

## Cable Joint to FFLP Cables for Provisional Repair with Quick Installation.

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### ABSTRACT

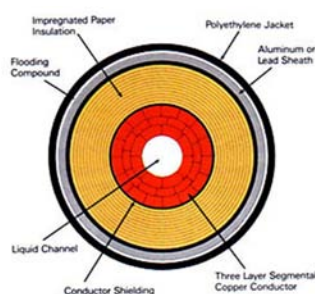
The use of FFLP cable "low pressure fluid filled" was discontinued during '90s in this country due to lack of technological development in cables and components and hard competition of XLPE cables among others manufacturers interests. Among other is, for example, the improvement of techniques to locate the oil leaks and to develop effective techniques to repair them. This work presents a development that allows to significantly reducing assembling time of 138kV FFLP strait joint: with elimination of lead welds to close the casing, pre-manufacture of paper notches, conductor connection made mechanically without pressing. Enabling assembly and reclose at least 6 hours. This development was carried out in a Brazilian Utility (LIGTH of Rio de Janeiro) as an alternative to improve the contingency of the southern zone of the city of Rio de Janeiro UG 138 KV grid.

### KEYWORDS

**Cables, Underground, Provisional Cable Joints, Materials, Maintenance**

### INTRODUCTION

The straight joint class 5 atm pressure for SCOF (Self Contained Oil Filled) cables applied in UG transmission lines are composed of the following elements: (1) to connector conducting material electrically and hydraulically connecting two sections of conductors; (2) An impregnated paper insulation which supports the specified voltage for underground transmission line; (3) a metal casing which contains the set (connector and insulating paper), and all the oil under pressure; (4) Lead alloy welds to seal the housing and others parts with the metal covering of the cables and finally a polyester reinforced material housing filled with asphalt that ensures the electrical insulation of housing against any earthing and seals the housing and isolated set against moisture penetration.



**FIGURE – 1**  
**CROSS SECTION OF SCOF CABLE**

The provisory joint repair, has the following innovations to meet the criteria of temporary repair: 1 connector applied tapping right on one side and to the left of another, eliminating the pressing operation in traditional joints; All housing welds described the present state of the art have been replaced by seals (provisional) of the O rings (toro rubber) and rubber cones (provisional) cable gaskets and finally the insulating papers will be previously cut, processed and applied on site, with significant assembly time savings.

### CABLE FAILURE ⇒ PROVISIONAL REPAIR

The Rio de Janeiro, in the south, is a city crammed between the Atlantic ocean and forests and mountains, protected by environmental laws and consequently cannot be cut.



**FIGURE – 2**  
**AERIAL VIEW OF SHOUTHERN OF RIO DE JANEIRO CITY**

Further to tourist area, this region is densely populated and the municipal authorities resist the construction of new civil works. The system 138 kV underground power supply is in electrical ring with a single power input and therefore must be protected against any loss of a circuit of this ring. This new electrical cable joint, quick mounting in solutions that are being developed to improve the reliability of power supply in the region.

The most common failure mode in underground transmission lines installed in large urban centers is the one caused by civil works from other concessionaires. Usually the mode is characterized by the cable lead sheath cut off with tear of some layers of paper, leading the cable to an electrical failure by short circuit.

The easiest way to fix the cable in this case is cable cutting with reconstruction of an straight joint of class voltage greater than the cable was failed. In this case most of the times require some gain of 25 centimeters for connection. This solution provides this gain with a convenient connector developed and splice has a longitudinal section as shown in figure 3.