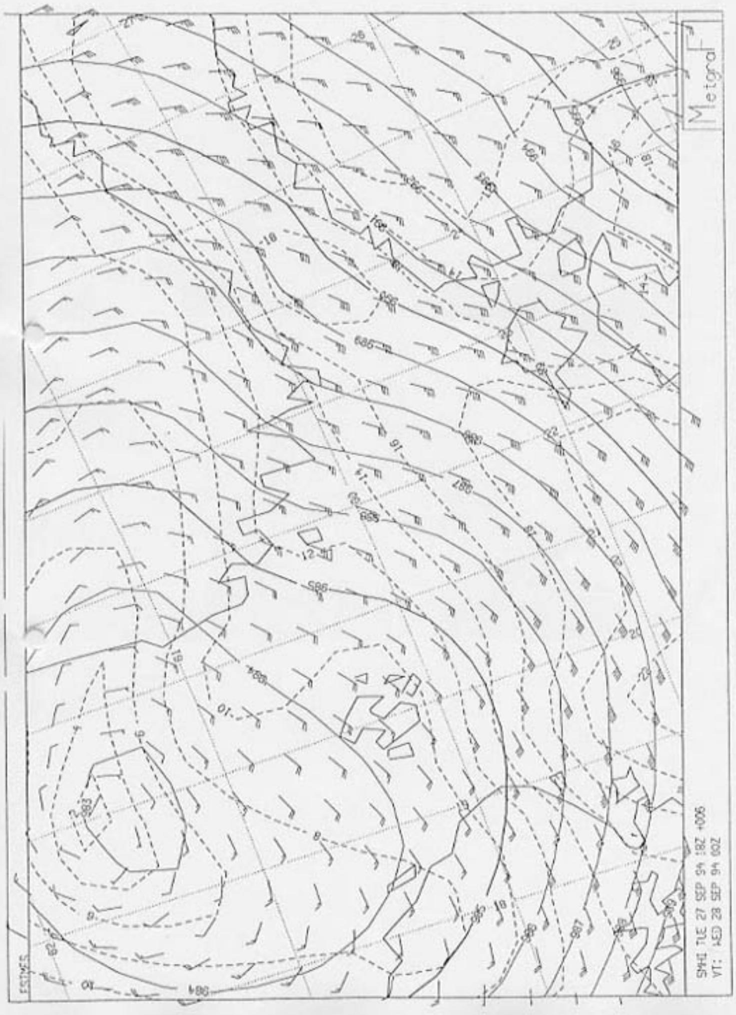


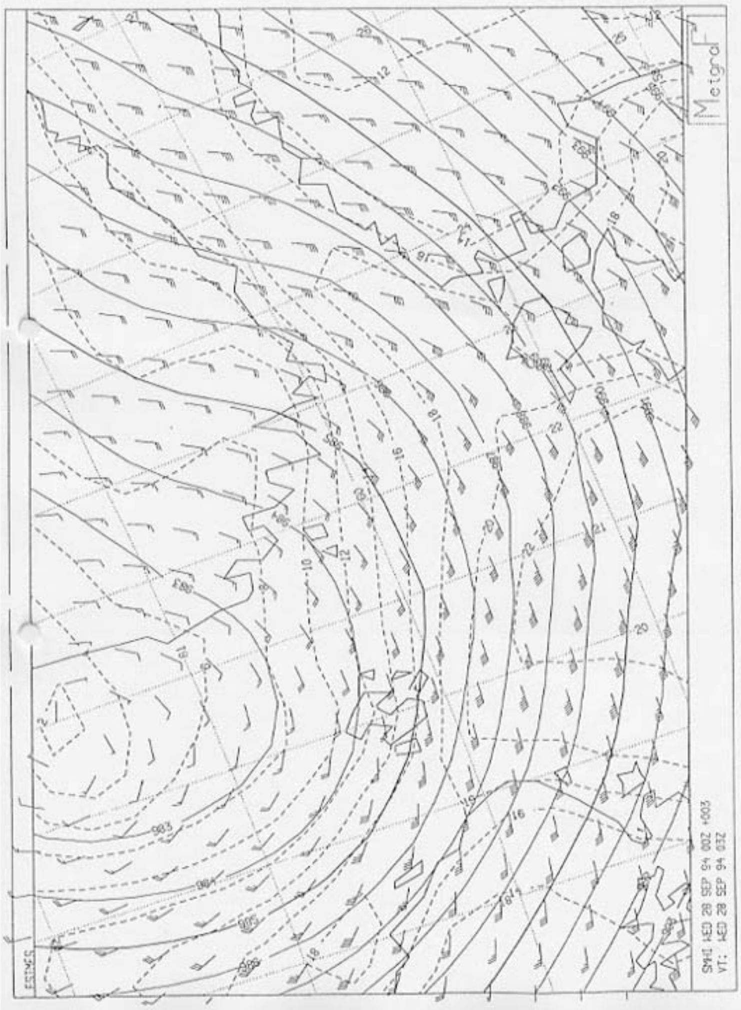
Datorbaserad tolkningsmodell kl 19.




