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Application of damped AC voltages for PD diagnosis of distribution power cables

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Abstract: It is known that condition based maintenance CBM can offer a support in meeting requirements of liberalization processes at power utilities. As a result, based on the information about the actual insulation condition of a cable link, the operation, the maintenance and the replacement can optimally be planned. This contribution discusses based on advanced PD diagnostic at Damped AC voltages different evaluation ways to assess the insulation condition of cable systems. Based on field experiences, important CBM aspects such as insulation defects, selecting diagnostic, performing on-site measurements and collecting data are discussed.

Keywords: condition based maintenance, partial discharges, diagnostics, power cables, damped AC voltages

1. Introduction

Performing maintenance on HV assets, e.g. power cables, based on their availability and reliability, important detailed information on their actual insulation condition is necessary. Even though actual aging processes, as detected through non-destructive diagnostics (e.g. PD measurements), are still not well understood at the present time, much information of a qualitative nature has been gathered over the years. Discharging local insulation imperfections or defects can be related to important symptoms of defects induced degradation processes, which may occur in the particular cable component. In particular, the combination of important parameters for PD detection (e.g. insulation type, defect type, load conditions) and supporting knowledge rules can be used to support the maintenance decision process [1,2].

With regard to distribution power cables the technical information needed for AM decision support is not only dependant on diagnostics applied to the cable section but it is also dependent on several asset-related effects such as network operation and cable construction, see figure 1.

Résumé: Il est reconnu que le CBM (Condition Based Management) peut offrir une aide pour satisfaire les exigences des processus de libéralisation des exploitants des réseaux d'énergie. En conséquence, en se basant sur l'information dont on dispose sur l'état de l'isolant d'une liaison, l'exploitation, la maintenance et le remplacement peuvent être gérés et planifiés d'une manière optimale.

Cette communication présente l'évolution de l'isolation des systèmes de câbles à partir des méthodes avancées de diagnostic de DP et de tensions alternatives amorties. A partir d'expériences en service, des aspects importants du CBM sont discutés : défauts d'isolation, diagnostic sélectif, mesures sur site et collecte des résultats.

Mots clés: l'entretien de base de condition, partiel décharge, le diagnostic, les cordons d'alimentation, les tensions de courant alternatif assourdi

The cable network is build up from different types of components, with use different construction and insulation materials. Therefore, due to different service conditions the components may age in different ways. In order to achieve a good diagnostic

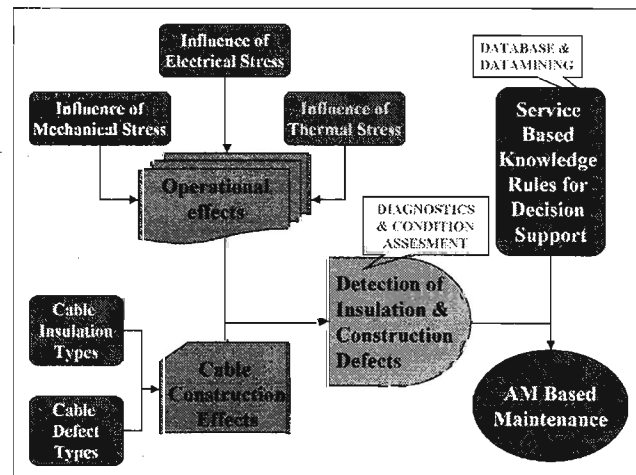


Figure 1: Different categories of technical information to support AM based maintenance of power cables.