

# REPORT ON ELECTRICAL EQUIPMENT.

(OTHER THAN FOR THE PROPULSION OF THE VESSEL)

Received at London Office

SEP - 1 1937

Date of writing Report 20-8-1937. When handed in at Local Office 28-8-1937 Port of GLASGOW.

No. in Survey held at GLASGOW. Date, First Survey 17-2-37 Last Survey 24-8-1937

Req. Book. 23973 on the T.S.M.V. "DUNERA". (Number of Visits 27)

Tons { Gross 11162  
Net 6634

Built at GLASGOW. By whom built BARCLAY CURLE & CO. LTD. Yard No. 663. When built 1937.

Owners BRITISH INDIA STEAM NAV. CO. LTD. Port belonging to LONDON.

Electric Light Installation fitted by THE SUNDERLAND FORGE & ENG CO Contract No. 663 When fitted 1937

Is the Vessel fitted for carrying Petroleum in bulk No.

System of Distribution Two wire.

Pressure of supply for Lighting 220 volts, Heating 220 volts, Power 220 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 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 Main engine room bottom platform, 2 port and 2 starb'd. is the ventilation 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, are the prime movers and their respective generators in metallic contact yes

Main Switch Boards, where placed on special platform in engine room aft end.

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 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 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 other non-hygroscopic insulating material, and the slab similarly insulated from its framework yes, 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 no, 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

Triple pole circuit breaker fitted with O.L. & R.P. trips for each generator. D.P. circuit breaker or D.P. Switch and fuses for each outgoing circuit.

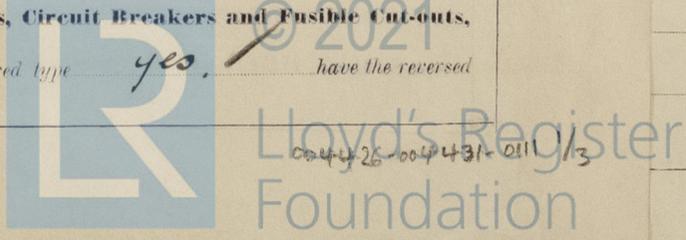
Are turbine driven generators fitted with emergency trip switch as per rule - Are cupboards or compartments containing switchboards composed of fire-resisting material or lined with approved material yes

Instruments on main switchboard nine ammeters four

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

Earth 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



**MY. "DUNERA"**  
**BARCLAY & CO. YARD No. 663.**

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** 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 **6 Volts.** **Fall of Pressure,** state maximum between bus bars and any point of the installation under maximum load **6 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 or 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, laundries, bathrooms and lavatories lead covered or run in conduit **yes.**

**Support and Protection of Cables,** state how the cables are supported and protected **main clipped to steel trays or wood grounds or clipped to bulkhead, protected by L.C or L.C.B.**

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 **Fibre tube.**

**Earthing Connections,** state what earthing connections are fitted and their respective sectional areas **metallic sheathing and for armoring of cables efficiently bonded and earthed by means of clips or bonding glands. Steels etc earthed efficiently.** are their connections made as per Rule **yes.**

**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 and Switchboard in Emergency Generator room on boat deck. Generator interconnected with main supply. driven by oil eng.**

**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 **—** 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 wing only.** 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.** 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 **—** 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 filled 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.**