Metgraf
SMHI TUE 27 SEP 94 18Z +003
VT: TUE 27 SEP 94 21Z

Bilaga 13.




Metgraf
SMHI WED 28 SEP 94 00Z +003
VT: WED 28 SEP 94 03Z

SMHI TUE 27 SEP 94 06z + 12
VT: TUE 27 SEP 94 18z

Bilaga 16.

SMHI TUE 27 SEP 94   06z + 18
VT: TUE 27 SEP 94   24z

SMHI TUE 27 SEP 94 06z + 24
VT: WED 28 SEP 94 06z

Office Translation

Wave Conditions in the Northern Baltic at S-SW wind 15-20 m/s

Definitions

Wave height and wave length are determined by the wind speed, however, to a similar extent by the duration the wind is blowing and the fetch, i.e. the area of free water exposed to the wind on which the waves are built up. The wave length under discussion is the distance from wave crest to wave crest. Wave height is defined by the distance from wave crest to wave trough. In the following it is meant that "wave height" is the average height of the highest 1/3 of the waves (significant wave height). Wave period is the time between two wave crests.

Wave Heights and Wave Length in the Northern Baltic
at Wind Speed 17-18 m/s.

When the wind speed is 18 m/s, the wave height can reach 5 - 5.5 m in free water. It takes, however, more than 24 hours of this high wind speed and requires a fetch of more than 1000 km. If the fetch is only 300 km (distance from East of Hoburgen to Gotland) and the wind speed is 17 m/s the wind has to blow more than 10 hours to create a wave height of 4 m. In the Northern Baltic there are frequently blowing times which restrict the wave height when the wind is blowing strongly from southerly direction. This means also that the long, high waves can have affect after 6-8 hours only from one wind direction or after an increase of wind speed.

The short, steep waves can therefore overlap a swell from a different direction, which creates an uncomfortable seastate for smaller craft.

When it is blowing with 17 m/s and the wave height is 4 m in the Northern Baltic, then the wave period should be about 8 s and the wave length about 100 m according to SMHI's recordings, tables and literature.

Wave fields at sea are not regular waves with long crests. Wave fields from different directions meet and create the chaotic seastate with short wave crests which we experience at sea. Due to the meeting of different wave directions, from time to time extremely high waves can be created. Single waves might reach double the significant wave height, whilst wave period and wave length do not change. Waves of the different wave trains are normally more or less similar in height and wave length. When two waves meet and create an extremely high wave there is a high probability that the next two following waves in the wave trains will also meet and several extreme waves will follow.

At certain locations it becomes very clear that in case of a change in wave direction, chaotic waves with extremely high waves shall be created. Upon passing over a shallow substantially higher waves can be met compared to the other waves in the surrounding.

It is of particular interest that the waves might be affected by the shallows that are South of the Stockholm archipelago and the Åland archipelago.

Which Ground Can Affect Storm Waves?

At a water depth of less than ¼ of the wave length the waves can be felt at the bottom. The most important factor, however, is that the speed of the waves is reduced. The waves passing the shallow do have a higher speed than those moving over the shallows, the wave fronts which become slower and break over the shallows and the wave heights become larger leeward of the shallow.

