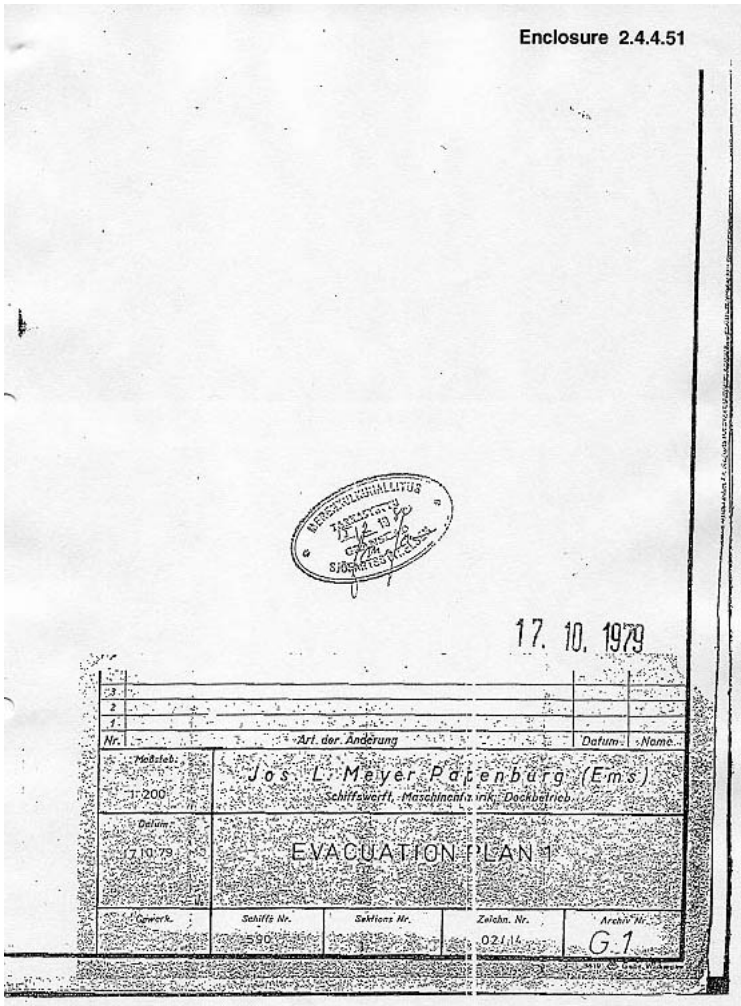
Evacuation plan 1



Signal lights plan

Enclosure 2.4.4.52

20. 2. 1980

Nr.	Art der Änderung	Datum	Name
1			
2			
3			

Maßstab 1:100	Jos. L. Meyer Papenburg (Ems) Schiffswerft, Maschinenfabrik, Dockbetrieb			
Datum 20.2.80	LATERNENPLAN SIGNAL LIGHTS			
Gewerk	Schiffs Nr. 590	Sektions Nr.	Zeichn. Nr. 51/3	Archiv Nr. G.1

Enclosure 2.4.4.53

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

Anl. 6.

YARD NO. 590

MS VIKING SALLY

TRIM AND STABILITY BOOKLET

Owner: Rederiaktiebolaget SALLY
Strandgatan 7

SF-22100 Mariehamn

Builders: Schiffswerft JOS. L. MEYER
Industriegebiet Süd

D-2990 Papenburg/EMS

HERENKULKUHALLITUS
SJÖFARTSSTYRELSEN

APPROVED ~~WITH~~ ~~REMARKS NOTED~~
BUREAU OF SHIPS, 11.7.1980

Untitled Document

Enclosure 2.4.4.54

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

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

Memo for Dr. Holtappels

re: 2nd Meeting with F.B.N. on 27.10.95

- Attendants:

Muttilainen	- Deputy General Manager
Valkonen	- Head of Maritime Dept.
Makkonen	- Head of Legal Dept.
Fabritius	- Naval Architect employed by F.B.N.
H. Gahmberg	- Lawyer Bützow & Co., Helsinki (HG)
Dr. Holtappels	-
Werner Hummel (WH)	

- Up-date by Dr. Holtappels on legal situation.

- HG: It was agreed to have a presentation of the facts.

- Dr. Holtappels

  : We want an open discussion about the situation in 1980 as to issuance of PSSC: a) Why no Exemption Certificate?

  b) Why not reported to IMO?

  : What does F.B.N. know about "Mariella" and "Viking Saga" incidents?

  : What is the F.B.N. opinion on the IHK?

  (Dr. Holtappels immediately submits his own opinion, viz. that IHK does not want to put the facts on the table) and also mentions the meeting with the EU Commission which is considering to constitute its own commission).

- Presentation of investigation results by WH and subsequent discussion

- Valkonen

  : F.B.N. has all the right to know the procedure of the IHK and this was expressed in writing to Kari Lethola together with copies of documents relating to "Viking Sally", "Silja Star", "Wasa King" (3-5 cm thick).

  : F.B.N. had no official knowledge of "Mariella" incident and have up-to-day not heard from "Viking Saga". They later found out that the course went over shallow water and right there she was struck. It has been established that around this shoal the waves rise tremendously under SW-ly wind conditions.

  As a consequence of the "Estonia" casualty they have issued a navigation warning to the effect that shoals might create enormous wave height and steepness. Soundings, however, subsequently revealed that the shoal effect did not play a role in the "Estonia" casualty.

- It turned out that the naval architect Fabritius had been working with Wärtsilä Shipyard in Turku - the builders of "Mariella" - at that time and knows lots of details about damage, repairs, etc. He stated that the vessel did not return to Helsinki - as we were told earlier - but proceeded to Stockholm at 3 kn, where the visor was temporarily repaired before next sailing.

- Upon presentation of the correspondence between von Tell AB/F.B.N. in connection with newbuilding "Viking Sally" and the F.B.N. requirements for drawings, etc. Mr. Valkonen confirmed that the reply of F.B.N. demonstrated exactly the attitude of those years. At that time there were 3 men in the technical department, who were basically busy with their own (F.B.N.) vessels. Valkonen was then head of the inspection department.

They never calculated required strength of locking devices, they had no means to do so at that time, it was part of the class responsibility and also of the yard.

- Valkonen confirmed that the bow ramp was the collision bulkhead in "Viking Sally".

F.B.N. 1980

Technical Bureau	Inspection Bureau
Edelmann	Valkonen
Haateinen	Jan Jansson
Wibeck	

- PSSC was at first issued temporarily for voyage Yard to Mariehamn, and thereafter the vessel got a restricted PSSC because not all passenger cabins were ready. The certificates were issued by his office and then submitted to the General Manager - then Muttilainen - for approval.

- He and Muttilainen signed an agreement to the effect that the trading area of "Viking Sally" was restricted to "not more than 20 nm from the nearest land" until all outstanding work would have been completed.

- When the vessel came the first time to Turku he and Gunnar Peper, their local surveyor from Kotka (now retired), had a severe car accident on the way to Turku, whereby both were injured. Finally in Turku they marked on a respective drawing all parts not to be used by passengers and limited the number of passengers to 700 stating that the 20 nm limit was valid until the vessel was totally completed. At a meeting on 19.7.80 it was decided that the vessel was now completed and the first real PSSC was issued, however, restricted to "Kustfart mellan Finland och Sverige" which related to manning requirements only, not to structural parts. The same PSSC was issued in 1982 and in 1983. Thereafter the term "Kustfart" disappeared.

- Valkonen stated that they were not aware that "Viking Sally" did not comply with SOLAS 1974, because all structural parts are - in their view - based on the 'Copenhagen Convention 1924' the responsibility of the class. According to Valkonen the recognised classification societies - DnV, LR, ABS, GL, but also BV - have to approve all structural matters including the SOLAS requirements as otherwise the Maritime Authorities would be forced to have own staff and equipment available to be able to carry out necessary calculations and inspections which the classification societies have anyway.

- Valkonen drew attention to the "Finnhansa" incident when half of the sliding doors were lost in heavy weather and to the "Fennia", which was built in Sweden 1964 with bow ramp - collision bulkhead and ever since has been sailing in unchanged condition.
  He also pointed out that the bow ramp is a very strong part because 40-ts trucks can drive over it.

- "Viking 4" / "Earl of Granville" conversion discussed.

- F.B.N.. was not informed by owners and/or BV that "Wasa King" would be respectively was sold. They got if from the registrar after she was sold and renamed "Estonia". There have not been any discussions whatsoever between F.B.N. and BV concerning the take-over, also not concerning the new role of BV representing the flag state authority a/o in SOLAS matters.

- F.B.N. also carries out port-state-inspections onboard of Estonian vessels when in Finnish ports and not seldom have they found deficiencies onboard vessels which had just passed a special survey of the BV surveyor.

- Upon being confronted with the remarks, which the BV plan approver Desouza had made on drawing 1103, Valkonen stated: It is out of the

question that they could ever have been able to calculate strength of locking devices or the like and they have to rely on the Copenhagen Convention.

- They promised to check the drawings they have for possible remarks.

- Jukka Häkämies is attending the meetings of the Finnish Commission and also attends the full Commission meetings at Tallinn. He keeps the informatin he obtaines confidential.

- Valkonen informs about rumours saying that the locking devices were constructed on basis of wrong drawings and therefore were under-dimensioned. WH explained actual situation based on recently taken statements from yard workers.

- Valkonen confirmed that due to the so-called "pumping effect" the water quantity inside the visor was continuously increasing due to the up-and-down movement of the bow in headseas and that model tests had confirmed that this effect was much larger with smaller openings compared to larger holes.

Werner Hummel

Passenger ship safety certificate (temp)

MATKUSTAJA-ALUKSEN TURVALLISUUSKIRJA
SÄKERHETSCERTIFIKAT FÖR PASSAGERARFARTYG

SUOMI
FINLAND

~~kansainvälisellä~~ lyhyelle kansainväliselle matkalle.

Enclosure 2.4.4.55

för ~~en~~ kort internationell resa.

Annettu ihmishengen turvallisuudesta merellä vuonna 1960 tehdyn kansainvälisen yleissopimuksen määräysten mukaisesti
Utfärdat enligt bestämmelserna i internationella konventionen om säkerhet för människoliv till sjöss, 1960

Aluksen nimi Fartygets namn	Tunnuskirjaimet Igenkännningsbokstäver	Kotipaikka Hemort	Bruttovetoisuus Bruttodräktighet	Tiedot III luvun 27 säännön c) 7 kohdan mukaan ehkä sallituista matkoista Detaljer beträffande eventuella resor, tillåtna enl. kapitel III, regel 27 c) 7	Kölinlaskemispäivä Datum, då kölen sträcktes
VIKING SALLY	OXIH	Mariehamn	15566,39		1979

Minä, allekirjoittanut, todistan:

I. Että kysymyksessä oleva alus on asianmukaisesti katsastettu edellä mainitun sopimuksen määräysten mukaisesti.

II. Että katsastuksessa todettiin aluksen täyttävän sanottuun sopimukseen liittyvien sääntöjen vaatimukset, siksi kuin kysymyksessä on:

1. aluksen rakenne, pää- ja apukattilat ja muut paineastiat sekä koneisto;
2. vedenpitävän osastoimisen järjestely ja yksityiskohdat;
3. seuraavat osastoimislastiviivat:

Jag, undertecknad, bestyrker:

I. Att ovan angivna fartyg undergått vederbörlig besiktning enligt bestämmelserna i ovannämnda konvention.

II. Att besiktningen utvisade, att fartyget uppfyllde fordringarna i de regler, som äro bifogade nämnda konvention, i vad avser:

1. konstruktionen, huvud- och hjälpångpannor och andra tryckkärl samt maskineri;
2. anordning och detaljer av den vattentäta rumsindelningen;
3. följande indelningsvattenlinjer:

Alukselle määrätyt ja sen kyllkoon pituuden keskikohdalle merkityt osastoimislastiviivat (II luvun 11 sääntö) För fartyget fastställda och midskepps å fartygssidorna utmärkta indelningsvattenlinjer (Kap. II regel 11)	Varalaita Fribord	Käytettävä milloin matkustaja kuljetetaan seuraavissa vaihtoehtoisesti lastitiloina käytettävissä tiloissa Gäller då passagerare föras i följande, jämväl för last användbara rum
C. 1	2062 mm	
C. 2		
C. 3		

III. Että pelastusvälineitä oli riittävästi enintään 1288 henkilöä varten, nimittäin

10 pelastusvenettä (niihin luettuina 10 moottoripelastusvenettä), joihin mahtuu 692 henkilöä, ja – radiosähköttyslaitteilla ja valonheittimellä varustettua moottoripelastusvenettä (mitkä sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään) ja – vain valonheittimellä varustettua moottoripelastusvenettä (mitkä myös sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään), joissa veneissä tulee olla – hyväksyttyä pelastusvenemiestä;

12 pelastuslauttaa, joita varten vaaditaan hyväksytyt vesillelaskulaitteet ja joille mahtuu 300 henkilöä; ja

51 pelastuslauttaa, joita varten ei vaadita hyväksyttyjä vesillelaskulaitteita ja joille mahtuu 1275 henkilöä;

III. Att livräddningsredskapen voro tillräckliga för högst 1288 personer, nämligen

10 livbåtar (däri inräknade 10 motorlivbåtar) tillräckliga för 692 presoner, och – motorlivbåtar försedda med radiotelegrafinstallation och strålkastare (inräknade i det ovan angivna sammanlagda antalet livbåtar) ävensom – motorlivbåtar utrustade endast med strålkastare (också inräknade i ovan angivna sammanlagda antalet livbåtar), fordrande – godkända livbåtmän;

12 livflottar, för vilka fordras godkända sjösättningsanordningar, tillräckliga för 300 personer; och

51 livflottar, för vilka godkända sjösättningsanordningar icke fordras, tillräckliga för 1275 personer;

6 kellumavälinettä, jotka kykenevät kannattamaan 120 henkilöä;
18 pelastusrengasta;
2291 pelastusliivi.

6 flytredskap, tillräckliga för 120 personer;
18 livbojar;
2293 livvästar.

IV. Että pelastusveneet ja pelastuslautat oli varustettu sääntöjen määräysten mukaisesti.
V. Että aluksessa oli sääntöjen määräysten mukainen suoranheittolaite sekä pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite.
VI. Että alus täytti radiosähkötyslaitteita koskevat sääntöjen vaatimukset seuraavasti:

IV. Att livbåtarna och livflottarna voro utrustade enligt bestämmelserna i dessa regler.
V. Att fartyget var försett med linkastningsapparat och bärbar radioapparat för livbåtar och livflottar enligt bestämmelserna i dessa regler.
VI. Att fartyget uppfyllde fordringarna i dessa regler i vad avser radiotelegrafinstallationer, som följer:

	Sääntöjen vaatimukset Fordringar enligt reglerna	Todellisuudessa I verkligheten
Radiosähköttäjän kuuntelutuntien määrä Lyssningstimmar för radiotelegrafist	168	168
Radiosähköttäjien lukumäärä Antal radiotelegrafister	1	1
Onko automaattinen hälytin Finnes autoalarm	1	1
Onko pääradiolaitteet Finnes huvudinstallation	1	1
Onko vararadiolaitteet Finnes reservinstallation	1	1
Ovatko päälähetin ja varalähetin sähköisesti erilliset vai yhdistetyt Äro huvudsändare och reservsändare elektriskt separata eller kombinerade	erilliset separata	erilliset separata
Onko radiosuuntimislaite Finnes radiopejlapparat	1	1
Sallittu matkustajamäärä Tillåtet antal passagerare	lyhyillä kansainvälisillä matkoilla för kort internationell resa	1100 1100

VII. Että moottoripelastusveneiden radiosähkötyslaitteet ja pelastuslauttojen siirrettävä radiolaite, milloin sellainen on, toimivat sääntöjen määräysten mukaisesti.
VIII. Että alus täytti tulipalon havaitsemis- ja sammutuslaitteita koskevat sääntöjen vaatimukset ja että siinä oli valot ja merkkikuviot, luotsitikkaat sekä laitteet ääni- ja hätämerkkien antamista varten näiden sääntöjen määräysten ja kansainvälisten meriteiden sääntöjen mukaisesti.
IX. Että alus kaikissa muissa suhteissa täytti sääntöjen vaatimukset, mikäli ne ovat siihen sovellettavissa.

VII. Att radiotelegrafinstallationer i motorlivbåtar och bärbar radioapparat för livbåtar och livflottar, om sådan finnes, fungerade i överensstämmelse med föreskrifterna i dessa regler.
VIII. Att fartyget uppfyllde fordringarna i dessa regler i vad avser anordningar för upptäckande och släckning av brand samt var försett med ljus och signalfigurer, lotslejdare ävensom med anordningar för avgivande av ljudsignaler och nödsignaler enligt bestämmelserna i dessa regler och i de internationella sjövägsreglerna.
IX. Att fartyget i alla övriga hänseenden uppfyllde fordringarna i dessa regler, i den mån de äro tillämpliga å fartyget.

Tämä todistuskirja on annettu Suomen hallituksen puolesta.
Detta certifikat är utfärdat på finska regeringens vägnar.
Todistuskirja on voimassa 21 päivään heinäkuuta/juli 19 80 saakka.
Certifikatet gäller intill den
Annettu Helsingissä 27 päivänä juni/kesä kuuta 19 80
Utfärdat i Helsingfors den

Allekirjoittanut ilmoittaa olevansa mainitun hallituksen asianmukaisesti valtuuttama antamaan tämän todistuskirjan.
Undertecknad förklarar sig vara av nämnda regering behörigen bemyndigad att utfärda detta certifikat.

Leima 10,–
Stämpel mk.
HD N:o
HD N:r

Merenkulun tarkastaja
Sjöfartsinspektör Jan Jansen

Passenger ship safety certificate (temp)

PASSENGER SHIP SAFETY CERTIFICATE

FINLAND

Enclosure 2.4.4.56

for ~~an~~ a short international voyage.

Issued under the provisions of the
International Convention for the Safety of Life at Sea, 1960

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	Particulars of voyages, if any, sanctioned under Regulation 27 (c) (VIII of Chapter III	Date on which keel was laid
VIKING SALLY	OIKW	Mariehamn	15566,39		1979

I, the undersigned certify:

I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. That the survey showed that the ship complied with the requirements of the Regulations annexed to the said Convention as regards:
1. the structure, main and auxiliary boilers and other pressure vessels and machinery;
2. the watertight subdivision arrangements and details;
3. the following subdivision loadlines:

Subdivision loadlines assigned and marked on the ship's side at amidships (Regulation 11 of Chapter II)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces'
C. 1	2062 mm	
C. 2		
C. 3		

III. That the life-saving appliances provide for a total number of 1280 persons and no more, viz.:

10 lifeboats (including 10 motor lifeboats) capable of accommodating 692 persons, and – motor lifeboats fitted with radiotelegraph installation and searchlight (included in the total lifeboats shown above) and – motor lifeboats fitted with searchlight only (also included in the total lifeboats shown above), requiring – certificated lifeboatmen;

12 liferafts, for which approved launching devices are required, capable of accommodating 360 persons; and

51 liferafts, for which approved launching devices are not required, capable of accommodating 1275 persons;

6 buoyant apparatus capable of supporting 120 persons;

18 lifebuoys;

2298 lifejackets.

IV. That the lifeboats and liferafts were equipped in accordance with the provisions of the Regulations.

V. That the ship was provided with a line-throwing appliance and portable radio apparatus for survival craft in accordance with the provisions of the Regulations.

VI. That the ship complied with the requirements of the Regulations as regards radiotelegraph installations, viz.:

	Requirements of Regulations	Actual provision
Hours of listening by operator	H8	H8
Number of operators	1	1
Whether auto alarm fitted	1	1
Whether main installation fitted	1	1
Whether reserve installation fitted	1	1
Whether main and reserve transmitters electrically separated or combined	separated	separated
Whether direction-finder fitted	1	1
Number of passengers for which certificated	for a short international voyage	1100

VII. That the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the Regulations.

VIII. That the ship complied with the requirements of the Regulations as regards fire-detecting and fire-extinguishing appliances and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals, in accordance with the provisions of the Regulations and also the International Collision Regulations.

IX. That in all other respects the ship complied with the requirements of the Regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the Finnish Government.

It will remain in force until the 21st day of July 19 80

Issued at Helsinki the 27th day of June 19 80

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

Inspector of Navigation

Jan Janson

Stamp 10,- mk.

HD N:o

Passenger ship safety (permanent)

MATKUSTAJA-ALUKSEN TURVALLISUUSKIRJA
SÄKERHETSCERTIFIKAT FÖR PASSAGERARFARTYG

SUOMI
FINLAND

Enclosure 2.4.4.57

~~kansainväliselle~~
lyhyelle kansainväliselle matkalle.

för ~~långt~~ kort internationell resa.

Annettu ihmishengen turvallisuudesta merellä vuonna 1960 tehdyn kansainvälisen yleissopimuksen määräysten mukaisesti
Utfärdat enligt bestämmelserna i internationella konventionen om säkerhet för människoliv till sjöss, 1960

Aluksen nimi Fartygets namn	Tunnuskirjaimet Igenkännningsbokstäver	Kotipaikka Hemort	Bruttovetoisuus Bruttodräktighet	Tiedot III luvun 27 säännön c) 7 kohdan mukaan ehkä sallituista matkoista Detaljer beträffande eventuella resor, tillåtna enl. kapitel III, regel 27 c) 7	Kölinlaskemispäivä Datum, då kölen sträcktes
VIKING SALLY	OHJ	Maariahamina Mariehamn	15566,99		1975

Minä, allekirjoittanut, todistan:

Jag, undertecknad, bestyrker:

I. Että kysymyksessä oleva alus on asianmukaisesti katsastettu edellä mainitun sopimuksen määräysten mukaisesti.

II. Että katsastuksessa todettiin aluksen täyttävän sanottuun sopimukseen liittyvien sääntöjen vaatimukset, sikäli kuin kysymyksessä on:
   1. aluksen rakenne, pää- ja apukattilat ja muut paineastiat sekä koneisto;
   2. vedenpitävän osastoimisen järjestely ja yksityiskohdat;
   3. seuraavat osastoimislastiviivat:

I. Att ovan angivna fartyg undergått vederbörlig besiktning enligt bestämmelserna i ovannämnda konvention.

II. Att besiktningen utvisade, att fartyget uppfyllde fordringarna i de regler, som äro bifogade nämnda konvention, i vad avser:
   1. konstruktionen, huvud- och hjälpångpannor och andra tryckkärl samt maskineri;
   2. anordning och detaljer av den vattentäta rumsindelningen;
   3. följande indelningsvattenlinjer:

Alukselle määrätyt ja sen kylkeen pituuden keskikohdalle merkityt osastoimislastiviivat (II luvun 11 sääntö) För fartyget fastställda och midskepps å fartygssidorna utmärkta indelningsvattenlinjer (Kap. II regel 11)	Varalaita Fribord	Käytettävä milloin matkustajia kuljetetaan seuraavissa vaihtoehtoisesti lastitiloina käytettävissä tiloissa Gäller då passagerare föras i följande, jämväl för last användbara rum
C. 1	3262 mm	
C. 2		
C. 3		

III. Että pelastusvälineitä oli riittävästi enintään ..... henkilöä varten, nimittäin
12 pelastusvenettä (niihin luettuina 10 moottoripelastusvenettä), joihin mahtuu 692 henkilöä, ja ..... radiosähköt.laitteilla ja valonheittimellä varustettua moottoripelastusvenettä (mitkä sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään) ja ..... vain valonheittimellä varustettua moottoripelastusvenettä (mitkä myös sisältyvät edellä mainittuun pelastusveneiden kokonaismäärään), joissa venoissa tulee olla ..... hyväksyttyä pelastusvenemiestä;
12 pelastuslauttaa, joita varten vaaditaan hyväksytyt vesillelaskulaitteet ja joille mahtuu 300 henkilöä; ja
51 pelastuslauttaa, joita varten ei vaadita hyväksyttyjä vesillelaskulaitteita ja joille mahtuu 1275 henkilöä;

III. Att livräddningsredskapen voro tillräckliga för högst 2267 personer, nämligen
10 livbåtar (däri inräknade 10 motorlivbåtar) tillräckliga för 692 presoner, och ..... motorlivbåtar försedda med radiotelegrafinstallation och strålkastare (inräknade i det ovan angivna sammanlagda antalet livbåtar) ävensom ..... motorlivbåtar utrustade endast med strålkastare (också inräknade i ovan angivna sammanlagda antalet livbåtar), fordrande ..... godkända livbåtmän;
12 livflottar, för vilka fordras godkända sjösättningsanordningar, tillräckliga för 300 personer; och
51 livflottar, för vilka godkända sjösättningsanordningar icke fordras, tillräckliga för 1275 personer;

6 kellumavälineitä, jotka kykenevät kannattamaan 120 henkilöä;
18 pelastusrengasta;
2298 pelastusliivi. + 200 lapsille
6 flytredskap, tillräckliga för 120 personer;
18 livbojar;
2298 livvästar. + 200 för barn

IV. Että pelastusveneet ja pelastuslautat oli varustettu sääntöjen määräysten mukaisesti.
V. Että aluksessa oli sääntöjen määräysten mukainen muoranheittolaite sekä pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite.
VI. Että alus täytti radiosähköttyslaitteita koskevat sääntöjen vaatimukset seuraavasti:

IV. Att livbåtarna och livflottarna voro utrustade enligt bestämmelserna i dessa regler.
V. Att fartyget var försett med linkastningsapparat och bärbar radioapparat för livbåtar och livflottar enligt bestämmelserna i dessa regler.
VI. Att fartyget uppfyllde fordringarna i dessa regler i vad avser radiotelegrafinstallationer, som följer:

Tuvva 9 – 3	Sääntöjen vaatimukset Fordringar enligt reglerna	Todellisuudessa I verkligheten
Radiosähköttäjän kuuntelutuntien määrä Lyssningstimmar för radiotelegrafist	168	168
Radiosähköttäjien lukumäärä Antal radiotelegrafister	1	1
Onko automaattinen hälytin Finnes autoalarm	1	1
Onko pääradiolaitteet Finnes huvudinstallation	1	1
Onko vararadiolaitteet Finnes reservinstallation	1	1
Ovatko päälähetin ja varalähetin sähköisesti eriliset vai yhdistetyt Äro huvudsändare och reservsändare elektriskt separata eller kombinerade	erilliset separata	erilliset separata
Onko radiosuuntimislaite Finnes radiopejlapparat	1	1
Sallittu matkustajamäärä Tillåtet antal passagerare	rannikkoliikenteessä Suomen ja Ruotsin välillä 2000 i kustfart mellan Finland och Sverige ; 2000	

VII. Että moottoripelastusveneiden radiosähköttyslaitteet ja pelastusveneiden ja pelastuslauttojen siirrettävä radiolaite, milloin sellainen on, toimivat sääntöjen määräysten mukaisesti.
VIII. Että alus täytti tulipalon havaitsemis- ja sammutuslaitteita koskevat sääntöjen vaatimukset ja että siinä oli valot ja merkkikuviot, luotsitikkaat sekä laitteet ääni- ja hätämerkkien antamista varten näiden sääntöjen määräysten ja kansainvälisten meriteiden sääntöjen mukaisesti.
IX. Että alus kaikissa muissa suhteissa täytti sääntöjen vaatimukset, mikäli ne ovat siihen sovellettavissa.

VII. Att radiotelegrafinstallationer i motorlivbåtar och bärbar radioapparat för livbåtar och livflottar, om sådan finnes, fungerade i överensstämmelse med föreskrifterna i dessa regler.
VIII. Att fartyget uppfyllde fordringarna i dessa regler i vad avser anordningar för upptäckande och släckning av brand samt var försett med ljus och signalfigurer, lotsledjdare ävensom med anordningar för avgivande av ljudsignaler och nödsignaler enligt bestämmelserna i dessa regler och i de internationella sjövägsreglerna.
IX. Att fartyget i alla övriga hänseenden uppfyllde fordringarna i dessa regler, i den mån de äro tillämpliga å fartyget.

Tämä todistuskirja on annettu Suomen hallituksen puolesta.
Detta certifikat är utfärdat på finska regeringens vägnar.

Todistuskirja on voimassa 26 päivään kesäkuuta/juni 19 82 saakka.
Certifikatet gäller intill den

Annettu Helsingissä 1 päivänä juni/heinä kuuta 19 81
Utfärdat i Helsingfors den

Allekirjoittanut ilmoittaa olevansa mainitun hallituksen asianmukaisesti valtuuttama antamaan tämän todistuskirjan.
Undertecknad förklarar sig vara av nämnda regering behörigen bemyndigad att utfärda detta certifikat.

Leima 10,– mk.
Stämpel
HD N:o
HD N:r

Merenkulunt arkastaja
Sjöfartsinspektör Heimo Suikki

Passenger ship safety certificate (permanent)

PASSENGER SHIP SAFFTY CERTIFICATE

Enclosure 2.4.4.58

FINLAND

for an/a short international voyage.

Issued under the provisions of the
International Convention for the Safety of Life at Sea, 1960

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	Particulars of voyages, if any, sanctioned under Regulation 27 (c) (VII) of Chapter III	Date on which keel was laid
VIKING SALLY	OYKU	Harfehamn	13566,89		1979

I, the undersigned certify:

I. That the above-mentioned ship has been duly surveyed in accordance with the provisions of the Convention referred to above.

II. That the survey showed that the ship complied with the requirements of the Regulations annexed to the said Convention as regards:
1. the structure, main and auxiliary boilers and other pressure vessels and machinery;
2. the watertight subdivision arrangements and details;
3. the following subdivision loadlines:

Subdivision loadlines assigned and marked on the ship's side at amidships (Regulation 11 of Chapter II)	Freeboard	To apply when the spaces in which passengers are carried include the following alternative spaces*
C. 1	2062 mm	
C. 2		
C. 3		

III. That the life-saving appliances provide for a total number of 2267 persons and no more, viz.:

10 lifeboats (including 10 motor lifeboats) capable of accommodating 692 persons, and – motor lifeboats fitted with radiotelegraph installation and searchlight (included in the total lifeboats shown above) and – motor lifeboats fitted with serachlight only (also included in the total lifeboats shown above), requiring – certificated lifeboatmen;

12 liferafts, for which approved launching devices are required, capable of accommodating 300 persons; and

51 liferafts, for which approved launching devices are not required, capable of accommodating 1275 persons;

6 buoyant apparatus capable of supporting 120 persons;

18 lifebuoys;

2298 lifejackets + 200 for children

IV. That the lifeboats and liferafts were equipped in accordance with the provisions of the Regulations.

V. That the ship was provided with a line-throwing appliance and portable radio apparatus for survival craft in accordance with the provisions of the Regulations.

VI. That the ship complied with the requirements of the Regulations as regards radiotelegraph installations, viz.:

	Requirements of Regulations	Actual provision
Hours of listening by operator	H6	H6
Number of operators	1	1
Whether auto alarm fitted	1	1
Whether main installation fitted	1	1
Whether reserve installation fitted	1	1
Whether main and reserve transmitters electrically separated or combined	separated	separated
Whether direction-finder fitted	1	1
Number of passengers for which certificated	For a short international voyage between Finland and Sweden	2000

VII. That the functioning of the radiotelegraph installations for motor lifeboats and/or the portable radio apparatus for survival craft, if provided, complied with the provisions of the Regulations.

VIII. That the ship complied with the requirements of the Regulations as regards fire-detecting and fire-extinguishing appliances and was provided with navigation lights and shapes, pilot ladder, and means of making sound signals and distress signals, in accordance with the provisions of the Regulations and also the International Collision Regulations.

IX. That in all other respects the ship complied with the requirements of the Regulations, so far as these requirements apply thereto.

This certificate is issued under the authority of the Finnish Government.

It will remain in force until the ~~26th~~ 30 day of June 19 81

Issued at Helsinki the ~~4th~~ 4th day of ~~June~~ July 19 80

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

Inspector of Navigation

~~Heimo Sulkki~~

Stamp ~~10,-~~ 10,- mk.

HD N:o

Finnish Maritime Administration

27 June 1995

03. Juli 1995

Enclosure 2.4.4.59

Dr. Peter Holtappels
Ahlers & Vogel
Schaartor 1
20459 Hamburg
Germany

Dear Sir,

Referring to our discussions on 21 June 1995 I send a few certificate copies concerning Viking Sally.

The first certificate for short international voyage had a validity of one month in order to permit sailing from Germany to Finland. The following full period certificates have a note under para VI (number of passengers) 'for short international voyage between Finland and Sweden'. The opposite side of the certificate, which is in the official language of the flag state, says 'i kustfart mellan Finland och Sverige'. 'Kust-fart' was definition as not south of latitude N 59 deg 30 min.

In 1983 we got a new decree on surveys of ships, where coastal traffic was limited to the domestic waters only. After that the certificates state 'på korta internationella resor mellan Finland och Sverige'. The change does not mean that a new traffic area was constituted.

After 1984 the certificates remain unchanged except the reference to the radiotelegraphy exemption and the change of the name of the ship to 'Wasa King'.

Yours Sincerely,

Head of Division Jukka Häkämies

Visiting Address: Vuorimiehenkatu 1, 00140 Helsinki
Mailing Address: P.O. Box 158, SF - 00141 Helsinki, Finland
Telephone: + 358 0 18081
Fax: + 358 0 1808 355
Telex: 121 471 mkh sf
Postal Cheque Account: 3801-4

Statement Lars Karlsson

Statement

Lars Karlsson, born 11.9.43 states :

I obtained the Chief Engineers License in May 1965 at the Technical School in Mariehamn/Aland Islands. My time with AB Sally commenced during the summer vacation in 1963 when I sailed as 3rd engineer on a tanker. After obtaining the license I sailed on cargo vessels and tankers of AB Sally; since 1969 as Chief Engineer. In August 1970 I became 1st engineer onboard of "Viking 1" and from summer 1971 I was again chief engineer and remained in that position ever since on Viking 3, 4, 5, and finally on "Viking Sally".

For "Viking Sally" I was newbuilding supervisor as I had been already for "Viking 3, 4, 5". As I knew the yard - and classification people already from these 3 newbuildings and also speak some German - I was nominated "coordinator" of owners' supervisors.

Three days after signing of the contract I came to Papenburg together with Capt. Brunström (was relieved after 5 weeks by Lars Mäkki), 1st engineer Stig Strömberg and electrician Lars Sjögren. At the beginning I had only 1 small Ga-plan. Deck and Engine specification were shown to me.

Due to pressure of time we had to make a lot of compromises. In my opinion and experience the Meyer Werft was the only yard in Europe able to do such a job because of so little bureaucracy. This has, in my opinion, nothing to do with the catastrophe. Meyer Werft has very much experience. They have built all ships very strong, i.e. they were usually heavy. It is a well known fact that Meyer ships were stronger and behaved better in ice compared to e.g. Wärtsila ships.

With my team of supervisors I checked everything including, and in particular, weldings in close cooperation with BV surveyor Lohmann and his colleague. As far as I remember Lohmann was more active on Viking 1-5, whilst on "Viking Sally" he was the boss and the other one did the routine work. Anyway Lohmann was always present when major items, such as ramp and visor, were presented by the yard and tested.

My best contacts were Mr. Motikat and Mr. Wahnes. F.B.N representatives came from time to time, however, all paperwork was done by the Sally office in Mariehamn directly with F.B.N. Helsinki.

I did some inspections with F.B.N. representatives in Papenburg, e.g.

- stairways, lifts;
- boats, liferafts, etc.
- fire doors, fire-fighting equipment, etc.

Chief officer Lindström came about 3 months before delivery.

I also inspected visor/ramp etc. I checked the visor during building together with the 1st engineer. It was very hectic during the last days before launching because there were delays in delivery of equipment from Sweden due to a strike in this country. After launching the visor was lifted ashore again. It was before only welded to the vessel by steel-bars. At present I do not remember details of the bearing/bushing system of visor hinges.

In 1987 the upper bearing of the port side lifting cylinder was changed by MacGregor, Turku during normal operation. They started in the evening and finished next morning. The change of this bearing became necessary because during opening operations there was a squeaking noise which was reported to me by the deck officer on watch.

