

## REPORT ON STEAM TURBINE MACHINERY. No. 2684

Received at London Office

Date of writing Report 14-3-1938 When handed in at Local Office 14-3-1938 Port of BARROW-IN-FURNESS.

No. in Survey held at BARROW Date, First Survey 16<sup>th</sup> JULY, 1936. Last Survey 9-3-1938.

Reg. Book. on the TWIN SC: "STRATHALLAN" (Number of Visits 256.) Tons Gross 23721.95. Net 14230.22.

Built at BARROW By whom built VICKERS-ARMSTRONGS LTD. Yard No. 723 When built 1938

Engines made at -do- By whom made Engine No. 723 When made 1938

Boilers made at -do- By whom made Boiler No. 723 When made 1938

Shaft Horse Power at Full Power 24000 Owners PENINSULAR &amp; ORIENTAL STEAM NAV. CO. LTD. Port belonging to LONDON

Nom. Horse Power as per Rule 4910 Is Refrigerating Machinery fitted for cargo purposes YES Is Electric Light fitted YES

Trade for which Vessel is intended 4912 MAIL &amp; PASSENGER

## STEAM TURBINE ENGINES, &amp;c.—Description of Engines PARSONS IMPULSE REACTION TYPE

No. of Turbines Ahead 6 Direct coupled, single reduction geared to Two propelling shafts. No. of primary pinions to each set of reduction gearing ✓  
Aster 4 double reduction geared

direct coupled to Alternating Current Generator ✓ phase periods per second rated ✓ Kilowatts ✓ Volts at ✓ revolutions per minute; Direct Current Generator ✓

for supplying power for driving Propelling Motors, Type ✓

rated ✓ Kilowatts ✓ Volts at ✓ revolutions per minute. Direct coupled, single or double reduction geared to ✓ propelling shafts.

