

Rpt. 13.

No. 13212

## REPORT ON ELECTRICAL EQUIPMENT.

(OTHER THAN FOR THE PROPULSION OF THE VESSEL) 22 APR 1942

Received at London Office.....

Date of writing Report... 26<sup>TH</sup> MARCH 42... When handed in at Local Office... 19... Port of... BelfastNo. in Survey held at... Belfast Liverpool Date, First Survey... 6 Aug 1940 Last Survey... 17<sup>th</sup> April 1942  
Reg. Book. (Number of Visits... 36...)on the... M.V. "Empire Grace" Tons {Gross 13477.9  
Net 9440.5

Built at... Belfast By whom built... Messrs Harland &amp; Wolff Ltd, Yard No. 1051 When built... 1942

Owners... Ministry of Shipping Port belonging to... London

Electrical Installation fitted by... Messrs Harland and Wolff Ltd, Contract No. 1051 When fitted... 1942

Is vessel fitted for carrying Petroleum in bulk... NO Is vessel equipped with D.F. Yes E.S.D. Yes Gy.C. NO Sub.Sig. NO

Have plans been submitted and approved... Yes System of Distribution... Two wire System. Voltage of supply for Lighting... 220

Heating... 220 Power... 220 Direct or Alternating Current, Lighting... DC Power... DC If Alternating Current state frequency... Prime Movers,

has the governing been tested and found efficient when the whole load is suddenly thrown on and off... Yes Are turbine emergency governors fitted with a

trip switch as per Rule... Generators, are they compound wound... Yes, are they level compounded under working conditions... Yes

if not compound wound state distance between generators... and from switchboard... Where more than one generator is fitted are they

arranged to run in parallel... Yes, are shunt field regulators provided... Yes Is the compound winding connected to the negative or positive pole

Negative Pole. Have machines over 100 kw. been inspected by the Surveyors during manufacture and testing... Yes Have certificates of

test for machines under 100 kw. been supplied... Yes and the results found as per rule... Yes Are the lubricating arrangements and the construction

of the generators as per rule... Yes Position of Generators... Two on Port Side of Motor Room, Two on Starboard Side.

Floor Level. is the ventilation in way of generators satisfactory... Yes are they clear of inflammable material... Yes, if situated

near unprotected combustible material state distance from same horizontally... and vertically... are the generators protected from mechanical

injury and damage from water, steam and oil... Yes are the bedplates and frames earthed... Yes and the prime movers and generators in metallic

contact... Yes Switchboards, where are main switchboards placed... Motor Room aft. Upper Deck Level.

are they in accessible positions, free from inflammable gases and acid fumes... Yes are they protected from mechanical injury and damage from water, steam

and oil... Yes, if situated near unprotected combustible material state distance from same horizontally... and vertically... what insulation

material is used for the panels... Sindamip. if of synthetic insulating material is it an Approved Type... Yes, if of

semi-insulating material (slate or marble) are all conducting parts insulated therefrom as per Rule... Is the frame effectually earthed... Yes

Is the construction as per Rule... Yes, including accessibility of parts... Yes, absence of fuses on the back of the board... Yes, individual fuses

to pilot and earth lamps, voltmeters, etc... Yes locking of screws and nuts... Yes, labelling of apparatus and fuses... Yes, fuses on the "dead"

side of switches... Yes Description of Main Switchgear for each generator and arrangement of equaliser switches... 1500 amp Triple Pole

Circuit Breaker - centre pole Equations, overload Time Lag. Reverse Current and Shunt Trip

and for each outgoing circuit... D.P. Circuit Breaker Overload Release &amp; Time Lag. or Double Pole. Quick Break.

Knife Switch &amp; fuse.

Are compartments containing switchboards composed of fire-resisting material or lined as per Rule... Yes Instruments on main switchboard... 4

ammeters... 2 voltmeters... synchronising devices. For compound machines in parallel is the ammeter connected on the pole opposite to the

equaliser connection... Yes Earth Testing, state means provided... Two Earth Lamps with Two Double Pole Tumbler Switches.



Rpt. 9a.