When waves with wave length of 100 m come in from S-SW on the shallows South of Åland, the waves are influenced and create a chaotic seastate with extremely high waves when the wave front is passing over the area of the shallows where the depth is below 100/4, i.e. 25 m.

Theoretical Estimation of Waves at "Estonia's" Casualty Position

At the casualty position of "Estonia" 59° 23,9' N, 21° 42,4' E, the depth according to the seachart is substantially larger than a depth which could affect the wave height. The waves should theoretically be ca. 4 m high with single waves of more than 8 m height, i.e. wave height which one has to expect to meet in the whole Northern Baltic with southerly winds of 15-20 m/s.

During the night of 28.9.94 at 01.00 hrs. Swedish time (00.00 UTC) the wind altered to west and increased to 24 m/s. After 1 hour the wind-sea from West with a wave height of 1.5 m can overlap the SW-ly swell with heights of up to 4 m. After 3 hours (04.00 hrs. Swedish time) the W-ly seas are theoretically 3.5 m high. Then the SW-ly sea has decreased substantially in wave height. In the morning the wind decreased in strength.

At a prevailing significant wave height of 4 m it has statistically to be expected that a vessel proceeding against headseas shall meet a wave of ca. 6.5 m height every 10 minutes. Waves of ca. 8 m height shall be met statistically every 3rd hour (2 hours 40 minutes).

5-10 nm North of the position the depth at several places is stated to be 20-30 m. In this area North of the casualty position were at the particular time more irregular seas with larger wave heights due to the waves having been influenced by the bottom topography.

Theoretical Estimation of Waves on "Estonia's" Route

On the route directly from Tallinn to the casualty position there are no shallow areas which could cause extreme wave conditions. At the beginning the waves were small due to lee side of the mainland and subsequently Dagö (Hiiumaa). Thereafter the vessel met waves from West and SW which were breaking around the shallow areas before Dagö. Finally they came out in the open sea from South and SW outside Dagö.

Vågförhållanden i N Östersjön vid S-SW vind 15-20 m/s

Definitioner

Avgörande för våghöjd och våglängd är vindhastigheten men i lika hög grad blåstiden och blåslängden (den sträcka med fritt vatten över vilken vågfältet byggs upp). Den våglängd som vi här talar om är avståndet från vågtopp till vågtopp. Våghöjden definieras som höjden från dal till topp. I fortsättningen avses med "våghöjd" medelhöjden av den högsta 1/3 av vågorna (den signifikanta våghöjden). Vågperiod är tiden mellan två vågtoppar.

Våghöjder och våglängder i N Östersjön vid vindhastigheten 17-18 m/s

Om vindhastigheten är 18 m/s kan våghöjden bli 5 - 5.5 m på fritt vatten. Det tar emellertid över 24 timmar med denna höga vindstyrka och kräver en fri blåslängd på över 1000 km. Om blåslängden är 300 km (sträckan från öster om Hoburgen på Gotland) och vindhastigheten är 17 m/s måste vinden blåsa över 10 timmar för att skapa 4 m höga vågor. I N Östersjön, med kraftiga, sydliga vindar är det ofta blåstiden som begränsar våghöjden. Detta betyder alltså att de långa, höga vågorna först efter 6-8 timmar påverkas av en vindvridning eller vindökning.

Den korta, krabba sjön kan däremot snabbt överlagras en dyning från annat håll vid en vindvridning, vilket skapar en obehaglig sjögång för mindre båtar.

Om det blåser 17 m/s och våghöjderna är 4 m i N Östersjön är, enligt SMHIs mätningar och tabeller ur litteraturen, vågperioden omkring 8 s och våglängden omkring 100 m.

Samverkan mellan olika vågfält

Vågfält på havet är inte jämna vågor med långa kammar. Vågfält från olika håll samverkar och ger den kaotiska sjögång, med korta vågkammar som vi upplever till sjöss. Genom samverkan mellan olika vågtåg får man då och då extremt höga vågor. Våghöjden kan för enstaka vågor vare den dubbla signifikanta våghöjden, vågperioden och våglängden ändras inte. Vågorna i de olika vågtågen är vanligen ganska lika i höjd och våglängd. Om två vågor samverkar och ger en extremt hög våg är sannolikheten hög att nästföljande två vågor i de två vågtågen också samverkar; flera extremvågor kommer i följd.

