

# REPORT OF SURVEY FOR REPAIRS, &c., OF ENGINES AND BOILERS

(Received at London Office. 26 NOV 1941)

Date of writing Report 19 When handed in at Local Office 19 NOV 1941 Port of LIVERPOOL

Survey held at Liverpool & Birkenhead Date. First Survey 23/3/41 Last Survey 15/11/1941 (No. of Visits 44)

298 on the Machinery of the Wood, Iron or Steel TWIN SC TACOMA STAR.

Gross 7924 Vessel built at Belfast By whom Workman Clark & Co. When 1919  
Net 4962 Engines made at do By whom do When 1919

1138 Boilers, when made (Main) 1919 (Donkey)  
3 DB Owners Frederick Heyland & Co. Owners' Address (if not already recorded in Appendix to Register Book.)  
of Main Boilers. 3 DB Port London. Voyage.

of Donkey Boilers. 1 Managers  
Main Boilers. 250 If Surveyed Afloat or in Dry Dock Canada St. R. St. R. Particulars of Classification (which must be inserted in Register Book & Supplements).

Donkey Boilers. 1 If Surveyed Afloat or in Dry Dock Canada St. R. St. R. Particulars of Classification (which must be inserted in Register Book & Supplements).

st Report No. Port 298  
Particulars of Examination and Repairs (if any) LMC & TS.

Periodical Surveys, when held, must be reported in detail and serially in the terms of the Rules. State clearly the nature and extent of Examinations and subsequent Repairs. Repairs on account of Damage (the cause of which must be stated) should be separated from Repairs due to other causes; and details being detailed in the body of the report, should be briefly summarised at the end of the report. State also the names and initials of any letters respecting this case.

damage cases where the Surveyor has not made a special damage report he is required to state whether he offered his services for this purpose, and why they were declined. Yes, but required Baebourne & Turner & Co.

as a damage report made by anyone else? If so, by whom? Baebourne & Turner & Co.

the Surveyor personally go inside each Main Boiler separately and make a thorough examination at this time? yes

Donkey " " " " " "

this was not done, state for what reasons

what parts of the Boilers could not be thus thoroughly examined?

what special means, in the absence of internal examination, were adopted by the Surveyor to assure himself of the thorough efficiency of those parts of each Boiler?

the latest date of internal examination of each boiler? CRSB 13-8-41, PB 19-9-41

the Surveyor examine the Safety Valves of the Main Boiler? yes To what pressure were they afterwards adjusted under steam? 200 lb/12"

the Surveyor examine the Safety Valves of Donkey Boiler? yes To what pressure were they afterwards adjusted under steam?

the Surveyor examine all the manholes, doors and their fastenings of the Main Boilers? yes and of the Donkey Boilers?

the Surveyor examine the drain plugs of the Main Boilers? yes and of the Donkey Boilers?

the Surveyor examine all the mountings of the Main Boilers? yes and of the Donkey Boilers?

the screw shaft now been drawn and examined? P+S yes Is it fitted with continuous liner? yes Is an approved appliance fitted at the after end of the shaft to permit of it being efficiently lubricated? yes

shaft now been changed? no If so, state reasons

the shaft now fitted been previously used? P+S 13-6-41 Has it a continuous liner? yes Is an approved appliance fitted at the after end of the shaft to permit of it being efficiently lubricated? yes

date of examination of Screw Shaft P+S 26-10-41 State the distance between lignum vitae or bearing metal of stern bush and top of after bearing of screw shaft blue fit

Engine parts, when referred to by numbers, should be counted from forward. Is electric light and/or power fitted yes

so, did the Surveyor examine the generators, motors, switchgear, cables and fuses? yes

the insulation resistance of the generators, circuits and apparatus been tested and found to be not less than 100,000 ohms? yes

the Survey is not complete, state what arrangements have been made for its completion and what remains to be done. Complete.

how done - vessel placed in dry dock, propellers, after end of screw shafts & fastenings of the screw connections examined & found satisfactory

Boiler Repairs & S.R. - Examined the four low furnaces were found deformed & wasted along line of fire bars these now removed & four new furnaces fitted.

Identification marks checked & verified as per attached certificate.

Boiler tubes found to be thin & baking all plain & stay tubes in this boiler now renewed & some grooving on back tube plates between vertical rows of margin tubes now used out & built up electrically. H.T.O.

