

## Thermal Analysis of Underground Power Cables- A Monitoring Procedure

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*Abstract*— The implementation of underground power distribution lines grown significantly over the last decades and this has increased to need to obtain a high level of operational reliability. Current monitoring strategies for underground power lines are developed based on different diagnosis tools and many of them are not cheap at all. As an example, traditional methods of thermal endurance characterization for XLPE insulated power cables are all based on analytical tools-infrared carbonyl absorbance, melting point, differential scanning calorimetry and others. These diagnosis techniques are either too time consuming or some can only give vague data that cannot be interpreted. The current paper proposes a new method for underground power cable monitoring based on cable historical operation temperature. Based on the current study, the aim of this innovative monitoring procedure is to estimate the degree of ageing for an underground power cable considering thermal stresses. Different parameters related to thermal aging are determined such as daily thermal aging and the average daily rate of aging. The input data considered for the current researches are chosen arbitrarily, but it can be switched with real data from exploitation. For thermal lifetime estimation, the thermal endurance profile for XLPE was applied. The current procedure can be applied either paper insulated or XLPE insulated power cables.