På vissa platser blir det extra tydligt att vågriktningen ändras och skapar kaotiska vågor med extremt höga våghöjder. Vid passage av en uppgrundning böjer vågorna av runt grundet och samverkar i lä om grundet där det ständigt kan vara betydligt högre vågor än i området i övrigt. Det är speciellt intressant att teoretiskt uppskatta hur vågor kan påverkas av de uppgrundningar som finns söder om Skärgårdshavet och Ålands Skärgård.

Vilka grund kan påverka stormvågor?

Om djupet är mindre än 1/4 av våglängden påverkas vågen märkbart av botten. Det viktigaste som sker är att vågens hastighet minskar. Den del av vågen som passerar på sidorna om ett grund har större hastighet än den del som passerar över grundet, vågfronten fördröjs och böjer av över grundet och våghöjden blir större i lä om grundet (se fig).

Om vågor med våglängden är 100 m kommer in från S -SW mot uppgrundningen S om Åland bör vågorna påverkas och skapa ett kaotiskt mönster med extremt höga vågor när vågfronten passerar över områden där djupet understiger 100/4 m d.v.s 25 m.

Teoretisk uppskattning av vågorna vid Estonias förlisningsplats

På den position där Estonia förliste 59° 23,9', 21° 42,4'är djupet enligt sjökort betydligt större än det djup som skulle kunna medföra förändringar av djupvattenvåghöjderna. Vågorna skulle teoretiskt vara omkring 4 m höga med enstaka vågor på över 8 m höjd d.v.s samma våghöjder som man får räkna med att möta över hela N Östersjön vid sydlig vind på 15 - 20 m/s.

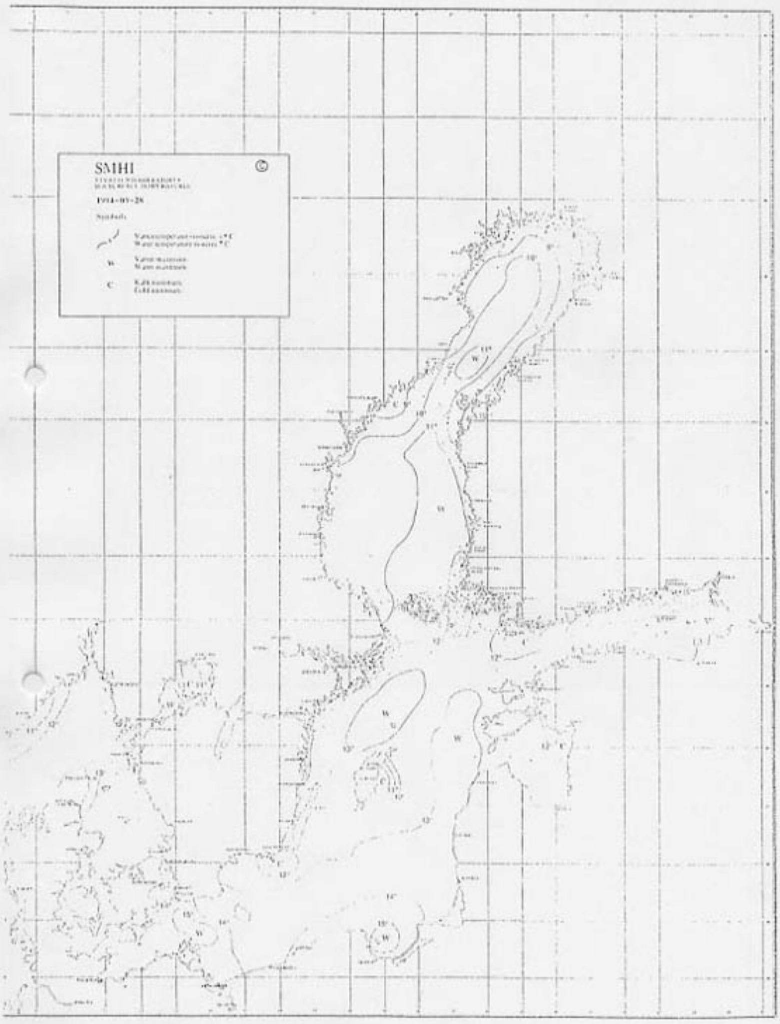
På natten 28/9 kl 01 svensk tid (kl 00 UTC) vred vinden till väst och ökade till 24 m/s. Efter 1 timma kan vågor från väst med en våghöjd på 1.5 m överlagras den sydvästliga "dyningen" med höjden upp mot 4 m. Efter 3 timmar (kl 04 svensk tid) är den västliga sjön enligt teorin 3.5 m hög. Den sydvästliga sjön bedöms då ha avtagit betydligt i våghöjd. Framåt morgonen avtog vinden i styrka.

