Government Circular No. 1,351.

G.O. Reference 21343/3.

G.  R.

The Douglas Corporation Electric Light and Power Act, 1921.

REGULATIONS.

By virtue of the powers vested in him by the provisions of the Douglas Corporation Electric Light and Power Act, 1921, His Excellency the Lieutenant Governor has made Regulations with respect to overhead lines for securing the safety of the public and for ensuring a proper and sufficient supply of electrical energy.

The approval of Tynwald was signified on the 26th day of February, 1932.

By Order,

B. E. SARGEAUNT,
Government Secretary.

Government Office,
Isle of Man,
26th February, 1932.

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THE DOUGLAS CORPORATION ELECTRIC LIGHT AND POWER ACT, 1921.

REGULATIONS

made by the Lieutenant Governor under the provisions of the Douglas Corporation Electric Light and Power Act, 1921, with respect to Overhead Lines for securing the safety of the public and for ensuring a proper and sufficient supply of electrical energy.

DEFINITION.

In the following Regulations the expression "line conductors" means conductors used for transmitting a supply of electrical energy, including so much of any service line as may be under the control of the undertakers.

I.—GENERAL.

Material of Line Conductors.

1. Line conductors shall be of copper, aluminium, or such other materials as may be approved by the Governor.

Strength of Line Conductors.

2. All line conductors at the time of erection shall comply, as regards elongation, breaking load and elasticity, with the specification of the British Engineering Standards Association then in force.

Minimum Size of Line Conductor.

3. The minimum permissible size for copper and other line conductors (other than service lines) shall be such as to have an actual breaking load of not less than 1,237 pounds, the equivalent minimum cross-sectional area and weight per mile for copper being as follows:—

Conductor.	Cross-sectional Area.	Weight per Mile.
	sq. ins.	Lbs.
No. 8 S.W.G. ...	0·0201	409

The minimum permissible size of service line shall be such as to have an actual breaking load of not less than 816 pounds, the equivalent minimum cross sectional area and weight per mile for copper being as follows:—

Conductor.	Cross-sectional Area.	Weight per Mile.
	sq. ins.	Lbs.
No. 10 S.W.G. ...	0.0129	262

Line Conductors to be inaccessible.

4. Line conductors shall be rendered inaccessible to any person from any building or other place without the use of a ladder or other special appliance.

Regard shall be had to the normal use by the occupier of any premises or land and where necessary (a) the height of the line conductors shall be increased to provide sufficient clearance for safety in accordance with such use, and (b) provision as hereinafter prescribed in Regulations 14 or 17 shall be made to prevent danger.

Line Conductors Crossing other Lines.

5. Where a line conductor crosses over or under, or is in proximity to any other overhead wire, precautions shall be taken by the Undertakers to prevent contact, due to breakage or otherwise, between the line conductor and the other overhead wire, or between the other wire and the line conductor.

Provided that where a line conductor crosses over any overhead wire other than a telegraph or telephone line of the Postmaster-General, the precautionary means to be adopted shall be as hereinafter prescribed in paragraph (3) of Regulation 18.

Provided further that this Regulation shall not be deemed to require the Undertakers to take precautions against contact between a broken line conductor and other auxiliary conductors and earth wires carried on the same support and forming part of the same overhead line.

Supports.

6. Line conductors shall be attached to suitable insulators carried on supports of wood, iron, steel or reinforced concrete. All wooden supports other than oak or hard wood cross-arms shall unless otherwise approved by the Governor be of red fir impregnated with creosote. Special precautions shall be taken to prevent the corrosion of all metal work at or below the surface of the ground.

Factor of Safety of Supports.

7. The supports, in conjunction with stays or struts if provided, shall withstand the longitudinal, transverse and vertical loads due to the ice loadings and wind pressure hereinafter specified without damage and without movement in the ground. In no case shall the strength of a support in the direction of the overhead line be less than ONE-QUARTER the required strength in a direction transverse to the line.

The following factors of safety shall apply to each support.