TURBINE BLADING.	H. P.			I. P.			L. P.			H. P. ASTERN (IMPULSE BLADING)		
	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.	HEIGHT OF BLADES.	DIAMETER AT TIP.	NO. OF ROWS.
1ST EXPANSION	3/4"	2'-3 1/2"	12	1 1/2"	3'-2.92"	7	3.325"	5'-0.65"	1	1 5/16"	5'-0 1/16"	1
2ND "	1 1/16"	2'-4 3/8"	12	1 5/16"	3'-3.795"	7	3.325"	5'-0.65"	1	1 5/16"	5'-1 5/16"	1
3RD "	1 7/16"	2'-4 7/8"	10	2 1/16"	3'-4.795"	7	3.325"	5'-0.65"	1	1 3/4"	5'-2"	1
4TH "	1 23/32"	2'-5 1/16"	10	3 1/8"	3'-6.17"	6	3.918"	5'-1.836"	1	L. P. ASTERN (IMPULSE)		
5TH "	1 7/8"	2'-6"	10	4"	3'-7.91"	4	4.655"	5'-3.31"	1	1 5/16"	5'-1 5/16"	1
6TH "	2 3/16"	2'-6 5/8"	10	4 9/16"	3'-9.035"	4	5.386"	5'-4.772"	1	1 7/8"	5'-2 1/8"	1
7TH "				5 1/8"	3'-10.16"	4	6.225"	5'-6.645"	1	(REACTION)		
8TH "							7.07"	5'-8.14"	1	3.19	4'-3.38	2
9TH "							7.915"	5'-9.83"	1	3.805	4'-4.61	2
10TH "							8.76"	5'-11.52"	1	4.4825	4'-5.965	2
11TH "							9.736"	6'-1.472"	1	5.3475	4'-7.695	2
12TH "							10.882"	6'-3.764"	1	6.4	5'-9.8	2
13TH "							11.16"	6'-4.33"	1			
14TH "												
15TH "												
16TH "												
Shaft Horse Power at each turbine	H.P. 4000			I.P. 4000			L.P. 4000			H.P. 1716		
	I.P. 4000			L.P. 4000			I.P. 1716			L.P. 1716		
	Revolutions per minute, at full power, of each Turbine Shaft									1st reduction wheel 1716		
										main shaft 112		
Rotor Shaft diameter at journals	H.P. 9"			I.P. 8 1/2"			L.P. 9"			Pitch Circle Diameter		
	1st pinion 10.14"			1st reduction wheel 115.994"			Width of Face			1st reduction wheel 50" + 17 1/2"		
	2nd pinion			main wheel 17 3/4"			1st reduction wheel			main wheel 2'-3 3/8"		
	WING BEARINGS			CENTRE 2nd pinion 21 1/4"			main wheel			GAP FOR CENTRE BEARING		
Distance between centres of pinion and wheel faces and the centre of the adjacent bearings	1st 8 1/2"			CENTRE 9 1/2"			2nd 3"			diameter at bottom of pinion teeth		
Flexible Pinion Shafts, diameter	1st 21"			2nd 19"			Generator Shaft, diameter at bearings			1st 10.001"		
	Pinion Shafts, diameter at bearings			1st 2'-2 1/8"			Propelling Motor Shaft, diameter at bearings			2nd		
Wheel Shafts, diameter at bearings	main 21"			13'-0 1/8"			Thrust Shaft, diameter at collars			as per rule 19.95"		
	as per rule 19 1/2"			as fitted 19 1/2"			as fitted 20.5"					
Intermediate Shafts, diameter	as per rule 20.625"			as fitted 21.25"			Is the screw shaft fitted with a continuous liner			YES.		
Tube Shaft, diameter	as per rule .931"			as fitted 1.0"			Is the after end of the liner made watertight in the					
Bronze Liners, thickness in way of bushes	as per rule .75"			as fitted .75"			If the liner is in more than one length are the junctions made by fusion through the whole thickness of the liner			YES.		
	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			Is an approved Oil Gland or other appliance fitted at the after end of the tube			Length of Bearing in Stern Bush next to and supporting propeller 10'-6"					
If two liners are fitted, is the shaft lapped or protected between the liners	No			State whether Moveable No			Total Developed Surface 135 square feet.					
Propeller, diameter 19'-0"	Pitch 22'-0"			No. of Blades 4			Can the H.P. or L.P. Turbine exhaust direct to the					
If Single Screw, are arrangements made so that steam can be led direct to the L.P. Turbine	No. and size 2 @ 240,000 lbs/hr. 1 @ 40,000 lbs/hr. 1 @ 40,000 lbs/hr.			How driven TURBO			TURBO			STEAM RECIP.		
Condenser	No. of Turbines fitted with astern wheels 4			Feed Pumps			No. and size 2 @ 60 TONS/hr. 1 @ 250 TONS/hr. 2 @ 160 TONS/hr.					
	How driven ELEC. MOTOR.			ELEC. MOTOR.			ELEC. MOTOR.					
Pumps connected to the Main Bilge Line	No. and size 1 @ 250 TONS/hr.			Lubricating Oil Pumps, including Spare Pump, No. and size 2 @ 24,000 GALLS/hr.								
	How driven ELEC. MOTOR.			Suctions, connected to both Main Bilge Pumps and Auxiliary Bilge								
Are two independent means arranged for circulating water through the Oil Cooler	YES			ENGINE ROOM 5 @ 3 1/2"			BOILER ROOM 1 @ 6 1/2"			In Pump Room		
Pumps, No. and size:—In Engine and Boiler Room	No. 1.—1 @ 3 1/2". No. 2.—2 @ 3 1/2". No. 3.—3 @ 3 1/2". No. 4.—1 @ 3 1/2". No. 5.—1 @ 3 1/2". No. 6.—2 @ 3 1/2".			TUNNEL 5 @ 3 1/2".			SHAFT SPACE 2 @ 2" (BOSSING)					
In Holds, &c.	REFRIG. MACHY SPACE 1 @ 3 1/2"			2 @ 20"			Independent Power Pump Direct Suctions to the Engine Room					
Main Water Circulating Pump Direct Bilge Suctions, No. and size	E.R. 1 @ 6 1/2", 2 @ 4", B.R. 2 @ 6 1/2"			Are all the Bilge Suction pipes in Holds and Tunnel Well fitted with strum-boxes			YES.					
Bilges, No. and size	REFRIG. MACHY SPACE 1 @ 6"			Are the Bilge Suctions in the Machinery Space led from easily accessible mud-boxes, placed above the level of the working floor, with straight tail pipes to the bilges			YES					
Are the Bilge Suctions in the Machinery Space	YES.			Are they fitted with Valves or Cocks			BOTH.					
Are all Sea Connections fitted direct on the skin of the ship	YES.			Are the Overboard Discharges above or below the deep water line			BELOW.					
Are they fixed sufficiently high on the ship's side to be seen without lifting the stokehold plates	YES.			Are the Blow Off Cocks fitted with a spigot and brass covering plate			YES.					
Are they each fitted with a Discharge Valve always accessible on the plating of the vessel	YES.			How are they protected								
What pipes pass through the bunkers	YES.			Have they been tested as per rule			YES.					
What pipes pass through the deep tanks	YES.			Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times			YES.					
Are all Pipes, Cocks, Valves, and Pumps in connection with the machinery and all boiler mountings accessible at all times	YES.			Is the arrangement of valves and their connections such as to prevent the possibility of water passing from the sea or from water tanks into the cargo or machinery spaces, or from one compartment to another			YES.			worked from BRIDGE & LOCALLY.		
Is the Shaft Tunnel watertight	YES.			Is it fitted with a watertight door			YES.					