DESCRIPTION.	No. OFF. No. of Poles	CONDUCTORS.		COMPOSITION & DIA.		TOTAL MAX CURRENT AMPERES.		APPROX LENGTH L.C.R. FEET	INSULATED WITH	HOW PROTECTED.
		No. POLE	AREA PER POLE	No.	DIA.	CIRCUIT	RISLE			
PUMPING PUMPS	2	1	.003	1	.064	8.6	12.9	80	VIR	L.C.A.B.
HALLMARK	1	1	.007	7	.036	12.1	24	100	"	L.C.B.
HOT SALT WATER PUMP	1	1	.0225	7	.064	35	46	66	"	"
OIL PURIFIER.	3	1	.003	1	.064	10.5	12.9	100	"	L.C.A.B.
LUB OIL TRANSFER	1	1	.003	1	.064	7.8	12.9	120	"	"
STORES LIFT.	1	1	.0225	7	.064	35	46	84	"	L.C.
ENG. ROOM LIFT.	1	1	.007	7	.036	21	24	195	"	L.C.B.
CAPTAINS FOR'D.	2	1	.075	19	.072	134	141	218	V.C.	L.C.
CAPTAINS AFT	2	1	.075	19	.072	134	141	146	"	"
WATERTIGHT DOORS FOR S.B.	5	1	.06	19	.064	45	122	340	"	"
WATERTIGHT DOORS AFT S.B.	5	1	.06	19	.064	45	122	416	"	"
ELECTROLYSERS.	-	1	.04	19	.052	45	94	212	"	"
NO 1 FAN D.B.	-	1	.0225	7	.064	45	46	184	V.I.R.	L.C.
NO 2 FAN D.B.	-	1	.04	19	.052	52	94	184	V.C.	"
HAIRDRESSERS AUX. DB	-	1	.01	7	.044	30	31	92	V.I.R.	"
GALLEY AUX. D.B.	-	1	.01	7	.044	29	31	160	"	"
HEATERS FOR'D UPPER D.K. S.B.	-	1	.0225	7	.064	36	46	78	"	"
" FOR'D MAIN D.K. S.B.	-	1	.0225	7	.064	36	46	118	"	"
" SECTION BOARD No 1	-	1	.0225	7	.064	41	46	196	"	"
" SECTION BOARD No 2	-	1	.0225	7	.064	45	46	196	"	"
" SEC. BO. ENG. PORT	-	1	.0225	7	.064	42	46	30	"	"
" SEC. BO. ENG. STBD.	-	1	.0225	7	.064	40	46	30	"	"
" SHELTER D.K. S.B. PORT	-	1	.04	19	.052	51	94	146	V.C.	"
" SHELTER D.K. S.B. STBD.	-	1	.01	7	.044	24	31	124	V.I.R.	"
" UPPER D.K. S.B. STBD.	-	1	.007	7	.036	23	24	276	"	"
" "T" WARD SEC. BO.	-	1	.01	7	.044	29	31	110	"	"
" PROM. D.K. AFT.	-	1	.0225	7	.064	44	46	52	"	"
" UPPER D.K. S.B. No 1	-	1	.0225	7	.064	44	46	52	"	"
" UPPER D.K. S.B. No 2	-	1	.0225	7	.064	46	46	52	"	"
" UPPER D.K. S.B. No 3	-	1	.01	7	.044	27	31	92	"	"
" MAIN D.K. S.B. AFT.	-	1	.01	7	.044	25	31	60	"	"

PARTICULARS OF GENERATING PLANT.

DESCRIPTION OF GENERATOR.	No. of	RATED AT				DRIVEN BY	WHERE DRIVEN BY AN INTERNAL COMBUSTION ENGINE.	
		Kilowatts.	Volts.	Amps.	Revs. per Min.		Fuel Used.	Flash Point of Fuel.
MAIN ...	4	220	220	1000	375	oil engine (See General Report to 58702)	Diesel Oil	Above 150°F
AUXILIARY ...	1	35	220	158	1000	oil engine (See General Report to 8893)	Diesel Oil	Above 150°F
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	1.0	61	.103	1000	972	176	V.C.	L.C.B.
EQUALISER CONNECTIONS ...	1	.5	61	.103	-	486	88	V.C.	"
AUXILIARY GENERATOR ...									
EMERGENCY GENERATOR ...	1	0.12	37	.064	158	189	24	"	"
ROTARY TRANSFORMER MOTOR GENERATOR ...									
ENGINE ROOM ... SB	1	.0225	7	.064	53	68	94	"	"
BOILER ROOM ... IA	2	.3	37	.072	810	444	786	"	"
AUXILIARY SWITCHBOARDS ... IB	2	.3	37	.072	880	444	448	"	"
... 2A	2	.3	37	.072	375	444	470	"	"
... 2B	2	.3	37	.072	291	444	286	"	"
... 2C	2	.3	37	.072	250	444	164	"	"
... 3A	2	.3	37	.072	480	444	310	"	"
... 3B	2	.3	37	.072	580	444	522	"	"
ACCOMMODATION MAIN DK. SB.	1	.04	19	.052	80.5	94	256	"	L.C.
UPPER DK. SB.	1	.04	19	.052	102.6	94	114	"	"
SHALTER DK. SB.	1	.04	19	.052	83	94	152	"	"
PROMENADE SB.	1	.04	19	.052	74	94	152	"	"
NAVIGATION. DB.	1	.0045	7	.029	13.3	18.2	240	V.I.R.	L.C.
WIRELESS ...	1	.01	7	.044	25	31	180	"	"
SEARCHLIGHT WIRING ONLY ...	1	.04	19	.052	60	94	84	V.C.	"
MASTHEAD LIGHT ...	1	.0015	1	.044	18	61	400	V.I.R.	L.C. or Conduit.
SIDE LIGHTS ...	1	.0015	1	.044	18	61	35	"	L.C.
COMPASS LIGHTS ...	1	.0015	1	.044	18	61	15	"	"
EMERG. LIGHTS S.B.	1	.0225	7	.064	30	46	152	"	"
BOAT LIGHTS S.B.	1	.01	7	.044	28	31	140	"	"
ARC LAMPS ...									
HEATERS ...									

