

1981 No. 214

ELECTRICITY

**The Electricity (Overhead Lines) Regulations
(Northern Ireland) 1981**

Made 29th June 1981

Coming into operation 1st September 1981

The Department(a), of Commerce in exercise of the powers conferred on it by Article 36 of the Electricity Supply (Northern Ireland) Order 1972(b), and of every other power enabling it in that behalf, hereby makes the following Regulations.

PART I

Citation and commencement

1. These regulations may be cited as the Electricity (Overhead Lines) Regulations (Northern Ireland) 1981 and shall come into operation on 1st September 1981.

Interpretation

2. In these regulations the following expressions have the meanings hereby assigned to them:

- “connected with earth” means connected with the general mass of earth in such a manner as will ensure at all times an immediate and safe discharge of energy;
- “the Department” means the Department of Commerce;
- “high voltage” means a voltage exceeding 650 volts;
- “line conductor” means a conductor used or to be used for conveying a supply of electricity;
- “low voltage” means a voltage not exceeding 650 volts;
- “metalwork” means any metalwork other than a line conductor or earth lead;
- “support” includes stays and struts, but does not include (a) insulators or their fittings or (b) metal brackets or fittings attached to buildings or structures.

Application

3.—(1) Subject to paragraph (4), Part II shall apply to electric lines placed above ground and erected before the coming into operation of these regulations being electric lines under the control of the Service.

(2) Subject to paragraph (4), Part III shall apply to electric lines placed above ground and erected by the Service after the date of coming into operation of these regulations.

(3) Subject to paragraph (4), Part IV shall apply to all electric lines whether placed above ground and erected before or after the coming into operation of these regulations, being electric lines under the control of the Service.

(4) These regulations shall not apply to any electric line above the ground within premises which are under the control of the Service and to which the public does not normally have access.

(a) Formerly Ministry; see 1973 c. 36 s. 40 and Sch. 5 para. 8(1)

(b) S.I. 1972/1072 (N.I. 9)

(5) References in Parts II, III and IV to electric lines or any description thereof are references to electric lines to which those Parts respectively apply.

Revocation

4. Any regulations relating solely to overhead lines made under section 6 of the Electric Lighting Act 1882(a) and continued in force by virtue of Article 36(3) of the Electricity Supply (Northern Ireland) Order 1972 shall cease to have effect.

PART II

EXISTING ELECTRIC LINES

Use of existing lines

5. The Service shall not use any line conductor or service line which does not meet the requirements of this Part.

Strength of line conductors

6. Every line conductor shall comply, as regards elongation, breaking load and elasticity with the specification of the British Engineering Standards Association or, as the case may be, the British Standards Institution in force at the date of its erection.

Minimum size of line conductors

7.—(1) Copper and other line conductors (other than service lines) shall be of such size as to have an actual breaking load of not less than 5502 newtons the equivalent minimum cross-sectional area and weight per kilometre being as follows:—

<i>Conductor diameter</i>	<i>Cross-sectional area</i>	<i>Weight per Km</i>
mm	sq mm	kg
4.06	12.9	115.4

(2) Service lines shall be of such size as to have an actual breaking load of not less than 3630 newtons, the equivalent minimum cross-sectional area and weight per kilometre of copper being as follows:—

<i>Conductor diameter</i>	<i>Cross-sectional area</i>	<i>Weight per Km</i>
mm	sq mm	kg
3.25	8.3	73.9

Minimum height of line conductors

8.—(1) The height above ground of any line conductor, at any point where it is over any road accessible to vehicular traffic, shall not, at a temperature of 50° Celsius, be less than the appropriate height specified in column 2 of Schedule 1.

(2) The height above ground of any line conductor, at any point where it is not over any road accessible to vehicular traffic, shall not, at a temperature of 50° Celsius, be less than the appropriate height specified in column 3 of Schedule 1; but this requirement shall not apply to:—

- (a) any line conductor surrounded by insulating material suitable for the conditions under which it is to be used;

- (b) any line conductor which is not so surrounded by insulating material and which is at least 4.3 metres above ground and connects transforming, switching or other equipment mounted on supports carrying line conductors with other such equipment or with any other line conductor; or
- (c) any line conductor connected with earth.

(3) Paragraphs 1 and 2 do not apply to any line conductor in respect of which there exists a consent with regard to the height thereof from the Department given before the making of these Regulations and which is placed in accordance with that consent.

Danger notices

9. Every support carrying a high voltage line conductor shall be numbered consecutively and shall have a danger notice of a permanent character securely fixed to it. Adequate provision shall also be made to prevent unauthorised persons from climbing on the supports.