Probably in 1986 we experienced twice that the Nirosta bolt of one of the visor hinges, I believe the port side, broke the securing plate screws and moved out by ca. 1 cm. This was noted by the deck officer being on forecastle deck for berthing because he found the broken off screws. The bolt was hammered back into position, the screw holes in the steel bushing drilled out and the securing plate refitted. If it would have happened again we would have investigated the cause, however, during my time, it did not occur again.

We never had greasing problems. Once per month grease was pressed into the bolts.
We never welded at the lifting cylinders or visor hinges. I have never seen the bolts out.

After every stormy cruise I inspected all the parts in the bow area. Four times a year I inspected in detail all safety relevant parts. This included visual inspection of the visor hinges, its weldings, etc. and also the inside of the visor including locking devices and its welding seams.

During one such inspection I found cracks in way of the foundations of the hydraulic cylinders for the ramp bolts which were of fatique nature and not due to overload. We welded strengthening plates to the foundations to stop the crack development.

I never found such cracks in way of Atlantic lock or side locks.

The rubber packings of the visor were changed once a year. The packings were mainly damaged on A-deck and 1 m upwards front bulkheads because the final movement before closure is backwards - not downwards - which destroys the packings due to the rubbing effect. Therefore we have put grease (same as used for the hinges) on the packings and it became better.

At some time, probably after the strong ice winter 1985/86, we increasingly had problems with electrical failures, short circuits, etc. caused by the sensors for the indicator lights of the Atlantic lock. So I checked with other vessels, e.g. "Viking Song" and "Viking Saga" and also the market, and finally bought rather expensive magnetic limit switches which were installed by electrician Sjögren instead of the mechanical sensors, and we never had problems again. I have been many times with B.V. surveyor Lars Olaf Ålander inside the closed visor when water or light tests were made during loadline survey. I believe that at the same time also the indicator lights were checked.

I have made at least 1000 cruises and more than 100 times reduced the engine output by myself in the engine room when I considered it necessary in heavy weather. Last time was in July 1991 when the vessel was already sailing as "Wasa King" between Waasa and Umea/Sundsvall when we arrived once 1 ½ hours late and another time 2 ½ hours late, both due to bad weather and the fact that I had reduced the engine output.

It has to be remembered that "Viking Sally" has been built for the archipelago, not for open sea. This refers in particular to the flare of her bow. In heavy seas the bow is shaking strongly sideways. This is created by the recess in the shell plating aft of the visor which results in a very strong setting-in. When the vessel is proceeding against headseas the pressure on the visor is in the aft direction. (Force direction is aft.)

We were all the time running in a very tight schedule with all 4 main engines at 90% output.

Reduction of speed in heavy headseas is not only a question of reduction of stress on vessel's and visor's structure and fixing points, but also the comfort of passengers has to be taken into account. We never had complaints to the best of my knowledge.

Officers and engineers have their accommodation directly in front of the superstructure overlooking the forecastle deck including the visor and I feel it difficult to believe that on the night of the catastrophe none of them looked out of their windows. I have sailed on "Viking 5" for 5 years between Helsinki and Stockholm and met quite some heavy weather.

In the engine control room (ECR) there were 2 output regulators for the main engines which were normally at 90%. Output could by these regulators be changed from ECR without any pitch change from the bridge.

The engines could be run on "Combinator" or on "Constant Revolutions". In all my 12 years onboard, however, it was always "Combinator" except during yard trials in 1980.

If the main engines are on "Combinator" and pitch of the propellers is reduced the revolutions are being reduced automatically. In other words, if the revolutions have not been reduced also the pitch cannot have been reduced from the bridge.

The bow ramp was considered to be the collision bulkhead same as on all the predecessors built by Meyer Werft, but also the same as on e.g. Turella, Rosella, Viking Song, Viking Saga, and many other ferries.

All 3 hydraulic pumps broke down one after the other (normal pressure 185 bar) which was apparently not enough. We built in stronger pumps and operated them at 240 bar pressure. The 2 big pumps could produce 400 bar pressure whilst the smaller one could produce 280 bar.

In winter we had problems to open the visor.
It is easy to increase the pressure by just turning a wheel at the hydraulic pump (axial piston pump - make: Vickers). There was a lock nut to regulate the pressure.

In case of difficulties to open the visor, e.g. due to being frozen fast, it is the easiest thing to increase the hydraulic pressure.

Although impossible due to the electrical system the visor can be closed if the ramp is open when the valves are operated manually. In case the rails of the ramp should be deformed this is due to the lowered down visor for working purposes.

The observation of pilot Stenhammar, i.e. that the crew was opening and quickly closing the visor in short intervals (to make it fit over the pyramide most likely) is difficult to believe. There were valves directly at the lifting cylinders by means of which the speed of the oil flow could be regulated. This must be absolutely identical at both sides otherwise one side will open or close faster than the other side and the visor will get out of alignment. These regulating valves are fitted at the outside of the lifting cylinders at the lower side (B-deck).

When the vessel was sailing between Turku - Stockholm there had to be 2 officers + 1 AB on the bridge. When she was shifted to the Waasa/Umea trade, owners wanted to save 1 officer which was accepted by F.B.N. under the condition that the control panel for the indicator lights for visor and bow ramp was moved to the large operation panel in front of the bridge where the lights could be seen from the seats of master and watch officer. This was done some time in 1991.

The light on the steering aid on the forecastle was mostly out.

To my knowledge the manual sidelocks were never used. They were more for open sea, Atlantic or the like. I have no particular memory about any play between bolts and hinges of Atlantic lock and/or sidelocks.
Opening/closing of visor was always and only done by Chiefmate and boatswain together.

I do not know whether ever the visor was opened with still closed locking devices respectively closed with already closed locking devices.

Upon being shown some underwater pictures from the damaged hinge remains I am of the opinion that the rust on the Nirosta bolt could have been caused by the disappearance of the bronze bushing, i.e. steel bushing in contact with Nirosta bolt. Also in case of bad greasing a bronze bushing will disappear more quickly.

On cardeck there were 4 cameras installed i.e. 1 forward to the forward ramp, 2 at the sides and 1 looking aft to the stern ramp. The cameras could be moved and had also zoom ability.

Monitors were on the bridge (located at port side of the entrance to the chart room) and in the ECR above the instrument panel. The camera picture shown on the monitor could be changed to another camera either manually or automatically. The monitors on bridge and in ECR were showing the same picture. The main monitor with operating sticks was in the ECR, i.e. the bridge could not change to another camera.

After the "Estonia" catastrophe I have heard from a former colleague engineer who had trained "Estonia's" engineers after they had taken over the vessel that they had problems with water in the visor which caused short circuits in the no more watertight magnetic switches for the indicator lights of the Atlantic lock. As the electrical system for these switches and the indicator lights are switched to the same fuse also securing the controls for all hydraulic installations on the cardeck, i.e. ramps, visor, movable decks, etc, such a short circuit caused a general black-out on the cardeck. Thus if the fuse (located on 9th deck) is out you have no power and the cause has to be removed if such a problem occurs frequently, which it apparently did.

Consequently they removed the magnetic limit switches from the plate near the Atlantic lock and there was only the indicator light for open/closed visor left active. (It is unknown what happened to the sidelock indicators.)

We never had problems with hydraulic power in the aft, only forward. There were 3 hydraulic pumps port side forward, 3 starboard aft. One of the aft pumps got power from the emergency generator (when in operation).

The 30.4.90 was the last day as "Viking Sally". On 7.5.90 she commenced sailing as "Silja Star". She kept this name only for ½ year and then became "Wasa King". I left the vessel on 30.3.92, but returned in November 1992 for one week upon instructions of Ulf Hobro, Nordström & Thulin. I checked the inventory of the engine department, the maintenance - and spare part - computer system and took a copy of the computer program.

Finally I would like to mention that a vessel sailing for 20 months at full speed in the Baltic will have a lot of cracks everywhere.

The electricians sailing with me were Sjögren and Märtensen.

Mariehamn, 15.10.95

.....

Lars Karlsson

Delivery certificate

Enclosure 2.4.5.61

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

DELIVERY - CERTIFICATE

this is to certify, that on this 29th day of June, 1980,

at 23^{30} hours local time,

the shipyard Jos. L. Meyer of Papenburg,
Federal Republic of Germany,

has delivered at the port of Emden, Federal Republic of Germany,
to the

Rederiaktiebolaget Sally,
Mariehamn/Finland,

the Car/Passenger Ferry

"VIKING SALLY"

(Newbuilding S. 590)

as per terms and conditions of the contract signed in Mariehamn/
Finland, on 11th September, 1980.

On behalf of the Purchaser:

Rederiaktiebolaget Sally,
Mariehamn/Finland

.....

On behalf of the Builder:

Jos. L. Meyer
Shipyard
Papenburg 1
Federal Republic of Germany

.....

Papenburg, 29th June, 1980

06/07 '95 13:34 ☎+49 4961 81300 SK MEYER VERFT ☎002

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

Jos. L. Meyer Schiffswerft as Builders, on the one part, and Rederiaktiebolaget Sally as Owners, on the other part, have at the delivery of the vessel "VIKING SALLY" on this day agreed on the following points:

1. The extra and minor costs have been finally settled as far as the scope of delivery is concerned. The deadweight according to contract will be 2740 t.

2. The uncompleted work on the vessel will be completed by the Builders at their cost as soon as it is practically possible according to contract, specification, drawings and subsequent agreements between the parties.

3. The question of penalties or premiums for speed and deadweight of the vessel will be settled according to the relevant clauses in the contract when results of the speed trials can be presented and the light weight of the vessel has been determined upon completion of the deliveries of specified inventories etc.

4. This agreement does not affect the scope of the contract in any respect not mentioned here or the scope of the guarantee.

Emden on the 29th day of June, 1980.

Rederiaktiebolaget Sally

Jos. L. Meyer
as Builders

Sven-Erik Johansson
for the Owners

06/07 '95 13:37 ☎+49 4961 81300 SK XEREX WENFT 001

Handing over report

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

Car and Passenger Ferry "VIKING SALLY"
S. 590

Handing-Over Report

The car and passenger ferry "VIKING SALLY" will be handed over to the owner company AB SALLY, Mariehamn, by shipyard JOS. L. MEYER, Papenburg, on 29th June, 1980. The vessel will sail for the VIKING-LINE between Finland and Sweden, also serving the Aaland islands. The VIKING-LINE is operated by the Finnish owner AB SALLY, the Swedish owner AB SLITE and the Finnish owner company SP-LINE.

From 1970 to 1974, JOS. L. MEYER already delivered 6 car and passenger ferries to the VIKING-LINE, 4 of this series for owner AB SALLY and 2 for AB SLITE. Moreover the "DIANA II" was handed over to owner AB SLITE on June, 1979.

The confidence in the shipyard created by the good cooperation was the decisive criteria for the owner to conclude the contract for this modern and high-sophisticated vessel. Despite keen and in some cases government-subsidized competition the yard could book this order as a result of short delivery terms, an interesting design worked out by yard's engineers and high flexibility in meeting the owner's requirements.

On request of the Owners the ship was delivered on 29th June in order to be able to put the vessel into service within the scheduled time although some areas of the accommodation were not completed. The time for the voyage from Papenburg to Mariehamn as well as for the outfitting of the ship by the owner should be used to complete the unfinished areas. The yard agreed to this solution although they would have had the right due to the late supplies of the materials from Sweden and Finland on account of the strike situation in these countries to keep the ship at the outfitting quay of the yard for some more time.

The owner's decision to order this vessel in Papenburg was in principle dependent on the very short construction and building period of approx. 9 months. In case of the 7 previous newbuildings JOS. L. MEYER showed their ability to strictly observe the delivery times stipulated by contract.

The main data of the vessel are as follows:

Length over all	155.40 m
Breadth	24.20 m
Draught, loaded	5.55 m
Deadweight	2,800 t
Tonnage	15,500 GRT
4 main engines (6,000 HP each)	24,000 HP
Speed	21.20 kn
Capacities	2,000 passengers
	1,186 cabin places
	110 officers and crews
	1,650 seats in restaurants, bars, clubs, etc.
	52 lorries w. trailers (18 m)
	or 460 passenger cars

06/07 '95 13:41 ☎+49 4961 81300 SE MEYER WERFT 007

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

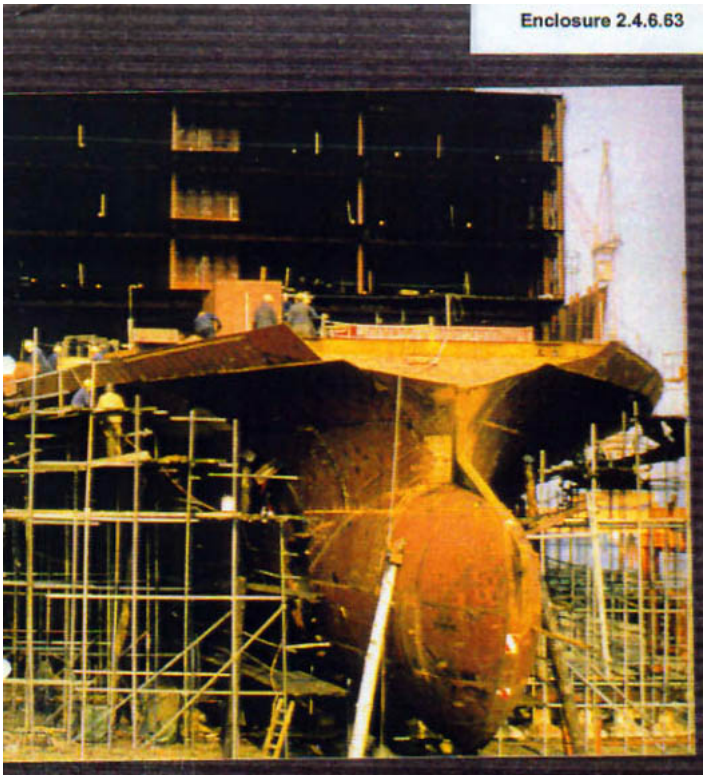
The following facts may give an idea of the expenditure of work involved in the construction of such a big ferry:

- About 280 km cables were laid out, i.e. 1.6 km cable/m of ship.
- About 30,000 m^2 areas were insulated, as much as 6 football fields or a small farm.
- 460 passenger cars can be transported on this vessel, i.e. a 2.1 km long line of cars.
- 1,300 beds and more than 1500 doors were installed.
- In addition to a main engine output of 17,600 kW, a generator capacity of 4,416 kW was provided - enough to supply a town with about 8,000 inhabitants.

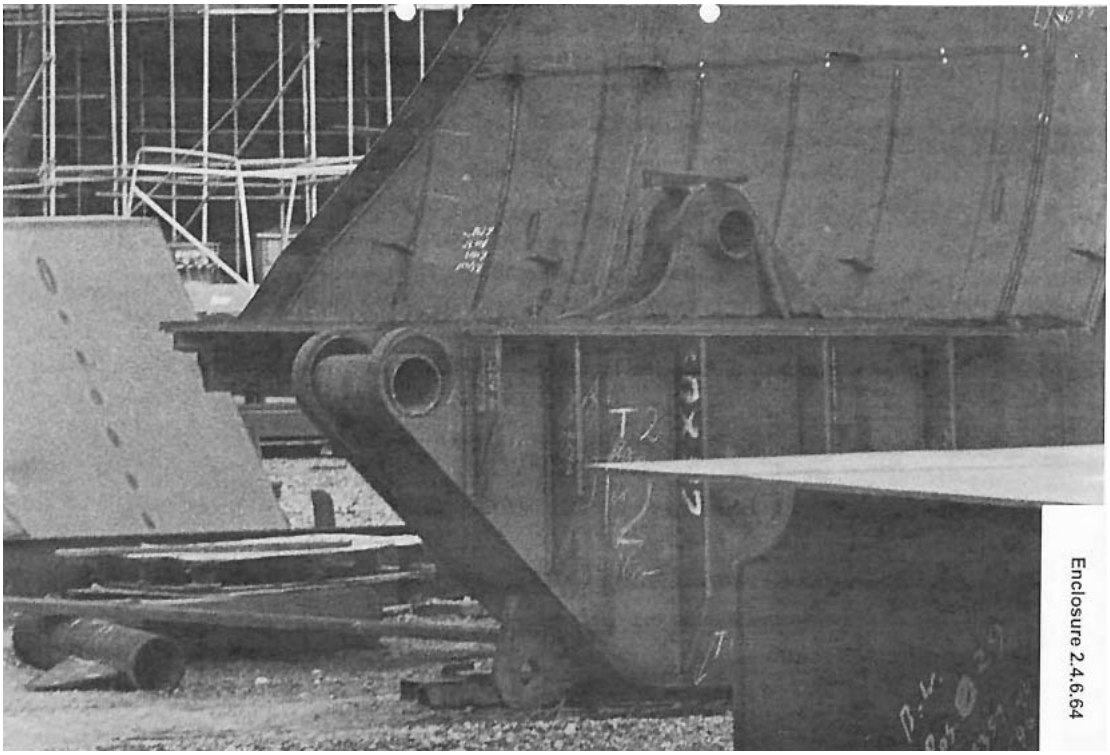
To sum up it can be said that this ship is hotel, basement garage, power plant, means of transportation, canalisation, supermarket and place of entertainment in one.

06/07 '95 13:41 ☎+49 4961 81300 SK MEYER WERFT ☎005

Photos showing fore ship area



Detail photo of the starboard visor hinge plate



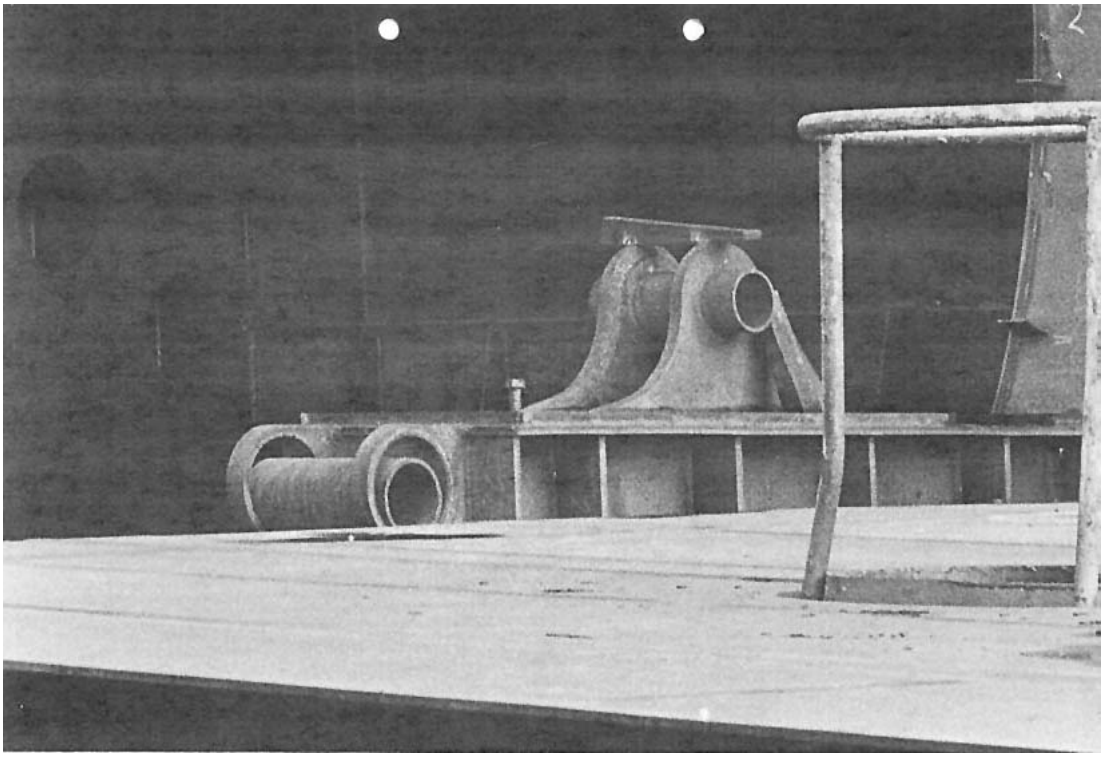


Photo showing visor at the vessel without hinge connection

Drawing arrangement if the visor hinges

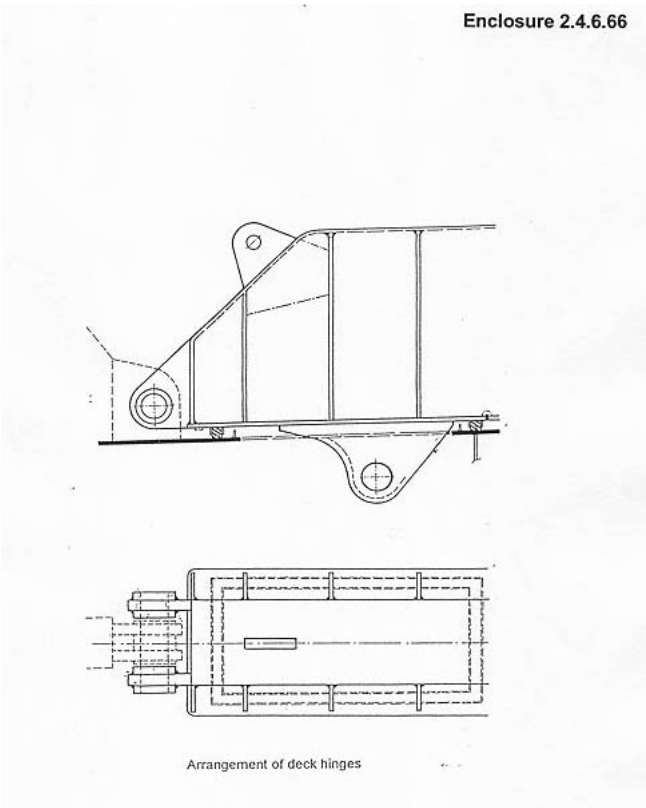


Photo viking sally with open visor and bow ramp

Untitled Document

Part of von tell manual

II. BOW VISOR

1) Construction

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

2) Maintenance

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

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

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

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

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

3) Locking device (25)

In closed position the visor is locked by 2 locking pins which are operated by one hydraulic cylinder (12) each. As a reserve the visor can also be locked by two manually operated locking devices. There is also one hydraulic operated "atlantic locking device" (12).

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

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

4) Operation

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

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

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

5) Control

Opening of the bow visor

1) Start both of the pumps.

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

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

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

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

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

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

7) Switch off the pumps.

Closing of the bow visor

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

1) Start the pumps.

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

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

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

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

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

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

8) Switch off the pumps.

III. BOW RAMP

1) Construction

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

Weight: abt 12,1 tons

The fore-end part of the ramp is provided with 8 sloping flaps, which automaticly extend when the ramp is opening. Each sloping flap is working independently

from the others in order to compensate for the heeling of the ship (2 degrees max.)

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

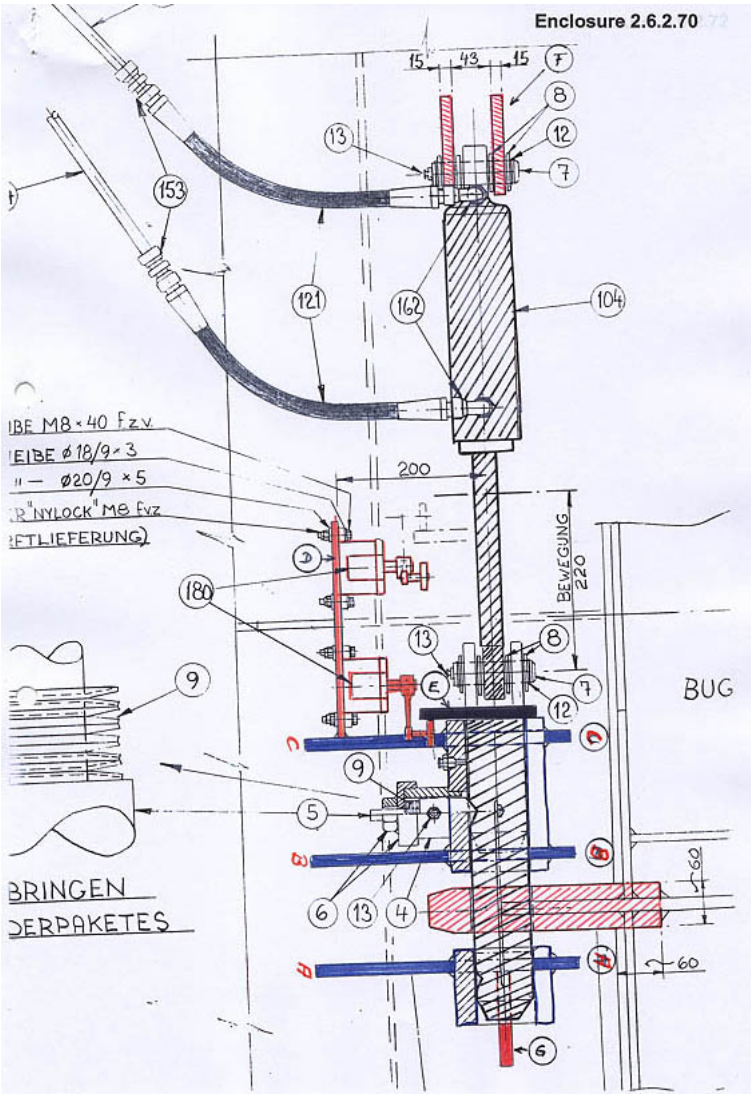
The ramp is equipped with fastenings for preventer stays.

2) Maintenance

See item I. pos. 2).

Drawing atlantic lock

Enclosure 2.6.2.70



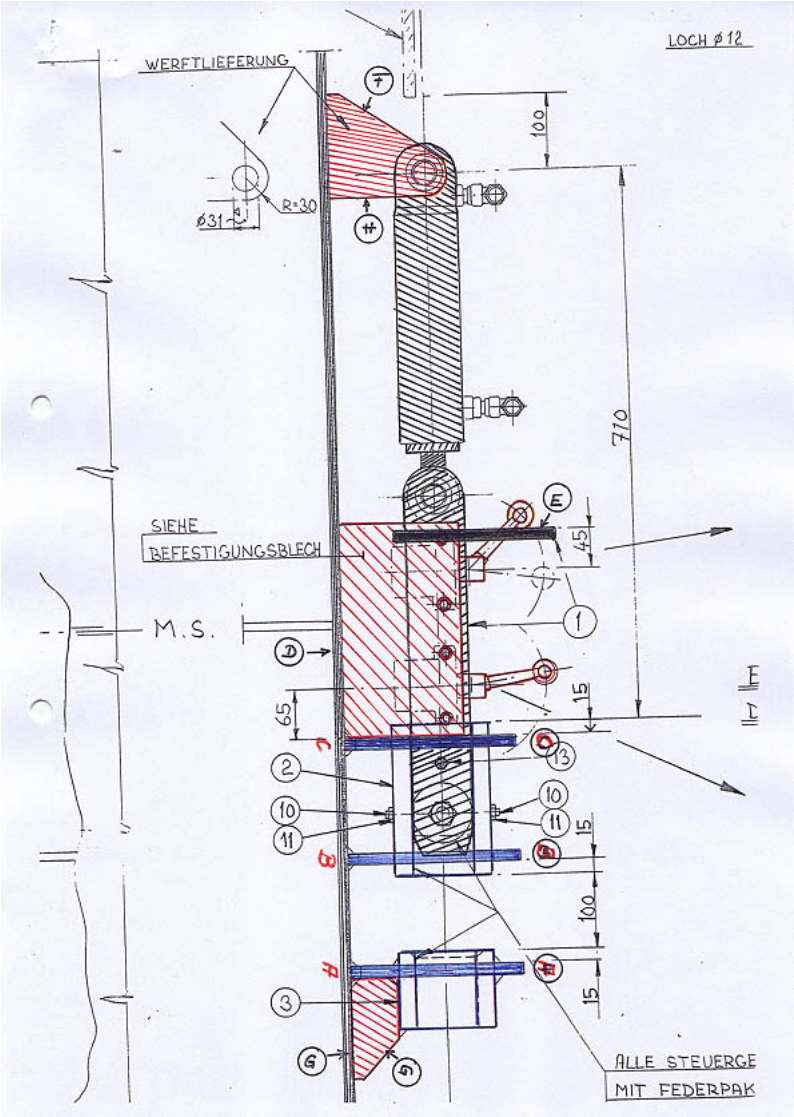


Photo estonia

Photo car deck of estonia

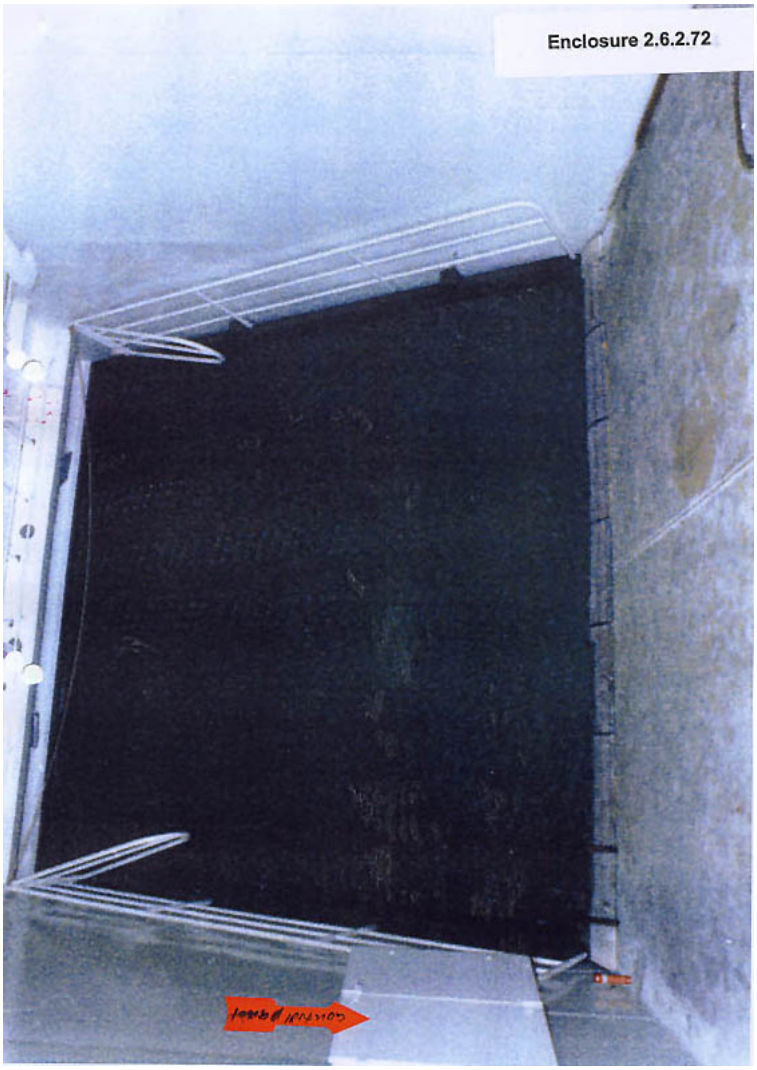


Photo showing hydraulic an manual side locks

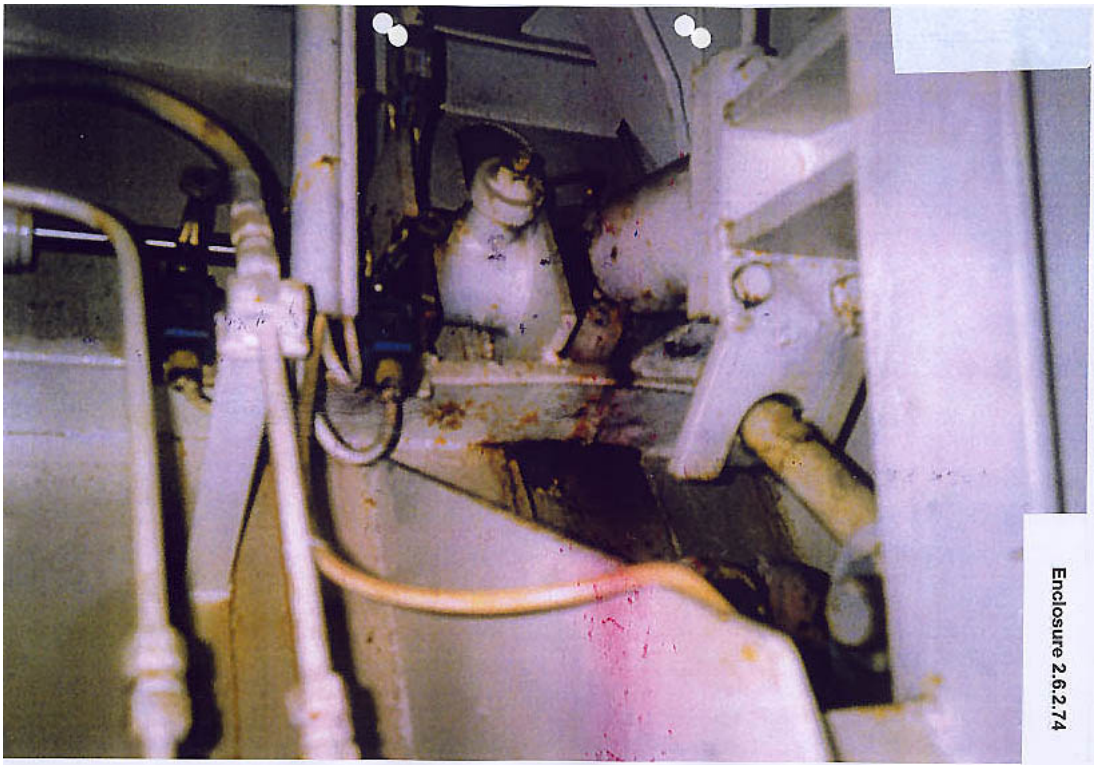
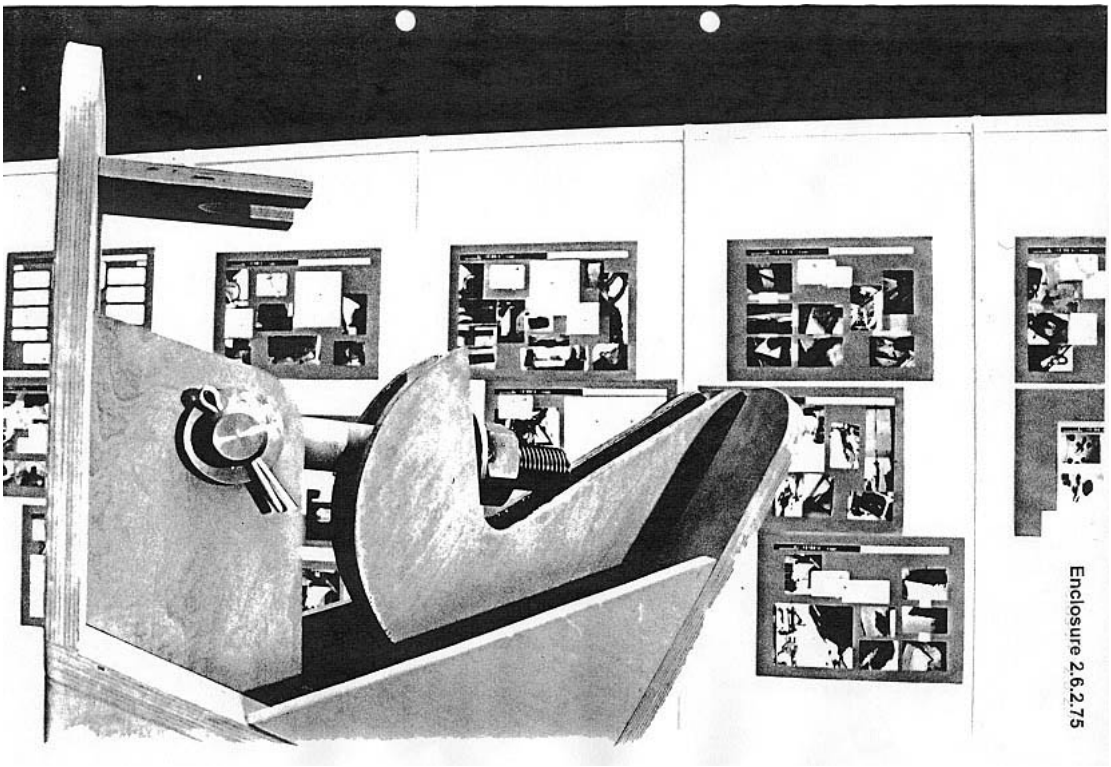
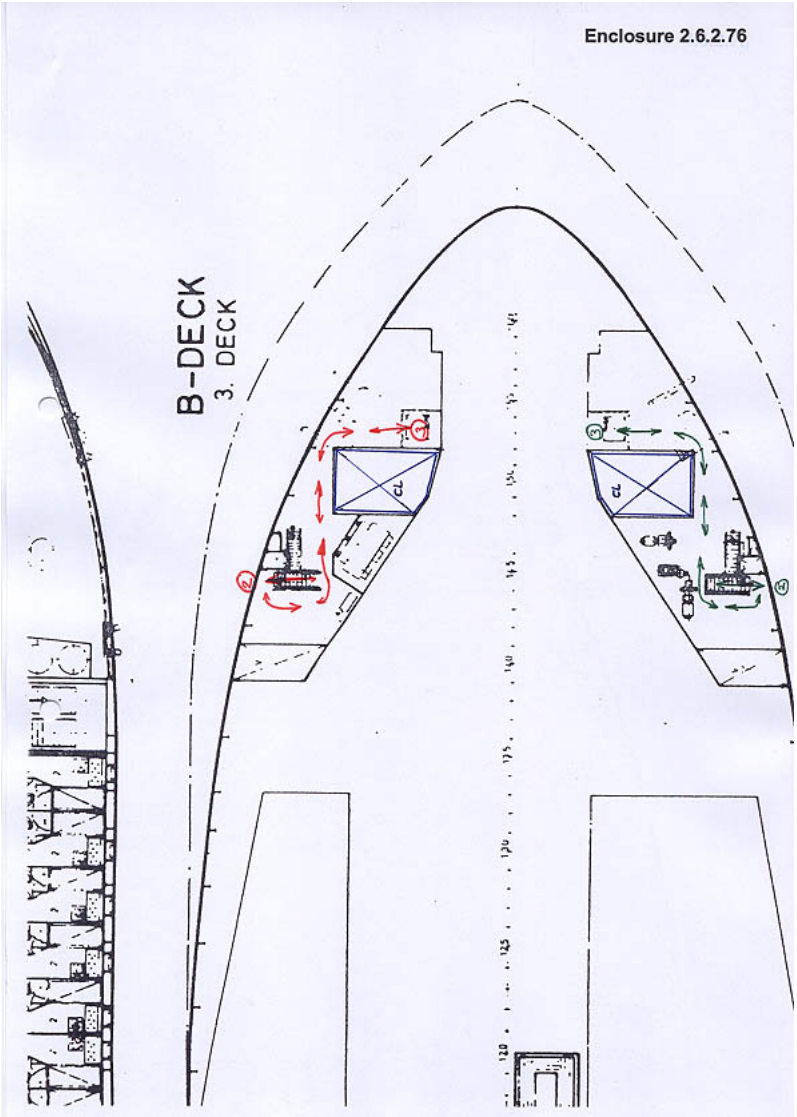