General Observations, Opinion, and Recommendation: - The machinery of the vessel as

(State clearly what alteration, if any, is suggested to be made in the existing classification of the vessel's machinery in the Register Book, consequent upon this survey, and also any alteration required to be made in the records of the vessel's machinery, boilers, working pressures, &c.; thus, for example, R.S. 9,11, R.&R.S. 9,11, & L.M.C. 9,11, or L.M.C. 140 lb., F.D., &c.)

as seen is in a good & efficient condition & eligible in our opinion to remain as classed with good record of LMC 11-41, TS(CL) P+S 10-41. Subject to

the 1st engine headplate repairs being examined before October 1942 & the 1st engine HP valve casing repair being examined before the end of May 1942.

Survey Fee (per Section 29) LMC £15 0 0 Fees applied for 19 NOV 1941

Special Damage - Repair Fee (if any) 57 10 0 Received by me, H. Taylor

Substantial Damage (if charged) £5 5 0

Travelling expenses (if charged) £4 0 0

Committee's Minute L.M.C. 11-41 Subject T.S. 10-41

Assigned T.S. 10-41

LIVERPOOL 25 NOV 1941

W223-0067 (117)

TWIN SC TACOMA STAR.

Boiler Repairs (cont): - Some wastage was noted along the line of fire bars of the fore & after wing furnaces, wastage chipped clean & furnaces built up electrically.

Sundry minor caulking & stay nut repairs carried out, on completion of boiler repairs the boiler hydrostatically tested & found satisfactory.

Machinery SHS: - Temporary repairs to the starboard engine H.P. inboard cylinder foot have now been carried out by means of suitable plate patches & strong backs & found satisfactory. Sundry minor voyage repairs effected.

Damage: - As follows

Meaning the completion of the above repairs the vessel is stated to have sustained damage by enemy bombing. The bomb exploding in the after starboard side of the lower tween deck bunker, whilst vessel lying in West Canada Dock on 3<sup>rd</sup> May 1941. The vessel heavily submerged & engine room flooded.

Low Down for Damage & Damage Repairs: -

Vessel placed in dry dock, propellers, skin tubes sea cocks & valves, & other fastenings examined.

Pont & Starboard screw shafts drawn & examined, stern tubes newwooded.

The Pont & Starboard main engines with attached pumps completely opened up for cleaning & examination. Crank shaft lifted cleaned & examined, thrust & intermediate shafting opened up & exposed for cleaning & examined. All auxiliary machinery & condensers, steering engine opened up cleaned & examined. All engine room plating removed, engine bedplates & pipe lines cleaned & examined for fractures. All lagging removed from steam cylinders & steam piping for examination.

All boiler cradles & fastenings examined. Lagging removed as required.

Damage Repairs: - The starboard main engine bedplate found fractured in way of HP & LP front column landing & longitudinal fracture at No 6 main bearing girder. The bedplate in way of these fractures now reinforced by means of suitable boundary steel plating, fastening bolts & screw stays, & long tie bolts extending from column fastenings through bedplate fastenings & tank top. These repairs have been efficiently carried out & considered efficient & satisfactory. It was recommended that the starboard bedplate repairs be specially examined before October 1942.

TWIN SC TACOMA STAR.

Damage Repairs (cont): - The starboard engine H.P. & I.P. cylinders cracked, now renewed, H.P. front & back columns cracked through fastenings, now renewed, I.P. back column cracked now renewed, H.P. quadrant bracket & intermediate slot valve cracked now renewed.

Gasting reports of cylinders & slot valve attached.

M.P. piston rod bent & fitted due to immersion now renewed.

Forging report attached.

M.P. valve spindle bent & fitted, sent to engine makers & reconditioned.

H.P. & L.P. piston rods fitted, now skimmed & new glands & neck bushes fitted.

H.P. balance crosshead fractured & damaged now renewed.

H.P. ahead guide shoe white metal cracked, now remetalled.

M.P. Impulse valve & lee piece connection fractured now renewed.

Port Engine: - All piston rods fitted due to immersion, now skimmed & new neck & gland bushes fitted.

M.P. crank pin white metal braces cracked now remetalled.

All main engine holding down bolts hardened up & renewed as found necessary.