BOILERS, &c.—(Letter for record S) Total Heating Surface of Boilers 37030 sq

Is Forced Draft fitted YES ✓ No. and Description of Boilers 6 BABCOCK & WILCOX. Working Pressure 450 lbs.

Is a Report on Main Boilers now forwarded? YES ✓

Is { a Donkey } Boiler fitted? No. ✓

If so, is a report now forwarded? ✓

Is the donkey boiler intended to be used for domestic purposes only ✓

Plans. Are approved plans forwarded herewith for Shafting YES Main Boilers YES Auxiliary Boilers ✓ Donkey Boilers ✓  
(If not state date of approval)

Superheaters YES General Pumping Arrangements YES Oil Fuel Burning Arrangements YES

SPARE GEAR.

Has the spare gear required by the Rules been supplied YES ✓

State the principal additional spare gear supplied SEE SEPARATE LIST ATTACHED.

For VICKERS-ARMSTRONGS LIMITED,

The foregoing is a correct description,

Manufacturer.

Dates of Survey while building  
During progress of work in shops -- 1936  
During erection on board vessel --- 1937  
Total No. of visits 256

Dates of Examination of principal parts—Casings 6.10.37 Rotors 29.10.37 Blading 15.11.37 Gearing 22.11.37

Wheel shaft 28.9.37 Thrust shaft 11.5.37 Intermediate shafts 15.9.37 Tube shaft ✓ Screw shaft 30.8.37

Propellers 9.9.37 Stern tube 1.9.37 Engine and boiler seatings 26.7.37 Engine holding down bolts 14.12.37

Completion of fitting sea connections 22.9.37 Completion of pumping arrangements 28.2.37 Boilers fired 24.9.37 Engines tried under steam 25.2.38

Main boiler safety valves adjusted 14.2.38 Thickness of adjusting washers No 1 A 7/32" No 2 A 3/16" No 3 A 3/16" No 4 A 1/8" Identification Mark JM + TBS7 NO 23

Rotor shaft, Material and tensile strength F.S. 34/38 TONS Identification Mark ✓

Flexible Pinion Shaft, Material and tensile strength ✓ Identification Mark ✓

Pinion shaft, Material and tensile strength NICKEL STEEL 40 TONS Identification Mark JM + TBS7 NO 23

1st Reduction Wheel Shaft, Material and tensile strength ✓ Identification Mark ✓

Wheel shaft, Material F.S. Identification Mark JM + TBS7 NO 23 Thrust shaft, Material F.S. Identification Mark NO 668 JM

Intermediate shafts, Material F.S. Identification Marks JM NO 668 Tube shaft, Material ✓ Identification Marks ✓

Screw shaft, Material F.S. Identification Marks JM NO 668 Steam Pipes, Material STEEL ✓ Test pressure ✓ 1350 lb.

Date of test 15.12.37 4.11.38 Is an installation fitted for burning oil fuel ✓

Is the flash point of the oil to be used over 150°F. YES ✓ Have the requirements of the Rules for the use of oil as fuel been complied with YES ✓

Is the vessel (not being an oil tanker) fitted for carrying oil as cargo ✓ If so, have the requirements of the Rules been complied with ✓

If the notation for ice strengthening is desired, state whether the requirements in this respect have been complied with ✓

Is this machinery a duplicate of a previous case YES ✓ If so, state name of vessel "STRATHEDEN" (No 722) ✓

General Remarks (State quality of workmanship, opinions as to class, &c.)

The machinery of this vessel has been constructed under Special Survey & in accordance with Rule requirements & the materials & workmanship are sound & good. It has been efficiently installed on board, tried under working conditions, found satisfactory, & is in my opinion eligible for the notation + Inc 3.38.

The amount of Entry Fee ... £ 6 : 0 : 0 When applied for,

Special (less 57 19-0) £ 154 : 2 : 6 15.3.1938

Donkey Boiler Fee ... £ : : : When received,

Travelling Expenses (if any) £ 4 : 6 : 9 26.3.1938

Committee's Minute.

FRI 18 MAR 1938

Assigned + Inc 3.38

Fitted for oil fuel 20 above 150°F

20 CR

Incumbent.  
Engineer Surveyor to Lloyd's Register of Shipping.



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Foundation