Photo showing mock up of side lock

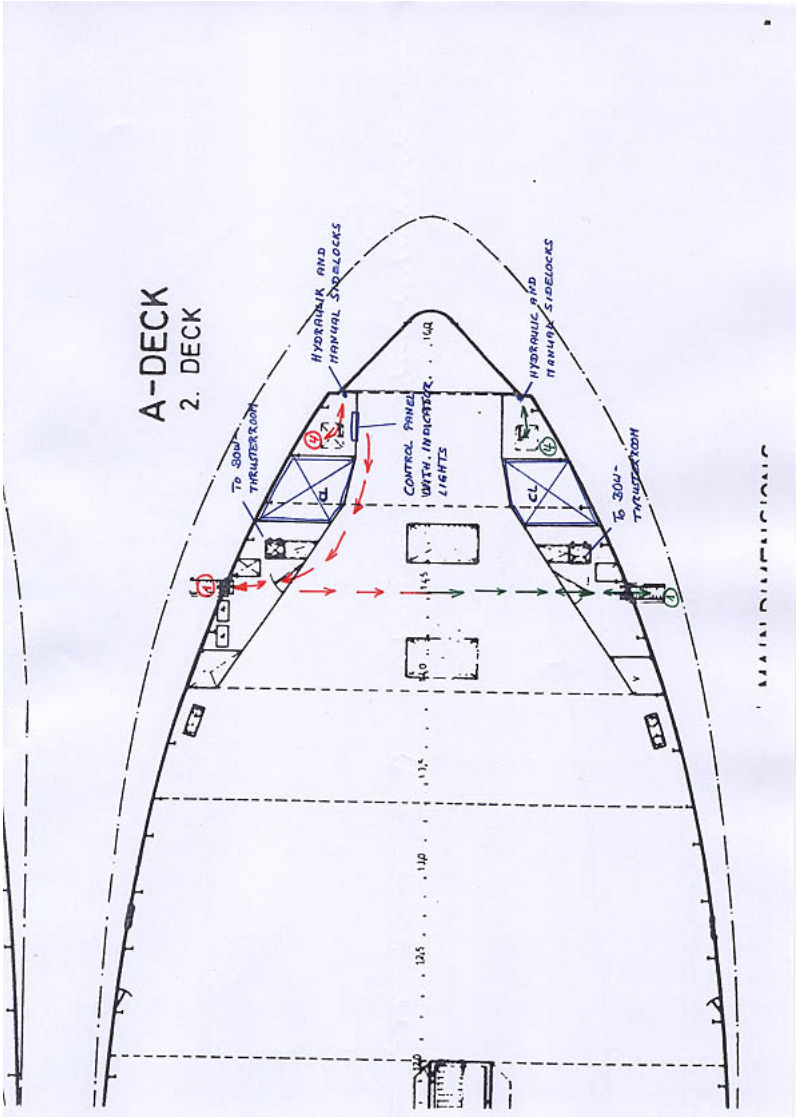


Enclosure 2.6.2.75

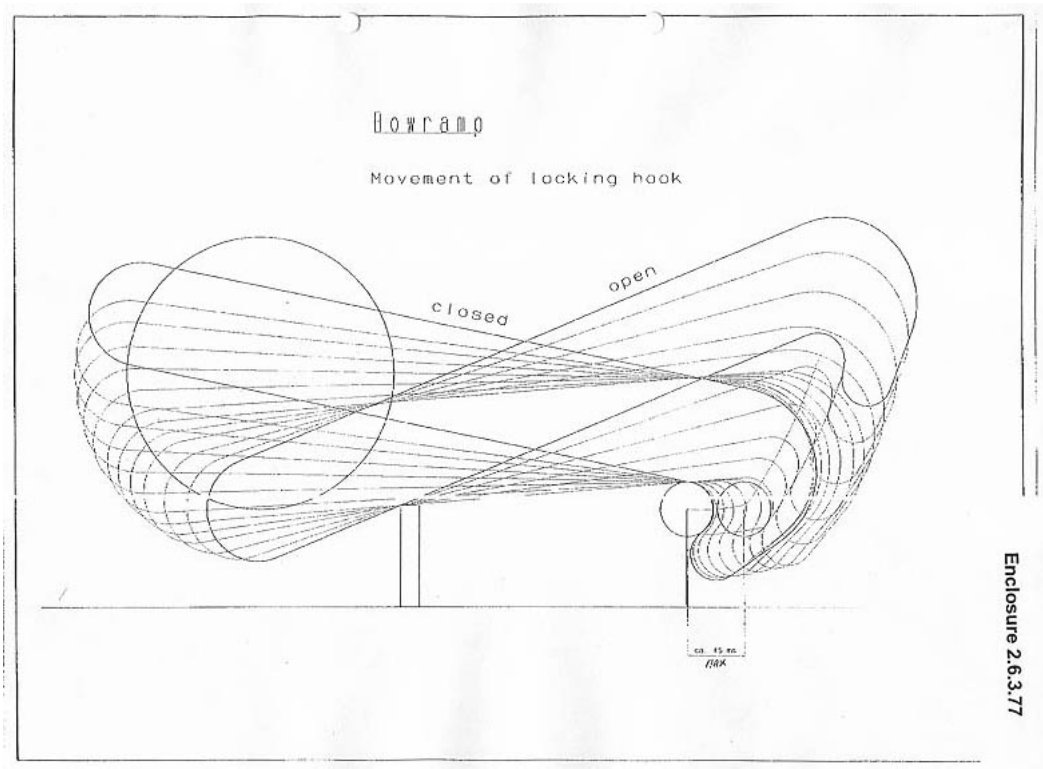
Drawings showing way from control panel



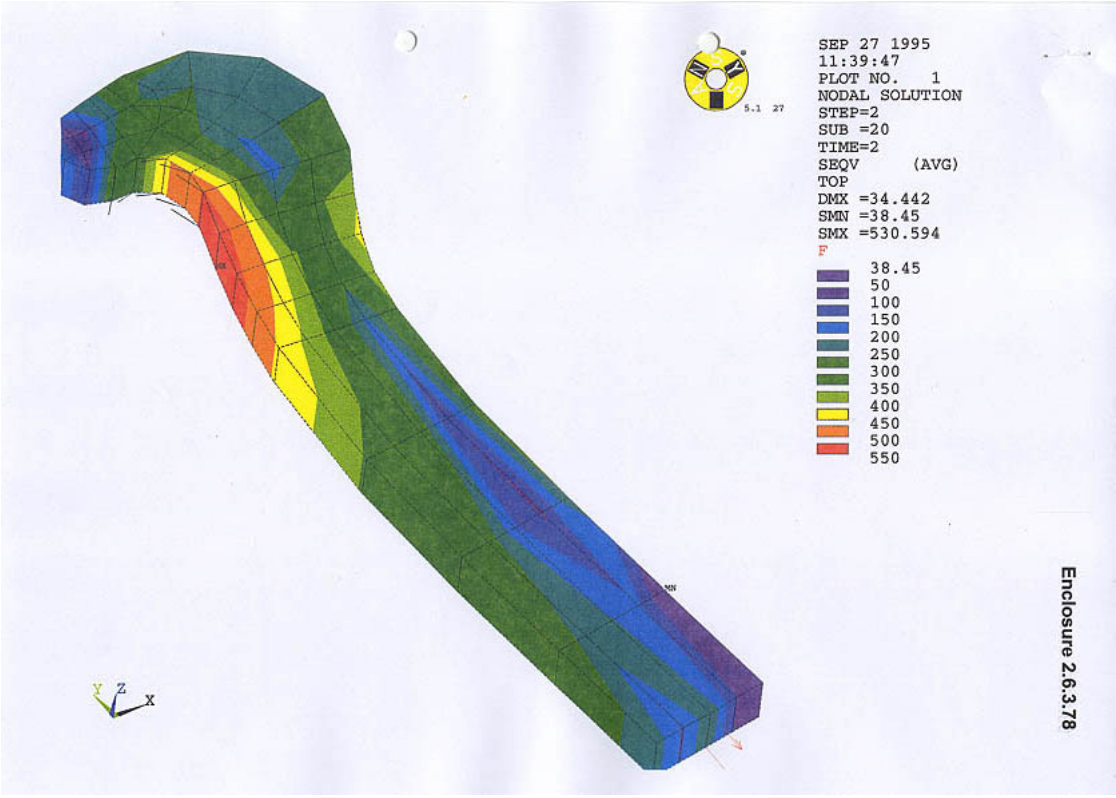
Enclosure 2.6.2.76



Drawing showing moving range of locking hook



Load distribution on bow ramp hooks 2



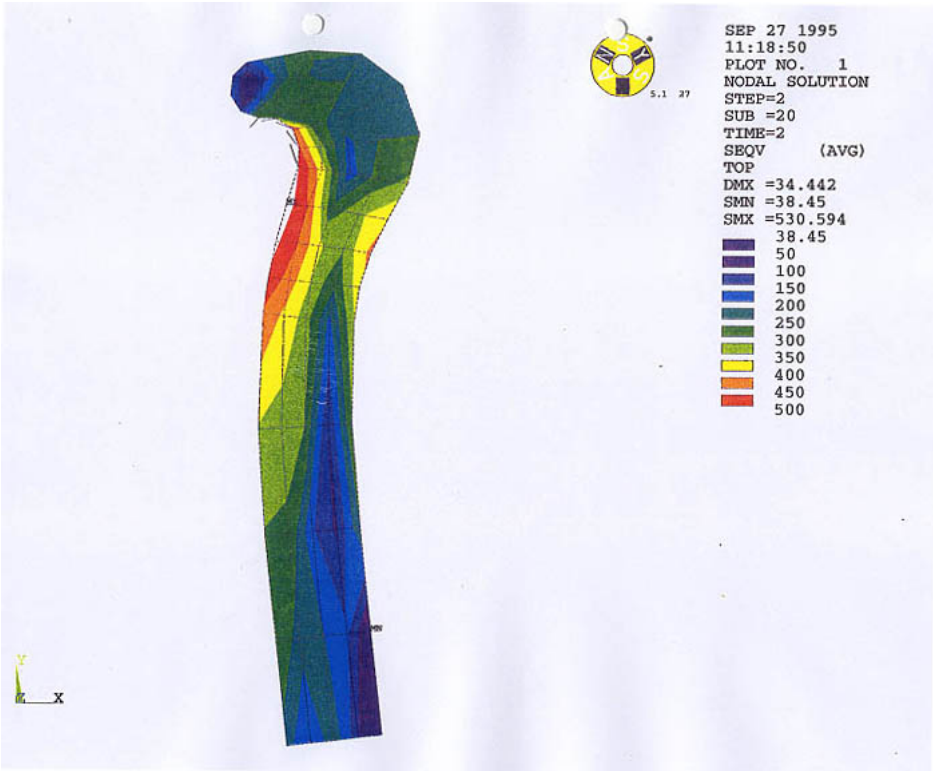
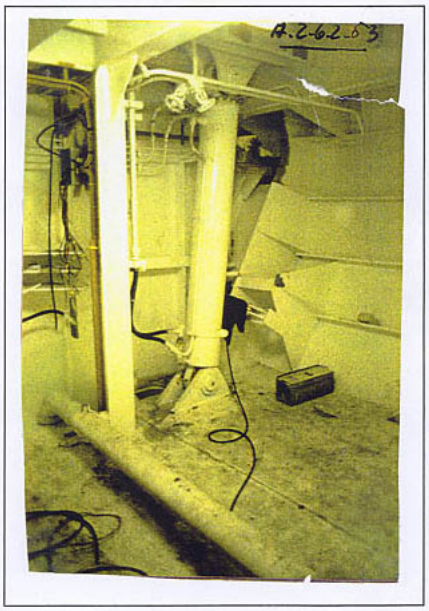
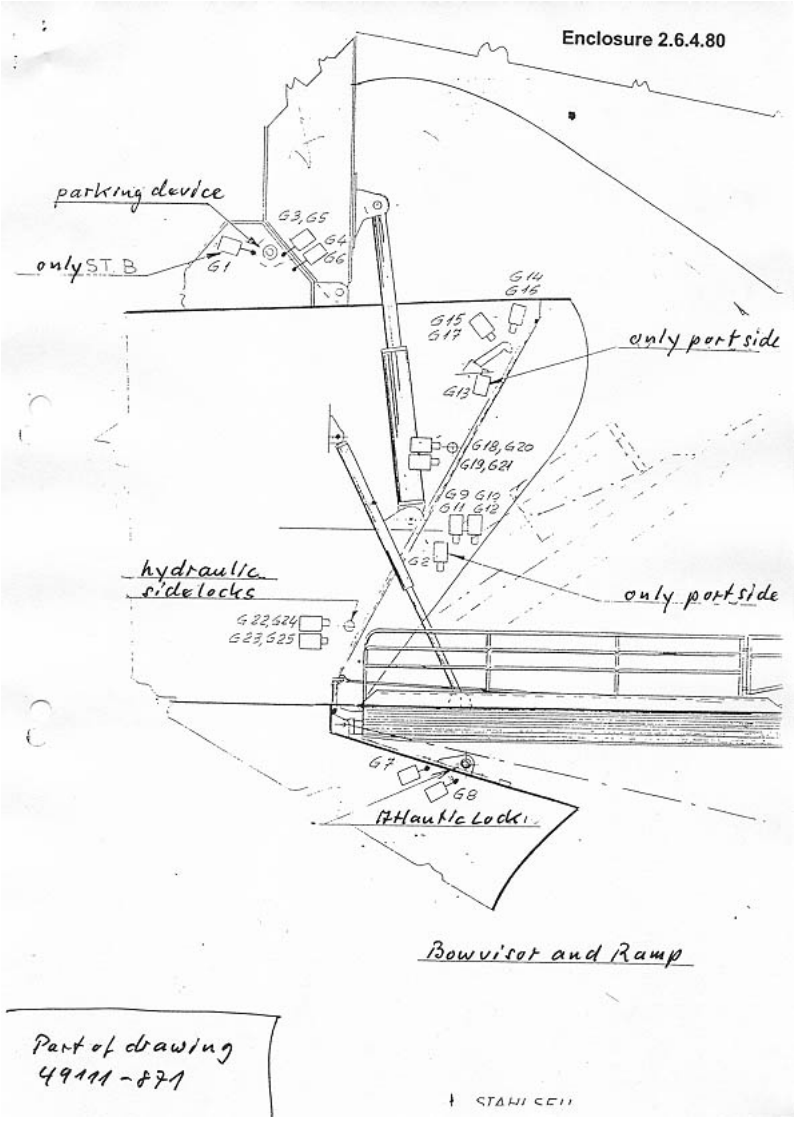


Photo B deck with lifting cylinder

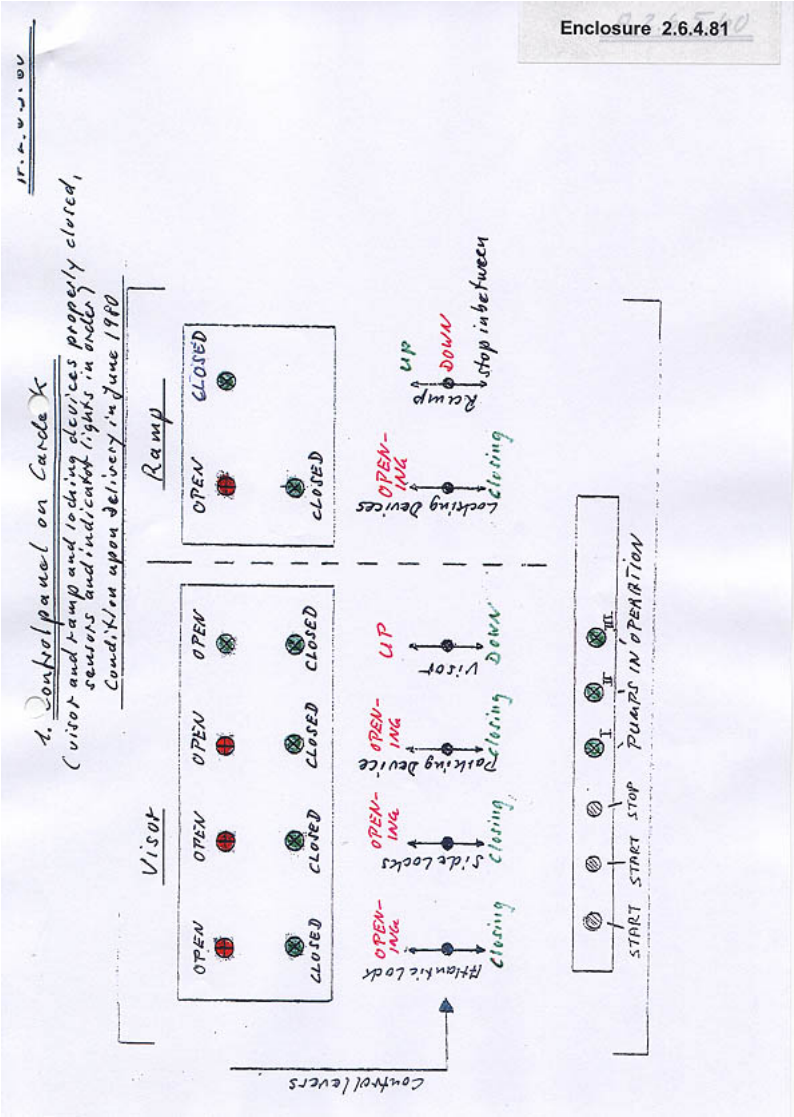
Enclosure 2.6.4.79



Drawing with sensors part of drawing 49111-871



Drawing of control panel on car deck condition june 1980



Solas 1992 edition chapter V

Enclosure 3.2.3.82

SOLAS

Consolidated Edition, 1992

INTERNATIONAL MARITIME ORGANIZATION

(d) Forecasts, warnings, synoptic and other meteorological reports intended for ships shall be issued and disseminated by the national service in the best position to serve various zones and areas, in accordance with mutual arrangements made by the Contracting Governments concerned.

Regulation 5

Ice patrol service

(a) The Contracting Governments undertake to continue an ice patrol and a service for study and observation of ice conditions in the North Atlantic. During the whole of the ice season the south-eastern, southern and south-western limits of the regions of icebergs in the vicinity of the Grand Banks of Newfoundland shall be guarded for the purpose of informing passing ships of the extent of this dangerous region; for the study of ice conditions in general; and for the purpose of affording assistance to ships and crews requiring aid within the limits of operation of the patrol ships. During the rest of the year the study and observation of ice conditions shall be maintained as advisable.

(b) Ships and aircraft used for the ice patrol service and the study and observation of ice conditions may be assigned other duties by the managing Government, provided that such other duties do not interfere with the primary purpose or increase the cost of this service.

Regulation 6

Ice patrol: Management and cost

(a) The Government of the United States of America agrees to continue the management of the ice patrol service and the study and observation of ice conditions, including the dissemination of information received therefrom. The Contracting Governments specially interested in these services undertake to contribute to the expense of maintaining and operating these services; each contribution to be based upon the total gross tonnage of the vessels of each contributing Government passing through the regions of icebergs guarded by the ice patrol; in particular, each Contracting Government specially interested undertakes to contribute annually to the expense of maintaining and operating these services a sum determined by the ratio which the total gross tonnage of that Contracting Government's vessels passing during the ice season through the regions of icebergs guarded by the ice patrol bears to the combined total gross tonnage

season through the regions of icebergs guarded by the ice patrol. Non-contracting Governments specially interested may contribute to the expense of maintaining and operating these services on the same basis. The managing Government will furnish annually to each contributing Government a statement of the total cost of maintaining and operating the ice patrol and of the proportionate share of each contributing Government.

(b) Each of the contributing Governments has the right to alter or discontinue its contribution, and other interested Governments may undertake to contribute to the expense. The contributing Government which avails itself of this right will continue to be responsible for its current contribution up to 1 September following the date of giving notice of intention to alter or discontinue its contribution. To take advantage of the said right it must give notice to the managing Government at least six months before the said 1 September.

(c) If, at any time, the United States Government should desire to discontinue these services, or if one of the contributing Governments should express a wish to relinquish responsibility for its pecuniary contribution, or to have its contribution altered, or another Contracting Government should desire to undertake to contribute to the expense, the contributing Governments shall settle the question in accordance with their mutual interests.

(d) The contributing Governments shall have the right by common consent to make from time to time such alterations in the provisions of this regulation and of regulation 5 of this chapter as appear desirable.

(e) Where this regulation provides that a measure may be taken after agreement among the contributing Governments, proposals made by any Contracting Government for effecting such a measure shall be communicated to the managing Government which shall approach the other contributing Governments with a view to ascertaining whether they accept such proposals, and the results of the enquiries thus made shall be sent to the other contributing Governments and the Contracting Government making the proposals. In particular, the arrangements relating to contributions to the cost of the services shall be reviewed by the contributing Governments at intervals not exceeding three years. The managing Government shall initiate the action necessary to this end.

Regulation 7

Speed near ice

When ice is reported on or near his course the master of every ship at night is bound to proceed at a moderate speed or to alter his course

Interview juhani luttunen

The German Group of Experts
investigating the sinking of M/V "ESTONIA"
c/o AHLERS & VOGEL · Schaartor 1 D-20459 Hamburg · Telephone 49-40-371075

Memo for Dr. Holtappels

re: Interview of Juhani Luttunen, ex boatswain of "Viking Sally", "Silja Star" and "Wasa King" from June 1980 to November 1992 on 6.9.96

1. Lutttunen had killed another ex crew member of "Viking Sally", etc., the engine repairman Christer Koivisto, by shooting him twice into the head onboard M.V. "Fennia" on the 12th June of this year whilst in the port of Wasa. This is why the interview took place in the prison of Wasa where Luttunen has been ever since. The interview, in the course of which also the underwater videos concerning the Atlantic lock area were viewed, took 4 hours. Participants were

   Daniel Allén - lawyer of Luttunen
   Henrik Gahmberg - Bützow & Co., Helsinki
   the Undersigned.

2. Christer Koivisto had been an engine repairman and 'ombudsman' (union representative) from the take-over of "Viking Sally" in Papenburg until June 1993 when the vessel was "Estonia, whilst Luttunen had been boatswain from the take-over in June 1980 to November 1992 when the vessel was "Wasa King". According to L., Koivisto had a very dominant/convincing personality, and we got the impression that there had been a certain rivalry between the two over the years. The exact times of Luttunen, Koivisto as well as of Göran Lindström and Bo Wesander, nominated by Luttunen as witnesses, can be taken from the attached copy of the crew register of the Finnnish Board of Navigation.

3. L. is believed to be schizophrene and/or paranoid and will undergo mental examination shortly. During the interview, however, he made a completely normal impression on us, very calm and concentrated, only once did he become slightly excited, viz. when we could confirm that the visor lug possibly showed indications of manipulation which could not be explained by normal wear and tear, and elongation/stretching in service.

4. L. explained in detail:
   - his function as boatswain in connection with operating visor/bow ramp, i.e. standing at the control panel, he explained the different handles and also the indicator lights, remembered clearly the 2 hooks and 4 bolts of the bow ramp as well as
   - the sidelocks, the Atlantic lock, and also explained that they had never engaged the manual sidelocks.
   - At some time in 1982 they realized that the visor was no more closing properly because it was in a misaligned condition athwortships, he believes that the starboard corner was standing a bit up. It was for this reason that the Atlantic lock bolt could no more move through the visor lug. The matter was discussed with the engine people and it was considered what could be done. Engine repairman Koivisto considered himself to be the visor expert and offered to rectify the Atlantic lock to the effect that the bolt would fit again. L. believes that Koivisto was even called back from vacation to do the modification.
   - In the presence of L. and Göran Lindström Koivisto cut off the upper part of the lugs of the Atlantic lock and took off the bushings. Thereafter he welded extended parts on the lug remains and the holes in the lugs now looked like an ellipse (see drawing attached an enclosure no. 2), the bushings did not fit any more and were left out as still the bolt would not go smoothly through the visor lug, which was extending apparently too much aft or too much forward. In any event Koivisto cut something off

the inside of the visor lug, whereby L. is of the opinion it was from the forward part (see drawing attached as enclosure no. 3). After the repairs were completed by Koivisto L. together with Lindström looked at the result and realized at once that it was impossible. They decided to contact the inspector from shore, he does not recall the name, is however sure that it was not Röblom (whom he knows). He is very careful with names since Lindström and Wesander, whom he had called as witnesses, had testified that they did not remember. It was their intention to call in the inspector who normally inspected the visor.

Somebody came and realized the poor modification. About one week later Swedish speaking people came from the company von Tell AB, totally cut off all 3 lugs of the Atlantic lock and welded new ones to the A-Deck with bushings inserted. He believes also that it was then realized that there was something wrong with the hydraulic, which was adjusted. The visor lug remained - as far as he remembers - unchanged, i.e. should still be the original.

When the repairs were completed the von Tell people expressly prohibited Koivisto or anybody else from board to ever manipulate the Atlantic lock again.

5. We have promised to send photos of bolts and lugs from the Atlantic lock as well as from the visor lug and will also attach photos from the poorly welded fundament of the port actuator and the hinges, although he has already said that he does not remember anything in this respect.

6. The information from Luttunen will be cross-checked with von Tell and some people in Mariehamn.

7. According to L. Koivisto has repeated the poor modification of the Atlantic lock again on "Estonia" which might have caused the catastrophe.

8. L. has spoken several times to T. Karppinen before and after the murder, the first time in December 1995 when he visited the Finnish Commission on his own initiative. According to Karppinen, however, he did not express himself very clearly at the beginning and spoke more in a coded manner, which was confirmed by L. when we asked him respectively.

9. In summary it has to be concluded that in case it can be proved that L. is right the 3 lugs at vessel's side are not original which would explain the good looking but too thin welds at centre and port lugs, whilst the starboard lug had subsequently been repair welded. It would also explain the longer support bracket at the starboard lug when comparing it with the drawing.

Hamburg, 09.09.96 Werner Hummel

Encl.

Trim and stability booklet

Enclosure 3.4.86

WASA KING

TRIM AND STABILITY BOOKLET

approved by FBA
Eckelu
23.1.91

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Combination table for loading cases		3
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LC1	Light ship	4-5
LC2	Ballast condition at departure	6-8
LC3	Ballast condition at arrival	9-11
LC4	Ship with full bunkers and stores + 2000 passengers at departure	12-14
LC5	Ship with full bunkers and stores + 2000 passengers at arrival	15-17
LC6	Fully loaded to draught 5.567 m, 47 trailers and 2000 passengers at departure	18-20
LC7	As case 6 but 50 % of bunkers and stores	21-23
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Appendix
Damage stability diagram 6891.01-1115.600
Hydrostatic particulars 6891.06-171.120
Stability Cross Curves values 6891.01-171.200
Report of inclining experiment 11.01 1991

G E N E R A L P A R T I C U L A R S

SHIP'S NAME :	WASA KING ex Silja Star ex Viking Sally	
SIGNAL LETTERS :	OIKW	
PORT OF REGISTRY :		
OWNERS NAME :		
BUILDERS NAME AND ADDRESS :	Jos. L. Meyer, Papenburg-Ems	
SHIP'S NUMBER :	590	
DATE OF KEEL LAID :		
MAIN DIMENSIONS :	Length over all	157.02 m
	Length between perp.	137.40 m
	Breadth mld	24.20 m
	Depth to A deck	7.65 m
	Draught	5.567 m
BLOCK COEFFICIENT :		0.681
DISPLACEMENT (1.025 t/m^3) : T = 5.567 M		12708 T

GENERAL

This Trim and Stability Booklet is based on Maierform's Hydrostatic Particulars 6891.06-171.120, Cross Stability Curves Values 6891.01-171.200 and Damage Stability Diagram 6891.01-115.600 and Inclining experiment 11.01. 1991.

The difference of Light Ship Weight between the two inclining experiments was 313 t. The largest parts in additional weights were 'Duck tail' and additional insulation between passenger cabins.

The Duck tail's volume and effect to KM is not included in hydrostatic particulars. (Reduced trim and give more stability). During inclining experiment the Duck tail was over water surface all the time.

In loading cases 4 and 5 there has been shown stability curve and GM-values in various numbers of passengers. In loading cases 6, 7 and 8 there has been shown GM-values in various numbers of trailers.

The damage stability diagram has been calculated with the following criterions:

- GM at least 0.05 m
- Max. heel in unsymmetrical cases not more than 7°
- Margin line not immersed in the final stage of flooding.

