A.4.5. Failure series analysis of wrap type cable joints on a 110 kV XLPE cable system
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Abstract

The XLPE cable is a proven and reliable alternative to the 110-kV-overhead transmission line. Shortly after the setting into operation of a 110-kV-cable section a series of breakdowns of the tape-wrapped joints of a newly constructed cable section left an opposite impression. The method of failure localization, the extent and the duration of the failure corrective action as well as the measures taken in order to determinate the cause of trouble are described in the following. Finally the realized joint technique is opposed to an eventual alternative.

The laying of the cables was realized in sections of a length of 700 to 800 m each, which resulted in 16 partial sections for the total length of 12,1 km.

At site the cable producer mounted tape-wrapped joints with self-bonding ethylene-propylene-rubber tapes (EPR) serving as insulation. This joint technique is often employed in 110-kV cable systems as it represents an economic solution [3].

![Diagram](image)

Figure 1: Block diagram of the 110-kV-transmission line

The outdoor sealing ends of the cable section on the transmission towers 21 and 23 were protected by a system of metal oxide arresters (MO). After the completion of the mounting works the cable system was tested according to the provisions of DIN VDE 0263 or IEC 840 with a direct current voltage of 3xU0=190 kV during a testing phase of 15 minutes.

A series of breakdowns of the joints

First breakdown during normal operation

Four weeks after the setting into operation an earth