

Combined application of diagnostic tools for Medium Voltage underground cable networks

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Condition based maintenance is an important and necessary strategy to overcome today's challenges for the asset management of a network operator. An exact knowledge about the condition of the cable line is necessary. Therefore test and diagnostic methods are necessary, which delivers meaningful results and simultaneously are cost efficient and simple to apply. For conditions assessment diagnostics in underground cable networks, basically online and offline methods are available.

Online Partial Discharge Spot-Testing can deliver information about the presence of Partial Discharge activities along the cable. Online PD Spot-testing can be used as efficient tool to support the decision making to shut-down a cable from operation in order to conduct an offline-diagnostic.

The offline diagnostic methodologies of TDR, Loss Factor measurement (TD), Partial Discharge measurement (PD) and the Monitored Withstand Test (MWT) deliver information in form of measurement values that allow providing comprehensive statements on the service reliability and condition of a medium voltage underground cable including judgment on the location of a weak spot. The article describes in detail, how the applied test methods can be used to understand the condition of a cable network, in order to identify weaknesses and improve the reliability of a cable network. The combination of online-PD measurement with offline-Diagnostic is closing the gap of unnecessary cable shut downs.

Case studies will explain how the technologies are applied and how clear statements and action plans for network improvements can be generated.

The paper will show in detail:

- A brief description of the measurement methods and why these methods have been selected
- A description of the whole cable condition assessment process: Starting from the selection of the cable which has to be investigated, to the collection and evaluation of the measurement data. Detailed analysis of the interpretation of the results will be explained.
- It will be shown, how the acquired know how can improve the condition assessment strategy
- Dedicated user cases will underline how the condition assessment strategy can be applied to define the improvement measures that are necessary to increase the reliability of the cable system.
- Available standards for the cable diagnostic