The following tanks and spaces are connected with cross-flooding ducts:

- Heeling tanks (Tank 13 and 14)
- Sauna fr 110 - 120 from CL-side P & S
- Fresh water tanks fr 120 - 132 P & S

COMBINATION TABLE FOR LOADING CASES

CASE NO	LOADING CONDITION	HFO T	FW T	PASS T	CARGO T	WB T	DWT T	MEAN DRAUGHT M	TRIM M	GM' M	GM_{REQ} M
1	LIGHT SHIP	-	-	-	-	-	-	4.47	-2.28	0.44	-
2	BALLAST CONDITION AT DEPARTURE	807	644	-	-	479	2307	5.33	-0.64	1.51	0.64
3	BALLAST CONDITION AT ARRIVAL	94	68	-	-	993	1248	4.95	-0.50	1.04	0.92
4	FULL BUNKERS +2000 PASS. AT DEPARTURE	807	644	200	-	479	2607	5.44	-0.51	1.49	0.62
5	FULL BUNKERS +2000 PASSENG. AT ARRIVAL	94	68	200	-	993	1555	5.06	-0.42	0.96	0.83
6	47 TRAILER & 2000 PASS. AT DEPARTURE	417	287	200	1692	-	2975	5.57	-0.84	1.14	0.66
7	47 TRAILER & 2000 PASS. 50 % B & S	208	137	200	1692	176	2658	5.46	-0.75	0.84	0.63
8	47 TRAILER & 2000 PASS. AT ARRIVAL	42	38	200	1692	567	2694	5.47	-0.12	0.85	0.63

LOAD CASE 1

LIGHT SHIP

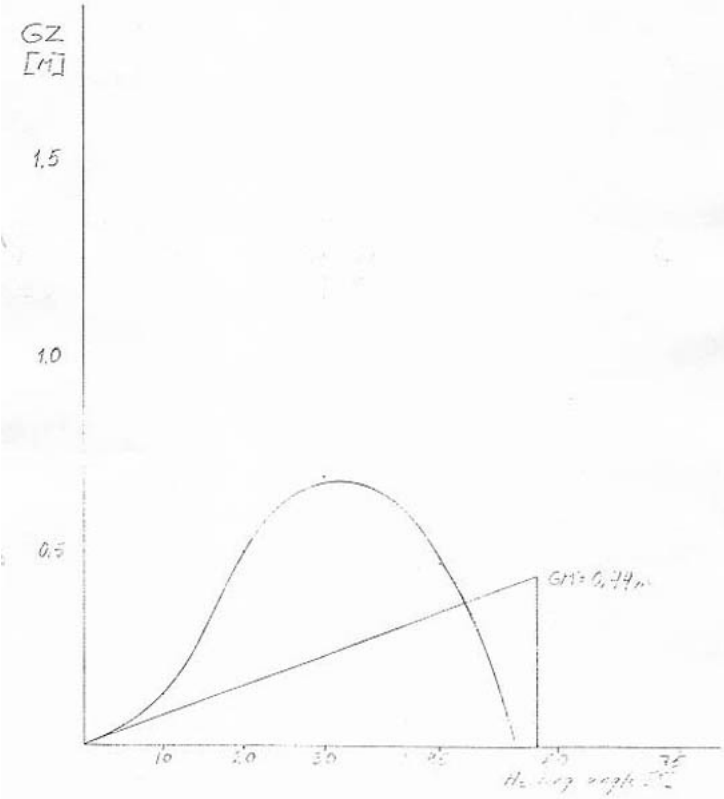
	Weight t	VCG from BL m	Mom tm	LCG from A_{PP} m	Mom tm	Free surf tm
Light ship weight	9733	11.56	112513	60.76	591377	-
Dead weight	-					
Displacement	9733	11.56	112513	60.76	591377	

Mean draught	4.47 m	KM	12.00 m
Trim	-2.28 m	KG	11.56 m
Draught aft	5.41 m	GM	0.44 m
Draught forw	3.13 m	MM'	0.00 m
		GM'	0.44 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.14	4.45	6.47	8.64	9.53	9.13
KG'*sin	2.01	3.95	5.78	8.17	10.01	11.17
GZ	0.13	0.50	0.69	0.47	-0.48	-2.04

Ship Consulting Turku Finland	LOAD CASE 1 LIGHT SHIP	WASA KING 20.01. 1991/VM



LOAD CASE 2

BALLAST CONDITION AT DEPARTURE

	Weight t	VCG from BL m	Mom tm	LCG from A_{PP} m	Mom tm	Free surf tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	20	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
H tank 10	162	2.70		74.20		
H tank 11	162	2.70		74.20		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
DB tank 19	66	0.51		58.30		
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	807	1.70		68.70		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		
DB tank 20	18	0.57		59.87		
DB tank 47	39	0.65		26.62		248
DB tank 48	41	0.65		26.51		249
Day tank 41	13	2.91		31.03		
Total of DO	236	0.72		53.95		497
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

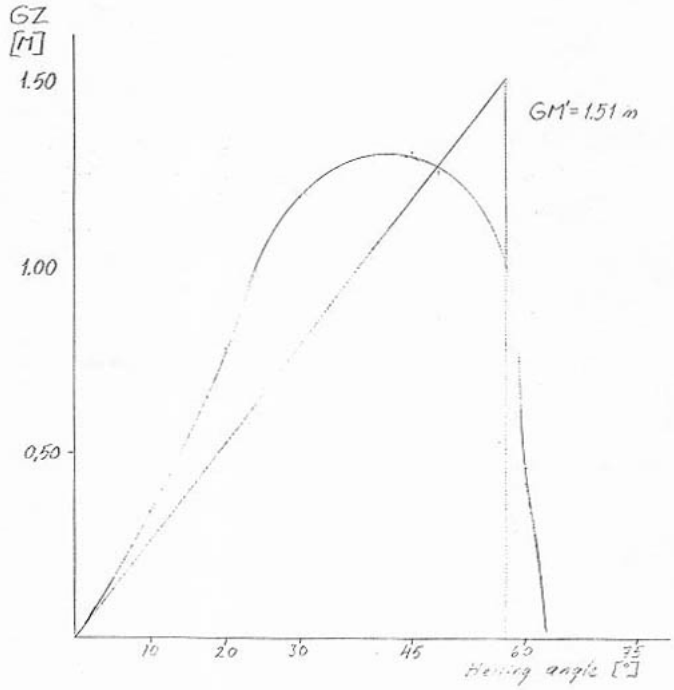
Fresh Water						
Tank 4a	75	2.79		114.25		
Tank 4b	75	2.79		114.25		
Tank 5	145	2.79		113.65		
Tank 56	156	3.07		9.46		353
Tank 57	156	3.07		9.46		353
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	644	2.80		59.82		706
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		2260
Total of WB	479	4.60		126.00		2260
Dead weight	2307	2.71	6247	75.17	173419	4331
Displacement	12040	9.86	118760	63.52	764796	4331

Mean draught	5.33 m	KM	11.73 m
Trim	-0.64 m	KG	9.86 m
Draught aft	5.65 m	GM	1.87 m
Draught forw	5.01 m	MM'	0.36 m
		GM'	1.51 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.28	6.30	8.54	9.31	8.95
KG'*sin	1.77	3.50	5.11	7.23	8.85	9.87
GZ	0.34	0.78	1.19	1.31	0.46	-0.92

Ship Consulting Turku Finland	LOAD CASE 2 BALLAST AT DEPARTURE	WASA KING 20.01. 1991/VMJ



LOAD CASE 3

BALLAST CONDITION AT ARRIVAL

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	15	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	94	2.85		34.46		105
Diesel Oil						
DB tank 20	11	0.57		59.87		
Day tank 41	13	2.91		31.03		
Total of DO	24	1.74		45.45		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	45	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	68	2.06		92.96		166
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Heeling tank 13	183	2.63		77.53		
Heeling tank 14	183	2.63		77.53		
DB tank 54	60	0.66		19.14		
Total of WB	993	3.29		99.80		

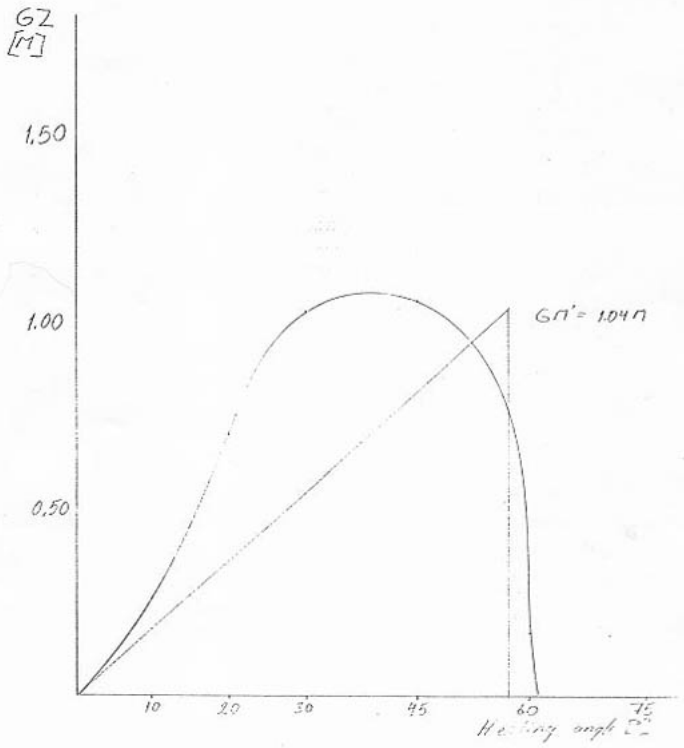
Dead weight	1248	3.46	4322	90.54	112988	310
Displacement	10981	10.64	116835	64.14	704365	310

Mean draught	4.95 m	KM	11.71 m
Trim	-0.50 m	KG	10.64 m
Draught aft	5.20 m	GM	1.07 m
Draught forw	4.70 m	MM'	0.03 m
		GM'	1.04 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.35	6.37	8.60	9.41	9.03
KG'*sin	1.85	3.65	5.34	7.54	9.24	10.31
GZ	0.26	0.70	1.03	1.06	0.17	-1.28

Ship Consulting Turku Finland	LOAD CASE 3 BALLAST AT ARRIVAL	WASA RHS 20.01 1991/VMJ



LOAD CASE 4

SHIP WITH FULL BUNKERS & STORES + 2000 PASSENGER AT DEPARTURE

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	80	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
H tank 10	162	2.70		74.20		
H tank 11	162	2.70		74.20		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
DB tank 19	66	0.51		58.30		
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	807	1.70		68.70		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		
DB tank 20	18	0.57		59.87		
DB tank 47	39	0.65		26.62		248
DB tank 48	41	0.65		26.51		249
Day tank 41	13	2.91		31.03		
Total of DO	236	0.72		53.95		497
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

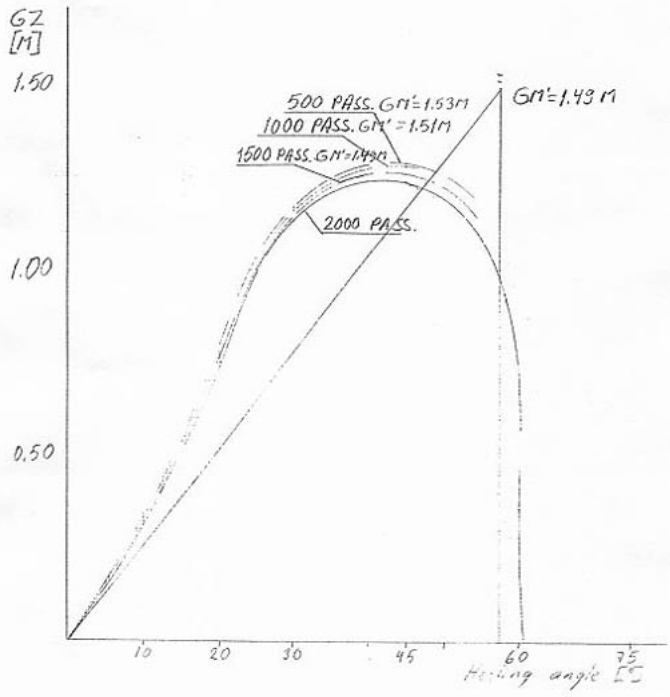
Fresh Water						
Tank 4a	75	2.79		114.25		
Tank 4b	75	2.79		114.25		
Tank 5	145	2.79		113.65		
Tank 56	156	3.07		9.46		353
Tank 57	156	3.07		9.46		353
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	644	2.80		59.82		706
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		2260
Total of WB	479	4.60		126.00		2260
2000 PASSENGER+LUGG	200	16.40		71.50		
Swimming pool	40	2.00		97.50		
Dead weight	2607	3.92	10207	74.56	194379	4331
Displacement	12340	9.94	122720	63.68	785756	4331

Mean draught	5.44 m	KM	11.78 m
Trim	-0.51 m	KG	9.94 m
Draught aft	5.70 m	GM	1.84 m
Draught forw	5.19 m	MM'	0.35 m
		GM'	1.49 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.27	6.28	8.52	9.27	8.92
KG'*sin	1.79	3.52	5.15	7.28	8.91	9.94
GZ	0.32	0.75	1.13	1.24	0.36	-1.02

Ship Consulting Turku Finland	LOAD CASE 4 FULL BUNKERS + 2000 PASS. AT DEPARTURE	WASA KING 20.01. 1991/VM



LOAD CASE 5

SHIP WITH FULL BUNKERS AND STORES + 2000 PASSENGERS AT ARRIVAL

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	-
Crew + effects	20	22.00		55.00		
Provision + stores	60	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	94	2.85		34.46		105
Diesel Oil						
DB tank 20	11	0.57		59.87		
Day tank 41	13	2.91		31.03		
Total of DO	24	1.74		45.45		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	45	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	68	2.06		92.96		166
Bilge water 33	22	0.55		35.83		

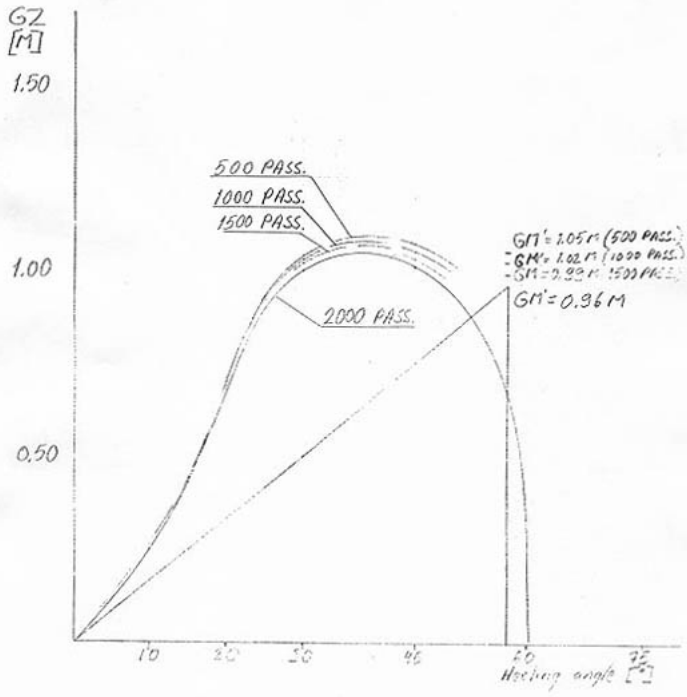
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Heeling tank 13	183	2.63		77.53		
Heeling tank 14	183	2.63		77.53		
DB tank 54	60	0.66		19.14		
Total of WB	993	3.29		99.80		
2000 passenger+lugg	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
Dead weight	1555	5.23	8132	85.72	133294	470
Displacement	11288	10.69	120646	64.20	724671	470

Mean draught	5.06 m	KM	11.69 m
Trim	-0.42 m	KG	10.69 m
Draught aft	5.27 m	GM	1.00 m
Draught forw	4.85 m	MM'	0.04 m
		GM'	0.96 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.35	6.37	8.60	9.41	9.03
KG'*sin	1.86	3.67	5.37	7.59	9.29	10.36
GZ	0.25	0.68	1.00	1.01	0.12	-1.33

Ship Consulting Turku Finland	LOAD CASE 5 FULL BUNKER + 2000 PASS. AT ARRIVAL	WASA KING 20.01 1991/VMJ



LOAD CASE 6

FULLY LOADED TO DRAUGHT 5.567 47 TRAILERS AND 2000 PASSENGES AT DEPARTURE

	Weight	VCG from BL	Mom	LCG from λ_{PP}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	80	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
DB tank 15	127	0.60		72.20		434
DB tank 16	127	0.60		72.20		434
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	417	1.11		66.08		868
Diesel Oil						
DB tank 8	65	0.60		86.60		
DB tank 18	60	0.51		58.30		245
Day tank 41	13	2.91		31.03		
Total of DO	138	0.78		69.06		245
Lubric. Oil						
Thermal oil tank 24	16	0.67		45.78		
Lubr oil tank 25	13	0.55		45.40		
Lubr oil tank 26	13	0.55		45.40		
Lubr oil tank 27	13	0.55		45.40		
Lubr oil tank 28	13	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Lubr oil tank 32	12	0.55		44.57		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	5	0.71		15.06		
Total of LO	101	0.58		43.05		

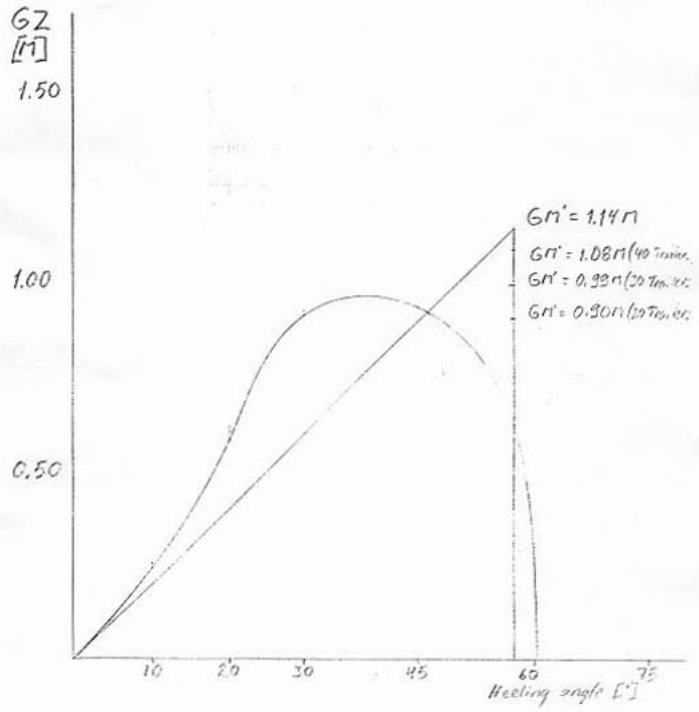
Fresh Water						
Tank 4a	75	2.79		114.25		
Tank 4b	75	2.79		114.25		
Tank 5	100	2.79		113.65		138
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	287	2.51		106.10		138
2000 PASSENGER+LUGG	200	16.40		71.50		
Swimming pool	40	2.00		97.50		
47 trailers a' 36 t	1692	9.50		66.50		
Dead weight	2975	7.40	22022	69.71	207381	1251
Displacement	12708	10.59	134536	62.85	798758	1251

Mean draught	5.57 m	KM	11.83 m
Trim	-0.84 m	KG	10.59 m
Draught aft	5.99 m	GM	1.24 m
Draught forw	5.15 m	MM'	0.10 m
		GM'	1.14 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.24	6.26	8.49	9.22	8.89
KG'*sin	1.86	3.66	5.35	7.56	9.26	10.33
GZ	0.25	0.58	0.91	0.93	-0.04	-1.44

Ship Consulting Turku Finland	LOAD CASE 6 FULLY LOADED TO DRAUGHT 5.567 M AT DEPARTURE	WASA KING 20.01 1991/VM



LOAD CASE 7

AS CASE 6 BUT 50 % OF BUNKERS AND STORES

	Weight t	VCG from BL m	Mom tm	LCG from A_{PP} m	Mom tm	Free surf tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provisions + stores	65	10.00		46.00		
Heavy Fuel Oil						
DB tank 9	69	0.60		86.60		
DB tank 16	45	0.60		72.20		434
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Settling tank 38	30	2.90		32.20		
Settling tank 39	22	2.86		33.84		
Total of HFO	208	1.62		58.76		434
Diesel Oil						
DB tank 8	56	0.60		86.60		236
Day tank 41	13	2.91		31.03		
Total of DO	69	1.04		76.13		236
Lubric. Oil						
Thermal oil tank 24	8	0.67		45.78		
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	10	0.55		50.15		
Kamewa tank 50	2	0.60		24.60		
Kamewa tank 51	2	0.60		23.40		
Kamewa tank 52	2	0.60		23.40		
Stern tube oil 55a	3	0.71		15.06		
Total of LO	51	0.58		42.07		

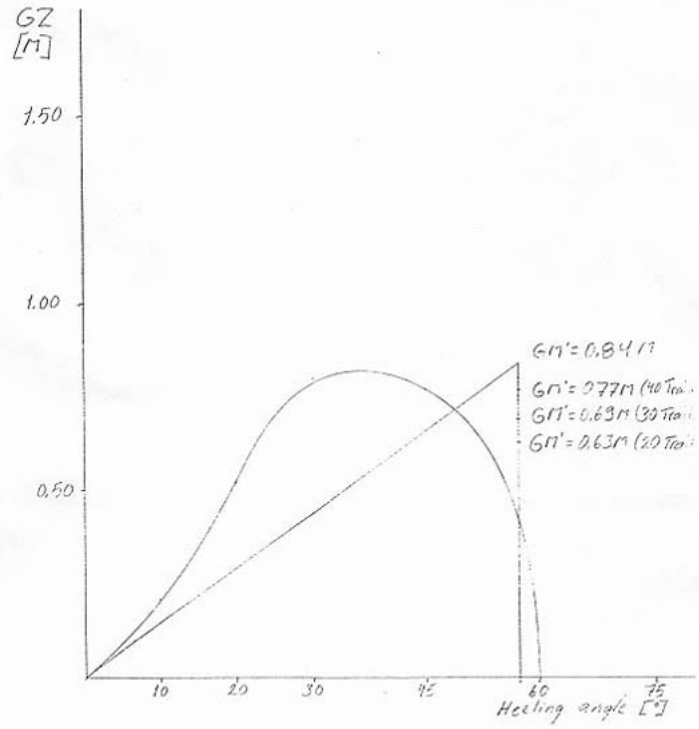
Fresh Water						
Tank 5	100	2.79		113.65		138
Circulating tank 17	18	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	16	0.67		45.80		
Total of FW	137	2.21		97.18		138
2000 PASSENGER+LUGG	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
47 trailers a' 36 t	1692	9.50		66.50		
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Dead weight	2658	8.29	22047	71.98	191311	968
Displacement	12391	10.86	134560	63.17	782688	968

Mean draught	5.46 m	KM	11.78 m
Trim	-0.75 m	KG	10.86 m
Draught aft	5.84 m	GM	0.92 m
Draught forw	5.09 m	MM'	0.08 m
		GM'	0.84 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.26	6.27	8.51	9.27	8.92
KG'*sin	1.90	3.74	5.47	7.74	9.47	10.57
GZ	0.21	0.52	0.80	0.77	-0.20	-1.65

Ship Consulting Turku Finland	LOAD CASE 7 FULLY LOADED TO DRAUGHT 5.567M BUT 50% BUNKERS	WASA KING 20.01 1991/VMJ



LOAD CASE 8

AS CASE 6 BUT 10 % OF BUNKERS AND STORES AT ARRIVAL

	Weight	VCG from BL	Mom	LCG from A_{pp}	Mom	Free surf
	t	m	tm	m	tm	tm
Light ship weight	9733	11.56	112513	60.76	591377	
Crew + effects	20	22.00		55.00		
Provision + stores	60	10.00		46.00		
Heavy Fuel Oil						
Day tank 36	24	2.82		36.23		
Day tank 37	18	2.81		36.62		
Total of HFO	42	2.82		36.40		105
Diesel Oil						
Day tank 41	13	2.91		31.03		
Total of DO	13	2.91		31.03		39
Lubric. Oil						
Lubr oil tank 25	6	0.55		45.40		
Lubr oil tank 26	6	0.55		45.40		
Lubr oil tank 27	6	0.55		45.40		
Lubr oil tank 28	6	0.55		45.40		
Lubr oil supply t 30	5	0.55		50.15		
Kamewa tank 50	1	0.60		24.60		
Kamewa tank 51	1	0.60		23.40		
Kamewa tank 52	1	0.60		23.40		
Stern tube oil 55a	2	0.71		15.06		
Total of LO	34	0.56		42.41		
Fresh Water						
Tank 5	15	2.79		113.65		
Circulating tank 17	10	0.60		58.30		
Cool water tank 22	3	0.57		55.40		
Cool water tank 29	10	0.67		45.80		
Total of FW	38	1.48		76.63		166
Bilge water 33	22	0.55		35.83		

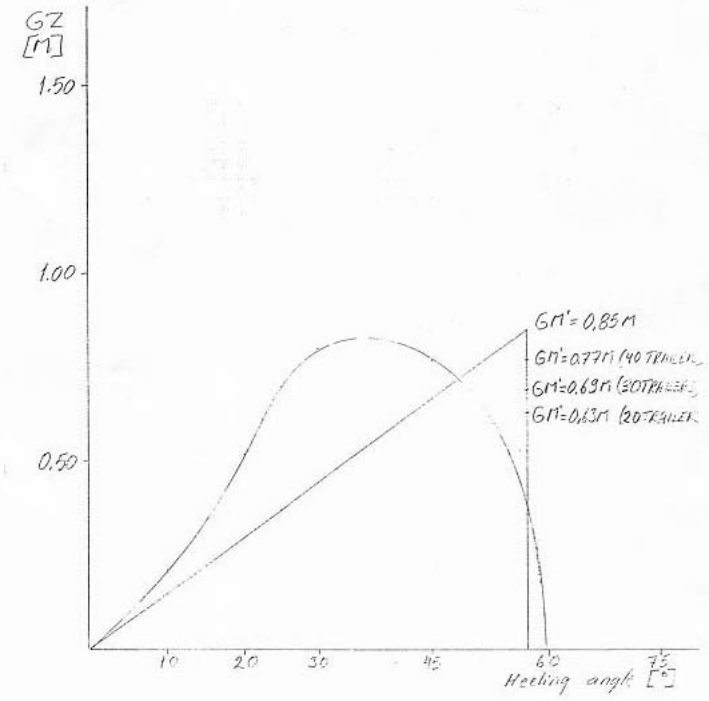
Water Ballast						
Fore peak tank 1	176	4.45		133.92		
Trim tank 2	303	4.69		121.40		
DB tank 6	88	0.64		104.84		
Total of WB	567	3.99		122.72		
2000 passenger+lugg	200	16.40		71.50		
Swimming pool	40	2.00		97.50		160
47 trailers a' 36 t	1692	9.50		66.50		
Dead weight	2694	8.52	22959	77.87	209790	470
Displacement	12427	10.90	135473	64.47	801167	470

Mean draught	5.47 m	KM	11.79 m
Trim	-0.12 m	KG	10.90 m
Draught aft	5.53 m	GM	0.89 m
Draught forw	4.41 m	MM'	0.04 m
		GM'	0.85 m

Calculation of curve of statical stability

Heeling	10°	20°	30°	45°	60°	75°
sin	0.1736	0.3420	0.5000	0.7071	0.8660	0.9659
KN	2.11	4.26	6.27	8.51	9.26	8.91
KG'*sin	1.90	3.74	5.47	7.74	9.47	10.57
GZ	0.21	0.52	0.80	0.77	-0.21	-1.66

Ship Consulting Turku Finland	LOAD CASE 8 FULLY LOADED TO DRAUGHT 5.567 M AT ARRIVAL	WASA KING 20.01 1991/VMJ



YARD NO. 590

VIKING SALLY

Information for the master of the ship

YARD NO. 590

1. General

1.1 Type and purpose of the ship
Car and passenger ferry

1.2 Short international voyage

1.3 Principal dimensions:

Length overall	155,40 m	
Length between pp.	137,40 m	
Breadth moulded	24,20 m	
Draught	5,567 m	
Lightship	~~9419,67 t~~	9733 t
KG from basis	~~11,31 m~~	11.56 m
LCG from AP	~~61,68 m~~	60.76 m

Determination of stability on board

1. General

With the stability blank forms 1 - 3 and 5 - 7 it is possible, to effect a stability calculation at altered loading compared with the loading conditions calculated in advance.

The documents are composed that way, that the stability calculation may be effected schematically.

The forms 1-3 include in tables all necessary basic data for the calculations which have to be done on forms 5 and6

After calculation has been done, it may be controlled by means of form 7 whether the ascertained stability data are sufficient.

2. Instruction for calculation of stability according to these blank forms

2.1. Weight- and moment calculations, Form 5

a) Enter the individual weights (light ship, crew and provision, tank contents, cargo weights) into the column WEIGHT.

b) Ascertainment of the c.g. above base line of the individuel weights (see enclosed documents) and enter in the colums ΘH

c) Multiplication of individual weight with the belonging to centers of gravity. Enter into column M_H.

d) Addition of the individual weights. Enter into column $\sum G = ①$

e) Addition of the vertical moments. Enter into column $\sum M_H = ②$

f) Division of $\frac{②}{①} = ⑤ = KG$. Enter into column 5.

KG = C.g. above baseline of the loaded vessel.

g) Ascertainment of the longitudinal C.G.'s of the individual weights (see enclosed documents) and insert in column ⊖L.

h) Multiplication of individual weight with the belonging to longitudinal c.g. Insert in column ML.

i) Additional of the longitudinal moments. Enter into column $\sum$ ML = ③

k) Division of $\frac{③}{①}$ = ⑥ = ⊖L

Insert in column ⑥

⊖L = longitudinal center of gravity of the loaded vessel.

2.1.1. Explanation for ascertainment of the centers of gravity for loading and consumable tank contents

a) Totally filled consumable tanks:

Weight, vertical- and longitudinal moments directly to be taken from form 1

b) Partly filled consumable tanks:

Weight of tank contents to be ascertained, c.g. above base line to be estimated on the basis of the position of the center of gravity of the completely filled tank. Longitudinal c.g. of the totally filled tank to be taken.

2.1.2. Influence of free surfaces

a) For partly filled consumable tanks the value $i_b \times \gamma$ of form 1 to be overtaken on form 5 in the column $i_b \times \gamma$

b) Addition of the values $i_b \times \gamma$. Insert in the line $\Sigma\, i_b \times \gamma$ = ④

c) Division of $\frac{③}{①}$ = Δ MG = ⑦

Insert in the line.
Δ MG = Stability loss due to free durfaces.

2.2. Stability- and trim calculation/Form 6

2.2.1. Stability calculation

a) Overtake of weight of the loaded vessel from column ① Form 5 in one of the columns ① of Form 6, depending on the spec. density of water.

γ = 1,00 fresh water
γ = 1,025 seawater

b) Overtake KG column ⑤ and Δ MG column ⑦ of form 5 into form 6.

c) In the tabulated curves sheet Form 2 the displacement ① according to Form 6 to be ascertained and the value "T" and "KM" belonging to to be inserted on Form 6.
If a trim calculation shall be carried out, the belonging to values

displacement - Δ (of Form 2)
Weight - Δ_L (of Form 5)
D/MCT Values (of form 2)

will also have to be overtaken.

d) Calculation of MG and MG' according to the scheme stated on Form 6. The valves of MG' should always lie above the limit curve shown in the damage stability diagram.

e) Calculation of the leverarm curve

From Form 3 "Cross-curves(W-values)", the cross curves data available for the medium draught column ⑧ to be overtaken to Form 6 column ⑰. Calculation of the lever-arm values $h\ell$ (column ⑲) according to the scheme on form 6
The lever arm values $h\ell$ (column ⑲) to be reduced by Δ MG to $h\ell'$ (column ㉑) according to the scheme stated on form 6
For partly filled tanks, the lever arm values $h\ell$ (column ⑲) to be reduced according to scheme by Δ MG free surfaces of the consumable tanks.

f) Drawing of the lever arm curve according to e)

MG from column ⑩ and MG' on the hatched MG-line to be drawn in from the base and the final points to be connected with 0° (MG-straight line resp. MG'-straight line). The lever arm values calculated according to e) $h\ell$ to be drawn in on the degree lines of the diagram and to be connected by a curve line. Curve line and MG-straight line must touch each other at small inclinations. The MG'-straight line states the actual available initial stability.

JOS. L. MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.01-171.200

STABILITY CROSS CURVES VALUES

MAIN DIMENSIONS

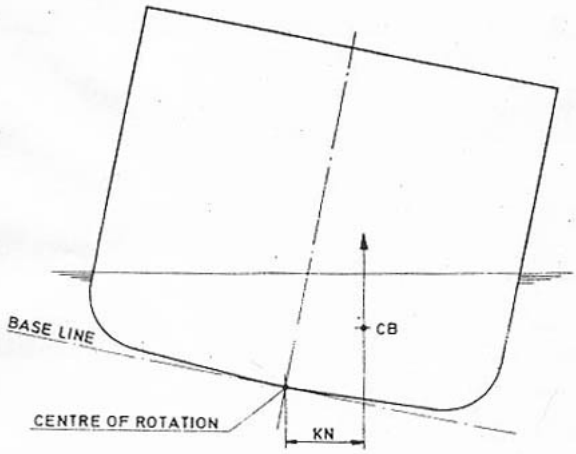
LENGTH OVER ALL	÷ m
LENGTH BETWEEN P.P.	137,40 m
BREADTH MOULDED A-DECK	24,20 m
DEPTH TO A-DECK	7,65 m
DESIGN DRAUGHT	5,55 m

REMARK:

THIS CALCULATION WAS CARRIED OUT WITH
MAIERFORM PROGRAM -PANTOBO-
ON COMPUTER SYSTEM CONTROL DATA CYBER 175
IT HAS BEEN CALCULATED WITH 49 FRAMES,
MEASURED ACCORDING TO CORRECTED LINES PLAN OF NB. Nº 592
DRAWG. Nº 6764.51-161.100
THE HULL HAS BEEN CONSIDERED UP TO C-DECK.

BREMEN 20TH SEPT. 1979

JOS.L.MEYER PAPENBURG EMS	BUILDING NO 590	MAIERFORM 6891.01-171.200 -1-



JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT BK (M)	DISPL. SEA-W. (T)	INCLINATION (DEGREES) 10	20	30	45	60	75
3.50	7256.	2.33	4.73	6.68	8.66	9.66	9.31
3.55	7377.	2.32	4.71	6.67	8.66	9.66	9.30
3.60	7498.	2.30	4.70	6.66	8.65	9.66	9.30
3.65	7619.	2.29	4.68	6.65	8.65	9.65	9.29
3.70	7741.	2.28	4.66	6.63	8.65	9.65	9.28
3.75	7863.	2.26	4.65	6.62	8.65	9.64	9.27
3.80	7985.	2.25	4.63	6.61	8.65	9.64	9.26
3.85	8108.	2.24	4.62	6.60	8.65	9.63	9.25
3.90	8231.	2.23	4.60	6.59	8.65	9.63	9.24
3.95	8355.	2.22	4.59	6.58	8.65	9.62	9.23
4.00	8479.	2.21	4.57	6.56	8.65	9.61	9.22
4.05	8604.	2.20	4.56	6.55	8.65	9.61	9.21
4.10	8729.	2.19	4.54	6.54	8.65	9.60	9.20
4.15	8854.	2.18	4.53	6.53	8.65	9.59	9.19
4.20	8980.	2.17	4.52	6.52	8.65	9.58	9.18
4.25	9106.	2.16	4.50	6.51	8.65	9.57	9.18
4.30	9233.	2.16	4.49	6.50	8.65	9.56	9.17
4.35	9360.	2.15	4.48	6.49	8.65	9.55	9.16
4.40	9487.	2.15	4.47	6.48	8.65	9.54	9.15
4.45	9615.	2.14	4.45	6.47	8.64	9.53	9.13
4.50	9743.	2.14	4.44	6.46	8.64	9.52	9.12
4.55	9872.	2.13	4.43	6.45	8.64	9.51	9.11
4.60	10001.	2.13	4.42	6.44	8.64	9.50	9.10
4.65	10131.	2.13	4.41	6.43	8.63	9.49	9.09
4.70	10262.	2.12	4.40	6.42	8.63	9.47	9.08
4.75	10394.	2.12	4.39	6.41	8.62	9.46	9.07
4.80	10526.	2.12	4.38	6.40	8.62	9.45	9.06
4.85	10659.	2.12	4.37	6.39	8.61	9.44	9.05
4.90	10793.	2.11	4.36	6.38	8.61	9.42	9.04
4.95	10927.	2.11	4.35	6.37	8.60	9.41	9.03
5.00	11063.	2.11	4.34	6.36	8.59	9.40	9.02
5.05	11198.	2.11	4.33	6.35	8.59	9.38	9.00
5.10	11335.	2.11	4.32	6.34	8.58	9.37	8.99
5.15	11472.	2.11	4.31	6.33	8.57	9.35	8.98
5.20	11610.	2.11	4.30	6.32	8.56	9.34	8.97
5.25	11749.	2.11	4.29	6.31	8.55	9.32	8.96
5.30	11888.	2.11	4.28	6.30	8.54	9.31	8.95
5.35	12028.	2.11	4.27	6.29	8.53	9.29	8.93
5.40	12169.	2.11	4.27	6.28	8.52	9.27	8.92
5.45	12311.	2.11	4.26	6.27	8.51	9.26	8.91

JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT (M)	DISPL. (T)	INCLINATION (DEGREES) 10	20	30	45	60	75
5.50	12455.	2.11	4.25	6.26	8.50	9.24	8.90
5.55	12599.	2.11	4.24	6.26	8.49	9.22	8.89
5.60	12744.	2.11	4.23	6.25	8.48	9.21	8.87
5.65	12889.	2.11	4.23	6.24	8.47	9.19	8.86
5.70	13035.	2.11	4.22	6.23	8.46	9.17	8.85
5.75	13182.	2.10	4.21	6.22	8.44	9.16	8.83
5.80	13330.	2.10	4.20	6.21	8.43	9.14	8.82
5.85	13478.	2.10	4.20	6.21	8.42	9.12	8.81
5.90	13627.	2.10	4.19	6.20	8.40	9.10	8.80
5.95	13776.	2.10	4.18	6.19	8.39	9.09	8.78
6.00	13926.	2.10	4.17	6.18	8.38	9.07	8.77
6.05	14077.	2.10	4.16	6.17	8.36	9.05	8.76
6.10	14229.	2.10	4.16	6.16	8.35	9.03	8.74
6.15	14381.	2.10	4.15	6.16	8.33	9.01	8.73
6.20	14534.	2.10	4.14	6.15	8.32	9.00	8.72
6.25	14688.	2.10	4.14	6.14	8.30	8.98	8.70
6.30	14842.	2.10	4.13	6.13	8.29	8.96	8.69
6.35	14997.	2.10	4.13	6.12	8.27	8.94	8.68
6.40	15153.	2.10	4.12	6.11	8.26	8.92	8.66

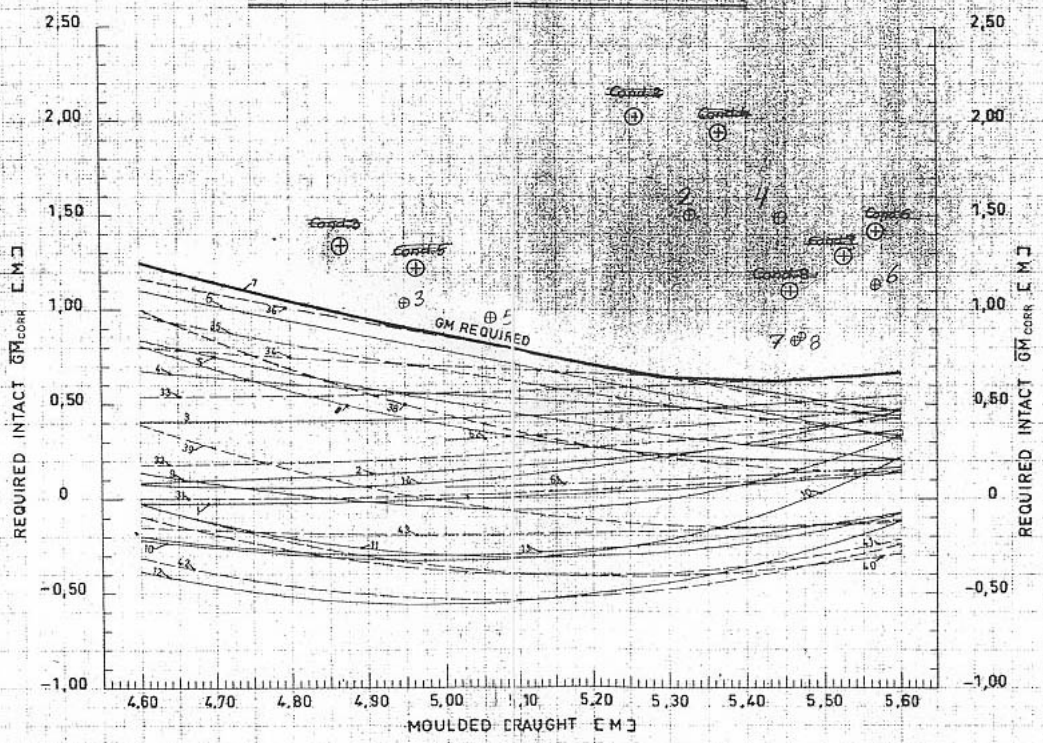
JOS.L.MEYER
PAPENBURG EMS
BUILDING NO.590

-CROSS CURVES OF STABILITY-
(KN-VALUES)
SMOOTH WATER

DRAFT (M)	DISPL. (T)	INCLINATION (DEGREES) 10	20	30	45	60	75
5.50	12455.	2.11	4.25	6.26	8.50	9.24	8.90
5.55	12599.	2.11	4.24	6.26	8.49	9.22	8.89
5.60	12744.	2.11	4.23	6.25	8.48	9.21	8.87
5.65	12889.	2.11	4.23	6.24	8.47	9.19	8.86
5.70	13035.	2.11	4.22	6.23	8.46	9.17	8.85
5.75	13182.	2.10	4.21	6.22	8.44	9.16	8.83
5.80	13330.	2.10	4.20	6.21	8.43	9.14	8.82
5.85	13478.	2.10	4.20	6.21	8.42	9.12	8.81
5.90	13627.	2.10	4.19	6.20	8.40	9.10	8.80
5.95	13776.	2.10	4.18	6.19	8.39	9.09	8.78
6.00	13926.	2.10	4.17	6.18	8.38	9.07	8.77
6.05	14077.	2.10	4.16	6.17	8.36	9.05	8.76
6.10	14229.	2.10	4.16	6.16	8.35	9.03	8.74
6.15	14381.	2.10	4.15	6.16	8.33	9.01	8.73
6.20	14534.	2.10	4.14	6.15	8.32	9.00	8.72
6.25	14688.	2.10	4.14	6.14	8.30	8.98	8.70
6.30	14842.	2.10	4.13	6.13	8.29	8.96	8.69
6.35	14997.	2.10	4.13	6.12	8.27	8.94	8.68
6.40	15153.	2.10	4.12	6.11	8.26	8.92	8.66

JOS. L. MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.01-115.600

DAMAGE STABILITY DIAGRAM



NOTES:
THE VESSEL'S CALCULATED AVAILABLE GM_{CORR} MUST ALWAYS BE ABOVE OF THE CURVE OF "GM-REQUIRED"
⊕ = GM VALUES AVAILABLE FOR INTACT VESSEL OF REPORT.

