BACKFILL REPLACEMENT SAVE UNDERGROUND TRANSMISSION LINES COST AND POSTPONE INVESTMENTS

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ABSTRACT

The underground transmission lines (UTL) with direct buried cables have been used widely in several parts of world since 1923. The self-contained oil filled (SCOF) cables has been used in these installation modes and the most of them still continues work. Nevertheless the needs of cable current increasing; the backfill replacement by advanced mix of stabilized materials can be considered instead of the cables replacement which were done in the near past. This word presents the development of a technology concerning the recovery of ampacity of transmission line with cable up rating by simply backfill replacement by new class of thermal stabilized backfill.

KEYWORDS

Cables, Underground, Ampacity, Backfill, Crushed Stones

INTRODUCTION

The origin of this work began in the extremely operational conditions of LT102 and LT148 of LIGHT SESA in Rio de Janeiro City long 4,7 km which are part of feeder ring of international airport as one can see in the figure 1.

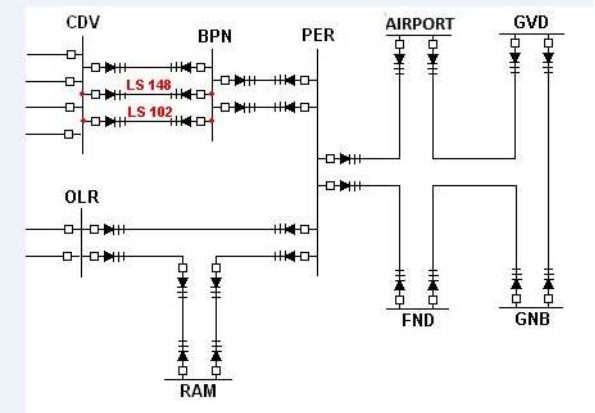

Figure1.

Feeder of International Airport

Two of circuits LT102 and LT148 made and installed in 1977 presented in early 90's show evidences of thermal runaway mainly due moisture migration concerned bad quality and workmanship of the backfill. Two circuit of 138 kV SCOF (Self Contained Oil Filled) cables 1000 mm² aluminum conductor, lead sheathed PE covered installed in trefoil formation (see fig 2) failed due thermal runaway.

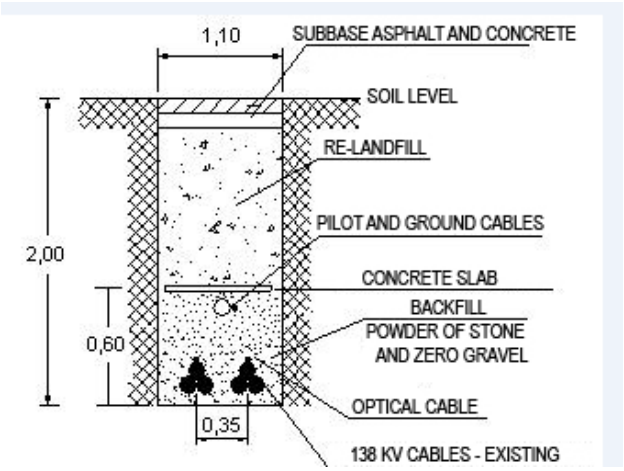

Figure 2
Cables trench

Many solutions were studied to overcome the problem including changing the cables, but the most economical solution elected were backfill replacement [1] only in the critical zone as shown in figure 3.

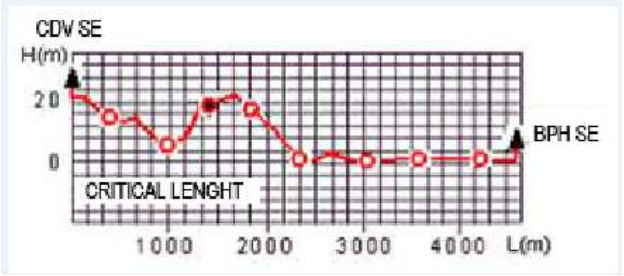

Figure 3
Critical length between Cordovil Braz de Pina substation

BACKFILL MATERIAL

The material should be a new class of stabilized backfill [2] called BI MODAL by resulting a blend of two size of crushed stones as one can see in the figure 4forward

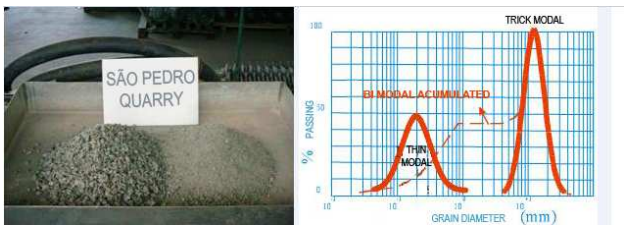

Figure 4
BI MODAL backfill material

This brings an ultimate solution as natural material for recovering cables ampacity.