

REPORT ON ELECTRIC LIGHTING INSTALLATION. No. 390

at of Cleveland Date of First Survey Mar 31 Date of Last Survey July 5 No. of Visits 28
 in on the Iron or Steel CARL D. BRADLEY Port belonging to Duluth
 Book 478 Built at Lorain Ohio By whom Amer. S. B. Coy. When built 1927-7
 ers Bradley Trans. Co. Owners' Address Rogers City Mich.
 No. 494 Electric Light Installation fitted by Amer. S. B. Coy. When fitted 1927

DESCRIPTION OF DYNAMO, ENGINE, ETC.

See Continuation Report attached hereto.

Capacity of Dynamo Engine Room Amperes at 50 Volts, whether continuous or alternating current Double
 Where is Dynamo fixed Eng. Room Whether single or double wire system is used Double
 Position of Main Switch Board Eng. Room having switches to groups Yard. end of of lights, &c., as below
 Positions of auxiliary switch boards and numbers of switches on each Pilot House

fuses are fitted on main switch board to the cables of main circuit Yes and on each auxiliary switch board to the cables of auxiliary circuits Yes and at each position where a cable is branched or reduced in size Yes and to each lamp circuit Yes
 Vessel is wired on the double wire system are fuses fitted to both flow and return wires or cables of all circuits including lamp circuits Yes
 Are the fuses of non-oxidizable metal Yes and constructed to fuse at an excess of 50 per cent over the normal current
 Are all fuses fitted in easily accessible positions Yes Are the fuses of standard dimensions Yes If wire fuses are used are permanent instructions fitted on or near each switch board giving particulars of proper size of fuse for each circuit Yes
 Are all switches and fuses constructed of incombustible materials and fitted on incombustible bases Yes

Number of lights provided for 600 to 400 arranged in the following groups:—

Location	Lights each of	Candle power	requiring a total current of	approx.	Amperes
Eng. Room	40 to 100	Watts		40	
Yard. Cabins	25			20	
After Cabins	25			20	
Tunnel	25 to 45			40	
Deck	1000			90	
2 Mast head light with 2 lamps each of 60				3	
2 Side light with 2 lamps each of 60				3	
36 Cargo lights of 100				36 amps	

 candle power, whether incandescent or arc lights incandescent

If arc lights, what protection is provided against fire, sparks, &c. ✓

Where are the switches controlling the masthead and side lights placed Pilot House

DESCRIPTION OF CABLES.

approx. 80 Amperes, comprised of 19 wires, each .045" S.W.G. diameter, 105,000 square inches total sectional area
 Tunnel 8 Amperes, comprised of 4 wires, each .049" S.W.G. diameter, 16,510 square inches total sectional area
 Branch cables carrying 3 Amperes, comprised of 4 wires, each .039" S.W.G. diameter, 10,380 square inches total sectional area
 Leads to lamps carrying 1/2 Amperes, comprised of 1 wires, each .064" S.W.G. diameter, 4,107 square inches total sectional area
 one hold 4 Amperes, comprised of 7 wires, each .049" S.W.G. diameter, 16,510 square inches total sectional area
 Cargo light cables carrying 36 Amperes, comprised of 4 wires, each .044" S.W.G. diameter, 4,740 square inches total sectional area

DESCRIPTION OF INSULATION, PROTECTION, ETC.

Stranded armoured & lead covered, varnished Cambric insulation. Vulcanized rubber double braided in steel conduits. To tests & specifications of Amer. Inst. of Elect. Eng.
 Joints in cables, how made, insulated, and protected soldered, rubber taped, & painted with insulating compound.

Are all the joints of cables thoroughly soldered, and the flux used not containing acids or other corrosive substances Yes. Are all joints in accessible positions, none being made in bunkers, cargo spaces, or spaces which may at any time be used for carrying cargo, stores, or baggage Yes.

Are there any joints in or branches from the cable leading from dynamo to main switch board No.

How are the cables led through the ship, and how protected Armoured & steel conduits. In Cabins wood moulding.



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DESCRIPTION OF INSULATION, PROTECTION, ETC.—continued.

Are they in places always accessible *Yes*.

What special protection has been provided for the cables in open alleyways or where exposed to weather or moisture *Armoured & Conduits*.

What special protection has been provided for the cables near galleys or oil lamps or other sources of heat *Armoured & Conduits*.