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 ...	1	1	.06	19	.064	103	122	180	V.C.	L.C.B.
MAIN BILGE LINE PUMPS ...	2	1	.0225	7	.064	56	68	190	"	"
AUX ENG. CIRC. PUMP ...	1	1	.0225	7	.064	38	46	156	V.I.R.	"
GENERAL SERVICE PUMP ...	1	1	.06	19	.064	105	122	374	V.C.	"
EMERGENCY BILGE PUMP ...	1	1	.06	19	.064	105	122	374	V.C.	"
FIRE PUMP ...	2	1	.12	37	.064	193	189	226	"	"
SANITARY PUMP ...	2	1	.12	37	.064	193	189	158	"	"
CIRC. SEA WATER PUMPS ...	2	1	.12	37	.064	193	189	158	"	"
AUX. F.W. COOLING PUMP ...	2	1	.0225	7	.064	56	68	190	"	"
CIRC. FRESH WATER PUMPS ...	2	1	.12	37	.064	200	189	250	"	"
AIR COMPRESSOR ...	2	1	.12	37	.064	200	189	250	"	"
FRESH WATER PUMP ...	2	1	.0225	7	.064	35	46	46	V.I.R.	"
ENGINE TURNING GEAR ...	2	1	.0225	7	.064	42	46	184	"	"
LISTON JACKET WATER PUMPS ...	2	1	.12	37	.064	193	189	134	V.C.	"
ENGINE REVERSE GEAR ...	2	1	.12	37	.064	193	189	134	V.C.	"
LUBRICATING OIL PUMPS ...	2	1	.0225	7	.064	46	46	150	V.I.R.	"
OIL FUEL TRANSFER PUMP ...	2	1	.007	7	.036	19	24	54	"	"
WINDLASS ...	1	1	.2	37	.103	300	346	27	V.C.	"
WINCHES, FORWARD ...	6	1	.06	19	.064	105	122	202	"	L.C.
BOAT WINCHES FORWARD ...	4	1	.0225	7	.064	42	46	252	V.I.R.	"
BOAT WINCHES MIDSHIPS ...	8	1	.0225	7	.064	42	46	180	"	"
WINCHES, AFT ...	2	1	.06	19	.064	105	122	84	V.C.	"
BOAT WINCHES, AFT ...	2	1	.06	19	.064	42	122	196	"	"
STEERING GEAR MOTORS ...	2	1	.075	19	.072	140	141	578	"	"
REFRIG. COMPRESSOR ...	2	1	.06	19	.064	126	122	112	"	L.C.B.
REARIG. MAC. SEC. BOARD ...	5	1	.06	19	.064	69	122	108	"	"
WORKSHOP MOTOR ...	1	1	.007	7	.036	13.5	24	54	V.I.R.	"
VENTILATING FANS ENGINE ...	4	1	.0225	7	.064	28	46	238	"	"
... 1	1	1	.007	7	.036	17	24	240	"	"
ENGINE ROOM POWER DB1	5	1	.12	37	.064	66	189	204	V.C.	"
DB2	3	1	.12	37	.064	124	189	308	"	"
DB3	4	1	.12	37	.064	201	189	388	"	"
DB4	10	1	.06	19	.064	122	122	84	"	"
AUX COND. CIRC. PUMP ...	1	1	.007	7	.036	19	24	234	V.I.R.	"
CRANE ...	2	1	.003	1	.064	9.45	12.9	120	"	"

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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 21st August 1937.

*J. B. Shankes*

COMPASSES.

Distance between electric generators or motors and standard compass 55 feet from fan motor.

Distance between electric generators or motors and steering compass 50 " " " "

The nearest cables to the compasses are as follows:—

A cable carrying 18 Ampères led into feet from standard compass led into feet from steering compass.

A cable carrying 13.3 Ampères 10 feet from standard compass 6 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 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.

FOR BARCLAY, CURLE & CO., LTD.  
*H. J. Seely*  
SECRETARY

Builder's Signature. Date 26<sup>th</sup> Aug 37

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 the vessel has been fitted on board under special survey, tested under full working conditions & found satisfactory. The materials and workmanship are good.

*29/8/37*

Notes.

*1/21 2/9/37*

Total Capacity of Generators 915 Kilowatts.

The amount of Fee £ 67 : 17 : 6  
4/5 Due Op. £ 54 : 6 : 0  
1/5 Due Lon. £ 13 : 11 : 6  
When applied for. 23 AUG 1937  
When received. 1/9 37  
Travelling Expenses (if any) £ 6 : 1 : 0  
Due London. 1/9 37

*L. Haffner. R. I. Kuschison*  
Surveyors to Lloyd's Register of Shipping.

Committee's Minute GLASGOW 31 AUG 1937

SEE ACCOMPANYING MACHINERY REPORT

Assigned

The Surveyors are requested not to write on or below the space for Committee's Minutes.



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