

Rpt. 17 (b)

"DNESTR"

20 JUL 1959

Date of writing Report 16th June, 1959.  
Survey held at Mukai shima, Japan.

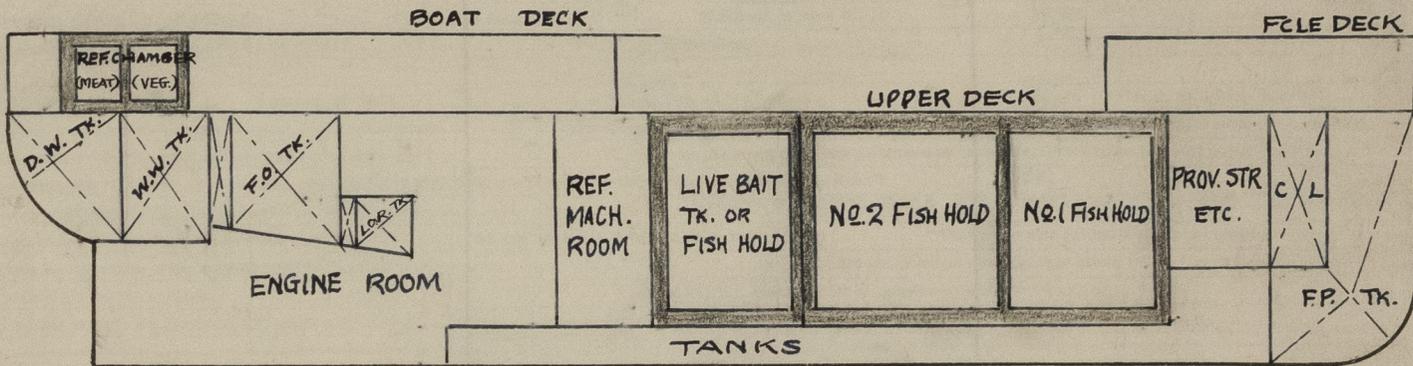
Received London 20  
No. of visits 20

Port KOBE No. FE-6518  
First date 10th Feb., 1959 Last date 4th June, 1959.

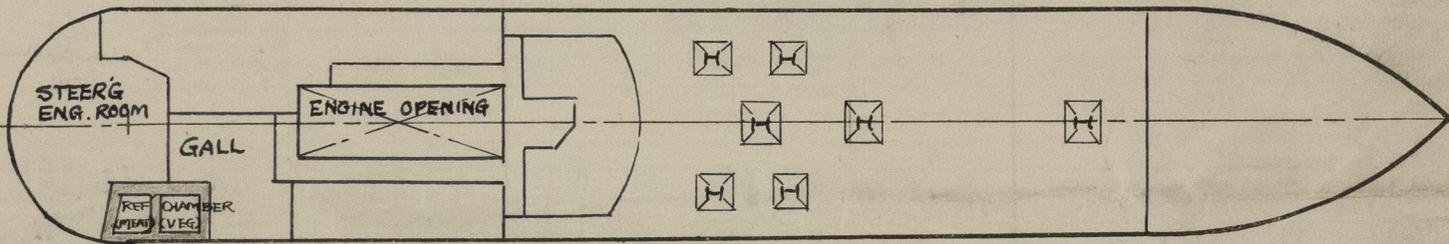
### REFRIGERATED CARGO INSTALLATION—REPORT ON INSULATION WORK, ERECTION OF PLANT ON BOARD AND TESTS AFTER COMPLETION

No. in R.B. \_\_\_\_\_ Name **Steel Single Screw Motor Fishing Boat "DNEPR" DNESTRE** Gross tons **497.10**  
 Built at **Mukaishima, Japan** By whom **Hitachi S.B. & Eng. Co., Ltd., Mukaishima Shipyard** Yard No. **3873**  
 Owners **V.O. Sudoimport Moscow U.S.S.R.** Port of Registry **Vladivostok**  
 Refrigerating Machinery made by **Sabroe Co. of Japan Ltd.** Machine Nos. **60031 & 60032** When made **12, 1958**  
 Insulation fitted by **Hitachi S.B. & Eng. Co., Ltd., Mukaishima Shipyard** Total No. of Chambers **2**  
 Total refrigerated cargo capacity measured in accordance with Society's requirements **6,184** cu. ft.

