

REPORT ON ELECTRICAL EQUIPMENT.

(OTHER THAN FOR THE PROPULSION OF THE VESSEL)

21 OCT 1936

Received at London Office

Date of writing Report 12 Oct. 1936 When handed in at Local Office 19. 10. 1936 Port of Glasgow.
 No. in Survey held at Glasgow. Date, First Survey 3. 9. 36 Last Survey 15. 10. 1936
 Reg. Book. 73062. on the S.S. 'CITY OF BENARES' (Number of Visits 11)
 Tons { Gross 11081
 Net 6720
 Built at Glasgow. By whom built Rowley Castle & Co. Ltd Yard No. 656 When built 1936
 Owners Ellerman Line Ltd Port belonging to Glasgow.
 Electric Light Installation fitted by The Sunderland Forge & Eng. Co. Ltd Contract No. 656 When fitted 1936
 Is the Vessel fitted for carrying Petroleum in bulk no.

System of Distribution Two wiresPressure of supply for Lighting 110 ✓ volts, Heating no ✓ volts, Power 110 ✓ volts.Direct or Alternating Current, Lighting Direct ✓Power Direct ✓If alternating current system, state frequency of periods per second -Has the Automatic Governor been tested and found efficient when the whole load is suddenly thrown on or off Yes. ✓Generators, do they comply with the requirements regarding temperature rise Yes ✓, are they compound wound Yes ✓are they over compounded 5 per cent. Yes. ✓, if not compound wound state distance between each generator -Where more than one generator is fitted are they arranged to run in parallel Yes ✓, is an adjustable regulating resistance fitted inseries with each shunt field Yes ✓ Have certificates of test results for machines under 100 kw. been submitted andapproved Yes ✓ Have machines over 100 kw. been inspected by the Surveyors during manufacture and testing Yes ✓Are all terminals accessible, clearly marked, and furnished with sockets Yes ✓, are they so spaced or shielded that they cannot be accidentally earthed,short circuited, or touched Yes ✓ Are the lubricating arrangements of the generators as per Rule Yes ✓Position of Generators On special flat in Engine Room. ✓, is the ventilationin way of the generators satisfactory Yes ✓ are they clear of all inflammable material Yes ✓ if situated near unprotectedwoodwork or other combustible material, state distance of same horizontally from or vertically above the generators - and -are the generators protected from mechanical injury and damage from water, steam or oil Yes ✓, are their axes of rotation fore and aft Yes ✓Earthing, are the bedplates and frames of the generating plant efficiently earthed Yes ✓ are the prime movers and their respective generatorsin metallic contact Yes ✓ Main Switch Boards, where placed In Engine Room adjacent to Generators. ✓

If the generators and main switchboard are not placed in the same compartment, is each generator provided with

a fuse on each insulated pole as near as possible to the terminals of the generator, additional to that provided on the main switchboard -Switchboards, are they placed in accessible positions, free from inflammable gases and acid fumes Yes ✓, are they protected from mechanicalinjury and damage from water, steam or oil Yes ✓, if situated near unprotected woodwork or other combustible material, state distance of samehorizontally from or vertically above the switchboards - and -, are they constructed wholly of durable, non-ignitable non-absorbentmaterials Yes ✓, is all insulation of high dielectric strength and of permanently high insulation resistance Yes ✓is it of an approved type Yes ✓, if semi-insulating material is used, are all conducting parts insulated from the slab with mica or micanite or othernon-hygroscopic insulating material, and the slab similarly insulated from its framework Yes ✓, is the non-hygroscopic insulating material of an approvedtype Yes ✓, and is the frame effectively earthed Yes ✓ Are the fittings as per Rule regarding: — spacing or shielding of live partsYes ✓, accessibility of all parts. Yes ✓, absence of fuses on back of board. Yes ✓, temperature rise ofomnibus bars Yes ✓, individual fuses to voltmeter, pilot or earth lamp. Yes ✓, are moving parts of switches alive in the"off" position no ✓ are all screws and nuts securing connections effectively locked Yes ✓ are any fuses fitted on the live side ofswitches no. ✓ Main Switchgear, description of switchgear for each generator and each outgoing circuit, and arrangement of equalizer switches

