

# REPORT ON ELECTRICAL EQUIPMENT.

(OTHER THAN FOR THE PROPULSION OF THE VESSEL)

Received at London Office APR 24 1940

Date of writing Report 6<sup>th</sup> April 1940. When handed in at Local Office 20.4.40 Port of GLASGOW.

No. in Survey held at GREENOCK & GLASGOW. Date, First Survey 1939 Oct. 13 Last Survey 16<sup>th</sup> April 1940.

Reg. Book. 39917 on the T.S. "LANARKSHIRE" Tons { Gross Net

Built at GREENOCK. By whom built Greenock Dockyard Co. Ltd. Yard No. 437. When built 1940

Owners Scottish Shire Line Ltd. Port belonging to Glasgow.

Electric Light Installation fitted by Sunderland Forge & Eng. Co. Ltd. Contract No. 437. When fitted 1940

Is the Vessel fitted for carrying Petroleum in bulk No.

System of Distribution two wire. Pressure of supply for Lighting 220. Heating — Power 220. 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 in series with each shunt field Yes. Have certificates of test results for machines under 100 kw been submitted and approved 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 in engine room. in way of the generators satisfactory Yes, are they clear of all inflammable material Yes, if situated near unprotected

woodwork 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. Main Switch Boards, where placed near generators. in metallic contact Yes.

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 position, free from inflammable gases and acid fumes Yes, are they protected from mechanical injury and damage from water, steam or oil Yes, if situated near unprotected woodwork or other combustible material, state distance of same horizontally from or vertically above the switchboards — and —, are they constructed wholly of durable, non-ignitable non-absorbent materials 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 micaite or other non-hygroscopic insulating material, and the slab similarly insulated from its framework Slidantop, is the non-hygroscopic insulating material of an approved type Yes, and is the frame effectively earthed Yes.

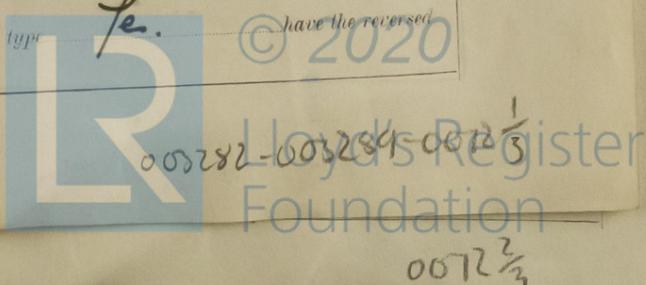
Are the fittings as per Rule regarding spacing or shielding of live parts Yes, accessibility of all parts Yes, absence of fuses on back of board Yes, temperature rise of omnibus bars Yes, individual fuses to voltmeter, pilot or earth lamp Yes, are moving parts of switches alive in the "off" position Yes, are all screws and nuts securing connections effectively locked Yes, are any fuses fitted on the live side of switches No.

Main Switchgear, description of switchgear for each generator and each outgoing circuit, and arrangement of equalizer switches Each generator controlled by T.P.C.B. fitted with O/LOAD and Reverse Current trips, each outgoing circuit controlled by DP O/LOAD C.B. or DP Switch & DP Fuses.

Are turbine driven generators fitted with emergency trip switch as per rule — Are cupboards or compartments containing switchboards composed of fire-resisting material or lined with approved material — Instruments on main switchboard 4 ammeters 3.

voltmeters — synchronising device for paralleling purposes. For compound machines is the ammeter connected on the opposite pole to equaliser connection Yes. Earth Testing, state what means are provided at the main switchboard for indicating the state of the insulation of the system cert lamps.

do these comply with the requirements of the Rules Yes, are the fusible cutouts of an approved type Yes, have the reversed