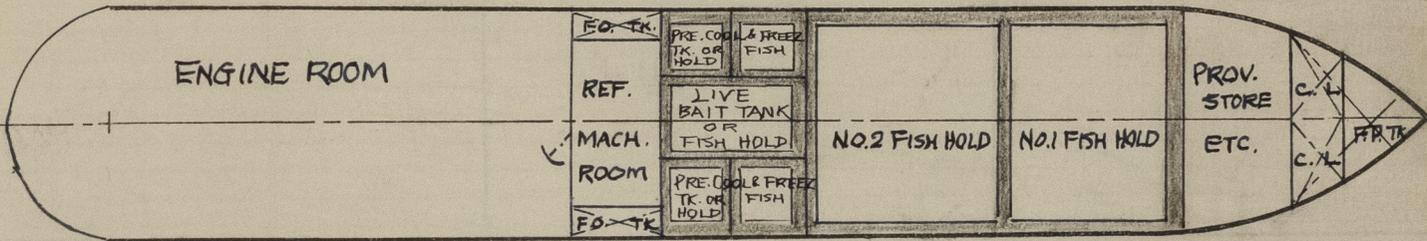
Location and boundaries in elevation and plan of each refrigerated cargo chamber, main and refrigerating machinery space(s), evaporator and brine rooms, and cooler houses to be shown by inserting decks and bulkheads in the diagrams. The frame numbers to be shown at each transverse bulkhead. The decks to be clearly marked in elevation and plan. Insulation to be shown by a line (preferably in colour) on the appropriate side or sides of decks and bulkheads. Oil storage tank tops and bulkheads adjoining refrigerated chamber(s) also to be shown. (If desired, a separately prepared diagram sheet may be attached by paste or staples provided the size is not greater than that below, all the required particulars are shown and the sheet is signed by the Surveyor.)



UPPER DECK PLAN



HOLD PLAN

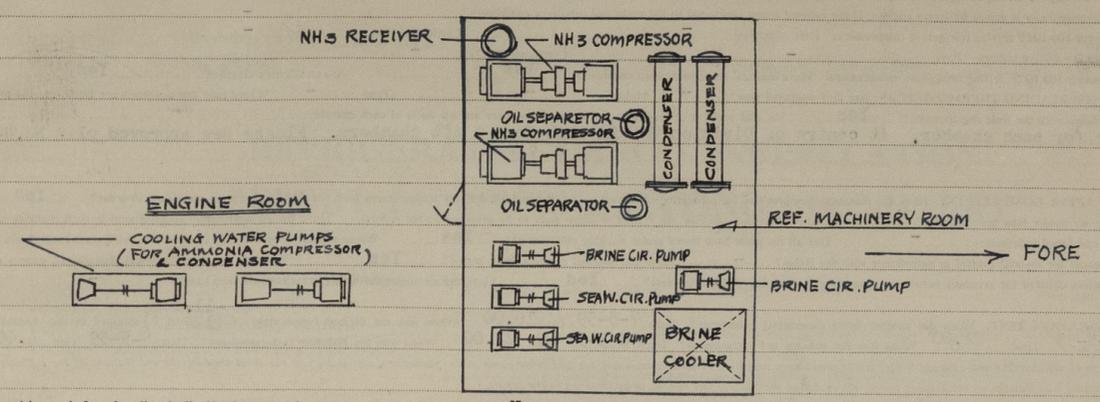


**INSULATION OF BOUNDARIES EXPOSED TO EXTERNAL CONDITIONS**  
*In cols. (1) identify each chamber by position (e.g. No. 2 UTD PORT) with each of its exposed surfaces immediately below (e.g. ships side, overheading, etc.), where the size of frames etc., change on any surface, give frame Nos. (e.g. Fms. 102 to 109) applicable to each size, on separate lines. Depth of insulation in cols. (3) to exclude any air space, linings, etc.*

