JICABLE'07
Rapporteur's Session Report

A.10 SESSION : TESTING METHODS (2)

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This session, which included six papers, was dedicated to cable testing methods.

Paper A.10.1 dealt in detail with various analytical methods that can be used in order to determine the amount of by-products present in XLPE after production and degassing of the cable. These by-products have to be removed or at least reduced when some of them remain. For example, Methane has to be removed since it may give rise to unexpected explosions during jointing and service failure due to the possible increase of methane pressure. In order to have a detailed understanding of the different by-products, a combination of several analytical tools is needed. Based on this knowledge and in the case of a specific cable, the authors suggested that a single analysis (TGA for instance) can be used as a quality control tool of degassing.

Paper A.10.2 described the results of an experimental investigation which proposes an alternative test procedure to reveal insulation weaknesses in polymeric HVDC cables before being installed. The recommended AC testing may not be the most relevant procedure for HVDC cables and it is also very expensive in case of long cables. The authors proposed to put the HVDC cable under DC voltage and then to ground one end rapidly. In case of long length cable, their method can possibly induce polarity reversal and then enables to reveal insulation defect which could give rise to breakdown. Moreover, it was shown that severity of the test could be fixed by controlling the voltage reduction rate during grounding (kV / ns).

Measurement of the cable conductor temperature is necessary for heat cycle voltage tests, which is so uneasy! The authors of paper A.10.3 have proposed a new method to install thermocouples on the reference cable conductor which could bring out good operational results during their tests. They also suggested that IEC 60840 should take their results into account in annex A.

Paper A.10.4 dealt with after installation testing of EHV extruded cables. The requirements are fixed and described in detail in IEC standards : sinusoidal waveform, 20 to 300 Hz, 1 hour, … The authors showed existing equipments for on-site testing and they think that PD measurement at each accessory could provide best test efficiency for long length EHV links even though it is not required by the standard at this time.

Paper A.10.5 described resonant test systems for long length cables with variable frequency (ACRF) for factory and on-site tests, in which the design and the limitations of the test equipment were discussed in detail. The test system could be operated at the lower frequency permitted by the IEC standard, i.e. 20 Hz, in order to minimize the required testing power. It is also emphasized that their testing systems are also suited for AC testing of very long DC links.

The type test procedure of coaxial MV HTS cable was described by the authors of paper A.10.6. All components of the link were put under a test sequence based on the different applicable standards for testing : cable, splices and terminations. The authors pointed out the cost of the testing procedure of this cold dielectric design, which needs a complete system such as cable, terminations and a cooling system in order to realize HV tests.