PART III

NEW ELECTRIC LINES

Restriction on placing electric lines above ground

10.—(1) The Service shall not:—

- (a) place above ground any electric line;
- (b) erect any support carrying line conductors; or
- (c) place above ground any wire or cable attached to any such support; otherwise than in accordance with the provisions of this Part.

(2) Any electric line, support or wire or cable placed or erected in accordance with the provisions of paragraph (1) shall be so maintained that it complies with the provisions of this Part.

Minimum size of line conductors

11.—(1) Every line conductor placed above ground shall have a cross-sectional area of not less than 12 square millimetres except as provided for in paragraph (2).

(2) A line conductor with a cross-sectional area of less than that required by paragraph (1) but not less than 4 square millimetres may be placed above ground provided that:—

- (a) where such a line conductor is in the open air and is not ordinarily accessible from the ground or from any building or structure, it is fixed at intervals not exceeding 5 metres to a support or to a building or structure;
- (b) where such a line conductor is in the open air and is ordinarily accessible from the ground or from any building or structure, it is fixed at intervals to a support or to a building or structure in such a manner that it lies throughout its length as close as practicable against such support, building or structure.

Minimum height of line conductors

12.—(1) The height above ground of any line conductor, at any point where it is over any road accessible to vehicular traffic, shall not, at its likely maximum temperature (whether or not in use), be less than the appropriate height specified in column 2 of Schedule 2.

(2) The height above ground of any line conductor, at any point where it is not over any road accessible to vehicular traffic, shall not, at its likely maximum

temperature (whether or not in use), be less than the appropriate height specified in column 3 of Schedule 2 but this requirement shall not apply to:—

- (a) any line conductor surrounded by insulating material suitable for the conditions under which it is to be used;
- (b) any line conductor which is not so surrounded by insulating material and which is at least 4.3 metres above ground and connects transforming, switching or other equipment mounted on supports carrying line conductors with other such equipment or with any other line conductor; or
- (c) any line conductor connected with earth.

Minimum height of wires and cables other than line conductors

13. The height above ground of any wire or cable which is attached to a support carrying any line conductor shall not, at its likely maximum temperature (whether or not in use), be less than 5.8 metres at any point where it is over any road accessible to vehicular traffic.

Warning notices

14. There shall be kept affixed to any support carrying a high voltage line conductor a notice inscribed with the word "DANGER" in white letters of at least 30 millimetres in height on a red background, or in red letters of the same dimensions on a white background.

PART IV

ALL ELECTRIC LINES

Materials of line conductors

15. Every line conductor shall be made of copper, aluminium or steel, or any alloys thereof, or any combination of any of such materials.

Stress limitations in line conductors and other wires and cables

16.—(1) In the case of a line conductor to which Part I of Schedule 3 applies the tension in that line conductor, or in any wire or cable attached to any support, bracket or fitting carrying such line conductor, shall be such that at a temperature of minus 5.6 degrees Celsius the forces specified in paragraph 2(a) of Schedule 3 can be accepted without the tension exceeding 40 per centum of the breaking load of that line conductor, wire or cable.

(2) In the case of any other line conductor, the tension in that line conductor, or in any wire or cable attached to any support, bracket or fitting carrying such line conductor, shall be such that at a temperature of minus 5.6 degrees Celsius the forces specified in paragraph 5(a) of Schedule 3 can be accepted without the tension exceeding 50 per centum of the breaking load of that line conductor, wire or cable.

Supports

17.—(1) Every support carrying a line conductor shall be made of wood, steel, reinforced concrete or pre-stressed reinforced concrete or any combination of any such materials, and, in any case in which wood or steel is used in the construction of a support, such wood or steel shall be so far as is reasonably practicable protected against decay or corrosion, as the case may be.

(2) Subject to paragraph (3) hereof every support and the foundations thereof shall be so constructed and sited, taking into account the reaction of the ground in which they are to be embedded to the loads which they are designed to carry, as to withstand simultaneously the forces specified in paragraph 5(b) of Schedule 3 without the stress

in the support or any of its constituent members exceeding 40 per centum of whichever of the following is appropriate:—

- (a) the elastic limit in the case of all steel members other than crossarms, bracings and stays fixed to wooden, reinforced concrete or pre-stressed reinforced concrete supports;
- (b) the ultimate tensile stress in the case of steel crossarms, bracings and stays fixed to wooden, reinforced concrete or pre-stressed reinforced concrete supports;
- (c) the ultimate extreme fibre stress in the case of wooden supports and wooden crossarms;
- (d) the ultimate compressive or shear stress of the material concerned;
- (e) the crippling load of any strut;
- (f) the maximum stress which can be accepted throughout a reinforced or pre-stressed reinforced concrete support without failure or inability to support further load.

