Analysis of electric field distribution in XLPE insulation of DC submarine cable

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With the continuous development and expansion of the power system, DC transmission technology attracted renewed attention with its advantages long-distance power transmission capacity and flexible power system interconnection.

Temperature field distribution of DC submarine XLPE cables operating at rated load, overload and under-load were simulated by using ANSYS finite element software in this paper. Based on the simulation results and conductivity measurement under different temperature by test, properties of electric field distribution in insulation material (XLPE) of the cable are got, The results show that the maximum electric field strength generally appears in the outer insulation when at full load and overload, while appears in the vicinity of the core of conduct wire when at no-load, the maximum value can reach 100 kV/mm.

Key words: DC XLPE submarine cable ; temperature field ; conductivity ; insulation resistance; electric field distribution

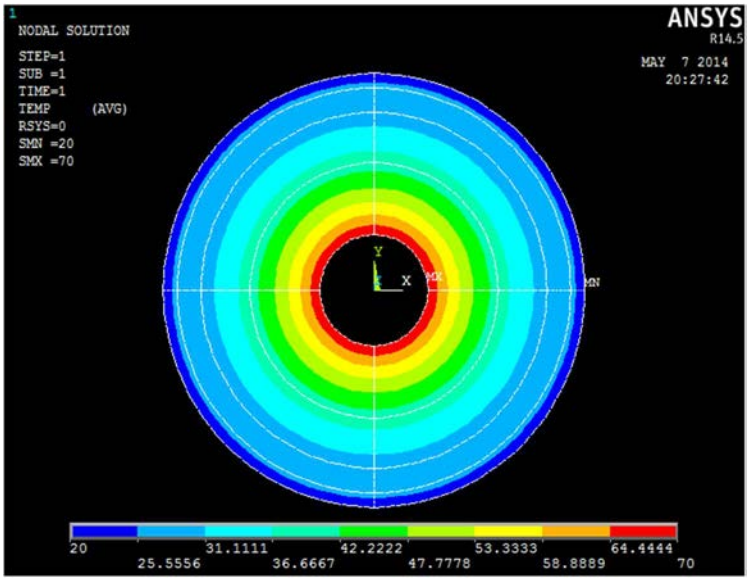

Fig.1 Temperature field of XLPE at rated load