Port of

Continuation of Report No.

dated

on the

## MOTOR CABLES CONTINUED

ALL IMPORTANT MOTORS TO BE ENUMERATED	No	B.H.P.	SECTIONAL AREA OF CABLES	MAXIMUM CURRENT IN CIRCUIT	CURRENT RATING	APPROX LENGTH	INSULATED	HOW PROTECTED
Bain Pump	1	3	7/029	12	15	150	Rubber	Hard Rubber + Braiding
Refrig Vent Fan	1	2	3/028	8	10	120	Do	Do
Exhaust Fan	1	3/4	3/029	3	5	180	Do	Do
Vegetable Room Fan	1	1/3	3/029	1.3	5	120	Do	Do
Refrig CO2 Compressor	3	160	127/103	595	595	30	Do	Do
37 1/2" Dia Refrig Cooler Fans	1	8 3/4	7/052	35	37	100	Do	Do
35" Do Do	5	9	7/054	36	46	270	Do	Do
35" Do Do	7	8	7/052	32	37	180	Do	Do
35" Do Do	1	6 1/4	7/044	25	31	250	Do	Do
20" Do Do	4	6 1/4	7/044	25	31	250	Do	Do
Windless	1	77	61/093	293	452	290	Do	Do
Winches Forward	6	57	37/083	222	247	100	Do	Do
Do Midships	5	57	37/083	222	247	130	Do	Do
Do Aft	8	57	37/083	222	247	100	Do	Do
Steering Gear	2	57	37/093	270	295	230	Do	Do
Thermolink Fan No 1. Passengers	1	3	7/029	12	15	60	Do	Do
Thermolink Fan No 2. "	1	1 1/2	3/038	6	10	8	Do	Do
Thermolink Fan No 3. "	1	3/4	3/029	3	5	10	Do	Do

Switches, Circuit Breakers and Fuses, are they as per Rule Yes, are the fuses an approved type Yes, are all fuses labelled as per Rule Yes, are the reversed current protection devices connected on the pole opposite to the equaliser connection Yes, have they been tested under working conditions Yes. Joint Boxes, Section Boards and Distribution Boards, is the construction and position as per Rule Yes.

Cables, are they insulated and protected as per the appropriate Tables of the Rules Yes, if otherwise than as per Rule are they of an approved type —, state maximum fall of pressure between bus bars and any point under maximum load 5.4, are the ends of all cables having a sectional area of 0.04 square inch and above provided with soldering sockets Yes. Are paper insulated and varnished cambric insulated cables sealed at the exposed ends —.

with insulating compound — or waterproof insulating tape —. Are all the cable runs in accessible positions, not exposed to drip or accumulation of water or oil, high temperatures or risk of mechanical damage Yes, are cables laid under machines or floorplates No, if so, are they adequately protected —. Are cables in machinery spaces, galleys, laundries, etc., lead covered H.R. or run in conduit —. State how the cables are supported and protected Brass clipped to perforated steel trays. Protected by sheet steel cover 1/8" thick in cargo.

Spaces - Where cable is run along the open fore deck, it is in a steel trough, bitumen filled. On and about the Bridge lead covered cables. Brass clipped to Bulkheads.

Are all lead sheaths, armouring and conduits effectually bonded and earthed Yes. Refrigerated chambers, are the cables and fittings as per Rule Yes.

Are all cables passing through decks and watertight bulkheads provided with deck tubes or watertight glands Yes, where unarmoured cables pass through beams, etc., are the holes effectively bushed Yes and with what material Sheet lead. Alternative Lighting, are the groups of lights in the engine and boiler rooms arranged as per Rule Yes. Auxiliary Supply, state position Auxiliary Generator.

Room. Stelter Deck and method of control By Switchboard in Auxiliary Generator Room and.

interconnected with Main Switchboard through D.P. Navigation Lamps, are they separately wired Yes controlled by separate change over switch.

double pole switches Yes and fuses Yes. Are the switches and fuses in a position accessible only to the officers on watch Yes, is an automatic indicator fitted Yes. Secondary Batteries, are they constructed and fitted as per Rule —, are they adequately ventilated —.

Fittings, are all fittings on weather decks, in stokeholds and engine rooms and wherever exposed to drip or condensed moisture, weatherproof Yes. Are fittings installed where readily combustible materials or inflammable or explosive dust or gases are likely to be present —, if so, how are they protected —.

and where are the controlling switches fitted —, are all fittings suitably ventilated Yes.

are all fittings and accessories constructed and installed as per Rule Yes. Searchlight Lamps, No. of One, whether fixed or portable Portable.

Signalling Projector, are their fittings as per Rule Yes. Heating and Cooking, is the general construction as per Rule Yes.

are the frames effectually earthed Yes, are heaters in the accommodation of the convection type Yes. Motors, are all motors constructed and installed as per Rule Yes and placed in well-ventilated compartments in which inflammable gases cannot accumulate and free from damage from water, steam and oil Yes, if situated near unprotected combustible material state minimum distance from same horizontally — and vertically —.