(3) For the purposes of paragraph (2) hereof the forces specified in paragraph 2(b) of Schedule 3 shall apply in place of those specified in paragraph 5(b) of that Schedule in the case of any support carrying a line conductor to which Part I of that Schedule applies.

(4) The strength of every support carrying a line conductor shall, in the direction of such line conductor or the mean direction as the case may be, be not less than one quarter of its required strength in a horizontal direction at right angles to such direction.

(5) The minimum diameter of a wooden support at a point 1.5 metres above the butt shall be 150 millimetres.

Position, insulation and protection of line conductor

18.—(1) Every line conductor or part thereof (other than a line conductor connected with earth) which is not ordinarily accessible from the ground or from a building or structure shall either:—

- (a) be supported at appropriate intervals by insulators suitable for the conditions under which it is to be used; or
- (b) be effectively insulated by surrounding it with, or encasing it in, material suitable for the conditions under which it is to be used.

(2) Every line conductor or part thereof (other than a line conductor connected with earth) which is ordinarily accessible from the ground or from a building or structure shall be effectively insulated by surrounding it with, or encasing it in, material suitable for the conditions under which it is to be used, and every such line conductor or part thereof and any insulating material surrounding or encasing it shall be protected so far as is reasonably practicable against mechanical damage or interference.

(3) Any bare low voltage line conductor not connected with earth shall be situated throughout its length, vertically above a bare earth wire or a bare line conductor which is connected with earth.

Earthing connections

19.—(1) Any metalwork attached to, or forming part of, any support carrying a line conductor, other than a wooden pole, and every metal transformer case shall be connected with earth.

(2) Any metal bracket which carries a line conductor not connected with earth and which is attached to, in contact with or adjacent to any metalwork on or forming part

of any building or structure shall be connected with earth unless such line conductor is both surrounded by insulation and supported by an insulator, each form of insulation being suitable for the conditions under which it will be required to operate in the event of failure of the other.

(3) Any metalwork attached to, or forming part of, any wooden pole support carrying a line conductor shall be connected with earth unless the design and construction of the support and its fittings are such as to prevent, so far as is reasonably practicable, danger within 3 metres of the ground due to leakage across, or failure of, an insulator supporting the line conductor or of the insulation surrounding such conductor.

(4) Every stay wire which forms part of or is attached to any support carrying a line conductor and which is not connected to an earth lead shall be fitted with an insulator no part of which shall be less than 3 metres above ground.

(5) Every earth connection shall be installed in such a manner and in such a position and so maintained as to prevent, so far as is reasonably practicable, any accident arising from the presence of a voltage gradient.

Precautions against excessive voltage

20. Every low voltage circuit shall so far as is reasonably practicable be protected against danger arising from accidental contact with or leakage from any high voltage circuit.

Precautions against access

21. Every support carrying a high voltage line conductor shall, if the circumstances reasonably require, be fitted with suitable devices so as to prevent so far as may reasonably be foreseen, any person from having access to any position which is so near any such line conductor as to cause danger to that or any other person.

Maintenance

22. Every electric line shall be properly and efficiently maintained so that so far as is practicable it meets the requirements of this Part at all times.

Exceptions

23.—(1) The Service may maintain an electric line otherwise than in accordance with Regulation 8, 12, 13, 16 and 19 for any period during which repairs, alterations or maintenance works are being undertaken.

(2) The Service shall complete any such works as are mentioned in paragraph (1) with reasonable despatch and shall take all reasonable precautions to ensure safety while such works are being carried on.

Sealed with the Official Seal of the Department of Commerce for Northern Ireland on 29th June 1981.

(L.S.)

R. A. Burden

Assistant Secretary

HEIGHT OF EXISTING LINE CONDUCTORS

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>
Not exceeding 650 volts	5.8 metres	4.6 metres
Exceeding 650 volts		
Not exceeding 33,000 volts	6.1 metres	5.2 metres
Exceeding 33,000 volts		
Not exceeding 66,000 volts	6.1 metres	6.1 metres
Exceeding 66,000 volts		
Not exceeding 110,000 volts	6.4 metres	6.4 metres
Exceeding 110,000 volts		
Not exceeding 165,000 volts	6.7 metres	6.7 metres
Exceeding 165,000 volts	7.0 metres	7.0 metres

HEIGHT OF NEW LINE CONDUCTORS

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>
Not exceeding 33,000 volts	5.8 metres	5.2 metres
Exceeding 33,000 volts but not exceeding 66,000 volts	6.0 metres	6.0 metres
Exceeding 66,000 volts but not exceeding 132,000 volts	6.7 metres	6.7 metres
Exceeding 132,000 volts but not exceeding 275,000 volts	7.0 metres	7.0 metres
Exceeding 275,000 volts	7.3 metres	7.3 metres

PART I

1. This Part applies to electric lines where the line conductors do not exceed 35 square millimetres of copper equivalent cross-sectional area and where the voltage of the system exceeds 650 volts but does not exceed 33,000 volts.