Om signifikant våghöjd är 4 m kan man statistiskt räkna med att fartyget med sin fart snett mot vågorna träffas av en våg som är omkring 6.5 m hög var 10 minut. Vågor med omkring 8 m höjd bör statistiskt träffa fartyget en gång varannan/var tredje timma (2 tim 40 min).

5-10 distansminuter norr om positionen är djupet på flera ställen angivet till 20-30 m. I detta område norr om förlisningsplatsen bör det vid tillfället varit mera oregelbunden sjö med högre våghöjder på grund av vågornas samverkan med bottentopografin.

Teoretisk uppskattning av vågorna på Estonias färdväg

Om kursen satts direkt från Tallinn mot positionen där förlisningen skedde, passeras inga grundområden som kan förorsaka extremt vågtillstånd. Vågorna bör från starten ha varit små i lä av land och i lä av Dagö. Därefter mötte fartyget vågor från väst och sydväst som böjts av runt grundområdet utanför Dagö. Slutligen kom man ut i öppen sjö från syd och sydväst utanför Dagö.


SMHI
W
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Prognostiker	Uppläsare	Datum	Sändningstid
Gu	LF	94-09-27	8:05

VÄDERÖVERSIKT

Storm- och kulingvarning är utfärdad för
SKAGERACK, KATTEGATT, VÄNERN, ÖRESUND OCH BÄLTEN, HELA ÖSTERSJÖN, ÅLANDSHAV OCH SKÄRGÅRDSHAVET.

Utsikter till Onsdag morgon

SKAGERACK:	Byig väst kuling 14-18 m/s ökande, i ~~kväll~~ e.m 18-22, i natt långsamt avtagande. storm 25.
KATTEGATT, VÄNERN, ÖRESUND OCH BÄLTEN, SYDVÄSTRA ÖSTERSJÖN, SÖDRA ÖSTERSJÖN:	Byig väst 12- kuling 16, på Kattegatt i eftermiddag och i kväll upp till 20. I natt långsamt avtagande.
SYDÖSTRA ÖSTERSJÖN, MELLERSTA ÖSTERSJÖN, NORRA ÖSTERSJÖN, ÅLANDSHAV OCH SKÄRGÅRDSHAVET:	Ökande sydväst, från i eftermiddag kuling 14-17, i natt byig väst 18-22, på norra och mellersta Östersjön storm 25.
BOTTENHAVET, NORRA KVARKEN:	Syd eller sydväst 8-12.
BOTTENVIKEN:	Sydost 9-13, m/s i eftermiddag syd och något avtagande.

STORM- OCH KULINGVARNING FÖR
SKAGERACK: Väst 14-18 m/s, i kväll 18-22, i natt långsamt avtagande.
KATTEGATT, VÄNERN, ÖRESUND OCH BÄLTEN, SYDVÄSTRA ÖSTERSJÖN, SÖDRA ÖSTERSJÖN: Väst 14-18, på Kattegatt i em. och i kväll ca 20.
SYDÖSTRA ÖSTERSJÖN, MELLERSTA ÖSTERSJÖN, NORRA ÖSTERSJÖN, ÅLANDSHAV OCH SKÄRGÅRDSHAVET: Från eftermiddagen sydväst 14-17, i kväll ytterligare ökande, i natt ca 20, på MELLERSTA och NORRA ÖSTERSJÖN STORM 25 m/s.

