

# Statement stig lindstrom

18/02 '95 14:54 0358 0 75908285  
15/02 '95 KE 13:44 FAX 358 21 655551

OM-SUURONNETTOM  
KRP TURAU

Enclosure 3.4.101

KRIMINALÖVERKONST/POLISEN  
Ålands-polisen

FÖRHÖRSBESÄTTNING/FÖRHÖRSPROTOKOLL  
Vittne

## FÖRHÖRSTILLFÄLLE:

CKP, Mariehamn fre 3.2.1995 kl.13.00  
Förhörare: kriminalöverkonst. Olof Lindqvist  
Förhörsvidtne:  
Andra närvarande:

## VITTNETS PERSONUPPGIFTER:

Namn: LINDSTRÖM, Stig Eskil pb.061242-467E  
Yrke: styrman  
Befolkningsregister: Mariehamn  
Adress: Knorringagränd 1, 22100 Mariehamn

Teléfono h/a 928-14243  
Arbetsgivare:  
Adress:

## KOMPLETTERANDE UPPGIFTER:

Släktskap: -

ANTECKNINGAR: Brott: Utredning av sjöolycka  
Anmäljan nr: 7020/S/10964/94

## DELGIVNING AV RÄTTIGHETER OCH SKYLDIGHETER:

Ställning i förundersökning (delgivits)  
Rätt att tillkalla förhörsvidtne.  
(delgivits)  
Rätt att vägra yppa omständighet, om han själv  
eller nära anhörig löper risk att utsättas för  
åtal (delgivits)  
Rätt att vägra svära utsaga varigenom affärs- el-  
ler yrkeshemlighet skulle uppenbaras  
Sanninghetsplikt samt påföljd om osann utsaga, SL  
17:4 (delgivits)

## TILLÄGSUPPGIFTER:

### FÖRHÖRSBERÄTTELSE:

Antecknas, att den förhörde ej önskade förhörsvidtnes närvaro vid  
förhöret.

Förhöret är upptaget på band och antecknat i referatform.

Stig Lindström berättade, att han arbetat på Viking Sally som se-  
dermera döpts om till Estonia. Han hade varit anställd som övers-  
tyrman från 1980 fram tills 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 normal längd. Men, om man stod bakom instrumentpanelen så såg man i princip ingenting av fören, bara gösen.

- Eftersom Viking Sally (sedermåra Estonia) inte var byggd som "ett vanligt fartyg" utan hade bryggan förskjuten någon bakåt, var uppsikten 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 styr-ljus 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 kontrolllampor. 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 visirat.

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 tvungna att göra en förstärkning på en läsanordning 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

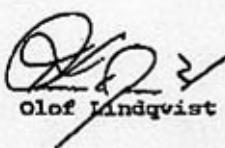
man "slagit sönder hela fartyget" och i "princip allting ombord".  
Man höll en sådan fart att det var bekvämt för passagerarna.

Stig Eriksson uppges 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.

Förhörret avslutades kl.13.15

- Antecknas, att avskrift av förhörret sänds Stig Lindström till kännedom.

Kriminalöverkonstapel

  
Olof Lindqvist

# Wasa king invoice to wasa line

**TURUN KORJAUSTELAKKA OY**  
TURKU REPAIR YARD LTD

**FAKTURA nr 31554**  
21.4.1993

Beställare  
Wasa Line Ab  
Box 213

65101 VAASA

Beställare ref  
C. Richardsson

Skjärare ref  
EMd/HKA/TA

Betalningsvilkor  
14 pv netto              Omvä  
0 %

Förfallodat 6.5.1993  
Förvaringsavgift 18 %

Märke  
M/S wasa king  
428

Ad 00

Pos. nr Specifikation

Totalpris

Rerarationsarbeten enligt  
bifogad specifikation som utförts  
under dockingen 4 - 8.1.1993

mk                            273.231,00  
\*\*\*\*\*

Postiosoite  
PL 430  
20101 TURKU

Puhelin  
(921) 638711

Telex  
19216387250

Telex  
62484 try sf

Pankki  
TYP 433110-19066  
PSP Tu 227388

Lvv  
Rek.

M/S WASA KING

Projekt nr. 428

Indockning 4.1.1993

Utdockning 8.1.1993

0010	In- och utdockning	26.300,00
	Dockshyra 2,5 dygn å 11.950,-	29.875,00
0020	Inkoppling av brandlinjer 2 st å 660,-	1.320,00
0030	Inkoppling av telefon	405,00
	Samtalsavgifter 540 impulser å 0,65	351,00
0040	Tömning och borttransport av avfall 2 ggr å 410,-	820,00
0050	Mätning av propelleraxel	2.700,00
0060	Utbyte av Cederwall-tätningsar	
	Inre tätning 1 st å 11.000,-	11.000,00
	Ytre tätning 2 st å 33.000,-	66.000,00
	Övertidsarbetskostnader	23.300,00
	Tätningsar 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 torkning av lindningar. Spärkullagrarna 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 <sup>2</sup> . 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

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mk 273.231,00  
\*\*\*\*\*

**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 %**

**Mark****M/S ESTONIA****Projectno. 429****COPY****Post. 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**  
\*\*\*\*\*

<b>Mailing address</b> P.O.Box 430 SF-20101 TURKU Finland	<b>Telephone</b> +358 21 638711	<b>Telecooper</b> +358 21 6387250	<b>Telex</b> 62484 Try sf	<b>Bank</b> SKOPBANK P.O. Box 400 SF-00101 HELSINKI Finland	<b>Account Nos.</b> DEM 433104-92109188 USD 433112-92118189 FIM 433110-19066
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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 m<sup>3</sup>/hour, which can be started either from bridge or from engine room.

Sprinkler system with 2 (drencher) pumps, capacity 150 m<sup>3</sup>/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<sub>2</sub> for the engine room situated on port side on the deck No. 8. The CO<sub>2</sub> can be discharged from a box by the CO<sub>2</sub> 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

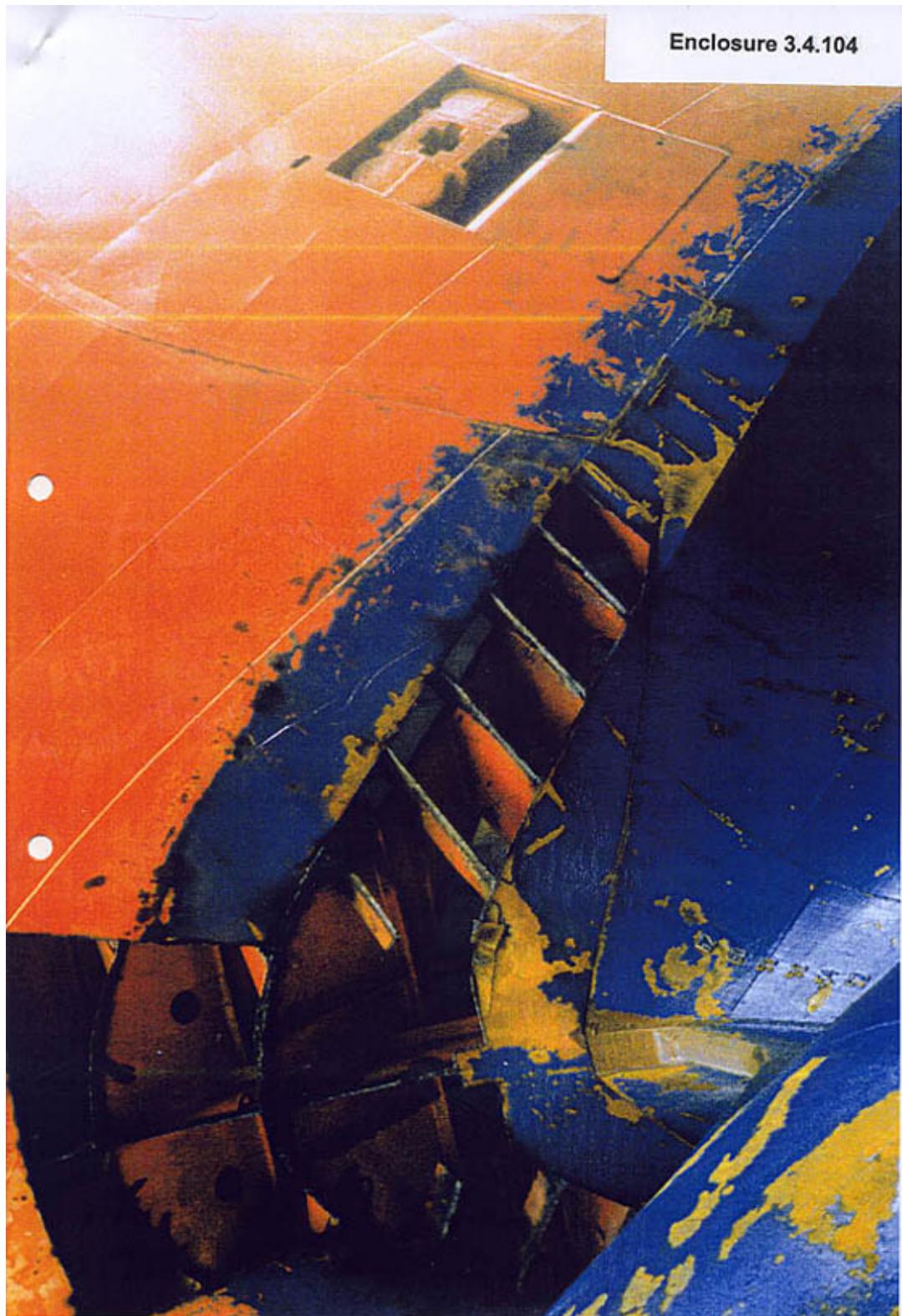
Heavy ice damage to shell plating in way of strakes A, B, and C from bow thruster to the fore ends of the bilge keels between frames 10-120 up to 20 mm deep.

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.

## Photo showing damaged visor plating



## Summary of pre -entry condition survey

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.

**Ms estonia a ship emanating from the baltic phenomenon**

# M/S Estonia

*a ship emanating  
from The  
Baltic Phenomenon*

An historical overview  
made by



for

The Joint Accident Investigation Commission  
of Estonia, Finland and Sweden

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## 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.

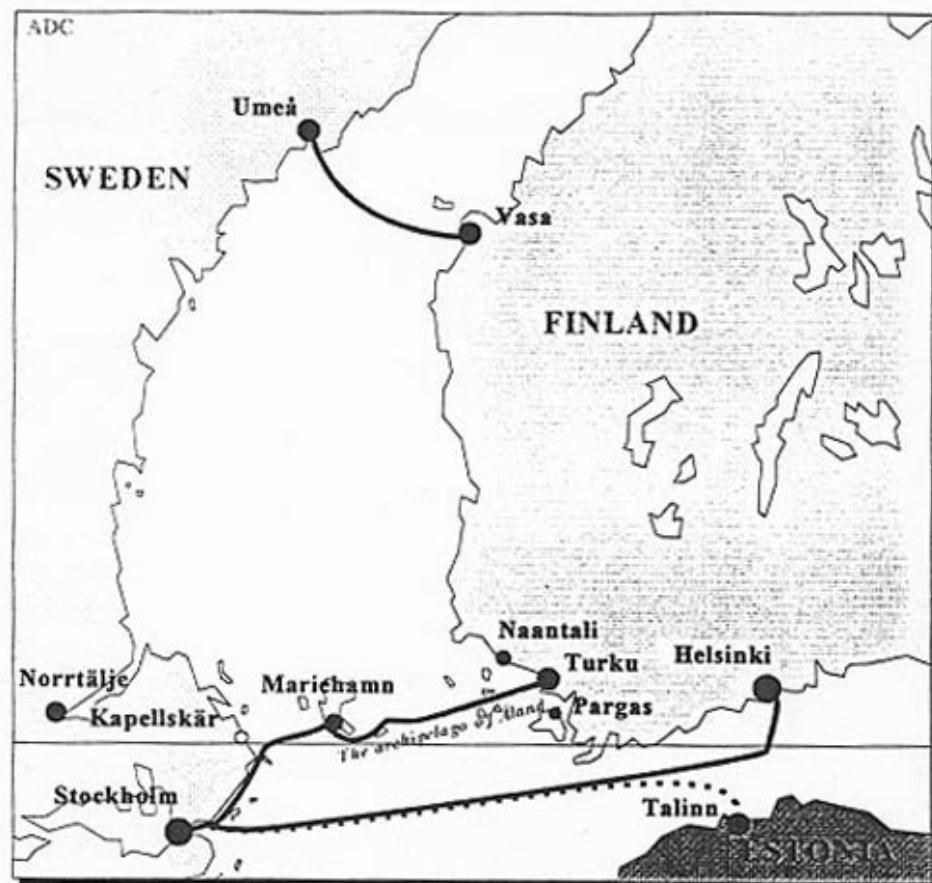
The ship was named *M/S Viking Sally* and commenced her service in Viking Line on July 5 1980 on the route Kapellskär (a small terminal Viking Line used about 90 km north of Stockholm) - Mariehamn - Naantali (about 20 km north of Turku, Finland). For eight months she belonged to the group of biggest 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 March 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-through 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 adapt 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.).

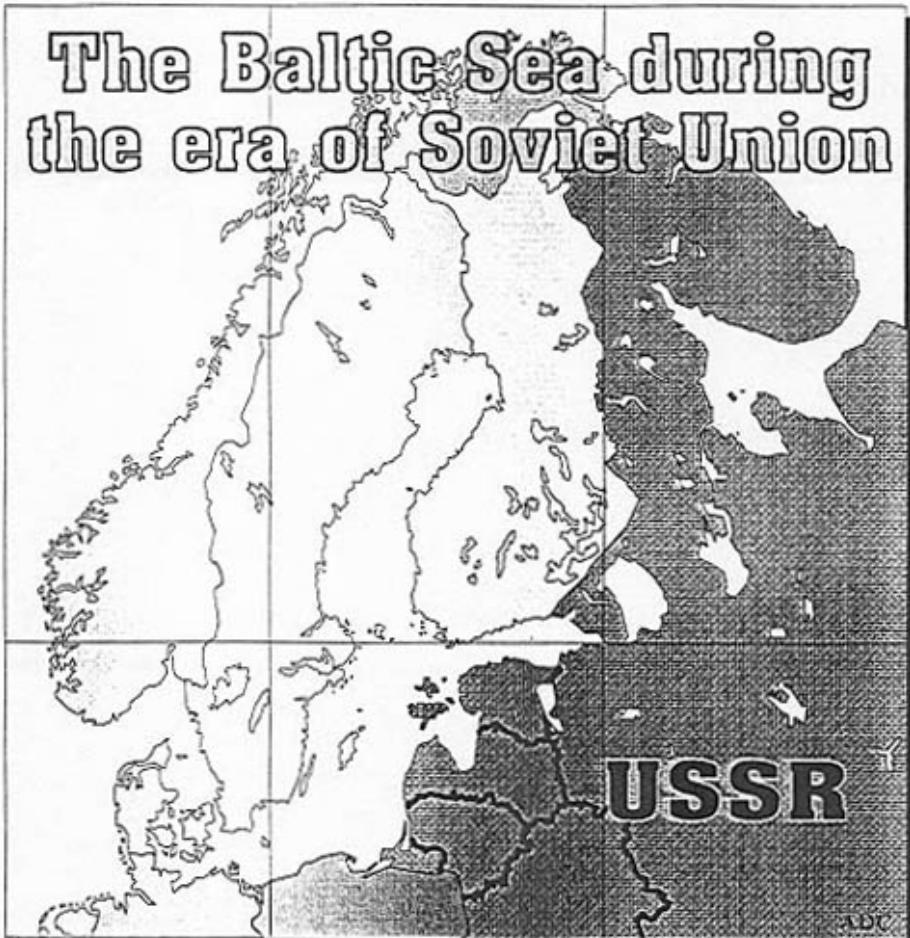
The ferry service handles mixed cargo and is performed on fixed published schedules. Except for dangerous cargo the service is offered on a general basis, a common transport service open to everyone. The cargo is normally standing on its own wheels and represents in general a high value per ton. Ships 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.

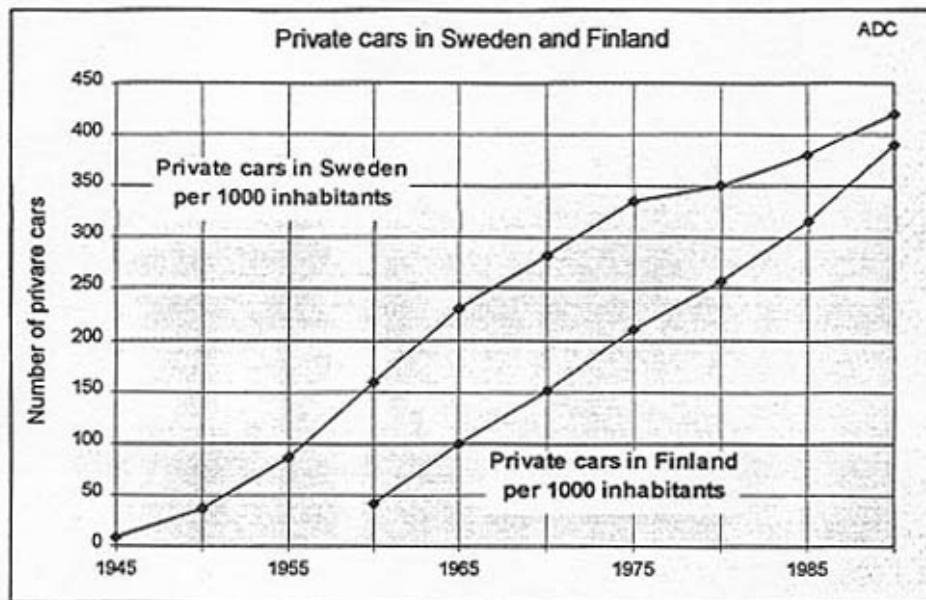
Late 1800 steamers were introduced on the trade to transport mail and passengers. The steamers were during the 60's replaced by diesel motor driven RoRo-ferries. In 1918 FÅA (the Finnish steamship company, later changed to the phonetic abbreviation EFFOA), the Finnish owner Bore and the Swedish owner 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 captain 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 Sölvborg 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 (Algö 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 impressive. 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.

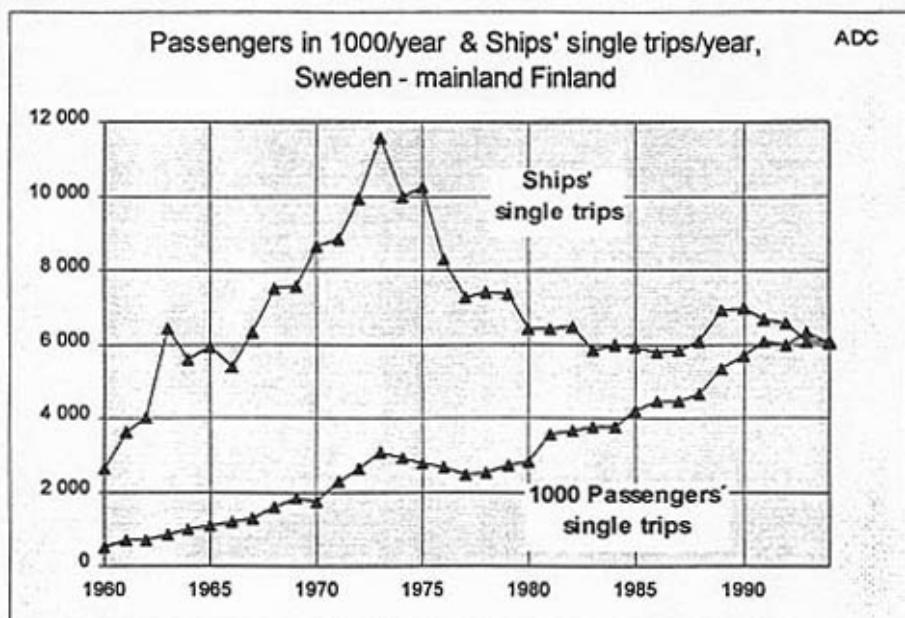
Silja Line couldn't deny that the new conceptual solution was a threat. Their philosophy that passenger and cargo traffic should be separated had to be revised. It wasn't a pleasant prospect that their passengers should be forced to go with "the newcomers" if they wanted to bring their car. It was however 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%

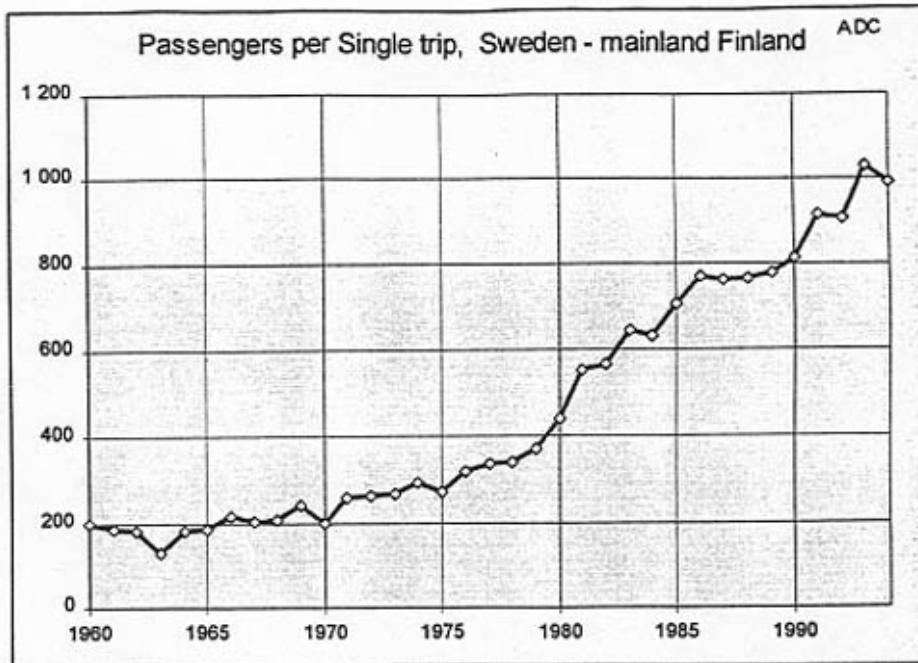
During the same period, in addition to above figures, passenger cruise traffic in the area and traffic to/from Åland has grown substantially.



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.

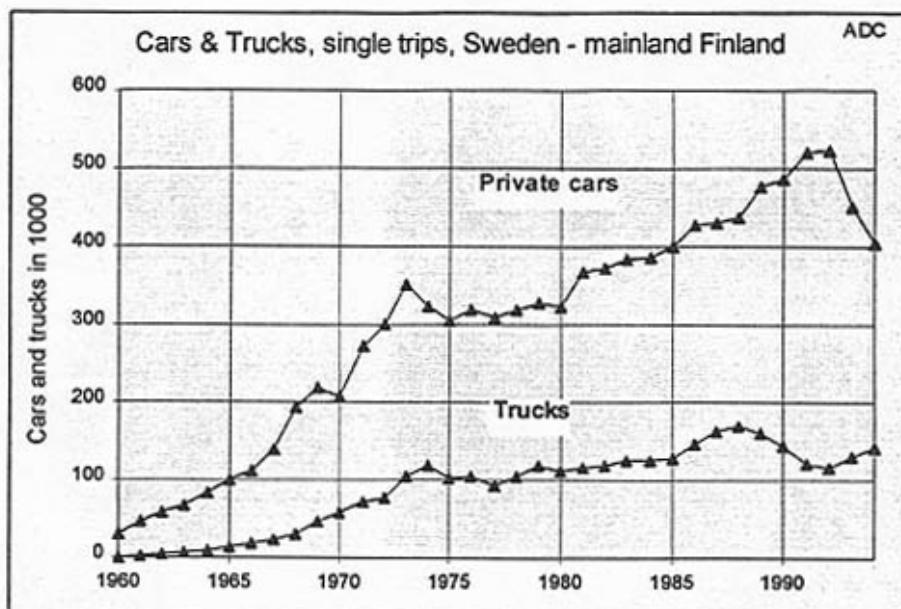
The reason is, competition has forced the traffic to be rationalised. Fewer and bigger ships made more transport work. This is not just an effect of economy of scale. The operators have also expanded their market by introducing new commercial concepts.



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 sharing.

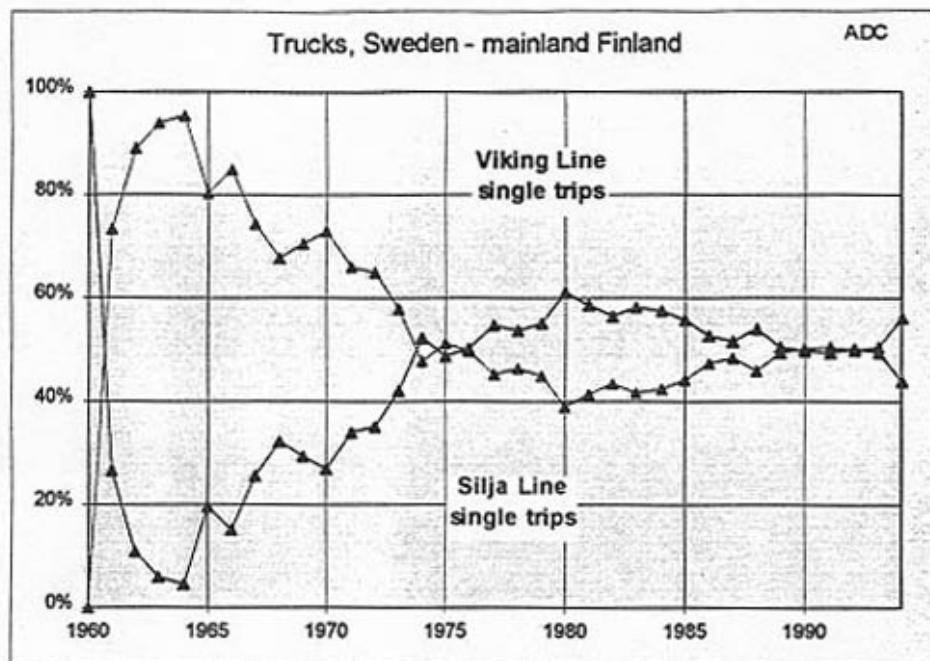


Although Viking Line almost immediately succeeded in gaining 30% of the passengers, Silja Line could defend their majority position until 1975. By chartering ships and an extensive new building-program Viking Line then took a bigger share than Silja Line. On the other hand it was some comfort to Silja Line that they could maintain somewhat higher prices for their services.



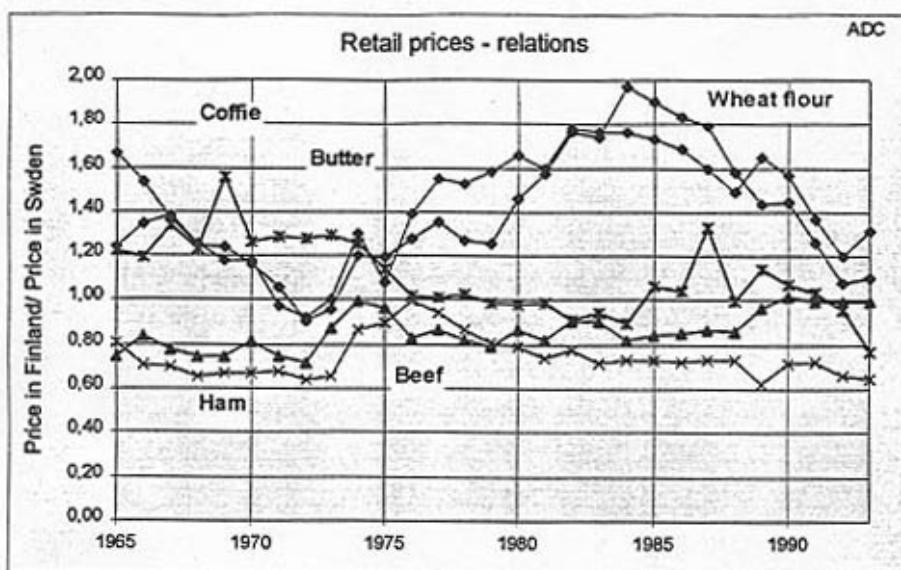
Viking Line got the initiative in the market of private cars. As seen in the diagram it took some time until the Silja Line passengers brought their cars over the Baltic. An explanation is that in the beginning the passenger with car selected the most affordable alternative for the transport. Later on 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 attractive 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.

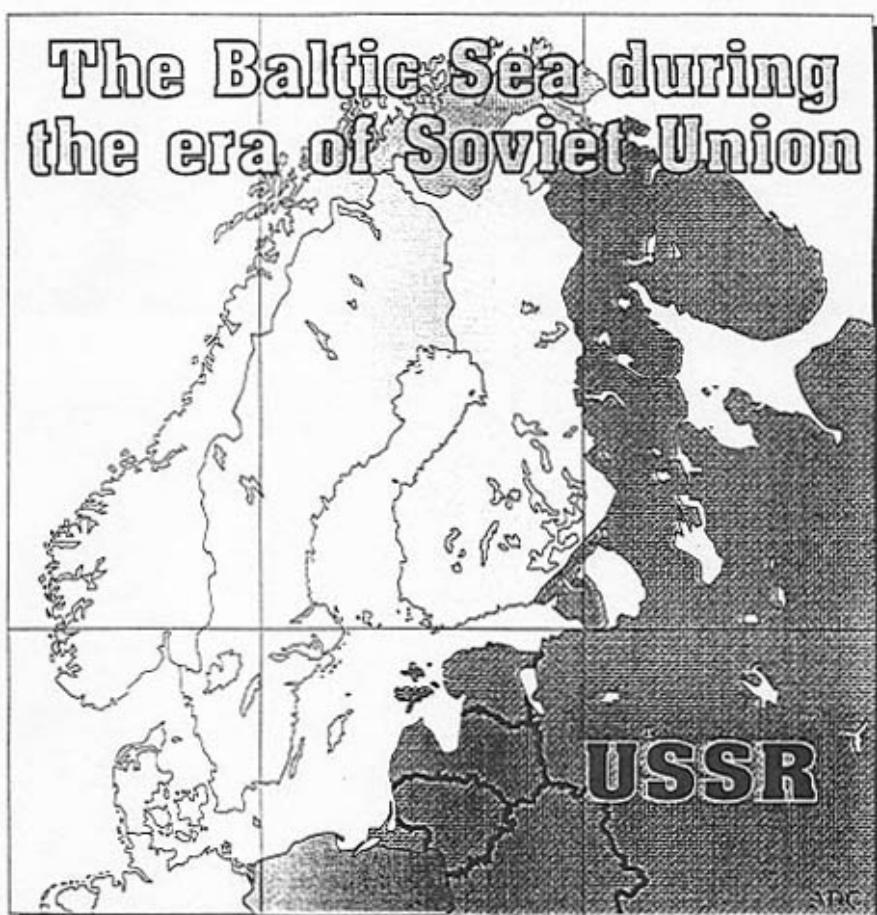


The traffic over Åland Sea between Sweden and Åland was elementary. The business idea was to make it easier to bring private cars between Sweden and Finland and to explore border trade. Border trade, meat and tax-free, soon made the traffic popular

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.

## The Baltic Sea during the era of Soviet Union



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-manufactured products etc.). On short and medium distances door-to-door truck transportation in com-

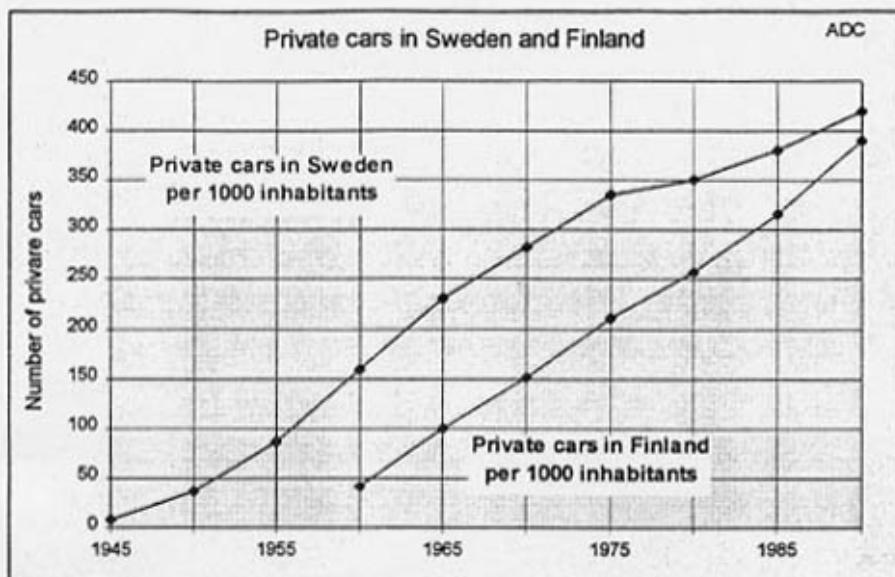
bination with the RoRo ferries could offer the required service quality. In this case quality was expressed in terms of reliability, flexibility and short transit times.

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.

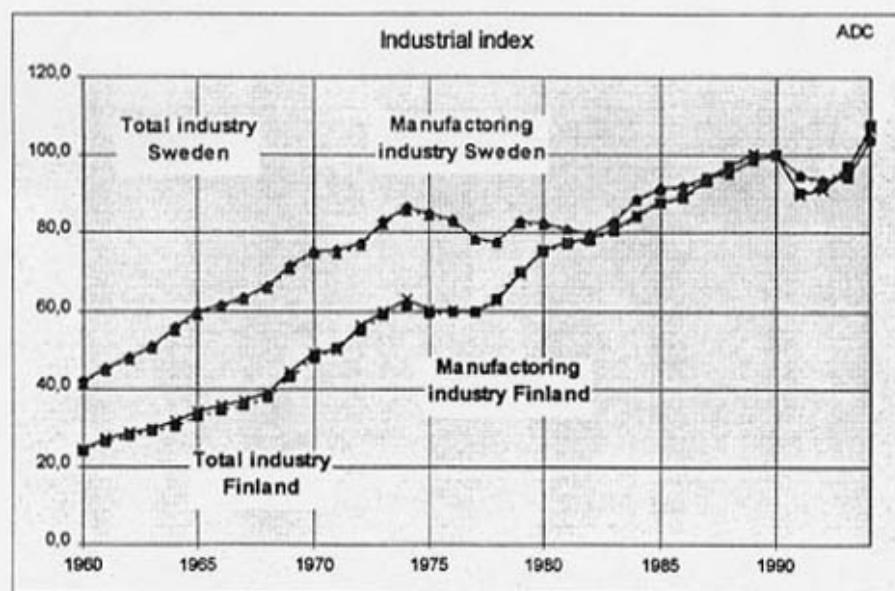


The diagram over Finnish export, shows how the trade grew with Sweden during the 60's. Then the industrial activity of Finland continued to increase. The Swedish share in % of the total volume declined however somewhat when other markets grew faster.

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.

