

## REPORT ON BOILERS.

No. 11527.

Received at London Office 25 AUG 1945

Date of writing Report 22<sup>nd</sup> March 1943 When handed in at Local Office 10 Port of Copenhagen  
No. in Survey held at Copenhagen Date, First Survey 2<sup>nd</sup> July 1942 Last Survey 6<sup>th</sup> March 1943  
Reg. Book. (Number of Visits 11) Gross 2273.30  
on the Single Screw Steamer vessel "NAVITAS." Tons Net 1164.43  
Master - Built at Copenhagen By whom built A. B. Bunnister & Wain Yard No. 666 When built 1943  
Engines made at Copenhagen By whom made A. B. Bunnister & Wain Engine No. 3505 When made 1943  
Boilers made at Copenhagen By whom made A. B. Bunnister & Wain Boiler No. 2022 When made 1943  
Nominal Horse Power 272 Owners 9/16 NAVITAS Port belonging to Copenhagen.

## MULTITUBULAR BOILERS MAIN, AUXILIARY, OR DONKEY.

Built at Copenhagen.

Manufacturers of Steel Plate: The Steel Comp. of Scotland. Tube: Mannesmann Rohrenwerke (setter for Record)

Total Heating Surface of Boilers 6 m<sup>2</sup> Is forced draught fitted no Coal or Oil fired coal firedNo. and Description of Boilers 1 off vertical multitube Working Pressure 5 kg/cm<sup>2</sup> 71/65Tested by hydraulic pressure to 10 kg/cm<sup>2</sup> Date of test 30.7.42 No. of Certificate 678 Can each boiler be worked separately -Area of Firegrate in each Boiler 0.25 m<sup>2</sup> No. and Description of safety valves to each boiler One off 2" diam. direct spring loadArea of each set of valves per boiler {per Rule 1960 w/m as fitted 1960 w/m Pressure to which they are adjusted 5 kg/cm<sup>2</sup> Are they fitted with easing gear yes

In case of donkey boilers, state whether steam from main boilers can enter the donkey boiler -

Smallest distance between boilers or uptakes and bunkers or woodwork alt 0.5 m Is oil fuel carried in the double bottom under boilers no

Smallest distance between shell of boiler and tank top plating - Is the bottom of the boiler insulated yes

Largest internal dia. of boilers 890 w/m Length 1625 w/m Shell plates: Material S. M. Steel Tensile strength 44 kg/cm<sup>2</sup>

Thickness 10 w/m Are the shell plates welded or flanged no Description of riveting: circ. seams {end single

long. seams single Diameter of rivet holes in {circ. seams 19 w/m as fitted 19 w/m Pitch of rivets {inter. 45 w/m

Percentage of strength of circ. end seams {plate 57.8 rivets 57.4 Percentage of strength of circ. intermediate seam {plate - rivets -

Percentage of strength of longitudinal joint {plate 57.8 rivets 57.4 combined Working pressure of shell by Rules 9.23 kg/cm<sup>2</sup>

Thickness of butt straps {outer - inner - No. and Description of Furnaces in each Boiler -

Material - Tensile strength - Smallest outside diameter -

Length of plain part {top - bottom - Thickness of plates {crown - bottom - Description of longitudinal joint -

Dimensions of stiffening rings on furnace or c.c. bottom - Working pressure of furnace by Rules -

End plates in steam space: Material - Tensile strength - Thickness - Pitch of stays -

How are stays secured - Working pressure by Rules -

Tube plates: Material {front S. M. Steel back - Tensile strength {44 kg/cm<sup>2</sup> Thickness {20 w/mMean pitch of stay tubes in nests 100 w/m Pitch across wide water spaces D = 400 w/m Working pressure {im 8.64 kg/cm<sup>2</sup> {back

