Minimum separation between lightning protection system and non-integrated metallic structures

ABSTRACT

In the event of a direct lightning strike to a protected building which is integrated with an electrical or electronic system installed on the roof such as roof-top PV system, dangerous arcing may occur between the external lightning protection system (LPS) and the conductive components of the electrical system. To prevent such side flashes, a minimum separation distance between the metallic components and the air termination system is required. Even though, IEC62305-3 Standard provides a formula to specify the necessary separation distance, so far there is no extensive study that has been done to evaluate the suitability of the application of equation to calculate the separation distance, specifically to the safety of electrical systems integrated into the roof top of building. In this study, a new computational method has been developed for calculation of the separation distance between an LPS and metallic components on the roof. In the proposed method which is based on the theoretical background of the IEC62305-3 Standard formula, the break down behavior of the gap geometry between the LPS and the metallic components for the applied voltage across the gap is analyzed. PSCAD software was used to model the LPS and the lightning strokes.