**T.S. "LANARKSHIRE"**  
**MOTOR CONDUCTORS.**

DESCRIPTION.	NO. OF MOTORS.	CONDUCTORS.		COMPOSITION OF STRAND.		TOTAL MAX. CURRENT AMPERES.		APPROX. LENGTH (LEAD & RETURN) FEET.	INSULATED WITH.	HOW PROTECTED.
		NO. PER POLE.	AREA/POLE SQ. INS.	NO.	DIAM.	IN CIRCUIT.	RULE.			
REARIG. WATER PUMPS	2	1	.0145	7	.052	37	37	248	V.I.R.	L.C.A.B.
BRINE PUMPS:-	3	1	.0225	7	.064	40	46	172	V.I.R.	L.C.A.B.
"	2	1	.01	7	.044	24	31.0	180	V.I.R.	L.C.A.B.
NO. 2. LTDBL. FANS	2	1	.0225	7	.064	36	46.0	340	V.I.R.	L.C.A.B.
NO. 2. HOLD FANS	2	1	.04	19	.052	61	64	350	V.I.R.	L.C.A.B.
NO. 3 LTQS. FANS	2	1	.007	7	.036	22	24	360	V.I.R.	L.C.A.B.
"	1	1	.007	7	.036	16	24	360	V.I.R.	L.C.A.B.
NO. 3 HOLD. FANS	2	1	.0225	7	.064	36	46	350	V.I.R.	L.C.A.B.
NO. 4 LTQS. FANS	2	1	.007	7	.036	22	24	320	V.I.R.	L.C.A.B.
"	1	1	.007	7	.036	16	24	320	V.I.R.	L.C.A.B.
NO. 4 HOLD. FANS	2	1	.007	7	.036	22	24	340	V.I.R.	L.C.A.B.
NO. 5 LTQS. FANS	2	1	.007	7	.036	22	24	340	V.I.R.	L.C.A.B.
"	1	1	.007	7	.036	16	24	340	V.I.R.	L.C.A.B.
NO. 5 HOLD. FANS	2	1	.0225	7	.064	36	46	350	V.I.R.	L.C.A.B.

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, concentric, or multicore. Single twin & multicore 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 Yes. Fall of Pressure, state maximum between bus bars and any point of the installation under maximum load 7.3 Volts L.V. 12 Volts Power. 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 or varnished cambric insulated, is the dielectric at the exposed ends of the conductor protected from moisture by being suitably sealed with insulating compound Yes, 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 temperatures 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 Cables L.C. L.C.B. or L.C.A.B. clipped to steel or woodwork.

If cables are run in wood casings, are the casings and caps secured by screws Yes, are the cap screws of brass Yes, are the cables run in separate grooves Yes. 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 Fibre.

Earthing Connections, state what earthing connections are fitted and their respective sectional areas Lead and armouring of cables efficiently earthed by means of clips or bonding glands.

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 Generator in special compartment off engine room controlled by its own control board, generator driven by I.C. 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 Yes.

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.

are any fittings placed in spaces where inflammable or explosive dust or gases are liable to be present, if so, how are they protected Yes.

where are the controlling switches situated Yes, 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 Yes, whether fixed or portable Yes, are their fittings as per Rule Yes.

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

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, if 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 Yes and Yes.

have machines of over 100 BHP been inspected by the Surveyors during manufacture and testing Yes. 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 Yes. 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 Yes, are all fuses of the fitted cartridge type Yes, are they of an approved type Yes.

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

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

*[Handwritten signature]*

PARTICULARS OF GENERATING PLANT.