Single pole circuit breakers (one pole equalising) with 1/2" x 1/2" trips for each generator. D.P. 5/6 switch for Emergency
board in line connection, D.P. switch for each outgoing circuit
 Are turbine driven generators fitted with emergency trip switch as per rule Yes ✓ Are cupboards or compartments containing switchboards composed of

fire-resisting material or lined with approved material Yes ✓ Instruments on main switchboard 3 ammeters 3voltage meters - synchronising device for paralleling purposes. For compound machines is the ammeter connected on the opposite pole to equaliser connectionYes. ✓ Earth Testing, state what means are provided at the main switchboard for indicating the state of the insulation of the systemEarth Lamps. ✓ Switches, Circuit Breakers and Fusible Cut-outs,do these comply with the requirements of the Rules Yes ✓ are the fusible cutouts of an approved type Yes ✓ have the reversed

current protection devices been tested under working conditions *Yes* ✓ **Joint Boxes, Section and Distribution Boards**, is the construction, protection, insulation, material, and position of these as per rule *Yes* ✓

Cables: Single, twin, ~~concrete~~ or multicore *All types* ✓ are the cables insulated and protected as per Tables IV, V, X or XI of the Rules *Yes* ✓

If the cables are insulated otherwise than as per Rule, are they of an approved type — **Fall of Pressure**, state maximum between bus bars and any point of the installation under maximum load *5.3 Volts* ✓ **Cable Sockets**, are the ends of all cables having a sectional area of 0.04 square inch and above provided with soldering sockets *Yes* ✓

Paper Insulated and Varnished Cambric Insulated Cables. If conductors are ~~paper~~ varnished cambric insulated, is the dielectric at the exposed ends of the conductor protected from moisture by being suitably sealed with insulating compound — or waterproof insulating tape *Yes* ✓ **Cable Runs**, are the cables fixed as far as possible in accessible positions not exposed to drip or accumulation of water or oil, or to high temperature from boilers, steam pipes, uptakes or other hot objects, or to avoidable risk of mechanical damage *Yes* ✓ Are cables in machinery spaces, galleys, lavatories, bathrooms and lavatories lead covered or run in conduit *Yes* ✓

Support and Protection of Cables, state how the cables are supported and protected *All cables are L.C. Banded w. L.C. A.B.* ✓ *Clipped to wood grounds faced with asbestos for ordinary wood grounds, steelwork or perforated steel* ✓ *Cables protected from damage where necessary.* ✓ If cables are run in wood casings, are the casings and caps secured by screws — are the cap screws of brass — are the cables run in separate grooves — If armoured and lead covered cables are secured by metal clips, are the clips spaced as per Table VIII *Yes* ✓

Refrigerated Chambers, are the cables and fittings in accordance with the special requirements *Yes* ✓

Joints in Cables, state if any, and how made, insulated, and protected *None* ✓

Watertight Glands and Deck Tubes, are all cables passing through decks and watertight bulkheads provided with deck tubes or watertight glands *Yes* ✓ **Bushes in Beams and Non-watertight Partitions**, where unarmoured cables pass through beams and non-watertight partitions, are the holes efficiently bushed *Yes* ✓ state the material of which the bushes are made *Lead* ✓

Earthing Connections, state what earthing connections are fitted and their respective sectional areas *Lead covering & armouring of cables* ✓ *efficiently bonded & earthed by means of bonding glands or clips.* ✓ are their connections made as per Rule —

Alternative Lighting, are the groups of lights in the propelling machinery space arranged as per Rule *Yes* ✓ **Emergency Supply**, state position and method of control of the emergency supply and how the generator is driven *In Emergency Room on boat deck. Emergency supply controlled by D.P. switch from Emergency switchboard interconnected with Main switchboard through D.P. change-over switch. Generator driven by Diesel Engine.* ✓

