

End of life of underground Medium Voltage cables on Pacific Islands

Blandine HENNUY (1), Sam PIOT (2)

1 Laborelec, Linkebeek, Belgium, blandise.hennuy@laborelec.com, sam.piot@laborelec.com

2 EDT (Electricité de Tahiti), Papeete, French Polynesia, sebastien.coulon@edt.pf

The failure rate of MV cables installed on one island of French Polynesia has dramatically increased during the last two years leading to frequent power interruptions. - Important to notice is that the cables who fail for a first time due to a internal fault, no longer seem to support the exploitation voltage for more than a few days or weeks after repair.

In order to assess the condition and determine the remaining life time of the cable network, EDT decided to measure all cables of the impacted island by means of non-destructive testing.

A visual examination of a piece of faulty cable revealed that the screen of the cable was completely corroded (figure 1) and at some locations only powder remained. The cable is affected for several meters whereas a longitudinal water tightness is part of the design. The cable screen is made from aluminium foil covered by a PVC outer sheath. This type of cable is used in some other countries, where they do not seem to be as severely affected by this phenomenon.

On-site measurement of the "screen" resistance was performed and it was concluded that the shield was no longer conductive (resistances higher than 2.5 k Ω were measured on several cables). Those degradations are impossible to be detected by "classical insulation measurements" as tan delta, insulation resistance, TEV or partial discharges.

The network was built in the 1980's and the screen is grounded at the joint locations which makes the measurement of the screen even more difficult. In some cases, the only indication is the reflectometry which indicates very high losses and sometimes it's even impossible to detect the end of the cable (see figure 2).

The measurements indicate that most of the cables suffer from the same kind of degradation and that the end of life of this type of cable in this environment could be reached. A few cables of the same type were measured on another island and the same phenomenon was detected on most of them.

A piece of cable will be analyzed in our laboratory within the following weeks in order to determine the exact root cause of such a degradation (salt water, damages on the outer sheath...) and it will be helpful to determine the type of replacement cable to be installed in order to avoid such failures in the future.



Figure 1: Damaged cable

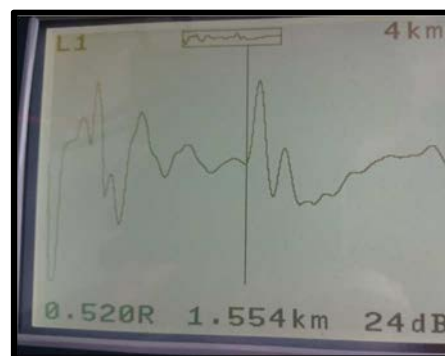


Figure 2: Reflectometry