

# REPORT ON MACHINERY.

Port of Belfast

Received at London Office THURS 26 JUNE 1890

No. 3718  
No. in Survey held at Belfast Date, first Survey 7<sup>th</sup> Nov 89 Last Survey 21<sup>st</sup> June 1890

Reg. Book. Sup<sup>t</sup>  
on the S. S. Michigan (Number of Visits 37) Net 2383  
Tons 3473 u.w.  
Gross 3721

Master W. H. Williams Built at Belfast By whom built Harland & Wolff When built 1890

Engines made at Belfast By whom made Harland & Wolff when made 1890

Boilers made at - do - By whom made - do - when made 1890

Registered Horse Power 375 Owners The Bernard S. S. Co. Ltd. Port belonging to London  
*Indic. 1950*  
*Lloyd's 380*

Registered Speed 11 knots.

Engines, &c.—  
Description of Engines Triple Compound 3 cyl. 3 cranks J. D. A. S. C.

Diameter of Cylinders 25 1/2, 42 & 70 Length of Stroke 51 No. of Rev. per minute 65 Point of Cut off, High Pressure .65 Low Pressure .6  
*all shafts steel, crank shaft built. Rule engine of clapping - 13-78-7-13%*

Diameter of Screw shaft 14 1/2 Diam. of Tunnel shaft 14 Diam. of Crank shaft journals 14 1/2 Diam. of Crank pin 14 1/2 size of Crank webs 19 1/2 x 10 1/2

Diameter of screw 17-6 Pitch of screw 20-0 No. of blades 4 state whether moveable yes total surface 87 sq. ft.

No. of Feed pumps 2 diameter of ditto 3 1/2 Stroke 32 Can one be overhauled while the other is at work Yes.

No. of Bilge pumps 2 diameter of ditto 4 Stroke 32 Can one be overhauled while the other is at work Yes.

Where do they pump from Bilge from all holds, E & W space, A, Peak & Tunnel. Fed from Hotwell

No. of Donkey Engines Five Size of Pumps 1 1/2, 2, 2 1/2, 3, 4 Where do they pump from Sea, Ballast & freshwater

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

No. of bilge injections One and sizes 5 1/2 Are they connected to condenser, or to circulating pump Yes.

How are the pumps worked By links and levers from Centre engine crosshead. Separate centrifugal circulating engines 2-9" cyl. 8" stroke. 11" suet to centrifugal pump.

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

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 all below except air pump disch.

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 accessible at all times Yes

Are the pipes, cocks, and valves arranged so as to prevent an unintentional connection between the sea and the bilges Yes

When were stern tube, propeller, screw shaft, and all connections examined in dry dock 14<sup>th</sup> May in Hamilton S. Dock. (1890)

Is the screw shaft tunnel watertight Yes and fitted with a sluice door Yes worked from Upper deck.

Boilers, &c.—  
Number of Boilers Two Description Double ended, Mult. circular Whether Steel or Iron Steel. (Siemens)

Working Pressure 180 lbs. Tested by hydraulic pressure to 360 lbs. Date of test 9-5-90 Cert. No. 77

Description of superheating apparatus or steam chest None fitted.

Can each boiler be worked separately Yes Can the superheater be shut off and the boiler worked separately ✓

Area of square feet of fire grate surface in each boiler 96 Description of safety valves Lockburn's No. to each boiler Two

Area of each valve 11.04 sq. in. Are they fitted with easing gear Yes No. of safety valves to superheater ✓ area of each valve ✓

Are they fitted with easing gear ✓ Smallest distance between boilers and bunkers or woodwork 12" with air Diameter of boilers 13-0"

Length of boilers 17-6" description of riveting of shell long. seams Double butt straps circum. seams Thickness of shell plates 1 1/2"

Diameter of rivet holes 1 9/16" whether punched or drilled drilled pitch of rivets 8 1/2" Lap of plating 19 x 1" 13 strips

Percentage of strength of longitudinal joint 84.6 working pressure of shell by rules 187 lbs size of manholes in shell 16" x 12"

No. of compensating rings U. S. Keils Patent Ring door No. of Furnaces in each boiler One

Inside diameter 38" length, top 7-0" bottom ✓ thickness of plates 5 1/8" description of joint welded if rings are fitted rolled

Smallest length between rings ✓ working pressure of furnace by the rules 210 lbs combustion chamber plating, thickness, sides 1 1/2" back ✓ top 5/8"

No. of stays to ditto, sides 7 1/2" back ✓ top 8 1/2" If stays are fitted with nuts or riveted heads nuts in C.C. working pressure of plating by rules 187 lbs

Diameter of stays at smallest part 1 3/8" working pressure of ditto by rules 188 lbs end plates in steam space, thickness 1 1/2"

No. of stays to ditto 19 1/2 x 16 1/2" how stays are secured Double washers working pressure by rules 204 lbs with C-2 diameter of stays at smallest part 3"

working pressure by rules 198 lbs. Front plates at bottom, thickness 1 3/16" Back plates, thickness ✓