Navigation Lamps, are these separately wired *Yes* ✓, controlled by separate switch and separate fuses *Yes* ✓, are the fuses double pole *Yes* ✓, are the switches and fuses grouped in a position accessible only to the officers on watch *Yes* ✓

has each navigation lamp an automatic indicator as per Rule *Yes* ✓ **Secondary Batteries**, are they constructed and fitted as per Rule —

Fittings, are all fittings on weather decks, in stokeholds and engine rooms and wherever exposed to drip or condensed moisture, watertight *Yes* ✓ are any fittings placed in spaces in which goods are liable to be stacked in close proximity to them; if so, how are they protected *Yes. Strong glass and metal guards.* ✓ are any fittings placed in spaces where inflammable or explosive dust or gases are liable to be present, if so, how are they protected —, how are the cables led —

where are the controlling switches situated —

are all fittings suitably ventilated *Yes* ✓, are all switches and lampholders constructed wholly of non-ignitable, non-absorbent materials *Yes* ✓

Heating and Cooking Appliances, are they constructed and fitted as per Rule *Yes* ✓, are air heaters constructed and fitted as per Rule *Yes* ✓

Searchlight Lamps, No. of —, whether fixed or portable —, are their fittings as per Rule —

Arc Lamps, other than searchlight lamps, No. of —, are their live parts insulated from the frame or case —, are their fittings as per Rule —

Motors, are their working parts readily accessible *Yes* ✓, are the coils self-contained and readily removable for replacement *Yes* ✓, are the brushes, brush holders, terminals and lubricating arrangements as per Rule *Yes* ✓, are the motors placed in well-ventilated compartments in which inflammable gases cannot accumulate and clear of all inflammable material *Yes* ✓, are they protected from mechanical injury and damage from water, steam or oil *Yes* ✓ are their axes of rotation fore and aft *Yes. where possible* ✓ situated near unprotected woodwork or other combustible material, are the motors of the totally enclosed, pipe ventilated, forced draught, drip or flame proof type *Yes* ✓, if not of this type, state distance of the combustible material horizontally or vertically above the motors — and —

have machines of over 100 BHP been inspected by the Surveyors during manufacture and testing — **Control Gear and Resistances**, are the generator field and motor speed regulators, starters and controllers constructed and fitted as per Rule *Yes* ✓ **Lightning Conductors**, where lightning conductors are required, are these fitted as per Rule — **Ships carrying Oil having a Flash Point less than 150° F.** Have the special requirements of the Rules been complied with regarding switches, joint boxes, section and distribution boards, protection of cables, method of distribution, lead of cables, lights and fittings — are all fuses of the fitted cartridge type — are they of an approved type —

If portable lamps for use in dangerous spaces are supplied, are they of a self-contained, battery-fed type approved by the Home Office —

Spare Gear, if the vessel is for open sea service have spares been supplied as per Rule *Yes* ✓

PARTICULARS OF GENERATING PLANT.									
DESCRIPTION OF GENERATOR.	No. of	Kilowatts.	RATED AT			DRIVEN BY	WHERE DRIVEN BY AN INTERNAL COMBUSTION ENGINE.		
			Volts.	Ampères.	Revs. per Min.		Fuel Used.	Flash Point of Fuel.	
MAIN ...	3	100	110	909	800	Steam Turbines - See London Report, No.	103/64.		
AUXILIARY ...						Diesel Engine	Diesel Oil	Above 150° F.	
EMERGENCY ...	1	35	110	318	1000	(See Manchester Report No 8662)			
ROTARY TRANSFORMER.									