(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation			(3) Depth of Insulation fitted mm	(1) Chamber(s) and Boundary	(2) Frames, reverse frames, beams, stiffeners, etc., within insulation			(3) Depth of Insulation fitted ins.
	Pitch mm	Width of face mm	Depth mm			Pitch ins.	Width of face ins.	Depth ins.	
<b>For'd</b>									
Fish Hold					Fms 56 to 66				
Ship Side	550	75	150	238	At Fm. 66				
For'd BHD	550	75	125	257	At Fm. 56				
Aft Wall	-	-	-	266					
Deck Over	550	-	125	238					
<b>Aft</b>									
Fish Hold					Fms. 48 to 56				
Ship Side	550	75	150	238	At Fm. 56				
For'd Wall	-	-	-	266	At Fm. 48				
Aft BHD	500	-	100	138					
Deck Over	550	-	125	238					

No. of refrigerating units 2 Can each unit operate on all chambers? Yes if not, state how connected

Primary refrigerant NH<sub>3</sub> Direct Expansion Where specified in the Rules, is the machinery isolated in an efficiently ventilated compartment? Yes  
 Medium for cooling chambers NH<sub>3</sub> Direct Expansion For particulars of refrigerating machinery see Kobe Report No. FE-6491  
 Diagrammatic sketch sufficient to show relative position (port or starboard, fore or aft) of each compressor, condenser, evaporator (brine cooler), condenser cooling pumps, and brine pumps



Is provision made for subcooling the liquid refrigerant (if so, state method) No  
 MOTIVE POWER supplied from (state No. of boilers or electric generators) 2 off, Diesel Eng. Elect. Generators Condenser cooling medium (if not sea water) Sea Water  
 CONDENSER COOLING PUMPS No. 2 Capacity of each 20 M<sup>3</sup> 2000 hour at head of 1.1 kg./cm<sup>2</sup>. B.H.P. of driving motors @ 2BHP  
 Are safety valves fitted where required by the Rules? Yes No. of sea connections 2  
 BRINE PUMPS No. - Capacity of each - lit./min. - galls./hour at head of - kg./cm<sup>2</sup>. B.H.P. of driving motors -  
 No. of brine temperatures which can be circulated simultaneously - Brine system "open" or "closed" type - Are safety valves fitted where required by the Rules? -  
 Are thermometers fitted to brine delivery and each return pipe? - If brine pipes and tanks are galvanized on brine side, is ventilation provided as per Rules? -  
 Are steel ~~brine~~ refrigerant pipes, cooling grids galvanized externally where required by the Rules? Yes  
 How are ~~brine~~ refrigerant steel pipes connected (flanges, butt welds, screw joints, etc.) Every element made with butt welding and flanged to each other.  
 Where brine pipes are connected by screwed couplings, are the coupling and back nut threads a good fit? - What is the pipe thickness at the bottom of the thread? -  
 Are the screw threads clear of the coupling coated as required by the Rules? - Are air cooler coils parallel to or across the air stream? -  
 Is provision made for air refreshing? No If so, are the arrangements in accordance with the Rules? -  
 What provision is made for defrosting air cooler coils and/or cooling grids in chambers? None

**PARTICULARS OF COOLING APPLIANCES IN EACH CHAMBER**  
 Identify each chamber by position (e.g. No. 2 LTD. Port, No. 3 Orlop D., No. 5 L.H. etc.)