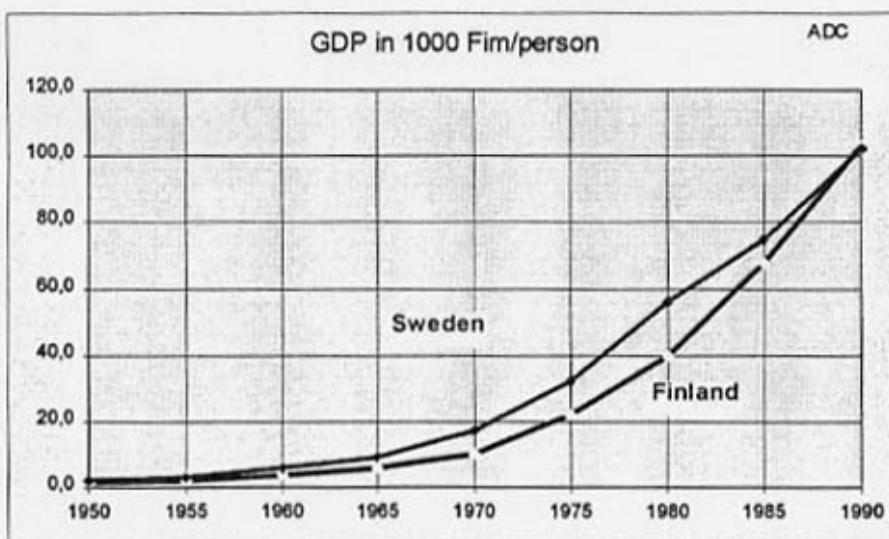


Industrial index (100% 1990) shows that industry in Finland had a faster expansion of

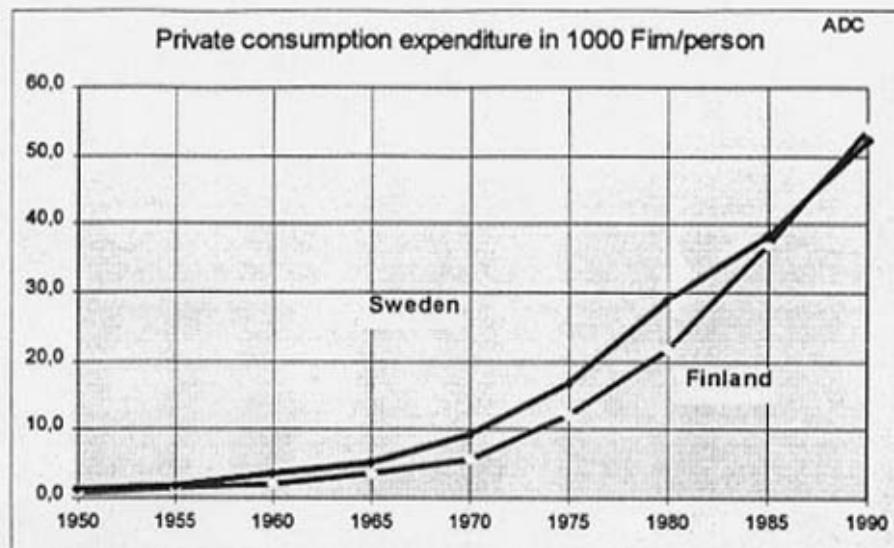
the industrial sector than Sweden during the period 1978 to -82. During this time the quality of the transport service also improved a lot. In 1981 the reliability was close to what it is today.



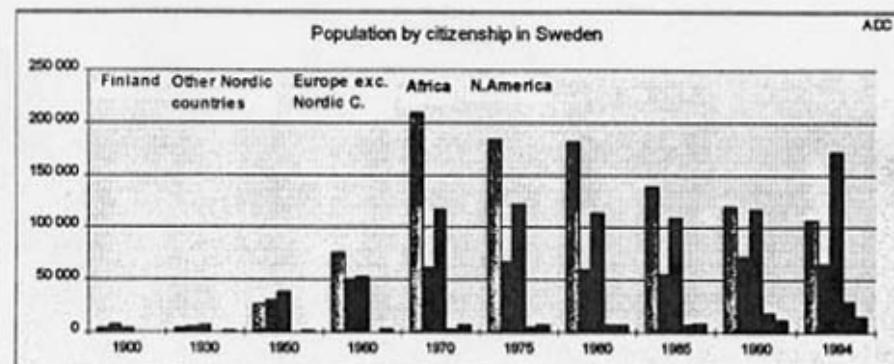
With the expansion of industry followed increased GDP. Sweden used to be ahead of Finland until today when GDP/person is practically the same for the two countries.



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 through 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 impressive and still is when comparing with today's 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), Silje (0))
SS Bore	1960	
Skandia (106)	1961	(Bore (0))
Nordia (209), Svea Jarl (250)	1962	
Ilmatar, Floria (cargo only)	1963	(Alandsfjjan (0))
(Holmin)	1964	Apollo (0) (Drott (172))
Fennia (296)	1965	Kapellaker
Bonita (162)	1966	Vinter traffic Kapellaker-Pargas
Silja to Västern	1967	Kapella (120), (Vistby (245), Stena Baltica)
Winter traffic Stockholm-Helsinki	1968	(Viking 2 (0))
Stockholm-Turku	1969	
Svea (186)	1970	Apollo (222), Viking 1 (206), Mariella (172)
Winter traffic Stockholm-Helsinki	1971	Viking 3 (226), Diana (240)
Boote I (377)	1972	New route for Viking Line -73
The 1st Oil Crisis	1973	Viking 4 (198), Aurelia (328)
Sven Coronis, Wellamo, Bore Star (810)	1974	Stockholm-Marihamn-Turku
(1175) (650)	1975	Viking 5 (410), (Viking 6 (432))
(110)	1976	New route for Viking Line
	1977	Stockholm-Helsinki -74
The 2nd Oil Crisis	1978	(Alandsfjjan)
	1979	Diana II (828), Tarell (750)
Finnlandia (1544), Silvia Regatta (1544)	1980	Rosella, Viking Song, Viking Sally, Viking Saga
	1981	(740) (1223) (1190) (1452)
	1982	(Aurelia (328), Alandsfjjan (0))
	1983	(Alandsfjjan(0))
Sven (1625)	1984	(Alandsfjjan(0))
Wellamo (1937)	1985	New name: Viking Line
	1986	Mariella (2447), (Alandsfjjan (0))
	1987	Olympia (2333)
	1988	(Alandsfjjan (0))
	1989	Amerilia (2112)
	1990	Athena (1712), Cinderella (2766), Isabella (2004)
Silja Serenade (2626) (Silja Star)	1991	Kalypso (2165)
Silja Symphony (2626)	1992	<small>Notes: Ships within brackets are not purpose built for the trade.</small>
(3700) (2188)	1993	<small>Figures in brackets are passenger bed capacity.</small>
(Silja Europa, Silja Scandinavia)		

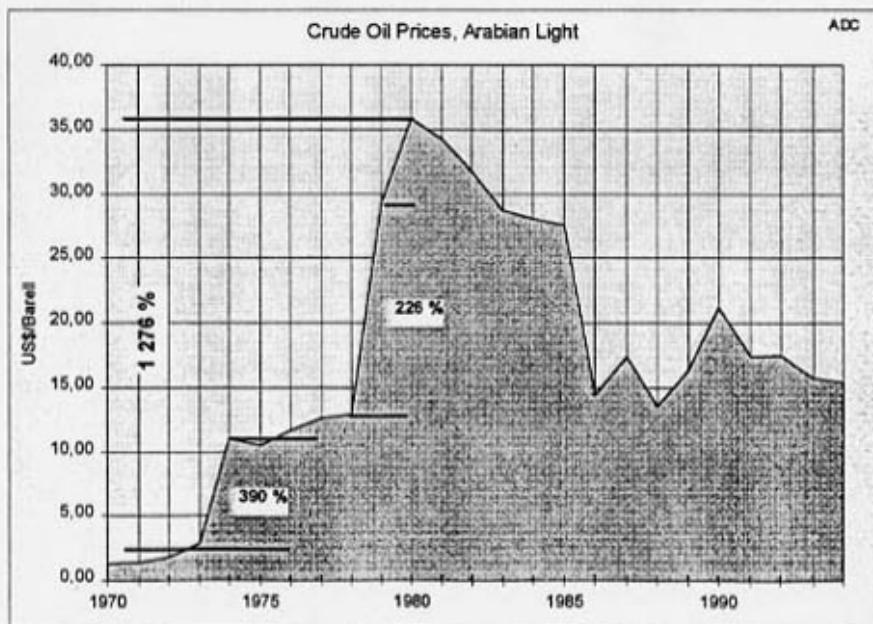
After: Supertech AB  
Stockholm 1997

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<sup>3</sup>, to be compared with M/S **Diana II**'s 11.537 m<sup>3</sup>. 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.

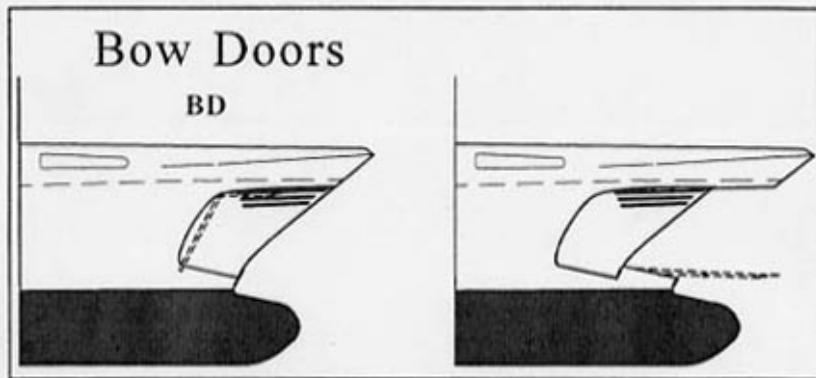
#### **The cargo deck and -accesses**

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.

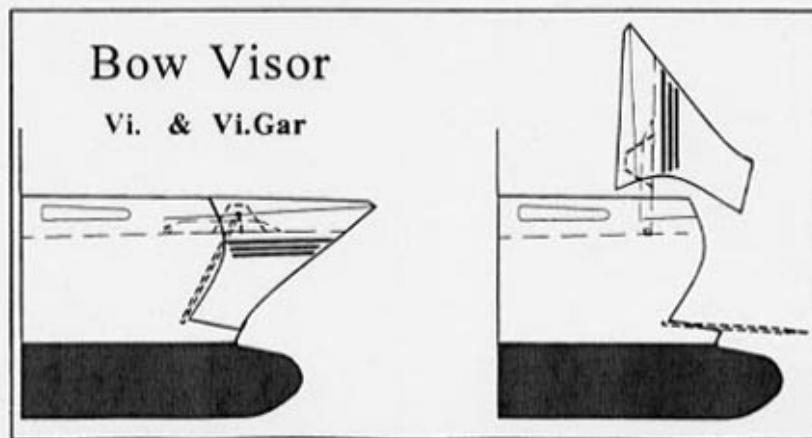
Stern ramps and stern openings have been improved but the design principal remain the same, i.e. in lowered position the ramp is a driving way and in the upper position the ramp seals the stern opening to cargo deck. This ramp is located in the aft most position of the ship with the aft collision bulkhead 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 there 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.

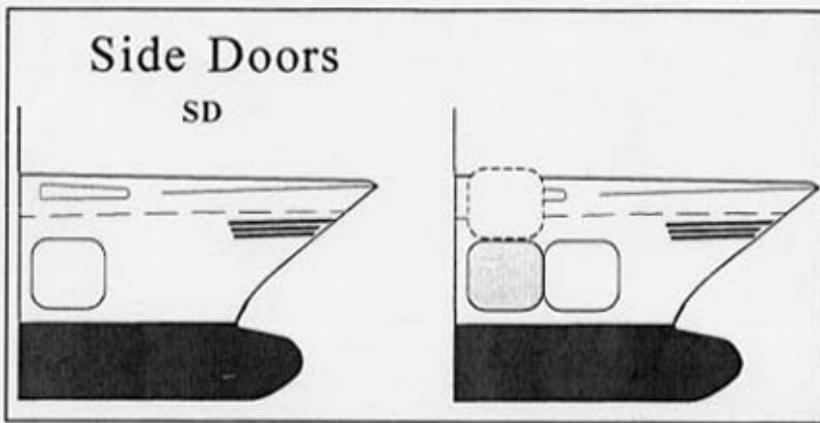
- **Bow doors** are normally hinged on heavy arms. The doors are opened by hydraulic cylinders moving the doors outside along the ship's sides. There are also some old designs where the doors are swinging. In closed position, pressure forces acting on the doors are transferred to the ship's hull via 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 Jel, Lo/Lo	1959	(Viking VI.Gar, Silje SD)		
SS Bore SD	1960			
Skandia VI.	1961	(Bore SD)		
Nordia N., Svea Jel SD	1962	(Alandstrajn VI.Gar)	Kapellskär	
Imatra VI.Gar, Floria, Lo/Lo	1963	Apollo VI.Gar (Drotten VI.Gar)		
(Holmia VI.Gar)	1964	(Visby VI.Gar)	Wester traffic Kapellskär-Pargas	
Fennia VI.Gar	1965			
Botnia VI.	1966	Kapella VI.Gar, (Visby VI.Gar, Stena Baltica VI.Gar)		
Silja es Vertas	1967	Kapella VI.Gar, (Visby VI.Gar)		
	1968	(Viking 2VI.Gar)		
New name: Silja Line	1969	Apollo VI.Gar, Viking 1VI.Gar, Merella VI.Gar		
Winter traffic Stockholm-Helsinki	1970	Viking 3VI.Gar, Diana VI.Gar	New route for Viking Line -'73	
Aallisto BD, Svea Regina BD	1971	Viking 4VI.Gar, Aurella VI.Gar	Stockholm-Marchhamn-Turku	
Bore 1VI.Gar	1972	Viking 5VI.Gar, (Viking 6 VI. )	New route for Viking Line	
The 1 st Oil Crisis	1973	(Apollo III SD)	Stockholm-Helsinki -'74	
Svea Coronis, Wellamo, Bore Star	1974			
Vi. Vi.	1975	(Alandstrajn VI.)		
	1976			
	1977			
	1978			
The 2 nd Oil Crisis	1979	Diana II VI.Gar, Turella VI.Gar		
	1980	Rosella, Viking Song, Viking Sally, Viking Saga		
Finlandia VI.Gar, Silvia Regina VI.Gar	1981	Vi. VI.Gar	Vi. VI.Gar	
	1982	(Aurella VI.Gar, Alandsstrajn VI.Gar)		
	1983	(Alandstrajn VI.Gar)		
	1984	(Alandstrajn VI.Gar)	New name: Viking line	
Svea BD	1985	Mariella VI.Gar, (Alandsstrajn VI.)		
Wellamo BD	1986	Olympia VI.Gar		
	1987	(Alandstrajn VI.Gar)		
	1988	Amorella VI.		
	1989	Athena BD, Cinderella BD, Isabella BD		
Silja Serenade BD, (Silja Star)	1990	Kalypso BD		
Silja Symphony BD	1991	Note: SD = Side Door, BD = Bow Door		
BD	1992	VI.Gar = Fair & Ramp-garage VI = Independent Fair		
(Silja Europa, Silja Scandinavia)	1993	VI.Gar = Fair & 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 height in the fore-ship was not sufficient to accommodate the full length of the ramp when raised.

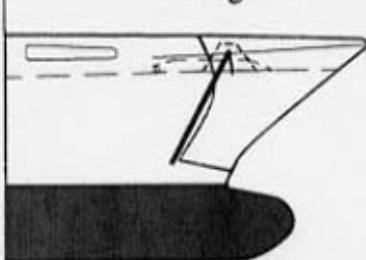
There were two possibilities to accommodate a long ramp, either to make the forward part of the ramp foldable or simply to increase the height by arranging a garage on the above deck in which the ramp could be stowed.

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.

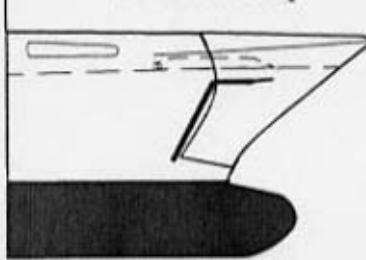
The other solution was to make the uppermost part of the ramp foldable forward under the mooring deck. The shapening of the bow limited the length of the folded part. This was also in practice an "integration" of the visor and the ramp. Thus if the visor for some reason was moved outside its normal track it could effect the folded part of the ramp.

## Ramps in stowed positions

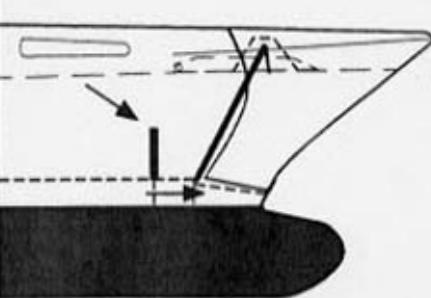
Garage



Folded ramp



Protecting barrier



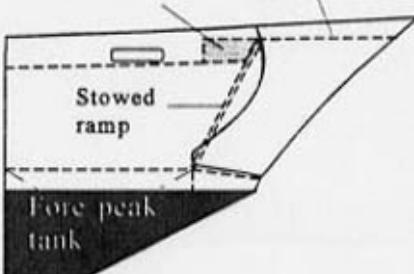
There was also a solution aiming to reduce the required length of the ramp. The pivoting point of the ramp was simply forward and thus could the ramp be made shorter. Often this was not sufficient so this was often combined with the above described arrangements. When the ramp was moved forward the ramp 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.

### The French Sisters

Store      Raised Dk



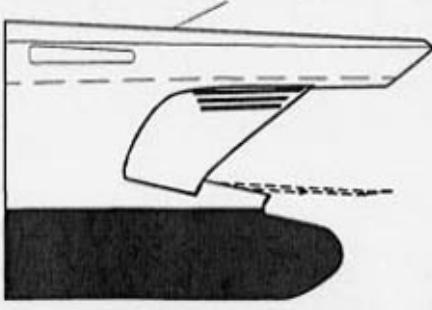
From design point of view, visors and bow doors is shaping the bow of the ship. Properly designed the bow shape would contribute to good sea keeping performance. Although it is the ambition, it is practically impossible, to keep the space forward of the ramp completely dry, but the construction shall 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.

### Covered mooring deck

A roof creating the top of a box



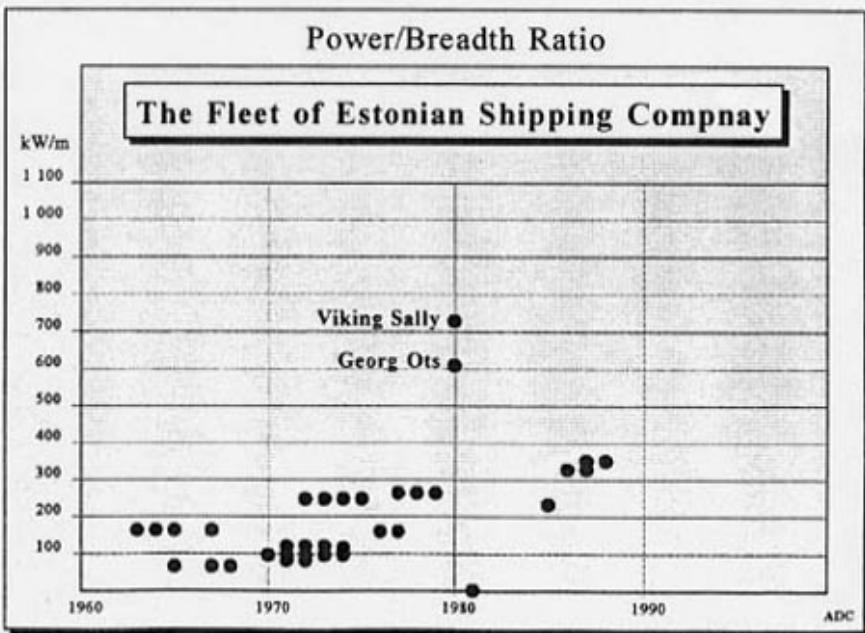
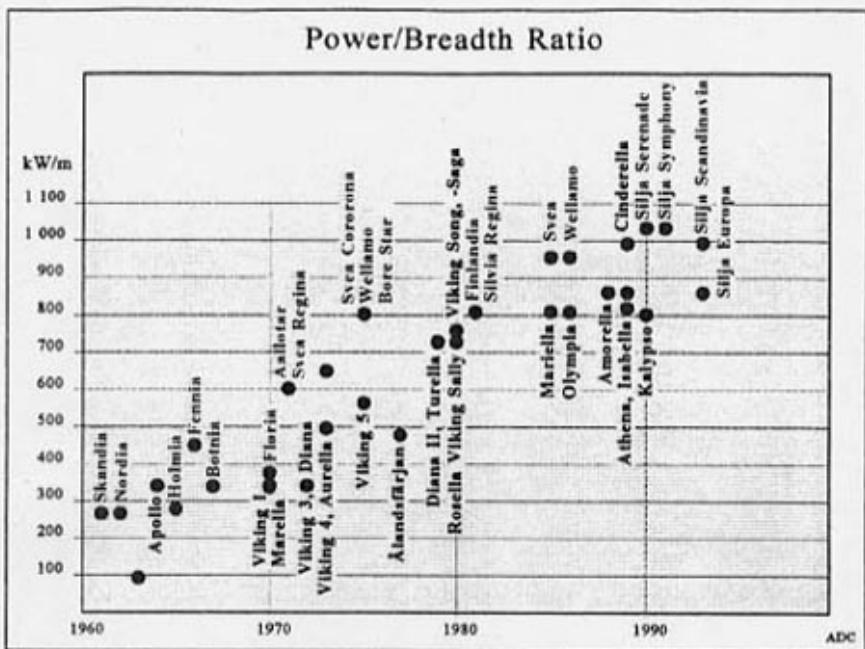
The consequence of a properly designed supporting structure for a bow door arrangement is often that the forward mooring deck is covered. Thus a stiff box construction provides the foundation of the supports absorbing vertical forces. It has not been difficult to get acceptance for such arrangements 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 maximising 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.



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 lot of 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 adapt 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

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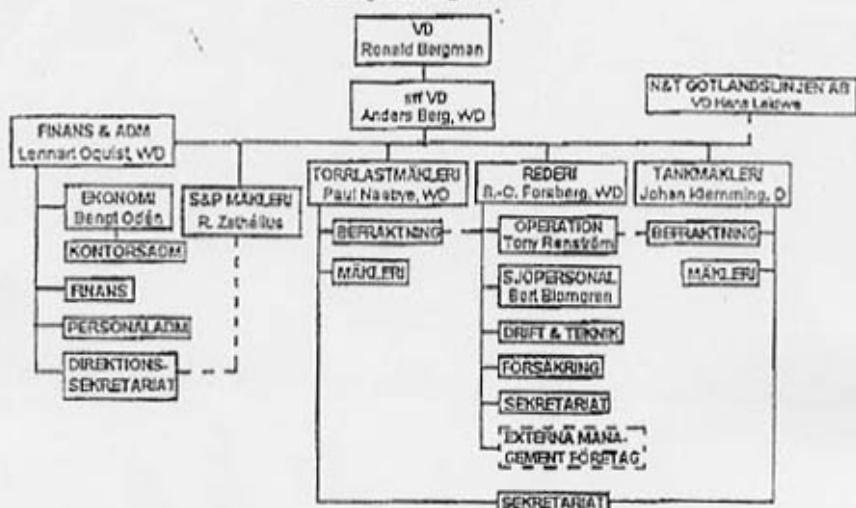
Hans Wermelin  
Naval Architect M.Sc.

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H. Wermelin

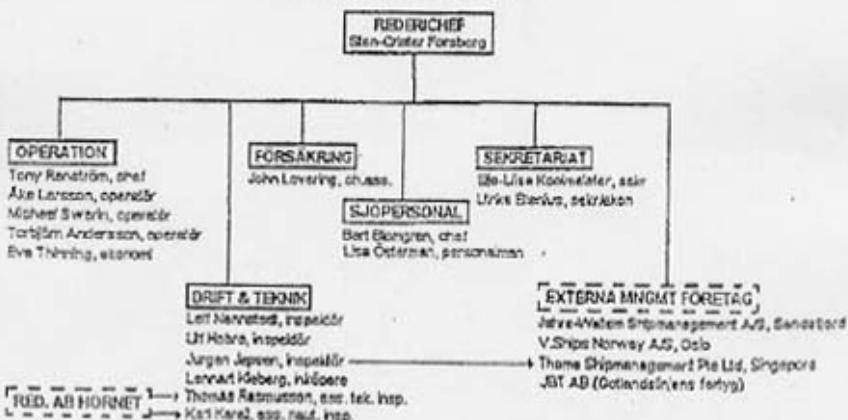
**SOURCES**

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

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## N&amp;T REDERIAVDELNING



**CV SC - forsberg**

## CURRICULUM VITAE

I (2)

Carl Sten-Crister Forsberg

Född i Göteborg 450304-5413  
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1965	Studentexamen, Reallinjen, Matematisk gren
	Hvitfeldtska HAL, Göteborg
1966--67	Plutonchefsskola, 117 Uddevalla
1968	Teoretisk Fysik med Kvantmekanik I betyg + del av Fysik I 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 Projektaffärsmedarbetare: dataprogrammering, tekniska illustrationer, fältmätningar
1972--74	GÖTAVERKEN CITYVARVET, Göteborg Biträdande reparatöringenjör, skrov och maskin
1974--76	SALÉNREDERIERNA AB, Stockholm Torrlastdivisionen, biträdande inspektör
1976--77	GÖTAVERKEN CITYVARVET, Göteborg Reparatöringenjör, 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.
1987--88	Koordinering av Argonaut AB fartygsdrift.
1988--	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
	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 farjefrågor, 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

**CV -Ulf hobro**



## CURRICULUM VITAE

1 (2)

Ulf Hobro

Född 1948-03-31

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1966 Skolfartyget M/S RAUNALA, förb. maskinteknikerkurs  
 1968 Maskinteknikerexamens, 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

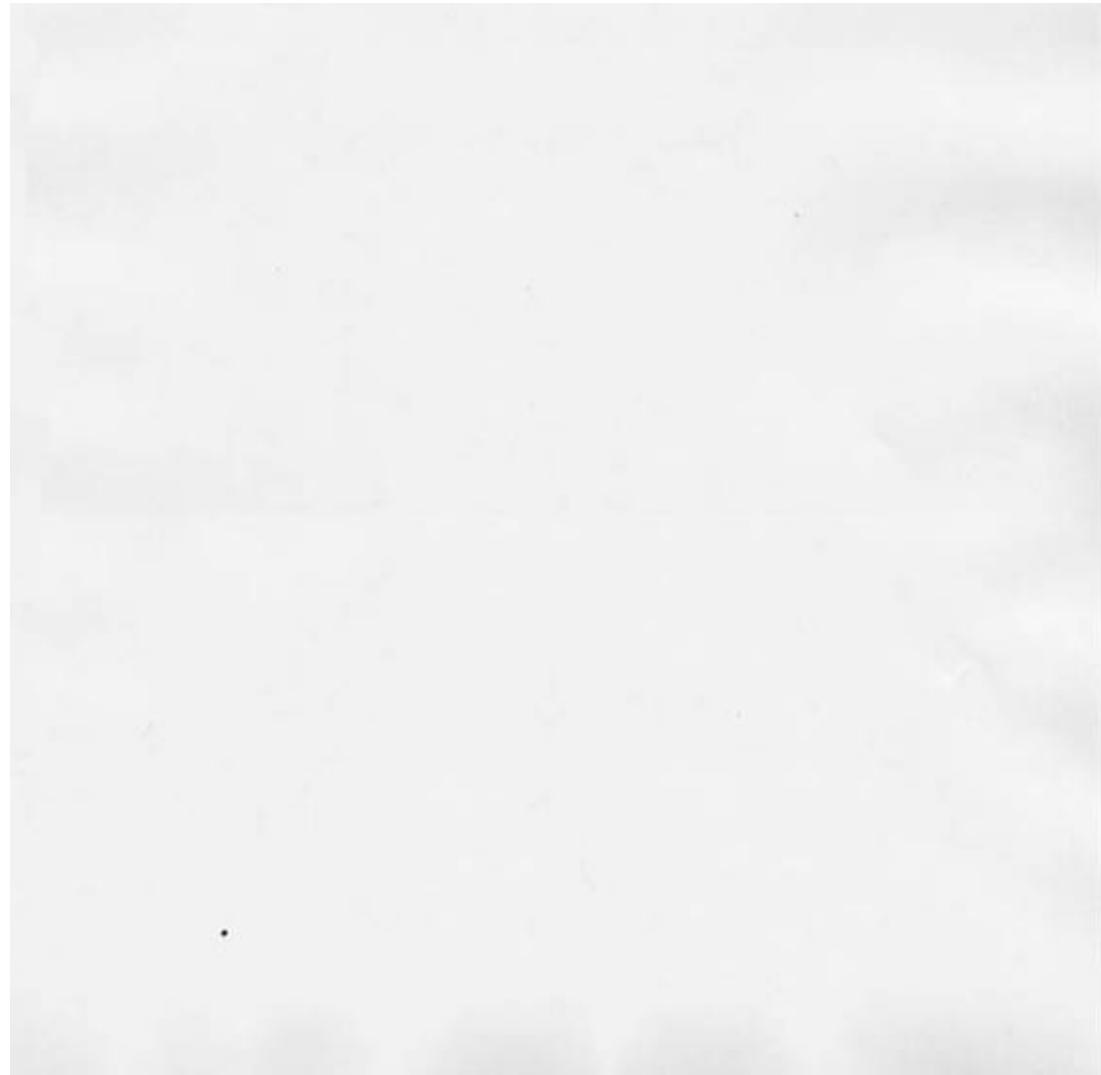
1971 Svetskurs med prov, ESAB  
 1971 Rationellt fartygsunderhåll, IKO Consult AB  
 1978 B&W Alpha training course  
 1979 Dator grundkurs, SIFU  
 1980 Uppräkning av maskiner och axlar i fartyg, STF ingenjör  
 1981 Underhållsteknik fartyg, Idshammar Konsult  
 1984 Släckledarkurs, Sjöfartens Brandskyddskommitté  
 1984 Arbetsmiljöutbildning, Arbatarskyddsnämnden  
 1987 Vardagsjuridik, upphandling konsulttjänster och entreprenadupphandling, Familjebostäder

## Anställningar

1965	JOHNSON LINE
	Maskinelev
1966	GRÄNGESBERSBOLAGET
	Maskinbefälselev
1967	ÖSTKUSTENS ÖRLOGSBAS
	Varvspraktik maskin och el
1968--69	GRÄNGESBERGSBOLAGET
	2:e mask. jr. under sommaruppehället från Sjöbefälsskolan
1970--73	WALLENIUS LINES
	4:e, 2:e, 1:e och maskinchef samt
	nybyggnadskontrollant M/S FIGARO
1973--87	KEDERI AB GOTLAND
	1:e maskinist och maskinchef
	Nybyggnadsinspektör M/S GOTLAND 1973
	M/S GUTE 1978--79
	M/S VISBY 1980
1976	WALLENIUS LINES
	Maskinchef

2 (2)

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



## **Letter SC forsberg to the criminal police**

**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 parallelregistrering 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 intekningssäkerhet, 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, överlätt 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 överlätt 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 (biljetts- 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 biljetts och fraktförsäljning i Estland och terminalverksamheten i Tallinn.

### 1.2 Internorganisation

N&T som är ett svenska 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 anställt hos ett fristående företag, Rederi AB Hornet, för bl.a. teknisk uppfölningsarbete 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 överläts 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 ansvarsituationen 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 ersättningssansvar bygger för övrigt på oaktksamhet 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 ersättningssansvar vid dödsfall, personskador och sakskador<sup>1</sup>. Dessa regler är tillämpliga bl.a. vid all passagerarbefordran till eller från Sverige oavsett om befördringen för övrigt är underlagd främmande rätt. Skadeståndsansvaret åvifor enligt grundregeln bortfraktaren. Bortfraktaren är definierad som "den som genom avtal ..... åtar sig att med fartyg befördra 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-

<sup>1</sup>I detta sammanhang avses sjölagen i den lydelse den hade vid fartygets fartygsning. 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.

1 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 registrering (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, sjövärighet, 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 uppfylls på respektive fartyg. Genom en särskild mellanstatlig överenskommelse utför också respektive lands sjöfartsmyndighet kontroll av det internationella säkerhetsregelverkets efterlevnad på andra länderas fartyg som anlöper landets hamnar, s.k. hamnstatskontroll.

Klassificeringssällskapen kontrollerar att tillståndet på fartygens skrov, maskineri och utrustning vidmakthålls i överensstämmelse med de regler som respektive klassificeringssällskap har givit och till vilka fartyget ifråga har konstruerats och byggs. För att erhålla försäkring krävs att fartyget uppfyller sådans regler. Respektive lands sjöfartsmyndighet kan också i varierande grad uppdraga/delegera sin egen myndighetsstillsyn 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 finländska 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:

Myndighetcertifikat:

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, virar, radiourtrustning och maskindelar.

Fartygets radiourtrustning uppfyllde svensk-finska krav för att få segla utan radiotelegrafist, men radiotelegrafist ingick likväld i fartygets permanenta bemanning.

## 6. TEKNISK TILLSYN ÖVER FARTYGET

N&T:S rederiavdelning har svarat för teknisk tillsyn av fartyget. Underställd rederichefen Sten-Crister Forssberg 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 befülhavare, överstyrman och maskinchef.

Thomas Rasmussen, som är en av N&T:S egna maskinchefar, bistod N&T:s driftsorganisation i förberedelsearbetet under ca två månader före fartygets övertagande och medföljde där efter fartyget för att bistå de estniska maskincheferna med uppdatering av fartygets databaserade underhållssystem samt utgöra del i N&T:s driftsorganisationens tillsyn av maskinanläggningens hantering och underhåll. I början av 1994 har stationerades Rasmussen på Estline-terminalen i Stockholm och hans formella anställning överfördes till Rederi AB Hornet av administrativa skäl. Rasmussens 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, surrmingsmateriel 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 notera de 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 manuskap 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-/RoRotaflit.

M/S ESTONIA övertogs från föregående ägare vid varv i Åbo, där den estniska besättningen tog fartyget i besittning, ombordorganisationen intrimmasades 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 inhrydes från fartygets tidigare operatör, Wasa Line, viss finskalande 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 första befälhavare Arvo Andresson, vilken också deltog i förberedelsearbetena under två månader före fartygets idrifttagande. Fartygets befälhavare har svarat för säkerhetsplanens vdjmakthållande 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 protokolfört 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 ågerande som "föredömligt snabbt och professionellt".

