Rpt. 5a.

REPORT ON BOILERS.

No. 2369

Received at London Office AUG -2 1938

Date of writing Report 25th May 19 38 When handed in at Local Office 25th May 19 38 Port of SHIMONOSEKI

No. in Reg. Book. 57414 Survey held at NAGASAKI Date, First Survey 2nd April 1937 Last Survey 10th May 1938 (Number of Visits See Machy.Rpt.)

on the Steel Single Screw Steamer "TENRYO MARU" Tons Gross 2,193:50 Net 1,158:41

Master / Built at Nagasaki By whom built Kawaminami Kogyo K.K. Koyagijima Zosensho. Yard No. 106 When built 1938

Engines made at Nagasaki By whom made Kawaminami Kogyo K.K. Koyagijima Zosensho. Engine No. 106 When made 1938

Boilers made at Nagasaki By whom made " " Boiler No. 106 When made 1938

Nominal Horse Power 294 Owners Kawaminami Kogyo Kabushiki K. Port belonging to Osaka

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MULTITUBULAR BOILERS—MAIN, ~~AUXILIARY, OR DONKEY.~~

Manufacturers of Steel Bethlehem Steel Co, Sparow point Maryland. (Letter for Record S)

Total Heating Surface of Boilers 429.08 M² / 4617 ☐ Is forced draught fitted Yes Coal or Oil fired Coal

No. and Description of Boilers Two- Single ended Multitubular. 2 ☐ **Working Pressure** 14 Kg/cm2

Tested by hydraulic pressure to 24.5 Kg Date of test 18-8-37 19-8-37 No. of Certificate 1855 & 1856 Can each boiler be worked separately Yes

Area of Firegrate in each Boiler 5.49 M² No. and Description of safety valves to each boiler Two, Spring loaded.

Area of each set of valves per boiler {per Rule 8646 MM² as fitted 11617 MM²} Pressure to which they are adjusted 14 Kg/cm2 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 500 m/m Is oil fuel carried in the double bottom under boilers /

Smallest distance between shell of boiler and tank top plating 460 m/m Is the bottom of the boiler insulated Yes

Largest internal dia. of boilers 4340 m/m Length 3500 m/m **Shell plates:** Material Steel Tensile strength 44-50 Kg/cm2

Thickness 34 Are the shell plates welded or flanged / Description of riveting: circ. seams {end D.R.Lapped. inter. /}

long. seams T.R.D.B,S. Diameter of rivet holes in {circ. seams 36.5 long. seams 36.5} Pitch of rivets {99.55 241}

Percentage of strength of circ. end seams {plate 63.3 % rivets 49.4 %} Percentage of strength of circ. intermediate seam {plate / rivets /}

Percentage of strength of longitudinal joint {plate 84.9 % rivets 97.9 % combined 89.2 %} Working pressure of shell by Rules 14.53 Kg/cm2

Thickness of butt straps {outer 29 inner 32} **No. and Description of Furnaces in each Boiler** 3- Morison's Type Corrugated. 3 ☐

Material Steel Tensile strength 41-47 Kg/cm2 Smallest outside diameter 1048

Length of plain part {top / bottom /} Thickness of plates {crown 16 m/m bottom 16 m/m} Description of longitudinal joint Welded

Dimensions of stiffening rings on furnace or c.c. bottom / Working pressure of furnace by Rules 15.66 Kg/cm2

End plates in steam space: Material Steel Tensile strength 41-47 Kg/cm2 Thickness 32 Pitch of stays 430x465

How are stays secured Double nuts & washers Working pressure by Rules 16.745 Kg/cm2

Tube plates: Material {front back Steel.} Tensile strength {41-47 Kg/cm2} Thickness {20}

Mean pitch of stay tubes in nests 232 m/m Pitch across wide water spaces 350 Working pressure {front 15.4 Kgs back 16.7 "}

Girders to combustion chamber tops: Material Steel Tensile strength 40-50 Kg/cm2 Depth and thickness of girder at centre 230x40 Length as per Rule 805 m/m Distance apart 207 No. and pitch of stays in each 3x180 Working pressure by Rules 18.91 Kg/cm2 **Combustion chamber plates:** Material Steel

Tensile strength 41-47 Kg/cm2 Thickness: Sides 18 Back 18 Top 18 Bottom 25

Pitch of stays to ditto: Sides 205x255 Back 220x230 Top 180x207 Are stays fitted with nuts or riveted over Nuts

Working pressure by Rules 14.92 Kg/cm2 **Front plate at bottom:** Material Steel Tensile strength 41-47 Kg/cm2

Thickness 20 **Lower back plate:** Material Steel Tensile strength 41-47 Kg/cm2 Thickness 18

Pitch of stays at wide water space 350x220 Are stays fitted with nuts or riveted over Nuts