What special protection has been provided for the cables near boiler casings *Armoured & Conduits*.

What special protection has been provided for the cables in engine room *80*.

How are cables carried through beams *Armoured & Conduits* through bulkheads, &c. *W. S. fittings*.

How are cables carried through decks *Water Tight Fittings*.

Are any cables run through coal bunkers *Yes* or cargo spaces *Yes* or spaces which may be used for carrying cargo, stores, or baggage *Yes*.

If so, how are they protected *Armoured & Conduits & secured as to be free from damage*.

Are any lamps fitted in coal bunkers or spaces which may at times be used for cargo, coals, or baggage *Yes*.

If so, how are the lamp fittings and cable terminals specially protected *Water & Gas tight fittings*.

Where are the main switches and fuses for these lights fitted *Switchboards*.

If in the spaces, how are they specially protected *W*.

Are any switches or fuses fitted in bunkers *W*.

Cargo light cables, whether portable or permanently fixed *Permanent* How fixed *Standard fitting & steel cable*.

In vessels fitted on the single wire system, how is the dynamo terminal fixed to the hull of vessel *✓*.

How are the returns from the lamps connected to the hull *✓*.

Are all the joints with the hull in accessible positions *✓*.

Is the installation supplied with a voltmeter *Yes* and with an amperemeter *Yes* fixed *Switchboard*.

VESSELS BUILT FOR CARRYING PETROLEUM.

In vessels built for carrying petroleum, are all switches and fuses fitted in positions not liable to the accumulation of petroleum vapour or gas *✓*.

Are any switches, fuses, or joints of cables fitted in the pump room or companion *✓*.

How are the lamps specially protected in places liable to the accumulation of vapour or gas *✓*.

The copper used is guaranteed to have a conductivity of not less than that of the Engineering Standards Committee's standard and the wires are protected by tinning from the sulphur compounds present in the insulating material.

Insulation of cables is guaranteed to have a resistance of not less than *1500* megohms per statute mile at 60° Fahrenheit after 24 hours' immersion in water, the test being made after one minute's electrification at not less than 500 volts and while the cable is still immersed.

The foregoing statements are a correct description of the Electric Light installation fitted by us on this vessel and we declare that it is at this date in good order and safe working condition.

Amer. S.B. Coy. Electrical Engineers Date

COMPASSES.

Distance between dynamo or electric motors and standard compass *Sperry Compass*.

Distance between dynamo or electric motors and steering compass

The nearest cables to the compasses are as follows:—

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

The maximum deviation due to electric currents, etc., was found to be degrees on course in the case of

standard compass and degrees on course in the case of the steering compass.

The American Ship Bldg Co. Builder's Signature. Date

GENERAL REMARKS.

The above installation has been fitted on board in a satisfactory manner. The quality of the material & workmanship are good. It has been tried out under working conditions & found efficient.

It is submitted that this vessel is eligible for THE RECORD. *See light*

G. Drummond

Surveyor to Lloyd's Register of Shipping.

Committee's Minute *NEW YORK AUG 24 1927*

Notation "Elec. Light"

Continuation of Report No. *390* dated *Aug. 18* on the

s/s "CARL D. BRADLEY"

Main Turbo Electric Machinery & Cables

Main Propulsion:— Turbo-generator K.W. 4300, R.M.P. 3600, Volts 2400, Cyc. 60. Main generator exciter K.W. 75, R.M.P. 3600, Volts 120. Propulsion Motor S.H.P. 4200, R.P.M. 106, three phase induction type.

Auxiliary Lighting & Power:— Induction motor generator dual set. Steam turbine K.W. 300, R.M.P. 800. Synchronous motor H.P. 375, R.M.P. 1200, Volts 2600. Direct current generator K.W. 250, R.P.M. 1200, Volts 240.

Transformers 3 - 200 K.V.A. 2300/230-115. Batteries, Resistances, Switchboards etc.

Main Propulsion:— 1,000,000 C.M. stranded, 427 wires, 9/16" rope core, 4000 volt cable; 11/64" Varnished Cambric Insulation, 3/32" reinforced 30% rubber hose jacket, two 0.030" copper tapes, wound spirally, one layer of rubber filled tape overall, treated with flame proof compound.

A.C. Lines Forward:— #4/0 (A.W.G.) stranded three conductor 3000 volt cable, 4/64" x 4/64" Varnished Cambric Insulation, 3/32" lead sheath, two rubber filled tapes, galvanized basket weave wire armor.