Myndighets- och klassstillsyn 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 Zahleé 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 medfölje 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 Karel 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, Karel 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 hittills 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 Karel 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 hanuppehållet i Tallinn framgångsrikt slutfört examination för detta inför Stockholms sjötrafikområdeschef Dan Myrberg och mästerlots Sundius samt skulle kapten Aavo Piht göra det samma 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). Karel 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

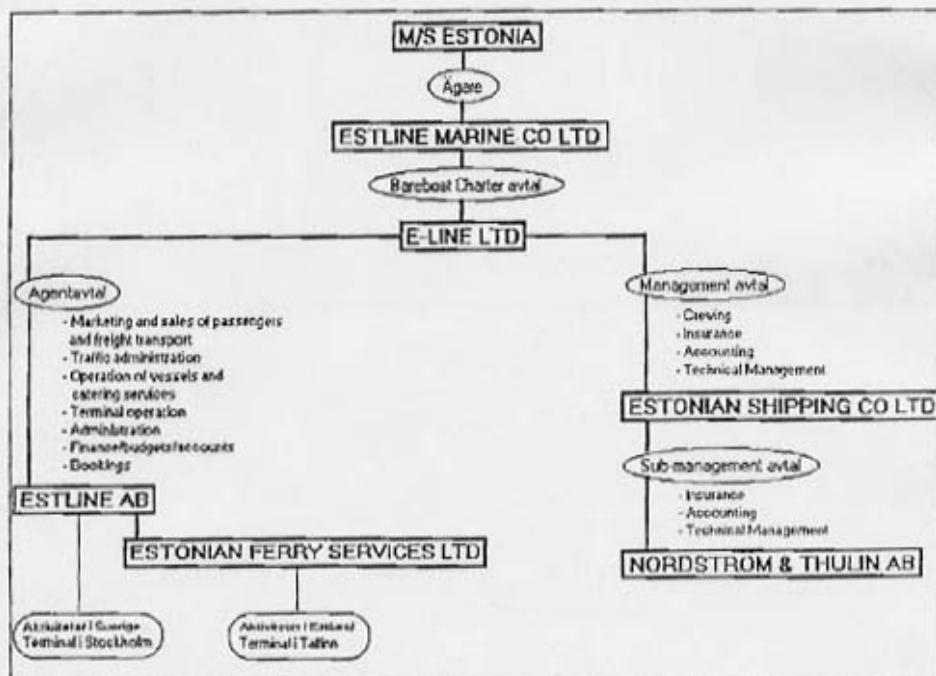
Lagerchef

ADB-chef

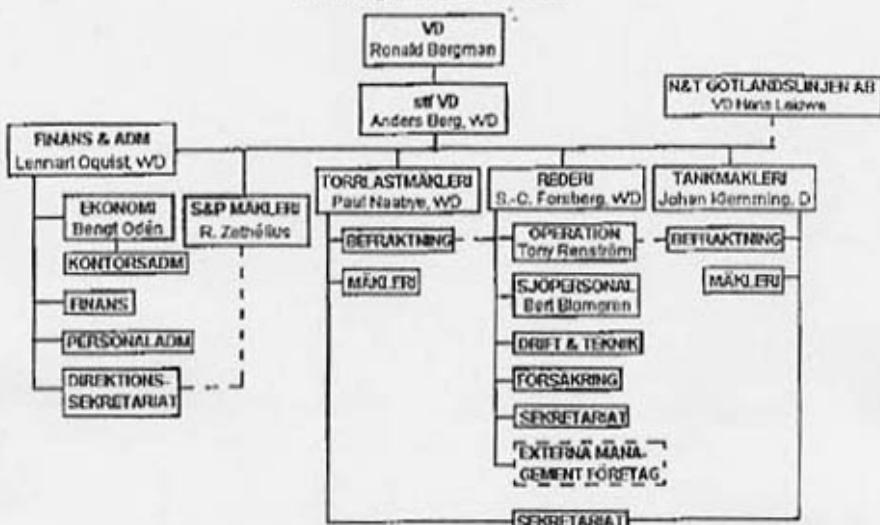
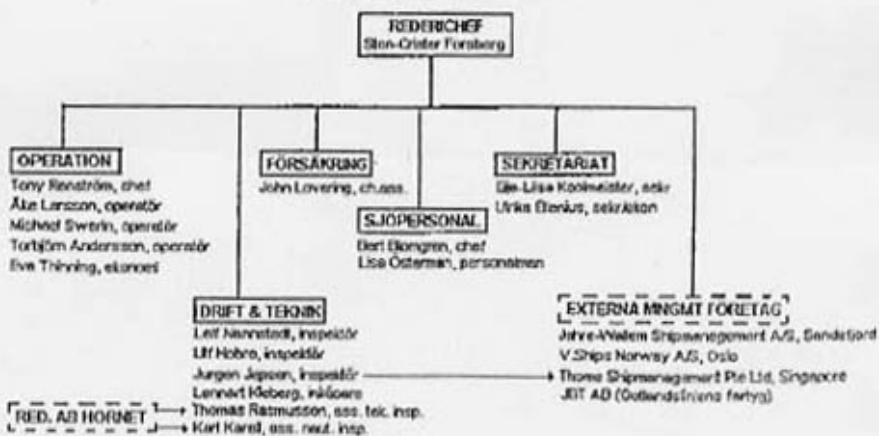
Samtliga befarade omkomna (rapporterade saknade och ej återfunna). Deras avlösande kollegor var vid tillfället engagerade i övertagandet i Rostock av linjens tillkommande fartyg.

ESTLINE Bolags- och organisationsstrukturm.a.p., M/S ESTONIA

<u>Bolag</u>	<u>Nationalitet</u>	<u>Ägare</u>
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

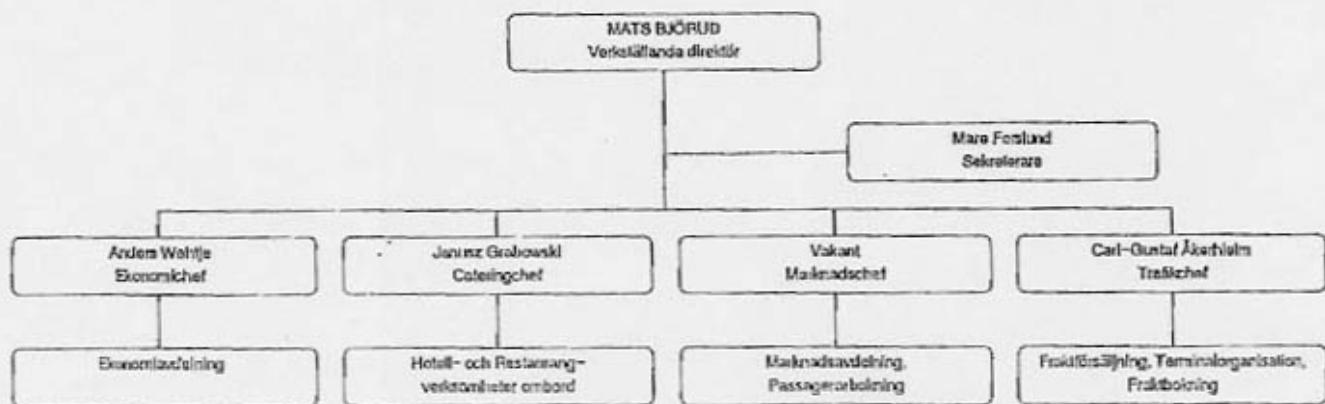


**NORDSTRÖM & THULIN AB**  
Ledning och organisation

**N&T REDERIADELNING**

# ESTLINE AB

## Organisation



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. Internal Organisation

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 Rederiet 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 transport 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. The vessel M.V. "ESTONIA"

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 Tallinn to Stockholm on the 28th September 1994. Andresson, Piht, 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:	Intendant
	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 ever 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 of captain per ringhagen

Statement

Captain Per Ringhagen, born 25.9.42 and living at Orienvägn 29,  
Östraskär (near Stockholm),  
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-Stockholm. 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 Stockholm, 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.
- Cargo documentation
  - 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	
<u>arrival</u>	<u>departure</u>	<u>arrival</u>	<u>departure</u>
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.

Some comments on the "Estonia":

- 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.

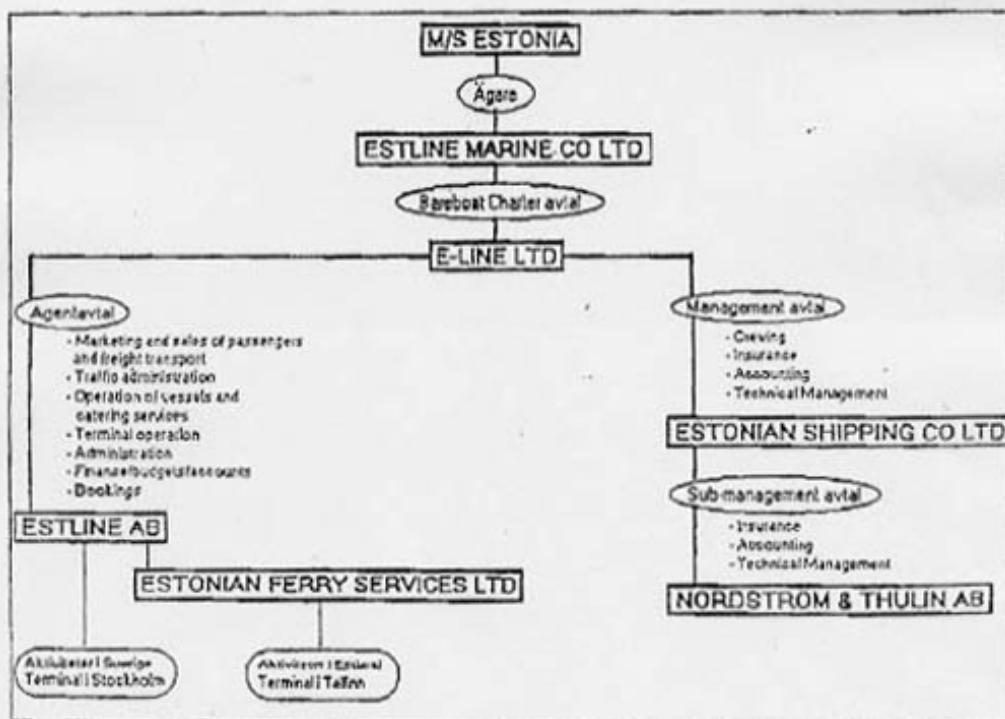
.....  
21.11.95

Per Ringhagen

## Structure of companies in relation to estonia

ESTLINE Bolags- och organisationsstrukturm.a.p. M/S ESTONIA

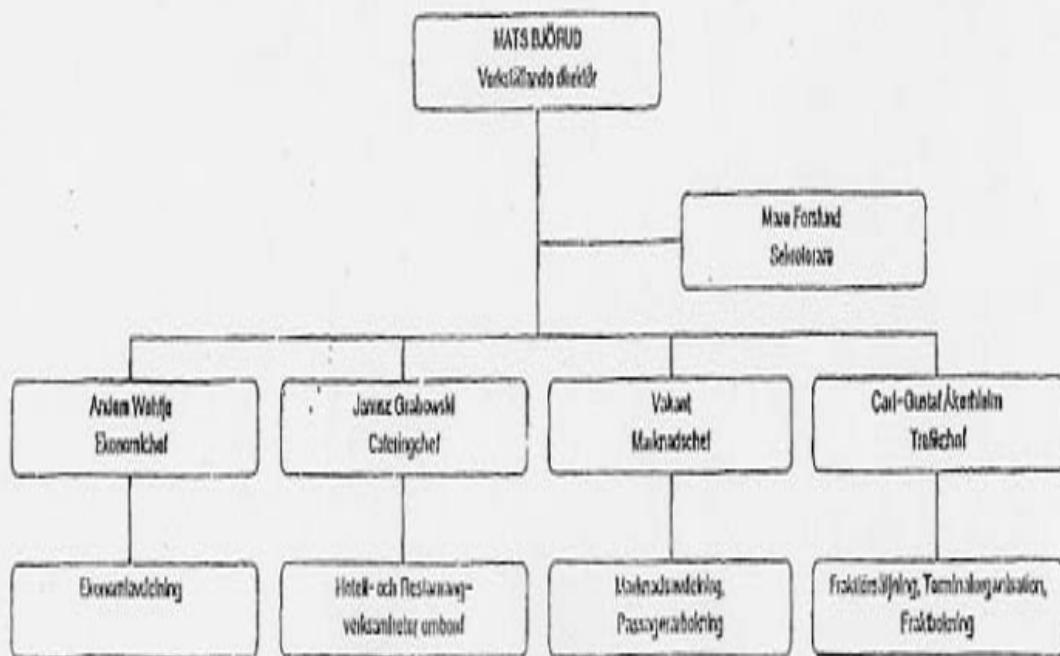
Bolag	Nationalitet	Ägare
ESTLINE MARINE CO LTD	Cypern	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
E-LINE LTD	Estland	50% ESTONIAN SHIPPING CO LTD 50% NORDTHULIN LUXEMBOURG S.A.
ESTLINE AB	Sverige	50% ESTONIAN SHIPPING CO LTD 50% NORDSTRÖM & THULIN AB
ESTONIAN FERRY SERVICES LTD	Estland	100% ESTLINE AB
ESTONIAN SHIPPING CO LTD	Estland	100% Estniska Staten
NORDSTRÖM & THULIN AB	Sverige	Börsnoterat svenska aktiebolag
NORDTHULIN LUXEMBOURG S.A.	Luxemburg	100% NORDSTRÖM & THULIN AB



## Organisation of estline AB

# ESTLINE AB

## Organisation



Enclosure 6.1.113

okt 1994

**Contract BV /estonian national maritime board**

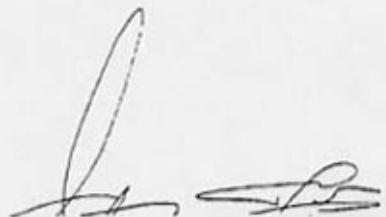
AGREEMENT

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:

A handwritten signature consisting of stylized initials and a surname.

1. This Agreement consists of the subscribed text of 3 pages, together with Annexes I and II hereto, and organizes 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.

... - 1 - 1997

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 18<sup>th</sup> of August 1992 set their authorized signatures as follows.



A handwritten signature of "Gerald More" is written over a circular stamp. The stamp contains the text "BUREAU VERITAS" at the top and "PARIS" at the bottom, with "1992" in the center.

ANNEX I

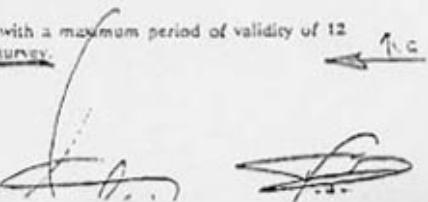
ASSOCIATED WORK TO BE PERFORMED BY THE SOCIETY AS AGENTS OF  
THE ADMINISTRATION

I.1. International Convention on Load Lines, 1966.

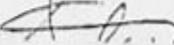
- I.1.1. Computation of load lines, approval, survey and verification of initial conditions of assignment.
- I.1.2. Confirmation that the general structural strength of the hull is sufficient for the draught corresponding to the freeboards assigned.
- I.1.3. Verification of inclining experiments and approval of the form of intact stability documentation.
- I.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.
- I.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.
- I.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.
- I.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.
- I.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.

I.2. International Convention on the Safety of Life at Sea 1974/78.

I.2.1. *Passenger Ships.*

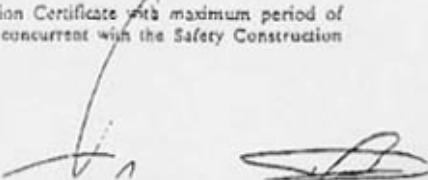
- I.2.1.1. Initial survey of ship structure, machinery, electrical arrangements and equipment before the vessel is put into service as an Estonian-Flag ship. Approval of subdivision and stability in accordance with required criteria.
- I.2.1.2. Approval and survey arrangements for fire protection, detection and extinction, life saving appliances, lights and sound signals and radio installations.
- I.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. 

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1987





- I.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.
- I.2.2. *Cargo Ships.*
- I.2.2.1. Safety Construction.
- I.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.
- I.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.
- I.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.
- I.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.
- I.2.2.2. Safety Equipment.
- I.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.
- I.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.
- I.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.
- I.2.2.3. Safety Radio.
- I.2.2.3.1. Initial and subsequent surveys of radio installations as required for the issue of a Cargo Ship Radiotelegraphy or Radiotelephone Certificate.
- I.2.2.3.2. Issue of the appropriate certificate with a maximum period of validity of 12 months on completion of a satisfactory survey.
- I.2.2.4. Grain Loading.
- I.2.2.4.1. Approval and certification of grain Loading arrangements and documents in accordance with relevant I.M.O. recommendations.
- I.2.3. *International Convention for the Prevention of Pollution from Ships, 1973/78 Annex I and Annex II.*
- I.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.
- I.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.

Two handwritten signatures are present on the document. The signature on the left appears to be "J. H." and the signature on the right appears to be "S. D." Both signatures are written in black ink.

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. A ✓

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.*

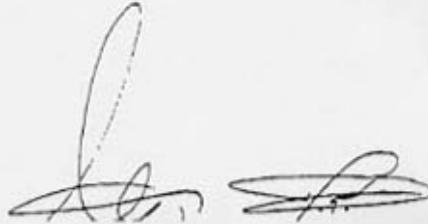
**I.6. Certificates**

*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 cases where the original classification status of the vessel is temporarily changed or 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.:

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- (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 occurred.

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.

*J. A. — S. G.*

II.6.2. Copies of all statutory certificates issued by the Society will be supplied to the Administration at the time of issue.

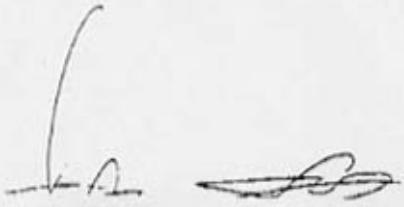
II.6.3. All other documentation including copies of surveyors' reports will be retained by the Society.

**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 failing within this Agreement that the ship is classed and is entitled to have all Convention Certificates issued at registration.

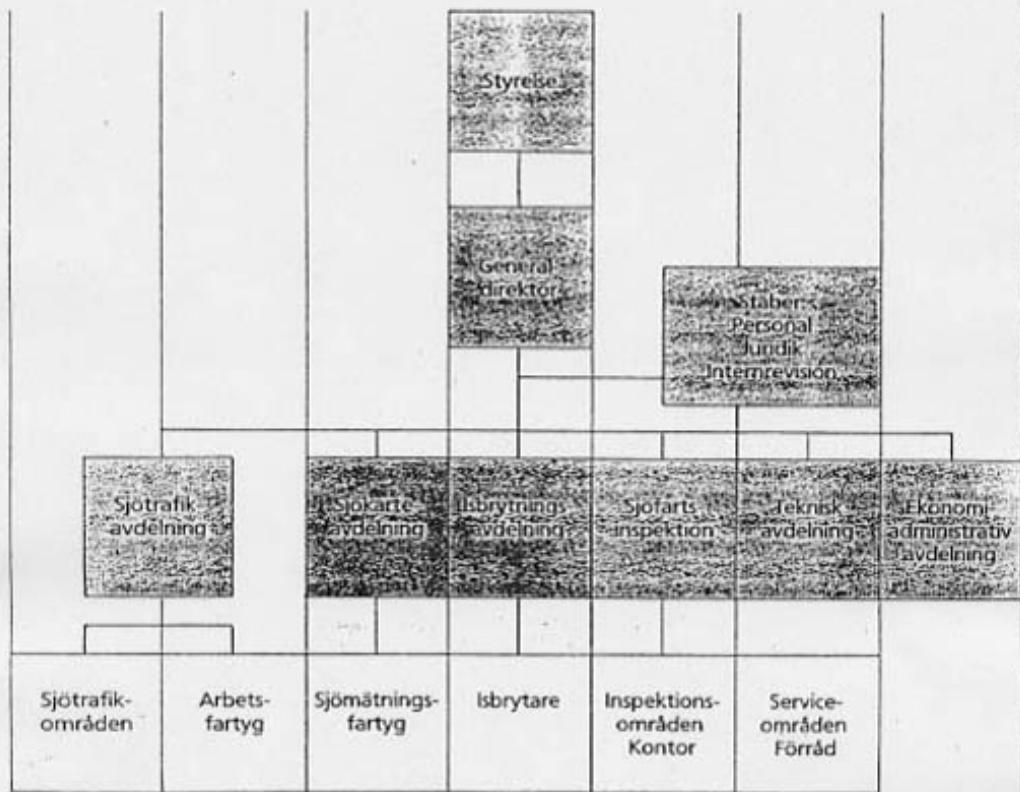
II.7.2. It is also agreed by the Society that all plans and documents necessary for the issue of these Convention Certificates will be made available in the event of these being required by the Administration for any future casualty or marine offense investigation.

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.

A photograph of two handwritten signatures. The first signature on the left appears to be 'A.' followed by a more stylized, cursive name. The second signature on the right is a more fluid, cursive script.

## Sjofartsverket organisation

## Sjöfartsverkets organisation



# Investigation report Magnus sjoberg

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 a 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 obliged 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 19<sup>th</sup> 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 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 on 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 it 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 Zeebrugge 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 Zeebrugge.

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 Stör 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 Zeebrugge. 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 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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Charts A-E

Chart A

Organisation of National Administration of Shipping and Navigation

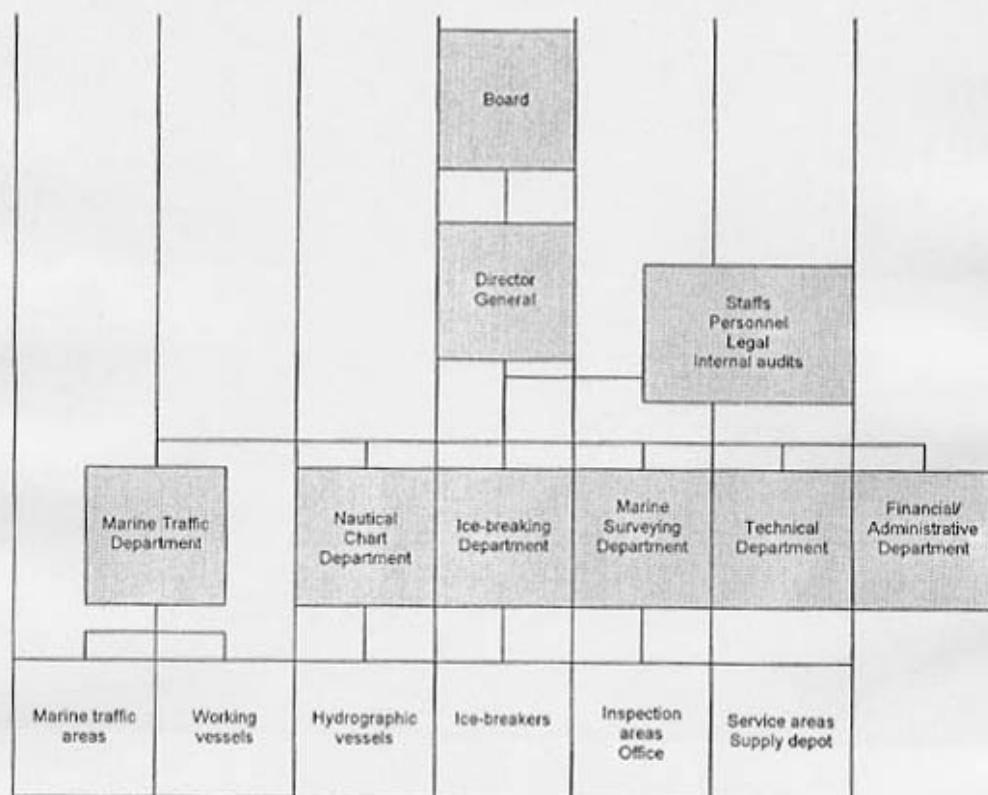
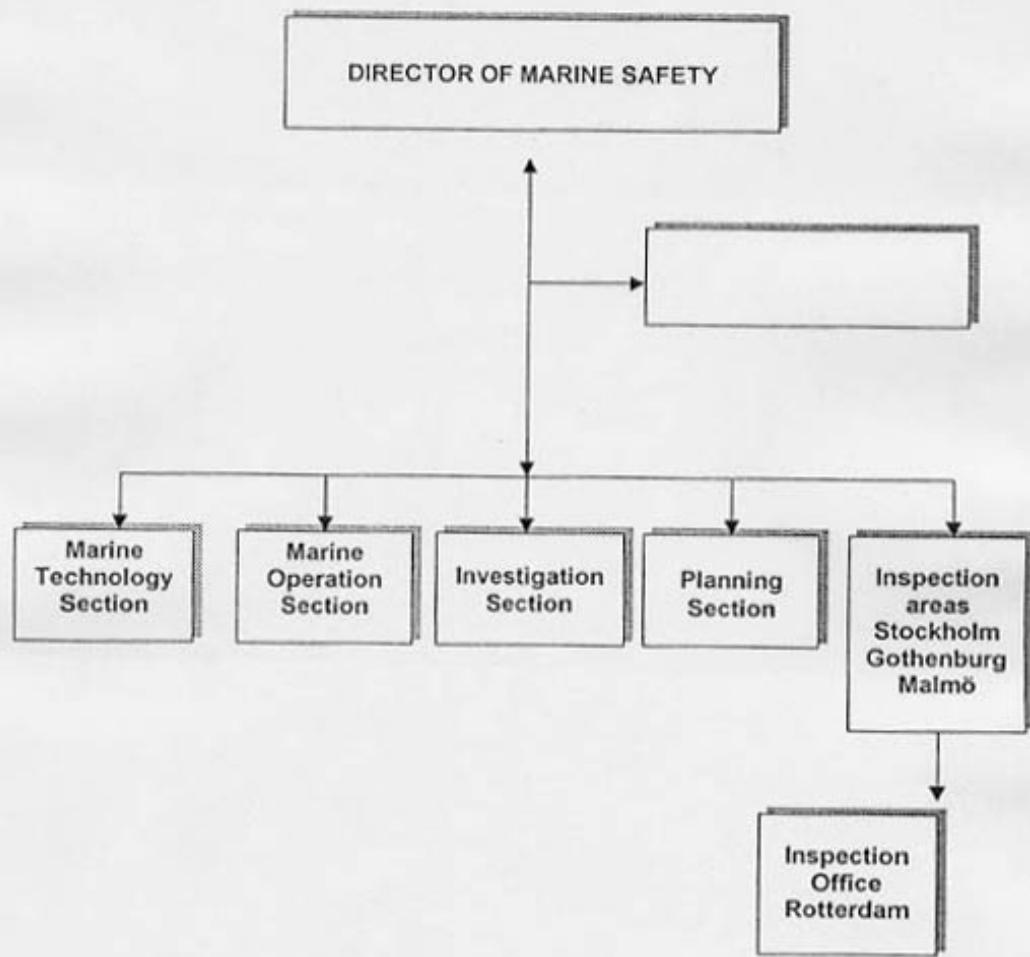


Chart B

NATIONAL ADMINISTRATION OF SHIPPING AND NAVIGATION  
MARINE SURVEYING DEPARTMENT



BOARD OF SHIPPING ORGANISATION

Chatt C

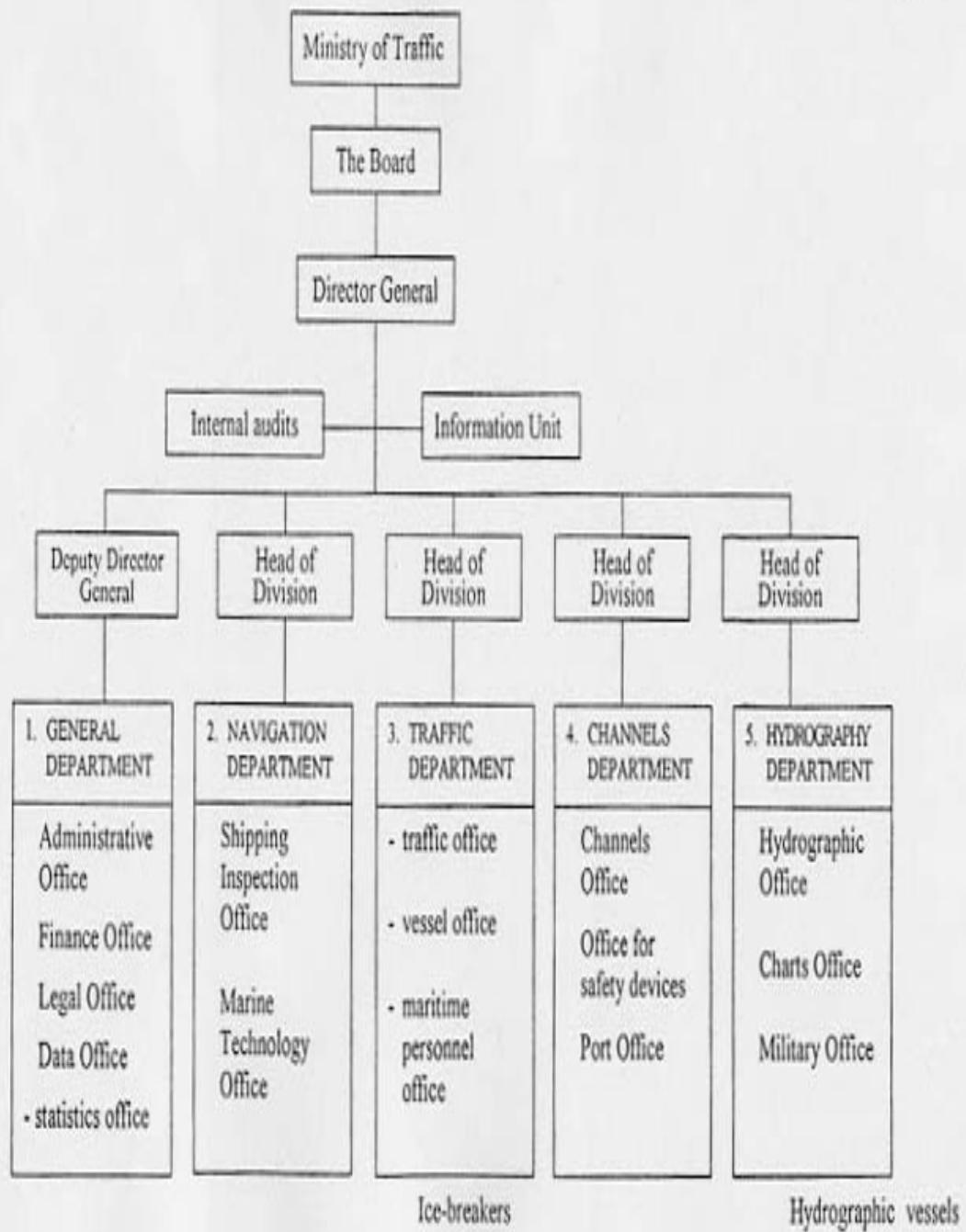
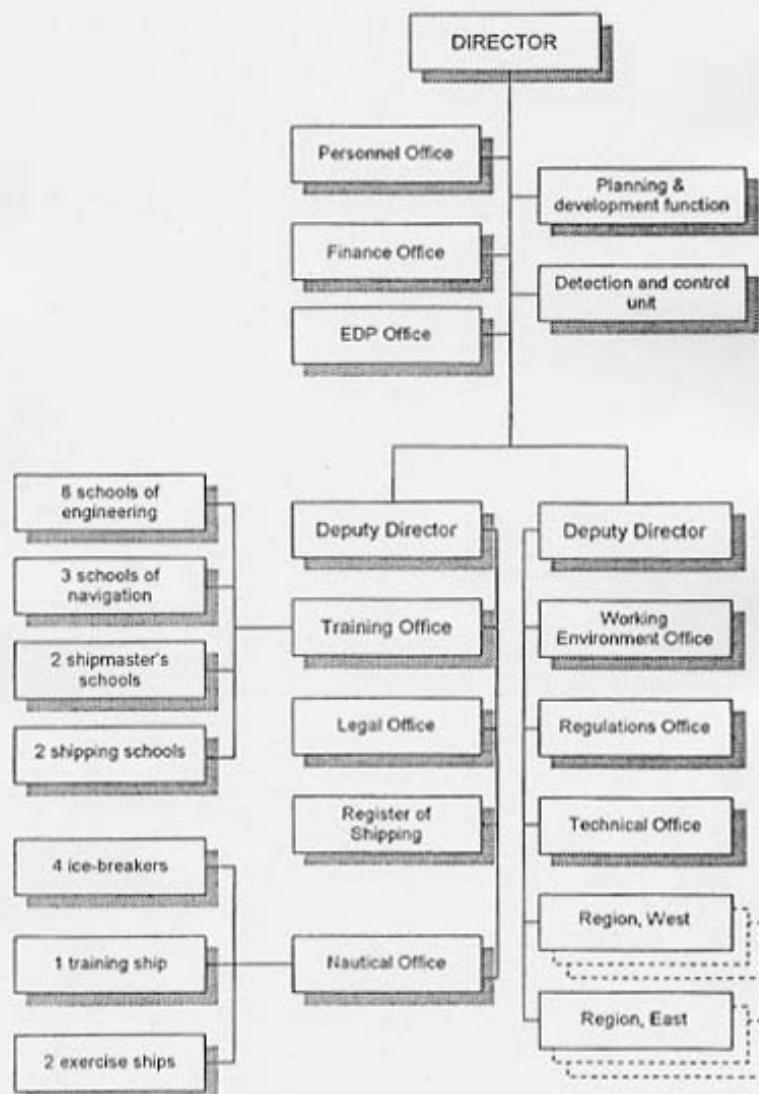


Chart D

Board of Shipping Organisation Plan



Erhållne av Kommunikationsdepartementet

08-80510000



Pojörn Hansson →

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 slits 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 sjöfartsinspekionsområdena - 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 Sjösäkerhetsslägtsfiftning

### 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 fritt står 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 särskilda att ett fartyg skall, när det hålls i drift, vara sjövärdfertigt, varvid också innefattas att det är försedd 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 fartygssäkerhetsslagen).

I förhållande till terminologin i den tidigare sjölagen (1891:35 s.1) har sjövärdfertighetsbegreppet utvidgats. Uttrycket betecknade i den gamla lagen endast ett fartygs sjöduglighet i teknisk eller inskränkt mening. Det innefattade 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 sjövärdfertighetsbegreppet också rese- och lastvärdigheten. I syfte att göra de nordiska sjölagen innehållsmässigt så lika som möjligt anpassades sjölagens sjövärdfertighetsbegrepp till vad som gäller i Danmark och Norge. Hela den nya sjölagen har för övrigt tillkommit i samarbete med Danmark, Finland och Norge. Sjövärdfertighetsbegreppet 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 underläter 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 antas 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 klärlägga 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 omarbettes 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 fartygssäkerhetslagen 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 sjövärighet, 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 svenska territorium och svenska fartyg även utanför territoriet.

Till ledning för bestämmandet av det sjövärldighetskrav som generellt omtalas i sjölagen finns regler i 2 kap. fartygsäkerhetslagen. I 2 kap. 1 § sägs särskilt att ett fartyg är sjövärldigt bara om det är så konstruerat, byggt, utrustat och hållit 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 bemynthigande att meddela sådana föreskrifter om hur ett fartyg skall vara konstruerat, byggt, utrustat och hållit i stånd för att det enligt 2 kap. 1 § skall anses sjövärldigt.

Fartygsäkerhetslagen 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 bemynthigande 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 sjövärldigt, 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, överlätts 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 klassificeringssällskapets 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 klassificeringssällskap som anges i 1 kap. 6 § första stycket att de alla var välnommerade 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 §.

Karakturen 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 författningsavläggningarna om 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 Arbeterskyddstyrelsen.

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 sjövärighet. 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 innehålla klass i något av de klassificeringssällskap 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 samspelet 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 avvikelerapporteringssystem 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 stevvis 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.

## 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 tillbuden inneburit allvarlig fara för att en olycka skulle inträffa eller om tillbuden 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 uppripning 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 överläta 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 biträts 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 bestämmar 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 anmälhan 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 avgå 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 män" 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 utredningsansväret.

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 ytter omständigheter, analys av för händelsen betydelsefulla faktorer, sannolika orsaker, redovisning av vilka bestämmelser och normer som överträts, 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 haverikommissons 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 havsföroringar. 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 besluttande 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 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) 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 havsförningar 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 underkommitté 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 benämns, 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 tröthetsfaktorns 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). Här 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 elektronikäldern, 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 rätvis 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 havsföroruningar från fartyg i Östersjön. Med början 1977 tillämpas konventionen av Sverige inom svenska sjöterritoriuum.