Material.	Factor of Safety.
Iron or Steel	2.5
Wood	3.5
Reinforced Concrete	3.5

These factors of safety shall be calculated on the assumption that all line conductors, cables and wires carried by the supports are at a temperature of 22 deg. F., and have a covering of ice to the radial thickness specified in Regulation 12 (or Regulation 15 according to the voltage) and that together with the supports they are subjected to a wind of 50 miles per hour at right angles to the line, this wind to be taken as exerting a pressure equivalent to 8 pounds per square foot calculated on the whole of the projected area.

The wind pressure on the lee side members of lattice steel or other compound structures, including A and H Poles, shall be taken as one-half of the wind pressure on the windward side members. The factor of safety shall be calculated on the crippling load of struts and upon the elastic limit of tension members.

Service Lines.

8. Service lines shall be connected to line conductors at a point of support only and shall be fixed to insulators on consumers' premises. Every part of a service line (other than a neutral conductor connected with earth) which is accessible from a building with the use of a ladder or other special appliance shall be efficiently protected either by insulating material or by other means approved by the Governor.

Erection of Line Conductors at Different Voltages on Same Supports.

9. Where line conductors forming parts of systems at different voltages are erected on the same poles or supports adequate provision shall be made to guard against danger to linesmen and from the lower voltage system being charged above its normal voltage by leakage from or contact with the higher voltage system; and the type of construction shall be subject to the prior approval of the Governor.

Inspection and Maintenance of Lines.

10. Every overhead line, including its supports and structural parts, and electrical appliances and devices belonging to or connected therewith, shall be regularly inspected and efficiently maintained.

Materials Used.

11. All materials used shall at the time of erection conform to the specifications of the British Engineering Standards Association and to the Post Office Technical Instructions for the Construction of Aerial Lines for the time being in force, so far as the same are applicable and are not inconsistent with these Regulations.

II.—SPECIFIC REGULATIONS.

[Applicable according to the voltage between line conductors where no part of the system is connected with earth, or according to the voltage to earth where part of the system is connected with earth.]

A. For voltages **not exceeding** 650 volts direct current and 325 volts alternating current.

Factor of Safety of Line Conductors.

12. The factor of safety of line conductors shall be 2. The factor of safety shall be based on the breaking load and shall be calculated on the assumption that the line conductors are at a temperature of 22 deg. F. and have a covering of ice to a radial thickness of THREE-SIXTEENTHS OF AN INCH, and that they are simultaneously subjected to a wind of 50 miles per hour at right angles to the line, this wind to be taken as exerting a pressure equivalent to 8 pounds per square foot calculated on the whole of the projected area of the ice-covered lines.

The weight of ice is to be taken as 57 pounds per cubic foot.

The elasticity of the metal may be allowed for in calculating the sag for line conductors.

Minimum Height of Conductors.

13. The height from the ground of any line conductor (other than a service line), earth wire, or auxiliary conductor at any point of the span at a temperature of 122 deg. F. shall not, except with the consent of the Governor, be less than 19 feet across a public road or 17 feet in other positions. A height of 15 feet may be adopted in situations inaccessible to vehicular traffic.

Where a service line is carried across or along a carriage-way, the height of the line from the ground at any part of the carriage-way shall not, except with the consent of the Governor, be less than 19 feet and 17 feet respectively.

Provision to Prevent Danger.

14. Where the voltage to earth exceeds 250 volts direct current or 125 volts alternating current, precautions should be taken to prevent danger—

(1) from a broken line conductor by the provision of—

(A) a neutral or earthed conductor carried continuously from pole to pole, and so arranged in relation to the other conductors that in the event of breakage of any one of them the line conductor shall make contact with the earthed wire; or

(B) other means approved by the Governor.

(2) from leakage by the provision—

(A) in cases where metal poles are used, of

(i) an earthed wire, running from pole to pole and connected to the poles; or

(ii) a suitable metal framework to support the insulators carrying the line conductors, the framework being insulated from the pole but connected to the neutral conductor; or

(iii) other means approved by the Governor.

(B) in cases where wooden poles are used, of

(i) a bonding wire connected to the supporting metal-work of all insulators, the bonding wire terminating at the lowest part of the supporting metal-work or

(ii) other means approved by the Governor.

