

REPORT ON MACHINERY.

Port of Bilbao

Received at London Office WED. 23 MAR. 1917

No. in Survey held at Bilbao Date, first Survey Aug 16th 1916 Last Survey 12th May 1917

Reg. Book. on the Steel s/s. "Mar Tirreno" (Number of Visits 10.)

Tons ^{Gross} 3367.
_{Net} 1896.
When built 1917-5.

Master A. CANDINA-11-17. Built at Bilbao By whom built Via Euzaldema de Lomb.

Engines made at W. Hartlepool By whom made Central Marine Engine Works when made 1917.

Boilers made at W. Hartlepool By whom made Central Marine Engine Works when made 1917.

Registered Horse Power _____ Owners Compania Maritima del Nervion Port belonging to Bilbao.

Tom. Horse Power as per Section 28 268. Is Refrigerating Machinery fitted for cargo purposes No Is Electric Light fitted No

ENGINES, &c.—Description of Engines Triple expansion No. of Cylinders Three (3) No. of Cranks Three (3)

Dia. of Cylinders 23" 36 1/2" 62" Length of Stroke 12" Revs. per minute 70. Dia. of Screw shaft ^{as per rule} 12.75" Material of _{as fitted} 13" screw shaft

Is the screw shaft fitted with a continuous liner the whole length of the stern tube Yes. Is the after end of the liner made water tight

in the propeller boss Yes. If the liner is in more than one length are the joints burned ✓ If the liner does not fit tightly at the part

between the bearings in the stern tube, is the space charged with a plastic material insoluble in water and non-corrosive Yes. If two

liners are fitted, is the shaft lapped or protected between the liners ✓ Length of stern bush 51"

Dia. of Tunnel shaft ^{as per rule} 11.41" Dia. of Crank shaft journals ^{as per rule} 11.98" Dia. of Crank pin 12 1/4" Size of Crank webs 7 1/2" x 17 1/4" Dia. of thrust shaft under

collars 12 1/4" Dia. of screw 15.6" Pitch of Screw 16.3" No. of Blades 4 State whether moveable No Total surface 78 Sq. ft.

No. of Feed pumps Two (2) Diameter of ditto 3" Stroke 30" Can one be overhauled while the other is at work Yes

No. of Bilge pumps Two (2) Diameter of ditto 3 1/2" Stroke 30" Can one be overhauled while the other is at work Yes.

No. of Donkey Engines Two (2) Sizes of Pumps 4" pump 6" stroke } duplex No. and size of Suctions connected to both Bilge and Donkey pumps
8" pump 8" stroke }

In Engine Room Two (2) 3 1/2" In Holds, &c. Two (2) 3 1/2" in each of Nos 1, 2, 3 & 4.

Holds. One 3 1/2" in dry tank under boilers. One (1) 2 1/4" in tunnel wall.

No. of Bilge Injections One sizes 6 1/2" Connected to condenser, or to circulating pump ✓ Is a separate Donkey Suction fitted in Engine room & size Just to 3 1/2"

Are all the bilge suction pipes fitted with roses Yes Are the roses in Engine room always accessible Yes Are the sluices on Engine room bulkheads always accessible ✓

Are all connections with the sea direct on the skin of the ship Yes. Are they Valves or Cocks Valves + Cocks.

Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates Yes Are the Discharge Pipes above or below the deep water line Above.

Are they each fitted with a Discharge Valve always accessible on the plating of the vessel Yes Are the Blow Off Cocks fitted with a spigot and brass covering plate Yes.

What pipes are carried through the bunkers None How are they protected ✓

Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times Yes

Are the Bilge Suction Pipes, Cocks, and Valves arranged so as to prevent any communication between the sea and the bilges Yes.

Dates of examination of completion of fitting of Sea Connections 9-10-16 of Stern Tube 9-10-16. Screw shaft and Propeller 9-10-16.

Is the Screw Shaft Tunnel watertight Yes Is it fitted with a watertight door Yes worked from Above load line.

OILERS, &c.—(Letter for record 3) Manufacturers of Steel John Spencer & Sons Ltd.

Total Heating Surface of Boilers 4090 Sq. ft. Is Forced Draft fitted No No. and Description of Boilers Two (2) Single ended.

Working Pressure 180 lbs Tested by hydraulic pressure to 360 lbs Date of test 12-12-16. No. of Certificate 3447.

Can each boiler be worked separately Yes. Area of fire grate in each boiler 52 Sq. ft. No. and Description of Safety Valves to

each boiler Two (2) Spring Area of each valve 8.295 sq. in. Pressure to which they are adjusted 180 lbs Are they fitted with easing gear Yes.

