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Protection of Transformers Against Surge Voltage

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Abstract : Surge voltage arises in the system either by switching operations of heavy load or by natural lightning. Surge voltages cause significant failure of power system equipment if adequate protection is not provided. A Surge Arrester is a device connected to a power system to protect the equipment against surge voltages. To protect the transformers against surge voltages, metal oxide surge arresters (MOSA) are connected across each terminal. Basic Insulation Level (BIL) has been defined in national and international standards of transformers based on their voltage rating. While designing transformer insulation, the BIL of the transformer, Surge arrester ratings and its operating voltage have to be considered. However, the performance of transformer insulation largely depends on the ratings of the surge arrester connected, the location of the surge arrester, the margin considered in the insulation design, the quantity of surge voltage strike, etc. This paper demonstrates the role of Surge arresters in the protection of transformers against over-voltage, transformer insulation design, optimum location of surge arresters and their connection lead length, Insulation coordination for transformer, protection margin in BIL and methods of protection of transformers against surge voltages, in detail.

Keywords : surge voltage, surge arresters, insulation coordination, protection margin
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