### 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 affärsvirk och fick 1988 en ny organisation. Sedan 1975 är centralförvaltningen lokaliseras 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, sjökartearvdelningen, 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 där till 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 vattenföroringar 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 inspekionsområdena samt vid kontoret i Rotterdam. Personalen uppgår till ca 120 personer, varav ett sextioal är anställda vid huvudkontoret och ungefär lika många fördelade på de olika inspekionsområdena. Sjöfartsinspekionsområdena har områdeskontor i Stockholm, Göteborg respektive Malmö. Cheferna för inspekionsområdena och inspekionskontoret 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 arbetsarskydd. 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 fartygssäkerhetsvattenförorenings-, 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 sjöförläggning
- 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 vattenförningar 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. sjöfartsinspekitionsbyrån. På det regionala planet finns det fyra självständigt arbetande sjöfartsdistrikt. Distrikts organisation är i sin tur sektorindelad varav en för inspekitionsverksamhet, benämnd sjöfartsinspekitionssektorn. 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 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 distriktskontor, 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 samarbetsavtalet 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 nyregisterade 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 regionala 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. *Uddannelseskontoret*, som förestår undervisningen på ett stort antal marina utbildningsanstalter och svarar för tillsynen av ett par privata sjöfartsskolor, utfärdar sjövärldighetsbevis och fastställer minimibesättningar, dock endast utgående från säkerhetspunkt. 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. Enhagens 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. Enhagens utredningsarbete har till syfte att klara 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 enhagens - från övrig kontrollverksamhet - fristående inspektörer. Vid sjöförklaringar har enheten rätt att delta 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 av olycksupplysningar som publiceras i Lloyd's list. Vid misstanke om brott överlämnas ärendet till den juridiska avdelningen. Enhagens 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 enhagens 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 forbund på såväl arbetsgivare- som arbetstagare sidan och dessa har tystnadspunkt. 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 sälunda 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. Direktoraten har en lagstadgad rätt att använda personal från erkända klassificeringssällskapet 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 varie sig resurser eller kompetens att ersätta klassificeringssällskapet 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 avvikelsrapporter, 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 tillsynsarbete 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. offshoreverksamhet. 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 fyrtio 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 samarbeitsorganisationen. 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 sälunda 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 klassificeringssällskapen.

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 avtalet 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 mänskliga, 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.

Uppräthållandet 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 även som tillgång till ett gott och varierat informationsunderlag samt ett ändamålsenligt utnyttjande av tillgänglig information. I så måtto har även detta uppdrag bärning 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 inspekionsverksamheten 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 försvara 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 svenska 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 Arbetskyddsstyrelsen.

## 7.2 Sjöfartsinspektionen och dess verksamhet

Det övergripande ansvaret för tillsynen av sjösäkerheten är 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 decentraliseras. 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 anfört att inspektionens samlade verksamhet syftar till att tillse att kraven på fartygs säkerhet samt skydd mot vattenförroningar 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 tillfredsställande 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 förtärliga 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 avvikelerapportering. 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 innehåller 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 spänvidd 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 Redareförenings tekniska kommitté. Det förekommer emellertid inte något organiserat samarbete direkt mellan inspektionen och assuradörerna eller befraktarna.

Sjöfartens brandskyddskommitté är en samverkansomstitution 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 formalisering och regelstyrda 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 inspekionskampanjer, 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 för - att finna nya vägar till ett för sjösäkerheten beträffande 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 arbetsgivares eller myndigheters sida. Det torde sälunda 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 framförs 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 framförs 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 anförs 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 påstas 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 Åklagardistrikts 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 fördelar över ett stort antal åklagare som var och en får endast enstaka fall. På grund härv och då sjösäkerheten är omgärdad av ett relativt omfängsrikt och inte alltid lättöverskådligt regelsystem kan svårigheter för åklagaren uppkomma. Under utredningen har framkommit fall som inte talar mot de slutsatser som ovan anförs. Vad gäller avsnaknaden 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 tillsynsförättningar 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 fartygssdossierna 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 fartygssdossierna. 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 inspekionsområdena 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 bedömingarna 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 tillsynsförättningar. Ojämnhet i tillsynsverksamheten mellan olika regioner kan, som redan antyts i det föregående, rubba tilltron till verksamheten som sådan. Utredaren vill alltså bestämt förordra att ordningen med checklistor eller motsvarande, så långt det är praktiskt möjlig, snarast återupptas och att tillsynsförättningarna 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 uppmärksammias vid förättningarna, vilket allt försvarar 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 försvarar 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 förrättnings 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 tillsynsförättnings 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 förre 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 anförla 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 haverikommision 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 diarie-nummerordning 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 svenskaägda 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 författningsar, 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 särskilt 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 parallel 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 användes 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 emaneras 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 antyts, 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 anfördta 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 kontrollapparater 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. Avtalet 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 angaende 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. Avtalet avseende SOLAS har upprättats enligt en av IMO rekommenderad mall.

Eftersom sällskapen genom avtalet 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 avtalet, och även sällskapens interna instruktioner, cirkulär och anvisningar skall vara tillgängliga för inspektionen. Enligt SOLAS-avtalet 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 anföras 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 nämns 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 dubbearbetet 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 maskineri 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 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 samarbeitsprojekt i tillsynsverksamheten, t.ex. finns det en överenskommelse vad gäller den operativa kontrollen av passagerarfärjorna 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. IDAMA 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 förekommmer 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 regelutveck-

ling 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 inspekionsmyndigheter 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 tillfredsställande 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 därfor 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 läsningshakarna till stävporten brutits av och att intrryckningar 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 läsningshakar av grövre dimension än tidigare och läsningsanordningen 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 läsanordningarna för stävporten var för krent dimensionerade.

### 8.2.4 Ärendets gång inom inspektionen

Sedan utredningssektionen varseblivit olyckan, troligen genom sin pressservice, 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.

*qq2*

"Sjöfartsverket som anser att bordläggningssport 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 läsningsanordningen 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 överände 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 bordläggningssportar, 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 skalkningssanordningar och ifrågasatte denna utveckling ur sjösäkerhetssynpunkt. Det nämnades 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 skalkningssanordningen, 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 läsanordningar 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 kient dimensionerade läsanordningarna till stävporten, anmärktes dels att klassificeringssällskapen uppmärksammat på behovet av kraftigare dimensionerade läsanordningar, 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 stora 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 läsningsanordningar etc. var tillfredsställande 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

Torr lastfartyget 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 läsanordningarna 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 manöverstängens fäste brustit.

### 8.3.3 Orsak

I utredningsrapporten av den 12 december 1974 angavs havariorsaken 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 Zeebrugge.

Den 2 maj 1974 inkom en rapport från Göteborgs sjöfartsinspektionsområde från ett möte angående undersökningar av läsanordningar 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 läsanordningar 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 utredrar 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 översändts 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 havariet. 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 söndersliten. Inga skador kunde upptäckas på själva porten eller klaffen. Låsningsanordningen lagades provisoriskt och besiktigades två dagar senare i Helsingborg av både klassificerings-sällskapet 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 där efter "§ 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; kravenavsågs att skärpas och stävens utformning med flare ansågs ha haft en bidragande orsak.

Den vid ärendet angående Visby omnämnda sammanfattande pro-memorian 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. (Hva kom nuvarande "bogportar" om fåt sätta riktigt bort?)

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 tillståelse 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 havariet 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 nämnades att bogportarna på såväl Visby som ett fartyg med namnet Wasa Star fått förstärkas i efterhand. Promemoriesförfattaren 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 brutto-dräktighet 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 säkerhetssektionen (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 tillfredsställande.

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.

## 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 undersökningskommision för att utreda händelsen och dess orsaker. Kommissionen avgav sin utredningsrapport i juli 1981. Händelseförollopet 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 tillfredsställande 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 skulle 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. Utbildningsfrågorna 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 klargöra 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 klargöra 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 en 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 hämföra till den mänskliga faktorn.

Olyckan med Herald of Free Enterprise föranledde Sjöfartsinspektionen att omedelbart göra en genomgång av alla svenskflaggade färjor utifrån stabilitethänseende. Vidare tillskrevs rederierna, varvid bl.a. efterfrågades deras rutiner för manöverering 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 föranledder 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 läsanordningarna 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 avkrävt 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  
Villket alltså innebär att Diana II - med samma s.k. som Estonia -  
var nte 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 undertrykas 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 svenskaflaggade passagerarfärjor utifrån stabilitethänseende samt att dåvarande Stockholms sjöfartsdistrikt genom hänvändelse till några av de större färjederierna inom distriktet underrättade sig om rutiner vid bl.a. barlastning och trimmning samt öppning och stängning av portar även som 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 särskilda samlad bild av vad som framkommit vid kontrollarbetet, vilket försvarar möjligheterna att uppnå ett effektivt resursnyttjande 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 sälunda 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 hel-täckande 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 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 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 anfördas 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 tillfredsställande. 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-systemet 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 till-synsmyndigheterna 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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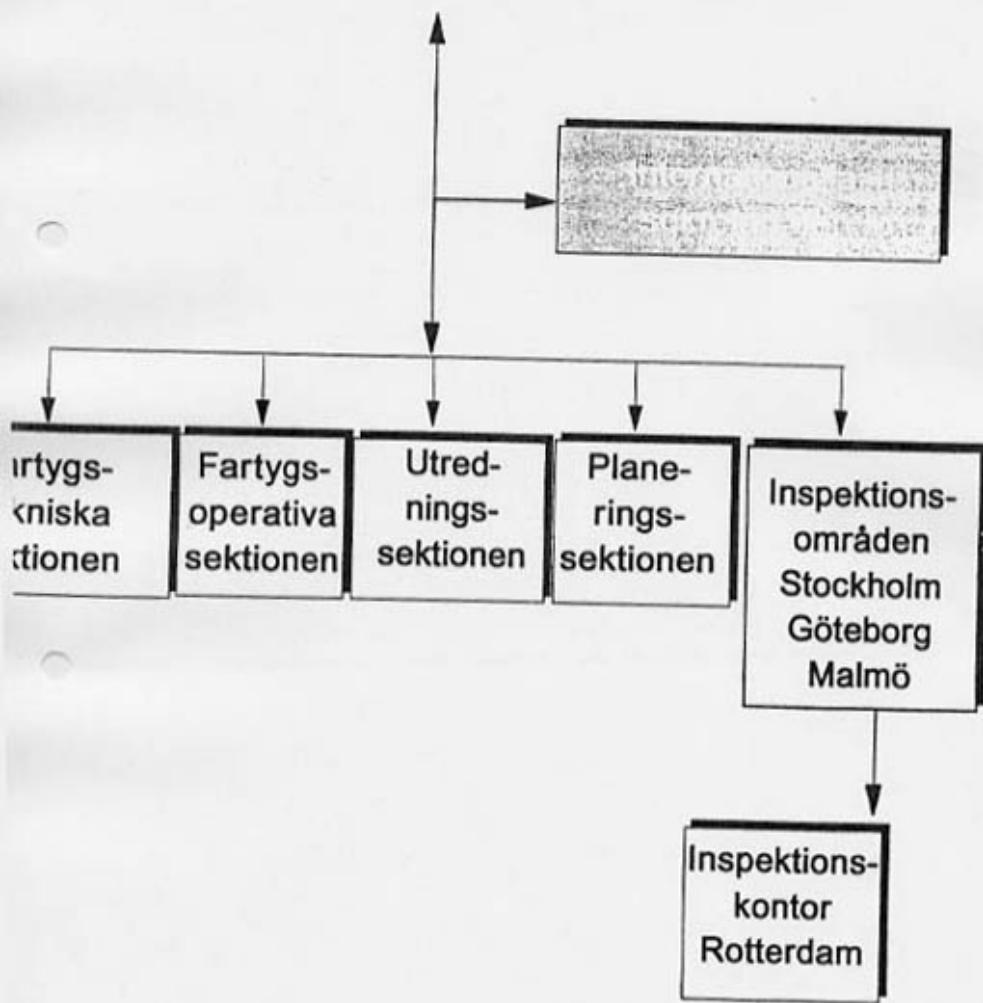
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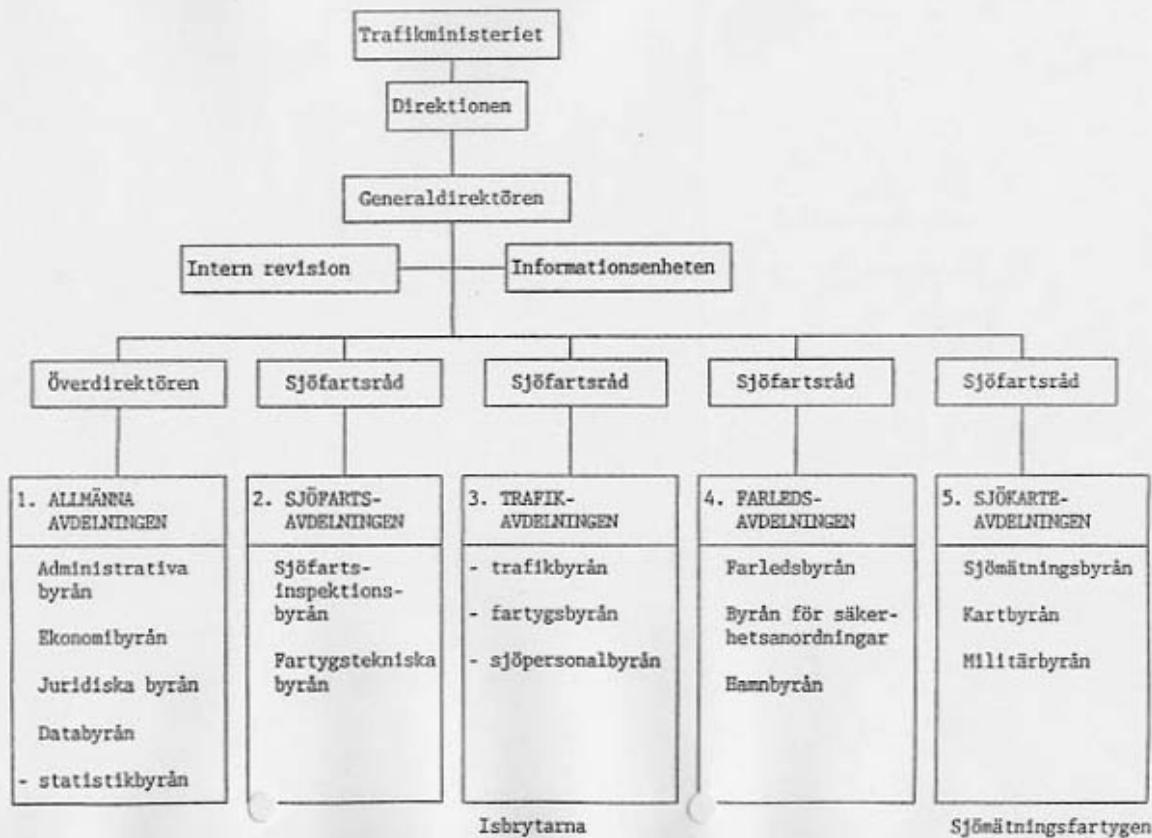


## SJÖFARTSINSPEKTIONEN

### SJÖSÄKERHETSDIREKTÖREN



SJÖPARTSSTYRELESENS ORGANISATION

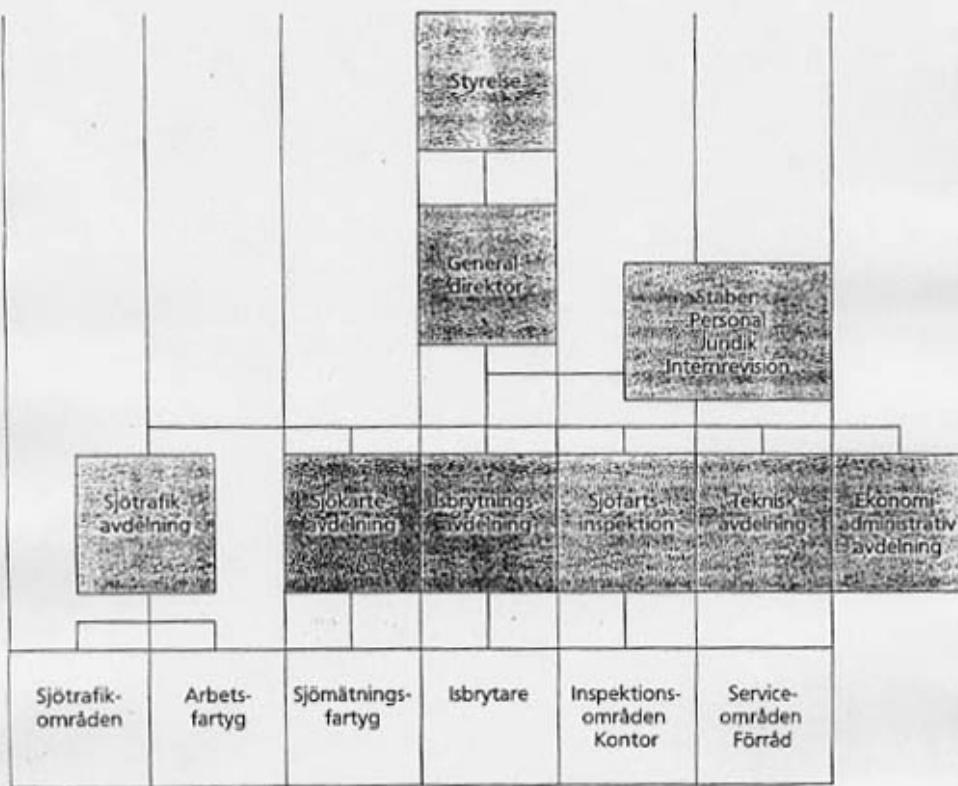


## Søfartsstyrelsens organisationsplan



Tablå A

## Sjöfartsverkets organisation



**Memo by ulf biejner- sjofartsverket**

Office Translation

Short Summary of a Meeting with Representatives of N&T on 24.11.92

Participants of the meeting were

Sten Christer Forsberg  
Ulf Hobro - both N&T  
and Ulf Beijner - SjöV IOS

Re: The present passenger vessel "Wasa King", which at the beginning of 1993 shall be renamed "Estonia" and put into the Stockholm-Tallinn service where it shall replace the Swedish flag "Nord Estonia"

"Estonia" shall be sailing under Estonian flag and with Estonian crew. The communication language onboard shall be Estonian. Ownership will be 50% the Estonian Shipping Company and 50% N&T.

As there is no "developed" Estonian inspection organisation Bureau Veritas has received the order to be responsible for surveys and certifications of the vessel on behalf of the Estonian Authorities. As BV in Sweden, who shall deal with the practical matters, has no complete knowledge about the inspection of passenger vessels, a certain back-up by IOS (Note: IOS - Inspection Office Stockholm) is being requested. According to UB (= Ulf Beijner) there is nothing against IOS taking over this assistance role against normal reimbursement.

N&T is even requesting that the 2/90 inspection shall be carried out at Tallinn. UB informed them that this would be possible, but that inspections carried out outside the IOS area required reimbursement of extra costs. UB requested ordering of the work according to the above.

Time schedule for taking over and putting into service has been preliminarily fixed as follows: Delivery between 7th and 17th January 1993. Dry-docking at Turku 4th January 1993 with class inspection.

Vessel thereafter to Tallinn for education and training of crew for 10-14 days, whereafter it is assumed that the vessel will be ready for service and the Swedish 2/90 inspection.

3 members of the new "Estonia" crew take up their work straight away. As advisers are coming from Sweden the master, Chief mate, 1st engineer and electrical engineer who will attend for a certain time.

Finally they put forward 2 questions:

1. Does Sjöfartsverket approve/accept totally open lifeboats?

A: Yes, because the requirement for closed boats is valid only for vessels built after 1.7.86. Furthermore, SOLAS 1974 in the original version is valid, i.e. no survival suits, just life-vests.

2. It is required that crew members need education and at least 9 months sea experience before they can obtain "lifeboat certificate"?

A: Yes.

signed by Ulf Beijner

28.11.92

# Ridderstolpe.

- 92

Kort sammanfattning av möte med repr från N&T den 24 nov 92.

Deltagare vid mötet var Sten Christer Forsberg  
Ulf Hobro båda N&T  
samt Ulf Beijner Sjöv IOS

Ärende: Nuvarande passagerarfartyget Wasa King som i början av 1993 under namnet Estonia skall insättas på färjeleden Stockholm-Tallinn och där ersätta svenskflaggade fartyget Nord Estonia.

Estonia kommer att segla under estnisk flagg och med estnisk besättning. Kommunikationsspråket ombord skall vara estniska. Ågandet är 50% det estniska rederiet och 50% N&T.

Då det inte finns någon "utbyggd" estnisk inspekionsorganisation har Bureau Veritas fått uppdraget att svara för besiktning och certifiering av fartyget på de estniska myndigheternas vägnar. Då BV i Sverige, som kommer att hantera den praktiska delen, ej har någon komplett kunskap om passagerarfartygsbesiktningar, finnes visst behov av backup från IOS sida. Inget hinder finns enligt UB att IOS mot ordinarie ersättning åtar sig denna hjälpfunktion.

N&T önskar även att 2/90 inspektionen skulle utföras i Tallinn. UB meddelade att detta var möjligt men att inspektionen när den utförs utanför IOS område skulle debiteras med uppkomna merkostnader. UB framförde en önskan om beställningar för arbetena enligt ovan.

Tidsplanen för övertagande och idriftsättning är preliminärt enligt nedan:

Leverans mellan 7 och 17 jan 93

Dockning i Åbo 4 jan 93 med klassgenomgång.

Fartyget därefter till Tallinn för utbildning och träning av besättningen under 10-14 dagar varefter man räknar med att fartyget är klart för idriftsättning och för den svenska 2/90 inspektionen.

Tre förhandsmän av den kommande estniska besättningen startar sitt arbete omedelbart (nu). Såsom instruktörer kommer sv befäl Bef, Öst, lmask och Elmask att finnas för viss tid framåt.

Slutligen ställdes två def frågor.

1. Kommer SjöV att godkänna helt öppna livbåtar? x)
2. Krävs att besättningsmännen har utbildning och min 9 mån sjöerfarenhet innan de kan erhålla "livbåtscert"?

Svaret på denna fråga var Ja. ✓

(Ulf Beijner)  
28 nov 92

✓) Ja, krasset på slutna båtar gäller endast för fartyg byggda efter 06-07-81. Alltid gäller SOLAS-74 i original - ingen överlevnadsdräkt, endast livräddare.

## Official regulation 1/92-sjofartsverket

Office Translation

Sjöfartsverket  
Sjöfartsinspektionen

The Swedish Maritime  
Administration

Official Regulation 1/92  
("New 2/90" - 30.3.1992)

Instructions and Guidelines for Operative  
Control of Swedish and Foreign Vessels

General Starting Points

The Safety Organisation shall be suitable and functional, which shall be demonstrated by exercises and similar activities. A vessel does not have an acceptable safety standard if its key personnel lacks firefighting training according to IMO's resolution A.437 (X1) 1972 Annex 1 and 2 and IMO/ILO Document for Guidance. The Shipping Industry's Firefighting Committee (SBK) fulfills by its "Principle of Firefighting Training" the theoretical and practical requirements which are demanded by IMO's resolution. Attestations or certificates of SBK's training or comparable shall therefore be accepted.

The meaning of "key personnel" is to be understood according to the requirements of "Safe Manning Document" or the minimum crew which in accordance with the number of qualifications has to be onboard. The remaining crew shall have the knowledge and experience to the required extent which is needed to co-operate with the key personnel when evacuating the vessel. A suitable training of these crew members can lead then to the "lifeboat certificate" in line with the Swedish Maritime Administration's Announcement (1984:6) concerning the special authority for lifeboatmen or a comparable education.

The remaining crew must be able to render first assistance including handling of fire-extinguishers and similar equipment....

In case the crew should be unable to communicate as required, be it due to language problems or other communicative deficiencies to such an extent that the internal co-operation is not ensured during exercises and consequently also not in emergency situation, then an acceptable safety standard does not exist.

#### Supervision

The above mentioned conditions shall be controlled during inspection of all Swedish flag vessels and all other vessels calling at Swedish ports. In addition, it is required that passenger vessels regularly calling at Swedish ports have to undergo a "2-90 inspection" with acceptable results before the vessel takes up service. Whilst in service the vessel has to undergo continued inspections in intervals determined by the Maritime Inspection, however, at least once a year.

#### Guidelines

1. Vessel inspectors shall never act in such a way that takes away the responsibility from the master.
2. The following items shall be taken into account to the necessary extent when performing a 2/90 inspection.
  - a.) The inspector will select the exercises or the combination of them which he considers suitable taking into account the circumstances. In addition, the knowledge of all participants in respect of vessel's safety and its continuity has to be checked. Even shore based functions in connection with vessel's safety have to be checked.
  - b.) Everybody onboard and others in contact with the vessel have to agree to participate in the exercise.
  - c.) The exercise has to be organised in such a way that risks for the participants should be avoided. Risk assessment always has to be carried out together with the master. He has to put on record that this has been done.
  - d.) An inspector of the Maritime Administration is appointed to take over the responsibility for the exercise. On a vessel underway it has to be an experienced master mariner. For exercises taking place exclusively in the engine room it has to be an experienced chief engineer. All

participants from the Administration have to wear armlets, marked overalls or the like.

- e.) All exercises shall be carried out in such a way that the normal operation of the vessel is disturbed as little as possible.
  - f.) All exercises shall be completed with an evaluation and talked through. The participants must have the possibility to ask questions and obtain information about the results of the exercise. Criticism should be welcome. Master and mates should not be criticised in front of large groups.
3. Whilst carrying out the exercises the IMO document "Guidance to Surveyors on Procedures for Operational Control" should be followed, enclosure 1. See in particular Sections 1 to 2.10.
4. Concerning the 'man overboard manoeuvres' the following has to be observed:
- that they are performed at sea in daylight conditions and in good visibility, at a position where disturbance of the other traffic is excluded, of course the 'Rules of the Road', traffic separation, etc. have to be observed, etc.
  - that the object thrown overboard, simulating the casualty, has to be neutral and cannot be misunderstood by the shipping.
  - that the MOB boat shall not be lowered down before the vessel is in position for the pick-up and that the speed has been reduced to nearly zero.
  - that the MOB boat is not lowered down if the vessel is rolling.
  - that the exercise is cancelled before the MOB boat has reached the water surface. Lowering down of the boat and picking up of the object is not required.

5. Operative control can even be carried out in connection with ordinary inspection work. This can be, e.g. lowering of a lifeboat which is carried out by the crew according to the Muster list. This is respectively valid for firefighting control as well as for emergency power supply.
6. Exercises shall be reported on the enclosed Report Form, see enclosure no. 1.

This official regulation enters into force on the 15th April, 1992 and replaces regulation 2/90.

signed by  
Bengt Erik Stenmark  
Maritime Safety Director

INSTRUKTION OCH ANVISNING FÖR  
OPERATIV KONTROLL AV SVENSKA  
OCH UTLÄNDSSKA FARTYG

Allmänna utgångspunkter

Säkerhetsorganisationen skall vara lämplig och funktionsduglig, vilket skall kunna visas vid övningar och liknande aktiviteter.

Ett fartyg har inte en godtagbar säkerhetsstandard om dess nyckelbesättning saknar brandskyddsutbildning enligt kraven i IMO's resolution A.437 (XI) 1972 Annex 1 och 2 och IMO/ILO Document for Guidance. Sjöfartens Brandskyddskommitté fyller med sin "Grundläggande brandskyddsutbildning" de teoretiska och praktiska krav som uppställts i IMO's resolution. Intyg eller certifikat från SBK's utbildning eller motsvarande skall därför kunna företes.

Med nyckelbesättning menas den besättning som krävs enligt ett "SAFE MANNING DOCUMENT" eller den minsta besättning som med hänsyn till antal och kvalifikationer bör finnas ombord. Övrig besättning skall i erforderlig omfattning ha den kunskap och övning som fordras för att

samverka med nyckelbesättningen vid evakuering av fartyget. Lämplig utbildning för dessa besättningsmedlemmar kan vara den som leder till båtmanscertifikat med ett innehåll enligt Sjöfartsverkets Kungörelse (1984:6) om specialbehörighet för båtman, eller en likvärdig utbildning. Övrig besättning skall även kunna ge första hjälpen samt kunna hantera handbrandsläckare och liknande utrustning. Det som sägs i detta sycke rör de utbildningskrav Sjöfartsverket ställer och påverkar inte verkets krav på minsta antal båtmanscertifierade besättningsemän enligt säkerhetscertifikat för passagerarfartyg.

En godtagbar säkerhetsstandard föreligger inte om besättningen på grund av språksvårigheter eller annan kommunikativ brist saknar förmåga att samverka internt och med passagerarna vid övningar och därfor inte kan väntas fungera vid en nödsituasjon. Arbetsförhållandena ombord ("shipboard conditions") får inte vara sådana att man kan antaga att det allvarligt stör besättningens förmåga till samarbete i säkerhetsarbetet.

#### Tillsyn

Ovannämnda förhållanden skall kontrolleras genom inspektion av alla svenskflaggade fartyg samt av övriga fartyg i trafik på svenska hamnar. Dock gäller för passagerarfartyg i regelbunden trafik på svenska hamnar, att dessa skall genomgå en "2-90 - inspektion" med godkänt resultat innan fartyget sätts i trafik. Sedan trafiken påbörjats skall fartyget undergå förnyade inspektioner med intervaller som bestäms av sjöfartsinspektionen, dock minst årligen.

#### Riktlinjer:

1. Fartygsinspektören får aldrig agera på ett sådant sätt att han frantar befälhavaren dennes ansvar.

2. Följande punkter skall i erforderlig omfattning iakttagas vid genomförandet av 2/90-inspektioner.

- a) Inspektören väljer de övningar eller de övningskombinationer han finner lämpliga med hänsyn till omständigheterna. Därutöver kan samtliga befattningshavares kunskaper med avseende på fartygets säkerhet och dess säkra framförande kontrolleras. Aven landbaserade funktioner med koppling till fartygets säkerhet kan kontrolleras.
- b) Samtliga ombordvarande och övriga berörda skall vara införstådda med att det rör sig om en övning.
- c) Övningarna skall läggas upp så att risker för de inblandade undviks. Riskbedömning skall alltid göras i samråd med befälshavaren. Det skall dokumenteras att detta skett.
- d) EN inspektör från Sjöfartsverket utses till övningsansvarig. På fartyg under resa bör denne vara en erfaren sjökaptén. Vid övningar som uteslutande rör maskineriets drift, bör denne vara en erfaren sjöingenjör. Samtliga deltagare från sjöfartsverket skall bärta armbindel, märkt överall eller dylikt.
- e) Alla övningar skall genomföras så att den normala driften av fartyget påverkas i så liten utsträckning som möjligt.
- f) Alla övningar skall avslutas med en utvärdering och genomgång. Deltagarna bör få möjlighet att ställa frågor och få information om övningens resultat. Kritik bör framföras med omdöme. Enskilda befattningshavare bör ej kritiseras inför större grupp.

3. Vid övningarnas genomförande är IMO-dokumentet,  
"GUIDANCE TO SURVEYORS ON PROCEDURES FOR OPERATIONAL  
CONTROL", vägledande, bilaga I. Se speciellt  
avsnitten 1 t o m 2.10.

4. Beträffande manöverbordövning bör bl a beaktas.

att denna utföres till sjöss under dagsljusför-  
hållanden med god sikt, på position utan  
hinder samt med hänsyn tagen till annan  
trafik, särskilda gällande trafikregler,  
trafikseparationer etc.

att föremål som kastas överbord, föreställande  
nödställd, skall vara neutrala och ej kunna  
missuppfattas av sjöfarten.

att MOB-båten ej firas förrän fartyget kommit i  
position för bärning och farten reducerats  
till nära noll.

att MOB-båten ej firas om fartyget rullar.

att övningen normalt avbrytes innan MOB-båten  
nätt vattenytan. Sjösättning av båten och  
bärning av kastat föremål bör ej ske i  
detta övningssammanhang.

5. Operativ kontroll kan även ske i samband med ordina-  
rie besiktningsarbete. Detta kan innebära, när t ex  
sjösättning av livbåtar sker, att detta utföres av  
personal enligt fördelningsplänen (Muster List).  
Motsvarande gäller vid t ex kontroll av brandskydd  
och nödkraftförsörjning.

5. Övningarna skall rapporteras på rapportformulär, se  
./. bilaga 1.

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Denna tjänsteföreskrift tråder i kraft den 15 april 1992  
och ersätter då tjänsteföreskrift 2/90.

*Bengt E Stenmark*

Bengt Erik Stenmark  
Sjösäkerhetsdirektör

## Report form -operative control



SJÖFARTSVERKET

Enclosure 6.4.119

RAPPORT

Operative Control/Safety exercise Regulation 1/92  
OPERATIV KONTROLL/SÄKERHETSÖVNING enl. tjänsteöreskrift 1/92  
("NYA 2/90")

Datum, inspektionens date, representatives of the inspection  
representanter.

Partys Vessel	Trade/Fartområde	
Ombordvarande passagerare involverats? passengers on board involved?	Nej <input type="checkbox"/>	Ja <input type="checkbox"/> Antal.....
ÖVNINGSTYP k type of exercise	UTFÖRDA MOMENT	ANMÄRKNINGAR
Utrymning abandon		
Kollision collision		
Grundstötning grounding		
Man överbord man over board		
Annan typ others		
ÖVNINGSTYP (nummerering enl bilaga 2)	UTFÖRDA MOMENT	ANMÄRKNINGAR
2.1 Mönstringslista (Muster list)		
2.1.1 _____		
2.1.2 _____		
2.1.3 _____		
2.1.4 _____		
2.1.5 _____		
2.2 Språkfärdigheter (Communication)		

ÖVNINGSTYP (numrering enl bilaga 2)	UTFÖRDA MOMENT	ANMÄRKNINGAR
2.3 Brandövning (Fire drill)		
2.3 Övergivande av fartyget (Abandon ship drill)		
2.3.1 _____		
2.3.2 _____		
2.3.3 _____		
2.3.4 _____		
2.3.5 _____		
2.3.6 _____		
2.3.7 _____		
2.4 Skadekontrollplan (Damage control plan)		
2.5 Brandkontrollplan (Fire control plan)		
2.6 Bryggrutinär (Bridge operation)		
2.7 Lastoperationer (Cargo operation)		
2.8 Säkerhetsrutiner maskinavd. (Operation of machinery)		
2.8.1 _____		
2.8.2 _____		
2.8.3 _____		
2.8.4 _____		
2.8.5 _____		
2.9 Manualer och instruktioner (Manuals, instructions)		
2.9.1 _____		
2.9.2 _____		
2.9.3 _____		
2.9.4 _____		
2.9.5 _____		
2.9.6 _____		

ÖVNINGSTYP (numrering enl bilaga 2)	UTFÖRDA MOMENT	INMÄRKNINGAR
2.10 Minimbemannning (Safe Manning Document)		
2.10.1		
2.10.2		
<i>General Observations</i>		
<u>ALLMÄNNA IAKTTAGELSER</u>		
Säkerhetsinformation	<i>safety information</i>	
till passagerarna	<i>to passengers</i>	
Utbildning	<i>education/training</i>	
Kommunikationseffektivitet:	<i>communication effectiveness</i>	
- besättningen sinsemellan	<i>between crew</i>	
- gentemot passagerarna	<i>towards passengers</i>	
- radio		
Alarmsignalers effektivitet	<i>effectiveness of alarms</i>	
Befällets uppträdande/ effektivitet	<i>performance/effectivity of master/officers</i>	
Manskapsuppträdande/ effektivitet	<i>performance/effectivity of crew</i>	
KRITIK		
<hr/>		
<i>Övningsledarens underskrift</i>		

# Guidance to surveyors on procedures for operational control

GUIDANCE TO SURVEYORS ON  
PROCEDURES FOR OPERATIONAL CONTROL OF SHIPS

**Introduction:**

Several serious shipping disasters in the past years, as well as other maritime casualties, have indicated that the human element plays an important role in these tragedies, which have caused the loss of life of hundreds of passengers and crew, and severe pollution of the marine environment.