(Ingen nedisningsvarning)

SMHI NORRKOPING - 1994-09-27 06:56 UTC

WOSN43 ESWI 270700
SWEDISH GALEWARNINGS 0700 UTC

SKAGERRAK:
WESTERLY 14-18 M/S. THIS EVENING 18-22. TONIGHT SLOWLY DECREASING.

KATTEGAT, LAKE VAENERN, THE SOUND AND THE BELTS, WESTERN BALTIC, SOUTHERN BALTIC:
WESTERLY 14-18. IN KATTEGAT THIS AFTERNOON AND EVENING 20.

SOUTHEASTERN BALTIC, CENTRAL BALTIC, NORTHERN BALTIC, SEA OF AALAND AND AALAND ARCHIPELAGO:
FROM AFTERNOON SOUTHWESTERLY 14-17. THIS EVENING FURTHER INCREASING, TONIGHT 20. IN CENTRAL AND NORTHERN BALTIC 25 M/S.

REMAINING AREAS NIL.

FPSN72 ESWI 271400

Prognostiker	Uppläsare	Datum	Sändningstid
Ha'	EWA	94-09-27	15:55

~~VÄDERÖVERSIKT~~
Ett intensivt lågtryck - med centrum över Värmland - rör sig nästan rakt österut. I morgon drar det bort över Finland.

~~Storm- och kulingvarning~~ är utfärdad för
STORMVARNING för mellersta och norra Östersjön.
KULINGVARNING för övriga delar av Götalands farvatten, Svealands farvatten och sydligaste Bottenhavet.

Utsikter till Onsdag kväll

FLADEN, DOGGER:	Nordväst 12 till kuling 15 m/s, något avtagande, i morgon sydväst. Måttlig till god sikt.
TYSKA BUKTEN, FISKEBANKARNA, SYD UTSIRA:	Nordväst kuling 16-22, i natt avtagande, på dagen sydväst 8-13. Måttlig sikt, till en början regnskurar, i morgon övergående regn.
SKAGERACK, NORRA KATTEGATT:	Väst eller nordväst kuling 17-23, i morgon avtagande till 8-13 och efterhand sydväst. Måttlig till god sikt.
SÖDRA KATTEGATT, ÖRESUND och BÄLTEN, SYDVÄSTRA ÖSTERSJÖN:	Omkring väst 13 till kuling 17, i morgon på dagen 7-12. Mest god sikt.
VÄNERN:	Nordväst 13 till kuling 17, i morgon väst och avtagande till 7-10. Måttlig till god sikt.
SÖDRA, SYDÖSTRA, MELLERSTA och NORRA ÖSTERSJÖN:	Sydväst 10-13, ökande till kuling 17-22, i natt väst, på mellersta och norra Östersjön STORM 25, under dagen avtagande. Måttlig sikt, övergående regn, därefter regnskurar.
ÅLANDSHAV och SKÄRGÅRDSHAVET, SYDLIGASTE BOTTENHAVET:	Sydväst 6-10, i kväll tillfälligt växlande, därefter nordväst 13 till kuling 18, senare under dagen något avtagande. Måttlig sikt, regn eller regnskurar.
NORRA BOTTENHAVET, NORRA KVARKEN:	Tillfälligt växlande 3-6, i morgon väst eller nordväst och ökande till 10-13. God sikt.
BOTTENVIKEN:	Omkring sydväst 4-8 m/s, i morgon något ökande. Måttlig sikt.

STORM- OCH KULINGVARNING FÖR
SKAGERACK, NORRA KATTEGATT: Omkring väst 17-23 m/s, i morgon avtagande.
NORRA KATTEGATT, ÖRESUND OCH BÄLTEN, SYDVÄSTRA ÖSTERSJÖN: Väst 14-17, i morgon avtagande.

Prognostiker	Uppläsare	Datum	Sändningstid
ÅB	EVA	94-09-27	21:50

~~VÄDERÖVERSIKT~~

Ett djupt lågtryck över inre Svealand fortsätter österut. Ett annat lågtryck söder om Island rör sig snabbt mot sydligaste Skandinavien, men blir inte lika intensivt som dagens lågtryck. Ett tredje lågtryck förskjuts åt nordväst över nordligaste Skandinavien.