Where lightning conductors are used or other uninsulated conductors are run down wooden poles to within 10 feet from the ground, the precautions for the prevention of danger from leakage shall be as for metal poles.

All stay wires other than those which are connected with earth by means of a continuous earth wire shall be insulated to prevent danger from leakage. For this purpose an insulator shall be placed in each stay wire at a height of not less than 10 feet from the ground.

B. For voltages **exceeding** 650 volts direct current and 325 volts alternating current.

Factor of Safety of Line Conductors.

15. The factor of safety of line conductors shall be 2. The factor of safety shall be based on the breaking load and shall be calculated on the assumption that the line conductors are at a temperature of 22 deg. F., and have a covering of ice to a radial thickness of THREE-EIGHTHS OF AN INCH, and that they are simultaneously subjected to a wind of 50 miles per hour at right angles to the line, this wind to be taken as exerting a pressure equivalent to 8 pounds per square foot calculated on the whole of the projected area of the ice-covered lines.

The weight of ice is to be taken as 57 pounds per cubic foot.

The elasticity of the metal may be allowed for in calculating the sag for line conductors.

Minimum Height of Conductors.

16. The height from the ground of any line conductor at any point on the span at a temperature of 122 deg. F. shall not, except with the consent of the Governor, be less than the height hereunder stated:—

Voltages not exceeding 66,000 volts.	20 feet.	Voltages exceeding 110,000 volts and not exceeding 165,000 volts.	22 feet.
Voltages exceeding 66,000 volts and not exceeding 110,000 volts.	21 feet.	Voltages exceedings 165,000 volts.	23 feet.

The height from the ground of an earth wire or auxiliary conductor shall not be less than the minimum heights prescribed in Regulation 13.

Provision to Prevent Danger.

17. Adequate means shall be provided to render any line conductor dead in the event of it falling due to breakage or otherwise.

All metal work other than conductors shall be permanently and efficiently connected with earth. For this purpose a continuous earth wire shall be provided and connected with earth at four points in every mile, the spacing between the points being as nearly equidistant as possible, or alternatively, the metal work shall be connected to an effective earthing device at each individual support. The design and construction of the system of earth connections shall be such that when contact is made between a line conductor and metal connected with earth the resulting leakage current shall not be less than twice the leakage current required to operate the devices which make the line dead.

Road Crossings, &c.

18. Where an overhead line is erected along or across a public road or canal or across a railway or crosses over any other overhead wire, all wires forming part of the overhead line including earth wires and auxiliary conductors shall be placed at the appropriate height from the ground specified in Regulation 16 for line conductors, and the following additional precautions shall be taken to prevent danger:—

(1) In the case of a line erected ALONG a public road or canal (or within 50 feet thereof) there shall be provided—

(A) duplicate insulators supporting the conductors; or

(B) a device to ensure that in the event of a line conductor falling it shall be put to earth; or

(C) other means approved by the Governor.

(2) In the case of a line erected ACROSS a public road, canal or railway there shall be provided—

(A) duplicate insulators for supporting the line conductor and a device to ensure that in the event of a line conductor falling it shall be put to earth; or

(B) duplicate insulators supporting duplicate conductors tied at intervals not exceeding five feet; or

(C) other means approved by the Governor.

(3) In the case of a line crossing OVER any other overhead wire there shall be provided—

(A) duplicate insulators for supporting the line conductor and a device to ensure that in the event of a line conductor falling it shall be put to earth; or

(B) duplicate insulators supporting duplicate conductors tied at intervals not exceeding five feet;

the provision prescribed in (A) or (B) hereof being supplemented in the case of line conductors at voltages exceeding 650 volts by the provision of arcing horns or rings; or

(C) other means approved by the Governor.

DANGER NOTICES

19. Supports shall be numbered consecutively and each support shall have a danger notice of a permanent character securely fixed to it. Adequate provision shall also be made to prevent unauthorised climbing.

These Regulations are made subject to the power of the Governor to make such further or other Regulations as he may think expedient.

GIVEN under my hand this 9th day of February, 1932.

CLAUDE H. HILL,
Lieutenant Governor.