B.1.4.

Influence of some selected service conditions on properties of XLPE applied in insulated or covered overheads conductors

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Insulated or covered overhead lines are an alternative for bare conductor lines. Insulation of overhead conductors is exposed to many more various degrading factors than cable insulation (moisture, UV radiation, large changes of ambient temperature, surface discharges, toxins, abrasion, etc.).

There is strong need of search for relationship between stress conditions occurring during service of a line with insulated or covered conductors and parameters characterizing their insulation. Authors simulated some commonly met service stress circumstances in laboratory conditions. The research consisted of a change analysis of some selected quantities characterizing insulation material during aging and degradation.

Five kinds of samples were investigated. In each case the basic material was crosslinked polyethylene. Samples differed by the kind and amount of additives.

Investigated materials were exposed to: surface discharges, UV radiation and water (by immersing). The comparative evaluation of the material was based on an analysis of:

– surface resistivity,
– wetting angle,
– water absorption,
– hardness.

As it had been expected, surface discharges affected a clear drop of surface resistivity. They also caused a substantial drop of the wetting angle. Water absorption was investigated too – for both new and degraded samples. It was checked by comparison of the mass of the samples.