C.8.3.5.

Diagnostic method for water tree aging XLPE cable with residual charge measurement

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Abstract

We've paid attention "Residual charge method", as hopeful method for diagnosing non-bridged water tree deterioration of 22-66kV class XLPE cable. In this paper, we describe the mechanism of residual charge generation in water tree by using equivalent circuit. Next, we studied the difference between deterioration signal and error signal. And based on this result, we've advanced this method for applying onsite cable.

Keywords: XLPE cable, non-bridged water tree, insulation diagnosis, residual charge, relaxation time

Résumé: Nous avons considéré la "méthode de la charge résiduelle" comme une méthode prometteuse de diagnostic de la détérioration des câbles 22-66 kV par des arborescences électrochimiques n'assurant pas le pontage de l'isolant. Nous décrivons dans la communication, le mécanisme de la génération de la charge résiduelle latente dans l'arborescence en utilisant un circuit d'équivalence. Ensuite, nous étudions la différence entre le signal de détérioration et le signal d'erreur. Sur la base de ces résultats, nous avons perfectionné la méthode pour l'appliquer à des câbles installés.

Mots-clé

Câble XLPE, arbre d'eau sans pont, diagnostique d'isolation, charge résiduelle latente, temps de relaxation

1. Introduction

XLPE cable has the feature that construction and maintenance are easier than oil filled (OF) cable, and it is the mainstream of power cable in Japan. On the other hand, XLPE cable has then characteristic deterioration form called water tree, and insulation breakdown of aged XLPE cable, laid in watery environment, occurs frequently, which is caused by water tree.

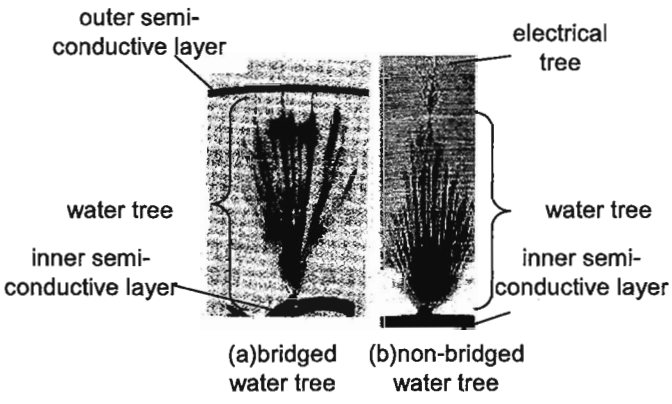

Fig.1 Shapes of water tree

In this paper, we pay attention to residual charge method as the effective technique of detecting water tree deterioration of 22-66kV XLPE cable, and we've advanced this method for putting in practical use as the deterioration diagnosis technique for on-site XLPE cable lines.

2. Water Tree Deterioration of 22-66kV Class XLPE Cable

In case of under 6.6kV class XLPE cable, it is known that the origin of insulation breakdown is water tree bridged between conductor and shield as shown in fig.1(a)(bridged water tree). It is easy to detect this