Girders to combustion chamber tops: Material - Tensile strength - Depth and thickness of girder

at centre - Length as per Rule - Distance apart - No. and pitch of stays

in each - Working pressure by Rules - Combustion chamber plates: Material -

Tensile strength - Thickness: Sides - Back - Top - Bottom -

Pitch of stays to ditto: Sides - Back - Top - Are stays fitted with nuts or riveted over -

Working pressure by Rules - Front plate at bottom: Material - Tensile strength -

Thickness - Lower back plate: Material - Tensile strength - Thickness -

Pitch of stays at wide water space - Are stays fitted with nuts or riveted over -

Working Pressure - Main stays: Material - Tensile strength -

Diameter {At body of stay, - or - No. of threads per inch - Area supported by each stay -

Working pressure by Rules - Screw stays: Material - Tensile strength -

Diameter {At turned off part, - or - No. of threads per inch - Area supported by each stay -

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Working pressure by Rules          Are the stays drilled at the outer ends          Margin stays: Diameter          { At turned off part,          or Over threads         

No. of threads per inch          Area supported by each stay          Working pressure by Rules         

Tubes: Material S.M. Steel External diameter { Plain 63.5 mm Stay 63.5 mm Thickness 3.46 mm SWG No. 9 No. of threads per inch 11

Pitch of tubes 100 x 100 mm Working pressure by Rules 16 kg/cm<sup>2</sup> Manhole compensation: Size of opening         

shell plate          Section of compensating ring          No. of rivets and diameter of rivet holes         

Outer row rivet pitch at ends          Depth of flange if manhole flanged          Steam Dome: Material         

Tensile strength          Thickness of shell          Description of longitudinal joint         

Diameter of rivet holes          Pitch of rivets          Percentage of strength of joint { Plate Rivets         

Internal diameter          Working pressure by Rules          Thickness of crown          No. and diameter of stays         

How connected to shell          Inner radius of crown          Working pressure by Rules         

Size of doubling plate under dome          Diameter of rivet holes and pitch of rivets in outer row in dome connection to shell         

Type of Superheater          Manufacturers of { Tubes Steel castings         

Number of elements          Material of tubes          Internal diameter and thickness of tubes         

Material of headers          Tensile strength          Thickness          Can the superheater be shut off and the boiler be worked separately         

Is a safety valve fitted to every part of the superheater which can be shut off from the boiler         

Area of each safety valve          Are the safety valves fitted with easing gear          Working pressure as per Rules         

Pressure to which the safety valves are adjusted          Hydraulic test pressure         

tubes         , castings          and after assembly in place          Are drain cocks or valves fitted to free the superheater from water where necessary         

Have all the requirements of Sections 14 to 22 inclusive for boilers been complied with yes

The foregoing is a correct description,  
BURMEISTER & PAHN  
KÖLN  
SKIBSBYGGERI

Dates of Survey { During progress of work in shops - - 2/1-22/1-27/1-3/2-1942 Are the approved plans of boiler and superheater forwarded herewith yes  
while building { During erection on board vessel - - - 1/4 5/4 9/4 16/4 30/4 42 2/1-4/2-7/2 (If not state date of approval.)  
Total No. of visits 11

Is this Boiler a duplicate of a previous case no If so, state Vessel's name and Report No.         

GENERAL REMARKS (State quality of workmanship, opinions as to class, &c.) The above described boiler has been built under special survey in accordance with the Rules and the approved plans. The material used in construction has been tested as required by the Rules and the workmanship is good.

The steam boiler is supplying steam for the gas generating plant and for heating purposes.

Survey Fee ... Fr. 100.00 When applied for, 1.4. 1943.

Travelling Expenses (if any) £          When received, 19

P. Langhild Jensen  
Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute FRI. 4 JAN 1948

Assigned See fee, made up

Rpt. 9a. I.  
Port of Copenhagen Continuation of Report No. 11527 dated 30<sup>th</sup> March 1948 on the

M/S. "NAVITAS", A/S. Burmeister & Wain's Yard No. 666.  
Gas Generating Plant.

