



## A.8.2.

Partial discharge diagnostics as part of CMB on MV power cables: *Yes or No ?*

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**Abstract:** This paper focuses on the considerations that shape Condition Based Maintenance (CBM) and the way CBM can be implemented for application in power cable networks. The application of partial discharge diagnostics as a tool for CBM is discussed. The "diagnostic dilemma" is introduced; meaning that application of diagnostic measurements will reduce the number of breakdowns during service significantly, but will not be able to prevent them all. Examples of application are given. Feedback from visual inspections is very important to tailor to the local circumstances. Conclusion is that CBM on power cables may pay off very well, but that expectations should be realistic.

**Keywords:** partial discharge diagnostics, CBM on power cables, MV cables

### 1. Introduction

Condition Based Maintenance (CBM) has gained great significance over the years replacing Periodic (or Time Based) and Corrective (or Failure Based) Maintenance, because it offers a better cost-benefit ratio in many cases. Timely tracing of failures-to-come at an attractive cost level is an important part of asset management of the electric energy infrastructure. Repair before breakdown reduces operational costs and customer claims, increases availability and reliability and postpones investments. Timely repair of existing cable circuits requires good insight in the local condition of the cable circuits. Diagnostics aim at giving this insight [1, 2, 3]. For service aged medium voltage (MV) cable circuits, various cable diagnostics are used to enable the condition assessment of the underground cable network [1, 2]. Results of the condition assessment are input for the economical and technical assessment enabling CBM. This maintenance

**Résumé :** Cet article est consacré aux considérations qui donnent corps à la maintenance préventive (Condition Based Maintenance ou CBM en anglais) et sur la façon dont elle peut-être implémentée pour être appliquée aux réseaux de câbles d'alimentation. L'application du diagnostic de décharge partielle comme instrument de maintenance préventive y est également traitée. La notion de «dilemme du diagnostic» est introduite; ce terme signifie que l'application de mesure de diagnostic réduira considérablement le nombre de pannes pendant le service mais ne permettra pas de les éviter toutes. Des exemples d'application y sont donnés. Le feedback des inspections visuelles est particulièrement important pour s'adapter aux situations spécifiques locales. La conclusion est que la maintenance préventive sur les câbles d'alimentation peut s'avérer très rentable mais que les attentes doivent rester réalistes.

**Mots-clés :** diagnostic de décharges partielles, câbles MT, maintenance préventive sur les câbles d'alimentation.

concept for cable circuits can be part of the total maintenance policy for the network.

The results so far show a nice reduction of the costs. Large investments could be postponed to a later date.

### 2. CBM on power cable systems

#### 2.1 Structure of CBM

CBM on a system starts with assessing its condition and determining what next maintenance action is required based on the assessed condition.

**Strategy:** CBM will be applied to serve a goal and the goal will depend with the strategy of the asset manager. Consider the two cases: a utility may face the need to reduce short-term costs or may face demands to warrant the reliability of power supply at certain costs. Reduction of short-term costs will allow this situation to continue ('see how bad it really gets'), whereas the demand of high reliability will