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Utsikter till Onsdag kväll

FLADEN, FISKEBANKARNA, SYD UTSIRA,	Omkring väst 10-kuling 15 m/s, tillfälligt avtagande till 6-10, i de norra farvattnen sent under onsdagen växlande. God sikt, under dagen tidvis regn.
DOGGER, TYSKA BUKTEN,	Omkring väst 7-12, från middagen ökande till 10-kuling 15. Måttlig eller god sikt.
SKAGERACK, NORRA KATTEGATT:	Omkring väst kuling 15-20, långsamt avtagande till 5-10, onsdag kväll möjligen växlande. Mest god sikt.
SÖDRA KATTEGATT, ÖRESUND och BÄLTEN, SYDVÄSTRA ÖSTERSJÖN:	Omkring väst 10-kuling 15, på dagen 7-12. Mest god sikt, sent i morgon regn.
VÄNERN:	Väst 12-kuling 17, under dagen avtagande till 4-8. Mest god sikt.
SÖDRA OCH SYDÖSTRA ÖSTERSJÖN,	Väst kuling 15-20, under dagen avtagande till ca 10. Mest god sikt.
MELLERSTA ÖSTERSJÖN, NORRA ÖSTERSJÖN,	Omkring väst kuling 17-storm 25, under dagen långsamt avtagande till 8-13. God sikt.
ÅLANDSHAV och SKÄRGÅRDSHAVET, SYDLIGASTE BOTTENHAVET,	Omslag till väst eller nordväst, ökande till 13-kuling 20, blåsigast i södra farvattnen, under dagen långsamt till ca 10. Förbättring till god sikt men någon regnskur.
BOTTENHAVET UTOM DEN SYDLIGASTE DELEN, NORRA KVARKEN:	Växlande 5-10, från morgonen väst 9-13. Mest god sikt.
BOTTENVIKEN:	Syd 4-8 m/s, i morgon väst eller nordväst och något ökande. God sikt.

Vindutsikter för Torsdagen

I samtliga farvatten vind mellan väst och nordväst, på många håll kuling.

SMHI NORRKOPING - 1994-09-27 18:56 UTC

WWSN42 ESWI 271900
SWEDISH GALEWARNINGS 1900 UTC

NEW:
SOUTHERNMOST PART OF BOTHNIA

SKAGERRAK, NORTHERN KATTEGAT:
AROUND WEST 15-20 M/S. SLOWLY DECREASING .

LAKE VAENERN:
WESTERLY OR NORTHWESTERLY 14-17. DURING THE DAY DECREASING.

SOUTHERN KATTEGAT. THE SOUND AND THE BELTS. WESTERN BALTIC:
WESTERLY. AT FIRST 15.

SOUTHERN BALTIC. SOUTHEASTERN BALTIC:
AROUND WEST 15-20. DURING WEDNESDAY DECREASING.

CENTRAL BALTIC. NORTHERN BALTIC:
AROUND WEST. TONIGHT 17-25. LATER DECREASING.

SEA OF AALAND AND AALAND ARCHIPELAGO. SOUTHERNMOST PART OF SEA OF BOTHNIA:
FROM LATE TONIGHT WESTERLY OR NORTHWESTERLY 14-20 M/S. TOMORROW DECREASING.

REMAINING AREAS NIL.

SLUTKOMMENTAR

Väder- och sjöförhållandena

Ovanstående bedömning anger att de hårdaste vindarna med vindkantring till västlig storm och grov sjö inträffade först 1-2 timmar efter förlisningen och pågick sedan 3-5 timmar fram till morgonen.

Det väder som inträffade var ej extremt på något sätt utan en relativt "normal" höststorm som brukar inträffa ett antal gånger varje höst- och vinterperiod, statistiskt sett 5-15 gånger per år.

Prognoser

Vad gäller prognoserna så anser SMHI att de allmänna sjörapporterna som sändes ut via P1, Kustradio och NAVTEX i god tid fångat och väl har beskrivit de vindförhållandena som inträffade under kvällen och natten 27-28:e på norra Östersjön. Likaså måste specialprognosen av vind och vågor som sändes och kvitterades per fax till m/s Estonia anses ha uppfyllt de kvalitetskrav man kan ställa på denna typ av prognoser, bortsett från att vågorna var något underskattade, särskilt maxvågorna.

