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## Preventive diagnostic testing of high- and medium voltage cables – Progress report

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Power cable systems can play a critical role with respect to the reliability of electric utilities and industrial plants. The average age of a considerable number of transmission and distribution cables in Germany is between 30 and 40 years. These cables mostly are oil-impregnated, paper-insulated, lead-covered (PILC) cables. Network extensions in recent years increasingly were carried out using crosslinked polyethylene (XLPE) cables. In respect to achieve an economically optimised network service as well as an efficient maintenance, rehabilitation or replacement strategy it is important to know about the development of weaknesses in cables or accessories reducing liability of the in many cases mixed cable system.

This paper reports on a preventive maintenance tool for shielded power cable systems based on the location of partial discharges. It describes the principles of the technology and provides data covering tests conducted on high and medium voltage cables. It discusses the technical and economic advantages, as well as some of the limitations of the diagnostic test method.

Measurement experiences on 110-kV- and 20-kV-PILC-, -XLPE- and mixed cable systems are provided using different measuring systems and test voltage supplies (power frequency, damped oscillating wave). The procedure of on-site partial discharge tests, results and benefits are described. Cable system weaknesses and quality of workmanship during cable installation can be evaluated and located. Results of partial discharge measurements are comparable to test results under laboratory conditions.

Index Terms – Preventive Maintenance, Cable Systems, Partial Discharge Location, Diagnostic Testing, Economic Maintenance, Rehabilitation and Replacement Strategy.