NEW REPAIR METHOD FOR A 380KV-FLUIDFILLED CABLE, DAMAGED BY IMPACT

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ABSTRACT

Wien Energie Stromnetz established a forced cooling system for two 380kV-fluidfilled cables systems, each 12km long. During work to expose the cooling pipes by removing the backfill material, impact damage to one cable phase was reported. The normal industry accepted method of repair would be two new cable joints and some meters of replacement cable. Procedures for opening the corrugated aluminum cable sheath to check the screen papers, have been developed by PRYSMIAN after discussion with Wien Energie Stromnetz (former Wienstrom). This procedure of repair avoided among other things two joints and saved 75 % of the repair costs.

KEYWORDS

380kV-fluidfilled cable, impact, removing backfill material, corrugated aluminium sheath, screen papers, cable freezing, avoiding cable repair joints.

INTRODUCTION

In urban areas where the existence of EHV-cables network together with other utility installations requires great care to avoid damage to the cables. After three damage situations in thirty years from third parties, we were now in a situation to have one more (2,3). This time our own contractor under our guidelines caused impact damage on one phase near a cooling pipe. If the damage was left and not investigated by opening the cable sheath, it could take some time before the cable failed. How long before this occurs can vary considerably. Our contractor reported the impact and we had to organize the repair investigation, cable inspection and remedial work. Insurance repair cover is always a costly and risky business especially for directly employed contractors and premiums and excesses high especially in the case of any negligence.

Fig.1 Removing backfill material with wooden wedges

Fig. 2 Damage on a 380kV-Fluidfill cable

Cause and effect

During work to connect the originally installed water cooling pipes (these were originally only nitrogen filled to allow leak detection if damaged by 3 rd parties) to a new cooling station to allow the cable circuit to be water cooled and uprated. It was necessary to expose the cooling pipes by carefully removing the backfill material by using wooden wedges (1). The situation near the old reversal point of the cooling pipes was different to the as built drawing. The backfill material was different in hardness to that which would normally have been installed thirty years ago. It was therefore difficult to distinguish the contact between the wooden wedge backfill or cable.

Fig. 3 Corrugated Aluminium Sheath damage after removal of outer polythene sheath