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Decision Support for Condition Assessment of Power Cables

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As known for many years, due to the service life of distribution power cables the insulating materials are subject to structural changes. In order to detect changes in the insulation at an early stage and to gain insight to the maximum service life of a power cable, predictive maintenance is often recommended and in several cases already in use.

To enable predictive maintenance the need arises for structured condition assessment of the power cables, by the use of diagnostic techniques. One of these diagnostic techniques is partial discharge detection and location.

To assess the condition of components such as distribution power cables, suitable parameters should be selected that give an indication of the components health. Levels should be defined that trigger inspection, maintenance or replacement actions. To support electrical engineers in the interpretation of diagnostic measurement results and recognition of aging processes in the insulation of power cables, linkage between specific insulation characteristic with the combined information as provided by quantities of the used diagnostics is necessary.

Because of the large amount of components, the diversity of component types and measurement data, information systems are needed for storage, correlation and comparison of measurement data on specific components and specific component types.

This contribution discusses the practical description and implementation of a database for power cables as is in use by Delft University of Technology and NUON InfraCore. All PD measurements, which are performed in the field, are stored inside this database. By application of intelligent filters, relevant measurement data can be selected from all data, which is profoundly analysed for characteristic behaviours. As a result of these analyses, knowledge rules are generated to support the asset management decisions.