Taking into account the final declaration of the Third International Conference on the Protection of the North Sea, the Port State Control Committee has asked a special working group to investigate possible options to get a firmer grip on compliance with (existing) requirements of operational nature by ships' crews. These operational requirements involve the proper handling of the ship and its equipment by her officers and crew during their duties which are assigned to them in respect of maritime safety and pollution prevention, and especially in emergency situations.

The working group has drafted a proposal for an IMO Assembly Resolution, containing procedures for the operational control of ships. At the 4th Ministerial Conference on Port State Control, the ministers decided to take the necessary steps within the IMO to develop further measures for adequate operational standards. The Maritime Authorities of Denmark, the Netherlands, Norway and Sweden accordingly submitted the draft Assembly Resolution to the IMO.

This Resolution, which was adopted at the 17th meeting of the IMO assembly, forms the basis for the following guidance for surveyors. The principles of operational control have been laid down in Section 3.1 and Annex 1 of the Memorandum of Understanding on Port State Control.

**1. General:**

Surveyors should, using their professional judgement, satisfy themselves whether the situation on board, existing procedures or instructions, the composition of the crew, their performance of duties and other relevant circumstances give reason to believe that the crew can comply with the operational requirements laid down in SOLAS and MARPOL and indicated in IMO Resolution A. —(17).

Special attention shall be paid to:

- passenger ships and roll-on/roll-off ships;
- ships which may present a special hazard, for instance oil tankers, gas carriers, chemical tankers and ships carrying harmful substances in packaged form; and
- ships which have had several recent deficiencies.

This guidance may be used when assessing the ability of officers and crew of a vessel to respond to emergency operations and all other duties which may be assigned to them. Surveyors shall initially focus their inspection on operational requirements in the area where, according to their professional judgement, they have doubts about the proficiency of the officers and/or crew or when the relevant Conventions obligate them to do so. If surveyors are not satisfied with the proficiency of the officers and/or crew in the initial drill or operation, they may direct their inspections to other areas of operations.

The following paragraphs give more detailed instructions on how surveyors may carry out operational control, taking into account the provisions of Resolution A.---(17).

Each paragraph begins with the corresponding text of the resolution in *italic print*.

## 2.1 Muster list

*The surveyor may determine if an up-to-date muster list is provided and whether the crew members are aware of their duties indicated in the muster list.*

The surveyor may ensure that muster lists are exhibited in conspicuous places throughout the ship including the navigating bridge, the engine room and crew accommodation spaces.

When determining if the muster list is in accordance with the regulations<sup>1</sup>, the surveyor may verify whether:

1. the muster list shows the duties assigned to the different members of the crew;
2. the muster list specifies which officers are assigned to ensure that life-saving and fire appliances are maintained in good condition and are ready for immediate use;
3. the muster list specifies the substitutes for key persons who may become disabled, taking into account that different emergencies may call for different actions;
4. the muster list shows the duties assigned to members of the crew in relation to passengers in case of emergency;
5. the format of the muster list used on passenger ships is approved.

To determine whether the muster list is up-to-date, the surveyor may require an up-to-date crew list to verify this.

The surveyor may determine whether the duties assigned to crewmembers manning the survival craft (lifeboats or liferafts) are in accordance with the regulations<sup>2</sup> and verify that a deck officer or certified person is placed in charge of each survival craft to be used. However, the Administration (of the flag State), having due regard to the nature of the voyage, the number of persons on board and the characteristics of the ship, may permit persons practiced in the handling and operation of liferafts to be placed in charge

of liferafts in lieu of persons qualified as above. A second-in-command shall also be nominated in the case of lifeboats.

The surveyor may determine whether the crew members are familiar with the duties assigned to them in the muster list and are aware of the locations where they should perform their duties.

## 2.2 Communication

*The surveyor may determine if the crew are able to communicate with each other, and with the passengers as appropriate, in such a way that the safe operation of the ship is not impaired, especially in emergency situations.*

The surveyor may ask the master which language is used as the working language.

If the surveyor is not familiar with the working language on board, he may ensure himself that the crew members are able to understand each other during the inspection or drills. Crew members assigned to assist passengers should be able to give the necessary information to the passengers in case of emergency.

## 2.3 Fire and abandon ship drills

*The surveyor may witness a fire and abandon ship drill to ensure that the crew are familiar with their duties and the proper use of the ship's installations and equipment.*

### Fire drills

The surveyor may witness a fire drill carried out by the crew assigned to these duties on the muster list. After consultation with the master of the vessel one or more specific locations of the ship may be selected for a simulated fire. A crew member may be sent to the location(s) and activate a fire alarm system or use other means to give alarm.

At the location the surveyors can describe the fire indication to the investigator and observe how the report of fire is relayed to the bridge or damage control centre. At this point most ships will sound the crew alarm to summon the fire fighting parties to their stations.

Observe the fire fighting party arriving on the scene, breaking out their equipment and fighting the simulated fire. Team leaders should be giving orders as appropriate to their crews and passing word back to the bridge or damage control centre on the conditions. The fire fighting crews should be observed for proper donning and the use of their equipment.

Make sure that all the gear is complete. Merely mustering the crews with their gear is not acceptable. Crew response to personnel injuries can be checked by selecting a crew member as a simulated casualty.

Observe how the word is passed and the response of stretcher and medical

teams. Handling a stretcher properly through narrow passageways, doors and stairways is difficult and takes practice.

The drill shall, as far as practicable, be conducted as if there were an actual emergency<sup>3</sup>.

Those crewmembers assigned to other duties related to a fire drill, such as the manning of the emergency generators, the CO<sub>2</sub> room, the sprinkler and emergency fire pumps, should also be involved in the inspection. The surveyor may ask these crewmembers to explain their duties and if possible to demonstrate their proficiency.

On passengerships, special attention should be paid to the duties of those crewmembers assigned to the closing of manually operated firescreen doors and firedampers. These closing devices should be operated by the responsible persons in the areas of the simulated fire(s) during the drill. Crewmembers not assigned to the fire fighting teams are generally assigned to locations throughout the passenger accommodations to assist in passenger evacuation. These crewmembers should be quizzed on their duties and the meaning of the various emergency signals and asked to point out the two means of escape from the area, and where the passengers are to report. Crewmembers assigned to assist passengers should be able to communicate at least enough information to direct a passenger to the proper muster area.

## M.O.B!

### Abandon ship drills

After consultation with the master, the surveyor may require a abandon ship drill for one or more survival craft. The essence of this drill is that the survival craft are manned and operated by the crewmembers assigned to them on the muster list. If possible the surveyor should include the rescue boat(s) in this drill. SOLAS 74, Chapter III, is giving specific requirements on abandon ship training and drills, of which the following principles are particularly relevant.

The drill shall, as far as practicable, be conducted as if there were an actual emergency<sup>4</sup>.

The abandon ship drill shall include:

1. summoning of (passengers and) crew to the muster station(s) with the required alarm and ensuring that they are aware of the order to abandon ship specified in the muster list;
2. reporting to the stations and preparing for the duties described in the muster list;
3. checking that (passengers and) crew are suitably dressed;
4. checking that lifejackets are correctly donned;
5. lowering of at least one lifeboat after the necessary preparation for launching;
6. starting and operating the lifeboat engine;
7. operation of the davits used for launching liferafts.

If the lifeboat lowered during the drill is not the rescue boat, the rescue boat shall be lowered as well, taking into account that it is boarded and launched in the shortest possible time<sup>6</sup>.

The surveyor shall ensure that crewmembers are familiar with the duties assigned to them during abandon ship operations and that the crew member in charge of the survival craft has complete knowledge of the operation and equipment of the survival craft.

Each survival craft shall be stowed in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than 5 minutes<sup>6</sup>.

On passenger ships, it is required that lifeboats and davit-launched life rafts are capable of being launched within a period of 36 minutes<sup>7</sup>.

On cargo ships, it is required that lifeboats and davit-launched life rafts are capable of being launched within a period of 10 minutes<sup>8</sup>.

#### 2.4 Damage control plan

The surveyor may determine if a damage control plan is provided on a passenger ship and whether the crew are familiar with their duties and the proper use of the ship's installations and equipment for damage control purposes.

The surveyor may determine whether the officers of the ship are aware of the contents of the damage control booklet which shall be available to them<sup>9</sup>.

The surveyor may question the officers in charge of the ship about their knowledge concerning the damage control plans.

The officers may be asked to explain the action to be taken in various damage conditions.

The officers may also be asked to explain about the boundaries of the watertight compartments, the openings therein and the means of closure and position of any controls thereof and the arrangements for the correction of any list due to flooding.

The officers should have a sound knowledge of the effect on trim and stability of their ship in the event of damage to and consequent flooding of a compartment and counter measures to be taken.

#### 2.5 Fire control plan

The surveyor may determine if a fire control plan or booklet is provided and whether the crew are familiar with the information given in the fire control

*plan or booklet.*

The surveyor may verify that fire control plans are permanently exhibited for the guidance of the ships officers. Alternatively, booklets containing the information of the fire control plan, may be supplied to each officer, and one copy shall at all times be available on board in an accessible position<sup>10</sup>. Plans and booklets shall be kept up to date, any alterations being recorded thereon as soon as practicable.

The surveyor may determine that the responsible officers, especially those who are assigned to related duties on the muster list, are aware of the information provided by the fire control plan or booklet and how to act in case of a fire.

The surveyor may question the officers in charge of the ship about their knowledge concerning the principal structural members which form part of the various fire sections and the means of access to the different compartments.

#### **2.6 Bridge operation**

*The surveyor may determine if officers in charge of a navigational watch are familiar with bridge control and navigational equipment, changing the steering mode from automatic to manual and vice versa, and the ships manoeuvring characteristics.*

The officer in charge of a navigational watch shall have full knowledge of the location and operation of all safety and navigational equipment. Moreover he shall be familiar with procedures which apply to the navigation of the ship in all circumstances and he shall be aware of all information available to him<sup>11</sup>.

The surveyor may verify the officers knowledge by asking him to demonstrate his familiarity with such procedures as voyage planning, preparations for departure, procedures for embarking/discharging pilots and for the navigation with a pilot on board, change over of the watch, periodical tests and checks of equipment, calling for assistance/master, preparations for arrival, change over of steering modes, signalling, communications, manoeuvring, emergencies and logbook entries.

The surveyor may also verify whether the officers are aware of all the information available to him such as manoeuvring characteristics of the ship, life saving signals, nautical publications, checklists concerning bridge procedures, instructions, manuals, etc.

#### **2.7 Cargo operation**

*The surveyor may determine if (officers and) crew members assigned specific*

duties related to the cargo and cargo equipment are familiar with those duties, any dangers posed by the cargo and with the measures to be taken in such a context.

The surveyor, when relevant, may determine whether the responsible crewmembers are familiar with the Code of Safe Practice for Solid Bulk Cargoes.

Solid materials transported in bulk can present a hazard during transport because of their chemical nature or physical properties. Section 4 of this Code contains the obligation imposed on the shipper to provide all necessary information to ensure a safe transport of the cargo. Section 2 of this Code gives general precautions.

For some cargoes, such as cargoes which are subject to liquefaction, special precautions are given (see Section 7 of this Code).

The surveyor may determine whether all precautions are met with special attention for the stability of those vessels engaged in the transport of cargoes subject to liquefaction and solid hazardous waste in bulk.

With respect to the familiarity of crewmembers of oiltankers, chemical-tankers and liquified gascarriers with the cargo and cargo-equipment reference is made to Annex I, paragraph 3.3.2 [as amended] of the Memorandum.

For the carriage of grain reference is made to Chapter VI of SOLAS. The surveyor may determine if all general provisions are met, in particular concerning Securing (Regulation 6), Authorization (Regulation 10) and Grain loading information (Regulation 11).

## 2.8 Operation of machinery

The surveyor may determine if responsible officers and crew members are familiar with their duties related to bringing into operation:

1. the machinery from dead ship condition without external aid;
2. emergency and stand-by sources of electrical power;
3. auxiliary steering gear;
4. bilge and fire pumps; and
5. any other equipment essential in emergency situations.

1. The surveyor may verify whether the responsible crew members are familiar with, inter alia,

General:

- actions which are necessary before the engine can be started
- checks that each action has the desired result
- possible alternatives for certain actions
- sequence in which the actions have to be carried out
- possible different ways to start the engines

- energy source or sources to do so
- procedures when the first attempt to start an engine fail

**Main Electricity Supply:**

- Ascertain that engine starts under light load conditions
- How to work the Main Switchboard
- How to run two generators parallel
- How to switch over from propulsionshaft generator to separate dieselgenerator and vice versa.

**Propulsion Machinery:**

- Ascertain that no propulsion thrust will be developed when starting a non-direct reversible engine.

2. The surveyor may verify whether the responsible crew members are familiar with, inter alia,

**Emergency generator:**

- actions which are necessary before the engine can be started
- different possibilities to start the engine in combination with the source of starting energy
- procedures when the first attempt to start the engine fail

**Stand-by generator engine:**

- possibilities to start the stand-by generator engine; automatic or by hand
- black-out procedures
- load sharing system

3. The surveyor may verify whether the responsible crew members are familiar with, inter alia,

- which auxiliary steering gear system applies to the ship under inspection
- how it is known which steering gear unit is in operation
- which actions are needed to bring the auxiliary steering gear into operation

4. The surveyor may verify whether the responsible crew members are familiar with, inter alia,

**Bilge pumps:**

- number of bilge pumps installed on board the ship under inspection (including emergency bilge pump)
- starting procedures for all these bilge pumps
- appropriate valves to operate
- most likely causes of failure of bilge pump operation and their possible remedies

**Fire pumps:**

- number of fire pumps installed on board the ship under inspection (including the emergency fire pump)
- starting procedures for all these fire pumps
- appropriate valves to operate

5. The surveyor may verify whether the responsible crew members are familiar with, inter alia,

- starting and maintenance of life boat engine and/or rescue boat engine
- local control procedures for those systems which are normally controlled from the navigating bridge
- use of the emergency and fully independent sources of electrical power for radio installations
- maintenance procedures for batteries
- emergency stops, fire detection system and alarm system
- operation of w/fire doors (stored energy systems)

**2.9 Manuals, instructions**

*The surveyor may determine if the appropriate crew members are able to understand the information given in manuals, instructions, etc., relevant to the safe condition and operation of the ship and its equipment and that they are aware of the requirements for maintenance, periodical testing, training and drills and of necessary log entries.*

The following information should i.a. be provided on board and surveyors may determine whether they are in a language understood by the crew and whether the crewmembers concerned are aware of the contents and are able to respond accordingly:

1. instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position<sup>12</sup>.
2. clear instructions to be followed in the event of an emergency shall be provided for every person on board<sup>13</sup>.
3. illustrations and instructions in appropriate languages shall be posted in passenger cabins and be conspicuously displayed at muster stations and other passenger spaces to inform passengers of their muster station, the essential actions they must take in an emergency and the method of donning lifejackets.
4. posters and signs shall be provided in or in the vicinity of survival craft and their launching controls and shall illustrate the purpose of controls and the procedures for operating the appliance and give relevant instructions or warnings<sup>14</sup>.
5. instructions for on-board maintenance of life-saving appliances<sup>15</sup>.
6. training manuals shall be provided in each crew messroom and recreation room or in each crew cabin. The training manual, which

may comprise several volumes, shall contain instructions and information, in easily understood terms illustrated wherever possible, on the life-saving appliances provided in the ship and on the best method of survival<sup>16</sup>.

#### 2.10 Safe manning document + minimum manning

*The surveyor may determine if a safe manning document is provided and whether the ship is manned in accordance with such a document.*

Solas regulation V/13 has been amended as follows.

The existing text has been renumbered as paragraph (a).

A new paragraph (b) was added, reading:

- b. Every ship to which Chapter I of this Convention applies shall be provided with an appropriate safe manning document or equivalent, issued by the Administration as evidence of the minimum safe manning considered necessary to comply with the provisions of paragraph (a).

The above amendment has entered into force on 1 February 1992. From that date cargo ships of 500 gross tonnage or more and passenger ships shall be provided with a safe manning document or equivalent. There is no internationally prescribed format for this document. However, IMO Resolution A.481(XII) recommends that the document should contain:

- a clear statement of the ship's name, its port of registry and its distinctive number or letters;
- a table showing the numbers and grades of the personnel required to be carried, together with any special conditions or other remarks;
- a formal statement by the Administration that, having regard to the principles and guidelines set out in the resolution, the ship is considered to be safely manned and, whenever it proceeds to sea, it carries not less than the numbers and grades of personnel shown in the document, subject to any special conditions stated therein;
- a statement as to any limitations on the validity of the document by reference to particulars of the individual ship and the nature of service upon which it is engaged;
- the date of issue and any expiry date of the document together with a signature for and the seal of the Administration.

[For further guidance to surveyors in respect of the safe manning document and manning control two options are open:

1. by reference to Annex 1, section 3, of the MOU, or
2. by repeating the integral text of section 3 in this guidance paper.]

#### 2.11 Oil and oily mixtures from machinery spaces

*The surveyor may determine if all operational requirements of Annex I of*

*MARPOL 73/78 have been met, taking into account:*

- .1 *the quantity of oil residues generated;*
- .2 *the capacity of sludge and bilgewater holding tank(s); and*
- .3 *the capacity of the oily water separator,*

*including the inspection of the oil record book. The surveyor may determine if reception facilities have been used and note any alleged inadequacy of such facilities.*

The surveyor may determine whether the responsible officer is familiar with the handling of sludge and bilgewater. The relevant items from the guidelines for systems for handling oily wastes in machinery spaces of ships may be used as guidance.

Taking into account the above, the surveyor may determine if the volume of the sludgetank is sufficient for the expected generated sludge during the next intended voyage.

The surveyor may verify that, in respect of ships for which the Administration has waived the requirements of Reg. 16(1) and (2), all oily bilgewater is retained on board for subsequent discharge to a reception facility.

#### **2.12 Loading, unloading and cleaning procedures for cargo spaces of tankers**

*The surveyor may determine if all operational requirements of Annexes I or II of MARPOL 73/78 have been met, taking into account the type of tanker and the type of cargo carried, including the inspection of the oil record book and/or cargo record book. The surveyor may determine if the reception facilities have been used and note any alleged inadequacy of such facilities.*

For the control on loading, unloading and cleaning procedures for tankers carrying oil reference is made to Resolution 540(13) i.e. Procedures for the control of ships and discharges under Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 related thereto. In Chapter 4 of the said Procedures guidance is given for the inspection of crude oil washing (COW) operations. In Appendix 3 the surveyor may find detailed guidelines for in-port inspection of crude oil washing procedures.

For the control on loading, unloading and cleaning procedures for tankers carrying noxious liquid substances reference is made to Resolution MEPC 26(23) i.e. Procedures for the control of ships and discharges under Annex II of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). In Chapter 4 of the said procedures guidance is given for the inspection of unloading, stripping and prewash operations. In Appendix 3 more detailed guidelines for these inspections are given.

## 2.13 Dangerous goods and harmful substances in packaged form

The surveyor may determine if the required shipping documents for the carriage of dangerous goods and harmful substances carried in packaged form are provided on board and whether the dangerous goods and harmful substances are properly stowed and segregated and the crew are familiar with the essential actions to be taken in an emergency involving such packaged cargo.

Ship types and cargo spaces of ships built after 1 September 1984 intended for the carriage of dangerous goods shall comply with the requirements of SOLAS Regulation II-2/54, in addition to the requirements of Regulation II-2/53 (for cargo ships) and the requirements of Regulations II-2/38 and II-2/39 (for passenger ships), unless such requirements have already been met by compliance with the requirements elsewhere in the Convention. The only exemption is when dangerous goods in limited quantities are carried.

The surveyor may determine whether a Document of Compliance is on board and whether the ship's personnel is familiar with this Document provided by the Administration as evidence of compliance of construction and equipment with the requirements of this Regulation.

Additional control may consist of:

- control whether the dangerous goods have been stowed on board in conformity with the Document using the dangerous goods manifest or the stowage plan required by SOLAS Chapter VII. This manifest or stowage plan may be combined with the one required under Annex III.
- control whether the required additional equipment is on board and in good order and working condition;
- control whether inadvertent pumping of flammable or toxic liquids is not possible in case these substances are carried in under-deck cargo spaces;
- control whether stowage and securing has been carried out in accordance with the "Code of Safe Practice for Cargo Stowage and Securing", issued under MSC/Circ.532 for advance information pending the adoption by the Assembly at its 17th session.
- determining whether the ship's personnel is familiar with the use of the Medical First Aid Guide and Emergency Procedures for Ships Carrying Dangerous Goods.

## 2.14 Garbage

The surveyor may determine if all operational requirements of Annex V of MARPOL 73/78 have been met. The surveyor may determine if the reception facilities have been used and note any alleged inadequacy of such facilities.

IMO Guidelines for the implementation of Annex V of MARPOL 73/78 have been developed. One of the objectives of these Guidelines is:  
"to assist vessel operators in complying with the requirements set forth in

Annex V and domestic laws".

The surveyor may determine whether:

- ship's personnel is aware of these Guidelines in particular Section 3 "Minimizing the amount of potential garbage" and Section 4 "Shipboard garbage handling and storage procedures".
- ship's personnel is familiar with the discharge requirements under Annex V inside and outside a Special Area and is aware of the Areas determined as Special Areas under Annex V.

1. Solas Regulation III/53
2. Solas Regulation III/10
3. Solas Regulation III/13
4. Solas Regulation III/18
5. Solas Regulation III/16
6. Solas Regulation III/13
7. Solas Regulation III/20
8. Solas Regulation III/26
9. Solas Regulation II-1/23
10. Solas Regulation II-2/20
11. STCW Regulation II/1
12. Solas Regulation II-2/20
13. Solas Regulation III/3
14. Solas Regulation III/9
15. Solas Regulation III/52
16. Solas Regulation III/51

## Solas chapter II-1, regulation22

**Regulation 22****Stability information for passenger ships  
and cargo ships\***

1 Every passenger ship regardless of size and every cargo ship having a length, as defined in the International Convention on Load Lines in force, of 24 m and upwards, shall be inclined upon its completion and the elements of its stability determined. The master shall be supplied with such information satisfactory to the Administration as is necessary to enable him by rapid and simple processes to obtain accurate guidance as to the stability of the ship under varying conditions of service. A copy of the stability information shall be furnished to the Administration.

2 Where any alterations are made to a ship so as to materially affect the stability information supplied to the master, amended stability information shall be provided. If necessary the ship shall be re-inclined.

3 At periodical intervals not exceeding five years, a lightweight survey shall be carried out on all passenger ships to verify any changes in lightship displacement and longitudinal centre of gravity. The ship shall be re-inclined whenever, in comparison with the approved stability information, a deviation from the lightship displacement exceeding 2% or a deviation of the longitudinal centre of gravity exceeding 1% of  $L$  is found or anticipated.

4 The Administration may allow the inclining test of an individual ship to be dispensed with provided basic stability data are available from the inclining test of a sister ship and it is shown to the satisfaction of the Administration that reliable stability information for the exempted ship can be obtained from such basic data, as required by paragraph 1.

5 The Administration may also allow the inclining test of an individual ship or class of ships especially designed for the carriage of liquids or ore in bulk to be dispensed with when reference to existing data for similar ships clearly indicates that due to the ship's proportions and arrangements more than sufficient metacentric height will be available in all probable loading conditions.

\* Refer to the Recommendation on Intact Stability for Passenger and Cargo Ships under 100 Metres in Length, adopted by the Organization by resolution A.167(ES.IV), the amendments to this Recommendation, adopted by the Organization by resolution A.206(VII), and the Recommendation on a Severe Wind and Rolling Criterion (Weather Criterion) for the Intact Stability of Passenger and Cargo Ships of 24 Metres in Length and Over, adopted by the Organization by resolution A.562(14). Refer also to MSC/Circ.456: Guidelines for the preparation of intact stability information.

## RESOLUTION A.266(VIII)

*Adopted on 20 November 1973  
Agenda item 10*

**RECOMMENDATION ON A STANDARD METHOD FOR ESTABLISHING  
COMPLIANCE WITH THE REQUIREMENTS FOR CROSS-FLOODING  
ARRANGEMENTS IN PASSENGER SHIPS**

THE ASSEMBLY,

NOTING Article 16(j) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

NOTING ALSO Regulation 7(e) of Chapter II of the International Convention for the Safety of Life at Sea, 1960 and Regulation 5(c) of the Regulations on Subdivision and Stability of Passenger Ships (Resolution A.265(VII)),

DESIRING application of a uniform method of calculation for cross-flooding arrangements in passenger ships,

HAVING CONSIDERED the Recommendation by the Maritime Safety Committee at its twenty-sixth session,

ADOPTS the Recommendation on a Standard Method for Establishing Compliance with the Requirements for Cross-Flooding Arrangements in Passenger Ships, the text of which is set out in the Annex to this Resolution,

INVITES all governments concerned to take appropriate steps to give effect to the Recommendations as soon as possible.

ANNEX

**RECOMMENDATION ON A STANDARD METHOD FOR ESTABLISHING  
COMPLIANCE WITH THE REQUIREMENTS FOR CROSS-FLOODING  
ARRANGEMENTS IN PASSENGER SHIPS**

In order to ensure uniform application of Regulation 7(e) of Chapter II of the International Convention for the Safety of Life at Sea and/or Regulation 5(c) of the Regulations on Subdivision and Stability of Passenger Ships (Resolution A.265(VII)), Administrations are recommended to apply the following cross-flooding formulae:

Time required for complete cross-flooding (seconds)

$$T_e = \frac{I_w}{SF} \cdot \frac{\left(1 - \sqrt{\frac{h_f}{H_0}}\right)}{\sqrt{2g \cdot H_0}} \cdot \frac{1}{\left(1 - \frac{h_f}{H_0}\right)} \quad (1)$$

Time required to bring vessel from an angle of  $\theta$ ° (or the angle of margin line immersion) to the upright

$$T_\theta = \frac{2W}{SF} \cdot \frac{\left(1 - \sqrt{\frac{h_f}{H_\theta}}\right)}{\sqrt{2g \cdot H_\theta}} \cdot \frac{1}{\left(1 - \frac{h_f}{H_\theta}\right)} \quad (\text{II})$$

Hence:

Time required from commencement of cross-flooding to  $\theta$ ° heel (or the angle of the margin line immersion)

$$T = T_\theta - T_0 \quad (\text{III})$$

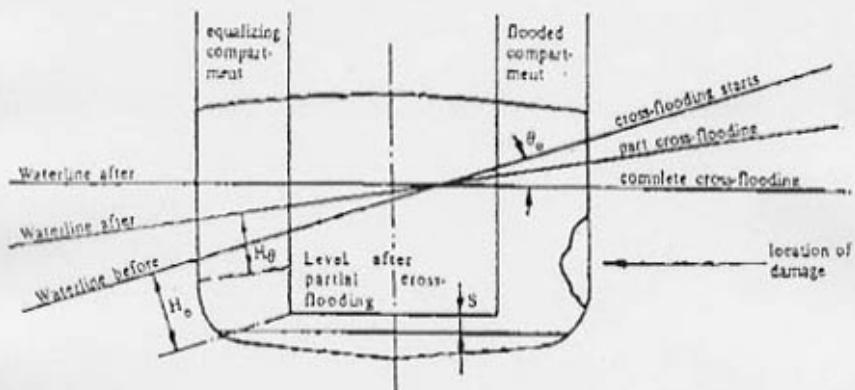


FIGURE 1

The following parameters, in feet or metric units, are used in formulae (I) – (III):

- $W$  • volume of water entering the equalizing compartments during the considered period,
- $S$  • cross-section area through the cross-flooding duct,
- $H_0$  • head of water before commencement of cross-flooding,
- $H_\theta$  • head of water at the time of cross-flooding where the vessel is heeled  $\theta$ °, (or at the angle of margin line immersion),
- $h_f$  • final head of water after cross-flooding ( $h_f = 0$  when the level inside the equalizing compartment is equal to the free level of the sea).

$$F = \frac{1}{\sqrt{1 + \sum k}}$$

- dimensionless factor of reduction of speed through the duct, being a function of bends, valves, etc., in the cross-flooding system.

For guidance some typical values for  $k$  are given in Figures 2 – 12.

**EXAMPLE**

Cross-flooding pipe, diameter ( $D$ ) 0.39 m, length ( $L$ ) 21.0 m  
cross-section area ( $S$ ) 0.12 m<sup>2</sup>

'k' values for the cross-flooding system:

Inlet	0.45
Pipe friction $\frac{0.02}{D} L$	1.08
2 Radius bends ( $\alpha = 45^\circ$ )	0.36
Non-return valve	0.50
Outlet	1.00
$\sum k = 3.39$	

$$\therefore F = \frac{1}{\sqrt{1 + \sum k}} = \frac{1}{\sqrt{1 + 3.39}} = 0.48$$

Initial angle of heel                           $\theta_0 = 11.9^\circ$   
 Head before cross-flooding commences     $H_0 = 5.3 \text{ m}$   
 Head after complete cross-flooding         $H_f = 1.5 \text{ m}$

$$\text{Time to complete cross-flooding} = T_0 = \frac{2W}{SF} \cdot \frac{\left(1 - \sqrt{\frac{H_f}{H_0}}\right)}{\sqrt{2g \cdot H_0}} \cdot \frac{1}{\left(1 - \frac{H_f}{H_0}\right)}$$

In this case:

$W$  = final volume of water entering the equalizing compartment  
 $= 365 \text{ m}^3$

$$\therefore T_0 = \frac{2 \cdot 365}{0.12 \cdot 0.48} \cdot \frac{\left(1 - \sqrt{\frac{1.5}{5.3}}\right)}{\sqrt{2g \cdot 5.3}} \cdot \frac{1}{\left(1 - \frac{1.5}{5.3}\right)}$$

$\approx 815 \text{ seconds}$  (13.6 minutes)

The vessel is balanced at  $7^\circ$  using the stability curve and  $H_g$  measured to the equilibrium waterplane.  $W$  is now the volume added to reduce the heel angle from  $7^\circ$  (or  $\theta$ ) to zero.

$$\text{Time from } 7^\circ \text{ heel to upright} = T_\theta = \frac{2W}{SF} \cdot \frac{\left(1 - \sqrt{\frac{H_g}{H_\theta}}\right)}{\sqrt{2g \cdot H_\theta}} \cdot \frac{1}{\left(1 - \frac{H_g}{H_\theta}\right)}$$

Head after partial cross-flooding to  $7^\circ$  heel     $H_g = 3.7 \text{ m}$   
 and  $W = 160 \text{ m}^3$

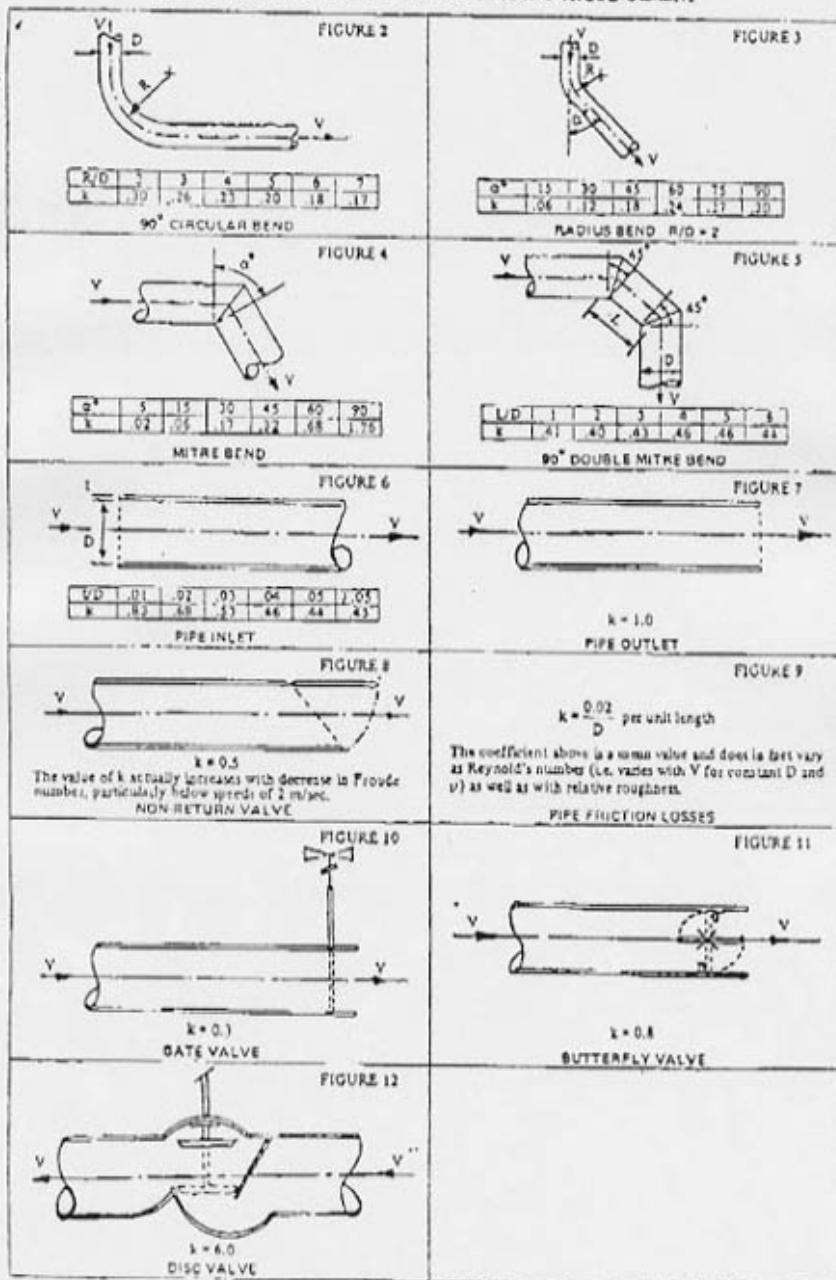
$$\therefore T_\theta = \frac{2 \cdot 160}{0.12 \cdot 0.48} \cdot \frac{\left(1 - \sqrt{\frac{3.7}{7.0}}\right)}{\sqrt{2g \cdot 3.7}} \cdot \frac{1}{\left(1 - \frac{3.7}{7.0}\right)}$$

$\approx 400 \text{ seconds}$  (6.7 minutes)

$$\therefore \text{Time from start of cross-flooding to } 7^\circ \text{ heel} = T_0 + T_\theta$$

$$= 815 \text{ seconds} (13.6 \text{ minutes})$$

FRICTION COEFFICIENTS IN CROSS-FLOODING ARRANGEMENT



SURVEY REPORT FOR ISSUE (1)  
RENEWAL

## PASSENGER SHIP SAFETY CERTIFICATE

Under the provisions of the International Convention for Safety of Life at Sea 1974.