The main gas generating plant comprises:-

- 2 cylindrical gas generators of equal size.
- 2 coal breakers.
- 1 coal crusher (for granulating coals).
- 1 coal lift.
- 2 dust separators.
- 2 water sealing tanks.
- 4 centrifugal tar separators.
- 2 scrubbers.
- 1 gas filter.
- 1 starting up fan.
- 1 gas suction fan.
- 1 tar separating tank.
- 1 centrifugal cleaning water pump.
- 1 centrifugal discharge pump for tarry water.
- 1 fresh water supply pump for cooling water.
- 1 condenser.
- 1 evaporator (seawater preheater & steam separator).
- 1 circulating seawater pump for do.

The auxiliary gas generating plant comprises:-

- 2 cylindrical gas generators of different size.
- 2 dust separators.
- 2 water sealing tanks.
- 2 scrubbers.
- 1 gas filter.

The cylindrical shells of the main gas generators are built of steel plates and fitted with water jackets. The bottom consists of a rotating cast iron ash pit, containing water so as to form a water seal and prevent false air from entering the generator. The centre part of the bottom is occupied of the grate which is shaped as a cone, placed a little eccentric in relation to the shell. By this arrangement the grate, when rotating, will tend to spread the coals.

The coals are led in from above through a rotating sluice in the watercooled cast iron cover, and the air is led in under the grate through a central pipe.

Part of the steam developed by the evaporation of the water in the water jacket is led into the air pipe.

From the top of the generator, the gas is led through a dust separator, a water sealing tank, tar separator No. 1, a scrubber, tar separator No. 2 and a gas filter to the main and auxiliary engines.

To start with the suction is brought about by the starting up fan, fitted in the funnel and discharging the gas to the air. When the gas is fit for use, the



M/S. "NAVITAS" (Continued).

starting up fan is stopped, and the gas suction fan is started drawing the gas from the generator through all the cleaning apparatus and discharging it into the lines leading to the main and auxiliary engines.

In order to provide electric current for the starting up process, the 2-cylinder auxiliary engine is arranged to work as oil engine, a minor quantity of heavy oil being carried on board for this purpose. Later on, when gas is available, the engine is changed over to gas fuel. The ignition of the gas in the cylinders may in the case of this engine also be effected by ignition of fuel oil.

Otherwise the ignition of the gas in the cylinders of the main and auxiliary engines is effected by an electric spark, the current being supplied by a small motor-generator in connection with a battery, all in accordance with the usual Bosch system. The tarry water from the water sealing tanks, tar separators and scrubbers is led to a tar separating or settling tank, from which the tar is led to a Double Bottom tank and the water over board.

The tarry water may also be pumped directly over board.

In order to make up for the loss of fresh water caused by part of the steam developed by the evaporation of the water from the generator cooling water spaces being blown into the air inlet pipe, a seawater heater and evaporator is fitted in the funnel, the heat being supplied by the exhaust gas. The steam thus developed and the surplus of steam from the evaporator tank for the generator cooling water is led to a condenser, from which the condensewater is led down to the D.B. fresh water tank. The generator cooling water is automatically supplemented from a fresh water feed tank, in which the water level is automatically maintained by means of a float and a centrifugal fresh water supply pump.

The whole of the main and auxiliary machinery has been thoroughly tested under working conditions and found to work satisfactorily and the manoeuvring of the main engine tested and found satisfactory.

In consideration, however, of the relative short period over which the machinery has been working, and seeing that the initial trials were all carried out under the most favourable conditions and under the Makers' control and guidance, we have found it advisable to make some reservation as to the classification of this machinery until some further experience has been accumulated as to the continuous working and maintenance, and we have therefore recommended that the notation of "Machinery Experimental" be attached to the vessel's name in the Register Book.

*P. Langhanssen Christoff*



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