A.3.4. Développement d'une jonction temporaire de réparation pour câble 275 kV à isolation polyéthylène réticulée

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Résumé

Depuis quelque temps, l'utilisation du câble XLPE à tension de service connaît un essor rapide. En outre, dans la région métropolitaine, l'on est actuellement en train de construire une ligne de transmission souterraine avec câble croissant d'électricité dans la région. Dans le même temps, les exigences de stabilité de l'alimentation électrique sont devenues de plus en plus sévères. En particulier, si une panne venait à se produire dans une ligne de transmission interurbaine importante, cela aurait des conséquences considérables. Pour limiter les réparations, il est de toute première importance de réparer la ligne endommagée dans les plus brefs délais. C'est pourquoi nous avons mis au point un joint pour réparations d'urgence conçu pour un usage à court terme qui permet de disposer d'un câblage remonté en 2 jours contre les 10 jours nécessaires à l'heure actuelle pour monter le joint du type extrudé.

1. Introduction

XLPE cable, which requires no installation space for firefighting equipment or oil supply equipment and presents little possibility of environmental pollution, has recently come to be widely used in Japan in place of Oil-Filled cable, which uses oil for the cable’s electrical insulation. XLPE cable is presently being used on underground power transmission lines of up to 275 kV. To cope with the growth in the demand for electric power in urban areas during this century, underground XLPE cable power transmission lines dozens of kilometers long are being built. Such ultra-high-voltage power transmission trunk lines have assumed a very important role today. When a reliable power supply is demanded to support this mainstay of an information-oriented society, under these circumstances, in order to minimize the effect on the public of any accident which would damage the insulation on a power transmission line, an emergency repair joint has been developed which could be assembled in 2 days for phase. This report discusses the results of the development of these short-term-use repair joints, which replaces the extrusion-molded joint (EMJ), which now takes at least 10 days per phase to install.

2. Development specifications

In setting the development specifications, a primary condition was to restore service as quickly as possible: “must be able to repair and restore operation within 48 hours after the occurrence of a breakdown along a power transmission line.” The operating condition for this emergency repair joint is set to “provided for emergency response if the breakdown occurs in summer, when the amount of electric power used reaches its peak.” and it was decided to be satisfied by 3-month performance and then the insulation EMJ for permanent restoration. Based on these premises, the specific development specifications were set as shown in Table 1.

3. Development subjects

(1) Selection of insulation method

In order to develop a joint of simple structure that can be installed quickly and electrically withstand ultra-high voltages, various conceivable insulation methods were widely identified, and their electrical insulation performance, ease of installation, and difficulty of development were studied and experimentally evaluated as shown in Table 2.