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JICABLE'07
Rapporteur's Session Report

B.9 SESSION : DESIGN (2)

Chairman : R. ROSEVEAR, Southampton Dielectric Consultant (UK)
Rapporteur : C. MOREAU, EDF R&D, France

Session B.9 was dedicated to various considerations in relation with cable system design. Important work is still carried out to optimise design of cable systems.

Paper B.9.1 showed a methodology developed to calculate the inception voltage of partial discharges in regard with the electrical design of the cable system and calibrated for different type of defects. The authors estimate the maximum allowable size of a potential defect for a considered design and compared the results to their experience. In the conclusion, they confirm the effectiveness of IEC clauses regarding the range of type approval.

Paper B.9.2 is focussed on the dielectric properties of XLPE material, especially when submitted to DC electrical stress. The more complex of the 3 models developed by the authors represents the cylindrical geometry of a power cable. Models in a planar geometry give a good representation of space charge profiles whereas the cylindrical geometry requires further investigations.

Although a lot of studies and solutions have been produced in this field, water ingress is still one of the causes of cable or accessory insulation failure. This point is emphasized by the increasing use of thin laminated aluminium sheaths. Paper B.9.3 presented the recent improvements reached in super-absorbent water blocking materials, especially concerning long term and thermal stability. Both radial and longitudinal water blocking aspects were concerned.

Fast commutation used in modern power electronic converters produces high voltage transients that creates HF currents propagating through the connected cable. A HF model of cable is necessary to produce accurate transient calculations and to estimate transient currents and voltages that may be observed at the load or at the network connections. Paper B.9.4 shows 2 cable model developments (and experimental validations) dedicated to be implemented in SPICE software. A good accuracy between calculation and measurement can be reached and it allows the study of solutions to reduce overvoltages.

Paper B.9.5 discussed the measurement method of longitudinal induction voltage of telecommunication cables located in parallel with power lines. A new test method not requiring "heavy" test equipment is presented and may be used during commissioning tests.

The importance of having a good estimation of cable parameters and especially underground link impedances is also underlined in paper B.9.6. In that case inaccurate values can lead to inappropriate tripping of distance protections. Authors recommended the use of on-site parameter measurements instead of calculations. Accurate calculations are requiring reliable access to many parameters although measurements are now relatively simple.