D.C. Generators:— 325 feet, 1,000,000 C.M. stranded 61 wires, 600 volt cable; 7/64" Varnished Cambric, 3/32" lead, two rubber filled tapes and galvanized basket weave armor.

A.C. Feeders Forward:— #1/0 (A.W.G.) stranded three conductor 3000 volt cable 4/64" x 4/64" Varnished Cambric Insulation, 5/64" lead sheath, two rubber filled tapes, galvanized basket weave wire armor.

D.C. Feeders Forward:— #1 (A.W.G.) stranded, single conductor 600 volt cable; 5/64" 30% rubber (A.S.T.M.) taped, 4/64" lead sheath, two rubber filled tapes and galvanized basket weave armor.

Grid Resistors:— #1 (A.W.G.) solid, single, conductor cable, three asbestos braids, saturated with flame proof paint.

D.C. Power Forward:— 750,000 C.M. stranded single conductor, 600 volt cable; 7/64" Varnish Cambric, 3/32" lead, two rubber filled tapes and galvanized basket weave armor.

D.C. Motors Forward:— #2/0 (A.W.G.) stranded, two conductor twisted, 600 volt cable; 5/64" 30% rubber (A.S.T.M.) and tape on each conductor, jute fillers, tape, 3/32" lead, two rubber filled tapes, galvanized basket weave armor.

Remote Controls:— #12 (A.W.G.) stranded 16 conductor, 600 volt control cable; 3/64" 30% rubber (A.S.T.M.) and distinctive colored braid on each conductor; jute fillers, tape, 5/64" lead sheath two rubber filled tapes and galvanized basket weave.

A.C. Conveying Remote Controls:— #10 stranded, single conductor, cable; 3/32" 30% (A.S.T.M.) and two weather proof braids.

Lighting Forward:— #1/0 (A.W.G.) stranded, 3 conductor, 600 volt cable; 3/64" x 3/64" Varnished Cambric, 3/32" lead, two rubber filled tapes and galvanized basket weave armor.

Engine Room Auxiliaries:— #1 (A.W.G.) stranded, 3 conductor, 3,000 volt cable; 4/64" x 4/64" Varnished Cambric, 5/64" lead, two rubber filled tapes and galvanized basket weave wire armor.

Engine Room Auxiliaries:— #4 (A.W.G.) stranded, ditto.

Storgae Battery:- 300,000 C.M. stranded single conductor, 600 volt cable; 3/32" lead sheath, two rubber filled tapes and galvanized basket weave wire armor, 3/32" Varnished Cambric Insulation.

Controls to Sperry Compass Indicators etc:- #12 (A.W.G.) stranded, eight conductor signal cable; 3/64" 30% rubber (A.S.T.M.) distinctive colored braid on each conductor, jute fillers, tape, 5/64" lead sheath, two rubber filled tapes, basket weave wire armor galvanized.

High voltage power from the main generator is supplied to the propulsion motor, unloading equipment and induction motor generator set. Through transformers to motor driven engine and boiler room auxiliaries, and lighting under normal operating conditions. In manoeuvring the propulsion motor, secondary resistances are used, and for slower speeds than 40 R.P.M. the turbine speed is reduced.

The induction motor generator set is used as an auxiliary, and when driven by the steam turbine furnishes A.C. power to the engine and boiler room auxiliaries, lighting and unloading equipment, it may be used also in emergency for propulsion. When this set is driven by motor the D.C. power generated may be used for deck engines and lighting.

The batteries are connected to essential lighting and excitation of main generators and motor generator set. All unloading machinery, and engine and boiler room driven auxiliaries are A.C. All deck engines are D.C., lighting A.C. or D.C. In the engine room there are three switchboards consisting of instruments for controlling the main propulsion unit, main and auxiliary generators, unloading equipment, distribution of D.C. power transformers etc., also low voltage control for starting engine and boiler room motor driven auxiliaries.

At the forward end of vessel there are two switchboards carrying control apparatus for conveying machinery, deck engines, lighting and radio etc.

The work of installation has been carefully executed. The cables are of special construction and meet the requirements of the American Institute of Electrical Engineers. The tests under working conditions have been satisfactory.

G. Drummond

Surveyor to Lloyd's Register of Shipping.

The foregoing is a correct description.

*The American Ship Bldg Co
J. M. McKinnon, C. E.*



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