

*Switchboards.*

22. All switchboards shall be made of and mounted on material that is not inflammable, and no switchboard conductor shall carry electric current at a density exceeding 1,000 amperes per square inch. No conductor at a pressure above 600 volts shall be exposed on the front of any switchboard, and the back of any switchboard carrying exposed conductors at a pressure over 600 volts shall be screened off and accessible only to authorized persons.

All power-house and sub-station switchboards shall be provided with two efficient and independent earth connections connected in parallel, to one of which all frames, instrument-cases, and other metal parts 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 recorded.

*Circuit-breakers.*

23. All outgoing feeders and distributors from any power-house or sub-station shall be provided with automatic circuit-breakers or fuses set to open at 50 per cent. excess current over the rated full load of such feeder or distributor, with a time-limit not exceeding ten seconds.

*Distribution.*

24. 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, they 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.

*Overhead Electric Lines.*

25. Overhead electric lines shall consist of conductors of stranded hard-drawn copper, aluminium, or other material of not less than 0.0229 square inch section in spans spreading 200 ft., nor less than 0.0129 square inch section in spans exceeding 100 ft., and not less than 0.0072 square inch section in spans under 100 ft.

The stress in overhead conductors shall not exceed 25,000 lb. per square inch for copper, 12,000 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 extreme case of a temperature of 20° Fahr. and a wind-pressure of 18 lb. per square foot of diametrical plane occurring simultaneously. The span between supports and the sag shall be determined to conform with the above limiting stresses.

No overhead low-pressure electric lines shall come within 2 ft. of any aerial wires or cables belonging to another authority except where it may be permitted to pass either set of wires between other wires at a pole or support.

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

Earthed neutrals may in all low-pressure circuits be bare.

Electric lines at high pressure shall be covered with vulcanized rubber at least 600-megohm grade, provided that where circumstances permit the lines may, with the consent of the Minister, be bare.

All overhead electric lines at low pressure shall be carried at a minimum height of 18 ft. above the ground, and shall not in any part thereof be within 5 ft. measured horizontally or vertically from any building or erection other than a support for the line, except where brought into a building for the purpose of supply.

All overhead lines at high pressure shall be carried at a minimum height of 23 ft. above the ground.

When 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.

Where an aerial line crosses or is in proximity to any metallic substance precautions shall be taken by the Council against the possibility of the line coming into contact with the metallic substance by breakage or otherwise.

*Supports for Overhead Lines.*

26. 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 support. Conductors covered with insulating material shall be so attached that their insulation shall not be impaired where they are secured to the insulator.

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 outside borough limits shall be such that the moment resulting from a wind-pressure of 30 lb. per square foot and 18 lb. per square foot of diametrical plane upon a cylindrical surface upon the lines and supports shall not exceed one-half of 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 within the borough limits 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 under the same conditions of wind-pressure as hereinbefore mentioned.

The distance between supports within borough limits shall not exceed 200 ft. except by approval of the Minister.

*Location of Overhead Lines.*

27. 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 shall be placed on the opposite side of the street to that on which any telegraph lines exist; and where the erection of the electric lines necessitates the alteration of any telegraph lines, and such alteration is approved by the Minister of Telegraphs, the cost of the alteration shall be borne by the Council.

In running the lines authorized by this license through or along any street where no telegraph line exists the Council shall keep to one side of the street, and in running wires to the opposite side of the street the Council shall arrange so as to interfere as little as possible with the route of any future telegraph lines.

*Lines not in Use.*

28. An aerial line shall not be permitted to remain erected after it has ceased to be used for the supply of energy unless the Council intends within a reasonable time again to take it into use.

*Post and Telegraph Crossings.*

29. Where electric lines are permitted to be supported on telegraph poles all details of the supports and the insulation shall be approved by the Minister of Telegraphs, who may, on giving to the Council reasonable notice in that behalf, require the Council to remove such electric lines at any time from such telegraph poles, and without payment of any compensation to the Council.

Wherever it may be necessary to cross telegraph wires the electric lines shall cross above, as far as may be practicable, and shall be at least 2 ft. distant. Where it is impracticable to cross above, the electric lines may be taken under or through. The crossing shall be made at a pole in a manner to be approved by the Minister of Telegraphs.

Where lead-covered telephone cables are crossed above or below by the electric-light wires the latter wires shall be insulated with a triple covering of jute braiding thoroughly compounded throughout the crossing-span, and over every such span they shall, if the Minister of Telegraphs so requires, be suitably suspended from effectively earthed steel bearer-wires.

In cases where it may be required to cross with the electric-light wires through any other aerial wires or through cables because of the impracticability of crossing above or below (and crossing shall be effected above or below if possible), all such through crossings, if permitted, shall be effected at a pole. In every case of a through crossing, no matter whose property the lines crossed through may be, the method of carrying the electric-light wires across the pole, of protecting them thereon, of preventing other wires from coming in contact with them, and of protecting persons working on the poles from danger of shock, shall be to the satisfaction of the Minister of Telegraphs. The electric-light wires shall be insulated with a triple covering of jute braiding thoroughly compounded where they pass through on the poles and over the whole length of the span on each side of the pole crossed through. Where the insulated wires cross through on the pole they shall be encased in some approved hard protecting substance for the entire length of the arms on such pole. If metal pipe is used to encase the wires it shall be effectively earthed.

Where the electric lines intersect telegraph lines the latter shall be suitably insulated if deemed necessary, and when the crossing is above and near a pole the spans on each side of the pole may be insulated.

Where high-pressure electric lines intersect telegraph lines the former shall be insulated with not less than 600-megohms grade of vulcanized rubber, and the low-pressure wires with weatherproofed insulation as prescribed in clause 26.

Where deemed necessary efficient guard-wires, effectively earthed, shall be erected in a manner to meet with the approval of the Minister of Telegraphs at all crossings or places