Attached Main Engine & Pumps: - The starboard engine feed, scumming, air & bilge pump valves placed in both lines for trial, skimmed & new neck & gland bushes fitted. After feed pump suc & del valve chest fractured, now renewed. Air pump C.I. suction pipe from condenser, fractured now renewed. Air pump tail valve fractured now renewed.

Auxiliary Machinery: - All auxiliary machinery opened up & cleaned examined & overhauled.

Port & Starboard condensers & auxiliary condenser opened up & cleaned & tested.

Stb condenser forward door fractured by explosion now renewed & about 200 damaged tubes & ferrules renewed, & four damaged S.H. through stays renewed.

S.S. pump (stb side) badly damaged, now renewed complete makers Haywood & Taylor & Co. 9 1/2 x 7 x 21. To 385-85, also suction & delivery valve boxes renewed.

Stb side Fan engine, casing & bracketing damaged. Fan engine now renewed complete with casing, bracketing through engine room & stokehold (James Howden & Co. Fan No 61435).

Forward evaporator (stb side) casing fractured, now renewed.

Andrew & Cameron & Co. 1584

TWIN SC TACOMA STAR.

Damage Repairs (Cont.):- Sanitary pump (stb side) damaged & torn from fastenings, new complete pump now fitted  
Meens to 18360 6" x 6" x 15"

The following pipes on stb side of engine room found damaged & now renewed:-

Main circulating water inlet to stb condenser.

Condensate pipe to stb air pump.

Evaporator blow down. & salt water feed. & drain from coils

Tank suction line to G.S. pump.

Bilge suction line to G.S. pump.

Sea suction line to G.S. pump & sanitary pump.

Bottomwell suction line to G.S. pump.

Bilge suction to ram pumps.

Discharge to auxiliary range (feed) G.S. pump.

Discharge overboard G.S. pump. & deck discharge

Discharge from sanitary pump to manifold

Feed discharge to filter

Bilge & sanitary discharge from ram pumps.

Induction pipe from stb condenser.

The following steam & exhaust pipes damaged now renewed:-

Steam & exhaust line to G.S. & sanitary pump.

" " " " to evaporators. & forced draught

fan engine.

Steam & exhaust line to stb circulating pump & dynamos.

Main & auxiliary steam pipes examined & tested hydraulically & found satisfactory

Steering engine & windlass overhauls & examined.

Boilers:- The Centre Boiler stated to have been steaming at time of damage & part submerged, has now been examined throughout & tested hydraulically & the following damage repairs carried out.

8 rolling stay studs fractured now renewed

All combustion chamber stay nuts hardened up.

16 rolling stay studs fractured & now renewed on stb boiler

Boiler Survey:- The main boilers examined throughout with mountings doors & fastenings & now placed in good condition. The port & stb boilers examined under steam & safety valves adjusted to pressure as above. The centre boiler also examined under steam, but due to insufficient compression on safety valve springs, new springs have now been fitted, but no opportunity was offered to adjust these valves at this time.

## TWIN SC TACOMA STAR.

Boiler Repairs (W & S)

Stt Boiler:- Stt Wing C.C.:- One fractured shell stay renewed.

Cracks in ford & after furnace neck flanging now "need" out & welded electrically, a number of furnace landing cracks need out & welded. A number of leaky furnace rivets renewed.

Stt Low C.C.:- Some grooving on back tube plate between vertical rows of margin tubes now "need" out & welded electrically. 18 stay & 14 plain tubes in way renewed.

Port Low C.C.:- Some grooving on back tube plate between vertical rows of margin tubes now need out & welded electrically. 16 stay & 15 plain tubes in way renewed.

Port Wing:- Bracks in ford & after furnace neck flanging now "need" out & built up electrically.

All furnaces where wasted along line of fire bars, built up electrically.

Centre Boiler:- Bracks in ford & after stt wing furnaces neck flanging now "need" out & built up electrically. Some grooving on stt wing back tube plates between vertical rows of margin tubes now "need" out & built up electrically. 5 stay & 3 plain tubes in way renewed.

All furnaces where wasted along line of fire bars, built up electrically.

Bottom manholes of centre & stt boilers where wasted built up electrically & domes fitted.

The hot water gauge breast cocks of the P & S boilers found wasted, now renewed (tested). Stt boiler blow down valve chest found thin now renewed (tested).