JOS. L. MEYER PAPENBURG EMS	BUILDING Nº 590	MAIERFORM 6891.06-171.120

HYDROSTATIC PARTICULARS

MAIN DIMENSIONS:

LENGTH OVER ALL	÷ m
LENGTH BETW. PP.	137.40 m
BREADTH MLD. A-DECK	24,20 m
DEPTH TO A-DECK	7,65 m
DRAUGHT	5,55 m

REMARK:

THIS CALCULATION WAS CARRIED OUT WITH MAIERFORM PROGRAM – KUBLENG – ON COMPUTER SYSTEM CONTROL DATA CYBER 175 IT HAS BEEN CALCULATED WITH 46 FRAMES, MEASURED ACCORDING TO CORRECTED LINES PLAN OF NB. Nº 592 DRAWG. Nº 6764.51-161.100

THE CORRECTED BOW THRUSTERS AND BULBOUS BOW HAVE BEEN CONSIDERED IN THE CALCULATION.

BREMEN 26TH JUNE 1980

HYDROSTATIC PARTICULARS

SPEC.GRAVITY OF SEA W. = 1.025 T/CBM
COEFF.FOR DISPL.OF SHELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED OR LPP/2

DRAFT BK	MOULDED VOLUME	DISPLACEM. FRESH-W.	DISPLACEM. SEA-W.	LCB	VCB	KM(T	KM(L)	WL-AREA	LCF	IMI	LMI	MCT BP	D/MCT	TPCI	AL-PHA (BP)	DEL-TA (BP)
METRES	M**3	METRIC-T.	METRIC-T.	METRES	METR.	METRE	METRES	M**2	METRES	M**4	M**4	MT/M	-	T/CM	-	-
4.30	8999.63	9062.63	9289.19	-3.19	2.30	12.1	298.81	2461.35	-4.73	88197.7	2668554.	19421.8	.478	25.41	.772	.656
4.35	9122.99	9186.85	9416.52	-3.21	2.32	12.0	297.31	2470.60	-4.84	88730.2	2691188.	19586.5	.481	25.50	.774	.657
4.40	9246.85	9311.58	9544.37	-3.23	2.35	12.0	295.90	2480.08	-4.96	89274.8	2714409.	19755.5	.483	25.60	.777	.658
4.45	9371.16	9436.76	9672.68	-3.25	2.38	11.9	294.60	2489.81	-5.08	89832.4	2738436.	19930.4	.485	25.70	.779	.659
4.50	9495.92	9562.39	9801.45	-3.28	2.41	11.9	293.41	2499.79	-5.20	90403.3	2763347.	20111.7	.487	25.80	.782	.660
4.55	9621.15	9688.50	9930.71	-3.30	2.43	11.8	292.34	2510.06	-5.32	90988.6	2789265.	20300.3	.489	25.91	.785	.661
4.60	9746.88	9815.11	10060.49	-3.33	2.46	11.8	291.41	2520.65	-5.45	91589.1	2816362.	20497.5	.491	26.02	.787	.662
4.65	9873.12	9942.23	10190.79	-3.36	2.49	11.8	290.63	2531.58	-5.59	92205.9	2844811.	20704.6	.492	26.13	.790	.663
4.70	9999.91	10069.91	10321.65	-3.39	2.52	11.8	290.00	2542.90	-5.72	92840.2	2874778.	20922.7	.493	26.25	.793	.664
4.75	10127.27	10198.16	10453.11	-3.42	2.55	11.8	289.53	2554.62	-5.86	93493.3	2906415.	21152.9	.494	26.37	.796	.665
4.80	10255.24	10327.02	10585.20	-3.45	2.57	11.5	289.24	2566.79	-6.00	94166.8	2939851.	21396.3	.495	26.49	.799	.665
4.85	10383.85	10456.54	10717.95	-3.48	2.60	11.4	289.12	2579.41	-6.14	94862.4	2975179.	21653.4	.495	26.62	.803	.666
4.90	10513.14	10586.73	10851.40	-3.52	2.63	11.2	289.18	2592.53	-6.29	95582.8	3012559.	21925.5	.495	26.76	.806	.667
4.95	10643.15	10717.65	10985.59	-3.55	2.66	11.1	289.39	2606.09	-6.44	96327.0	3051757.	22210.7	.495	26.90	.810	.668
5.00	10773.88	10849.29	11120.53	-3.59	2.69	11.0	289.71	2620.00	-6.58	97095.9	3092329.	22506.0	.494	27.04	.814	.669

SPEC.GRAVITY OF SEA-W. = 1.025 T/CBM
COEFF.FOR DISPL.OF SHELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED FOR LPP/2

DRAFT BK METRES	MOULDED VOLUME M**3	DISPLACEM. FRESH-W. METRIC-T.	DISPLACEM. SEA-W. METRIC-T.	LCB METRES	VCB METR.	KM(T) METRES	KM(L) METRES	WL-AREA M**2	LCF METRES	TMI M**4	LMI M**4	MCT BP MT/M	D/MCT -	TPCI T/CM	AL-PHA (BP) -	DEL-TA (BP) -
5.00	10773.88	10849.29	11120.53	-3.59	2.69	11.70	289.71	2620.00	-6.58	97095.9	3092329.	22506.0	.494	27.04	.814	.669
5.05	10905.32	10981.66	11256.20	-3.63	2.71	11.69	290.11	2634.29	-6.73	97896.8	3134192.	22810.7	.493	27.19	.818	.670
5.10	11037.49	11114.75	11392.62	-3.66	2.74	11.69	290.64	2649.05	-6.89	98739.3	3177634.	23126.9	.493	27.34	.822	.671
5.15	11170.43	11248.62	11529.83	-3.70	2.77	11.69	291.30	2664.35	-7.05	99629.3	3223043.	23457.4	.492	27.50	.826	.672
5.20	11304.15	11383.28	11667.87	-3.75	2.80	11.69	292.10	2680.17	-7.22	100566.2	3270288.	23801.2	.490	27.66	.830	.673
5.25	11438.69	11518.76	11806.73	-3.79	2.83	11.70	292.98	2696.38	-7.40	101548.4	3318932.	24155.3	.489	27.83	.835	.674
5.30	11574.04	11655.06	11946.43	-3.83	2.86	11.72	293.91	2712.90	-7.57	102573.9	3368652.	24517.1	.487	28.00	.839	.675
5.35	11710.21	11792.18	12086.99	-3.88	2.88	11.73	294.86	2729.63	-7.75	103639.6	3419080.	24884.1	.486	28.17	.844	.677
5.40	11847.21	11930.14	12228.40	-3.92	2.91	11.75	295.79	2746.45	-7.92	104741.6	3469822.	25253.4	.484	28.35	.848	.678
5.45	11985.04	12068.94	12370.66	-3.97	2.94	11.78	296.68	2763.24	-8.09	105874.7	3520473.	25622.1	.483	28.52	.853	.679
5.50	12123.70	12208.56	12513.78	-4.02	2.97	11.80	297.49	2779.87	-8.25	107033.4	3570630.	25987.1	.482	28.69	.857	.680
5.55	12263.17	12349.01	12657.73	-4.07	3.00	11.82	298.19	2796.24	-8.40	108211.6	3619913.	26345.8	.480	28.86	.862	.681
5.60	12403.44	12490.27	12802.52	-4.12	3.03	11.85	298.77	2812.27	-8.53	109404.2	3668155.	26696.9	.480	29.03	.866	.682
5.65	12544.52	12632.33	12948.14	-4.17	3.06	11.88	299.19	2827.82	-8.65	110604.3	3714850.	27036.8	.479	29.19	.870	.683
5.70	12686.37	12775.17	13094.55	-4.22	3.09	11.90	299.42	2842.72	-8.75	111801.4	3759327.	27360.5	.479	29.34	.874	.685

SPEC.GRAVITY OF SEA-W. = 1.025 T/CBM
COEFF.FOR DISPL.OF SHELL PL.= 1.007
TRIM = 0.000 M ON EVEN KEEL
KEEL-THICKNESS = 0.000 MM
DRAUGHTS INDICATED FOR LPP/2

DRAFT BK METRES	MOULDED VOLUME M**3	DISPLACEM. FRESH-W. METRIC-T.	DISPLACEM. SEA-W. METRIC-T.	LCB METRES	VCB METR.	KM(T) METRES	KM(L) METRES	WL-AREA M**2	LCF METRES	TMI M**4	LMI M**4	MCT BP MT/M	D/MCT -	TPCI T/CM	AL-PHA (BP) -	DEL-TA (BP) -
5.70	12686.37	12775.17	13094.55	-4.22	3.09	11.90	299.42	2842.72	-8.75	111801.4	3759327.	27360.5	.479	29.34	.874	.685
5.75	12828.95	12918.76	13241.73	-4.27	3.12	11.92	299.44	2856.98	-8.83	112986.1	3801461.	27667.1	.479	29.49	.878	.686
5.80	12972.23	13063.04	13389.61	-4.32	3.15	11.95	299.29	2870.71	-8.90	114154.5	3841657.	27959.7	.479	29.63	.882	.687
5.85	13116.18	13208.00	13538.20	-4.37	3.18	11.97	299.03	2884.05	-8.96	115308.3	3880521.	28242.5	.479	29.77	.885	.688
5.90	13260.80	13353.62	13687.46	-4.42	3.21	11.99	298.69	2897.06	-9.00	116449.3	3918322.	28517.6	.480	29.90	.889	.689
5.95	13406.06	13499.90	13837.40	-4.47	3.23	12.00	298.26	2909.74	-9.04	117576.7	3955110.	28785.4	.481	30.03	.892	.691
6.00	13551.95	13646.81	13987.98	-4.52	3.26	12.02	297.76	2922.15	-9.06	118691.9	3991054.	29047.0	.482	30.16	.895	.692
6.05	13698.46	13794.35	14139.21	-4.57	3.29	12.04	297.22	2934.34	-9.08	119796.9	4026322.	29303.7	.483	30.29	.898	.693
6.10	13845.59	13942.51	14291.07	-4.62	3.32	12.05	296.64	2946.34	-9.09	120893.8	4061078.	29556.6	.484	30.41	.901	.694
6.15	13993.31	14091.27	14443.55	-4.67	3.35	12.07	296.03	2958.19	-9.09	121985.5	4095480.	29807.0	.485	30.53	.904	.696
6.20	14141.63	14240.63	14596.64	-4.72	3.38	12.09	295.40	2969.94	-9.09	123074.5	4129674.	30055.9	.486	30.65	.907	.697
6.25	14290.55	14390.58	14750.34	-4.76	3.41	12.10	294.78	2981.62	-9.08	124163.4	4163798.	30304.2	.487	30.78	.910	.698
6.30	14440.04	14541.12	14904.65	-4.81	3.44	12.12	294.15	2993.21	-9.07	125250.7	4197841.	30552.0	.488	30.90	.913	.699
6.35	14590.12	14692.25	15059.56	-4.85	3.47	12.13	293.55	3004.85	-9.05	126348.4	4232255.	30802.4	.489	31.02	.916	.700
6.40	14740.80	14843.98	15215.08	-4.89	3.50	12.15	293.00	3016.65	-9.03	127468.1	4267519.	31059.1	.490	31.14	.919	.702

SHIP CONSULTING

REPORT ON INCLINING EXPERIMENT

Ship : M S W A S A K I N G

Owner: SALLY LINE AB MARIEHAMN

Main dimensions:

LENGTH OVER ALL	155.40 m
LENGTH BETWEEN PERP.	137.40 m
BREADTH MOULDED	24.20 m
DEPTH TO A DECK	7.65 m
DEPTH TO C DECK	13.40 m

Date: 11.01 1991 betw. 16.00-19.00 o'clock

Place: MASA YARDS TURKU

- SPEC. GRAVITY OF SEAWATER 1.004 t/M^3
- TEMPERATURE abt.-6 centigrade
- TEMPERATURE OF WATER abt. 0 centigrade
- WIND no wind

Present:

MR ALF ANDERSSON	MS WASA KING
MR CARL GUNNAR EKSTRAND	MS WASA KING
MR BO HENRIK STOLPE	MS WASA KING
MR TIM R. E. AUTERO	Finnish Board of Navication
MR VELI-MATTI JUNNILA	Ship Consulting

SHIP CONSULTING

READED DRAUGHTS

	DRAUGHT MARK		DISTANCE TO SEA-LEVEL		DRAUGHT	MEAN
d_{AP}				=		5.07
d_{ASB}				=		
d_{MP}	5.567	-	0.61	=	4.957	5.082
d_{MSB}	7.667	-	2.46	=	5.207	
d_{FP}	5.20	-	0.08	=	5.12	5.12
d_{FSB}	5.20	-	0.08	=	5.12	

TRIM $d_F - d_A = 5.12 - 5.07 = +0.05$ m

HOGGING CORRECTIONS

$Fo = d_M - \frac{1}{2}(d_F + d_A) =$
$= 5.082 - \frac{1}{2}(5.12 + 5.07) = 0.013$ m

CORRECTED MEAN DRAUGHT $= d_M + Cb \times Fo$
$= 5.082 + 0.667 \times 0.013 = 5.091$ m

Cb = block coefficient at draught of 5.10 m

Displacement at draught 5.091 m is 11132 t and LCG -3.657 m

TANKS TO BE SUBTRACTED

TK8	DB-TANK 8	53,55	86,60	0,00	0,55	236
TK41	DO DAY TANK	11,56	31,03	0,00	2,85	4
TK 45	OVERFLOW TANK 45	1,19	35,78	0,00	0,10	8
TK20	DB-TANK 20	3,49	59,87	0,00	0,25	27
TK10	H-TANK 10	42,75	74,20	0,00	1,30	150
TK11	H- TANK 11	27,55	74,20	0,00	1,28	150
TK38	SETTLING TANK 38	21,38	32,20	0,00	2,30	10
TK39	SETTLING TANK 39	13,59	33,84	0,00	1,85	7
TK36	HFO DAY TANK 36	17,29	36,23	0,00	2,20	8
TK37	HFO DAY TANK 37	19,79	36,62	0,00	2,81	6
TK40	OVERFLOW TANK	3,04	34,38	0,00	0,11	74
TK4A	TANK 4A	70,00	114,25	0,00	2,72	48
TK4B	TANK 4B	65,00	114,25	0,00	2,65	48
TK5	TANK 5	135,00	113,65	0,00	2,70	138
TK44	SLUDGE OIL	5,50	32,20	0,00	0,11	123
TK33	BILGE WATER	21,00	35,83	0,00	0,53	50
TK42	DIRTY OIL	6,20	33,85	0,00	0,35	12
TK17	FRESH WATER CIRCUL.	13,70	58,30	0,00	0,52	14
TK22	COOLING WATER	1,00	55,40	0,00	0,35	3
TK29	COOLING WATER	7,00	59,82	0,00	0,32	11
TK6	DB-TANK 6	87,95	104,84	0,00	0,64	0
TK2	TRIM TANK 2	303,06	121,40	0,00	4,69	0
TK1	FORE PEAK TANK 1	175,98	133,92	0,00	4,45	0
TK24	THERMAL OIL TANK 24	5,13	45,78	0,00	0,25	13
TK25	LUBR OIL TANK 25	11,88	45,40	0,00	0,45	3
TK26	LUBR OIL TANK 26	9,00	45,40	0,00	0,40	3
TK27	LUBR OIL TANK 27	9,90	45,40	0,00	0,42	3
TK28	LUBR OIL TANK 28	9,72	45,40	0,00	0,41	3
TK30	LUBR OIL SUPPLY TANK 30	5,85	50,15	0,00	0,32	7
TK32	LUBR OIL TANK 32	7,74	47,40	0,00	0,55	3
TK50	KAMEWA TANK 50	0,88	24,60	0,00	0,25	2
TK51	KAMEWA TANK 51	1,71	23,40	0,00	0,50	0
TK52	KAMEWA TANK 52	1,71	23,40	0,00	0,50	0
TK55A	STERN TUBE OIL	0,99	15,06	0,00	0,20	5
TK55	STERN TUBE TANK	0,59	15,10	0,00	0,30	1
	GEAR OIL STORAGE	1,35	39,40	0,00	3,50	0
TK13	HEELING TANK SB	28,60	78,10	0,00	0,52	193
TK14	HEELING TANK P	129,90	77,60	0,00	1,91	73
	TOTAL OF TANKS	1331,52	98,42	0,00	2,73	1436

SHIP CONSULTING

SUBTRACTED WEIGHT

CODE NUM.	WEIGHT T	NAME	FRAME NO	FROM DECK	FROM CL	DECK NO
	0.3	FORK LIFT PLATFORMS	5	0.2	0	2
	1.3	FORK LIFT	10	0.7	0	2
	0.5	VENEER	59	0.6	0	2
	16.0	WASTE CONTAINERS	53	0.8	0	2
	1.5	EMPTY CONTAINER	122	2.4	0	2
	0.1	CLEANING EQUIPMENTS	105	0.2	0	0
	0.1	CLEANING EQUIP.	100	0.2	0	1
	0.8	INSULATION MATERIALS	45	0.5	0	8
	1.5	FUEL FOR EMER. GENER.	76	0.9	0	8
	1.9	STEEL PLATES	57	0.6	0	8
	1.75	CARPETS	8	1.0	0	1
	1.0	GLASS	8	0.3	0	1
	0.5	MATERIALS	7	0.2	0	1
	2.8	MATERIALS	13	1.2	0	1
	1.0	FORK LIFT	25	0.5	0	1
	0.25	TOOLS	26	0.2	0	1
	1.5	PROVISIONS	35	0.8	0	1
	3.5	PROVISIONS	37	0.8	0	1
	0.05	CLEANING EQUIP.	118	0.2	0	9
	0.1	COPY MACHINE	110	0.7	0	7
	0.15	LINEN STORE	117	1.0	0	7
	0.1	OFFICERS DAY ROOM	110	0.8	0	7
	0.4	MISCELLANEOUS	95	0.5	0	7
	0.05	HOSPITAL	90	0.6	0	7
	1.3	MATERIALS	81	0.3	0	7
	2.0	MISCELLANEOUS	80	0.7	0	7
	0.15	MATERIALS	54	0.3	0	7
	0.3	MESS ROOMS	25	0.5	0	7
	0.15	SPORT ROOM	10	0.8	0	8
	0.4	MATERIALS	73	0.3	0	7
	0.2	LINEN STORE	28	0.7	0	6
	0.4	GALLEY	47	1	0	6
	0.24	CARPETS	81	0.4	0	6
	2.9	CARPETS	80	0.5	0	5
	0.15	WELDING MACHINE	40	0.5	0	5
	1.3	CARPETS	81	0.6	0	4
	0.6	INSULATION MATERIALS	82	0.8	0	4
	0.42	CARPETS	82	0.6	0	4
	0.1	STORES	42	0.6	0	4
	0.6	WASTE	75	0.3	0	4
	0.1	REFRIGERATOR	122	0.6	0	4
	5.6	PROPELLER SPARE PLADES	15	0.4	0	2
	0.2	U-PROFILES	25	0.2	0	2
	0.8	I-PROFILES	25	0.2	0	2
	0.3	WASTE	24	0.2	0	2
	0.9	WASTE	70	0.4	0	2
	1.1	ICE AND SNOW	80	0.0	0	7
	0.9	ICE AND SNOW	85	0.0	0	8
	0.1	ICE AND SNOW	120	0.0	0	10

SHIP CONSULTING

SUBTRACTED WEIGHT

CODE NUM.	WEIGHT T	NAME	FRAME NO	FROM DECK	FROM CL	DECK NO
	3.2	MATERIALS IN ENG ROOM	60	0.2	0	1
	1.65	22 PERSONS IN SHIP	80	1.1	0	5
	3.75	CREW'S PERS. GOODS	70	1.0	0	7
	66.96	TOTAL OF SUBTRACTED WEIGHT	40.12		12.22	

SHIP CONSULTING

PENDEL NUMBER 1 LENGTH OF PENDEL 4455 MM

NAME OF OBSERVERS: TOMI JUNNILA

LOCATION OF PENDEL: ON CARDECK AFTER

CASE NO	NUMB. OF OBS.	1	2	3	4	5	6	7	8	9	10	SUM	MEAN VALUE	LIST
I	1	2330											2330	0.00
II	1	2252											2252	1.00
III	1	2226											2226	1.34
IV	1	2324											2324	0.08
V	1	2388											2388	0.75
VI	1	2454											2454	1.59
VII	1	2511											2511	2.33
VIII	1	2415											2415	1.09
IX	1	2343											2343	0.17

SHIP CONSULTING

PENDEL NUMBER 2 LENGTH OF PENDEL 4470 MM

NAME OF OBSERVERS: BO HENRIK STOLPE

LOCATION OF PENDEL: ON CARDECK AFTER

CASE NO	NUMB. OF OBS.	1	2	3	4	5	6	7	8	9	10	SUM	MEAN VALUE	LIST
I	1	728											728	0.00
II	1	650											650	1.00
III	1	622											622	1.36
IV	1	723											723	0.06
V	1	788											788	0.77
VI	1	853											853	1.60
VII	1	910											910	2.33
VIII	1	813											813	1.09
IX	1	742											742	0.18

SHIP CONSULTING

HEELING TANK SOUNDINGS AND VOLUMES

CASE NO	LIST	PORT SIDE SOUN cm	CORR cm	VOL m^3	WEIG t	TCG m	SB-SIDE SOUN cm	COR cm	VOL. m^3	WEIG. t	TCG m
I	.6°SB	450	452	129.7	129.9	-8.69	121	119	28.5	28.6	7.57
II	.4°P	485	483	141.8	142.3	-8.74	68	70	16.4	16.5	7.34
III	.7°P	491	494	146.1	146.8	-8.75	47	50	11.8	11.8	7.20
IV	.5°SB	453	455	130.9	131.4	-8.70	116	114	27.2	27.3	7.54
V	1.3°SB	422	427	120.0	120.5	-8.67	161	155	38.1	38.3	7.69
VI	2.2°SB	391	399	109.3	109.7	-8.59	206	199	48.6	48.8	7.95
VII	2.8°SB	365	375	100.2	100.6	-8.54	246	235	57.9	58.1	8.13
VIII	1.7°SB	411	417	116.2	116.7	-8.63	179	171	41.7	41.9	7.79
IX	.8°SB	446	449	128.5	129.0	-8.72	126	123	29.6	29.6	7.59

SHIP CONSULTING

D U R I N G E X P E R I M E N T

MEAN MOULDED DRAUGHT	5.091	m
TRIM	+0.05	m
SEAWATER DENSITY	1.004	ton/m³
DISPLACEMENT	11132	t
HEIGHT OF METACENTER ABOVE BL	11.69	m

CASE NO	INCLINING WEIGHT (TON)	INCLINING MOMENT (TONM)	TOTAL MOM (TONM)	INCLINING ANGLE DIFFER. (DEG)	TOTAL (DEG)	METACENTRIC HEIGHT GMI (M)
II	12.14	196.30	196.30	1.00	1.00	1.011
III	4.47	71.55	267.86	0.35	1.35	1.021
IV	15.36	-247.24	20.62	-1.28	0.07	0.994
V	10.94	-178.38	-157.76	-0.83	-0.76	1.068
VI	10.64	-174.96	-332.72	-0.84	-1.595	1.073
VII	9.24	-153.38	-486.10	-0.73	-2.33	1.073
VIII	16.16	267.44	-218.66	1.24	-1.09	1.032
IX	12.24	200.45	-18.21	0.92	0.17	1.127

METACENTRIC HEIGHT DURING EXPERIMENT	GM = 1.050 M
FREE SURFACE CORRECTION	GMC = 0.129 M
CORRECTED METACENTRIC HEIGHT	GMO = 1.179 M
HEIGHT OF METACENTER ABOVE BL	KM =11.690 M
CENTRE OF GRAVITY ABOVE BL	KG =10.511 M

L I G H T S H I P

	WEIGHT (TON)	CENTRE OF GRAVITY FROM LPP/2 (M)	CL (M)	BL (M)
DURING EXPERIMENT	11132	-3.553	0.00	10.511
WEIGHTS TO BE ADDED	0	-0.000	0.00	0.00
WEIGHTS TO BE SUBTRACTED	67	-28.58	0.00	12.22
TANKS TO BE SUBTRACTED	1332	+29.72	0.00	2.73
LIGHT SHIP	9733	-7.934	0.00	11.564
INCLINING TEST 21.6 1980	9420	-7.02	0.00	11.31
DIFFERENCE	313	-0.914	0	+0.254

Summary of BV inspections

SURVEYS CARRIED OUT BY BUREAU VERITAS ON M/S "ESTONIA"

Place	Intervention dates	Class surveys	Statutory surveys	Observations
Papenburg	1980 07 01		ISLL	Issuance of Class and Load Line certificates to
				Messrs Meyerwerft Newbuilding S 590 VIKING SALLY
Hamburg	1981 02 12	OS AUT		Issuance of definitive AUT certificate
Stockholm	1981 04 13	CSH CSM		
Turku	1981 05 04 - 08	AS DOK CSH CSM	ASLL	
Stockholm	1981 4 23	CSM		
Turku	1981 9 3	OSAB		
Turku	1981 09 21 - 22	CSM ASAUT		
Turku	1981 10 20	OSH		Survey after minor collision
Turku	1982 5 13	ASM CSM		
Turku	1982 5 17	CSM		
Stockholm	1982 05 24 - 25	ASH CSH CSM		
Stockholm	1982 05 25 - 06 07	CSH AB	ASLL	
Turku	1982 11 8	ASAUT		
Turku	1982 12 9	OSAB		
Stockholm	1983 01 07	CSM		
Stockholm	1983 03 04	CSH		
Turku	1983 04 25 - 29	AS DOK CSH CSM	ASLL	CSH item Bow Door credited
Stockholm	1983 05 02 - 16	OSM		
Turku	1983 05 25	OSM CSM		
Stockholm	1983 10 24 - 1984 01 02	ASAUT		
Turku	1984 04 02	CSM		
Stockholm	1984 05 07	CSM		
Stockholm	1984 05 18	AS UWS CSH CSM ASAB	ASLL	
Mariehamn	1984 05 25	OSH		Survey after grounding ,voyage to Helsinki for repairs
Helsinki	1984 05 25 - 26	OSH		Temporary repairs of grounding damages
Turku	1984 11 23	OSM		Extension of tailshaft survey periodicity
Turku	1984 12 10	ASAUT		

Bureau Veritas
Marine Division

15.06.1995

Place	Intervention dates	Class surveys	Statutory surveys	Observations
Stockholm	1984 12 17	OSH		Diver survey,postponement of grounding repairs
Turku	1985 02 15	OSM		
Stockholm	1985 03 25	OSH		Diver survey, postponement of grounding repairs
Helsinki	1985 04 22 - 05 06	DOK CSH TS CSM		Permanent repairs, stem modification
Stockholm	1985 05 24 - 07 15	AS CSH CSM ASAB ASAUT	PSLL	Renewal of class term and load line certificate
Turku	1986 04 10	CSM		
Stockholm	1986 04 25	CSH CSM		
Stockholm	1986 05 27		ASLL	
Stockholm	1986 08 18	CSM		
Stockholm	1986 09 01	CSM		
Stockholm	1986 09 24	AS UWS		
Stockholm	1986 09 24 - 12 08	ASAUT		
Turku	1987 01 13 - 21	DOK CSH		Repairs of cracks in rudder plating
Turku	1987 04 06 - 08	OSH OSM OSAB CSH		Bottom of bow door repaired/strengthened (ice
				damage)
Turku	1987 04 23 - 05 08	OSM		Repairs to main engine n°1
Stockholm	1987 05 10	CSM		
Stockholm	1987 07 23	AS ASAUT ASAB	ASLL	
Stockholm	1988 02 08	CSH ASAB		
Turku	1988 03 14	CSM		
Turku	1988 03 28	CSM		
Stockholm	1988 05 10	AS CSH CSM	ASLL	CSH item Bow Door credited
Stockholm	1988 05 25	CSH CSM		
Turku	1988 09 15	DOK CSM		
Turku	1988 09 26	ASAUT		
Stockholm	1988 11 06 - 12 09	DOK TS		Surveys after grounding and periodical surveys
Turku	1989 05 02 - 03	DOK ASAUT CSH CSM		
Turku	1989 05 29 - 30	AS CSH CSM	ASLL	
Turku	1990 04 30 - 05 07	DOK CSH CSM		Change of name to "SILJA STAR"

Place	Intervention dates	Class surveys	Statutory surveys	Observations
Stockholm	1990 06 14 - 07 03	AS CSH CSM ASAB AUT	PSLL	Renewal of class term and load line certificate
Turku	1990 11 21 - 12 14	DOK		
Turku	1991 02 04	OS		Change of name to "WASA KING"
Holmsund	1991 04 13 - 15	AS CSH CSM	ASLL	
Holmsund	1991 09 23	ASAUT CSM		
Holmsund	1992 06 17 - 18	AS ASAUT CSH CSM	ASLL	
Holmsund	1992 11 28	ASAB CSM		
Abo	1993 01 04 - 14	DOK TS CSH	PSLL IOPP PSCONS	Change of name to "ESTONIA" and of Owners/Flag
			PSEQ PSRAD	Issuance of: interim LL certif.; interim cargoship
				safety certificates.
Tallinn	1993 01 16 - 28		PSPS	Issuance of interim PSSC certificate (passenger ship)
Stockholm	1993 03 15	CSH CSM	OSIOPP	Issuance of interim IOPP certif.(definitive certificate
				issued on 07/04/1993)
Abo	1993 03 22 - 04 03	OSM		Change of outboard tailshaft sealings
Stockholm	1993 05 22 - 24	CSH CSM		Postponement of CSH/CSM items
Stockholm	1993 06 14		OSLL OSPS	Renewal of interim LL & PSSC certificates
Stockholm	1993 08 12 - 13	AS ASAUT	ASIOPP	
Stockholm	1993 10 18	CSH CSM		CSH item Bow Door credited
Stockholm	1993 11 11		OSLL OSPS	Renewal of interim LL & PSSC certificates
Stockholm	1993 11 16	ASAB		
Nadendal	1994 01 10 - 14	DOK		Installation of Stabiliser units
Stockholm	1994 01 27		PSPS	Periodical survey and renewal of interim PSSC certif.
Stockholm	1994 03 16	CSH CSM		
Stockholm	1994 04 11		OSLL	Renewal of interim LL certificate
Stockholm	1994 05 09 - 11	CSH CSM		
			Issuance of definitive PSSC (clerical mishandling) 23 june 1994	
Stockholm	1994 06 26		OSPS	Renewal of interim PSSC certificate
Stockholm	1994 08 23 - 25	AS ASAUT ASAB CSM	ASLL ASIOPP	
Stockholm	1994 09 09		OSLL	Renewal of interim LL certificate

SURVEY CODES USED IN THE TABLE				
	CLASS SURVEY CODES			STATUTORY SURVEY CODES
AS	Annual survey (Hull & Machinery)		ISLL	Initial survey Load Line
ASAB	Annual survey Boilers		ASLL	Annual survey Load Line
ASAUT	Annual survey Automated installation		PSLL	Periodical survey Load Line
CSH	Continuous survey Hull		ASIOPP	Annual survey Marpol
CSM	Continuous survey Machinery		IOPP	Periodical survey Marpol
DOK	Periodical bottom survey in drydock		PSPS	Periodical survey Passenger ship
UWS	Underwater survey		PSCONS	Periodical survey Saf. construction
TS	Tailshaft survey		PSEQ	Periodical survey Saf. equipment
OSH	Occasional survey Hull		PSRAD	Periodical survey Saf. radio
OSM	Occasional survey Machinery		OSLL	Occasional survey Load Line
OSAB	Occasional survey Boilers		OSIOPP	Occasional survey Marpol
OSAUT	Occasional survey AUT installation		OSPS	Occasional survey Passenger ship

Wasa king certificates issued by FBN

01/02/95 16:14 MERENKULKUOS. 358 0 1808500 → 05593584

Enclosure 3.4.88

KATSASTUS-/TARKASTUSPÖYTÄKIRJA

Sini ja ent. nimi: WASA KING / SINJA RTAE

Rek.paikka ja -nro: VAASA 283

Kotipaikka: VAASA

Tunnuskirjaimet: OKLW

Aluksen laji: AURILAUTTA

Rakentamisvuosi: 1980 sisä: TEÄS paikka: PARAINEN Pituus: 15,02 m Leveys: 4,22 m

Alus on avoin ☐ kannellinen ☒ Br.vetoisuus: 15598 Päälkoneiden lukumäärä: 4 Kokonaisteho: 1760 kW

Milloin viimeksi telskoitu: 11/90 Missä viimeksi telskoitu: NAANTALI

Laivanisäntä: WASALINE OY

Isännän postiosoite: GÄMNVARUSTAJANT. 12 65170 VAASA

HUOMAUTUKSIA: SIKU:TA TUTKA RAY TYKON 1650 12 KW PÄÄTIETTÄ SINK:K SIKLAUTA/DECCA PÄÄSEM SÄÄNNÖLLÄTTÄ G.P.S ASENNETTU APTEEKKI TARKASTETTU 29.1.92

Kysymys oli:	Perus-	Määräaikainen	Väli-	Vuosi-	Ylimääräinen katsastus
Merikelpoisuudenkatsastus		X			
Koneistonkatsastus					
Rungonkatsastus					
Radiolaitteidenkatsastus					
Marpol-katsastus					

Katsastus/Tarkastus on toimitettu 29. 5 / 19 92

01/02/95 16:14 MERENKULKUOS. 358 0 1008500 → 05593584

Enclosure 3.4.88

KATSASTUS-/TARKASTUSPÖYTÄKIRJA

Nimi ja ent. nimi: VAASA KING / SINJA STAR — Rek.paikka ja -nro: VAASA 283 — Kotipaikka: VAASA — Tunnuskirjaimet: OIKW — Aluksen laji: AURIALUSTA

Rakennusvuosi: 1980 — aloa: TEräs — paikka: PAJA-BUZO — Pituus: 15,02 m — Leveys: 24,23 m

Alus on avoin ☐ kannellinen ☒ — Br.vetoisuus: 15598 — Pääkoneiden lukumäärä: 4 — Kokonaisteho: 1760 kW

Milloin viimeksi telakoitu: 11/90 — Missä viimeksi telakoitu: NAANTALI

Laivanisäntä: WASALINE Oy — Isännän postiosoite: LAIVANVARUSTAJANK. 12 65170 VAASA

HUOMAUTUKSIA: SINU 13 TUTKA RAYTHEON 1680 12 X 2 POISTETTIN SINA:K SIRIUSTE/DECCA POISETTIN SASWAN LAITE GPS ASENNETTIN KOTEKYK TÄYDENNETTIN 27.1.92

Kyseessä oli:	Perus-	Määräaikainen	Väli-	Vuosi-	Ylimääräinen katsastus
Merikelpoisuudenkatsastus		X			
Koneistonkatsastus					
Rungonkatsastus					
Radiolaitteidenkatsastus					
Marpol-katsastus					

Katsastus/Tarkastus on toimitettu 25.5 / 1992

Office translation

REPORT OF INSPECTION

Name of the vessel:	M/S Wasa King
Port of Registry:	Vaasa
Call sign:	OIKW
Former name:	Silja Star
Home port:	Vaasa
Ship type:	Car Ferry
Date of build:	1980
Material:	Steel
Place of build:	Papenburg
Length:	157,02 m
Breadth:	24,22 m
The vessel is Open/decked:	Decked
Gross tonnage:	15598
Number of Main Engines:	4
Total power:	17600 kW
Last drydocked:	11/90 in Naantali
Shipowner:	Wasaline Oy
Address:	Laivanvarustajankatu 1, 65170 Vaasa
Remarks:	Page: 13 Radar Raytheon 1650 12 x? removed. Page: 11 Shipmate/Decca removed. Satellite Navigation Device GPS installed. Medicines inspected 27.1.92.

