

Design and Construction of an Impulse Current Generator for Lightning Strike Experiments

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Abstract : There has been a rising trend in using impulse current generators to investigate the lightning strike protection of materials including aluminum and composites in structures such as wind turbine blade and aircraft body. The focus of this research is to present a new impulse current generator built in the High Voltage Lab at Mississippi State University. The generator is capable of producing component A and D of the natural lightning discharges in accordance with the Society of Automotive Engineers (SAE) standard, which is widely used in the aerospace industry. The generator can supply lightning impulse energy up to 400 kJ with the capability of producing impulse currents with magnitudes greater than 200 kA. The electrical circuit and physical components of an improved impulse current generator are described and several lightning strike waveforms with different amplitudes is presented for comparing with the standard waveform. The results of this study contribute to the fundamental understanding the functionality of the impulse current generators and present a new impulse current generator developed at the High Voltage Lab of Mississippi State University.

Keywords : impulse current generator, lightning, society of automotive engineers, capacitor

Conference Title : ICHVE 2021 : International Conference on High Voltage Engineering

Conference Location : London, United Kingdom

Conference Dates : November 18-19, 2021