On completion of the boiler repairs the centre & starboard boilers examined under hydraulic pressure & found satisfactory.

Damage to S:- It is stated that whilst vessel was weighing anchor in River Mersey on completion of half speed trials of main engines, the vessel ran aground due to heavy weather on Churchill sands, River Mersey on 18<sup>th</sup> October 1941.

How Done for Damage:- Vessel placed in dry dock, propellers, stern tubes, sea cocks, valves & fastenings examined, grids removed & sand deposits cleared.

Port & stt screw shafts drawn & examined (26 Oct 1941).

P & S circulating pumps & condensers & injection pipes opened up cleared of sand deposits & examined.

Bilge & sanitary pumps & injection pipes opened up cleared of sand deposits & examined.

## TWIN SC TACOMA STAR.

NOTE:- The opportunity was taken at this time to complete the boiler survey (see body of report). The central boiler examined under steam & safety valves adjusted to 200 lb/H<sup>2</sup>.

Damage do 3:- The following damage was stated to have been caused whilst vessel on final engine trials in River Mersey on 30<sup>th</sup> October 1941.

Low Down for Damage:- Starboard engine cylinders opened up & examined. Apparently one 1/2 nut having been left in HP valve chest, it was found that the HP valve lever was broken, & casing cracked, also a set pin had passed through the under side of M.P. piston causing a bent piston rod.

Damage Repairs:- All star engine cylinders, pistons valves & casings opened up & examined.

New M.P. piston rod now fitted, Stamped:- LLOYDS NO 6320.  
(Forgery report attached) C.B. 31/10/41 E.R.B.

New HP valve lever fitted.

HP valve casing pinned at end of fracture, & suitable support plate fitted & steel reinforcing ring shrunk over bit of casing.

This repair in my opinion is efficient, meantime, but it is recommended that the HP valve casing repair be examined before the end of May 1942.

On completion of repairs the machining tried under full working conditions & found satisfactory. Pumping arrangements examined & tried.

The Owners request that the machining examination now made be accepted as Lloyd's Machining Survey.

NOTE:- The 90 KW generator engine stated not to have been in use for a considerable time has now been removed & placed ashore.

M.F.



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S.S. 'TACOMA STAR'Electrical Equipment.

Installation examined & tested under working conditions, generators, switchboard, cables, fittings etc examined, insulation test made.

Repairs:-

Generators:- one 90 Kw and one 50 Kw generators disconnected and removed to works for overhaul. Machines stripped & completely rewound. The 90 Kw. generator has not been refitted on vessel. The 50 Kw machine was re-assembled & fitted on board, new main cables fitted between generator & main switchboard.

One 15 Kw & one 10 Kw generators disconnected & removed to works for overhaul. Field coils retaped & varnished, 15 Kw machine armature rewound, 10 Kw armature cleaned & varnished, commutator skimmed & mica undercut. Brush gear of both generators overhauled & made good. New main cables fitted between generator & main switchboard. New governor gear fitted to engine driving 10 Kw. machine.

Main switchboard cleaned, overhauled & new parts fitted as necessary. Lathe motor control gear completely overhauled & repaired. New fuses cables fitted from main switchboard.

Engine Room Lighting:- Wiring renewed, fuse boxes overhauled, new fuses fitted where necessary. New fittings supplied as required.

Boiler Room Lighting:- Wiring renewed & fittings repaired or renewed as necessary.

Tunnel Lighting. Wiring renewed & fittings made good.

Navigation Circuits. overhauled, new lanterns supplied, wiring partly renewed.

Engine's accommodation partly renewed, fittings repaired or renewed, fuse boxes overhauled & made good.

Officers' accommodation wiring overhauled, fuse boxes cleaned & overhauled, fittings renewed as necessary.

Crews Quarters wiring overhauled, partly renewed & fittings made good.

Foreward Accommodation. Faulty circuit rewired, remainder overhauled, fuse boxes cleaned & new fuses fitted as necessary, fittings repaired & some renewed.

Telephone Circuits overhauled & partly renewed, instruments repaired or renewed as necessary. Wiring for electric log partly renewed.

On completion the whole installation was examined & tested under working conditions & found satisfactory. The total generator capacity of this equipment is now 75 Kw.

A.L.

14/11/21

PSD11

DATE: 4/10/21

Requies

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