Periodical Inspection of Seaworthiness.

Inspection carried out: 22.5.1992

KATSASTUSTODISTUS

Aluksen nimi: M/S WASAKING — Kotipaikka: VAASA — Tunnuskirjaimet: OIKW

Rakennusvuosi: 1980. Paikka: PORSGRUNN Aika: TEL Br.vetoisuus: 1558 Pituus: 1703

Päätoneiden lukumäärä: 4 Kokonaistehe: 17600 kW Liikennealue: kaikki kelmut

Suurin sallittu henkilömäärä/matkustajamäärä .....

Rajoitukset .....

Katsastuksessa todetut puutteet .....

Puutteet korjattava ..../.... 19.... mennessä. (enintään 1 kk)

Puutteet todettu korjatuiksi ..../.... 19.... .....
Tarkastaja/katsastaja

Alus on tässä perus- ☐ määräaikais- ☒ väli- ☐ ylimääräisessä ☐ katsastuksessa hyväksytty käytettäväksi 28.1.5. 1992. saakka edellytyksellä, että vuosikatsastukset toimitetaan säädetyin välein.

Paikka	Aika	Katsastaja	Katsastuspiiri
VAASA	28.1.5. 1992	[illegible]	VAASA

VUOSIKATSASTUKSET / NIIDEN SISÄLTÖISET KATSASTUKSET

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

Paikka	Aika	Katsastaja	Katsastuspiiri
	..../..... 19.....		

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

Paikka	Aika	Katsastaja	Katsastuspiiri
	..../..... 19.....		

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

Paikka	Aika	Katsastaja	Katsastuspiiri
	..../..... 19.....		

Vuosikatsastus / sen sisältöinen katsastus on toimitettu

Paikka	Aika	Katsastaja	Katsastuspiiri
	..../..... 19.....		

Aluksella on luokituslaitoksen tai MOTin todetus ilman jäänkulkurajoituksia ☐ Ei ole ☐

Alus on hyväksytty talviliikenteeseen

		Paikka	Aika	Katsastaja
talvikautena	19.... - 19....		..../..... 19.....	
talvikautena	19.... - 19....		..../..... 19.....	
talvikautena	19.... - 19....		..../..... 19.....	
talvikautena	19.... - 19....		..../..... 19.....	
talvikautena	19.... - 19....		..../..... 19.....	

Office translation

CERTIFICATE OF INSPECTION

Name of the vessel:	M/S Wasa King
Port of Registry:	Vaasa
Call sign:	OIKW
Date of build:	1980
Place of build:	Papenburg
Material:	Steel
Gross tonnage:	15598
Length:	157,02 m
Number of Main Engines:	4
Total power:	17600 kW
Traffic area:	Near traffic

The vessel has approved in this Periodical Inspection fit for use till 28/5 1993 subject to Yearly Inspection as required by the Rules.

Place and date:	Vaasa 22/5 1992
Inspector:	Signature
Inspection District:	Vaasa

Ote

Valvontakansio nro

Sivu nro 15

Aluksen nimi	Kotipaikka
M/S VAASA KING	VAASA

Varustamo (nimi, osoite) WAMILINES OY LAIVANVARUSTAJANK. 1 65100 VAASA

Päällikkö O. HOLKANEN

VAASA 22.5.92

SUORITETTU MÄÄRÄAIKAINEN KERIKSEYSTUTKIMUS

VAIKASTUS SEURAAVA MÄÄRÄAIKAINEN

VAIKUTUS 28.5.93 (-3KK) 1 KÄYNTI 2360,-

VAASA 22.5.1992

Suoritettu määräaikainen konciston katsastus

Seuraava määräaikainen konciston katsastus 28.5.1993-3kk

2 käyntiä 3540:-

Office translation

Extract

CONTROL FILE NO.

Page No.
15

Name of the vessel: M/S Wasa King

Port of Registry: Vaasa

Shipowner (name, Address): Wasaline Oy
Laivanvarustajankatu 1, 65170 Vaasa

Master: O.Hokkanen

Vaasa 22.5.92

Carried out Periodical Inspection. Next Periodical Inspection
28.5.93 (- 3 months) 1 visit 2.300,-.

Signature

Vaasa 22.5.1992

Carried out Periodical Machinery Inspection. Next Periodical
Machinery Inspection 28.5.1993 - 3 months.
2 visits 3.540,-.

Signature

Records of international paint

Enclosure 3.4.89

TEKNOS

TELEFAX

PAGE 1 +

TO	ANDREW RAYNER
COMPANY	INTERNATIONAL PAINT
FAX NO.	000-44-101 438 3977
FROM	JARMO LAHTI
DATE	31.7.1995

RE: YOUR FAX TO BENGT SJÖBLUM 28 JULY

1.
ESTONIA, ex Viking Sally, Silja Star, Vasa King

-91 no docking report
-90 primered with INERTA 160 , viking blue

No other reports available.

2.
Specification done according the following

Inlet ducts for waterjets PRELIMINARY

Preparation:

- Aluminium work grade: D5
- Degreasing, followed by fresh water cleaning to remove contamination
- Sandaweeping or grinding (sand papering)
- Surface roughness requirement. Coarse, according to ISO 8503-2.
- Abrasive material: Quartz sand, nickel slag or aluminium silicate

Product	Colour	Layers	DFT/µm
Balloflake*	green	(1x)	1000
Intershield Newbuilding ENA301/ENA303 aluminium	alum.	(1x)	150
Intertuf JXA464/JXA465	black	(1x)	75
Interspeed water BWA001	black	(2x)	150
			1000+375 µm

* In vicinity of the waterjet unit in inlet duct Balloflake to be replaced with Belzona Ceramic K-metal DFT 2000 +500 µm. Prior application of the subsequent coat Belzona surface to be sandaweeped. Exact defination for Belzona application areas to be done, when work will be carried out. (total protection area ab. 5 sqm/ vessel).

0280E001 A

Best regards

Jarmo Lahti

TEKNOS WINTER OY
FOUNDING, LABORATORY & TECHNICAL SERVICE: FAX +358 0 508 095 00
PHONE +358 0 500 001
P.O. BOX 107
FIN-00371 HELSINKI, FINLAND

SHIP DETAILS — SILVA STAR

OWNER/MANAGER	SALLY REDERI AB
SHIP TYPE	FERRY
TONNAGE	15566
LLOYDS NO.	7921033
EXECUTIVE POINT	HELSINKI
DELIVERY DATE	1 JUN 80
SERVICE SPEED	19 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P	137.42
BEAM MOULDED	24.21
ANTIFOULING HT (FWD)	5.60
ANTIFOULING HT (AFT)	5.60
BOOTTOP HT (AFT)	
BOOTTOP HT (FWD)	

SURFACE AREAS (SQ METRES)

HULL BELOW WATER	3850
FLATS	2300
BOOTTOP	
TOPSIDES	

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF REPORT
8808	FINLAND	HEM	100	DRYDOCK (M/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (M/S)
8304	FINLAND	HEM	100	DRYDOCK (M/S)
8505	VALMET VUOSAARI	IMC	100	DRYDOCK (M/S)
		HEM	100	
		IMC		DRYDOCK
870'	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (M/S)
		IMC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (M/S)
		IMC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (M/S)
		IMC		DRYDOCK

COATING APPLICATION — DRYDOCK:- MAY 95 VALMET VUOSAARI FHIS

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME	
*FLATS	1	T/U	80	JVA003 INTERTUF	VINYL TAR HS TINTED
	2	T/U	100	JVA007 INTERTUF	VINYL BLACK
*FLATS	1	T/U	500	ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE
PORT SIDE U/W STARBOARD SIDE U/W	1	FULL	500	ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE
PORT BOOTTOP					
STARBOARD BOOTTOP					

**SPLIT AREA

PRODUCT & NAME		LITRES
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	2360
JVA003 INTERTUF	VINYL TAR HS TINTED	0
JVA007 INTERTUF	VINYL BLACK	0

SHIP DETAILS SILVA STAR

OWNER/MANAGER : SALLY REDERI AB
SHIP TYPE : FERRY
TONNAGE : 15586
LLOYDS NO. : 7921033
EXECUTIVE POINT : HELSINKI
DELIVERY DATE : 1 JUN 80
SERVICE SPEED : 18 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P : 137.42
BEAM MOULDED : 24.21
ANTIFOULING HT (FWD) : 5.60
ANTIFOULING HT (AFT) : 5.60
BOOTTOP HT (AFT) :
BOOTTOP HT (FWD) :

SURFACE AREAS (SQ METRES)

HULL BELOW WATER : 3850
FLATS : 2300
BOOTTOP :
TOPSIDES :

DRYDOCK SUMMARY

DATE	LOCATION	WPR	%	TYPE OF REPORT
8008	FINLAND	HEM	100	DRYDOCK (M/S)
8108	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (M/S)
8304	FINLAND	HEM	100	DRYDOCK (M/S)
8505	VALMET VUOSAARI	INC	100	DRYDOCK (M/S)
		HEM	100	
		INC		DRYDOCK
8701	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK

COATING APPLICATION DRYDOCK:- JAN 87 KVAERNER MASA YARDS-TURKU FH04

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME
FLATS	1	FULL	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STERN	1	T/U	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
	2	T/U	500	ERA163 INTERSHIELD INERTA 160 BLACK BASE

PRODUCT & NAME		LITRES
BLA110 INTERSPEED	PREMIUM A/F RED	40
ERA163 INTERSHIELD	INERTA 160 BLACK BASE	120
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	1500

SHIP DETAILS SILVA STAR

OWNER/MANAGER : SALLY REDERI AB
SHIP TYPE : FERRY
TONNAGE : 15586
LLOYDS NO. : 7921033
EXECUTIVE POINT : HELSINKI
DELIVERY DATE : 1 JUN 80
SERVICE SPEED : 18 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P : 137.42
BEAM MOULDED : 24.21
ANTIFOULING HT (FWD) : 5.60
ANTIFOULING HT (AFT) : 5.60
BOOTTOP HT (AFT) :
BOOTTOP HT (FWD) :

SURFACE AREAS (SQ METRES)

HULL BELOW WATER : 3850
FLATS : 2300
BOOTTOP :
TOPSIDES :

DRYDOCK SUMMARY

DATE	LOCATION	WPR	%	TYPE OF REPORT
8008	FINLAND	HEM	100	DRYDOCK (M/S)
8108	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (M/S)
8304	FINLAND	HEM	100	DRYDOCK (M/S)
8505	VALMET VUOSAARI	INC	100	DRYDOCK (M/S)
		HEM	100	
		INC		DRYDOCK
8701	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	INC	100	DRYDOCK (M/S)
		INC		DRYDOCK

COATING APPLICATION DRYDOCK:- SEP 88 KVAERNER MASA YARDS-TURKU FH04

AREA OF SHIP	C	TYPE	DFT	PRODUCT & NAME
PORT SIDE U/W	1	T/U	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STARBOARD SIDE U/W				
PORT BOOTTOP	1	FULL	330	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE
STARBOARD BOOTTOP				
STERN	1	FULL	500	ERA165 INTERSHIELD HS BLUE-INERTA 160 BASE

PRODUCT & NAME		LITRES
ERA165 INTERSHIELD	HS BLUE-INERTA 160 BASE	0

SHIP DETAILS	SILVA STAR
OWNER/MANAGER	: SALLY REDERI AB
SHIP TYPE	: FERRY
TONNAGE	: 15566
LLOYDS NO.	: 7321033
EXECUTIVE POINT	: HELSINKI
DELIVERY DATE	: 1 JUN 80
SERVICE SPEED	: 19 KNOTS

DIMENSIONS (METRES) :-

LENGTH B/P	: 137.47
BEAM MOULDED	: 24.21
ANTIFOULING HT (FWD)	: 5.60
ANTIFOULING HT (AFT)	: 5.60
BOOTTOP HT (AFT)	:
BOOTTOP HT (FWD)	:

SURFACE AREAS (SQ METRES)

HULL BELOW WATER	: 3850
FLATS	: 2300
BOOTTOP	:
TOPSIDES	:

DRYDOCK SUMMARY

DATE	LOCATION	MFR	%	TYPE OF REPORT
8006	FINLAND	HEM	100	DRYDOCK (N/S)
8106	KVAERNER MASA YARDS-TURKU	HEM	100	DRYDOCK (N/S)
8304	FINLAND	HEM	100	DRYDOCK (N/S)
8506	VALMET VUOSAARI	IMC	100	DRYDOCK (N/S)
		HEM	100	
		IMC		DRYDOCK
8701	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (N/S)
		IMC		DRYDOCK
8809	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (N/S)
		IMC		DRYDOCK
9005	KVAERNER MASA YARDS-TURKU	IMC	100	DRYDOCK (N/S)
		IMC		DRYDOCK

COATING APPLICATION DRYDOCK:- MAY 90 KVAERNER MASA YARDS-TURKU FHD4

AREA OF SHIP	C TYPE OFT PRODUCT & NAME
FLATS	T T/U 500 ERAMES INTERSHIELD HS BLUE-INERTA 160 BASE
PORT SIDE U/W	
STARBOARD SIDE U/W	

PRODUCT & NAME		LITRES
BJ445C INTERSPEED	EXTRA A/F RED	0
ERAMES INTERSHIELD	HS BLUE-INERTA 160 BASE	0

03/08 '95 08:16
28-JUL-95 FRI 10:16 +49 40 7205744 TECE CONTROL INT.FARBENW. VS. FAX NR. 0421/[illegible] 007

Invoice warsila marine

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning

Handläggare

FAKTURA
Datum
19.10.1987

24 1858

Köparens referens
Insp. Y. Röblom

Säljarens referens
AEP/lt

Beställare
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Enclosure 3.4.90

Godsmottagare

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 d. netto
*)

Moms %
0

Märke
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/87

Vid betalning av fakturan ber vi Er notera a konto inbetalningar
FIM 650.000,- 20.2.87,
FIM 350.000,- 15.7.87

20449 Specifikation	Mängd	Enhetspris	Totalpris
100 In- och utdockning av fartyget inkl. dockshyra 1 dygn.		23.886,-	
Dockshyra för de följande 10 dygnen.		107.490,-	
101 Extra omändring av dockningsbädd.		8.640,-	
100 Smältning av is från fören med hett vatten, 2 smältbilar med manskap i arbete.		10.000,-	
102 Anslutning av elkabel ombord 1 ggr.		560,-	
Anslutning av telefon 1 ggr.		305,-	
Telefonavgift 3088 impulser		1.853,-	
Hyra för värmefläktar.		3.140,-	
103 Anslutning av vattenslang 2 ggr.		1.120,-	
Leverans av kylvatten undr 10 dygn.		2.750,-	
Borttransport av avfall 7 ggr.		2.870,-	
104 Anslutning av brandslang 1 ggr.		560,-	
Brandvakt 18 arbetsskift.		11.310,-	
Till brandbekämpning 50 m2 aluminiumbekl. glasfiberväv.		2.830,-	

Postadress Telex Telefon Telecopier Bank Postgiro Oms
Wärtsilä Marinindustri Ab

MS VIKING SALLY

20449

300	Bultar förnyats till bogpropellerns tryckhuv. Borrning och gängning av hål.Löstagning av skyddsnuvan och maskinbearbetning av fördjupningar för låsbultar enl. ritning. Bultarna förnyats. Borrning samt gängning. Återmontering samt montering av låsningar. Ställningsarbete.	25.050,-
301	För reparation av SB och BB bottenventiler löstagits 2st NS300 rörkrökar. Ventilernas vridningsslider öppnats och förnyats kilar och stoppare. Kilarna svängts åt rätt håll och monterats på platsen. Täthet kontrollerats och ventilerna samt rören målats med Epoksifärg. Rörkrökarna återmonterats. 2st NS150 bordläggningsventiler översetts.	18.820,-
302	Mätning av spel i roder och propelleraxelar.	3.450,-
303	Propellerbladens ytor fyllts med keramisk Belzona metall samt Prestolith blandning. Bladens ytterkanter slipats jämna och stötta kanter på båda propellrarna avrundats.	13.500,-
	Båda propellrarnas bladytor polerats.	9.600,-
304	Propelleraxlarna Cederwall-skydd (SB och BB) löstagits, öppnats samt granskats Cederwall-tätningarnas ytor och utbytts Sempak-tätning. Fastsättningsbultarna kontrollerats samt skydden återmonterats och svetsats. Ställningsarbete.	16.160,-
305	Helikopterdäckets Plexi-glas, räck samt belysning löstagits. Räckena tapats med slipskiva. Räckena sandblästrats Sa 2,5 samt målats 2 ggr med beställarens färg. Glasen tvättats och monterats Räck med glas återmonterats. Svetsning, elmontering samt fläckmålning. Övertidsersättning.	62.500,-
400	Reparation av yorcalbrorör enl. beställarens numrering. I arbetet använts material enl. följande. Rör 1 ø159 yorcalbrorör L-1500 2st yorcalbrokrökar ø159 2st nav ø159 2st spännlinsar NS150.	5.300,-

10449

	Rör 17 ø323,9 yorcalbrorör 1-2000 1st yorcalbrokrök ø323,9 2st yorcalbrokrök ø323,9 2st spännfläns NS300 1st förgreningsstuts NS200 + fläns + nav NS200.	16.000,-
	Rör 17.A ø267 yorcalbrorör L-500 1st yorcalbronav ø267 1st spännfläns NS250	5.000,-
	Rör 18 ø76,1 yorcalbrorör L-500 2st yorcalbrokrök ø76,1 2st yorcalbronav ø76,1 2st spännfläns NS65 1st yorcalbronav NS40 1st spännfläns NS40.	3.020,-
401	Mellan crimtankar 13 och 14 monterats av beställaren levererad hydr. ventil. Erforderliga stålarbeten i mellanskott för montering av ventilen. Montering av ø12mm hydr.rör med Ermeto-koppling, 12m. Gamla grönsläggesbrytarnas kablar avlägsnats och monterats nya grönsläggesbrytare och nya kablar samt kabelrör.	36.000,-
402	Yorcalbrorör NS150 förnyats till EB isbrunn. Materialåtgång: 1200mm NS150 yorcalbrorör, 3st NS150 yorcalbrokrökar 2st NS150 yorcalbronav, 28st NS150 spännflänsar	4.830,-
500	Lager utbytts i maskinrumsfläktarnas elmotorer.	44.960,-
501-	Ombyggnadsarbeten i bogpropellerns motor. Materialåtgång: 36m kabel NJEM 1x70 2m Cu-skena 60x10 6m Cu-skena 80x10 kopplingsskor, skruvar och muttrar.	15.120,-
600	I matsalens mellanvägg gjorts öppning i garnerat stålskott 1050x500mm. Öppningen inramats och garnerats med mässingsplåt. Ramarna beställarens.	9.130,-
700	Värmisiretts och båda akterrampernas tätningar förnyats delvis, sammanl.22m.	14.110,-

MS VIKING SALLY

20449

Rör 2 ø180 yorcalbrorör L-1200 2st Yorcalbrokrökar ø180 2st " nav ø180 2st spännflänsar NS125	5.000,-
Rör 4 ø133 Yorcalbrorör L-2000 2st yorcalbro krökar ø133 2st " " ø133 2st spännflänsar NS125	6.000,-
Rör 5 ø180 yorcalbrorör L-2100 1st yorcalbronav ø180 1st spännfläns NS175 (gammal standard) 1st förgreningsstuts ø133 + krök ø133 + nav + fläns 1st förgreningsstuts ø88,9 + nav + spänn- fläns 1st förminskningskon ø180-ø159 + nav ø159 + fläns.	10.500,-
Rör 8 ø125 yorcalbrokrökar 2st förminskning ø125-100 2st flänsar + nav NS125 1st flänsar + nav NS100	7.000,-
Rör 10 ø267 yorcalbrorör L-1000 1st yorcalbronav ø267 1st spännfläns NS250 1st Straub koppling ø267	9.000,-
Rör 11 ø267 yorcalbrorör L-1000 1st yorcalbronav ø267 1st spännfläns NS250 1st Straub koppling	9.000,-
Rör 16 ø267 yorcalbrorör L-1000 1st yorcalbrokrök ø133 1st yorcalbronav ø133 1st yorcalbronav ø267 1st spännfläns NS250 1st spännfläns NS125 1st Straub koppling ø267 (röret har NS125 förgreningsstuts.	10.000,-

AS VIKING SALLY

20449

701	Rodrens bottenpluggar öppnats. För BB rodret förnyats plåtar 2st 500x250x20mm 1st 630x600x20mm, bockats För SB rodret förnyats plåtar 1st 450x250x20mm 1st 550x350x20mm 1st 1700x650x20mm, bockats Svetssömmarna påsvetsats samt frätta ställen fyllts med Belzona Prestolith massa.	52.370,-
702	Frätta svetssömmar i bottnen påsvetsats.	7.280,-
703	Bottensilar öppnats och fastsatts. Svetssömmar reparationssvetsats.	6.480,-
704	Förnyats zinkanoder a 10kg i brunnar 5st, i förpropellertunneln 6st.	3.190,-
707	Till köket tillverkats vask och dräneringsränna av plåt 900x560x5mm, djup 100mm med galler 900x560mm. (Taket nedanför rivits av fartyget)	5.470,-
708	Förliga inkörsbanans klarfars gångjärn reparerats, förnyats 2st gångjärn. Gångjärnen jämte gångjärnstappar 6st förnyats för täckplåtar mellan inkörsbanan och fartyget Ställningsarbete.	25.270,-
709	Rullklysen för- och akterut reparerats enl. anvisning med beställarens delar. Ovanför klysen monterats 18st knän 300x250x15mm. Målningsarbete. Arbetet utförs på yttre bordläggningen med hjälp av krankorg.	24.080,-
900	Fartygets flatbotten sandblästrats SA 2,5 samt målats med Inerta 160, 1450 m2. (Beställarens färg)	116.000,-
	Fartygets aktarliga och förliga delar fläck-sandblästrats SA 2,5 samt fläckmålats med Inerta 160 (Beställarens färg) Förliga delen 50 m2 akterliga delen 300 m2.	29.750,-

OJS SERIO-FSET

Nro Reparationsnummer

M/S VIKING FALLY

20449

901	Ramparnas och hyllornas vajrar samt block granskats visuellt.	810,-
903	Sötvattentank no 17 tvättats och rengjorts.	8.000,-
904	Smutsoljetankarna rengjorts och oljigt och fast avfall transporterats att förstöras.	42.000,-
905	Värmeväxlarens gavlar 4st sandblästrats SA 2,5 samt målats med Inerta 160.	2.000,-
	Saltvattenfilter 2st, brunnar 2st och rör 2st rengjorts samt målats 1 ggr med Antifouling.	6.620,-
907	Bottenbrunnarna rengjorts och målats 1 ggr med Antifouuling .	3.150,-
909	Täckning av fartygsbottnen och värmning på grund av Inerta målning.	120.000,-
919	Fartygets däck och utsidor tvättats med hett vatten före udockning.	32.810,-
	FIM	1.021.844,-

Tokl

2.11-87

Yliajosta veloitamme korkoa ... 16%
För dröjsmål debiteras ränta

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning | Handläggare

FAKTURA

Datum: 19.10.1987
nr: 24 1860

Köparens referens: Insp. T. Röblom
Säljarens referens: A2P/lt
Beställare

Godsmottagare

Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor: 14 d. netto

Oms%: 0

Märke
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/37

20449 Specifikation	Mängd	Enhetspris	Totalpris
706 Spricka i yttre bordläggningen invid matsalen på BB-sida reparerats medels förnyande av skottplåt 830x300x12mm och däcksplåt 200x150x12mm samt svetsning, montering av garnerings- och inredningsskivor. Skyddande av golvet på inre sidan. - Ställningsarbete. Skydd på utsidan under reparationsarbetet.			17.620,-
104 Brandvakt på grund av haveriarbetet 2 arbetsskift.			1.740,-
		FIM	19.360,-

COPY

4.11.87
1670

Postadress | Telex | Telefon | Telecopier | Bank | Postgiro | Oms

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning

Handläggare

FAKTURA
Datum
19.10.1987

nr
24 1859

Köparens referens
Insp. Y. Röblom

Säljarens referens
ABP/lt

Godsmottagare

Beställare
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.om.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 d. netto

Oms %

Märke
MS VIKING SALLY

Dockning 12-23.1.1987

Anbud WTKT1101/87

20449 specifikation	Mängd	Enhetspris	Totalpris
705 Fästöron 8st för huvudmotorernas avgasrörs ljuddämpare flyttats. Förnyats av beställaren levererade ljuddämpare. Ställningsarbete.		20.230,-	
104 Brandvakt på grund av haveriarbetet 3 arbetsskift.		2.610,-	
	FIM	22.840,-	

COPY

4.11.87

162

Postadress	Telex	Telefon	Telecopier	Bank	Postgiro	Oms
Wärtsilä Manmindustri Ab Åbo reparationsvarv		Nat (921) 359 500		FBF		

Invoice wartsila marine

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning

Handläggare

FAKTURA

Datum: 7.10.1987

nr: 24 1800

Köparens referens: Insp. Röblom

Säljarens referens: AEP/lt

Godsmottagare

Beställare:
Sally Rederi Ab
Hamngatan 8

22100 MARIEHAMN

Enclosure 3.4.91

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor: 14 d. netto

Moms %

Märke

MS VIKING SALLY

20518

Dockning 6-8.4.1987

Pos. nr. specifikation	Mängd	Enhetspris	Totalpris
20518			
100 In- och utdockning av fartyget inkl. dockshyra för 1 dygn.		23.886,-	
Dockshyra för de följande 2 dygnen		21.498,-	
Bogseraasistans vid utdockning.		7.970,-	
101 Omändring av dockningsbädd. Avlägsnande av is från dockan.		11.340,-	
102 Anslutning av 2st telefoner.		610,-	
Telefonavgift, 772 impulser.		309,-	
103 Borttransport av fartygets avfall, 3 ggr.		1.230,-	
104 Anslutning av brandslang ombord.		560,-	
Brandvakt 5 arbetsskift.		4.350,-	
Torv för uppsamling av olja.		210,-	
300 Båda propelleraxlarnas Cederwall-skydd löstagits. BB- tätning utbytts (beställarens leverans). Gamla vitmetallringen maskinbearbetats. 800 l. spillolja tagits till vara. BB- propelleraxelspel mätts. BB akselns skyddsplåt 10x240x3500mm tillverkats och förnyats. Skydden återmonterats. Ställningsarbete.		31.320,-	

COPY

~~MS VIKING SALLY~~

20518

301	Loggens ventil 1st NS300 utbytts (beställarens). I förliga tankens tak gjorts öppning och genomgångsluckan förstorats. Fläns tillverkats och ventilen provtryckts från utsidan. Gjorda öppningar stängts.	12.580,-
303	Propellerblad på SB och BB propellrar utbytts 1 + 1 st. Beställaren levererat blad, tätningar och låsningar. Alla propellerblads låsningar granskats, 5st nya nya bladbultar samt låsningar (beställarens delar) monterats. Lösa pluggar i bladens lyfthål förnyats. Ställningsarbete.	28.640,-
700	Reparation av bordläggningen vid bogportens undre kant. - gamla plåtar avlägsnats genom skärbränning. - nya plåtar och profiler tillverkats, bockats, monterats och svetsats. 1st plåt 18x1280x4800mm 1770 kg 1st plåt 18x2900x3250mm 1357 kg P-stång 160x8 750kg Ställen med sprickor svetsats. Reparerat område maskinborstats på in- och utsida samt målats med beställarens färg. Kittning utförts med Prestoflex-massa. Visirets gummitätning förnyats.	137.070,-
701	SB slingerköl förnyats spt 84-95 material använts: - plåt 15x600x7300 mm 2st - plåt 15x600x2000 mm 2st - plåt 15x300x540mm 5st - rundjärn ø50 -9500mm 1st. Bordläggningsskada reparerats invid slingerkölen spt 91-92, 1st plåt 12x500x500mm förnyats. 7st anodzinkar a 10 kg monterats. Den förnyade slingerkölen maskinborstats och målats med varvets färg.	32.790,-
702	SB slingerköl förnyats spt 71-95 material använts: - plåt 15x600x1900mm 2st - plåt 15x600x2000mm 2st - plåt 15x300x540mm 15st rundjärn ø50 21000 mm 1st. 5st anodzinkar a 10 kg monterats. Reparationssvetsning samt fastsvetsning av mål för bottenplugg.(pluggen saknats) Den förnyade slingenrkölen maskinborstats samt målats med varvets färg.	71.140,-

mh-stenorset

WÄRTSILÄ MARINE

Åbo reparationsvarv

no

Sivu Sida Page 3

~~M. VI-EN? INGUE~~

30518

801 Sikt för SB bottenbrunn löstagits, riktats, spricka svetsats.
Förnyats och svetsats mellanspjälor och plattjärn vid kanten.
Återmonterats.

4.990,-

FIM 390.493,-

Lasku eräantu ... Pvm 22.10.87 ... 107.

050 SERIOFFSET

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning
Handläggare

FAKTURA
Datum: 7.10.1987
Nr: 24 1801
Köparens referens: Insp. Röblom
Säljarens referens: AEP/lt
Beställare:
Sally Rederi Ab
Hamngatan 8
22100 MARIEHAMN

Godsmottagare
Leveransadress
Anbudet giltigt t.o.m.
Leveranssätt
Leveransvillkor
Leveranstid
Betalningsvillkor
14 d. netto
Oms %: 0

Märke
MS VIKING SALLY
20518
Dockning 6-8.4.1987

Pos. nr. specifikation	Mängd	Enhetspris	Totalpris
20518			
302 Hissaxeln transporterats från fartyget till maskinverkstaden och demonterats. Lagerstållen besprutats med metall och slipats. 2st lager 6018 förnyats. Axeln ihopmonterats och transp. ombord. Sätesring för ventil, ø315x300x30 tillverkats, maskinbearbetats av beställarens material. Ventiltallrikens tätningsytor maskinbearbetats ø315mm.			FIM 7.870,-

COPY

23.10 87
167

Postadress: Wärtsilä Marinindustri Ab
Telex
Telefon
Telecopier
Bank
Postgiro
Oms

Invoice wartsila marine

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning | Handläggare

FAKTURA
Datum: 12.12.1988
Nr: 24 4835

Köparens referens: Insp. Mickelsson
Säljarens referens: AEP/lt
Beställare

Enclosure 3.4.92

Godsmottagare

Sally Rederi Ab
Strandgatan 7

22100 MARIEHAMN

Leveransadress

Anbudet giltigt t.o.m.

