

12. *Underground cables, insulation of.*—The insulation resistance of all continuously-insulated cables used for lines, for insulated returns, for feeders, or for other purposes, and laid below the surface of the ground, shall not be permitted to fall below the equivalent of 10 megohms for a length of one mile. A test of the insulation resistance of all such cables shall be made at least once in each month.

13. *Telegraph wires, protection from induction.*—Where in any case in any part of the tramway the "line" is erected overhead and the "return" is laid on or under the ground parallel with or nearly in the same direction as any telegraph, telephone, or signalling wires, the property of the Government, the company shall, if required so to do by the Postmaster-General or the constituted authorities, provide, insert, and maintain in the company's line one or more induction coils or other apparatus mutually approved of by the Postmaster-General, the constituted authorities, and the company, for the purpose of preventing, as far as possible, disturbance of the said telegraph, telephone, or signalling wires by electric induction.

14. *Distance between line and insulated return.*—Any insulated "return" shall be placed parallel to and at a distance not exceeding 3 feet from the "line" when the "line" and "return" are both erected overhead, or 18 inches when they are both laid underground.

15. *Feeders.*—In the disposition, connexions, and working of feeders the company shall take all reasonable precautions to avoid injurious interference with any existing wires.

16. *Sparking, prevention of.*—The company shall so construct and maintain their system as to secure good contact between the motors and the "line" and "return" respectively, and shall adopt the best means available to prevent the occurrence of undue sparking at the rubbing or rolling contacts, and in the construction and use of their generator and motors.

17. *Controlling rheostat.*—In working the cars the current shall be varied as required by means of a rheostat containing at least 20 sections, or by some other equally efficient method of gradually varying resistance.

18. *Conduits.*—Where the "line" or "return" or both are laid in a conduit the following conditions shall be complied with in the construction and maintenance of such conduit:—

- (a) The conduit shall be so constructed as to admit of easy examination of and access to the conductors contained therein, and their insulators and supports.
- (b) It shall be so constructed as to be readily cleared of dust or other debris, which on no account shall be allowed to accumulate.
- (c) It shall be laid to such falls and so connected to sumps or other means of drainage as to prevent the possibility of water rising to the level of the conductors.
- (d) If the conduit is formed of metal, all separate lengths shall be so jointed as to secure metallic continuity for the passage of electric currents. Where the rails are used to form any part of a return, each length of rail shall be electrically connected by means of copper wires or strips having a sectional area of at least one-sixteenth of a square inch or by other metallic connexion of equal conductivity. Where the return is wholly insulated and contained within the conduit, the latter shall be connected to earth at the generating station through a high-resistance galvanometer suitable for the indication of any contact or partial contact of either the line or the return with the conduit.
- (e) If the conduit is formed of any non-metallic material not being of high insulating quality, and impervious to moisture throughout, and is placed within 6 feet of any pipe, a non-conducting screen shall be interposed between the conduit and the pipe of such material and dimensions as shall provide that no current can pass between them without traversing at least 6 feet of earth, or the conduit itself shall in such case be lined with bitumen or other non-conducting damp-resisting material in all cases where it is placed within 6 feet of any pipe.
- (f) The leakage current shall be ascertained daily, before or after the hours of running, when the line is fully charged, and if at any time it shall be found to exceed half an ampere per mile of tramway the running of the cars shall be stopped, unless the leak is localized and removed within 24 hours.

19. *Pressure, limit of.*—Where any part of the "line" or "return" is not continuously insulated the pressure on such "line" or "return" shall not exceed 550 volts.

20. *Lightning arresters.*—Lightning arresters of approved pattern shall be placed in the circuit of all conductors, either partly or wholly overhead, at the point where they leave the generating station.

21. *Cut-outs.*—Cut-outs of approved pattern shall be inserted in the circuit at the points where conductors for traction or other power purposes leave the generating station, and so arranged that in the event of a short circuit occurring between the "line" and "return" the current will be automatically cut off.

22. *Records to be kept.*—In order to insure the efficient working of the tramway or railway the following records shall be kept, and all such records shall be available for the information of the constituted authorities at any time:—

#### *Daily Records.*

Number of cars running.  
 Maximum working current.  
 Maximum working pressure.  
 Maximum current from the earth connexions (*vide* Regulation 8, section 1 of paragraph "e.")  
 Leakage current (*vide* Regulations 11 and 18).  
 Fall of potential in return (*vide* Regulation 3).

#### *Monthly Records.*

Condition of earth connexion (*vide* Regulation 7).  
 Insulation resistance of insulated cables (*vide* Regulation 12).

#### *Quarterly Records.*

Conductance of joints to pipes (*vide* Regulation 9).

#### *Occasional Records.*

Any tests made under provisions of Regulation 8.  
 Localization and removal of leakage, stating time occupied.  
 Particulars of any abnormal occurrence affecting the electric working of the tramway.