Våghöjden fram till förlisningen angavs i prognosen som 2.5-3.5 m, max 5.5 m. I analysen som utförts i denna utredning får fram att våghöjden i stället bör ha varit 3.5-4.5 m, max 7.0, före förlisningen.

SMHI finner inga fysikaliska eller topografiska förhållanden i havet som kan ha skapat några extremvågor över 7 m före förlisningen.

Förhållandena efter förlisningen med vågor på 5.0-6.0 m, max 8-9 m, som inträffade 2-6 timmar fram på morgonen den 28:e hade ju aldrig m/s Estonia upplevt om hon fortsatt västerut med 14-16 knop, eftersom hon då hamnat mer i "sjölä" för den W-liga stormen.

Därmed angavs det i SMHIs specialprognos kl 04-07 (svensk tid kl 03-06) avtagande vågor trots att vindprognosen angav ökning till W 18-25 m/s.

SMHI anser att prognoserna i detta fall bör ej ha upplevts som "avskräckande" för befälet på m/s Estonia eftersom denna typ av väder upplever man ett flertal gånger varje år på norra Östersjön, några gånger till och med värre.

Förutom en detaljerad vindprognos för olika delsträckor anges i denna även en prognos på våghöjden som är beräknad utifrån den ovan beskrivna vågmodellen.

Prognosunderlag

Det underlag som SMHI använder för prognoserna upp till 72 timmar är en numerisk (datorbaserad) vädermodell som körs i en stordator 4 gånger per dygn. För de längre prognoserna upp till 10 dygn används en sam-europeisk numerisk vädermodell som körs 2 gånger per dygn och har lite grövre upplösning i tid och rum.

För att ha beredskap mot tekniska problem samt för jämförelse med de egna slutsatserna erhåller SMI dagligen även numeriska vädermodeller från Storbrittanien, Tyskland och USA.

Samtliga observationerna som finns tillgängliga från jordytan, atmosfären och satelliter matas kontinuerligt in i dessa vädermodeller. Dessa data presenteras kontinuerligt även för vakthavande meteorolog på skärm eller i kartform, som på så sätt övervakar och följer väderutvecklingen.

Väderutvecklingen den 27-28 september var väl fångad av SMHIs numeriska vädermodell, likaså av d utländska numeriska vädermodellerna. Vakthavande meteorologer som tjänstgjorde på SMHI under måndag-tisdag den 27-28 september hade därmed ett mycket bra underlag och stormvarning utfärdade redan tisdag morgon för kommande natt på norra Östersjön.

Vågmodellen, som initialiseras av vindarna från SMHIs numeriska vädermodell och som används som underlag för vågprognoserna, var relativt bra men hade något underskattat våghöjderna.

S M H I
Sjöfart Tel 011-17 01 02 (kl 08-16)

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Att: MASTER

Fax: 010 - 261 98 08
CC: 08-666 60 52 ATT: BENGT BRYUNGS

Issued: 1994-09-27 1311 LT

TALLINN - STOCKHOLM

Stretch	Time (svensk tid)	Mean wind speed on 10 m level	m/s	Prob. for mean wind >15 m/s in %	Wave height sign (m)	max (m)	Remarks
Naisaar-N Osmusaar	(19-21) 20-22	S-SW	10-15	20	1,0-2,0	3,0	
N Osmusaar-S Bogskär	(21-03) 22-04	SW-W	15-20	70	2,5-3,5	5,5	
S Bogskär-Sandhamn	(03-06) 04-07	W-NW	18-25	90	3,5-2,0	5,5	

COMMENTS: INTENSE LOW NEAR OSLO MOVING E-WARD VIA SOUTHERN SEA OF BOTHNIA TO SUOTHERN FINLAND. IT WILL CAUSE INCREASING SW- LATER W-NW. FROM TO NIGHT GUSTY WIND. AT DEP. RAIN WITH MOD VIS. LATER SOME SHORT SHOWERS.

BEST REGARDS/