

Development of a portable type I to III lightning surge protective device for compact structures

ABSTRACT

Lightning Surge protection of large structures is done under zonal concept due to the requirement of a system with high current handling capacity and low voltage protection level. Induction of transient voltage in the wiring system within the building is another reason for such. However, in the case of compact structures such as base transmission stations (BTS) of tower sites, outside broadcast vehicles (OBV), various stages of railway systems etc. there are no sufficient lengths in the wiring network for implementing SPDs in such zonal-segment scenario. Also due to the remoteness of most BTSs and need for regular and/or continuous usage of OBVs and railway systems, the time-consuming replacement of out-of-order fixed SPDs is most often not warranted. In this backdrop, it was proposed to develop a portable/pluggable system of coordinated SPDs with high current handling capacity and low voltage protection level. A compact SPD system that is capable of handling high currents (50 kA) with low let through voltage (1 kV) was designed using PSCAD and a thorough market research was conducted to identify products that satisfied the requirements of the system designed in PSCAD. Type I and III SPDs capable of handling 50 kA and 2.5 kA respectively, were identified and used for the hardware implementation of the system. Elimination of the type II SPD made the design more compact and better suited for applications at space-restricted locations.

Keyword: Coordinated surge protective device; Compact structure surge protection; Type I to type III surge protective device