Forces applicable

2. (a) In the case of every line conductor, wire or cable the forces shall be the tension forces in the conductor, wire or cable subject to the equivalent wind pressure specified in paragraph 3;
- (b) in the case of every support the forces on the support shall be the forces due to the conductor, wire or cable being subject to the equivalent wind pressure specified in paragraph 3.

Equivalent wind pressure

3. (a) The equivalent wind pressure on any line conductor, wire or cable shall be 760 newtons per square metre, the equivalent wind pressure on any support, insulator or equipment attached thereto being disregarded;
- (b) for the purposes of paragraph 2 the force attributable to the equivalent wind pressure shall be the force resulting from the equivalent wind pressure acting horizontally at right angles to the line conductor on an area equal to the projected area of the line conductor, wire or cable as the case may be.

PART II

4. This Part applies to electric lines other than those to which Part I applies.

Forces applicable

5. (a) In the case of every line conductor, wire or cable the forces shall be the tension forces in the conductor, wire or cable due to the conductor, wire or cable having the augmented mass and the augmented diameter specified in paragraphs 6(a) and 6(b) respectively and being subject to the equivalent wind pressure specified in paragraph 6(c);
- (b) in the case of every support the forces shall be:—
 - (i) the forces on the support due to the line conductors, wires and cables having the said augmented mass and the said augmented diameter specified in paragraphs 6(a) and 6(b) respectively and being subject to the equivalent wind pressure specified in paragraph 6(c)(i), the force specified in paragraph 6(c)(iii) and the projected area specified in paragraph 6(c)(iv) for such line conductors, wires and cables; and
 - (ii) the forces on the support, insulators and any equipment attached thereto due to the equivalent wind pressure specified in paragraph 6(c)(ii) and the force specified in paragraph 6(c)(iii) for such support, insulators and attached equipment.

Calculation of forces

6. For the purposes of paragraph 5:—

- (a) (i) The augmented mass in grammes per metre length of every line conductor, wire or cable shall be the mass in grammes per metre length increased by the quantity derived from the formula:—

$$0.717 \alpha (\alpha + 2\delta)$$

where δ is the diameter in millimetres and α is the amount in millimetres specified in sub-paragraphs (ii) or (iii) hereof as appropriate;

- (ii) where the highest voltage on the support does not exceed 650 volts α shall be 9.5;
- (iii) where the highest voltage on the support exceeds 650 volts α shall be 19.

- (b) (i) The augmented diameter of every line conductor, wire or cable shall be the diameter increased by the amount in millimetres specified in sub-paragraphs (ii) or (iii) as appropriate;
- (ii) where the highest voltage on the support does not exceed 650 volts the amount in millimetres referred to in sub-paragraph (i) shall be 9.5;
- (iii) where the highest voltage on the support exceeds 650 volts the amount in millimetres referred to in sub-paragraph (i) shall be 19.
- (c) (i) The equivalent wind pressure on any line conductor, wire or cable shall be 380 newtons per square metre;
- (ii) the equivalent wind pressure on any support, insulator or equipment attached thereto shall be 380 newtons per square metre except in the case of any leeside member of a compound support when the equivalent wind pressure thereon shall be 190 newtons per square metre;
- (iii) the force attributable to the equivalent wind pressure shall be the force resulting from the equivalent wind pressure acting horizontally at right angles to the line conductor on an area equal to the projected area of the line conductor, wire, cable, support, insulator or equipment attached thereto as the case may be;
- (iv) the projected area of any line conductor, wire or cable shall be the projected area based on the augmented diameter specified in sub-paragraph (b).

EXPLANATORY NOTE

(This note is not part of the Regulations.)

These regulations impose safety standards for overhead lines in Northern Ireland. Part II applies to overhead electric lines placed and erected before 1st September 1981 the date on which these regulations come into force. It provides for maintaining the standards already applied to these lines. Part III applies to overhead electric lines placed and erected after that date. Part IV applies to all overhead electric lines.