GENERATOR, LIGHTING AND HEATING CONDUCTORS.									
DESCRIPTION.	CONDUCTORS.		COMPOSITION OF STRAND.		TOTAL MAXIMUM CURRENT. AMPERES.		Approximate Length. (Lead and Return.) Feet.	Insulated with	HOW PROTECTED.
	No. per Pole.	Total Nominal Area per Pole Sq. Ins.	No.	Diameter.	Circuit.	Rule.			
MAIN GENERATOR ...	2	1.00	61	.103	909	992	60	Varnished Cambric	L.C. B.
EQUALISER CONNECTIONS ...	1	.50	61	.103	-	486	30	"	"
AUXILIARY GENERATOR...									
EMERGENCY GENERATOR ...	1	.50	37	.103	318	346	45	"	"
ROTARY TRANSFORMER } MOTOR									
ENGINE ROOM... S.B.	1	.06	19	.064	87.8	122	80	"	"
BOILER ROOM, BOAT LIGHTS.	1	.04	19	.052	31	64	360	Rubber	"
AUXILIARY SWITCHBOARDS ...									
EMERGENCY LIGHTING. S.B.	1	.06	19	.064	94	122	30	Varn. Cambric	"
GALLEY, STORES, CUB. FOR S.B.	1	.06	19	.064	87	122	350	"	"
LOUNGE, BALL RM. ETC. S.B.	1	.10	19	.083	103	172	456	"	"
LIBRARY, DINING RM. S.B.	1	.10	19	.083	111	172	350	"	"
OFFICERS' ACCOMMODATION D.B.	1	.04	19	.052	43	64	330	Rubber	"
SWITCHER - UPPER DECK, S.B.	1	.06	19	.064	121.7	122	350	Varn. Cambric	"
ACCOMMODATION " " S.B.	1	.30	37	.103	318	346	510	"	"
INTERCONNECTOR, MAIN EN. ROOMS	1	.04	19	.052	59	64	330	Rubber	"
ENG. ACCOMMODATION S.B.	1	.10	19	.083	121.4	172	140	Varn. Cambric	"
LIGHTING PORT SWITCHEE DE. S.B.	1	.10	19	.083	140	172	140	"	"
" STAR " " S.B.	1	.10	19	.083	140	172	140	"	"
" PORT UPPER DECK S.B.	1	.01	7	.044	20	31	80	Rubber	"
WIRELESS ...	1	.01	7	.044	19.8	31	360	"	"
SEARCHLIGHT NAVIGATION ...	1	.002	3	.029	36	7.8	650	"	"
MASTHEAD LIGHT ...	1	.002	3	.029	36	7.8	96	"	"
SIDE LIGHTS ...	1	.002	3	.029	18	7.8	55	"	"
COMPASS LIGHTS ...	1	.002	3	.029	18	7.8	55	"	"
MAIN FANS ETC. UPPER DECK S.B.	1	.10	19	.083	141.5	172	140	Varn. Cambric	"
PORT LIGHTS ...	1	.06	19	.064	61.7	93	140	Rubber	"
CARGO LIGHTS S.B.	1	.06	19	.064	107	122	140	Varn. Cambric	"
LIGHTING STAR UPPER DECK S.B.	1	.06	19	.064	107	122	140	Varn. Cambric	"
" TWEEN DECK S.B.	1	.01	7	.044	24.4	31	45	Rubber	L.C. A. B.
" " S.B.	1	.03	19	.044	44.3	53	520	"	"
CUB. ART. LIGHTING. D.B.									