Have motors of 100 BHP and over been inspected by the Surveyors during manufacture and testing Yes. Have certificates of test for motors under 100 BHP intended for essential services been supplied and the results found as per Rule Yes. Control Gear and Resistances, are they constructed and fitted as per Rule Yes. Lightning Conductors, where required are they fitted as per Rule —. Ships carrying Oil having a Flash Point less than 150° F. Have all the special requirements of the Rules for such ships been complied with —, are all fuses of the 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 flameproof type —. Spare Gear, if the vessel is for open sea service have spares been provided as per Rule Yes, are they suitably stored in dry situations Yes. Insulation Tests, has the insulation resistance of all circuits and apparatus been megger tested and found satisfactory Yes.

## PARTICULARS OF GENERATING PLANT.

DESCRIPTION OF GENERATOR.	No. of	RATED AT			DRIVEN BY	WHERE DRIVEN BY AN INTERNAL COMBUSTION ENGINE.	
		Kilowatts.	Volts.	Ampères.		Fuel Used.	Flash Point of Fuel.
MAIN ...	4	830	222	1490	300	DIESEL ENGINE.	POOL DIESEL
AUXILIARY ...	1	25	220	114	800	DIESEL ENGINE.	POOL DIESEL
ROTARY TRANSFORMER							



# GENERATOR CABLES.

DESCRIPTION.	KILOWATTS.	CONDUCTORS.		MAXIMUM CURRENT IN AMPERES.		APPROX. LENGTH (lead plus return feet).	INSULATED WITH.	HOW PROTECTED.
		No. in Parallel Per Pole.	Sectional Area or No. and Dia. of Strands. Sq. ins. or sq. mm.	In the Circuit.	Rule.			
MAIN GENERATOR ... ..	330	3	127/103	1490	1785	140	Rubber	Hard Rubber & Braiding
" " EQUALISER ... ..		2	91/093		768	70	Do	Do
AUXILIARY GENERATOR ... ..	25	1	19/083	114	118	45	Rubber	Hard Rubber & Braiding
ROTARY TRANSFORMER: MOTOR								
" " GENERATOR ... ..								

## MAIN DISTRIBUTION CABLES.

INTERCONNECTION WITH MAIN SWBD,		1	37/083	140	184	225	Rubber	Hard Rubber & Braiding
AUX. SWITCHBOARDS								
Masterboard A	Ninches	1	91/103	400	461	300	Do	Do
Do A	Heating & Cooking	1	91/093	350	384	300	Do	Do
Do B	B&C Winches, Windlass, D. G.	1	91/103	444	461	600	Do	Do
Do D	Ninches D. G.	1	61/103	325	332	150	Do	Do
Do E	Ninches & Steering Gear	1	91/103	400	461	250	Do	Do
Do E	Heating	1	37/083	175	184	250	Do	Do
Do F	Refrigeration & Yens	2	127/093	970	1024	165	Do	Do
Do F	Refrigeration C.O <sub>2</sub> Compressors	3	127/103	1785	1785	165	Do	Do

## LIGHTING AND HEATING, ETC., CABLES.

WIRELESS ... ..	1	19/064	27.5	83.0	250	Rubber	H.R. & Hard Covered
NAVIGATION LIGHTS ... ..	1	7/064	0.72	5.0	25	Do	Do
LIGHTING AND HEATING ... ..							
Master Head Light	1	3/029	0.18	5.0	500	Do	Do
Side Lights	1	3/029	0.18	5.0	80	Do	Do
Stem Lights	1	3/029	0.18	5.0	800	Do	H.R.
Compass Light	1	3/029	0.10	5.0	25	Do	Do
Cargo Lights Forward.	1	19/064	14.0	83.0	300	Do	Hard Rubber
Cargo Lights aft.	1	10/064	17.0	83.0	360	Do	Do
Heaters 600W 750W 1000 WATTS.	1	3/029	2.75/4.55	5.0		Do	Do
Do 1500W 2000 WATTS	1	3/036	5.92/9.1	10.0		Do	Do
Do 2500 WATTS	1	7/029	11.36	15.0		Do	Do

