

SENSITIVITY ANALYSIS OF LIGHTNING RETURN STROKE CURRENTS IN CASE OF DIRECT HITS TO ELEVATED OBJECTS

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Abstract

This paper deals with the spatial-temporal current distribution along elevated objects struck by lightning. Currents measured on elevated objects may present distortions associated with differences between the impedances of the lightning channel, the strike object and the grounding system. In other words, the current along such objects may, in some circumstances, depend significantly on many parameters and differ substantially from the current that flows along the lightning channel. These currents are called "contaminated" by the reflections at the top and at the base of the strike object. The main objective of this paper is to evaluate the sensitivity of the "current contamination" process with respect to the object parameters and to the soil and lightning channel characteristics, as well as to compare currents along strike objects with those that would be obtained in the case of strikes to flat ground.

Index Terms: Elevated Strike Objects, Lightning, Lightning Return Stroke Current, Reflections, Transients.