MOTOR CONDUCTORS.										
DESCRIPTION.	No. of Motors.	CONDUCTORS.		COMPOSITION OF STRAND.		TOTAL MAXIMUM CURRENT. AMPERES.		Approximate Length. (Lead and Return.) Feet.	Insulated with	HOW PROTECTED.
		No. Per Pole.	Total Nominal Area per Pole Sq. Ins.	No.	Diameter.	In Circuit.	Rule.			
BALLAST PUMP ...										
MAIN BILGE LINE PUMPS ...										
GENERAL SERVICE PUMP ...										
EMERGENCY BILGE PUMP ...	1	1	.075	19	.072	119	141	690	Varn. Cambric	L.C. B.
INDUCED DRAUGHT FAN ...	1	1	.20	37	.083	266	266	320	"	"
SANITARY PUMP ...	1	1	.06	19	.064	102	122	195	"	"
SEWAGE PLANT MOTORS ...	2	1	.06	19	.064	102	122	195	"	"
CHG. SEA WATER PUMPS ...	1	1	.01	7	.044	28.6	31	176	Rubber	L.C. A. B.
OIL PURIFIER ...	1	1	.01	7	.044	24	31	324	"	"
CHG. TRASH WATER PUMPS ...	1	1	.01	7	.044	24	31	324	"	"
ASH HOIST MOTOR ...	1	1	.20	37	.083	244	266	360	Varn. Cambric	L.C. B.
AIR COMPRESSOR ...	1	1	.04	19	.052	64	64	144	Rubber	L.C. A. B.
GALLEY POWER SECT. BOND ...										
FRESH WATER PUMP ...	1	1	.04	19	.052	64	64	144	Rubber	L.C. A. B.
ENGINE TURNING GEAR...										
ENGINE REVERSING GEAR ...										
LUBRICATING OIL PUMPS ...										
OIL FUEL TRANSFER PUMP...										
WINDLASS ...										
WINCHES, FORWARD ...										
WINCHES, AFT ...										
STEERING GEAR—										
(a) MOTOR GENERATOR...										
(b) MAIN MOTOR ...										
WORKSHOP MOTOR ...										
VENTILATING FANS FOR W. Spaces -	1	1	.20	37	.083	192	266	350	Varn. Cambric	L.C. B.
" " (Boat Deck) ...	1	1	.10	19	.083	156	172	300	"	"
" " Engine Room ...	1	1	.15	37	.072	210	222	330	"	"
" " Aft ...	1	1	.15	37	.072	207	222	140	"	"
" " Main ...	1	1	.06	19	.064	100	122	620	"	"
" " Main ...	1	1	.03	19	.044	36	53	385	Rubber	"
" " (Main Deck Entrance) ...	1	1	.075	19	.072	139	141	310	Varn. Cambric	"
" " (Eng. Acc.) ...	1	1	.06	19	.064	68	83	255	Rubber	"
" " Children's Rm. D.B. ...	1	1	.06	19	.064	68	83	255	Rubber	"

All Conductors are of annealed copper conforming to British Standard Specification No. 7 (or International Electro-technical Commission Publication No. 28).

The Insulated Conductors are guaranteed to withstand the immersion and resistance tests specified in the Rules.

The foregoing is a correct description.

P.Pro. THE SUNDERLAND FORGE & ENGINEERING CO. LTD. Electrical Engineers.

Date 12.10.36.

COMPASSES.

Distance between electric generators or motors and standard compass

72 feet (Emergency Generator)

Distance between electric generators or motors and steering compass

70 feet

The nearest cables to the compasses are as follows:—

A cable carrying 20 Amperes 12 feet from standard compass 12 feet from steering compass.

A cable carrying 19.4 Amperes 12 feet from standard compass 10 feet from steering compass.

A cable carrying Amperes feet from standard compass feet from steering compass.

Have the compasses been adjusted with and without the electric installation at work at full power Yes

Has the effect of switching on and off circuits, motors and other electro-magnetic apparatus within the vicinity of the compasses been noted Yes

The maximum deviation due to electric currents was found to be 1/2 degrees on any course in the case of the standard compass, and 1/2 degrees on any course in the case of the steering compass.

H. Tully

Builder's Signature.

Date

15th Oct 36

Is this installation a duplicate of a previous case No. If so, state name of vessel

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

The electrical equipment of this vessel

has been fitted on board under special survey, tested under full working conditions and found satisfactory. The materials and workmanship were found good and sound.

17/10/36.

Noted

Ymn

27.10.36

Total Capacity of Generators 335 Kilowatts.

The amount of Fee ... £ 49: 5: 0

When applied for.

Travelling Expenses (if any) £

When received.

20 OCT 1936

Committee's Minute GLASGOW

TUE. 29 DEC 1936

Assigned SEE ACCOMPANYING MACHINERY REPORT.



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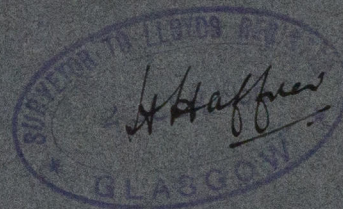
REPORT ON TESTS

of

3 - 100-KW. TURBO-GENERATORS

for

S. S. "CITY OF BENARES."



**METROPOLITAN
Vickers**

Works: Trafford Park, Manchester, and Sheffield.



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