Chamber(s)	Capacity measured in accordance with Society's requirements cu. ft.	Roof grids		Side grids		FLOOR <del>XXXX</del> coils		FANS						
		Length in ft.	No. of sections	Length in ft.	No. of sections	Length in ft.	No. of sections	Number	Maximum RPM	Minimum RPM	Cubic ft. of air per minute at maximum RPM	Static water gauge ins.	BHP of fan motor	Motor inside or outside insulated envelope
For'd Fish Hold	3114	967	8	1050	10	210	2							
Aft Fish Hold	3070	866	4	1194	10	245	2							

Are all divisional bulkheads of steel construction in accordance with the Rule? Yes If not, state position and when approved

Insulating material(s) (if more than one, state where fitted) Cork board and Alflex inner bot

Air space, if any, within insulation lining, position and depth Shell side 31mm for'd chamber for'd BHD (F66) 50mm deck above, 31mm top of /

Is approved fire resisting insulation fitted in way of ~~bulkheads~~ and other surfaces exposed to excessive heat? Yes State material fitted Air space & gutter way

Insulation lining(s) material and thickness Timber: Shell side, BHD & deck above; 2 x 19mm Top of inner bottom; 50mm

Methods of securing lining(s) (if timber grounds state whether across face, on face or on sides of frames, etc.) Timber grounds on sides of frames

Floor insulation covering 1mm Galvanized steel plate on 50mm timber Support for floor covering Steel plate directly covers timber on jo

State location and thickness of insulation of all insulated hatch coamings exposed to external conditions One hatch each located on centre line at for'd (F.Nos.61-63) and aft (F.Nos.49-51) of Nos.1 & 2 chambers respect

Insulation ribbands state where, the insulating material, thickness, width and covering -

Hatch covers, type and thickness of insulation Removable wood cover, 150mm Exposed loading and tonnage doors, state thickness of insulation -

Air ducts buried in insulation, state where -

Meat rail and/or grid hangers, state in which chambers In fore & aft fish holds

State location and dimensions of all web frames, deep girders or beams within the insulation Deep girders (depth, 250mm face, 210mm) and side stringers

(depth, 200mm, face 65mm) in both for'd and aft fish holds. 2 x 19mm

State how hold pillars and masts are insulated Pillars in insulated divisional wooden bulkhead (40mm thick) 75mm cork board covered

Are air ducts and insulation linings so constructed and erected as to prevent air entering insulation? Yes

Where oil storage tanks adjoin refrigerated chambers, are the arrangements in accordance with the Rules? Yes Are screens fitted over cooling grids on sides of chambers? Yes

Is the insulation in way of hatchways on the tank and tunnel tops protected in accordance with the Rules? Yes Are hatch plugs and their supports; chamber, air cooler and other access doors and frames; closing appliances of tonnage openings; bilge limbers and plugs, satisfactorily fitted and airtight? Yes

Are access plugs and/or panels provided in the insulation where required for easy access to the bilges, bilge suction roses, drains, tank manhole doors, air and sounding pipes? Yes

Are cargo battens provided in accordance with the Rules? Yes Dimensions and spacing on sides, vertical surfaces 50mm x 50mm S.P. 300mm

Have all ventilators and ducts passing through refrigerated chambers to other compartments been made airtight and efficiently insulated? -

Where ventilators are provided to refrigerated spaces, are they provided with airtight and insulated closing appliances? -

Are insulation linings and air screens on the sides of chambers suitably stiffened to prevent crushing by cargo? Yes

Are all steel bolts, nuts, hangers and fixtures which support or secure cooling appliances, insulation, meat rails, etc., galvanized? Yes

Is the insulation and air ducting in accordance with the approved plans and specification? Yes

The foregoing is a correct description of the insulation and appliances.

Are air cooler fans reversible? - Is access to the refrigerating plant hatched?