Smallest distance between boilers or uptakes and bunkers or woodwork 17" Mean dia. of boilers 15.0" Length 10.6" Material of shell plates Steel

Thickness 1 1/4" Range of tensile strength 27/30 Tons Are the shell plates welded or flanged both Descrip. of riveting: cir. seams

long. seams 366: dble shop Diameter of rivet holes in long. seams 1 5/16" Pitch of rivets 8 1/16" Lap of plates or width of butt straps 19 1/4"

Per centages of strength of longitudinal joint ^{rivets} 91. Working pressure of shell by rules 180.4 lbs Size of manhole in shell 16" x 12"

Size of compensating ring 32" x 28" x 1 5/16" No. and Description of Furnaces in each boiler Three (3) Morrison Material Steel Outside diameter 46 1/8"

Length of plain part ^{top} 8" Thickness of plates ^{bottom} 9/16" Description of longitudinal joint Welded. No. of strengthening rings Suspension.

Working pressure of furnace by the rules 184 lbs Combustion chamber plates: Material Steel Thickness: Sides 10/16" Back 10/16" Top 10/16" Bottom 10/16"

Pitch of stays to ditto: Sides 9" x 8 1/4" Back 9 1/4" x 8" Top 8 1/4" x 8 1/2" If stays are fitted with nuts or riveted heads nuts Working pressure by rules 181 lbs.

Material of stays Steel Diameter at smallest part 1.508 Area supported by each stay 9" x 8 1/4" Working pressure by rules 192 lbs End plates in steam space:

Material Steel Thickness 1 5/16" Pitch of stays 21 1/2" x 19 1/2" How are stays secured dble nuts Working pressure by rules 183 lbs Material of stays Steel

Diameter at smallest part 3.161 Area supported by each stay 21 1/2" x 19 1/2" Working pressure by rules 194 lbs Material of Front plates at bottom Steel

Thickness 1" Material of Lower back plate Steel Thickness 1 5/16" Greatest pitch of stays 16 1/4" x 7 1/2" Working pressure of plate by rules 189 lbs.

Diameter of tubes 3 1/4" Pitch of tubes 4 1/2" Material of tube plates Steel Thickness: Front 1" Back 1 1/16" Mean pitch of stays 9"

Pitch across wide water spaces 14 1/4" Working pressures by rules 189 lbs Girders to Chamber tops: Material Steel Depth and

thickness of girder at centre 8 1/2" x 1 1/4" Length as per rule 28 5/8" Distance apart 8 1/2" Number and pitch of stays in each Two (2) 8 3/4"

Working pressure by rules 184 lbs Superheater or Steam chest; how connected to boiler _____ Can the superheater be shut off and the boiler worked

separately _____ Diameter _____ Length _____ Thickness of shell plates _____ Material _____ Description of longitudinal joint _____ Diam. of rivet

holes _____ Pitch of rivets _____ Working pressure of shell by rules _____ Diameter of flue _____ Material of flue plates _____ Thickness _____

If stiffened with rings _____ Distance between rings _____ Working pressure by rules _____ End plates: Thickness _____ How stayed _____

Working pressure of end plates _____ Area of safety valves to superheater _____ Are they fitted with easing gear _____



VERTICAL DONKEY BOILER— Manufacturers of Steel *S. Colville & Sons.*

No. *7102* Description *Cochran*
 Made at *Annan* By whom made *Cochran*
 Working pressure *100 lbs* tested by hydraulic pressure to *200* Date of test *25-2-16* No. of Certificate *13364* Fire grate area *26.75* Description of Safety Valves *2 direct spring* No. of Safety Valves *Two* Area of each *7* Pressure to which they are adjusted *100 lbs* Date of adjustment *12-3-17*
 If fitted with easing gear *Yes* If steam from main boilers can enter the donkey boiler *No* Dia. of donkey boiler *7'-0"* Length *15'-0"*
 Material of shell plates *Steel* Thickness *5/8, 1/2* Range of tensile strength *28-32* Descrip. of riveting long. seams *D.R. Lap.*
 Dia. of rivet holes *3/32* Whether punched or drilled *drilled* Pitch of rivets *2.92"* Lap of plating *1/2"* Per centage of strength of joint *70*
 Working pressure of shell by rules *106* Thickness of shell crown plates *1/2, 7/8* Radius of do. *42"* No. of stays to do. *Five* Dia. of stays *1/2"*
 Diameter of furnace Top *Rad* Bottom *72"* Length of furnace *47 1/4"* Thickness of furnace plates *1/2, 7/8* Description of joint *lap*
 Working pressure of furnace by rules *100* Thickness of furnace crown plates *17/32* Stayed by *Hemispheres*
 Diameter of uptake *15" X 23"* Thickness of uptake plates *9/16* Thickness of water tubes *front 7/8, back 3/4* Dates of survey *1916. Jan 21, 28. Feb 11, 18.*