## CARGO VESSELS OF 500 GRT AND OVER

V Number - 's name	Distinctive number or letters	Port of Registry and flag	Gross Tonnage	Keel laid on	Length (2)	Type of Ship
STONIA"	E S T E	TALLIN	15598	1979	157,02	FPS

nd Address of Owners or Managers : Estline A/S, Estonian Shipping CO Ltd  
 Nordström & Thulin AB, Shipowning Dept, Box 1215, S-111 82 STOCKHOLM/Sweden

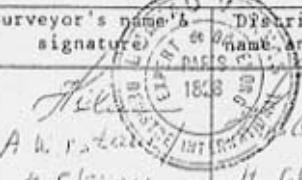
rvey made at : Tallin on the 28.01.1993 at the request of : Owners

"interim"  
 "Conditional-issue" certificate (1) been delivered ? Yes date of delivery : 28.01.93  
 date of validity : 28.06.93

es the vessel call regularly your port ? Yes

## - GENERAL INFORMATION :

 preceding certificate delivered by : Finnish Maritime Administration date of expiry : 22.05.1993 rvey made at : Tallin on the : 28.01.1993 at the request of Owners r of passengers carried (Reg. 2 (c), Chapter I) : 2000 number of persons carried : 2188 ship engaged on international voyages (Reg. 2 (d), Chapter II) ? No the ship engaged on short international voyages (Reg. 2 (a), Chapter III) ? Yes the vessel proceed more than 20 miles from the nearest land, in the course of her e ? (Reg. 1 (c), Chapter II) ? Yes pe of machinery : Internal Combustion Engines power : 17600 kW existing vessel (keel laid before 25th May 1980), specify the Method (I/II/III) adopted fire protection : SOLAS 74 Delete as appropriate. length of the ship (between perpendiculars of the deepest subdivision loadline  
(Reg. 2 (b), Chapter II))

ADMINISTRATION	REGISTRATION	DISTRICT	Surveyor's name & signature	District Head's name and signature
sea statutory surveys section	REPORT N° GTB/ Date 93/2/1 Invoice N° 2874 Date 8.01.93	BU GTB Date 7.02.93		H. CLESLIN

2 - SURVEY OF HULL AND MACHINERY

2.1. Has an inspection of the structure been carried out, including a survey of the hull in dry-dock ? Yes 1-93

Has the equipment (windlass, chains, anchors...) been inspected ? Yes  
Condition : Satisfactory, Complete survey carried out.

2.2. Has an inspection of the machinery been carried out ? Yes

Have the boilers and other pressure vessels with their auxiliaries been inspected ? Yes  
Condition : Satisfactory

3 - STABILITY Chapter II - 1, Reg. 7-19-20)

Is the master supplied with the necessary documents concerning stability ?  
(See in annex I the list of these documents). Yes  
(Approved by the Finnish Auth. pending B.V. approval)

4 - SUBDIVISION Chapter II - 1, Part. B)4.1. Subdivision loadlines (Reg. 11)

Indicate hereafter the free-board corresponding to the subdivision loadlines assigned and marked on the ship's side at midships :

C.1 2062 mm  
C.2  
C.3

4.2. Watertight integrity4.2.1. Watertight Bulkheads, Watertight doors (Reg. 13)

Condition : Satisfactory

Test carried out : Yes

4.2.2. Opening in shell plating below the Margin Line (Reg. 14)

Condition : All bottomvalves surveyed in drydock 1-93

4.2.3. Watertight integrity above the Margin Line (Reg. 17)

Condition : Satisfactory

4.3. Bilge pumping arrangements (Reg. 18)

## 4.3.1. Pumps :

Number of pumps	Duties		Separate output	Location	Method of driving
	Main	Auxiliary			
81	X		300 m/h	ME Room	E1
82	X		300 m/h	Aux Room	E1
83I	X		110 m/h	Stern tube	E1
83II	X		110 m/h	Aux Room	E1
84 (Mono)	X		30 m/h	KaMeWa	E1
80	X		110 m/h	KaMeWa	E1 (emergency)

4.3.2. Bilge main diameter : Ø 125 mm

4.3.3. Observations about pumps trials, condition of bilge pumping pipes, distributions boxes, cocks and valves, spindles :  
Everything inspected and tested to satisfaction

4.4. Damage control plans (Reg. 20)

Are plans showing, watertight compartments, openings means of closure and arrangements for the correction of list due to flooding, permanently exhibited ?

Are booklets containing above information available to ship's officers . Yes

MACHINERY AND ELECTRICAL INSTALLATIONS (Chapter II-1 Part C)

5.1. Main source of electrical power (Reg. 24)

Specify the location and the characteristics of the source of power :  
Aux. Engine room, 4 1C diesel generating sets total 4400 kW

5.2. Emergency sources of electrical power (Reg. 25)

Specify the location and the characteristics of the emergency source of power and the temporary source of power :  
- Deck No 8 Emergency diesel engine 320 kW  
- Batteries

5.3. List of services supplied by the emergency source of electrical power :

Emergency bilge pump, fire pump, steering gear, air compressor; lights and illumination, communication etc. All SOLAS requirements complied with.

Has a black-out test been carried out ? Yes

5.4. Precautions against shock etc. (Reg. 27)

Has the electrical installation been inspected ? Yes

Has a megger test been carried out ? Yes, through main switchboard  
Observations : None

5.5. Means of going astern (Reg. 28)

Power for going astern : CP propellers

5.6. Steering gears (Reg. 29 and 30)

Specify the characteristics of the main and auxiliary steering gears :  
Electro hydraulic with two separate circuits

. / ...

General observations on the condition of the steering gear, trials works carried out etc... Emergency steering tested in steering gear room including communication bridge/steering gear room.

5.7. Communication between bridge and engine room (Reg. 32)

Specify existing means. Telegraph, normal telephone, emergency telephone, loudspeaker system and VHF

i - FIRE PROTECTION : DETECTION : EXTINCTION Chapter II-2)

6.1. Subdivision (Reg. 18 - 19 - 20 - 23 - 24)

6.1.1. Condition of main vertical bulkheads, bulkheads within main principal zones, doors and openings : Satisfactory

Draught stops missing in some places. Recommendation issued in a special note.

6.2.2. Working test of doors, dampers (manual and automatic) : Yes

Satisfactory tests carried out

6.2. Means of escape (Reg. 21, 22)

Condition of stairways, ladders, corridors : Satisfactory

6.3. Ventilation systems (Reg. 25)

6.3.1. Working test of fan's remote control : All systems tested including remote stops. Satisfactory

6.3.2. Condition and working test of ventilation ducts dampers :

6.4. Protection of accommodation and services spaces (Reg. 29)

6.4.1. Automatic +sprinkler+ and fire alarm and fire detection system.

Condition of the installations (pumps, pipings, stop valves, test valves, pressure gauge, sprinkler heads) : N.A.

Tests : automatic starting test of the system with main and emergency source of power, visual and audible alarm signals, location indicating units :

Spare sprinkler heads : N.A.

. / . . .

6.4.2. Automatic fire alarm and fire detection system

Type : SALVICO, heat detectors

Conditions of the installations : detectors, electrical circuits, indicating units : Satisfactory after repairs

Working test of the installation on main and emergency supply : Satisfactory after repairs

Spare detectors : Yes

6.5. Protection of special category spaces (Reg. 30)

6.5.1. Fixed fire extinguishing system

Type : Drenching

Working test : Carried out

6.5.2.1. Patrols

Are patrol systems maintained in such spaces ? Yes

6.5.2.2. Automatic fire detection system

Type : SALVICO, smoke detectors

Working test : Satisfactory after repairs

6.5.2.3. Manual fire alarms

Are manual alarms provided as necessary and close to each exit Yes

6.5.3. Fire extinguishing equipment

Number of hydrants :

Water fog applicators (minimum 3) :

Portable froth applicator (minimum 1) :

Number of portable extinguishers :

In accordance with  
approved safety plan.  
Number of equipment  
confirmed.

6.5.4. Ventilation system

Working test : Yes

Alarm (if loss or reduction of ventilating capacity) : No

Indication provided on car deck fore and aft.

6.6. Protection of cargo spaces other than special category spaces intended for the carriage of motor vehicles with fuel in their tanks (Reg. 31)

N.A.

. / . .

6.6.1. Fire detection and fire detection systems

Type : N.A.

Working test :

6.6.2. Fixed extinguishing system

Type : N.A.

Working test

6.7. Maintenance of fire patrols/alarms (Reg. 32 (a))

Is there an efficient patrol system ? Yes

Are manual alarms fitted throughout the accommodation and services spaces ? Yes

Is there an approved fire alarm or fire detecting system in cargo spaces ? N.A.

Is there a special alarm system to summon the crew ? Yes

Is there a public address system ? Yes

6.8. Fire extinguishing equipment (Reg. 5, 32)

6.8.1. Fire pumps

Number	Duties		Separate output in t/h	Discharge Head	Location	Method of driving
	Main	Auxiliary				
1	X		92	90 m	Aux. Room	E1
1	X		92	90 m	Main Eng Room	E1
1		X	92	90 m	KaMeWa Room	E1 (em)

Is there a remote control of fire pumps ? Yes (Emergency) Location : Bridge

Are relief valves provided in connection with all fire pumps ? No

Centrifugal pumps

Can each pump produce at least the two jets of water required by Regulation ?

Yes

Is the arrangement such as to ensure that a fire in any one compartment will not put all the fire pumps out of action ? Yes

Examination of the fire pumps which are not normally surveyed during classification surveys : N.A.

6.8.2. Fire main

Is the fire main maintained under pressure ? No

Inside diameter : 8260 m/m Maximum pressure in service : 9 bar

Condition : Satisfactory

.//...

6.8.3. International shore connection

Location : Deck 7 Port and SB, Car deck Port and SB

Facilities available enabling the connection to be used on either side of the ship :

Yes

6.8.4. Hydrants, Hoses and Nozzles

6.8.4.1. Machinery spaces

	Engine Room	Boiler Room	Tunnel	Type of Coupling
Hydrants Number and Dia.	According	to approved safety plan		
Hoses No, Dia, Length and Material	According	to approved safety plan		Type of Nozzle

6.8.4.2. Other spaces

	Location	Number	Diameter	Type of Coupling
Hydrants	According to approved safety plan			
Hoses with nozzle for each	According to approved safety plan		Length	Material Nozzle

Conditions of hydrants, hoses and nozzles :

Everything checked and found satisfactory

6.8.5. Water fog applicators in machinery spaces of category A.

Number : 4

Condition : Satisfactory

6.8.6. Portable fire extinguishers in accommodation, service spaces and control stations

Location	N <sup>ber</sup>	Type	Capacity	Date of last recharge or weight checking	Last date of test
<u>Control stations</u>					
<u>Services spaces</u> galley, stores					
<u>Accommodation spaces</u> airways, corridors			According to approved safety plan		
public spaces					
lavatories cabins					

6.8.7. Fire extinguishers in Machinery spaces and boilers room

Location	N <sup>ber</sup>	Type	Capacity	Date of last recharge or weight checking	Date of last test
Main engine room					
Boiler room					
Auxiliaries			According to approved safety plan		
Great capacity extinguishers					

Is the number of extinguisher in compliance with the requirement of Reg. 32 (g) (iii) and 32 (h) (iii) ?

Yes

. . .

Observations 1993 01 04

1. Draught stops seem to be missing in several places. To be checked against fire protection plan.
2. Windows facing lifeboats embarkation stations (and lowering area) does not seem to be "fire-proof" by 26
3. Draught marks "missing" aft and to be painted fore.
4. Control station for cardeck sprinkler system has open ventilation to staircase.
5. Indication of shell doors Port and SB #10 and #122 cardeck missing (also hatches for mooring, close by)
6. Main galley door against staircase! Reg 22 b)
7. Furniture in staircase
8. Galley on deck 5 (grill) does not fulfil requirements for galley
9. Baggage room deck 4 placed in staircase.
10. ? Fixed fire fighting ventilation system in main galley missing + fire flaps + heat stop. | To be checked.

11. Lifeboat vessel's condition questionable  
to be investigated. How old, when  
turned?

12. Paint kept in three different places  
with no fixed fire fighting system.  
(i.e. 6-deck SB\*, 3rd deck #114  
and cardeck aft) + Store Deck No 1 (Cat 1C)  
\* also openings  
to fan room

Minor remarks

- Fire insulation: outside 4101 (cabin) A-60 removed and not repaired, same in bar #40 under deck.
- Damage Control Plan? bridge!
- Some fire doors bad function! i.e.  
~~636, 8C, 55C\*, 55E\*, 551@77\* + also damaged~~  
~~fire doors 8D 8E 7B with permanent~~  
~~hooks~~ See Special Notes
- Fire flaps need to be greased (does not close properly) - Marking
- Emergency lighting not properly marked some in bad condition and some not functioning
- Manouvering devices for lifeboat and liferaft lowering need to be adjusted and checked
- Closing device on airpipe #133 Port cat-deck missing.

- A lot of signs missing i.e.  (3)
- fire alarm push buttons, liferaft storage
- Store in staircase  contains mattresses etc.

MV Estonia

Jan. 21, 1993

[D]

Fire Doors -

The following faulty in need of adjustment:

Deck 7 - Nos. 7, b

Deck 6 - Nos. 25, 28, 32, 35, 36, 38  
64 A, B, C, D

Deck 5 - Nos. 56, 55 D, 55A, 53, 54, 45  
68, 67, 64, 60, 32, 80, 79

Deck 4 - No. 77

Deck 3 - No. 84

Deck 1 - No. 105

- Fire doors with permanent hooks - to

be removed 8D, 8E and 7B

- Maneuvering of sliding doors from  
closed to open position to be checked

# FIRE DETECTION SYSTEM

[E]

21.1.93

THE FOLLOWING TO BE DEALT  
WITH PRIOR TO APPROVAC:

FIRE SECTION C.1: LOOP FAILURE

C5: LOOP FAILURE

E1: LOOP FAILURE

D.5: FAILURE TO DETECTORS

D.4: ONE DETECTOR WITHOUT  
COVER - OUTSIDE CABIN

633

H1: LOOP FAILURE

G4: TEST AT DETECTOR

OUTSIDE CABIN 4628 INDICATES FIRE IN SECTION

H1

J1: LOOP FAILURE

J4: LOOP FAILURE

M3: LOOP FAILURE

DRAWING/SKETCH OF DETECTION  
SYSTEM TO BE PLACED ADJACENT  
TO ILLUMINATION PANELS.

[E]

TEST OF WT-DOORS 21.3.93

DOOR NO 18: SILK PLATE TO BE ADJUSTED

15: LOOSE VENTS TO BE REMOVED

3: NO AVAILABLE LATCH - NO  
INDICATION ON BRIDGE FOR  
CLOSED DOORS.

2,8,9: ADJUSTMENT OF MICROSWITCHES.

2,3,7,8,9,18 : NO INDICATION FOR CLOSED  
DOOR ON BRIDGE

6 : INDICATION LAMP TO BE  
ADJUSTED ON BRIDGE.

21.01.93 Test of Fire main hoses and nozzles

(1)

[G]

1. Fire hose missing deck 7 aft
2. All hoses and nozzles to be attached to the hydrants in the accommodation.
3. L-shaped pipes 1 fog applicators missing in engine room (cat A) as well as on car deck (3 pcs)
4. Indicator bottomvalve for emergency fire pump no function.

#### Test of emergency bilge system

1. Overboard valve from emergency bilge pump not remotely operated from central or on car deck.
2. No emergency light in central for emergency bilging
3. Oil drums stored in central (not allowed)
4. Hand manouevring device on suction valve SB side separator room missing
5. Emergency bilge pump took no suction (test could not be done with water)

Tested again it seems like the evacuation pump is not working. To be retested completely

(2)

H

21.05.93 Test of lifeboats (watched)

- 5 lifeboats Port side lowered to water  
hooks released, motors started
- 2 liferaft cranes on Port side tested  
with one raft (not inflated).

### Stop of jams

- ER jaws remote stop tested 1OK
- CAR deck — - - " 1OK
- Accomodation — - - 1OK

### Quick closing valves

1. All quick closing valves have to be tested again. (except drain thermal oil (2 off), 4 on main engines}, booster ME 182 and 384 (2 off))
2. Port for release locket to be marked "Ventilation stop and quick closing valves". Ventilation fire flaps on cardeck

- Port #80 not working
- ME room #65 — -

(3)

I

### Drencher system

1. Sections 10, 9, 7, 5, 3 tested

nozzle at 2C middle and  
2B at casing

not working

2. Scupper at # 79 tight.

Room for emergency handling of the bow-  
ramp need to be cleaned.

22.01.93 Drechsel system

J.

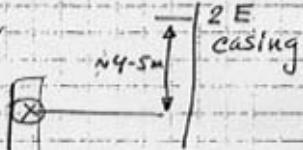
The rest of the drechsel system tested

Remarks

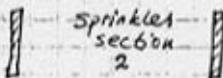
1. Instructions in Estonian language to be posted in the sprinkler station

2. Two sprinkler heads under movable deck at 2F clogged.

3. One sprinkler nozzle clogged



4. limits of the sprinkled sections to be marked on the wood bulkheads and section numbers.



'Test' and inspection CO<sub>2</sub>-system

1. Instructions for handling of the system to be posted in "Estonian language" (In CO<sub>2</sub> room and in release locker)

2. Kallewa room fans didn't stop when release locker was opened.

---

In various stores under the stairs (in the stairways) a lot of combustibles were kept (not allowed) and shall be removed.

22.01.93 We need

Bureau Veritas

K

- Copy of the Training Manual
- Copy of the Certificate of Registry. (Estonia)
- Copy of minimum safe Manning document (Estonia)

Equivalents or exceptions:

Equiv

- |    |  |  |
|----|--|--|
| 1. | No food in the lifeboats required. <i>and liferafts</i>  | } SjöV<br>21-9072022<br>90 04 11<br>copy in file |
| 2. | Water in lifeboat/liferafts 1/2 lit/person   |  |
| 3. | Exemption for the aft toplight in the long. direction ( required; aft funnel, placed forward part of funnel ). |  |

## Operational control estonia

Enclosure 6.5.2.127

# Operational Control

" ESTONIA "



M/V " ESTONIA " - Tallinn

Procedure for Operational Control, January 26, 1993.

The safety of the crew and others on board the vessel at the time of the drill is the responsibility of the Master. The National Maritime Administration of Sweden will be observers during the drill and in no way require any actions that may involve risk.

The drill shall not disturb the normal operation of the vessel.

The following shall be included:

1. Fire Drill
2. Abandon Ship Drill

A smoke generator will be placed on board to simulate a fire. The smoke is harmless but should be treated as if it was real.

Prior to the drill the entire crew should be gathered together to receive information from the authorities. After completion the crew should once again be gathered to hear the views of the surveyors.

Details to be noted:

1. Arm bands will be placed through out the ship. These represent receipts for having searched all areas and are to be collected by the search parties. Each arm band has a number. They will be collected at the end of the drill.
2. Fire hoses used for fighting the " Fire " should have full pressure.
3. Life boats used in the drill are to be confined to the sea side of the ship. Those on the quay side are not to be used. The boats are to be lowered into the water, engines running, and disconnecting from the hooks.
4. All external communication may be simulated.
5. Simulated casualties may be used.
6. Position of the vessel - at sea, roughly half way between Tallinn and Stockholm.
7. Weather - SW force 6, good visibility, -8 C.
8. Passengers on passage: 850
9. The " Fire " , will at a given time become uncontrollable and necessitate abandon ship . The surveyor at the scene of the fire will inform the fire fighting party at the appropriate time.
10. Bridge Operation shall function as if this were a real incident.

Stockholm, January 24, 1993

Tom Evers

Senior Ship Surveyor

National Maritime Adm.

Sweden

OPERATIONAL CONTROL  
M/V " ESTONIA " - TALLINN  
JANUARY 26, 1993

On January 26, 1993 four surveyors from the National Maritime Administration of Sweden attended the Estonian Passenger Vessel " Estonia " while berthed at Baltic Ship Repair in Tallinn. The purpose of the visit was to observe Fire and Abandon Ship Drills prior to the vessel commencing regular service between Tallinn and Stockholm.

A representative from Bureau Veritas was present and did observe the drills as carried out by the crew under command of the master Arvo Andresson.

The following is a summary of events during the drill:

09:30 , The entire crew was gathered in the conference room for general information regarding the drills at hand. They were informed that a smoke generator would be used to simulate a fire and that, although harmless, the smoke should be treated as if it was real. Armbands had been placed in various compartments and would represent receipts for having searched the vessel. A red and amber blinking light would be used to indicate the " Fire ". As the ship was berthed with her starboard side to the quay, only lifeboats on the port side were to be used. Fire hoses used in the drill should be under full pressure. Simulated weather - SW wind force 6, good visibility, -8 C. No actual passengers were on board at the time of the drill. For the sake of the drill a figure was set at 850 passengers.

The position of the vessel was given as at sea, roughly half way between Tallinn and Stockholm, within VHF distance of the Swedish coast. All external communication should be simulated.

2. 09:45 , A number of persons ( 20 ) were placed about the ship as simulated casualties. The extent of their casualties varied from generally confused, lightly dressed to a mother who had her baby in the smoke filled section and on to those unconscious.

3. 10:10 , A false alarm was set off by a surveyor to test the reaction time for investigating this incident and not " over-reacting ".

4. 10:16 , Fire Alarm.

5. 10:18 , Coded message announcement over the PA system.

6. 10:22 , Information to passengers over the PA system in Swedish, Estonian, and English.

7. 10:23 , Fire fighting group II arrives at fire door aft of smoke filled section.

8. 10:24 , Fireman belonging to group I with breathing apparatus and hand-held extinguisher arrives at smoke filled section.

9. 10:26 , VHF contact with Stockholm Radio.

10. 10:31 , Fire fighting groups I and II at smoke filled section with full pressure on hoses.

11. 10:35 , Surveyors inform the Master that the fire is now out of control.

12. 10:37 , Lifeboat alarm.

13. 10:38 , Passengers are requested over the PA system to go to the muster stations .

14. Simultaneously evacuation groups go about their tasks. Casualties are taken care of by the first aid group. Helicopter landing platform is made ready. Lifeboats are placed in embarkation readiness. VHF contact is upheld with Stockholm Radio.

15. 10:55 , The Master is informed by a surveyor that the drill is over.

At 11:30 the crew was once again gathered in the conference room to hear the views of the surveyors.

It was emphasized that when dealing with safety there is always room for improvement. The element of time is particularly essential to the successful fighting of a fire on board a passenger vessel.

- \* Although within the boundaries of acceptance the time from alarm to attacking the fire could be cut down.
- \* Evacuation was carried out in a professional manner. ( See our comments in the conclusion )
- \* The first aid group acted as well as could be expected considering the fact that none of the casualties were visibly injured. It is difficult to judge the quality of their performance. The casualties were given warm clothing or blankets for protection and those in need were placed in the proper position.
- \* The performance of the lifeboat crews was quite acceptable.
- \* Communication appeared to function very well throughout the drill.

#### Conclusion

The evaluation made by the surveyors based on observations during the drill is that, within the framework of " Operational Control ", the organisation proved itself to function properly. It was stressed in discussions with the master and the chief engineer how important it is to continually work at keeping safety at a level with highest priority. The National Maritime Administration of Sweden is constantly striving to improve the awareness of those trading Swedish ports regarding safety. The master was reminded that any of a number of controls may be done in the near future.

The following recommendations were made:

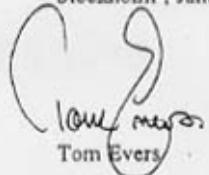
1. Tape or chalk marking of the cabins searched.
2. Due to a system error regarding keys to crew cabins , a new drill confined

to an evacuation drill is to be held within 30 days.

The following surveyors took part in the drill:

Surveyor in charge	- Tom Evers
Surveyor	- Johan Bäth
Surveyor	- Stellan Johansson
Surveyor	- Ari Niemenen

Stockholm, January 28, 1993

  
Tom Evers

M/V " ESTONIA "

Notations regarding the safety organisation.

Fire fighting

Consists of the Chief Engineer as Fire Chief, 2 fire groups and the engine group.

The Fire Chief is in charge of the fire groups and, when necessary, the engine group. He operates from the bridge.

Fire Alarm

Over the PA system a coded message announcement is used.

Coded message + number = The number of the fire station to which the groups should gather.

Coded message without number = Groups gather at their own fire station.

Command Structure

The command center on the bridge consists of the Master , the Chief Engineer, the Chief Mate and the Purser.

While the Master is in charge of the vessel as a whole the delegation of responsibilities is as follows:

The Chief Engineer is the Fire Chief. He is directly responsible for fire groups I and II as well as the engine group.

The Chief Mate is responsible for the first aid group, the Helicopter group and the lifeboat groups ( Starboard and port side ). He is second in command under the Fire Chief and also responsible for questions regarding stability.

The Purser is responsible for the security group and the evacuation groups which are led by zone leaders ( 2 ).

Muster list number 711 is to go to the bridge and is responsible for recording and documentation as well as assisting in general.

**Article from hansa no. 19/1980**

# SCHIFFBAU

## SCHIFFSMASCHINENBAU SCHIFFFAHRTSTECHNIK

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. 580, 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 Åland-Inseln bedient werden. Die finnische Reederei AB Sally betreibt zusammen mit der schwedischen Reederei AB Slite und der finnischen Rees-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.

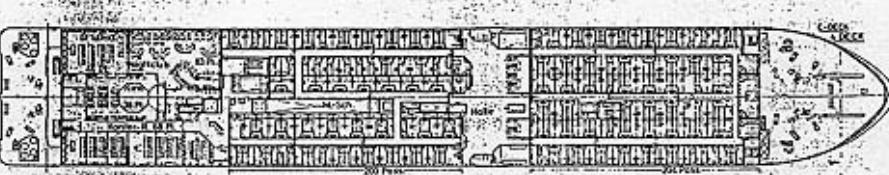
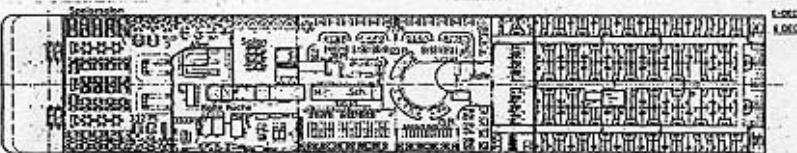
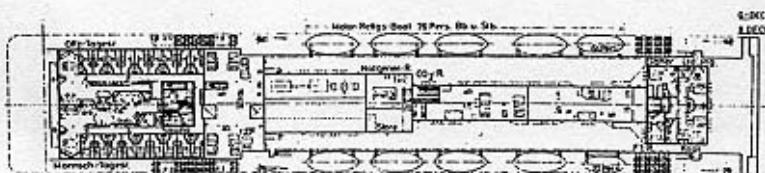
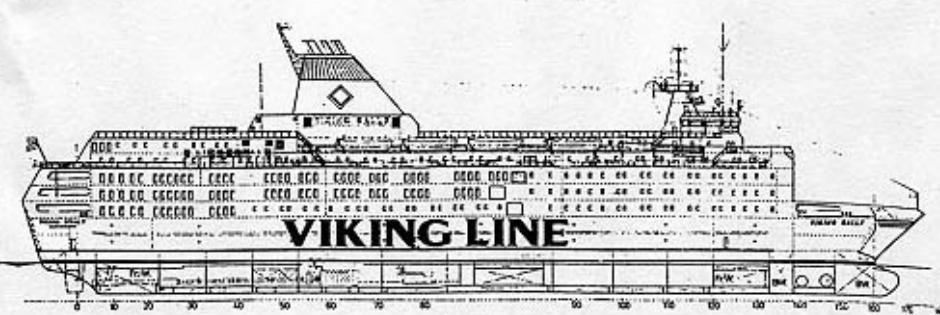
Weicher Arbeitsaufwand in einer solchen Großfähre steckt, beweisen folgende Fakten:

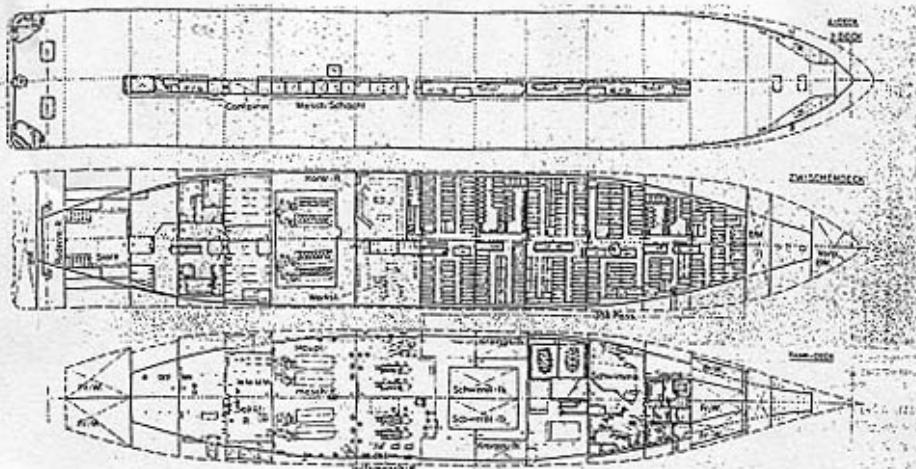
- Es wurden ca. 280 km Kabel eingebaut, d. h. 1,6 km Kabel pro Meter Schiff.
- Es wurden ca. 30 000 m<sup>2</sup> Flächen isoliert, soviel wie sechs Fußballfelder oder ein kleiner Bauernhof.
- Das Schiff faßt 460 Pkw, was einer 2,1 km langen Autoschlange entspricht.
- Es wurden 1300 Bolten und über 1500 Türen eingebaut.
- Das Schiff ist 44,5 m hoch, mit seinen 11 Decks höher als manches Hochhaus oder mancher Kirchturm.
- Neben der Hauptmaschinenleistung von 17 000 kW wurden 4410 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 . . . . .	23,00 m
Höhe bis Wagendeck . . . . .	7,65 m
Tiefgang . . . . .	5,55 m
Tragfähigkeit . . . . .	2 000 t
Vermessung . . . . .	15 500 BRT
	8 380 NRT
Geschwindigkeit . . . . .	21,20 kn
Maschinenleistung (4x6400 PS) . . . . .	4x4 800 kW
Ladefähigkeit . . . . .	52 Lkw à 18 m, oder 460 Pkw einschl. auf Hängedecks





#### Wagendeckelrichtung:

Wagendeckbelastung ..... Achslast 18 t  
 Freie Höhe unter hochgezogenem Hingedekk ..... 4,10 m.  
 1 Bugvisier, 1 Bugrampe, 2 Heckrampen  
 Hingedekk

#### Passagiere und Besatzung:

Insgesamt .....	2000 Personen
in Doppel-Kabinen mit Naßzelle .....	164 Personen
in 4-Mann-Kabinen mit Naßzelle .....	124 Personen
in 2-Mann-Kabinen .....	128 Personen
in 4-Mann-Kabinen mit gemeinsamen Wasch- und WC-Räumen .....	232 Personen

Offiziere und Mannschaften .....	110 Personen
Öffentliche Räume:	

Speisesalen .....	330 Sitzplätze
Cafeteria mit Grillraum .....	400 Sitzplätze
Tanzsalon .....	270 Sitzplätze
Konferenzräume, Nightclub .....	235 Sitzplätze
A-La-Carte-Raum .....	100 Sitzplätze
„Lounge“ .....	50 Sitzplätze
Schlafesselraum .....	70 Sitzplätze
Gallen und Arkaden .....	125 Sitzplätze
Swimming-Pool, Bar .....	40 Sitzplätze
Konferenzraum .....	27 Sitzplätze
Supermarkt, Saunas, Kinderspielraum.	

#### Maschinenanlage:

4 Hauptmotoren M.A.N. Type 8 L 40/45, mit je 4400 kW (6000 PS) bei 600 U/min = total 24000 PS  
 4 Diesel-Drehstrombordaggregat, Type B & W, mit je 1104 kW (1500 PS), Generatorleistung 1049 kW/1111 kVA  
 1 Notaggregat von 300 kW.

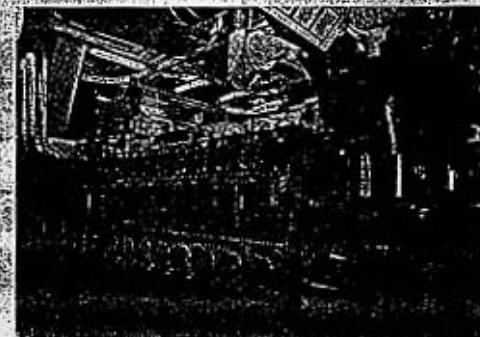
Nachfolgend wird das Schiff beschrieben, und zwar vom Maschinenraum unten bis oben zum Schornstein.

#### 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 Motoren werden über ein Untersetzungsgetriebe der Firma Renk auf eine Wellenleitung zusammengefäßt, so daß max. 12000 PS auf jeden der zwei Verstellpropeller abgegeben werden. Die Verstellpropelleranlage wurde von der Firma KameWa als screw-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-Drehstromaggregat 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 werftseigener Montage installiert. Das Notstromaggregat, das von der Firma Rolf Jansen, Aurich, geliefert wurde, erzeugt 300 kW und ist auf



Maschinen-Kontrollraum mit Hauptfahrsäule



Hauptmaschinenraum (M.A.N.-Maschine, 4400 kW) 31.2.1961

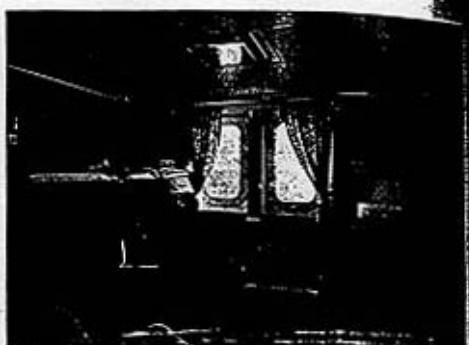


Steuerbordseite Wagendeck, Im Vordergrund Containerlift zu den Storeräumen

dem G-Deck angeordnet. Im Separatorenraum werden das Schweröl, Dieselsöl und Schmieröl in acht Separatoren der Firma Alfa-Laval aufbereitet. Die Hauptmotore und die Hilfsdiesel sind für Schweröl von max. 1F 180 konzipiert. Die Wärmeversorgung des Schiffes und die Beheizung der Schweröltanks erfolgen über eine Thermalöl-anlage. Das Thermalöl wird durch die Abgase der Hauptmotore in vier Abgaskesseln und in vier Abgaskesseln durch die Abgase der Hilfsdiesel und in zwei automatischen, ölfreuderten Kesseln der Firma Sanea erhitzt. Die drei Hochdruckkompressoren für die Steuerluft wurden von der Firma Jos. L. Meyer selbst hergestellt. Die gesamten Abwasser des Schiffes werden in zwei biologisch arbeitenden Abwasseranlagen der Firma Format-Chemie aufbereitet. Die Vakuumtoiletten lieferte die Firma Evak. Die hohe Manövriertsfähigkeit 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 Tefjord geliefert.

#### Versorgung

Zur Belieferung der Proviantsstorerräume im Zwischen-deck wurde am hinteren Ende des Mittelschachtes auf dem Wagendeck ein großer Lift angeordnet, um Proviantscontainer zum Zwischendeck zu befördern. Zwei Versorgungs-lifte verbinden die Storeräume auf dem Zwischendeck mit der Küche auf dem E-Deck und dem Supermarkt auf dem D-Deck. Je ein Personallift befindet sich im Mittelschiffs-bereich (Hallen) sowie vorne im Kabinenbereich. Zu den Storeräumen auf dem Zwischendeck gehören auch große Proviantskühlräume, damit ausreichend Getränke und Nah- rungsmittel gelagert werden können.



Luxus-4-Bett-Kabine

#### Wagendeck

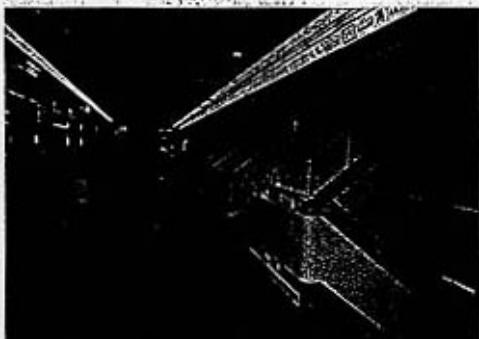
Das Hauptdeck kann 52 Lkw zu je 18 m Länge fassen. Statt Lkw können auch in zwei Lagen Pkw auf dem Wagendeck geladen werden, so daß die Gesamt-Pkw-Kapazität bei 460 Pkw liegt. Zwei Spuren sind aber aus-schließlich für Lkw vorbehalten. Die Roll-on/Roll-off-Einrichtung besteht aus einer wasserfesten Bugklappe, einer Bugrampe und zwei wasserfesten Heckrampen mit hy-draulischer Befestigung. Die gesamte Hydraulik der Hänge-decks und der Roll-on/Roll-off-Einrichtung wurde von der Firma von Teitl geliefert. Die Stahlarbeiten wurden von der Werft ausgeführt. Alle Wagendecks sind durch eine Wassersprühflut-Anlage 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 insge-samt 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 Außen-kabinen, 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 Schlebewänden wurde dieser Raum sehr variabel gestaltet und kann aufgeteilt



Haupttreppenhaus



5. Deck, Selbstbedienungsstraße der Cafeteria

Werdern 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.