Can each section of air cooler coils and chamber grids be readily isolated? Yes

Where cooling pipes pass through watertight bulkheads or decking, are the fittings and gland packing both watertight and fire resisting? Yes

PRIMARY REFRIGERANT PIPING (not fabricated at Plant Makers Works) internal diameter and thickness of each size 52.9mm x 3.8mm, 41.6mm x 3.5mm, 27.67mm x 3.2mm

21.6mm x 2.8mm, 16.1mm x 2.8mm, 12.7mm x 2.3mm

Material Steel How manufactured Solid drawn Pressure tests 35 kg./cm<sup>2</sup>. hydraulic 17.5 kg./cm<sup>2</sup>. air.

Pressure tests after erection 14 lbs./in<sup>2</sup>. gas or air. Brine system pressure test on completion - lbs./in<sup>2</sup>.

K. Sasaki  
 Builders or Insulation Contractors  
 Under-director, Head of yard  
 Hitachi Shipbuilding & Engineering Co.,  
 Mukaishima Shipyard.



Do all pipes, including scupper pipes, air pipes and sounding pipes which pass through refrigerated chambers comply with, and are they erected and insulated in accordance with the Rules? **Yes**  
 Are air cooler trays provided in accordance with the Rules? **Yes** Are the drainage arrangements of the refrigerated chambers, cooler trays and air spaces behind insulation in accordance with the Rules? **Yes** Has the spare gear (see Report 17(a)) been placed on board? **Yes**  
 Is a separate plant fitted for ships stores and/or air conditioning purposes? **No** Where the installation is on a ship not classed or intended to be classed with the Society, have the general engines and electrical equipment which supply power to the refrigerating plant been examined generally and under working conditions and found sufficient and satisfactory? **-**  
 Steam or oil engines driving refrigerant compressors. Report 4c, Port **-** No. **-**  
 Where the machinery is driven by steam engines, is the exhaust steam connected to the main and auxiliary condensers? **-**  
 Motors over 100 BHP driving refrigerant compressors. Port **-** Certificate Nos. **-**  
 Air cooler fan driving motors. Port **-** Certificate Nos. **-**  
 Motors under 100 BHP driving refrigerant compressors. Have makers' certificates been obtained? **Yes** Are certificates attached? **Yes**  
 DISTANCE READING THERMOMETERS: Are they approved type? **-** Makers **-** Type **-** Where tube thermometers are fitted, are the tubes in accordance with the Rule requirements? **Yes** No. and position of thermometers in the cargo space and air ducts of each chamber.  
**One for each chamber, At centre of Division BHD in each Fore & Aft chambers. Please see approved plan No.0-**

TESTS AFTER COMPLETION: Have the thermometers provided for measuring chamber, air suction and air delivery temperatures been checked for accuracy and found in order? **Yes**  
 Have the air cooler fans been tested? **-** (the statements showing the results of these tests to be attached to the report). Have the air distribution arrangements in each chamber been checked and found satisfactory? **-** Has all the plant been tested under working conditions? **Yes** Where a plant is operated by thermostatic refrigerant control, are there arrangements for manual control in accordance with the Rules? **-** Have the manual controls been tested? **Yes** Were all the plant electrical instruments, gauges and thermometers checked for accuracy before the commencement of the refrigeration test? **Yes** Have the air cooler defrosting arrangements been tested? **-**

REFRIGERATION TEST. When did cooling down chamber(s) commence? Date **7-5-59** Time **18.00** When was the desired temperature of **-11.1** °C (**12**) °F attained in the chamber? Date **7-5-59** Time **22.00** When was the balance test commenced? Date **8-5-59** Time **22.00** When was the Balance Test completed? Date **9-5-59** Time **4.00**  
 Log sheets of the chamber and external temperatures, machinery operating conditions including fan and brine pump motor particulars, also a copy of the sheet showing the calculations of the estimate of the theoretical heat leakage on the average temperatures during the balance test period, to be attached to the report.

