Review of On-Site Testing and Partial Discharge Diagnosis of Power Cables

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ABSTRACT

Power cables and other high voltage equipment suffer from voltage stress and other environmental factors. As a result, deterioration occur to the equipment. Due to this, power engineers employ On-Site testing (OT) and partial discharge (PD) diagnosis widely to determine the health of these power equipment, especially the cables. Through these tests, it is possible to identify patterns of deterioration and localization of the failures of power cables. Both the OT and PD are nondestructive testing methods and can conveniently be used for cables that are in operation. Therefore, this review paper undertakes to elucidate the OT and PD and how these methods can be used to predict the future condition of the power cables. Both the significances and challenges of these methods are discussed. The review further covers best practice for cable testing by using different methods of testing for such as frequency tuned resonance testing system in the frequency range of 20 – 300 Hz. Some recommendations are made to technical teams of utility companies as to the import of the OT and PD testing in order to avoid shortening of power cable life.

INTRODUCTION

Partial discharge (PD) diagnosis of power cables is addressed in the aspects of off-line test, on-line test, and sensors. The DP measurement methods are necessary to investigate these defects and their impact on the cable insulation. Different ways to suppress external noise is applied to detect signals with high sensitivity also in difficult on-site conditions (ElFaraskoury & Dessouky, 2015). The on-site testing of cable has to check the insulation condition after laying and assembly of cable system. Since power cables are subjected to electrical, mechanical, thermal and environmental

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