Leveranssätt

Leveransvillkor

Leveranstid

Betalningsvillkor: 14 dgr netto

Oms %: 0

Märke

MS VIKING SALLY

Dockning: 12-16.9.1988

Pos. nr, specifikation	Mängd	Enhetspris	Totalpris
Anbud WMTR1066/88			
20706			
0010 In- och utdockning av fartyget inkl. 1 dygns dockshyra.			23.886,-
Dockshyra för de följande dygnen			42.996,-
0020 Omändring av dockningsbädd.			8.640,-
0030 Anslutning av el ombord , 1 ggr			560,-
Leverans av 44440 kWh elström.			26.664,-
Anslutning av telefon			305,-
Telefonsamtal 995 impulser			398,-
0040 Anslutning av brandslang 1ggr			560,-
Brandvakt 5 arbetsskift			4.350,-
0050 Borttransport av avfall 2 ggr.			820,-

COPY

Postadress | Telex | Telefon | Telecopier | Bank | Postgiro | Oms
Wärtsilä Marinindustri Ab

MS VIKING SALLY

20706

0060	Partygsbottnen högtrycksvattenspolats, 1000m2.	3.000,-
0070	Bottnen sandblästrats Sa2 och målats med lösningsmedelafri Inerta 160 620 m2. Beställarens färg.	55.800,-
	Bottnen lättsandblästrats och målats med lösningsmedelsfri Inerta 160 800 m2. Beställarens färg.	43.280,-
	Målning av djupgångsmärken.	2.600,-
	Skyddande av propellrar och rodertappar	2.880,-
0080	Frätta svetsfogar påsvetsats på rodret och i bogpropellertunneln. Ställningsarbete.	
	På rodren monterats och fastsvetsats plåt 20x180x180mm 1st, 20x350x480mm 1st.	20.000,-
0090	Zinkanoder a 90kg förnyats - i bogpropellertunneln 8st - på skrovet 18st - på rodren 8st - på roderstockarna 4st	11.020,-
	Läckande ställen på slingerkäl vid spt 85-86 BB-sida reparerats genom svetsning.	600,-
0100	Mätning av spetum i roder och i propelleraxelns lager. Mätningsprotokoll uppgjorts och levererats till fartyget.	3.450,-
0110	SB propelleraxels yttre Cederwallaxeltätning öppnats och ihopmonterats med beställarens delar.	10.800,-
	Gamla Cederwallaxeltätningen iståndsatts, ytorna maskinbearbetats, levererats ombord. Låsningar inspekterats och repererats samt nät avlägsnats från för- och akterpropellrar.	19.800,-
0120	Bottenbrunnarnas sikt öppnats och brunnarna rengjorts samt målats med Interspeed BLA110. Sikten återmonterats.	5.400,-
	Svetsömmar i bottensiktens galler utökats 4st	3.400,-
	Filterbrunnarna rengjorts, målats med Antifouling färg 3st.	11.250,-
	Snäckor bortskrapats från brunnarna.	5.400,-
	Färg från varvet: Interspeed BLA110 50 l.	1.675,-

0706

0130 SB akterligaste bottenventil NS250 öppnats och gummitätning levererad av beställaren förnyats. Rostfri kil tillverkats 12x50mm samt låsning ø50x100mm. Ventilen ihopmonterats och tätheten kontrollerats. 10.000,-

0140 Saltvattenrör mellan akterliga bottenventiler och filtren löstagits 3st NS250 och transporterats till rörverkstaden. Rören reparerats genom svetsning av flänsfogar och förnyande av förgreningar ø120x200x8mm, 3st. Rören målats på inre sidan med Antifouling färg och svetsfogarna med Galvex färg.
Transporterats till fartyget och monterats på platsen med nya packningar och bultar. 16.000,-

0150 I maskiarummet förnyats och reparerats yorcalbro-kylrör enl. anvisning.
NS175 yorcalbrorör 1m
NS175 " krök 1st
NS125 " " 2st
NS200/150 " förminskning 3st
NS150/175 " " 1st
NS175 fläns + nav 1st
NS125 " " 1st
NS200 yorcalbrorör 0,3m
NS200 " krök 1st
NS200 fläns + nav 3st
NS150 yorcalbrorör 0,1m
NS150 fläns + nav 1st
NS80 yorcalbrorör 1,5
NS80 " krök 9st
NS80 fläns + nav 15st
NS80 blindfläns 1st
NS100 galv.rör 0,3m
NS100 rörfläns 3st
Flänspackningar, bultar samt muttrar förnyats
Tillverkat och monterats 2st löödningsnipplar av brons
Viking koppling ø324 1st
" ø220 1st
vridventil NS150 2st
yorcalbromuff ¾" 2st. 40.000,-

0160 2st fjäderbelastade bordläggningsventiler löstagits och transporterats till verkstaden samt demonterats. Ventilhusen och tätlocken maskinbearbetats. Förnyade stödflänsar för fjäder samt O-ringar. Ventilerna slipats, ihopmonterats samt monterats på platsen. 10.000,-

0170 Plåtbeslagningar för HM avgaspannor 4st reparerats genom att jämna fogarna och monterats plåt på fogarna samt i botten och på hörnen i väggen, 8st L-järn 50x50 L=2100mm. Svetsningarna utförts. 32.830,-

WÄRTSILÄ MARINE

	Avgasrören isvidats i pannorna med fiberskivor.	3.200,-
	Avgaspannan rengjorts (beställaren skött om öppnande och fastsättning av luckor.	9.150,-
0190	Spilloljetanken tömts med hjälp av tvätt-och sugbil samt högtrycks tvättats.	11.000,-
0200	Tillverkats enl. ritning samt avarvats 4st 6-kant skruvar och bultar 4st.	5.560,-
0210	Förliga hissens vajerhjul och axel transp. till verkstaden. Lagret utpressats från boet och från axeln. Axeln reparerats genom påsvetsning och slipats till angivet mått. Nya av beställaren levererade tätningar och lager monterats på axeln.	5.760,-
0220	Propellarbladens skadade och frätta kanter tillsats och frätningarna fyllts med Belzona. Frätningar på rodren och på axelbäraren fyllts med Praktolith massa. Beställningsarbete.	14.000,-
0230	Bilfäckets gångplattform på BB-sida invid maskinkapsel repererats genom förnyande av plåt 2x560x6050mm.	5.140,-
	FIM	472.224,-

27.12.86

1672

WÄRTSILÄ MARINE
Åbo reparationsvarv
Avdelning

Handläggare

FAKTURA
Datum
22.6.1989

nr
24 6794

Köparens referens
L Janlöv

Säljarens referens
AEP/lt

Godsmottagare

Beställare

Rederi Ab Sally **Enclosure 3.4.93**
Hamngatan 8

Leveransadress

22100 MARIEHAMN

Anbudet giltigt t.o.m.

Levererasätt

Leveransvillkor

Leveranstid

Betalningsvillkor
14 d netto

0 Oms %

Marke

MS VIKING SALLY

Dockning 2.6.-3.6.1989

Art.nr/specifikation	Mängd	Enhetspris	Totalpris
7010 Intagning av fartyget i torra dock. Nedsänkning tekn. i dygn avra.			26.275,-
Dockavgifter i dygn.			11.943,-
7011 Omhändertagande av dockningsmedel.			6.100,-
3020 Anslutning av telefon.			305,-
3040 Anslutning av brandlarm.			560,-
3050 Byte av propellerskydd m.m. medel.			75.100,-
3060 Tillverkning av 4st vorenlöpare enligt modell från fartyget. Fartygets personal lösgjorde de gamla och monterade de nya rören. Materialåtgång:			
rör 133 x 2,5 CuZn29Al P33 DIN:17677 T	5,50	m	
" 133 x 2,5 " " " 17671 TT	,50	m	
" 219,1 x 3 " 17671	1,50	m	
sexkantstrut M16 x 8,dm pass 421.9.2.	30	st	
sexkantsmuttar M16 8 m pass. 452.9.2.	30	st	
rör 90 vorenlöpare 133 x 2,5 R=1,5xD	3	st	
" " " 219,1x3,0 "	1	st	

Postadress: Wärtsilä Maskinindustri Ab, Åbo reparationsvarv
Telex
Telefon: Nat (921) 359-600
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Oms

WÄRTSILÄ MARINE

Åbo reparationsvarv

Sivu Sida Page 2

MS VIKING SALLY

20784

	lösflänsar 200/219,1 DIN 2642 NP10 ST37-2	2 st	
	nav NS200/219,1 628.2.4. NP10 CuZn21Al	2 st	
	spännfläns NS125/133 628.9.2. NP10 ST/37-	4 st	
	" NS150/159 " "	2 st	
	nav NS125/133 628.2.4 NP10 CuZn21Al2	4 st	
	" NS150/159 " " "	2 st	24.396,-
0070	Lösstagning och montering av axelskydd för mätning av spel i cederwall-tätningen på SB-sida.		3.080,-
0080	Partyget använt kran och lyftkorg för målning av utsidor.		7.000,-
0100	1 man som hjälp åt Kamewa-montör för undersökning av läckage i OD-box.		1.600,-
0110	Tenfjord rodermaskinens läckor undersökta och reparerade tillsammans med tillverkarens representant.		8.251,-
0120	- Lyftöra svetsad på SB-sidan i bottenbord-langningen, lösd ca 1,5 m. - Läcka i BB rodret svetsats fast, ett norsen-nål fyllts med Presto.lim - Slinkar monterade på slangerkslar SB och BB sammanl. lätt å 10 st.		8.608,-
0130	Material av spelrim i roder och propellerskaft.		2.800,-
		FIM	176.018,-

6.7 t5

1676

Enclosure 3.4.94

TURUN
KORJAUSTELAKKA OY
Turku Repair Yard

F A K T U R A nr 229/90
2.10.1990

Beställare

Sally Line Ab
Hamngatan 8

22100 MARIEHAMN

Köparens ref
Lars Karlsson Order 09-9440
Säljarens ref
AEP/ta

Betalningsvillkor	Oms
per omgående	0 %
Förfallodag	
Försäningsränta	18 %

Märke

M/S VIKING SALLY

916
969

COPY

Pos. nr	Specifikation	Totalpris
	Raparationer, som utförts i samband med dockningen av M/S Viking Sally under tiden 30.4. - 7.5.1990 enligt tidigare överlämnad specifikation	
	TOTALT	1.420.000,- **********
	./. FÖRSKOTTSBETALNING	300.000,-
	ÅTERSTÅR TILL BETALNING	1.120.000,- **********

Postiosoite/ PL 430 20101 TURKU | Postal address P.O. Box 430 SF-20101 TURKU Finland | Puhelin/Telephone (921) 638711 Internat. +358 21 638711 | Telekopio/Telecopier (921) 6387250 Internat. +358 21 6387250 | Telex 62484 try sf | Pankki/Bank TYP 433110-19066 PSP Tu 227388 | Lvv Rek.

TURUN
KORJAUSTELAKKA OY
Turku Repair Yard

SPECIFIKATION AV DE REPARATIONER SOM UTFÖRTS UNDER DOCKNINGEN AV M/S VIKING SALLY 30.4 - 7.5.1990 TILL FAKTURA NR. 229/90 av den 9.8.1990

0010	Dockning och sjösättning av fartyget inkl. dockshyra för 1 dygn	26.275,-
0011	Ändringsarbeten i dockningsbädden	7.100,-
0010	Dockhyra för 7 dygn	83.601,-
0010	Kostnader för övertidsarbete i samband med dockningen	8.930,-
0012	Anslutning av 4 st elkablar	2.240,-
0013	Anslutning av 3 st. brandslangar	1.680,-
	Brandvakt 16 arbetsskift	13.920,-
0014	Anslutning av färskvattenslang 1 gång	560,-
	Levererats 175 m³ färskvatten	1.575,-
0015	Anslutning av telefon 1 st.	305,-
	Telefonsamtalsavgifter 3847 impulser	2.501,-
0016	Leverans av kylvatten till hjälpmaskiner 4 500 m³ färskvatten, till havsvattenspris à 3,- / m³	13.500,-
0017	Borttransport av fartygets avfall 18 ggr.	7.380,-
0018	- -	
0019	Lyftkranshyra för att lyfta CO2-flaskor	1.200,-
0021	Färskvattensköljning av utsidorna för att avlägsna salt. Kostnader för övertidsarbete.	9.680,-
0022	Sandblästring av bottnen SA 2,5 1800 m² och målning med INERTA 160 målfärg 1800 m²	270.000,-
0024	Rullmålning av Boottop området 1 ggr 1050 m² med beställarens målfärg INERTA-70. Kostnader för övertidsarbete.	15.090,-

0025	Målning av djupgångs- och fribords-märkena.	2.600,-
	Linjering av vattenlinjeområdet 300 m	2.700,-
0026	Lätt sandblästring av utsidorna samt blästring av rostiga ställen SA 2,5. Målning 3 ggr med beställarens färg. Målats 2 st. ca 1 m svarta ränder på utsidan.	130.000,-
	Breddning av ränderna från ca 1 m till 1,5 m.	3.120,-
0027	Slipning av rostiga ställen samt fläck-målning och övermålning av skorstenen, däcksbyggnadens skorsten, samt ställen på förskeppsskottet och kommandobryggan. Beställarens färg.	99.000,-
	Breddning av ränderna från ca 1 m till 1,5 m	432,-
0029	Utmärkning och målning av fartygets nya namn samt målning av Siljas logo på utsidorna. Beställarens färg.	63.000,-
	Namnet målat på två ställen på aktra bilporten.	1.640,-
0400	Utsidans sandblästring och målning 1 gång, slipning och fläckmålning av ställen där första strykningen flagat. Ställningsarbete	11.350,-
0410	Målning av Världsnaturfondens märken på SB- och BB-sidorna	10.830,-
	Målning av rederiets märke	2.040,-
	Bogportens insida, uppfartsbrons utsida och sidor samt avsatsen under uppfarts-bron rengjorts, avskärmats samt målats. Rengörning, avskärmning och målning av akterrampen samt röda områden som kommit i dager efter att rampen öppnats. Beställarens färger	53.540,-
	Sönderslipning av ytan samt övermålning av akterspegelns vita del 150 m². Beställarens färg.	4.290,-

	Extra övermålning av blå rand på SB-sidan 20 m, på BB-sidan 60 m Ställningsarbete Beställarens färg	10.820,-
0031	Avskärmning av propeller och rodertappar	4.500,-
0041	- -	
0050	Zinkanoder à 10 kg förnyats - i skrovet 7 st. - i förpropellertunneln 7 st. - i bottenbrunnarna 2 st.	4.880,-
0060	Mätts spelrum i propelleraxlarna, uppgjorts och levererats mätnings-protokoll.	2.450,-
	Kontrollmätning utförts	1.260,-
0070	Mätts spelrum i rodren, uppgjorts och levererats mätningsprotokoll	1.550,-
0080	- -	
0090	Öppning och rengörning av bottenbrunnarna 3 st. samt målning av brunnarna 1 ggr antifouling	7.560,-
	Skada förorsakad av vattenflöde i samband med behandlingen av bottenbrunnarna	3.810,-
0100 0370	Transport av 7 st. havsvattenfilter från fartyget till plåtverkstad, reparation av filtrens ramar genom att förnya plattorna.	

2 st ϕ 550 mm	10 mm platta
3 st ϕ 400 mm	10 mm platta
1 st ϕ 650 mm	10 mm platta
1 st ϕ 600 mm	3 mm rostfri platta

	Förnyats byglar 3 x 30 mm i plattstången. Förnyats siktens låsanordningar 20 st 10 x 70 x 100 mm Utförts fyllnadssvetsning av ramarna. Sandblästring och målning av filtren med INERTA 160 målfärg Installerats 6 st zinkanoder à 5,5 kg	26.130,-
0110	Reparation av Yorcalbro kylvattenrören enl. pos. 1-9 i specifikationen (beställaren lossar och monterar rören på plats.)	91.500,-

0360 Utöver offerten har Turun korjaustelakka Oy assisterat vid löstagningen av rören samt levererat 1 st. STRAUB-koppling 219,1. Därutöver har reparerats 3 st av beställaren löstagna Yorcalbro-rör, som ej ingått i offerten.

Material som använts vid reparationen:

1 m	Calbro-rör	NS 250
1 st	Calbro-nav	NS 250
1 st	Calbro-nav	NS 100
1 st	Calbro-krök	NS 100
0,3 m	Calbro-rör	NS 100
2 st	spännfläns	NS 250
1 st	spännfläns	NS 100
0,5 m	Calbro-rör	NS 250
2 st	Calbro-krok	NS 250
2 st	Calbro- nav	NS 250
2 st	spännfläns	NS 250
1 st	svetsupphöjning	1/2 "
3 st	Calbro-nav	NS 50
3 st	spännfläns	NS 50
4 st	Calbro-krok	NS 50
1 m	Calbro-rör	ϕ 57
1 st	tapp	2 "
1 st	förminskningskon	NS 50-40

55.610,-

0120 Tömning och rengörning av spillolje-tanken 6.800,-

Kostnader för behandling av 14 m³ spillolja 29.120,-

0160 Byte av 2 st BB-propellerblad 16.560,-

Reparation av fartygets felaktiga bladbultsnyckel samt vridning av propellern med hjälp av talja 8.800,-

0170 SB-rodermaskins distansstång löstagits från hjärtstocken och fraktats till verkstad.
Lager hålet gjorts större och mellanhylsa ϕ 120 x 60 mm tillverkats samt nytt av beställaren levererat lager monterats.
Montering på plats och provkörning utförts. 16.770,-

0190 Ventilationskanalernas alla galler på utsidan löstagits, sandblästrats samt målats med beställarens färg. 38.000,-

0200	Utmärkning och målning av skorstenens nya märke	20.200,-
	Avlägsning av det gamla rederimärket från skorstenen.	12.540,-
0210	Avlägsning medelst skärbränning av namnet "Viking Sally" 4 st, samt utjämning av spåren	24.000,-
0220	Övertäckning av fartygsbottnen akterifrån 3/4 av längden, samt uppvärmingskostnader. Brännolja för uppvärmning 7950 l från varvet.	98.050,-
0250	Avlägsning av gamla landgångsfästen 8 st. samt tillverkning av 4 st. nya fästen på båda sidorna av fartyget. Ställningsarbete.	33.990,-
0260	Avlägsning av E3-skyltarna från fartygets båda sidor	3.520,-
0270	Högtryckstvätt och tvätt med upplösnings medel av oljiga fläckar på fartygets båda sidor	8.870,-
0280	Mätning av kompressionen i Cederwall-boxarna i SB- och BB-propelleraxlarna, uppgjorts och levererats mätningsprotokoll. Skydden lösgjorts och monterats på plats.	10.830,-
0290	Ändringsarbete på landgångarna på passagerardäck. Borttagning av ledstängerna samt breddning enligt instruktionerna.	6.580,-
0300	- -	
0310	Assisterat vid monteringsarbete av lysrör	11.230,-
0320	Reparation av läckage i rodren och roderkonsolerna genom att förnya en plåt 12 x 450 x 900 och svetsa korroderade ställen. Ställningsarbete.	24.510,-
0330	Reparerats läckage i SB-propellerns stävrör. Löstagits skyddskon och packring. Förnyats o-ringbandet ϕ 16 mm 1,9 m. Delarna monterade på plats.	25.660,-

TURUN
KORJAUSTELAKKA OY
Turku Repair Yard

0340	Utlånats gascentral och brännskärnings-aggregat för fartygsmanskapets bruk.	800,-
0350	- -	
0360	- -	
0370	- -	
0380	Uppsugning av oljeavfall från diesel-dagtanken samt rengöring av tanken	13.100,-
0390	Svetsning av bunkerluckans öra	880,-
0410	Skaffats billyftkran till varvet för att få allt extra arbete slutfört föröver.	40.445,-

Totalt: mk 1.511.404,-
****

Invoice turku repair yard

Enclosure 3.4.95

TURUN KORJAUSTELAKKA OY
TURKU REPAIR YARD LTD

F A K T U R A nr 30014
1.2.1991

Beställare
Vaasanlaivat-Vasabåtarna Oy Ab
C. Rickhardsson
PL 213

65101 VASA

Köparens ref

Säljarens ref
ARP/SeR/TA

Betalningsvillkor
14 dagar netto

Oms
0 %

Förfallodag 15.2.1991
Försåningsränta 18 %

Märke

M/S WASA KING

107

Pos. nr	Specifikation	Totalpris
	Reparationer, som utförts i samband med dockningen av M/S Wasa King under tiden 20.11. - 23.11.1990 enligt bifogad specifikation	
	Totalt	mk 846.769,-
		**********

Postiosoite/
PL 430
20101 TURKU

Puhelin
(921) 638711

Telefax
(921) 6387250

Telex
62484 try sf

Pankki
TYP 433110-19066
PSP Tu 227388

Lvv
Rek.

TURUN KORJAUSTELAKKA OY
TURKU REPAIR YARD LTD

M/S WASA KING

SPECIFIKATION FÖR REPARATIONER UTFÖRDA UNDER DOCKNINGEN I NÅDENDAL

Indockining 20.11.90
Utdockning 23.11.90
Avfärd från kajen 5.12.90

0100		
1.	In och utdockningen inkl. dockshyra för ett dygn	26.300,00
1.1.	Omändring av dockningsbädden	12.000,00
2.	Dockshyra för 3 dygn	35.850,00
	Kostnader för övertidsarbete i samband med indockningen	10.010,00
	Kostnader för övertidsarbete i samband med utdockningen	12.936,00
0120		
7.	Till och frånkoppling av telefon 2 ggr	610,00
7.1.	Samtalsavgifter 3.870 impulser	2.516,00
0130		
4.	Anslutning av kylvatten en gång	600,00
4.1.	Leverans av kylvatten för hjälpmaskiner 3 dygn	825,00
0140		
5.	Till och frånkoppling av brandslang 3 ggr	1.800,00
8.	Brandvakt 27 arbetsskift	26.190,00
	50 m² glasfibertyg med AL-yta för skyddning	2.940,00
0150		
6.	Anslutning av dricksvatten 2 ggr	1.200,00
6.1.	Leverans av färskvatten 109,4 m³	1.094,00
0160		
9.	Borttransport av avfall 14 ggr	5.740,00
0170		
10.	-	
0180		
15.	Färskvattenspolning av utsidorna, 780 m² BB 240 m² och SB 540 m²	4.680,00

Postiosoite/ PL 430 20101 TURKU
Puhelin (921) 638711
Telefax (921) 6387250
Telex 62484 try sf
Pankki TYP 433110-19066 PSP Tu 227388
Lvv Rek.

0190 15.	Lätt sandblästring av sidorna	4.800,00
	Fläckning 2 x 210 m²	2.940,00
	Målning 2 ggr 2 x 210 m²	1.890,00
	Märkning och målning av logo	63.000,00
	Rederiets färg	
	Kostnader för kranbil	11.070,00
	Sandblästring av bordläggningsöpningarnas kanter på utsidan, SA 2,5, samt målning med zinksilikatfärg och med ytfärg 2 ggr.	
	Rederiets färger	2.360,00
0200 16.	-	
0210 17.	Högtryckstvätt av skorsten med tvätt-medel.	
	Kostnader för övertidsarbete	5.650,00
	Skorstenens gamla målyta slipats med handslipmaskin. Nya blåa ränder har linjerats, märkts samt målats 2ggr. Det gamla sälmärket har övermålats med vit färg. Tillverkning av schablon för rederi-logon. Logon märkts och målats på båda sidorna av skorstenen.	48.780,00
	Kostnader för kranbil	18.680,00
0220 18.	Målning av EFFJOHN-logo på ena sidan av fartyget. Rederiets färg	2.500,00
	Målning av ramar runt EFFJOHN-logo på SB-sidan	2.250,00
0230 19.	Slipning av Panda-logons kantbitar och målning med vit ytfärg 2 ggr.	1.320,00
	Övermålning av Panda-logon med beställarens blå ytfärg 2 ggr.	800,00
	Kostnader för kranbil	1.150,00
0240 20.	Bortskärning av "Mariehamn" på båda sidorna i aktern	12.500,00

0250 21.	Märkning och målning av nytt namn "Wasa King" och hemort "Wasa". Tillverking av 3 st schabloner.	4.600,-
	Förutom i offerten nämnda arbeten har gamla namn bortslipatas med handslipmaskin samt ytorna målats 2 ggr med vit ytfärg.	7.850,00
	Två namn märkta och målade under akterkanten.	1.640,00
	Kostnader för kranbil	2.180,00
0260 22.	Avikerlisten	
	Avikerlistens övre del sandblästrad, SA 2,5 och nedre delen lättsandblästrad. Listen ca 80 m² målats 4 ggr med rederiets färg.	8.800,00
	Kostnader för kranbil	6.540,00
0270 23.	-	
0280 24.	-	
0290 31.	Mätning av propelleraxelspel	2.700,00
0300 32.	Mätning av roderspel	2.100,00
0310 33.	-	
320 34.	Förnyande av zinkanoder 10 kg Roder 2 + 2 st Bottenbrunnar 12 st	4.880,00
0330 35.	Bottenbrunnar öppnats, rengjorts och målats med antifouling 4 st	10.080,00
0340 36.	Byte av 2 st propellerblad BB sida	16.500,00
	I samband med byte av bladen har tätningsringar av brons lösmonterats och lyfts ut, 6 st lyftskruvar har tillverkats. O-ringarna förnyade. Hopmontering.	1.600,00

0350 41.	Reparation av 12 st yorcalbrorör.	79.900,00
	Tillverkning av delar till rör NS 175 av gammal standard och ihoppassning med rör NS 200.	2.160,00
0360 42.	Rengöring av slamtank, 20 m³ och bilgevattentank 22 m³	12.700,00
	Transport av oljeavfall till Ekokem och behandlingskostnader, 21.000 kg	46.430,00
0370 43.	Rören för djupgångsmätarna, 2 st ϕ 50 x 6 m, borrats öppna och krassats rena. Rören blindats och fyllts med Antifouling-färg, däreter avtappats. 20 l Antifouling-färg från varvet.	16.360,00
0380 51.	De gamla plastnamnen har avlägsnats genom uppvärmning och bortslipning. Namnskyltarna slipats och målats med ytfärg 2 ggr. Tillverkning av schablon för namnet samt märkning och målning av det nya namnet. Vid arbetet utförande har en saxhiss använts.	12.820,00
0390 52.	Löstagning av landgångsfästena på båda sidorna genom brännskärning och förflyttning till däck nr 4 enligt skiss. Rengöring och målning 3 ggr.	21.580,00
	Kostnader för kranbil	1.120,00
0400 53.	Reparation av bordläggningsskada spanter 122-140 för och akter i randningen enligt offert inkl. arbetena, plåttjocklek 10 mm, 2900 kg	147.370,00

Förnyade bordläggningsplåtarna,
tjocklek 10 mm:

spt 119 - 131	18 m²	1440 kg
spt 131 - 142	23,1 m²	1848 kg
spt 142 - 146,5	4,75 m²	380 kg
P-220 stång 4 x 2 m + 4 x 3 m		456 kg

Spant -5--7		
bordläggningsplåtar	2,12 m²	170 kg
däcksplåtar	0,46 m²	37 kg
balkbricka	0,08 m²	6 kg
sammanlagt		4.337 kg

	Debitering för extra kilon inkl. ställningsarbetena (4337 kg - 2900 kg) x 27,50	39.518,00
	Sandblästring av utsidan av skadade områden SA 2,5 samt målning med zinksilikatfärg och grundfärg samt ytfärg 2 ggr. Insidan rengjord och grundmålad 2 ggr.	37.860,00
0410	Öppning och påsvetsning av frätta svetssömmar på SB och BB rodren.	
	Dubleringsplåt 500 x 1200 x 23 mm monterats på BB-rodern. Ställningsarbete	17.980,00
0420	Nedre delen av BB propelleraxelskyddet löstagits och fisknät borttagits runtom propelleraxeln. Skyddet fastsatt. Ställningsarbete	2.640,00
0430	Slipning av BB propellerblad 2 st Ställningsarbete	4.830,00
0440	Skyddsrör och platta under SB sidoporten borttagna genom skärbrännning.	880,00
0450	Skyddsjärn för avrinningsrör på bildäcket tillverkad av rundstång och monterats på plats.	640,00
0460	Leverans och lyftning av asetylen- och syre-behållarepaket ombord på fartyget nära skorstenen för reparationer av pannor.	4.670,00
0470	Loss och fast av bottenpluggar 8 st. Montering och svetsning av en ny 3/4" muff och 1 st messingplugg.	2.860,00
	Totalt	846.769,00 *********

Wasa king tender specification and quotation

25. 9. 1992

Enclosure 3.4.96

PELAKONT TURKUSSA

M/S "VAASA KING"

1.	In och utdockningen inkl. en dag i docka	26.300,-
1.1.	Omändring av dockningsbådden	12.000,-
2.	Stående i docka, dockshyra/dygn	11.950,-/dygn
3.	Anslutning av el-kabel	660,-/anslutning
3.1.	Leverans av el-ström 1200 A, 18000,- +10% MÄÄRÄNTÄLESSÄ	0,60/kWh
4.	Anslutning av brandslang	660,-/anslutning
5.	Anslutning av dricksvatten	660,-/anslutning
5.1.	Leverans av dricksvatten	11,-/m³
6.	Anslutning av telefon	405,-/kabel
6.1.	Samtalsavgifter	0,65/impuls
7.	Brandvakt	1.320,-/8 h skift
8.	Borttransport av avfall 150 l	410,-/gång
9.	Anslutning av kylvatten för hjälpmotorer	660,-/anslutning
9.1.	Leverans av kylvatten	275,-/dygn
10.	Anslutning av tryckluft	660,-/anslutning
10.1	Leverans av tryckluft 7 kp/cm²	450,-/ arbetsskift

Målning

1122	Täckning av fartygsbottnet Uppvärmning	- INDIKAATIOHINTA - LÄMMITYSÖLJY FAKTAN MUKAAN	200 000,-
1222	Sandblästring fläckvis	HINTA KOSKEE YLI 500 m² MAALATTAVAA ALAA	145,-/m²
1322	Målning med Inerta	ALLE 500 m² LASKETTYNÄ	
1422	B.B. avvisarlist blästras och målas med Galvosil Hempel 1570, 127 m.		15500,-
1522	Ankarklys och ankaren blästras och målas med Galvosil		5900,-
1622	Färskvattentanken 4A och 4B ca 75 m³ vardera samt 5, 145 m³ rengöres och målas ca 10 - 20 % .		79200,-

- LASKETTU MAALAUS LAAJUUS 20 %
- KORKEAPAINEVESIPESU KAKO TANKKI
- MAALATTAVAT ALUEET Sa 2.5

1722	Ballasttanken TK 1, 175 m³ ; TK 2, 300 m³ ; TK 13 och TK 14, 183 m³ vardera; TK 54, 54 m³ ; TK 58, 220 m³. Rengöres och målas 10 - 20 % .	178400,-

- LASKETTU MAALAUS LAAJUUS 20%
- KORKEAPAINEVESIPESU KAKO TANKKI
- MAALATTAVAT ALUEET KÄYTTÖKIELLÄ PUHALLUS

1822	Förliga rampan, sidorna, blästras och målas ca 24 m².	3900,-
1922	Akterliga ramperna, sidorna, blästras och målas 2 x 12 m².	3900,-

VARUSTAMO TOIMITTAA MAALIT.

Bottenarbeten

31.28	Mätning av propelleraxelspel	2700,–
32.28	Cedervall tätningarna yttre / inre läcker olja. reparera	39500,–/AKSE-
	– TILAAJAN VARAUSAT	
	– TELINEET JA SUOJAN IRROITUS/ASENNUS	
	LASKETTU POSITIOON 33.28	
33.28	Partiell axeldragning "klassning"	49000,–/
	SUORITETAAN MODIFIOITU AKSELINVETO	/AKSELI
34.28	Lyftning av propellerblad, byte av tätningar / blad	8250,–/LAPA
35.22	Mätning av roderspel	2100,–
36.22	Lyftning av roder (rodren har ett skrikande oljud när man svänger med dem, troligen är smörjrören till lagret stockade.	28600,–
	EHDOTUS TYÖN SUORITTAMISESTA:	
	– VIRTAUS LEUYUEN POISTO /ASENNUS	
	– ALATAPIN IRROITUS JA TARKASTUS	
	– ALALAAKERIN TARKASTUS	
	– ALALAAKERIN RASVAUSPUTKEN TOIMINNAN TARKASTUS JA PUHDISTUS.	
	– PERÄSIMEN ALASOTTO LISÄHINTA 25000,–	
37.28	Täckning av propellrar och rodertappar	4500,–
38.22	Förnyande av zinkanoder 10 kg / st	325,–/KPL.
39.22	Bottenbrunnar upp och fast rengöres, målas.	3500,–/KPL.
40.22	Ankare med kätting firas ut, klassas.	7000/KETJU 2kpl

Sinkel

Maskinrumsarbeten

51.26 Bottenventiler överkalas
DN 100, 9 st; DN 125, 3 st; DN 150, 2 st;
DN 200, 6 st; DN 250, 5 st; DN 300, 2 st;
DN 450, 1 st.
Samtliga ventiler fjädermanövrerade. 37200,—

52.26 Aktra SW filterhusen förnyas 2 st.
diam 700, längd 800. 36500,—

53.26 Övrig filterhus rengöres och målas, 4 st. 7100,—

PESU, HARJAUS JA MAALAUS

54.26 Filterkorgar till dito filterhus förnyas eller repareras, om så behöves 5400,-/kpl.

LASKETTU UUSIMINEN

55.26 SW-kylvattenrör förnyas och repareras i maskin.

- PUTKET LASKETTU OHEISTEN SKISSIEN MUKAAN
- HINNAT SISÄLTÄVÄT POSITIOISSA MAINITUT STRAUB-LIITTIMET
- MATERIAALI VORCALBRO
- HINNAT EIVÄT SISÄLLÄ MAHDOLLISIA OHEIS JA LUOKSEPÄÄSY TÖITÄ
- HINNAT POSITIOITTAIN SKISSEISSÄ

56.26 HJM FW kylvattenrörsystem förnyas och repareras.

- PUTKET LASKETTU OHEISTEN SKISSIEN MUKAAN
- HINTA SISÄLTÄÄ SKISSISSÄ № 4 OLEVAT VENTTIILIT
- MATERIAALI = TERÄSPUTKI
- HINNAT EIVÄT SISÄLLÄ MAHDOLLISIA OHEIS JA LUOKSEPÄÄSY TÖITÄ
- HINNAT POSITIOITTAIN SKISSEISSÄ

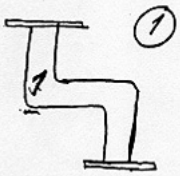
57.26 HJM FW Expansionstanken förnyas och flyttas upp till samma nivå som HUM expansionstankar.
Tanken 700 x 1220 x h 1220. 2 st rör L 15 m,
diam 60 mm, tillop och overflow.

INDIKAATIO HINTA 50000,—

Dockningsspec 1992

55.26
1/5

55.26
1) Dubbel krok vid ~~inlopp~~ avlopp till HM. 4 F.W kylare.



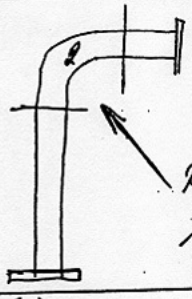
(1)

Yϕ 175

L ca 1000

HINTA 8550,-

) Krok på rör vid inlopp till HM 4 F.W kylare.



(2)

Yϕ 175

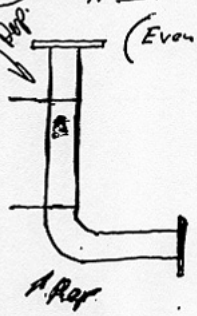
Repl ca 600

Ny krok 90°

HINTA 5490,-

(3) Avlopp Jn till HM 3 F.W kylk

(Eventuellt gör ett rör.



Yϕ 135

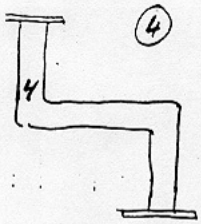
L ca 1700.

HINTA 5890,-

Dubbel krok vid HH 3
FW. kylare.

55.26
2/5

(4)



yp 175
L ca 1000

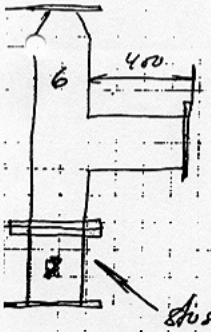
HINTA 8550,-

(5) Grova rör efter, mixad sea water vech på STB. sida på hyllan

Borde gå att separera.

HINTA TARKASTUKSEN JÄLKEEN

(6+7) T-stycke i stos i BR HH. 4 SKO. 6



yp 160.
L ca 1400.

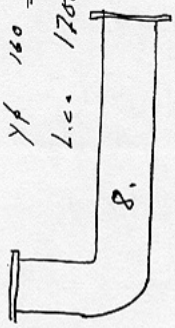
stuss. under dork.

HINTA 11990,-

Slam ladning på STB. hylla (7+6)

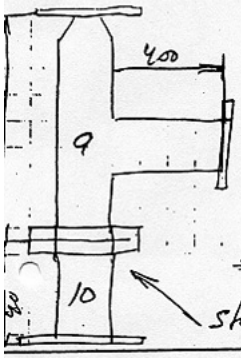
(8)

yp 160 HINTA 8780,-
L ca 1700.



55.26
3/5

(9+10) T-stycke i Stuss. i HII HM i SHO. kyl



Yp 160
L ca 1400.

HINTA 11990:-

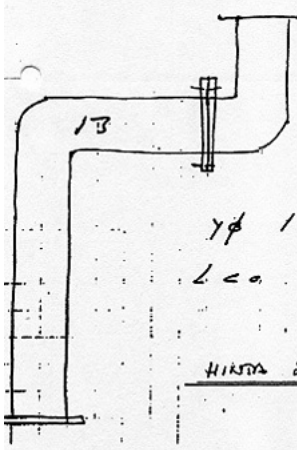
Stuss under dok.

(11) Stoss mellan HM i spolluftkylare och vent.

Yp 135 — 1
L ca 200

HINTA 3870:-

(13) Rör för uppvärmning av bottenförvaren på BR. sida HM. rum.



Rör med lugg

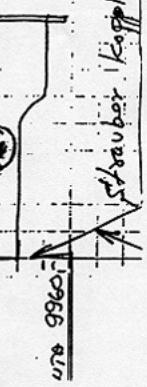
Straubor koppling

Yp 160
L ca 4.200

HINTA 20460:-

Ångledning ovan Yp BR. växel.

(12)



Yp 160
L ca 1200

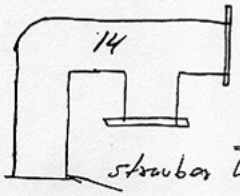
Straubor koppling

Ångledning ovan Yp BR. sida

HINTA 9960:-

55.26
4/5

(14) Rör för uppvärmning av bottenbunnen på STB. sida HH. rummet.