TOTAL THEORETICAL HEAT LEAKAGE DURING THE BALANCE TEST PERIOD

Through surfaces, etc., of cargo chambers, brine rooms, cooler houses, etc.	29,001	<del>XXXXXXXX</del>	BTU/hr
Through refrigerant leads	2,853	<del>XXXXXXXX</del>	BTU/hr
<b>Total</b>	<b>30,854</b>	<del>XXXXXXXX</del>	<b>BTU/hr</b>

MEASURED HEAT LEAKAGE

Compressor Operating Conditions:

State which compressor(s) used **Outboard Compressor**

Average evaporator gauge **-43.9** °C (**-47.02**) °F

Average condensing temperature **19.1** °C (**66.38**) °F

Compressor R.P.M. **484.1**

Machine output from curves **41,494.7** ~~XXXXXXXX~~ BTU/hr **kg. cal./h** BTU/hr

Fan, brine pump etc., heat load.

Average total fan heat load **kg. cal./h** BTU/hr

Average total brine pump heat load **kg. cal./h** BTU/hr

Any other heat load such as heaters in chamber **kg. cal./h** BTU/hr

Total of above loads **kg. cal./h** BTU/hr

Total measured heat leakage load **41,494.7** ~~XXXXXXXX~~ BTU/hr **kg. cal./h** BTU/hr

Ratio  $\frac{\text{measured heat leakage}}{\text{theoretical heat leakage}} = \frac{41,494.7}{30,854.0} = 1,345$

Maximum ratio permissible for temperature qualification desired by Owners (state head office figure).

If the arrangements and details are not precisely in accordance with the approved specifications and plans, have full details of deviations been forwarded with this Report? **Yes**  
 Is the refrigerated cargo installation a duplicate of a previous case? **Yes** If so, state name of vessel or Yard and Yard No. **Hitachi Ship No.3872 m.s. "DENPR"**  
 If the survey is not complete, state what arrangements have been made for its completion and what remains to be done **Complete**

GENERAL REMARKS. (State whether installation has been constructed under special survey in accordance with the Rules, approved plans and Secretary's letters. State quality of materials and workmanship, opinions as to class, etc.)

**The Refrigerated Cargo Installation of this ship has been constructed under Special Survey in accordance with the Rules, approved plans and Secretary's letters.**

**The material and workmanship are satisfactory.**

**The Installation has been tried under working conditions and found satisfactory and in our opinion, is worthy for Classification with the notation of +LLOYD'S RMC 5,59 "to maintain temp. -10°C with sea temp. 32°C maximum".**

**For the Survey Report on the Refrigerating Machinery, please see Kobe Rpt.17(a) No.FE- being sent now.**

PARTICULARS FOR REGISTER BOOK

MACHINERY

No. of units **2** Prime movers **Electric Motor**

Total BHP of all Compressor prime movers **80 BHP**

Refrigerant **NH<sub>3</sub>**

Makers **The Sabroe Co., of Japan Ltd.** Date of Construction **5,1959**

Machinery particulars **2-2 cylinder single acting single stage compressors**  
**150mm x 125mm x 550/700 r.p.m.**  
**2-shell & tube type condensers**  
**2-shell & tube type evaporators**

CARGO CHAMBERS

Total capacity in cubic feet **6,184** Total No. **2**

No. Independent **2** No. independently refrigerated **2**

Method of Cooling **Direct Expansion**

Insulating material(s) **Cork Board and Alflex**

Insulation lining **Timber**

Survey Fee **£** : : Fee applied for, **19**  
 Travelling Expenses **£** : : Received by me, **19**  
 Date of Committee **FRIDAY 7 AUG 1959**  
 Class assigned **+ Lloyd's RMC 5,59**

Sm,2,58. T.

CERTIFICATE WRITTEN **10/8/59**

**"to maintain temp. -14°F with sea temp 90°F max"**



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 Foundation

Kobe (1)

Lloyd's