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Critical issues for the HV & EHV XLPE cables of today and tomorrow

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Crosslinked polyethylene (XLPE) has a long track record for use in power cable applications. XLPE is now being used as the insulation system of first choice for a large number of High Voltage (HV) and Extra High Voltage (EHV) cable systems [1]. These systems are in commercial operation and the cables display very high levels of reliability.

At the present time there are some clear trends

major projects with EHV XLPE (Abu Dhabi, Barcellona, Berlin, Copenhagen, Dachaoshan [China], Dublin, Mystic [USA], Seoul, Singapore) cables are being successfully installed [2 – 11]

high electrical stresses are being used enabling XLPE cables to match the dimensions of paper insulated cables - Warwick 132 kV [3], Consolidated Edison 345 kV [4]

innovative moisture barriers being used to facilitate easy installation - foil sheath with robust HDPE jackets

significant improvements in quality continue to be made [13]

the amount of XLPE Transmission cable is increasing rapidly

The reliability of cable systems depends on a number of attributes, which include correct design procedures, care in cable manufacturing and use of high quality XLPE compounds. This contribution will examine the advances that have been made with XLPE Transmission Cables (above) and examine how we might solve the challenges that stand in front of us.

In the future the challenges are likely to include

reduced size - the space available for the installation of cables is always at a premium, therefore there is a growing need to fit cables into smaller spaces, thus ever higher electrical stresses are required [13].

increased outputs - as the need for XLPE power cables continues to increase supplying the requirements of utilities will become a great challenge

increased lengths - lower installation costs & improved system reliability. The changes in cable design require different performances from traditional components within the cable. This will affect both the material technology and the test protocols that are employed.

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