

complied with, a breach of these regulations shall be deemed to have been committed. If the accuracy of the Council's recording voltmeter is questioned by the consumer, a standard instrument shall be supplied by the Inspecting Engineer, the readings of which shall be accepted as final.

#### 5. SWITCHBOARDS.

All switchboards shall be made of and mounted on material that is not inflammable; and the maximum permissible current and temperature in any conductor mounted thereon or leading thereto shall not exceed the values permitted under the rules of the Institution of Electrical Engineers of Great Britain. No conductor at a pressure above 650 volts shall be exposed on the front of any switchboard, and the back of any switchboard carrying conductors at a pressure over 650 volts shall be screened off, and accessible only to authorized persons.

All substation switchboards controlling high-pressure or extra high-pressure circuits shall be provided with two efficient and independent earth connections, connected in parallel, to which all frames, instrument-cases, and other metal parts thereof shall be connected. Means shall be provided for testing the resistance between these two connections through the earth. Such tests shall be made at least once a month, and be recorded.

Every switch intended to be used for breaking a circuit, and every circuit-breaker, shall be so constructed or arranged that it cannot with proper care be left in partial contact or accidentally fall or move into contact when left out of contact.

All switchboard circuits shall be so arranged that the course of any conductor may be readily identified.

Adequate means of access, free from danger, shall be provided for every switchboard passage-way; and the following provisions shall apply to all switchboard working-platforms and passage-ways, unless the bare conductors, whether overhead or at the sides of the passage-ways, are otherwise adequately protected against danger by divisions or screens or other suitable means:—

(a.) Passage-ways constructed for low-tension switchboards shall have an overhead clearance of 7 ft. between the conductors and the floor, and a clear width measured from bare conductor of not less than 3 ft.

(b.) Passage-ways constructed for high-pressure and extra high-pressure switchboards, other than operating desks or panels working solely at low pressure, shall have an overhead clearance of not less than 8 ft., and a clear width measured from bare conductor of not less than 3 ft. 6 in.

(c.) Bare conductors shall not be exposed on both sides of the switchboard passage-way unless either (1) the clear width of the passage is, in the case of low pressure, not less than 4 ft. 6 in., and in the case of high pressure not less than 8 ft., in each case measured between bare conductors; or (2) the conductors on one side are so guarded that they cannot accidentally be touched.

Suitable means, such as rubber mats and gloves, shall be provided and used when necessary adequately to prevent danger.

#### 6. CIRCUIT-BREAKERS.

All outgoing feeders and distributors from the substation shall be provided with automatic circuit-breakers or fuses set to open circuit at 100 per cent. excess current over the rated full load of such feeder or distributor, with a time-limit not exceeding ten seconds.

#### 7. FUSES.

Every fuse shall be either of such construction or so protected by a switch that the fusible metal may be readily renewed without danger.

#### 8. DISTRIBUTION.

The distribution may be carried out either by underground or overhead conductors, provided that if at any time it is deemed by the Minister to be detrimental to the public safety for the conductors or any particular class of conductors to be overhead such conductors shall, on receipt of notification to that effect from the Minister, and within ten months of such notification, be laid underground, and all consequent and necessary alterations made by and at the cost of the Council.

#### 9. OVERHEAD ELECTRIC LINES.

The diameter of any conductor in any electric line laid or erected for the supply of electrical energy shall not be less than 0.104 in. diameter (No. 12 S.W.G. or 7/20 S.W.G.). If the material of the conductor is aluminium the conductor shall be stranded.

#### 10. STRESSES IN OVERHEAD LINES.

The stress in overhead conductors shall not exceed 25,000 lb. per square inch for copper, 12,500 lb. per square inch for aluminium, 34,000 lb. per square inch for steel, and 22,500 lb.

per square inch for iron in the event of a minimum temperature of 32° Fahrenheit, and a wind-pressure of 18 lb. per square foot of diametral plane occurring simultaneously in the case of lines erected outside township limits, and 9 lb. per square foot of diametral plane in the case of lines within the township limits. The span between supports and the sag shall be determined to conform to the above limiting-stresses.

#### 11. CLEARANCES FOR OVERHEAD LINES.

Overhead lines at low pressure shall not in any part thereof be at a less height than 18 ft. from the ground.

Overhead lines at extra high pressure shall not in any part thereof be at a less height than 23 ft. from the ground.

At road crossings the above minimum heights shall be increased in each case by 2 ft.

No overhead electric lines shall come within 3 ft. of any other aerial wires or cables, except where it may be permitted to pass either set of wires between other wires at a pole or support.

Overhead electric lines shall be so erected as to be inaccessible to any person without the use of a ladder or other special appliance.

The maximum sag shall be computed on the assumption that the conductor is subject to a temperature of 122° F.

#### 12. SUPPORTS FOR OVERHEAD LINES.

All metal work attached to or forming part of supports for extra high-pressure lines shall be effectively earthed.

Every support for an aerial line shall be of durable material, and properly strengthened against forces due to wind-pressure, change of direction of line, and unequal length of span. The factor of safety of such supports, if carrying transmission-lines only, shall be such that the moment resulting from a wind-pressure of 30 lb. per square foot of plane surface and 18 lb. per square foot of diametral plane upon a cylindrical surface upon the lines and supports shall not exceed one-half the applied moment which is sufficient to cripple the support if of iron, steel, or ferro-concrete, and shall not exceed one-fourth of the breaking-stress in the case of wood. The factor of safety of supports carrying distribution-lines shall be four in the case of steel, iron, or ferro-concrete, and five in the case of wood, calculated upon the ultimate strength of material, assuming the wind-pressure to be 15 lb. per square foot upon a plane surface and 9 lb. per square foot upon a diametral plane upon a cylindrical surface.

All aerial wires shall be attached to suitable insulators carried on cross-arms of suitable material and cross-section, and they shall be so attached to the insulators or guarded that they cannot fall away from the supports. Conductors covered with insulating material shall be so attached that their insulation shall not be impaired where they are secured to the insulators.

Electric lines may be carried on brackets attached to buildings; provided they are inaccessible from any window, balcony, parapet, or other portion of the building without the use of a ladder or other special appliance.

#### 13. MAXIMUM LENGTH OF SPAN.

The distance between supports carrying distribution-lines shall not exceed 150 ft. where the direction of the line is straight, or 120 ft. where the direction is curved or where the wires make a horizontal angle at the point of support.

#### 14. ANGLE OF CROSSING THOROUGHFARES.

Where an aerial line crosses a street the angle between the line and the direction of the street at the place of crossing shall not be less than 60°, and the span shall be as short as possible.

#### 15. INSULATION OF OVERHEAD LINES.

Electric lines at low pressure shall be insulated throughout with triple braiding, thoroughly impregnated with water-proof compound; provided that where circumstances permit the lines may, with the consent of the Minister, be bare.

Electric lines at extra high pressure shall be bare.

Earthed intermediate conductors may in all cases be bare.

All materials used for insulating electric lines or apparatus should be of the best quality and thoroughly durable and efficient, having regard to the conditions of their use.

#### 16. LOW AND EXTRA HIGH PRESSURE LINES ON SAME POLES.

Low-pressure and extra high-pressure lines shall not be carried on the same poles or supports except with the consent of the Minister, who shall prescribe the conditions under which the electric lines shall be erected.

#### 17. LOCATION OF OVERHEAD LINES.

Except by permission of the Minister of Telegraphs, or subject to an agreement between the Post and Telegraph Department and the Council, all overhead electric lines