Working Pressure 19.18 Kg/cm2 **Main stays:** Material Steel Tensile strength 44-50 Kg/cm2

Diameter {At body of stay, 80 or Over threads over threads. 86} No. of threads per inch 6 thread per 25.4 Area supported by each stay 430x465 m/m

Working pressure by Rules 19.18 Kg/cm2 **Screw stays:** Material Steel Tensile strength 41-47 Kg/cm2

Diameter {At turned off part, / or Over threads 1 7/8"} No. of threads per inch 9 thread per 25.4 Area supported by each stay 205x255 m/m

Working pressure by Rules 18.46 Kg/cm² *the stays drilled at the outer ends* No *Margin stays: Diameter* { *At turned off part* / / *or Over threads* 2 3/8" & 2 1/8"

No. of threads per inch 9 ✓ *Area supported by each stay* 350x220 m/m *Working pressure by Rules* 16.6 Kg/cm2

Tubes: *Material* Steel *External diameter* { *Plain* 89 ✓ / *Stay* 89 ✓ } *Thickness* { 4.1 m/m ✓ / 8 & 9.5 m/m ✓ } *No. of threads per inch* 9 thread per 25.4

Pitch of tubes 116x120 m/m *Working pressure by Rules* 18.05 Kg/cm2 **Manhole compensation:** *Size of opening in shell plate* 305x405 m/m *Section of compensating ring* Flange ✓ *No. of rivets and diameter of rivet holes* 36-36.5 ✓

Outer row rivet pitch at ends about 120 ✓ *Depth of flange if manhole flanged* 90 ✓ **Steam Dome:** *Material* Steel

Tensile strength 41-47 ✓ *Thickness of shell* 18 ✓ *Description of longitudinal joint* D.R.D.B.S. ✓

Diameter of rivet holes 26.5 ✓ *Pitch of rivets* 102 ✓ See plan *Percentage of strength of joint* { *Plate* 74 % / *Rivets* 92.3 % }

Internal diameter 900 ✓ *Working pressure by Rules* 28.79 Kg/cm2 *Thickness of crown* 18 ✓ *No. and diameter of stays* / *Inner radius of crown* 825 ✓ *Working pressure by Rules* 28.79 Kg/cm2

How connected to shell D.R.Lapped ✓ *Size of doubling plate under dome* 1490 m/m Dia x 34 m/m P ✓ *Diameter of rivet holes and pitch of rivets in outer row in dome connection to shell* 26.5 m/m - 863 m/m. See plan.

Type of Superheater Schmidt's ✓ *Manufacturers of* { *Tubes* Nippon Steel Tube Co.Ld. Kawasaki. ✓ / *Steel castings* Miki Cast Steel Works. Osaka. ✓ }

Number of elements 4 *Material of tubes* S.D.Steel ✓ *Internal diameter and thickness of tubes* 15.6 m/m x 3.2 m/m ✓ ✓

Material of headers Cast steel ✓ *Tensile strength* 41-47 Kg/cm2 *Thickness* 26 m/m ✓ *Can the superheater be shut off and the boiler be worked separately* Yes ✓ *Is a safety valve fitted to every part of the superheater which can be shut off from the boiler*

Area of each safety valve 2642.08 MM² *Are the safety valves fitted with easing gear* Yes ✓ *Working pressure as per Rules* 14 Kg/cm2 ✓ ✓ *Pressure to which the safety valves are adjusted* 14 Kg/cm2 ✓ *Hydraulic test pressure: tubes* 70 Kg/cm2 ✓, *castings* 42 Kg/cm2 ✓ *and after assembly in place* 42 Kg/cm2 ✓ *Are drain cocks or valves fitted to free the superheater from water where necessary* Yes ✓.

Have all the requirements of Sections 14 *to* 22 *inclusive for boilers been complied with* Yes ✓.

The foregoing is a correct description,

T. Shinohara
General Manager
Manufacturer.

Dates of Survey while building { *During progress of work in shops* - - } { *During erection on board vessel* - - - } See Machinery Report.

Are the approved plans of boiler and superheater forwarded herewith 1-4-37 & 31-3-37. (If not state date of approval.)

Total No. of visits /

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 Boilers and Superheaters of this vessel were constructed under Special survey in accordance with the Rules and Approved plans.

The materials have been tested found efficient and the workmanship is good.

This case is eligible in our opinion to have the record of B.S. 5-38, in the Register Book.

Survey Fee ... ... £ : : See Machy.Rpt. *When applied for,* 19

Travelling Expenses (if any) £ : : *When received,* 19

H.D. Buchanan
Engineer Surveyor to Lloyd's Register of Shipping.

Committee's Minute TUE. 9 AUG 1938

Assigned See F.E machy rpt.