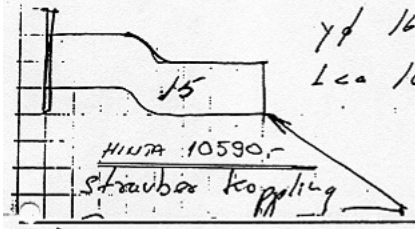
yϕ 160

L ca 1350

HINTA 13470,-

Straubar koppling

(15) Stamledning ovan för STB. växel



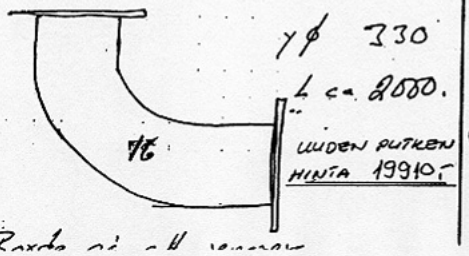
yϕ 160

L ca 1600.

HINTA 10590,-

Straubar koppling

(16) Sugsida HH. äldre salt vatten pump. STB. s.



yϕ 330

L ca 2000.

UTAN RUTKEN
HINTA 19910,-

Borde gå att separera.

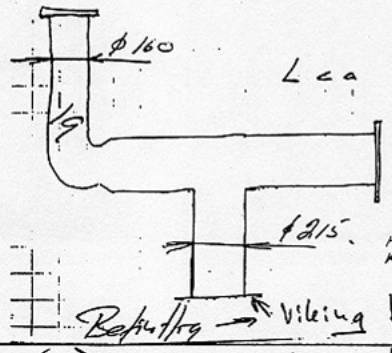
(17) Gamla rör ϕ 330 ovan för HH. kylvatten pump vuxet hyllan. STB. sida.

Borde gå att separera

(18) Gamla rör ϕ 330 ovan HH. kylvatten pump STB. sida vuxet hyllan.

Borde gå att separera.

(19) Stam ledning för Hjälp kylare. 55.26 5/5



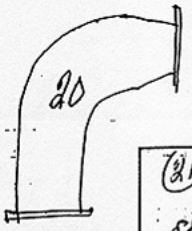
L ca 3000.

HINTA 17370,-

HINTA EI SISÄLLÄ VIKING KOPLINKAR.

Beställ → Viking koppling

(20) Krok för förliga Hjälp saltvattenpump

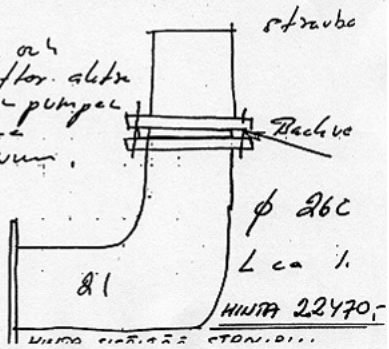


ϕ 315

L ca 1000

HINTA 17770,-

(21) krok och stos efter alla kylvattenpumpar BB. sida M.. rum.



ϕ 260

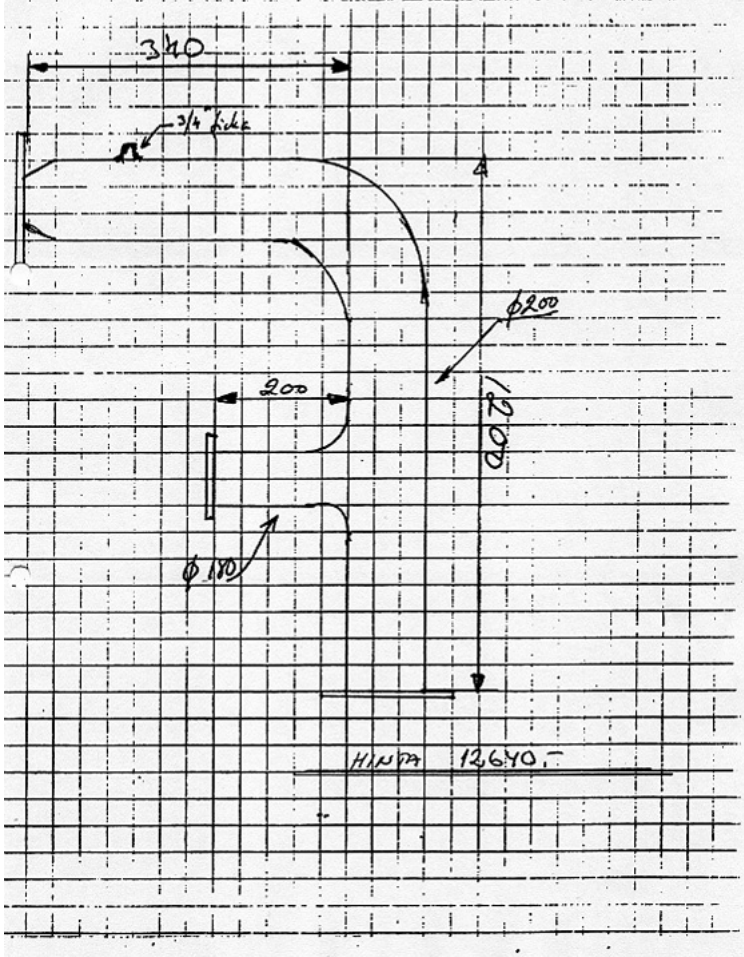
L ca 1.

HINTA 22470,-

5626
1/5

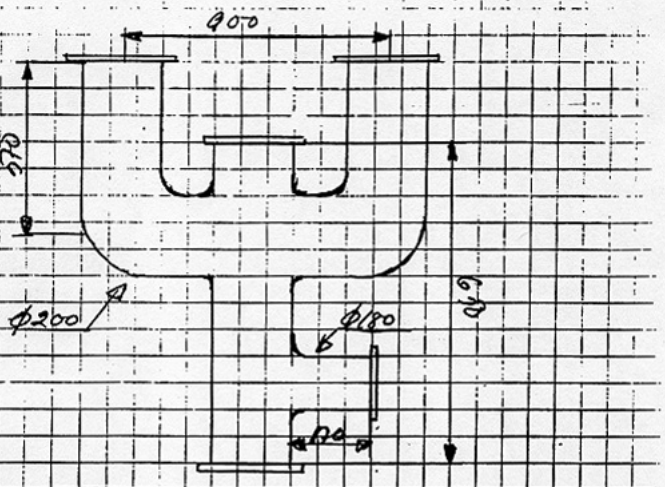
RÖR Nº 1 Hjm kylv. syst FW

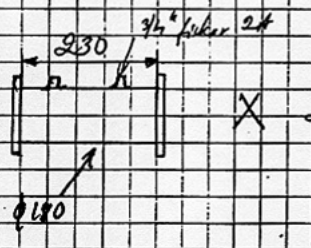
Drakt c. på [illegible]



HINTA 12640.-

RÖR Nº 2 Hfm kylv. syst. PW 6626 2/5

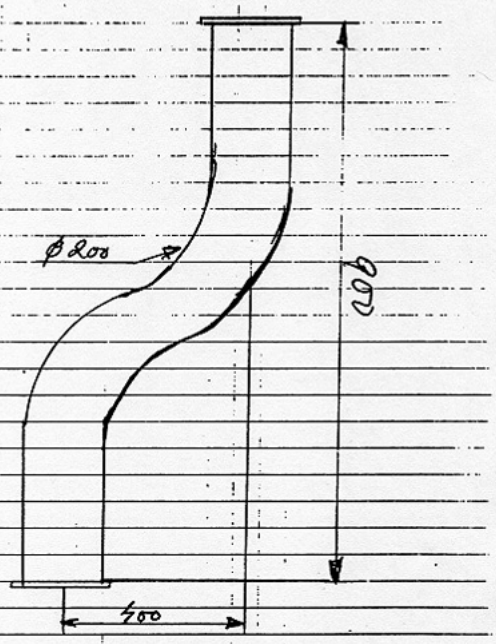




X 2

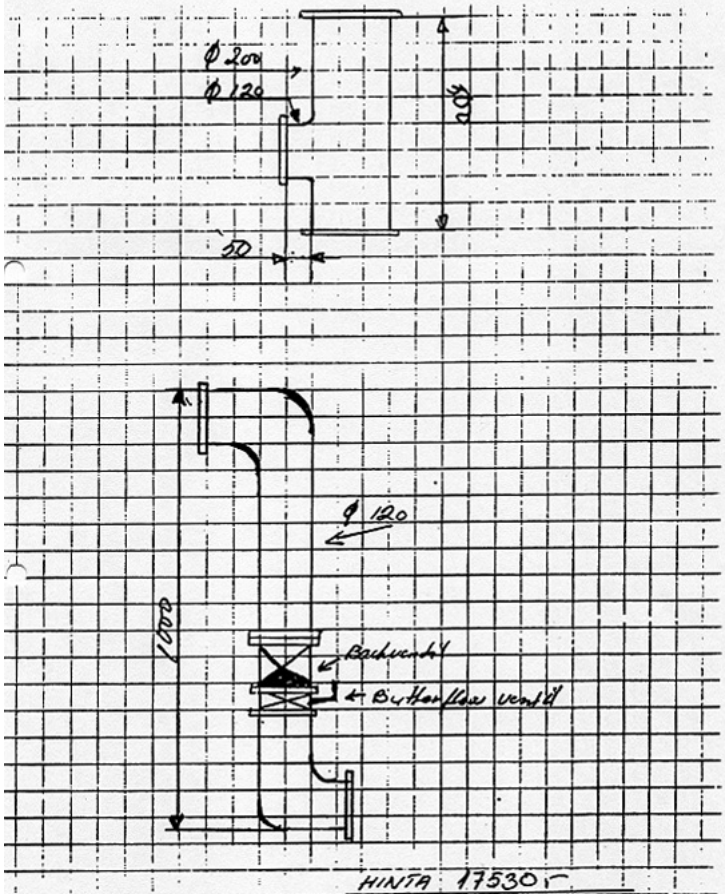
Hinta 24800:-

RÖR Nº 3 1½" kylv.sept FW 5626 3/5



HINTA 7700,-

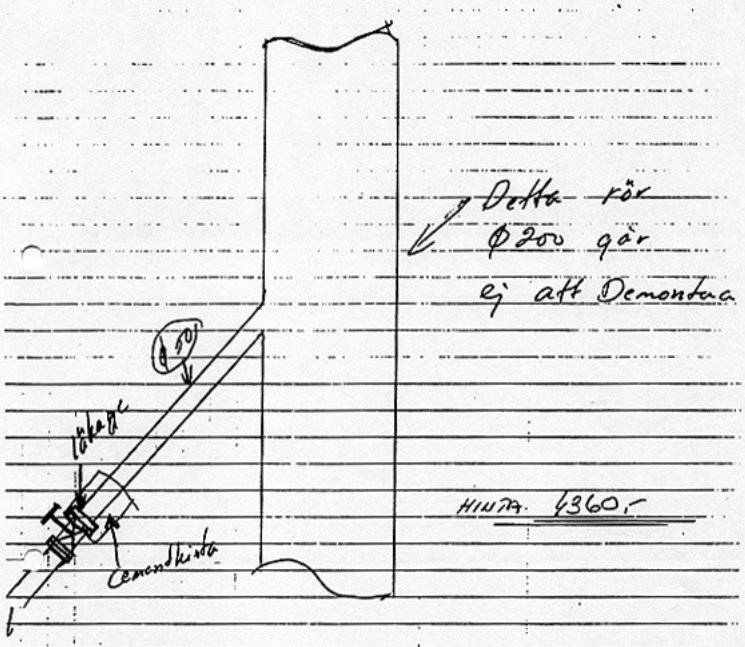
RÖQ Nº4 H/M kylv. syst. FW 5626 4/5



HINTA 17530:-

56.26

RÖR Nº 5 H/M kylv. syst 7W 5/5



HINTA 4360,-

U tank 22

58.26 Röret mellan fettavskiljningstanken i spritförrådet och gråvattentanken i separatorummet förnyas. Diam 110 mm, L 12 m, 4 st krökar 90° samt flänsar.

INDIKAATIO HINTA 37000,-

59.26 Bilgevattentank no 33, 22 m³, rengöring. 12700,-

60.26 Smutsoljetank no 42, 13 m³, rengöring. 8500

JÄTEÖLJYN MÄÄRITYS FAKTAN MUKAAN

61.26 Sludgetank no 44, 25 m³, rengöring.

HINTA TARKASTUKSEN JÄLKEEN

62.26 HJM Avgaspannor 4 st, Sanea 65 m² reparation, förnyande av bottnet.

INDIKAATIO HINTA 200000,-

63.26 Hisschakten på 2 provianthissar, skotten riktas, avståndet för stort till hisskorgen

HINNOITELLAAN KUN TYÖN LAAJUUS ON MÄÄRITELTY

64.26 Flexibel tryckslang med stålväv, diam 50 mm, längd 200 mm, 150°C, 8 st insättes i HUM H.O.fuel tryck och returrör.

65.26 Expansionstankar i HUM kylsystem rengöres och målas 2 st x 1,5 m³. 7000,-

Övrigt

70.22 Akterramperna, skalkningarna service samt förstärkningar 5200,-/kal.

71.22 Akterramperna, gångjärn överhalas, nya bussningar. 46600,-

72.22 Förramp och visir skalkningar ögnas förstärkes.

HINTA TARKASTUKSEN JÄLKEEN

73.22 Förramp, gångjärn överhalas eventuellt nya bussningar. 23900,-

74.22 Visir 15 m och ramp-packningar 10 m förnyas 18600,-

75.22 Vajerbyten på bildäckshyllorna (12 VAIJERIA) 54600,-

Wasa king docking specification 1993

M/S Wasa King
Dockningsspecifikation 1993

Particulars
Passengership

LOA	157.00	Bureau Veritas	
LPP	137.40	DWT	3345
B.extr.	24.2	Gross	15598
Draft	5.55	Net	8394

Allmän del

01 Indockning, utdockning, 1 dag dockstående

02 Dockstående / dygn

03 Anslutning av elkablar
Leverans av el 1200 A, 380 V, 50 Hz

04 Anslutning av brandslangar

05 Anslutning av dricksvatten
Leverans av dricksvatten

06 Anslutning av telefon
Samtalsavgifter

07 Brandvakt

08 Avfall

Målning

1122 Täckning av fartygsbottnet
Uppvärmning

1222 Sandblästring fläckvis

1322 Målning med Inerta

1422 B.B. avvisarlist blästras och målas med Galvosil
Hempel 1570, 127 m.

1522 Ankarklys och ankaren blästras och målas med
Galvosil

1622 Färskvattentanken 4A och 4B ca 75 m^3 vardera
samt 5, 145 m^3 rengöres och målas ca 10 - 20 % .

1722 Ballasttanken TK 1, 175 m^3 ; TK 2, 300 m^3 ;
TK 13 och TK 14, 183 m^3 vardera; TK 54, 54 m^3 ;
TK 58, 220 m^3. Rengöres och målas 10 - 20 % .

1822 Förliga rampen, sidorna, blästras och målas
ca 24 m^2.

1922 Akterliga ramperna, sidorna, blästras och målas
2 x 12 m^2.

Bottenarbeten

31.28 Mätning av propelleraxelspel

32.28 Cedervall tätningarna yttre / inre läcker olja repareras

33.28 Partiell axeldragning "klassning"

34.28 Lyftning av propellerblad, byte av tätningar / blad

35.22 Mätning av roderspel

36.22 Lyftning av roder (rodren har ett skrikande oljud när man svänger med dem, troligen är smörjrören till lagret stockade.

37.28 Täckning av propellrar och rodertappar

38.22 Förnyande av zinkanoder 10 kg / st

39.22 Bottenbrunnar upp och fast rengöres, målas.

40.22 Ankare med kätting firas ut, klassas.

Maskinrumsarbeten

51.26 Bottenventiler överhalas
DN 100, 9 st; DN 125, 3 st; DN 150, 2 st;
DN 200, 6 st; DN 250, 5 st; DN 300, 2 st;
DN 450, 1 st.
Samtliga ventiler fjädermanövrerade.

52.26 Aktra SW filterhusen förnyas 2 st.
diam 700, längd 800.

53.26 Övrig filterhus rengöres och målas, 4 st.

54.26 Filterkorgar till dito filterhus förnyas eller repareras, om så behöves

55.26 SW-kylvattenrör förnyas och repareras i maskin.

56.26 HJM FW kylvattenrörsystem förnyas och repareras.

57.26 HJM FW Expansionstanken förnyas och flyttas upp till samma nivå som HUM expansionstankar.
Tanken 700 x 1220 x h 1220. 2 st rör L 15 m ,
diam 60 mm, tillop och overflow.

58.26 Röret mellan fettavskiljningstanken i spritförrådet och gråvattentanken i separatorummet förnyas. Diam 110 mm, L 12 m, 4 st krökar 90° samt flänsar.

59.26 Bilgevattentank no 33, 22 m^3, rengöring.

60.26 Smutsoljetank no 42, 13 m^3, rengöring.

61.26 Sludgetank no 44, 25 m^3, rengöring.

62.26 HJM Avgaspannor 4 st, Sanea 65 m^2 reparation, förnyande av bottnet.

63.26 Hisschakten på 2 provianthissar, skotten riktas, avståndet för stort till hisskorgen

64.26 Flexibel tryckslang med stålväv, diam 50 mm, längd 200 mm, 150°C, 8 st insättes i HUM H.O.fuel tryck och returrör.

65.26 Expansionstankar i HUM kylsystem rengöres och målas 2 st x 1,5 m^3.

Övrigt

70.22 Akterramperna, skalkningarna service samt förstärkningar

71.22 Akterramperna, gångjärn överhalas, nya bussningar.

72.22 Förramp och Visir skalkningar överses förstärkes.

73.22 Förramp, gångjärn överhalas eventuellt nya bussningar.

74.22 Visir 15 m och ramp-packningar 10 m förnyas

75.22 Vajerbyten på bildäckshyllorna

TURKU REPAIR YARD LTD
SF-20101 TURKU, FINLAND
Box 430
Tel. +358 21 638711 Telex 62484 try sf

TELECOPIER WORK ORDER
Telecopier No. +358 21 638 7250
638 7251 prod.

To: VAASANLAIVAT OY
Date: 25.9.1992
No: 961-3260199
Ref:
Attn: C. RICKHARDSSON
No. of pages including cover sheet: 16
From: B. KUJALA

IF NOT CORRECTLY RECEIVED PLEASE REPORT IMMEDIATELY

Subject: M/S "WASA KING"

OHEISENA LÄHETÄMME TYÖ-
KAPPALEEN TARJOUKSESTAMME
KOSKIEN 18.9 PÄIVÄTTYÄ ERITTELYÄ
ALUKSELLA SUORITETTAVISTA TÖISTÄ
TAMMIKUUSSA -93.
PUHTAAKSIKIRJOITETUN TARJOUKSEN
LÄHETÄMME VIIKKO 40 ALUSSA.

YSTÄVÄLLISIN TERVEISIN

TURKUN KONNAKISTELAKKA OY
MYYNTIOSASTO
Boris Kujala

LÄHETETÄÄN!
EI TARVITSE PUHTAAKSI KIRJOITETUA
PUH. kesk. AS. 9
klo 11.40
ALA TAAN PUUKALU-
KULKEESSA
ASIAAN!

Wasa king quotation by Macgregor, turku

Enclosure 3.4.98

Office Translation:

MacGREGOR-NAVIRE (FIN) Oy / No. / Date 22.9.92 / Our ref. T. Mäki / page 1/1
To: Turku Repair Yard, attn: Boris Kujala / Ref: M/S Wasa King, Offer

OFFER

Referring to your fax request for a tender, dated 19.9.92 we hereby offer spare parts and repair works as follows:

Pos 70.22 Stern ramps, service and strengthening of locking devices.

Price: Work FIM 3,500 / locking device, VAT 0%
Materials FIM 500 / locking device, VAT 0%

Pos 71.22 Stern ramps, exchange of end hinge bushings and hinge axles.

Price: Work FIM 33,000 / vessel, VAT 0%
Materials FIM 2,800 / vessel, VAT 0%

Pos 72.22 Bow ramp, exchange of end hinge bushings and hinge axles.

Price: Work FIM 16,500 / vessel, VAT 0%
Materials FIM 1,400 / vessel, VAT 0%

Pos 73.22 Bow visor, exchange of 15 metres and bow ramp 10 metres rubber sealing gasket.

Price: Work FIM 6,300 / 25 metres, VAT 0%
Materials FIM 8,000 / 25 metres, VAT 0%

Pos 74.22 Exchange of car deck wires.

Price: Work FIM 3,000 / wire, VAT 0%
Materials FIM 500 / wire, VAT 0%

Delivery time for: Work 1 week
Materials: 2 weeks from ordering

Delivery terms: Free Turku - 93
Payment terms: 30 days net
Other terms: NLM 84

Best regards

signed
Tomi Mäki

MacGREGOR NAVIRE MacGREGOR-NAVIRE (FIN) Oy Marine Services Unit	No.	Date 22.9-92	Our ref. T.MÄKI	Page 1/1

TO: TURKU REPAIR YARD
ATTN: BORIS KUJALA

REF: M/S WASA KING
TARJOUS

IF NOT CORRECTLY RECEIVED, PLEASE INFORM US.
TELEPHONE: +358-21-892111 TELEX: 62112, 62382 mgnfi sf
TELEFAX: +358-21-892517

TELEFAX

TARJOUS

VIITATEN TARJOUSPYYNTÖÖNNE FAX 19.9-92 TARJOAMME TEILLE EM. ALUKSEN VARAOSIA JA KORJAUSTYÖTÄ SEURAAVASTI:

POS. 70.22 PERÄRAMPPIEN LUKITUSLAITTEIDEN HUOLTO JA VAHVISTUS.

HINTA TYÖLLE : FIM 3500,-/LUKITUSLAITE, LVV 0%
HINTA MATERIAALILLE : FIM 500,-/LUKITUSLAITE, LVV 0%

POS. 71.22 PERÄRAMPIT, PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPIN VAIHTO

HINTA TYÖLLE : FIM 33.000,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 2800,-/ALUS, LVV 0%

POS. 72.22 KEULARAMPIN PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPPIEN VAIHTO

HINTA TYÖLLE : FIM 16.500,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 1400,-/ALUS, LVV 0%

POS. 73.22 KEULAVISIRIN 15M JA KEULARAMPIN 10M TIIVISTEKUMIN VAIHTO

HINTA TYÖLLE : FIM 6.300,-/25, LVV 0%
HINTA MATERIAALILLE : FIM 8.000,-/25M. LVV 0%

M/S WASA KING - TARJOUS 2/2

POS. 74.22 AUTOKANNEN VAUERIEN VAIHTO

HINTA TYÖLLE : FIM 3000,- /VAUERI, LVV 0%
HINTA MATERIAALILLE : FIM 500,- / VAUERI, LVV 0%

TOIMITUSAIKA TYÖLLE : 1 VIIKKO
— " — MATERIAALILLE : 2 VIIKKOA TILAUKSESTA

TOIMITUSEHTO: VAPAASTI TURKU -93
MAKSUEHTO : 30 PV NETTO
MUUT EHDOT : NLM 84 MUKAAN

YST. TERVESIN

Tom Juhl

Office Translation

To: Vasanlaivat Oy, no: 961 - 3260199, attn: C. Rickhardsson, date 25.9.92
Fm: Turku Repair Yard, Boris Kujala
Telecopier Work Order

Subject: M/S Wasa King

Attached please find a draft of our offer regarding the specification dated 18.9 for works to be performed on the vessel in January -93.

We shall mail you a final offer at the beginning of week 40.

Best regards

Turku Repair Yard Oy
Sales Department

signed
Boris Kujala

Added text: Final version not necessary. Phone conference at 1140 on 25th September. Revert to the business in a months time.

TURKU REPAIR YARD LTD
SF-20101 TURKU, FINLAND
Box 430
Tel. +358 21 638711 Telex 62484 try sf

TELECOPIER WORK ORDER
Telecopier No. +358 21 638 7250
638 7251 prod.

To: VAASANLAIVAT OY
No: 961-3260199
Attn: C. RICKHARDSSON
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Ref:
No. of pages including cover sheet: 16

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Subject: M/S "WASA KING"

OHEISENA LÄHETÄMME TYÖ-
KAPPALEEN TARJOUKSESTAMME
KOSKIEN 18.9 PÄIVÄTTYÄ ERITTELYÄ
ALUKSELLA SUORITETTAVISTA TÖISTÄ
TAMMIKUUSSA -93.
PUHTAAKSIKIRJOITETUN TARJOUKSEN
LÄHETÄMME VIIKKO 40 ALUSSA.

YSTÄVÄLLISIN TERVEISIN

TURKUN KORJAMOTELAKKA OY
MYYNTIOSASTO
Boris Kujala

LÄHETETTÄ
KIRJOITETUN
PUHTAAKSI
EI TARVITSE
PUH. kesk. 25.9
klo 11.40
ALKAMAN KUULUESSA
ASIAAN!

Statement tarmo makki-macgregor turku

Enclosure 3.4.99

21/03 '97 PE 09:25 FAX +358 0 4550619 VTT/Laiva&Kone

Witness Statement

Central Criminal Police, Turku Thursday 20.03.1977 at 1100
Interrogator: Senior Constable Esko Vesanen
Witnessed by: Senior Constable Esko Ala-Hannula Present on signing X

Mäki, Tarmo Kalevi 290854-201K

Engineer Kaarina Parish
Koriston Rantatie 16 20780 Kaarina 02-243 7770 home
DNV Turku 02-273 7200 office

Re: Investigation into the Estonia accident

Others present: Special Expert VTT's special investigator Tuomo Karppinen

Witness Statement

I commenced working for Navire Cargo Gear (FIN) Oy in 1979. This company changed name into Mac Gregor-Navire (FIN) Oy in 1984, as I recall, and then again in 1992 into MacGregor (FIN) Oy.

At first in 1979 I worked as a designer and from November 1980 my assignment was changed and I was assigned the job of maintenance engineer. My term of service ended in the fall of 1995 when I started working as a DNV surveyor.

This assignment covered service and maintenance and modernisation of cargo handling gear of trading vessels. On being asked specifically about this cargo handling gear I will say that they comprised bow visors, bow ports, bow and stern ramps, hatches and car decks and also deck cranes, i.e. the gear necessary for loading and discharging a vessel. Everything which had to do with the servicing and other maintenance of the aforementioned gear was my responsibility.
On being asked how our company acquired these assignments I will say that either the vessel itself or a shipping line surveyor would always order the job to be done. In general our company was always informed in detail about 'problem' and we assumed the assignment as a 'general responsibility'.
In practice we boarded the object, i.e. the vessel, and discovered these 'problems', after which we prepared a maintenance plan to remedy the 'problem' after which we performed the job itself (in Finnish the wording used may also mean 'we ourselves performed the job').

On being asked I will say that that the company I represented also on request performed annual inspections of cargo handling gear on vessels. We issued our own certificates to the vessels regarding these inspections.

In addition to inspections performed by us the classification societies and maritime authorities performed their own inspections on ships, for which they issued their own certificates. These were so called 'official inspections'.

Work performed for Sally Line

The company I represented performed the above work for several shipping lines. Among these was Sally Line, which had its head offices in Mariehamn. On being asked I will say that Navire, which I represented, was the only company which alone performed the above service and maintenance work for Sally Line until this shipping line went into bankruptcy sometime in 1989. Even after this date Navire performed these same works for the ex vessels of the line, although the shipping line name had changed.

Sally Line also owned a vessel called Viking Sally, which had been launched in Germany in 1980.

On being asked I will say that the Viking Sally became a Navire customer for the first time in 1981 - 1982. In any event the guarantee period, which normally is one year, for that vessel had already expired. During the guarantee period the company I represented did no work onboard this vessel.

The first time the company I represented did any work on this vessel I was responsible for these works. Sven Olof Mäki was the shipping line's machinery superintendent, who ordered these first works.

When the company I represented had been assigned this first job I personally went onboard to familiarise myself with the vessel. I recall that we had been invited onboard the Viking Sally for maintenance work on the visor rubber sealing bands. The said rubber sealing band had become worn in use and had to be partly renewed.

On being asked I will say that when this vessel, which later became the Estonia, sunk I was contacted by persons investigating the accident. It was then clarified what works the company I represented had then performed. All documents regarding these works, invoicing and orders for spare parts supplied onboard through us and installed onboard are all still available due to which all works we have performed on the Viking Sally can be checked from the records.

At first we thus performed the servicing of this rubber sealing band. The same sealing band on the bow visor then had to be exchanged several times, annually.

On being asked I will say that this rubber sealing band had to be exchanged because it was not water tight, which in turn led to water ingress between the visor and the ramp.

The reason for the sealing band wear was that the bow visor was resting on this sealing band, due to the visor having too few support blocks. There were only three support blocks, when in my opinion there should have been from six to eight support blocks.

On being asked I will say that I discussed this problem with representatives of the shipping line a few times over the years and I suggested installing these support blocks, but in the event the shipping line did not 'warm' to my suggestion.

The fore peak stem damage

On now being asked in relation to the rubber sealing band whether I did observe damages to the peak stem on the Viking Sally over the years that might have been due to the visor resting too

heavily on this stem peak due to bad sealing bands I will say that I do not recall observing anything in this direction. I believe that had I observed this kind of issue I would have interfered in one way or the other.

These service and maintenance works were carried out by Navire on the Viking Sally annually ever since the guarantee period of the vessel had expired.

In addition I performed an annual survey onboard this vessel of her lifting gear, from 1984 until 1992. These inspections were so called official inspections which I personally had been authorised to perform although I performed them on behalf of the company I represented.

On being asked in general about these inspections and maintenance works I will state that in practice I was onboard the Viking Sally annually on a trip during which we inspected i.a. problems with other cargo handling gear on location. I thus obtained an idea of the problem at hand by observing the gear in actual operation. These inspections were performed annually, always in the beginning of May, before the summer season started.

Problems with the visor and the bow ramp

On now being asked what problems the visor itself or the bow ramp were suffering from I will state that in addition to the rubber packing problem there were no problems apart from one which was the exchange of a joint bearing on the upper part of the visor actuator which appeared in 1990.

The said bearing had broken and had also broken the stud inside the bearing. The bearing and stud were then replaced. The job was done in the spring of 1990 and the work itself was performed en route from Turku via Stockholm to Turku. At that time the vessel was already sailing as the Silja Star. The work was performed by Mac Gregor Navire. I was responsible for the performance of the job.

Visor locks

On being asked what service or maintenance works the company I represented performed on these over the years I will state there were none. In my opinion no works were ever performed on the visor locks through the years. As far as I know they developed no problems. Had there been problems with the visor locks I and the company I represented would surely have been advised, since our customer relationship with the shipping line was at all times very close and confidential. On being asked I will state that Sally Line related very 'respectfully' towards these locking devices and would therefore surely not by themselves have commenced working on them, had they developed problems, but the work would have been delegated to specialists in the field.

The Atlantic lock

On being asked whether the company I represented performed any service or maintenance work on the Atlantic lock of the visor I will state that we did not. No defect was ever observed with the Atlantic lock.

The company I represented still annually inspected this lock. No visual defect or defect in operation was found. The lock always worked without problems. On being asked I will state that these

inspections also included inspecting the moving bolt of the locking device as well as the lower lugs which engage the bolt on closing.

During the inspection the signal lights of the locking devices and operation of the limit switches were also inspected. The inspection of lights and switches was performed and noted both on the bridge and on the car deck, at the operating panel close to the ramp. I do not recall ever encountering anything out of the ordinary at these inspections either. Had anything special appeared during these inspections the matter would certainly have been rectified.

I do, however, recall in relation to these signal lights that the mechanical limit switches, which signalled close or open visor locks, were replaced at some stage and exchanged for inductive switches, because the original limit switches did not stand up well to humidity which now and again was able to enter the space between the visor and the ramp past the visor.

I do not with certainty recall whether exchange of the above switches was performed by the company I represented or by the vessel's own electricians. This work was, however, done sometime in the mid 80'.

Inspections in general

As stated above the company I represented commenced performing the said inspections on the said vessel in 1981 - 1982 when the vessel was the Viking Sally. These inspections were always performed regularly and annually until the spring of 1992, when the vessel was called Wasa King. During 1990, before this, during a period of less than a year the vessel was also called Silja Star.

When the vessel was sold to Est-Line at the end of 1992 the service and maintenance works of the company I represented came to an end onboard the vessel. The company I represented performed no work on behalf of Est-Line.

Read, checked and accepted; signature
Witnessed; signature
Present; signature
Heard by; signature

Noted: The hearing was finished at 1255

Wasa king quotation by macgregor turku

MacGREGOR NAVIRE MacGREGOR-NAVIRE (FIN) Oy Marine Services Unit	No.	Date 22.9-92	Our ref. T.MÄKI	Page 1/1
TO: TURKU REPAIR YARD ATTN: BORIS KUJALA		REF: M/S WASA KING TARJOUS		

IF NOT CORRECTLY RECEIVED, PLEASE INFORM US.
TELEPHONE: +358-21-892111 TELEX: 62112, 62382 mgnfi sf
TELEFAX: +358-21-892517

TELEFAX

TARJOUS

VIITATEN TARJOUSPYYNTÖÖNNE FAX 19.9-92 TARJOAMME LLE EM. ALUKSEN VARAOSIA JA KORJAUSTYÖTÄ SEURAAVASTI:

POS. 70.22 PERÄRAMPPIEN LUKITUSLAITTEIDEN HUOLTO JA VAHVISTUS.

HINTA TYÖLLE : FIM 3500,-/LUKITUSLAITE, LVV 0%
HINTA MATERIAALILLE : FIM 500,-/LUKITUSLAITE, LVV 0%

POS. 71.22 PERÄRAMPIT, PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPIN VAIHTO

HINTA TYÖLLE : FIM 33.000,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 2800,-/ALUS, LVV 0%

POS. 72.22 KEULARAMPIN PÄÄTYSARANOIDEN LAAKERIN JA SARANATAPPIEN VAIHTO

HINTA TYÖLLE : FIM 16.500,-/ALUS, LVV 0%
HINTA MATERIAALILLE : FIM 1400,-/ALUS, LVV 0%

POS. 73.22 KEULAVISIRIN 15M JA KEULARAMPIN 10M TIIVISTEKUMIN VAIHTO

Bogrampens fundgång/tätningar och gång-
HINTA TYÖLLE : FIM 6.300,-/25, LVV 0%
HINTA MATERIAALILLE : FIM 8.000,-/25M. LVV 0%
Byte

Stig Lindström berättade vidare: När man befann sig på bryggan var det 2 faktorer som spelade en viktig roll i hur mycket man kunde se av fartygets för, för det första var man befann sig på bryggan och för det andra hur lång man var. Manöverpanelen täckte nästan hela "framkanten", men det fanns platser där man kunde komma ända fram till förskottet och gick man ända fram dit, så såg man en del av själva fören. Detta om man var av normallängd. Men, om man stod bakom instrumentpanelen så såg man i princip ingenting av fören, bara gösen.

Eftersom Viking Sally (sedermera Estonia) inte var byggd som "ett vanligt fartyg" utan hade bryggan förskjuten någon bakåt, var upsikten över fören sämre. Framför bryggan och 2 däck därunder fanns ett promenaddäck som delvis skymde.

Vid mörker kastades en del ljus från fartygets främre fönster fram mot fören och på den gös som fanns på bogvisiret fanns ett styrljus i toppen. Detta gjorde att man vid mörker kunde se något av fören.

Stig Lindström tror att det kan ha varit ganska vanskligt att från bryggan se om bogvisiret hade öppnat sig under färd utan att man direkt misstänkte detta. Han tror inte att man rutinmässigt kunnat se detta. Däremot fanns det lampor i en kontrollpanel på bryggan som visade om bogvisiret var öppet eller stängt. Man hade också bogvisiret under uppsikt med hjälp av dessa kontrollampor. Naturligtvis såg man vid angöring till kaj att bogvisiret öppnade sig, var öppet eller stängt, och ju mer öppet det var ju mer såg man av visiret.

Under den tid Sig Linström seglat på Viking Sally hade de enligt hans uppfattning inte haft några, som han ser det, problem med bogvisiret, men däremot hade man blivit tvugna att göra en förstärkning på en låsanordning vid ett tillfälle.

Några restriktioner eller direktiv över hur fartyget skulle framföras vid hårt väder med grov sjö fanns inte under den tid han seglade på Viking Sally. Däremot var man tvungen att dra ner på farten eftersom fartyget var så pass utsvängt i fören, annars hade