

**B.1.5. Evaluation technico-économique de différents types de câbles de distribution 1 kV en Espagne**

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Résumé

Pour la distribution électrique 1kV en Espagne on utilise câble d'un seul conducteur d'aluminium avec isolation de XLPE and gaine de PVC. Souvent les câbles sont endommagés et le conducteur en aluminium reste en contact avec le sol, ce qui cause la corrosion électrolytique du conducteur et la défaillance du câble. On a fait une étude pour sélectionner un type de câble avec une meilleure performance.

Foreword.

Cables for 0.6/1kV electric power distribution network in Spain are usually single core stranded and compacted aluminium conductor with XLPE insulation and PVC sheath, generally according to IEC 502. Common cross sections are 150 and 240 mm². Distribution circuits are made with 4 single core cables of same cross section (or alternatively one half size conductor-the neutral) laid parallel, spaced and directly buried.

Very often scratches on insulation and sheath due to cable mishandling leave bare aluminium conductor in contact with soil. Then a low fault current is established between the damaged cable and the solidly earthed neutral of the distribution transformer through the soil, causing corrosion of the aluminium conductor. Corrosion can progress up to the complete destruction of the conductor, so causing interruption of supply or discontinuity of the neutral. (See illustration 1 and 2).

Fuses for overcurrent protection of the cable may be unable to detect the small fault current and stop the corrosion progress.

A study was launched to select a cable type among cables currently used for 0.6/1kV distribution, giving a better performance.

Study methodology

The steps followed were:

- 1) To select cable types to be considered.
- 2) To define performance of cables through 12

B.1.5. Technical and economical evaluation of different cable design for 1 kV distribution cables in Spain

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Abstract

1 kV electric public distribution in Spain uses single core cable with aluminium stranded conductor, XLPE insulation and PVC sheath. Often cable insulation and sheath are damaged leaving bare aluminium in contact with the soil, causing electrolytical corrosion of the conductor and subsequent failure of the cable. A study was launched to select a cable type with a better performance.

parameters. Each parameter is "weighed" from 1 to 10 according to their relative interest for users.

3) To establish a four-point level (i.e. from 1= poor, to 4= very good) to evaluate the expected performance of each cable type against each parameter.

4) To select five representative cable types for a deeper study

5) To establish for the selected types and common cross sections, the basic electrical and dimensional characteristics, and their approximate cost level. Select one cable type.

6) To establish a complete dimensional specification of the cable selected and estimated cost of complete circuit (cable itself plus laying operations).

7) Conclusion.

Cable types considered.

Eleven cable types were considered. All cables have been used for long time in Spain or other European countries and should be regarded as well known and field tested. A short description of selected cables follows:

1- Single core XLPE/PVC

Stranded aluminium conductor
 XLPE insulation and PVC sheath.

2- Single core EPR/PCP

Stranded aluminium conductor
 EPR insulation and water-resistant PCP sheath

3- Four single core XLPE/PVC bundled

4 single core XLPE/PVC cables (described under N°1) laid with a long lay length

4- Four core XLPE/PVC full neutral