

Nanoindentation technique for the determination of cable aging condition monitoring indicators

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Abstract

The subject of the presentation is to describe the practical application experiences of micro-indentation methods, i.e. measurement of material characteristics by low loads indentation tests, for the preparation a standardized procedure of the conditional monitoring of selected system components of the safety-related systems to ensure their long-term exploitation.

The observation results show, that standardized conservative methods of measurement of material properties, such as monitoring of changes of the relative elongation at break or OIT (Oxidation-Induction Time), which defines the aging rate, and can be supplemented or fully replaced by methods of micro-indentation measurements. These methods can be effectively determine parameters of the dynamic hardness significantly more accurately and consequently identify local indicators of aging with significantly higher populations of measurements.

Herewith, there is guaranteed realistically determine values of the indicators of aging, as is introduce by IEC-IEEE 62582 or IEEE Std 323-2004, and eliminate uncertainty measurement and considerably precise a prediction of service lifetime. The indisputable advantage is also non-destructive nature of the tests and demands to the size of samples.