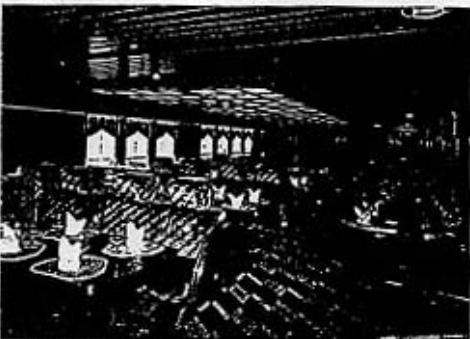
#### Klimaanlage

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 Funkpeil
3 Radargeräte TM	1 FT-Anlage
1 EchoLOT	



A-la-Carte-Salon, E-Deck

#### Vorschriften

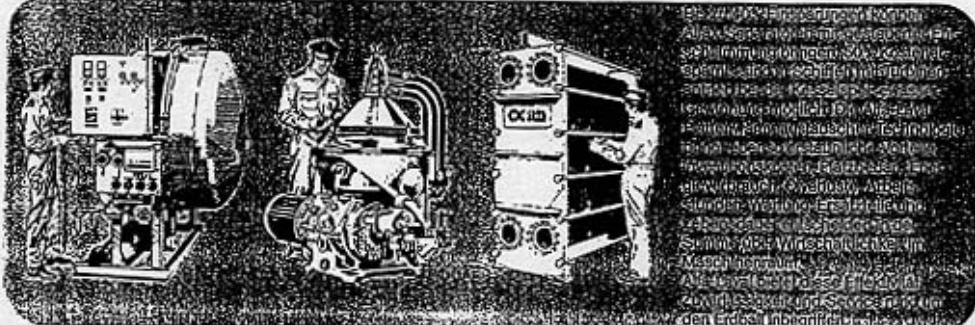
Das Schiff und die Maschinenanlage wurden gebaut nach den Vorschriften und unter Aufsicht von Bureau Veritas für das Klassenzeichen I 3/3 E + Deep Sea Ice Class IA Car/Passenger Ferry.

erner wurden folgende Vorschriften erfüllt:

1. SOLAS 1974 für kurze internationale Fahrt (Z-Abteilungs-Status).
2. Internationale Vorschriften zur Vermeidung von Kollisionsen 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 1974, einschließlich Änderungen von 1959 und 1971.

**ALFA-LAVAL**

# Kostensenken im Maschinenraum



Alfa-Laval Entwicklungen für Maschinenraummanagement. So kostengünstige Systeme für die Schiffsbauindustrie entstehen. Ein Beispiel ist die Kette der Alfa-Laval Separatoren. Ein weiterer wichtiger Punkt ist die Alfa-Laval Marine Oil Treatment Technology. Durch diese Gesamtlösungen können Betriebskosten gesenkt werden. Eine weitere Vorteile ist die einfache Wartung. Alfa-Laval Stundenwartung. Ersatzteile und Anbauteile sind leicht zu handhaben. Stetige Alfa-Laval Wirtschaftlichkeit im Maschinenraum. Ganzheitliche Lösungen für die Ölverschmutzung. Diese Produkte sind zuverlässig, sparsam und Serviceorientiert. Der Erfolg ist begründet in der Praxis.

**ALFA-LAVAL**

HANSA - Schifffahrt - Schiffbau - Hafen — 117. Jahrgang — Nr. 13

Alfa-Laval Industrietechnik GmbH  
Abt. IM · Postfach 80 03 29 · 2000 Hamburg 80  
Telex 217 821 · Tel. (040) 72 701-1

1511

## Statement lars Olof alander

**Polismyndigheten i Stockholms län  
City polismästardistrikt  
Våldsroteln.**

ÅKLAGARMYNDIGHETEN  
STOCKHOLM  
1998-02-12  
Dnr. 65-1-37798

Förhör hållt med Lars -Olof Ålander  
310204-7812, Fogdevägen 31, 152 40  
Södertälje.  
Förhörlet hållt i Ålanders bostad den  
1998-02-03 med början klockan 10.40.  
Färhörsledare krkom Bo Wide. Med vid  
förhörlet var Cå Tomas Lindstrand.  
Förhörlet 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 hamntsadskontroll 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.

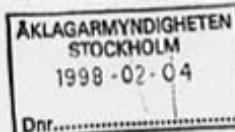
Förhörret utskrivet efter gjorda anteckningar och översänds till Ålander för godkännande.

Mottagen av Lars-Olof  
Åhlunder 980203  
i Söderortie / TL

CS-1-392-98

content for actions taken:

- 00 no action taken
- 10 deficiency rectified
- 12 all deficiencies rectified
- 15 rectify deficiency at next port
- 16 rectify deficiency within 14 dayt
- 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 detension
- 40 next port informed
- 45 next port informed to re-detain
- 50 flag state/captain 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)



## SMHI- weather opinion

1994-11-23

**ESTONIA-olyckan****Väderförhållanden 27 och 28 september 1994****ALLMÄNT**

Väderförhållanden den 27 september domineras 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 Bottenviken 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 plottrade. 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 läoeffekter. 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 kallas 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 originalregistreringarna 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 fyrlägen råder det dessutom stor läoeffekt vid vissa vindriktningar. Observationerna från Bogskär och Ristna bedöms i denna vädersituation som de mest representativa.

För att eliminera läoeffekterna 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 ytvatten-temperaturen. 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 tolkningskort från kl 19, 22, 01 och 04 den 27-28/9.

## VÅGOR

#### Definition av vågor

Med våghöden menas avståndet från dal till topp. Internationell standard är att mäta och beskriva vågor 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 överensstämelse 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 lätit den datorbaserade tolkningsmodellen för väderet 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 väderet.

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 olycksonrådet 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. Besättlet 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. Kapitenerna 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 Marinens som anlände till havariplatsen 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 tolkningsmodellen. Det samma 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 överens 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.

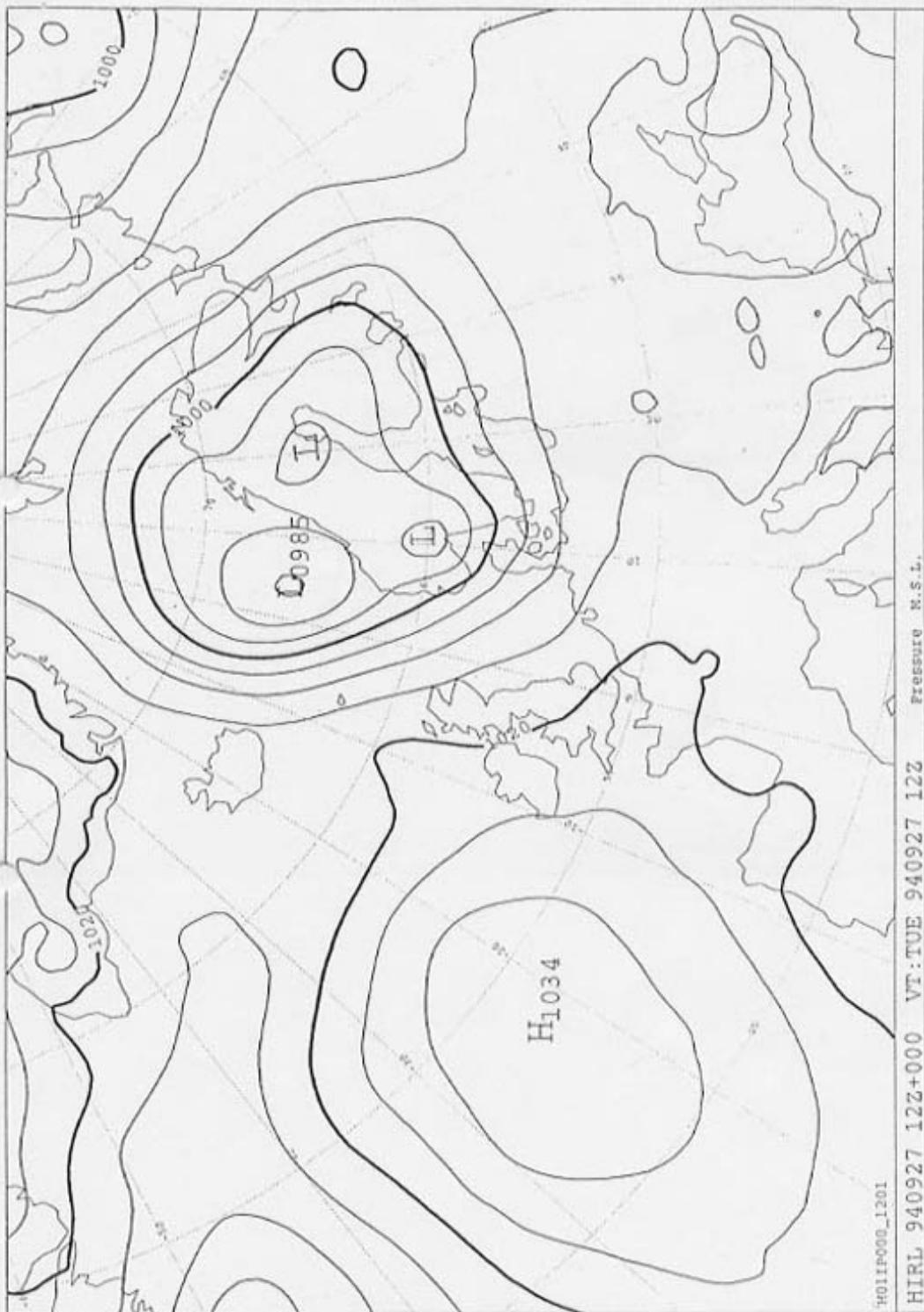
Även dessa uppgifter stämmer i stort sett med de väderobservationer som utförts samt de beräkningar som erhållits från den sk tolkningsmodellen, där beräkningen av byarna ger upp till 30-34 m/s.

#### 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.

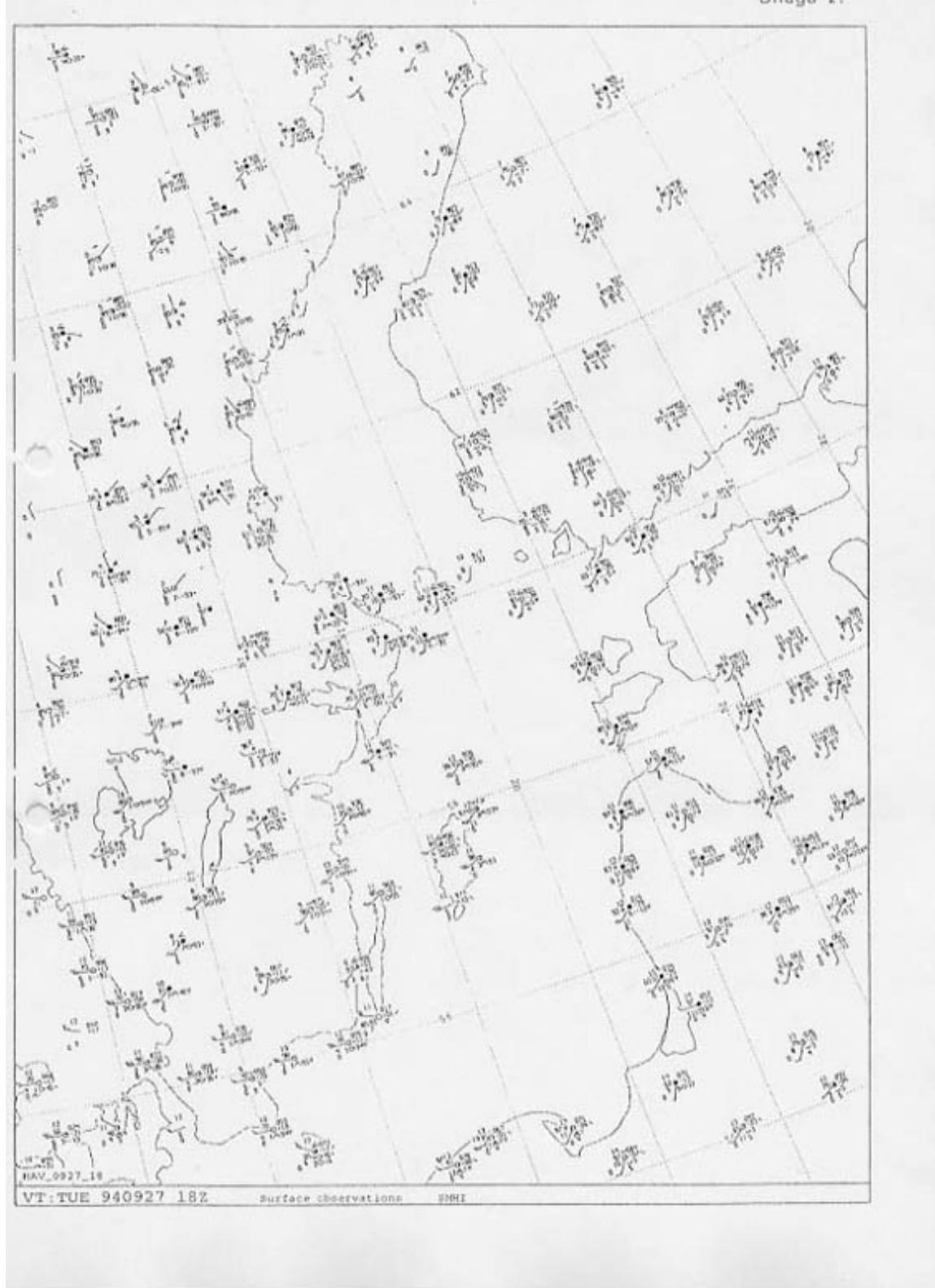
Man får utgå från att helikoptrarna ej särskiljer mellan signifikant och maximal våghöjd och därmed spänner deras rapporter över stora intervall.

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.

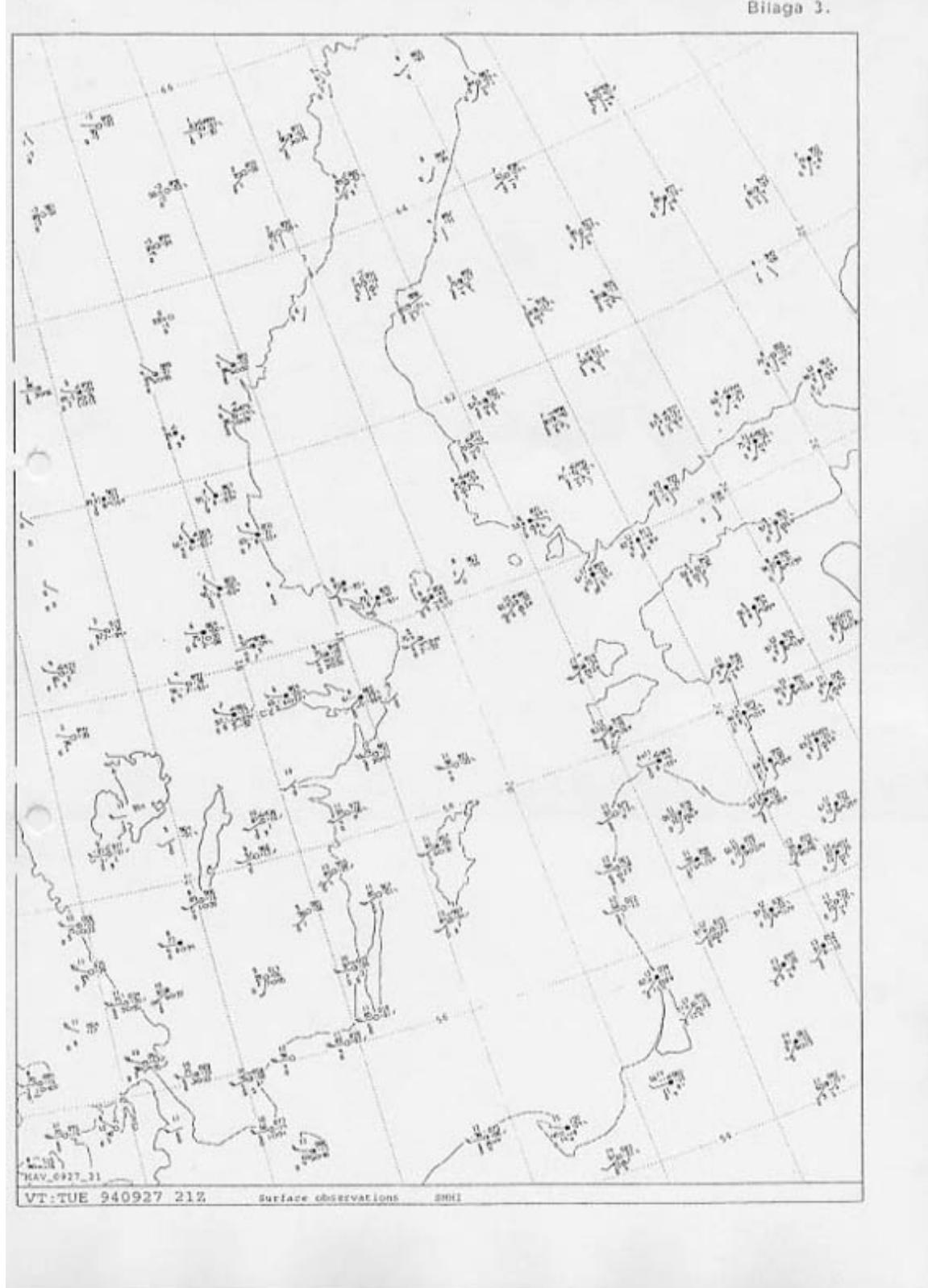


H0111000\_1201

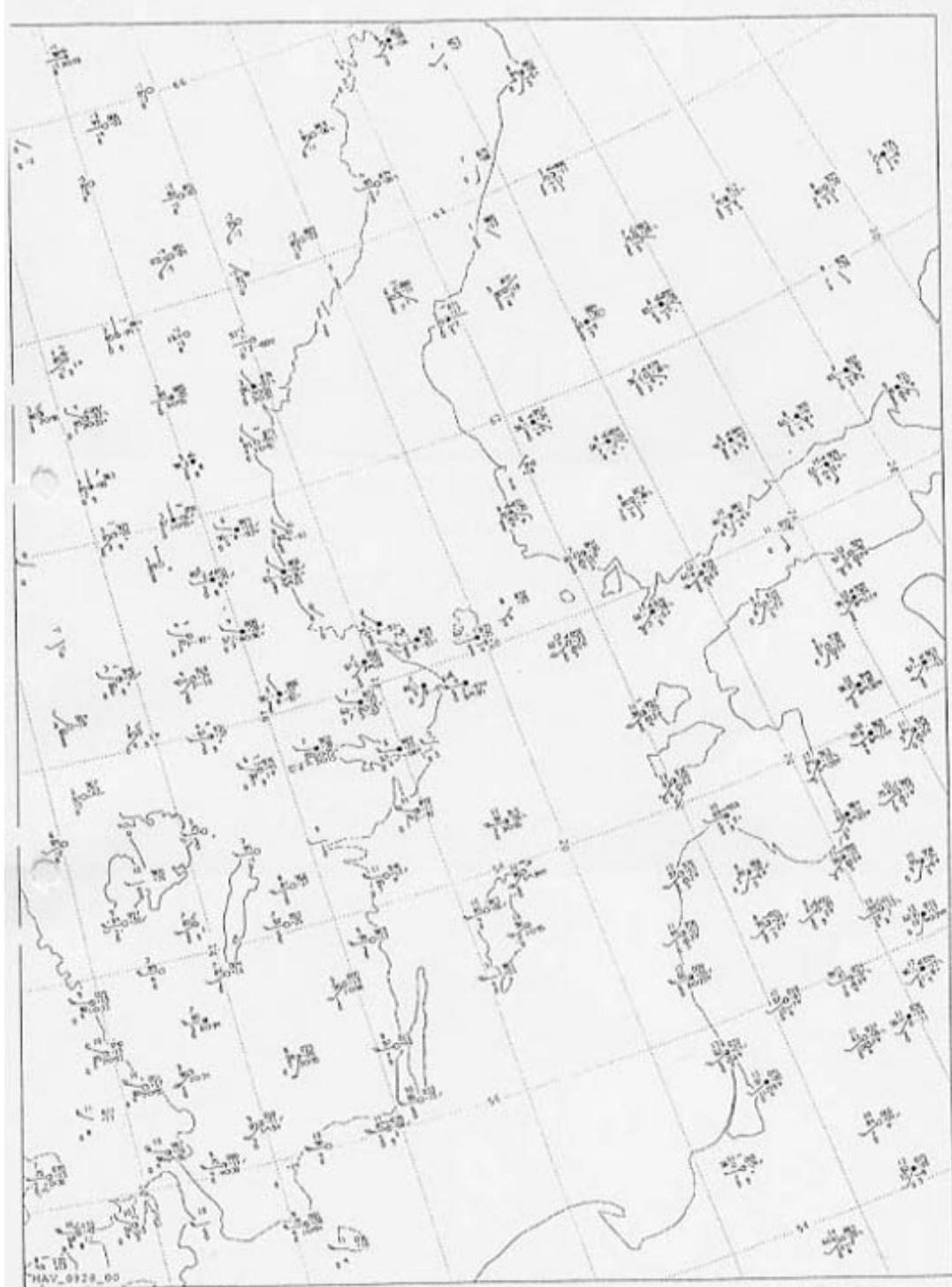
HIRL 940927 12Z+000 VTT:TUE 940927 12Z Pressure N.S.L.



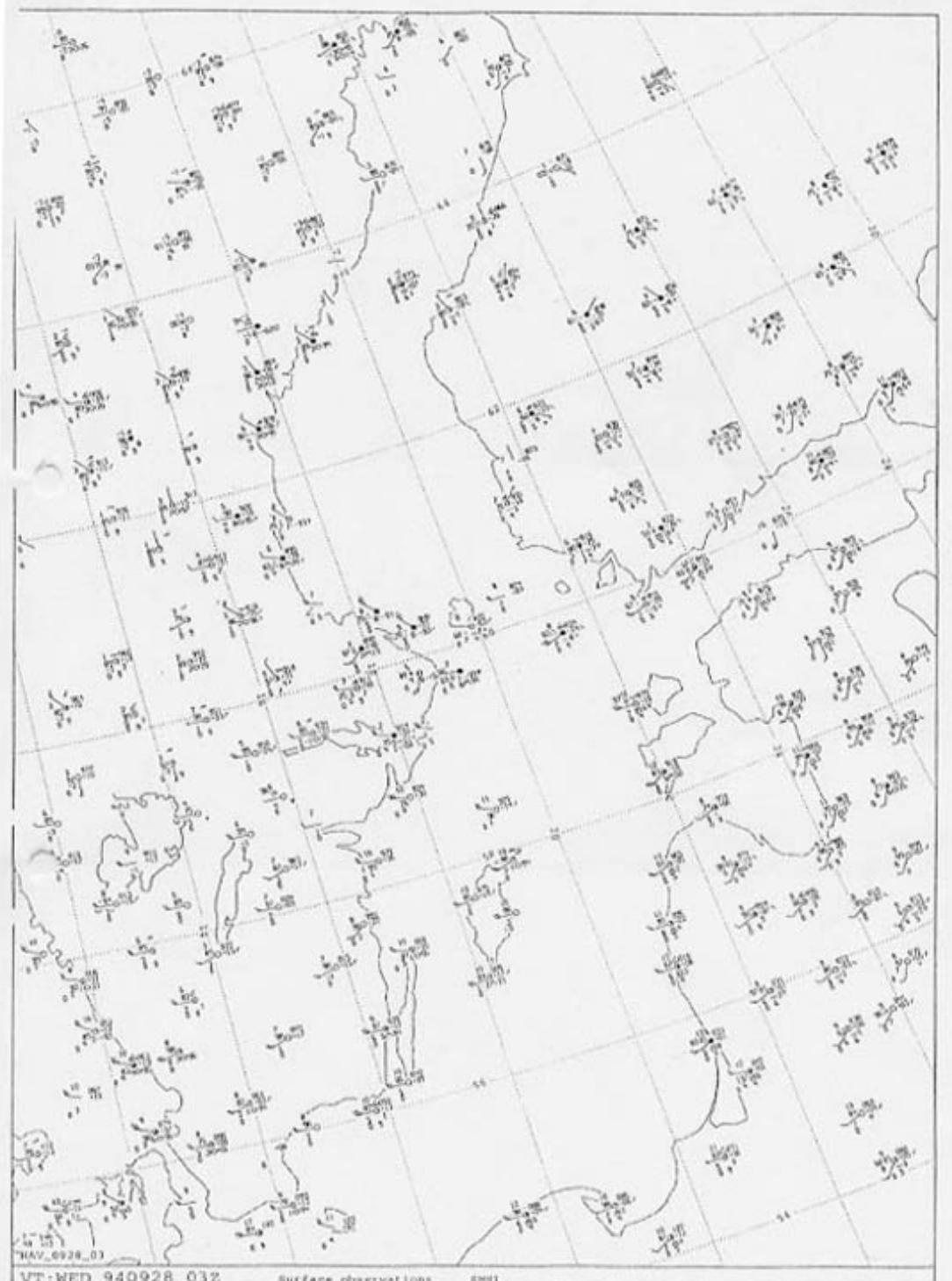
Bilaga 3.

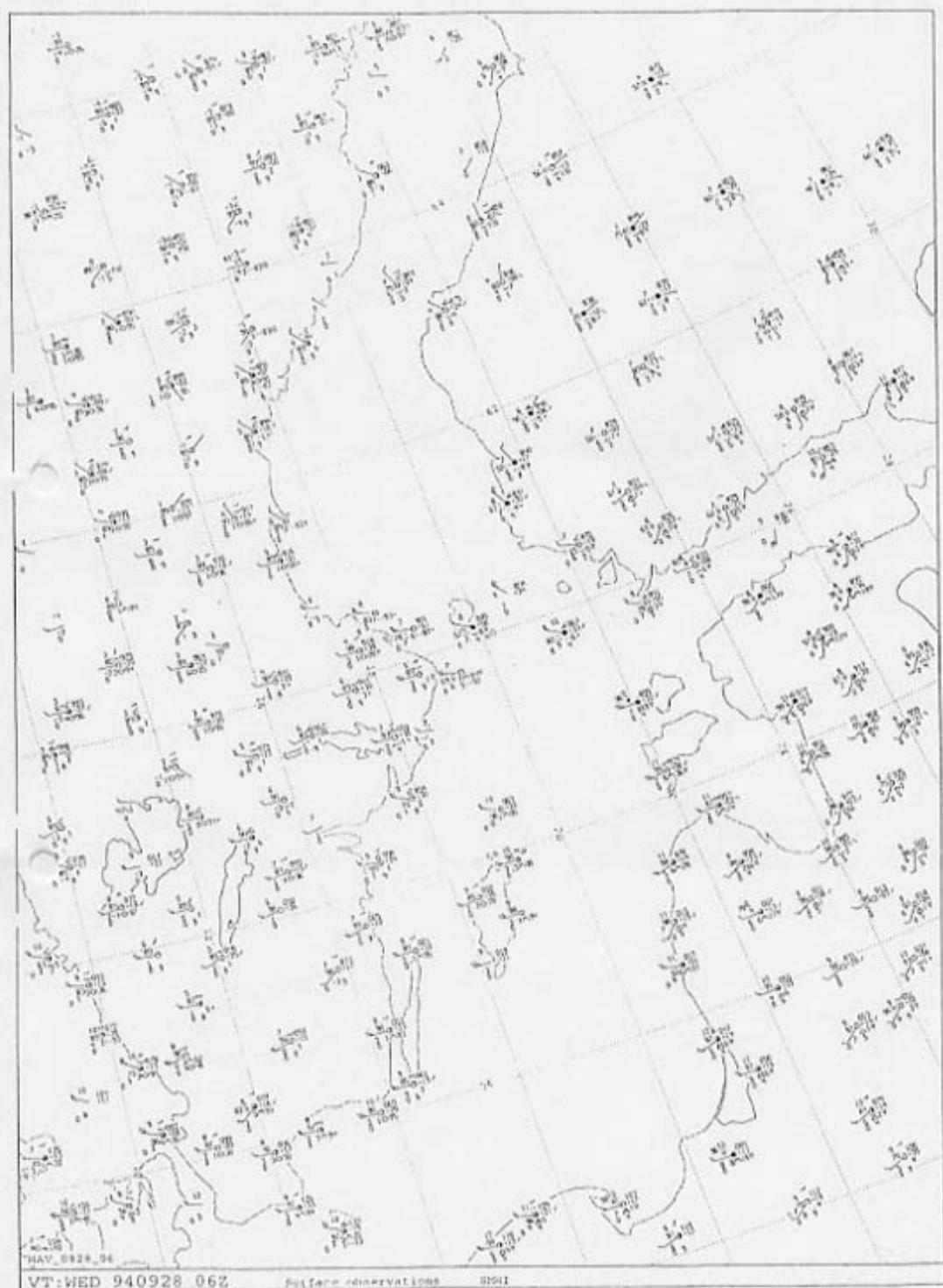


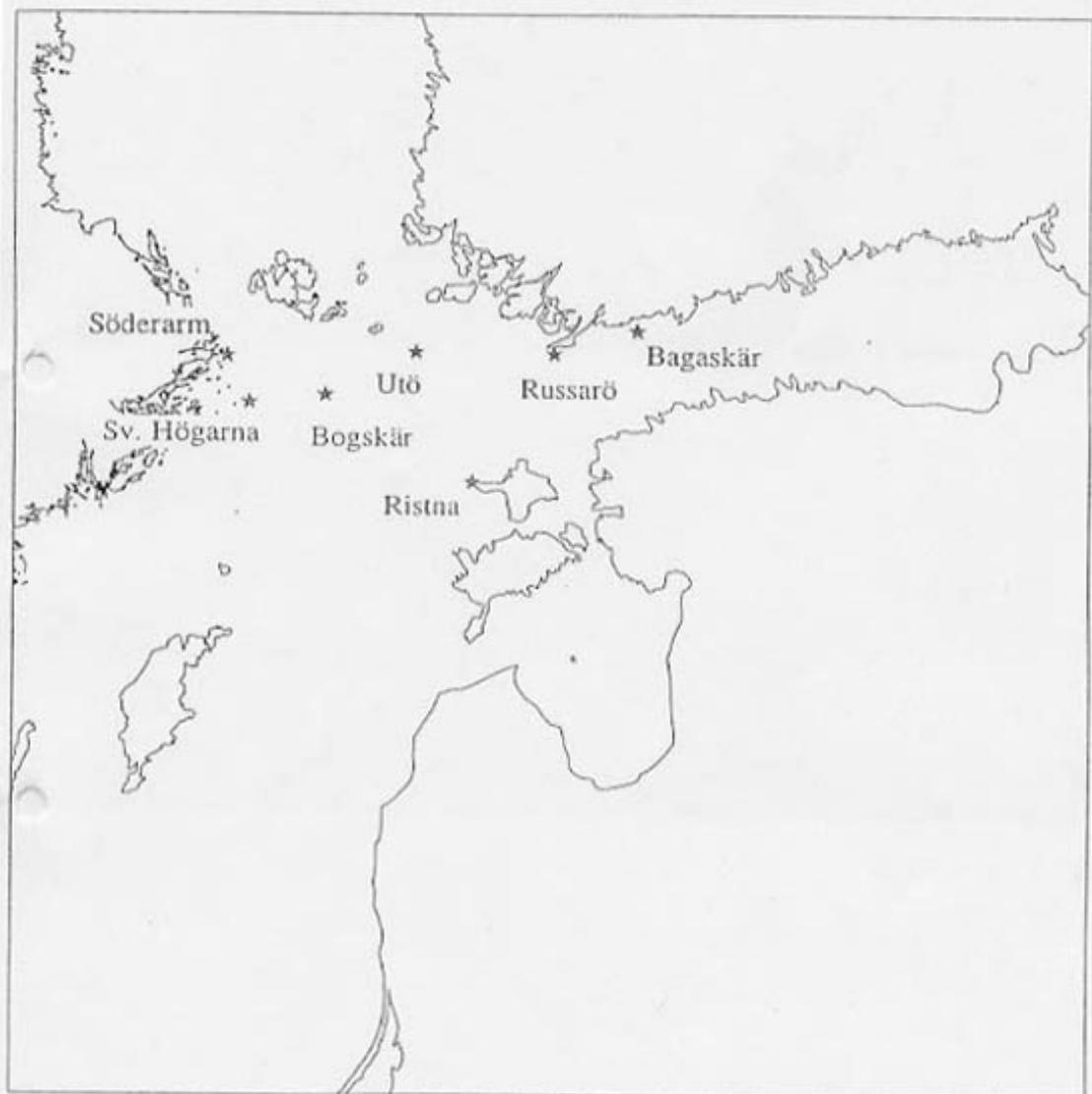
Bilaga 4.



15 16  
HAV\_0928\_00  
VT:WED 940928 00Z Surface observations SHOT







## 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	Bagaskär / bymax
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.

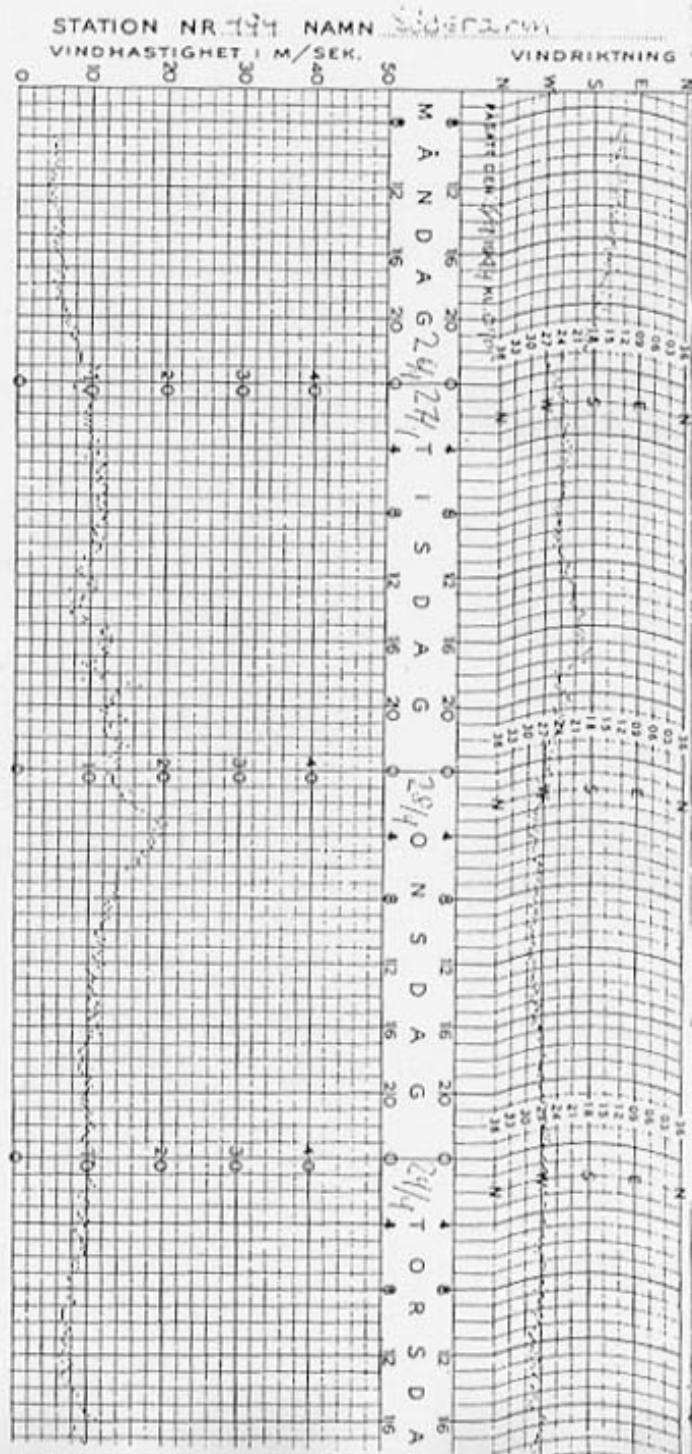
28 september kl 06.25 till 27,7 m/s.

