

Achievement and experience in service of long length HV DC electrical links by insulated power cables

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Following the success of WETS 2007 which was focused on AC links, during WETS 2011 the discussion was enlarged to the topic of DC, with a review of the achievements and experience associated with the widespread deployment of HV and EHV DC insulated power cable systems.

This presentation is based therefore on the outcomes of WETS 2011.

After a short introduction on the relation between converter topologies and cable types, the presentation illustrates the state of the art of DC cables technologies (for long length, Mass Impregnated and Extruded) and gives a comparison of the relevant design parameters and performances.

The comparison will conduct to an overview of the different service experience of different technologies (500 kV for MI cables against 200 kV for XLPE cables), will discuss about voltage and current limits, and will introduce the possible future scenarios, detailing some of the ongoing projects.

Part of the presentation will be about some “collateral challenges” related to long HVDC connections, like installation in deep waters, need for joints capable to connect cables from different manufacturers and – possibly – with different technologies, increased used of DC insulated cables for underground connections, possibility to use an existing AC link in DC and vice versa, etc.

Presentation will include few highlights on the activities within Cigré and IEC in the field of HVDC cables, including the reference to recently completed Technical Brochure TB 496 and the introduction to ongoing works.

Conclusion will be about the role that Jicable and WETS may have to make cable technology successfully matching the evolving requirements of modern HVDC land and submarine power systems.

Marco Marelli

Biography



Marco Marelli was born in Lecco, Italy, in 1969. He received his Degree in Electrical Engineering from the Polytechnic of Milano in 1997 and shortly after, in 1998, joined Prysmian (at that time called Pirelli), one of the leading companies in cable manufacturing.

Initially system designer for High Voltage cables, Marco then become responsible for HV Cable System Engineering dealing with the firsts long extruded 400 kV AC underground systems installed in Europe and Middle East. Shortly after, he's been involved in HVDC projects and worked on the design of the first 200 kV DC extruded cable ever installed and of the challenging 500 kV DC cable system called SAPEI and installed at 1650 m water depth.

He's currently Engineering Manager for HV/EHV and Submarine Cable Systems in Prysmian PowerLink, with responsibilities on both AC and DC cable systems. In his current position he's engaged in all major submarine projects including the HVDC projects in the German North Sea, the challenging interconnections in the Mediterranean Sea and the 600 kV Western HVDC Link. He is past Italian Member of CIGRE Study Committee B1 and currently Convener of B1 PAG; in the CIGRÉ General Session 2012 he acted as Special Reporter for SC B1. His work within CIGRÉ has been recognized with the "TC Award" in 2010 and the "Distinguished Member Award" in 2012. In Italy, he's member of AEIT, part of the board of AEE and Member of the Presidential Council of CIGRÉ NC.

He's author of several papers and publications on a wide range of subjects in the field of cable systems.