Smallest pitch of stays ✓ working pressure by rules ✓ Diameter of tubes 3 1/2" pitch of tubes 4 1/2" thickness of tube ✓

Plating, front 7" back 3 1/4" how stayed stay tube pitch of stays 9" x 9" width of water spaces By loss. 7 1/2"

Diameter of Superheater or Steam chest ✓ length ✓ thickness of plates ✓ description of longitudinal joint ✓ diam. of rivet holes ✓

No. of rivets ✓ working pressure of shell by rules ✓ diameter of flue ✓ thickness of plates ✓ If stiffened with rings ✓

Between rings ✓ working pressure by rules ✓ end plates of superheater, or steam chest; thickness ✓ how stayed ✓

Superheater or steam chest; how connected to boiler ✓

Description of furnaces Siemens Patent

Lloyd's Register Foundation

BEL57-0050

**DONKEY BOILER**— Description *Cir. Single ended, Multitubular, Steel with 2 Furnaces*  
 Made at *Belfast* by whom made *Harland & Wolff* when made *1890* where fixed *Upper deck*  
 Working pressure *90 lbs* tested by hydraulic pressure to *180 lbs* No. of Certificate *76* fire grate area *29.2 sq. ft.* description of  
 valves *D. Cockburns* No. of safety valves *2* area of each *6.5 sq. in* if fitted with easing gear *Yes* if steam from main  
 enter the donkey boiler *No* diameter of donkey boiler *10'-0"* length *8'-10 1/2"* description of riveting *10-13 Straps 3/4"*  
 Thickness of shell plates *5/8"* diameter of rivet holes *7/8"* whether punched or drilled *drilled* pitch of rivets *4 3/4"* lap of plating *9"*  
 per centage of strength of joint *82* thickness of ~~end~~ plates *5/8"* stayed by *13 7/8" steel stays 15 1/4" pitch, double nut & 14" dia 1/2" rivets & flat*  
 Diameter of furnace, top *36"* bottom *36"* length of furnace *6 7/8"* thickness of plates *5/8"* description of joint *Butt straps single*  
 Thickness of ~~fire~~ crown plates *3/4"* stayed by *1 1/8" W. J. screw stays 7 1/2" and 7 1/4" pitch* working pressure of shell by rules  
 Working pressure of furnace by rules *103 lbs.* diameter of uptake *✓* thickness of plates *✓* thickness of water tubes *✓*  
*Propeller shaft.*

**SPARE GEAR.** State the articles supplied:— *2 propeller blades C. J.; 2 pairs Crank pin brass; 2 lo  
 down M. & L. bolts & nuts; 2 bolts top end connecting rod bolts & nuts; Ramsbottom rings for all just  
 eccentric strap complete, Air pump bucket check valve complete, 6 propeller studs & nuts, 6 coupling  
 bolts and nuts, 12 screw ring bolts, feed & sludge pump valves etc etc etc.*

The foregoing is a correct description,  
*Harland & Wolff Ltd.* Manufacturer.

**General Remarks** (State quality of workmanship, opinions as to class, &c.)  
 The machinery of this steamer has been constructed in accordance with the amended plan of Main boiler for the "Alexander Elder" (Bel. Rep. No. 3685) the plan of auxiliary boiler under the Secretary's letters dated 5th April and 20th Nov. 1889, the Rules of the Society for First Entry or equal thereto and to the satisfaction of the undersigned.

The steel used in the construction of the boilers has been tested as required by the Rules and signed invoices examined.

The main and auxiliary boilers and main steam pipes were tested to twice the working pressure by water and found tight.

The Boilers were tested under steam and the safety valves adjusted to 180 lbs. & 90 lbs. working pressures on main & donkey boiler respectively.

The main & auxiliary engines were tried under steam, at full speed and gave entire satisfaction.

The shafting when finished was found sound & free from any visible defect.

Electric light (Swans incandescent) single wire system was fitted throughout the vessel - two separate engines and machines - each machine capable of lighting the whole of the vessel. each machine giving 60 volts & 100 amperes.

All the material used in the construction of engines & boilers and the workmanship throughout are good & satisfactory. I would therefore respectfully recommend that the Notification **L.M.C. 6.90** be granted & recorded in the Reg. B.

The amount of Entry Fee .. £ 3 : 0 : 0 *not yet received by me,*  
 Special .. .. £ 38 : 15 : 0  
 Donkey Boiler Fee .. .. £ : :  
 Certificate (if required) .. £ 3 gratis: *28/11/90*  
 To be sent as per margin.  
 (Travelling Expenses, if any, £ : :)

It is submitted that this vessel is eligible to have L.M.C. 6.90 recorded. *26.6.90*  
*E. M. 30.6.90 a record*  
**James Claxton**  
 Engineer Surveyor to Lloyd's Register of British & Foreign Ships

Committee's Minute **FRI 27 JUNE 1890**  
*+ L.M.C. 6/90*

The L.M.C. Refrigerator apparatus is fitted.