Däremellan var bymax betydligt lägre.

SÖDERARM

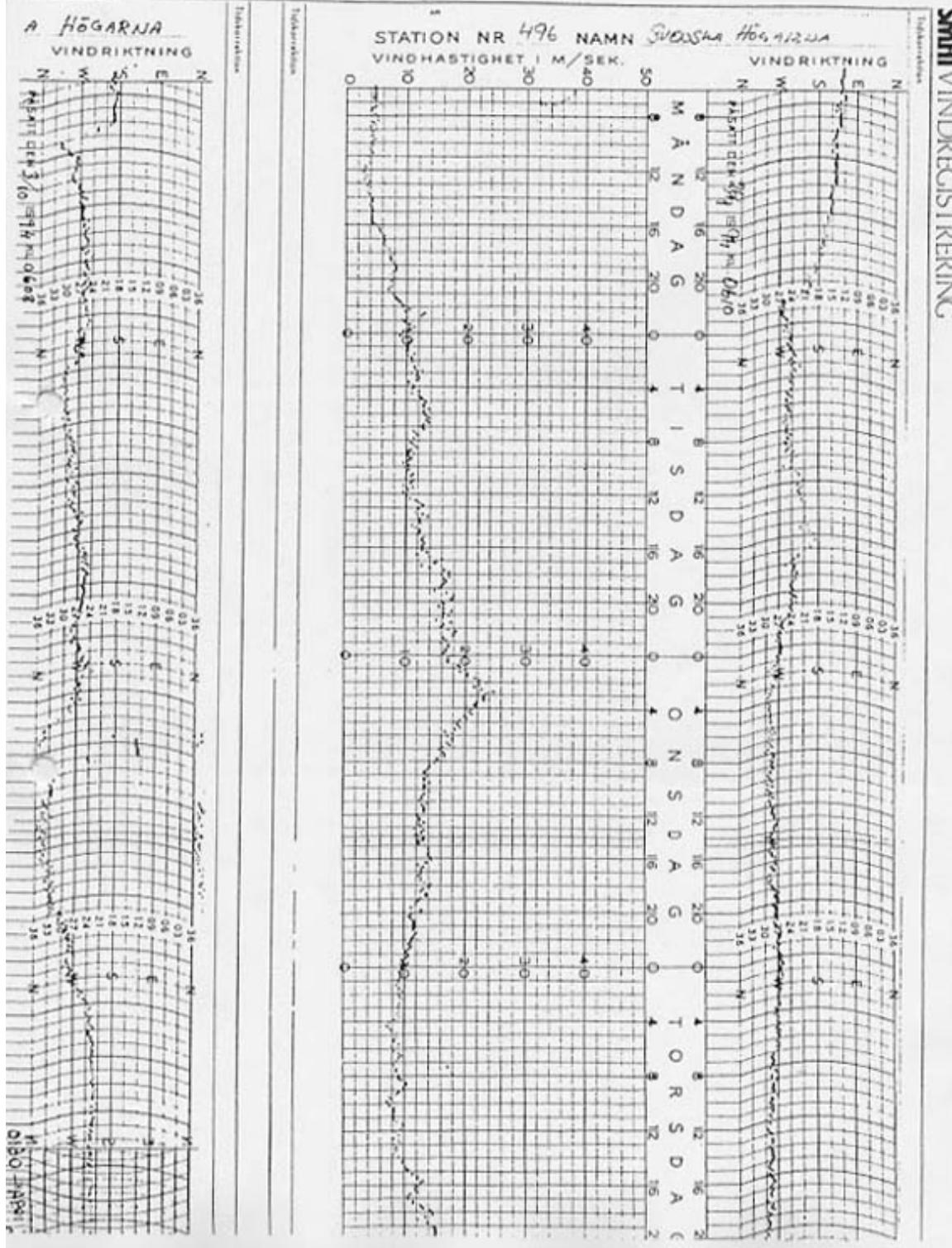
113 1987.03, 4000 SUPERSET International

Environ Biol Fish (2007) 79:1–10

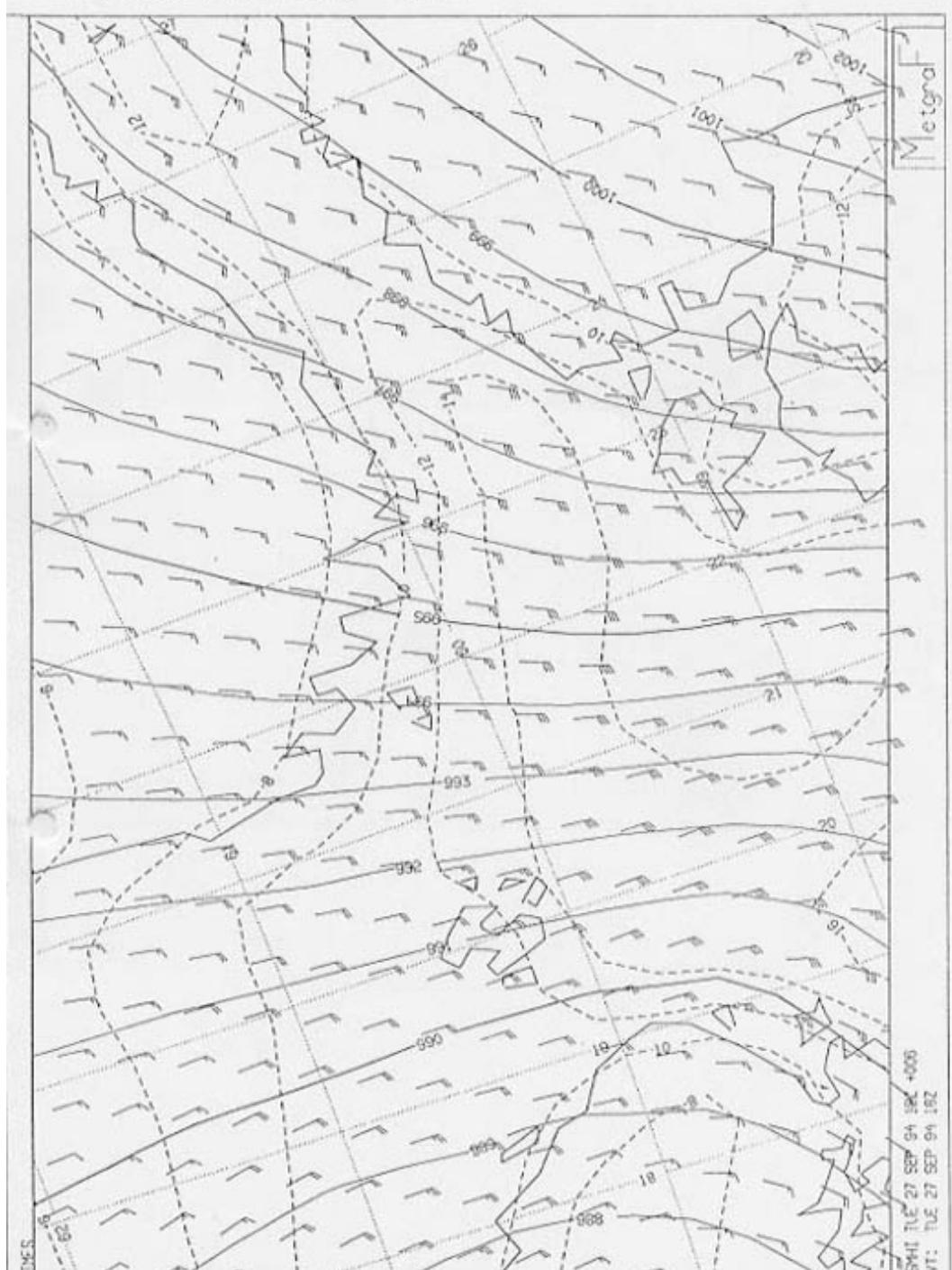


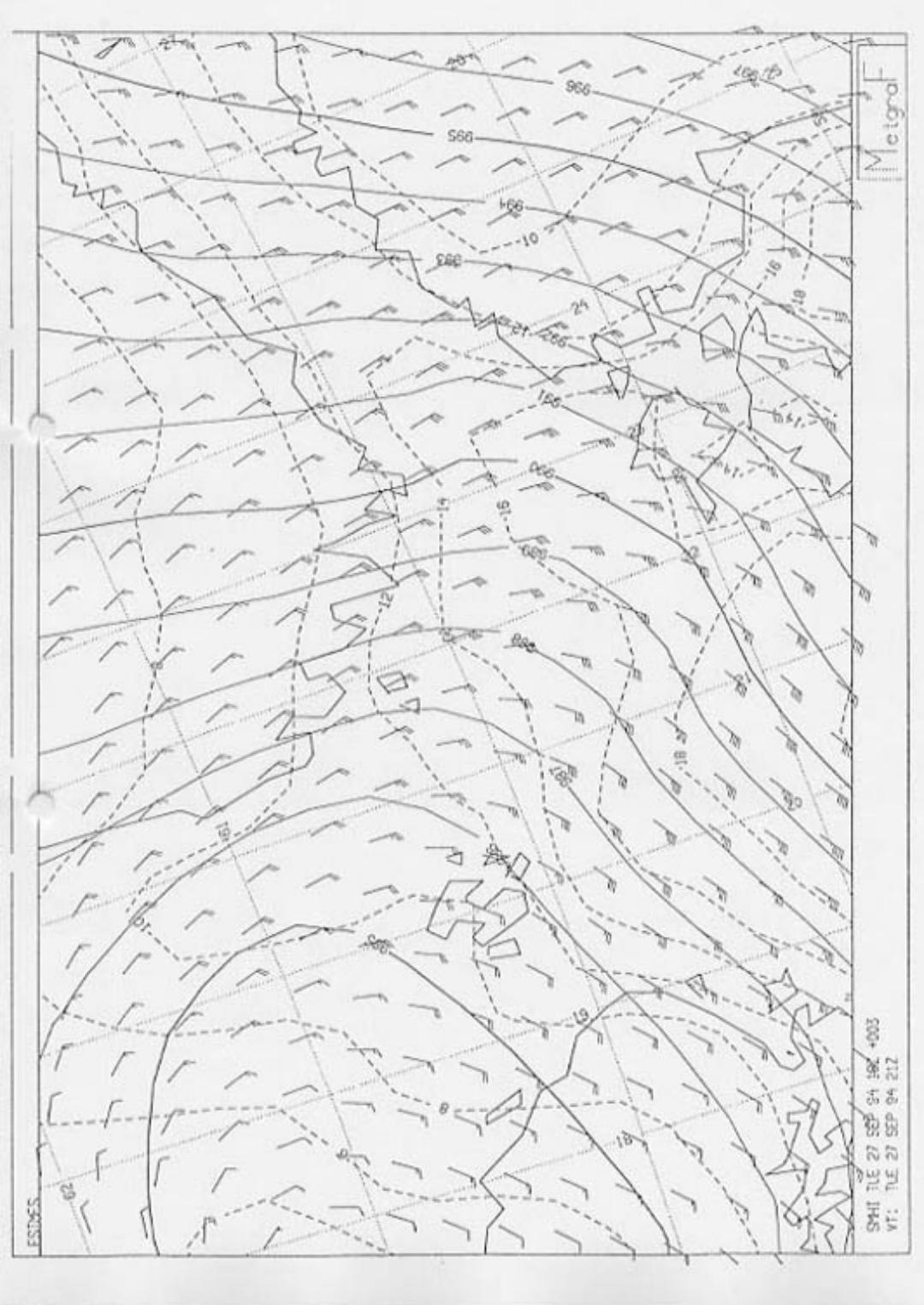
SVENSKA HÖGARNA

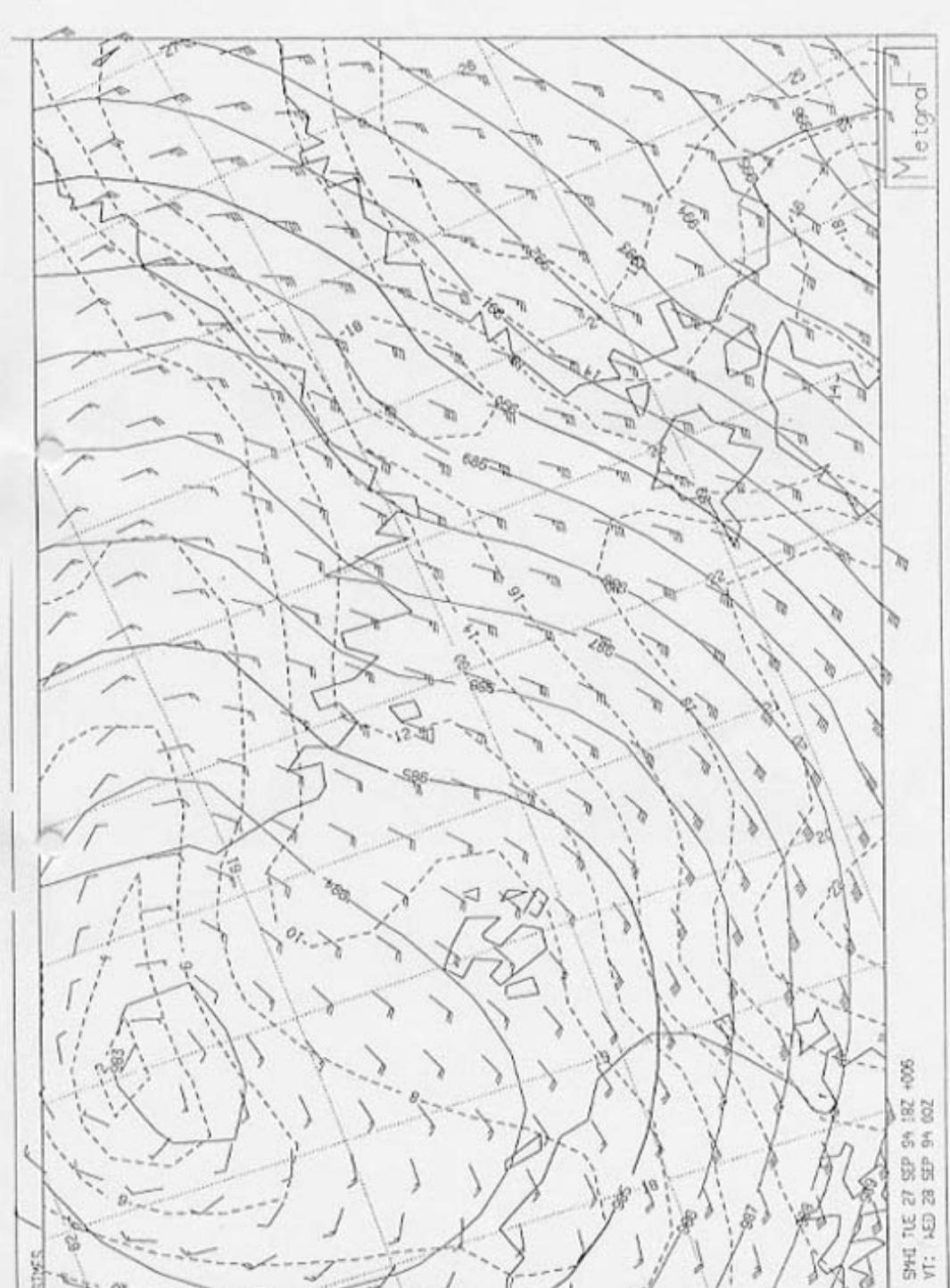
Bilaga 10.

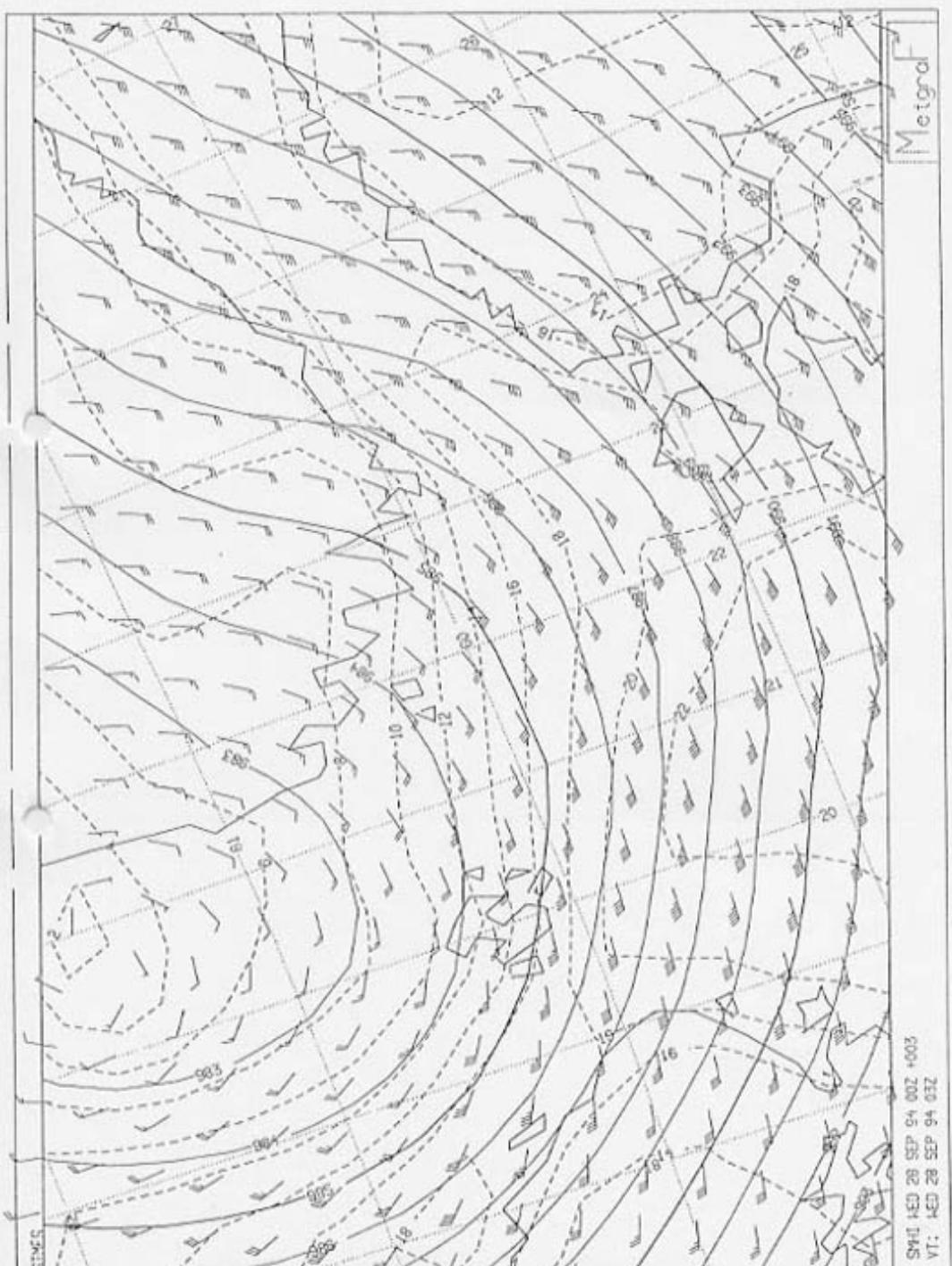


Datorbaserad tolkningsmodell kl 19.







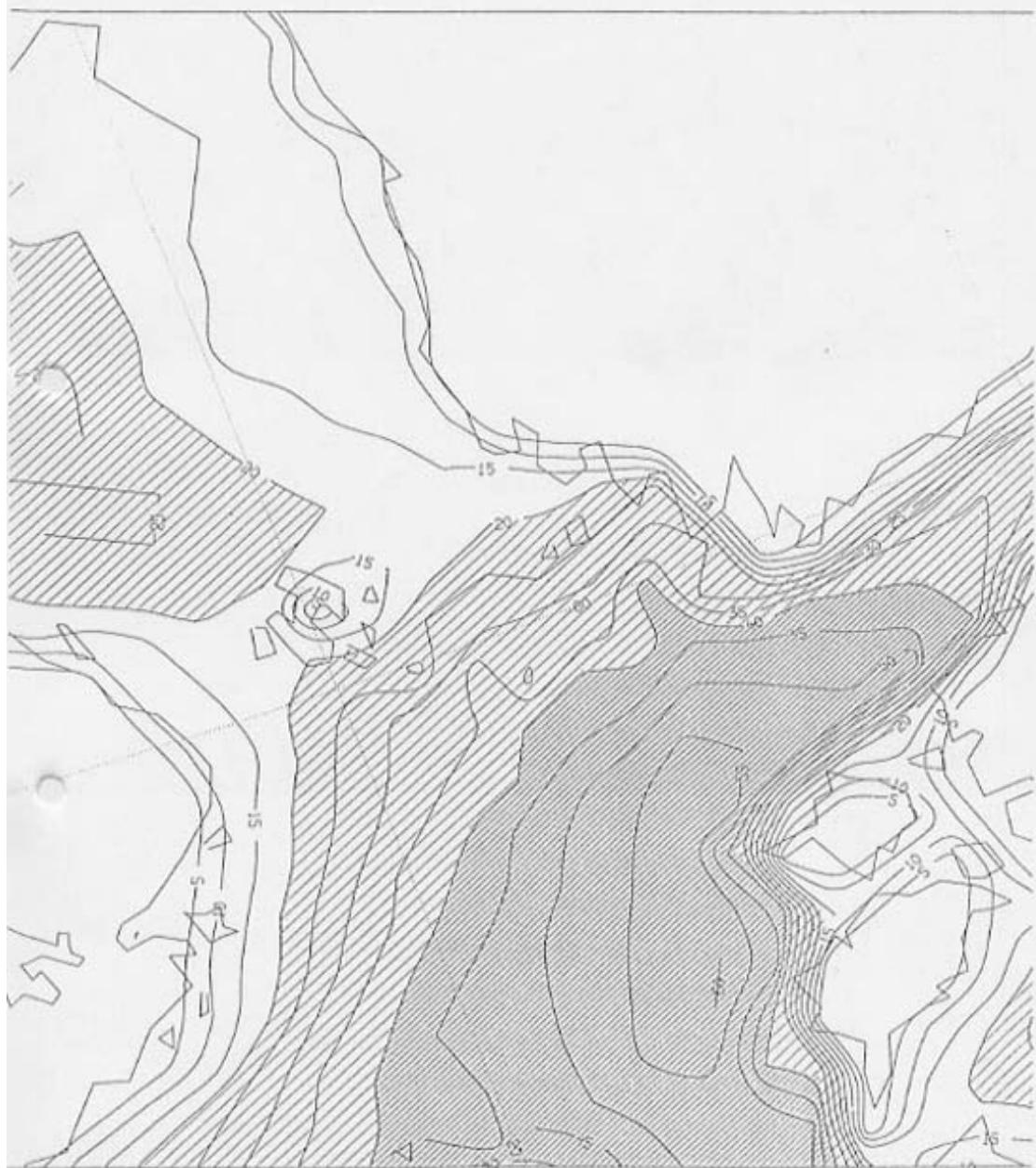




SMHI TUE 27 SEP 94 06z + 12  
VT: TUE 27 SEP 94 18z



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  $\frac{1}{4}$  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 (Hiumaa). 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.

## Vägförhållanden i N Östersjön vid S-SW vind 15-20 m/s

### Definitioner

Avgörande för väghöjd och väglängd är vindhastigheten men i lika hög grad blästiden och blåslängden (den sträcka med fritt vatten över vilken vågfältet byggs upp). Den väglängd som vi här talar om är avståndet från vågtopp till vågtopp. Väghöjden definieras som höjden från dal till topp. I fortsättningen avses med "väghöjd" medelhöjden av den högsta 1/3 av vågorna (den signifikanta väghöjden). Vågperiod är tiden mellan två vågtoppar.

### Väghöjder och väglängder i N Östersjön vid vindhastigheten 17-18 m/s

Om vindhastigheten är 18 m/s kan väghöjden 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 blästiden som begränsar väghöjden. 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 väghöjderna är 4 m i N Östersjön är, enligt SMHI:s mätningar och tabeller ur litteraturen, vågperioden omkring 8 s och väglängden omkring 100 m.

### Samverkan mellan olika vågfält

Vägfält på havet är inte jämna vågor med långa kammar. Vägfält 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. Väghöjden kan för enstaka vågor variera den dubbla signifikanta väghöjden, vågperioden och väglängden ändras inte. Vågorna i de olika vågtågen är vanligen ganska lika i höjd och väglängd. 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 vågrikningen ändras och skapar kaotiska vågor med extremt höga väghöjder. 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 upprundningen 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  $59^{\circ} 23,9'$ ,  $21^{\circ} 42,4'$  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.

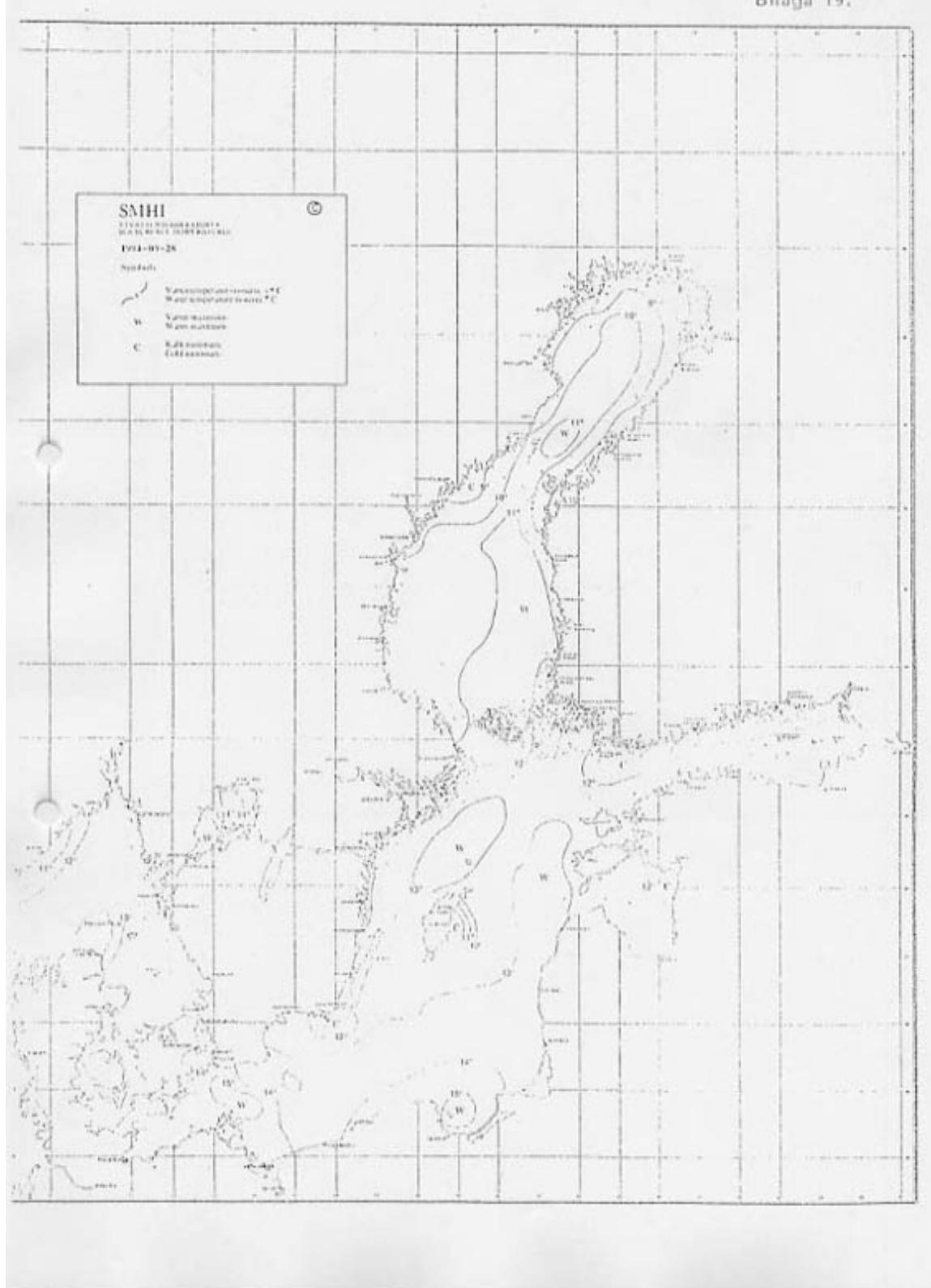
På natten 28/9 kl 01 svensk tid (kl 00 UTC) vred vinden till väst och ökade till 24 m/s. Efter 1 timma kan vågor från väst med en våghöjd på 1.5 m överlägra den sydvästliga "dyningen" med höjden upp mot 4 m. Efter 3 timmar (kl 04 svensk tid) är den västliga sjön enligt teorin 3.5 m hög. Den sydvästliga 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.



Prognostiker      Uppläsare      Datum      Sandningstid  
Gu                  LF                91-09-27      8:05

#### VÄDERÖVERSIKT

Storm- och kulingvarning är utfärdad för  
SKÄGERACK, KATTEGATT, VANERN, ÖRESUND OCH BÄLTEN, HELA ÖSTERSJÖN, ÅLANDSHAV  
OCH SKÄRGÅRDSHAVET.

Utsikter till Onsdag morgon

SKÄGERACK:

Byig väst kuling 14-18 ökande, i kväll  
18-22, i natt långsamt avtagande.  
~~18-22~~ <sup>öft</sup> ~~kväll~~ <sup>25</sup>.

KATTEGATT, VÄNERN, ÖRESUND  
OCH BÄLTEN, SYDVÄSTRA  
ÖSTERSJÖN, SÖDRA ÖSTERSJÖN:

Byig väst 12-16 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, i eftermiddag syd och något  
avtagande.

#### STORM- OCH KULINGVARNING FÖR

SKÄGERACK: 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 NORRANOPING - 1994-09-27 06150 UTC

WOSNATI ESWI 270700

SWEDISH GALEWARNINGS 0700 UTC

SKAGERRAK:

WESTERLY 14-18 M/S. THIS EVENING 18-22. TONIGHT SLOWLY DECREASING.

KATTEGAT, LAKE VAERN, THE STRAITS AND THE BELTS, WESTERN BALTIC,

EASTERN BALTIC:

WESTERLY 14-16. IN KATTEGAT THIS AFTERNOON AND EVENING 20.

SOUTHEASTERN BALTIC, CENTRAL BALTIC, NORTHERN BALTIC, SEA OF GALAND  
AND HAI AND 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 Ha'	Uppläsare EWA	Datum 94-09-27	Sändningstid 15:55
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**VÄDERÖVRHÖRMIT**

Ett intensivt lågtryck - med centrum över Värmland - rör sig nästan rakt österut. I morgon drar det bort över Finland.

~~Stora kulingvarning~~ är utfärdad för  
STORMVARNING för mellersta och norra Östersjön.  
KULINGVARNING för övriga delar av Götalands farvatten, Svealands farvatten och sydligaste Bottnahavet.

Utsikter till Onsdag kväll

PLÄDEN, 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.

SKÄGERACK, 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. Nest 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 SKÄRGÄRDSHAVET,  
SYDLIGASTE BOTTNHAVET:

Sydväst 6-10, i kväll tillfälligt växlande, därefter nordväst 13 till kuling 18, senare under dagen något avtagande. Måttlig sikt, regn eller regnskurar.

NORRA BOTTNHAVET, 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**

~~SKÄGERACK, NORRA KATTEGATT: Omkring väst 17-23 m/s, i morgon avtagande.~~  
~~NORRA KATTEGATT, ÖRESUND OCH BÄLTEN, SYDVÄSTRA ÖSTERSJÖN: Väst 14-17, i morgon avtagande.~~

Prognosritare Uppläsare Datum Handlingstid  
ÅB EVA 9-09-27 21:50

✓VÄGTEÖVERSIET

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.

~~Storm- och kulingvarning är utfärdad för STORMVARNING/för mellersta och norra Östersjön, KULINGVARNING för övriga delar av Götalands och Svealands farvattnen och för sydligaste Bottenhavet.~~

Utsikter till Onsdag kväll

FLÄDEN, 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.
SKÄGERACK, NORRA KATTEGATT:	Omkring väst kuling 15-20, långsamt avtagande till 5-10, onsdag kväll möjlig växlande. Mest god sikt.
SÖDRA KATTEGATT, ÖRESUND och BALLEN, 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 BOTTEHAVET,	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 UTOH DEN SYDLIGASTE DELEN, NORRA KVARKEN:	Växlande 5-10, från morgonen väst 9-13. Mest god sikt.
BOTTENVIKEN:	Syd 4-6 m/s, i morgon väst eller nordväst och något ökande. God sikt.

Vindutsikter för Torsdagen

I samtliga farvattnen vind mellan väst och nordväst, på många håll kuling.

SAFTEI NOTIFICATION - 1994-09-27 18:56 UTC

WENAD SWM 271900  
SWEDISH GALEWARNING 1900 UTC

NEW:  
SOUTHERNMOST PART OF BOTHNIA

SKÄVERÖA, NORTHERN KATTEGAT:  
AROUND WEST 15-20 M/S, SLOWLY DECREASING.

LAKE VÄNERN:  
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 ÅLAND AND ÅLAND 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

Oväntade 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.

### Prognoserna

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 vindförfållandena som inträffade under kvällen och natten 27-28:e på norra Östersjön. Likaså måste specialprognoserna 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 prognos, bortsett från att vågorna var något underskattade, särskilt maxvågorna.

Våghöjden fram till förlisningen angavs i prognoserna 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 "sjölit" för den W-liga stormen.

Därmed angavs det i SMHIs specialprognos kl 04-07 (svensk tid kl 03-06) avtagande vågor trots att vindprognoserna 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 SMHI 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 de utländska numeriska vädermodellerna. Vakthavande meteorologer som tjänstgjorde på SMHI under måndag-tisdag den 27-28 september hade därmed ett mycket bra underlag och stormvarning utförslade 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  
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TALLINN - STOCKHOLM

Stretch	Time	Mean wind speed on 10 m level (m/s)	Prob. for mean wind >15 m/s	sign in Z	Wave height (m)	Remarks
Naisaar-N Osmusaar	(18-21) 20-22	S-SW	10-15	20	1,0-2,0	3,0
N Osmusaar-S Bogskär	(21-04) 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 SOUTHERN FINLAND. IT WILL CAUSE INCREASING SW- LATER W-NW. FROM TO NIGHT GUSTY WIND. AT DEP. RAIN WITH MOD VIS. LATER SOME SHORT SHOVERS.

BEST REGARDS/

## Statement of peeter tuur