SPARE GEAR. State the articles supplied:— *2 top end + 2 bottom end bolts + nuts for connecting rod. 2 main bearing bolts + nuts. One set of coupling bolts + nuts. 2 feed pump valves. 2 bilge pump valves. One set of H.P. piston springs. One solid propeller. 4 assorted bolts + nuts + iron bars.*

The foregoing is a correct description,
 for *Cochran* Marine Locomotives.
 (Signed) *John B. Williams.* Manufacturer.

1916. Feb 3, 4, 10, 14, 17, 24, 25. Mar 1, 2, 14, 15. May 1. June 15, 16, 19, 20, 21, 22, 23, 28, 29. July 3, 4, 5, 19, 22, 31.
 Dates of Survey while building: During progress of work in shops— *Aug. 1, 2, 11, 16, 18, 25, 28, 29, 30, 31. Sep. 1, 11, 12, 20, 22, 27. Oct. 2, 3, 4, 5, 6, 9, 11, 12, 13, 18, 19, 20, 23, 24, 25, 26, 27, 30. Nov. 1, 3.*
 During erection on board vessel— *Bilbao, 1916. Aug 16, 29. Sept 7, 13. Oct 9, 1917. April 18, 23, 25. May 11, 12.*
 Total No. of visits *at W. H. port. 95. at Bilbao 10.* Is the approved plan of main boiler forwarded herewith
 " " " donkey " " "

Dates of Examination of principal parts—Cylinders *22-12-16* Slides *4-1-17* Covers *8-1-17* Pistons *20-12-16* Rods *30-11-16*
 Connecting rods *18-12-16* Crank shaft *20-12-16* Thrust shaft *20-12-16* Tunnel shafts *21-12-16* Screw shaft *3-7-16* Propeller *4-7-16*
 Stern tube *4-7-16* Steam pipes tested *4-1-17* Engine and boiler seatings *18-4-17* Engines holding down bolts *4-5-17*
 Completion of pumping arrangements *11-5-17* Boilers fixed *4-5-17* Engines tried under steam *12-5-17*
 Main boiler safety valves adjusted *12-5-17* Thickness of adjusting washers *Port main boiler. Shank 10 1/2". Shank main boiler. Shank 11 1/2".*
 Material of Crank shaft *Scrap iron* Identification Mark on Do. *5844* Material of Thrust shaft *Scrap iron* Identification Mark on Do. *5844*
 Material of Tunnel shafts *Scrap iron* Identification Marks on Do. *5844* Material of Screw shafts *Scrap iron* Identification Marks on Do. *5778*
 Material of Steam Pipes *Steel lap-welded.* Test pressure *600 lbs.*

General Remarks (State quality of workmanship, opinions as to class, &c.) *Workmanship good.*
Evaporator coils tested to 400 lbs, & body to 50 lbs water pressure.
The Engines + Boilers have been constructed under special Survey & in accordance with the requirements of the Society's Rules. The Machinery is intended for the new steamer "New Firm" & is being shipped to Bilbao to be fitted on board her.

The Main Engines + Boilers as per West Hartlepool Rpt No 15333, and the Donkey boiler as per Glasgow Rpt No 35819, have now been fitted aboard, secured, mounted and tested with satisfactory results. All the Safety valves of both main boilers + of donkey boiler have now been adjusted under steam pressure. The Main + Auxiliary machinery have been tested with satisfactory results.

This vessel is Eligible in my opinion to have the Notation of Δ LMC. 5-17, Records in the Society's Register Book.

It is submitted that this vessel is eligible for THE RECORD. + LMC 5. 17.

Certificate (if required) to be sent to Committee's Minute.

The amount of Entry Fee..	<i>50</i>	When applied for,	
Special	<i>250</i>		<i>14/5-1917</i>
West Hpt Credit Bilbao			
Donkey Boiler Fee	<i>11-2-0</i>	When received,	
Travelling Expenses (if any)	<i>4-50</i>		<i>14/5-1917</i>

J. de Moutigabaf
 Engineer Surveyor to Lloyd's Register of British & Foreign Shipping.

Committee's Minute
 Assigned

WED. 30 MAY 1917
 + L.M.C. 5.17

MACHINERY CERTIFICATE
 WRITTEN

