

safety of such supports, if of iron, steel, or ferro-concrete, taking into consideration all possible stresses, including wind-pressure at 30 lb. per square foot on plane surfaces and 18 lb. per square foot of diametrical plane for cylindrical surfaces, shall be such that the moment resulting from these stresses shall not exceed one-half the applied moment which will cripple the supporting structure. The factor of safety of the support, if of wood, shall be four, reckoned upon the ultimate strength of the material.

25. Along the transmission-wire route a wire or wires of hard-drawn copper not smaller than No. 12 standard wire gauge may be run for service telephone purposes. This wire shall be bound throughout to double-shed porcelain insulators.

26. At the generating and transformer stations the transmission-wires shall be securely and safely led in; and protection against lightning shall be provided at each end of the lines. The telephone wire or wires shall be suitably guarded against lightning, shall be fused, and such arrangements shall be made where the telephone is placed as will prevent the possibility of injury resulting to any person using the telephone should a power-wire come into contact with the telephone wire.

27. Where conductors cross telegraph or telephone lines they shall be insulated and protected by the licensee to the satisfaction of the Minister of Telegraphs.

28. The transmission-line shall be on the opposite side of the road or street to that on which the telegraph and telephone lines are run, and where there are no telegraph or telephone wires the licensee shall erect his lines on one side of the road or street only. It shall be patrolled throughout its whole length at least once a week, and its insulation shall be so maintained that the maximum leakage shall not exceed one-thousandth part of the maximum supply current. Suitable means shall be provided for indicating leakage on the line. Every leakage shall be remedied without delay. Tests shall be made weekly, and recorded by the licensee.

29. Transformers shall have easily removable fuses for the primary circuit, and shall, as far as possible, be installed in small enclosures accessible only to the licensee's officers or servants. Transformers for use outside shall be fitted with watertight cast-iron cases, and shall be affixed to poles so as to be inaccessible except by the use of a ladder or other special appliance. Every transformer shall have its iron case effectively connected with earth.

30. Conductors used for making the lightning-guard and transformer-case earth connections shall be of copper, and shall have an area of at least 0.023 square inches. They shall be properly stapled or fastened to the supports, and shall be protected by a batten for a distance of 8 ft. from the ground. They shall be run as straight as possible, and be properly connected to an earth-plate. A test shall be made every three months, and oftener if required, of all earths, to ensure that the earth-wire is intact and that the earth is effective.

31. Where poles are carrying low-tension wires, the spans shall not exceed 200 ft. where the direction of the line is straight, or 150 ft. where the direction is curved or where the wires make a horizontal angle at the point of support.

32. Low-tension distribution shall be carried out on the single-phase system at a pressure of 230 to 250 volts. The supply to street lamps, incandescent lamps, and to private consumers shall be at a pressure of 230 volts.

Where cables are led to and from transformer enclosures they shall be protected on the poles by being run in iron pipe, which shall be effectively earthed.

Low-tension wires or cables shall be covered with a triple braiding impregnated with waterproof compound, except where otherwise provided for.

33. Where the erection of the electric lines or wires necessitates the alteration of existing telegraph or telephone lines or wires, the expense of such alteration shall be borne by the licensee.

34. The sectional area of the conductor in any electric line for distribution purposes laid or erected in any street shall not be less than the area of a No. 10 S.W.G. wire.

35. All material used for insulating electric lines or apparatus shall be of the best quality, and thoroughly durable and efficient, having regard to the conditions of its use. Suitable provision shall be made where necessary for the protection of the insulating material against injury or removal. If the protection so provided is wholly or partly metallic it shall be efficiently connected with earth.

36. Any metallic body to be "efficiently connected with earth" shall be connected with the general mass of the earth in such manner as will ensure at all times an immediate and safe discharge of electrical energy.

37. Every support for an aerial line for distribution purposes shall be properly stayed against forces due to wind-pressure, change of direction of the line, or unequal lengths of span. The factor of safety shall be for all aerial lines and

for all other parts of the structure at least 6, and for aerial wires at least 4, taking the maximum possible wind-pressure at 30 lb. per square foot.

38. The low-tension wires shall be attached to double-shed porcelain 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.

39. Any aerial wire used for low-tension distribution or for telephone service shall not in any part thereof be at a less height from the ground than 18 ft., or within 5 ft. measured horizontally or vertically from any building or erection other than a support for the line, except where brought in to a building for the purpose of supply.

40. Service lines from aerial lines shall be led as directly as possible to insulators firmly attached to some portion of the consumer's premises which is not accessible to any person without the use of a ladder or other special appliance. Every portion of any service line which is outside a building but is within 7 ft. from any part of the building shall be rubber-insulated.

41. Where an aerial wire 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 spans shall be as short as possible.

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

43. Where telegraph or telephone wires are crossed either over or under by the low-pressure electric-light wires, there shall be a distance of at least 2 ft. between the telephone and the electric-light wires, and the former shall, if deemed necessary, be insulated throughout the whole length of the span intersected, and when the crossing is at a telegraph or telephone pole the spans on each side of the pole shall be insulated by the licensee, if required by the Minister of Telegraphs. The low-pressure wires shall, where deemed necessary, be rubber-insulated at such crossings either over the whole span or over such portion of it as will ensure that uninsulated portions of the telegraph or telephone and of the low-tension electric-light wires shall not come into contact with each other. In cases where it may be deemed not necessary to insulate both classes of wires, either the telegraph and telephone or the electric-light wires shall be insulated as may be considered most suitable by the Minister of Telegraphs. Where it may be required to cross through telegraph or telephone wires with low-tension distribution-wires, the latter shall be affixed to porcelain insulators mounted on iron brackets suitably attached to the arms on each side of the line being passed through, and then taken through bell-mouthed iron pipes secured to the arms. The iron pipe and brackets shall be efficiently earthed. The low-pressure wires shall be insulated with vulcanized rubber of 600-megohms-per-mile grade, and the insulation shall extend as is indicated in the preceding part of this clause. The cost of insulating the telegraph and telephone wires shall be borne by the licensee.

Due notice in writing shall be given to the Telegraph Engineer of the district or his deputy of all works involving the crossing or intersection of telegraph or telephone wires.

No attempt shall be made to utilize telegraph or telephone poles as supports for low tension wires until the consent of the Telegraph Engineer of the district or his deputy shall first have been obtained, and such applications shall be confined strictly to those cases where no other practicable means of overcoming the difficulty are available.

44. Efficient guard-wires or other suitable protection shall, if required by the Minister of Telegraphs, be erected in a manner to meet with the approval of the said Minister at all crossings and places where either transmission or distribution electric-lighting wires intersect telegraph or telephone wires. The licensee shall bear the expense of such guard-wires or other protective devices in all cases where an electric-lighting wire intersects a telegraph or telephone wire previously existing.

45. Every aerial line, including its supports, its conductors, and their insulating covering, and all the structural parts and electrical appliances and devices belonging to or connected with the line shall be duly and efficiently supervised and maintained by the licensee as regards both electrical and mechanical conditions.

46. An aerial line shall be removed so soon as it has ceased to be used for the transmission of electricity, unless the licensee intends within a reasonable time again to take it into use.

47. All metal pipes or coverings containing any electric line or wire shall be efficiently connected with earth, and shall be so jointed as to make good electrical connection throughout their whole length.

48. The licensee shall be responsible for all electric lines, fittings, and apparatus belonging to him, or under his control