DESCRIPTION OF GENERATOR.	No. of	RATED AT				DRIVEN BY	WHERE DRIVEN BY AN INTERNAL COMBUSTION ENGINE.	
		Kilowatts.	Volts.	Ampere.	Revs. per Min.		Fuel Used.	Flash Point of Fuel.
MAIN	3	125	220	570	500	Steam engine.		
AUXILIARY								
EMERGENCY	1	40	220	181.	900	I.C. engine	dil.	above 150°.
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	.40	37	.083	570	592	114	Y.C.	L.C.B.
EQUALISER CONNECTIONS	1	.20	37	.083		294	56	Y.C.	L.C.B.
AUXILIARY GENERATOR									
EMERGENCY GENERATOR	1	.10.	19	.083	181.	191.	50	Y.C.	L.C.A.B.
ROTARY TRANSFORMER									
ENGINE ROOM. } MOTOR									
ENGINE ROOM. } GENERATOR									
ENGINE ROOM. } FORD	1	.0045	7	.029	16	18.2	120	Y.I.R.	L.C.A.B.
ENGINE ROOM. } AFT	1	.0045	7	.029	16	18.2	100	Y.I.R.	L.C.A.B.
AUXILIARY SWITCHBOARDS									
REFRIG. SW. Bd.	3	.60	37	.083	730	888	180	Y.C.	L.C.B.
Main Sw. Bd. to Aux. Sw. Bd.	2	.40	37	.083	462	592	192	Y.C.	L.C.B.
Aux. Sw. Bd. to Act. Main Bd.	1	.20	37	.083	232	296	140	Y.C.	L.C.B.
ACCOMMODATION									
NAVIGATION. DB.	1	.0145	7	.052	15	37	606	Y.I.R.	L.C.A.B.
SALOON. DB.	1	.01	7	.044	11.5	31.0	436	Y.I.R.	L.C.A.B.
WIRELESS	1	.0145	7	.052	15	37	618	Y.I.R.	L.C.A.B.
SEARCHLIGHT									
MASTHEAD LIGHT	1	.002	3	.029	.18	7.8	464	Y.I.R.	L.C.A.B.
SIDE LIGHTS	1	.002	3	.029	.18	7.8	80	Y.I.R.	L.C.B.
COMPASS LIGHTS	1	.002	3	.029	.07	7.8	45	Y.I.R.	L.C.B.
POOP LIGHTS	1	.0225	7	.064	18.4	46.0	546	Y.I.R.	L.C.A.B.
CARGO LIGHTS	1	.01	7	.044	15	31.0	442	Y.I.R.	L.C.A.B.
ARC LAMPS	1	.007	7	.036	9	24.0	468	Y.I.R.	L.C.A.B.
HEATERS FUEL OIL.	1	.0225	7	.064	41	46	260	Y.I.R.	L.C.A.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										
SANITARY PUMP	1	1	.0225	7	.064	36	46	160	Y.I.R.	L.C.A.B.
CIRC. SEA WATER PUMPS										
CIRC. FRESH WATER PUMPS										
AIR COMPRESSOR										
FRESH WATER PUMP										
ENGINE TURNING GEAR. POET	1	1	.01	7	.044	25	31.0	94	Y.I.R.	L.C.A.B.
ENGINE TURNING GEAR. TUDING										
ENGINE TURNING GEAR. STAR	1	1	.01	7	.044	25	31.0	50	Y.I.R.	L.C.A.B.
LUBRICATING OIL PUMPS										
OIL FUEL TRANSFER PUMP										
WINDLASS										
WINCHES, FORWARD										
WINCHES, AFT										
STEERING GEAR—										
(a) MOTOR GENERATOR										
(b) MAIN MOTOR										
WORKSHOP MOTOR	1	1	.0045	7	.029	16	18.2	70	Y.I.R.	L.C.A.B.
VENTILATING FANS										
ENGINE ROOM. FANS DB.	2	1	.0225	7	.064	34	46.0	160	Y.I.R.	L.C.A.B.
FORCED DRAUGHT FAN	1	1	.10	19	.083	181	191	260	Y.C.	L.C.A.B.
STARTING PUMP. BLK. FUEL	1	1	.002	3	.029	2.8	7.8	180	Y.I.R.	L.C.A.B.
OIL PURIFIERS.	1	1	.002.	3	.036	9	12.0	70	Y.I.R.	L.C.A.B.
OIL FUEL PUMP	1	1	.007	7	.036	21	24.0	260	Y.I.R.	L.C.A.B.

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.

*L. B. Shankel*  
P. Rep. THE SUNDERLAND FORGE & ENGINEERING CO. LTD. Electrical Engineers. Date 13th April 1940.

COMPASSES.

Distance between electric ~~generators~~ or motors and standard compass *25 feet*

Distance between electric ~~generators~~ or motors and steering compass *20 feet*

The nearest cables to the compasses are as follows:—

A cable carrying *.07* Ampères *led into* feet from standard compass *led into* feet from steering compass.

A cable carrying *15.* Ampères *15.* feet from standard compass *10.* feet from steering compass.

A cable carrying Ampères 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 *nil* degrees on *anf.* course in the case of the standard compass, and *nil* degrees on *anf.* course in the case of the steering compass.

THE GREENOCK DOCKYARD CO. LTD

*Michael Macneil* Builder's Signature.

Date *16th Apr 1940*

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, etc.)

*The electrical equipment of this vessel has been fitted on board under special survey. Tested under full working conditions and found satisfactory. The material and workmanship are good.*

*Noted  
JY  
26/4/40*

*Rob  
20/4/40*

Total Capacity of Generators *415* Kilowatts.

The amount of Fee *Glasgow 4/5-142-12-0.* When applied for. *London 5/ £ 10-13-0: ar-ent*

Travelling Expenses (if any) *Glasgow 1-5-4.* When received. *London 16-7-6 16-5-19 40/-*

*H. C. Findlay*  
Surveyor to Lloyd's Register of Shipping.

Committee's Minute **GLASGOW 23 APR 1940**

Assigned *See LUK 20943*

750,000.— Transfer. The surveys are requested not to write on or back of the space for Committee's Minutes.



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