

## **Modelling of lightning current in the case of striking to a tall structure**

### **ABSTRACT**

Lightning current is an important parameter that has to be considered. The different behaviour of lightning current depends on the way the lightning strikes either as a direct or indirect lightning strike. In this paper the modelling of the current as a result of a direct strike of lightning on a tall structure is considered. A few of up-to-date on current models, current functions, reflection factors, the return stroke velocity (RSV), the general equation representation of this case are reviewed. Also, through MATLAB software, the results of a case study are generated. The results show a good agreement with the measured values. In addition, the behaviour of the lightning current is evaluated at different heights of the lightning channel with respect to the top and bottom of a tall structure. Also, the lightning current at the top and bottom of the tall structure are observed for different values of the reflection factor. The results show that the peak of the lightning current along different heights of the channel with respect to the top and bottom of a tall structure decreases with increasing height of the channel. Also there is a time delay during the initial time period. Furthermore, the lightning current at the bottom of a tall structure has a high value of peak current and has an attenuation wave shape of current that compares with the lightning current at the top of the tall structure. As a result, this paper may provide benefit in evaluating the electromagnetic (EM) field since the behaviour of the lightning current on a tall structure is known.

**Keyword:** Lightning current; Tall structure; Engineering model; Current function; RSV