## MOTOR CABLES.

ALL IMPORTANT MOTORS TO BE ENUMERATED.	No.	B.H.P.						
Air Compressors	2	100.0	1	91/093	380.0	384.0	320	Do
Hub Oil Pumps	3	86	1	61/103	523.0	532	210	Do
Main S.W. Pumps	3	36	1	37/072	137.0	152	320	Do
Main F.W. Pumps	2	26	1	19/083	100.0	118	320	Do
Ballast Pump	1	26	1	19/083	100.0	118	340	Do
General Service Pump	1	24	1	19/072	93.0	97	330	Do
Sanitary Pump	1	22	1	19/072	86.0	97	330	Do
Turning Gear Motors	2	13	1	19/052	58.0	64	210	Do
Bilge Pumps	2	13	1	19/052	51.0	64	270	Do
F.O. Transfer Pumps	2	12	1	19/044	47.0	53	270	Do
Refrig S.W. Circ Pumps	2	26	1	19/083	100.0	118	400	Do
Motor Room Vent Yens.	2	2	1	7/029	8.0	15	250	Do
Do. Do.	3	1.75	1	7/029	7.0	15	250	Do
Vapour Extraction Yens.	2	4.5	1	7/036	18.0	24.0	260	Do
6 Ton Hoists - Motor Room.	2	5.0	1	7/044	20.0	31.0	60	Do
F.O. Purifiers	3	2.5	1	7/029	11.0	15.0	60	Do
L.O. Purifiers	1	2.5	1	7/029	11.0	15.0	60	Do
Pumped Fuel Oil Pump	1	1.75	1	3/036	7.8	10.0	60	Do
Laths	1	2.0	1	3/036	8.0	10.0	40	Do
Grinders	1	2.0	1	3/036	8.0	10.0	60	Do
Drilling M/C.	1	2.0	1	3/036	8.0	10.0	60	Do
Auxiliary S.W. Pump	1	8.0	1	7/052	32.5	37.0	60	Do
Auxiliary F.W. Pump	1	5.0	1	7/036	21.0	24.0	60	Do
Hand Mark M/C	1	0.75	1	3/036	3.8	10.0	100	Do
Boiler Blower	1	2.0	1	3/036	8.0	10.0	60	Do
Galley Range Blowers	4	0.3	1	3/029	1.3	5.0	60	Do
Domestic F.W. Pump	1	7.0	1	7/044	28.0	31.0	240	Do
Refrig Brine Pumps	4	17.0	1	19/064	68.0	83.0	110	Do
Do Plunger Pump	1	3.25	1	7/029	13.0	15.0	150	Do

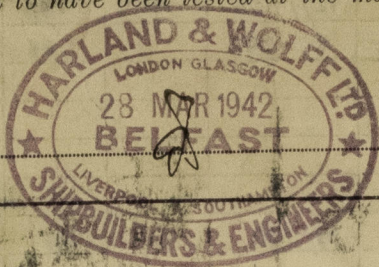
Note: all wiring & cables in vicinity of wheel house & wireless room in lead covered cables.

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Lloyd's Register Foundation



The Electrical Equipment is installed in accordance with the approved plans and the requirements of the Rules.  
All Insulated Conductors are guaranteed to have been tested at the maker's works as specified in the Rules.  
The foregoing is a correct description.



Electrical Engineers.

Date 2-4-42.

#### COMPASSES.

Minimum distance between electric generators or motors and standard compass 25 feet

Minimum distance between electric generators or motors and steering compass 25 feet

The nearest cables to the compasses are as follows:—

A cable carrying 0.25 Ampères 4 feet from standard compass 8 feet from steering compass.

A cable carrying 0.18 Ampères 8 feet from standard compass 11 feet from steering compass.

A cable carrying 13. Ampères 4 feet from standard compass 6 feet from steering compass.

Have the compasses been adjusted with and without the electric installation at work at full power 100% 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 all course in the case of the standard compass, and Nil degrees on all course in the case of the steering compass.



Builder's Signature.

Date 2. 4. 42.

Is this installation a duplicate of a previous case. Similar If so, state name of vessel Empire Hope (1051.)

General Remarks (State quality of workmanship, whether insulation tests, etc., have been made, opinions as to class, etc.) The electrical

equipment of this vessel has been fitted in board under special survey in accordance with the approved plans and Lloyds' letter and specification. With the exception of the 25kw auxiliary generator set, the engine of which is not yet completed, the installation has been tested under full working conditions. The builder state that the 25kw generator will not be completed until the vessel's return from present voyage. On the vessel's arrival at Liverpool it was reported that bad commutation had developed on a number of the refing. coolers, motors after prolonged running. The motor manufacturer's representative attended & it was found that inevitable brushes were fitted. Carbon brushes of correct grade were fitted and the motor tested under all conditions & so far as could be seen, were satisfactory. In our opinion the electrical equipment is eligible to be accepted, subject to the 25kw generator being tested and all the refing. cooling fan motors examined & tested on the vessel's return from the present voyage.

Noted

23/4/42

Total Capacity of Generators 1345 {MAIN 1320 ✓  
Aux 25 Kilowatts.

The amount of Fee ... £78 : 7-6 When applied for, 14. 4. 42  
One Belfast £39.3-9  
One Liverpool £29.3-7  
Travelling Expenses (if any) £19 : 11-6 When received, 19. 11. 42  
Specification 25%

L. Haffner R Shaw  
Surveyor to Lloyd's Register of Shipping.

Committee's Minute FRI. 24 APR 1942

Assigned See Bel 26 13212