

On-site condition assessment of XLPE MV cable joints by using an insulation tester

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Measuring the dielectric loss tangent ($\tan \delta$) as a function of voltage and frequency is a well-established method to assess the condition of medium voltage XLPE cable insulations containing water trees. In Norway it has been observed that many XLPE cable sections with heat shrink joints have a very low insulation resistance. If the cable section assessed contains such joints, the resulting high $\tan \delta$ values may lead to erroneous conclusions, typically that the insulation is heavily water treed. Laboratory examinations have shown that these joints most likely have experienced excessive overheating during service.

This paper presents on-site time domain dielectric response measurements on Norwegian XLPE MV cables from the early 1980's. All the selected cables have joints with a low insulation resistance. The main purpose of this paper is to examine if the dielectric response of cables with low resistivity joints depends on the service conditions. This includes the load history, the ambient temperature and weathering conditions. This information is important as it could have an impact on the development of the diagnostic criteria.

It has been shown that both the polarization and depolarization currents of the low resistance joints studied in the laboratory are e.g. voltage dependent. The data obtained on-site will be compared with the laboratory measurements.

These results will be used to finally develop a simple method for assessing the condition of cable systems with critical joints by using an insulation tester.