



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

K.9

PROTECTION AGAINST INTERFERENCE

**PROTECTION OF TELECOMMUNICATION
STAFF AND PLANT AGAINST
A LARGE EARTH POTENTIAL
DUE TO A NEIGHBOURING ELECTRIC
TRACTION LINE**

ITU-T Recommendation K.9

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation K.9 was published in Volume IX of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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PROTECTION OF TELECOMMUNICATION STAFF AND PLANT AGAINST A LARGE EARTH POTENTIAL DUE TO A NEIGHBOURING ELECTRIC TRACTION LINE

(Mar del Plata, 1968)

1 General

From the technical standpoint the precautions taken on electrified railways to protect staff and plant may differ according to a number of factors, the chief of which are:

- ground resistivity;
- electrical line equipment (track circuits) which, though necessary for railway safety installations, may prevent the systematic connection to rail of metal structures near the railway;
- the characteristics of the protective devices required which, with a.c. electric traction systems, may be to some extent affected by the presence (or absence) of booster-transformers;
- the degree of insulation of the contact system, which may also affect the nature of the protective devices, particularly in the case of relatively low-voltage electric systems such as 1500 V d.c. lines;
- the means to be recommended for linking a metal structure to the rail in case of overvoltage without making a permanent connection (one method is to make the connection via a spark gap).

2 A.c. electric traction lines

It is recommended that neighbouring metal structures, for example all those within a certain distance from the line, be connected to rail, provided that there are no safety installations which make this impossible.

If the structures cannot be connected to rail, it is recommended that they be earthed to an earth electrode having a sufficiently low resistance.

3 D.c. electric traction lines

Protective measures should also take account of the need to avoid any risk of electrolytic corrosion. Such measures may amount to connecting to rail only such metal structures as are sufficiently insulated from the ground or linking them via a spark gap or, in the case of metal structures carrying an adequately insulated contact system or lines with a sufficiently low service voltage, connecting neither to rail nor to earth.

4 Telecommunication cables

In new installations, it is recommended that cables near rails, at the entry to substations or over metal bridges should have an outer plastic covering, possibly of high dielectric strength, where it is necessary to prevent contact between the cables and such structures.

If, on the other hand, cables with metal sheaths already exist, a good solution, at least in the case of large railway stations, may be to connect the sheaths to rail.

5 Conditions to be fulfilled by PTT installations in the neighbourhood of electric traction lines

The following are the main precautions taken to protect such installations:

- placing them outside the danger zone;
- screening;
- substituting insulating components for metal components, in particular the sheaths or covering of cables or in the construction of repeater cabinets or boxes.

Note – The above recommendations are inspired solely by technical considerations which are to be carefully weighed up in each case. It goes without saying that every Administration must comply with the laws and regulations in force in its country.