

## ABSTRACT

### **SIMULATION OF OVERVOLTAGE DUE TO LIGHTNING STRIKES TO THE DETERMINATION OF THE MAXIMUM DISTANCE FOR THE EQUIPMENT PROTECTION IN SUBSTATIONS**

By

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Electrical energy is an important factor for sustaining life and community activities. In the process of distribution of electrical energy from substations to consumers is often have a obstacle. The one of obstacle of the transmission lines and the distribution caused by lightning strikes occurring in the power system. Lightning strikes that occur in substations will cause a large increase overvoltage at the equipment in the substation.

To determine the placement of arrester done by calculations and next doing overvoltage simulation of lightning strike using software *Alternative Transients Program* (ATP). Simulations doing by varying the flow of lightning striking and different front time of lightning also a safe maximum distance of arrester and transformer. The analysis was performed by a comparison of the two lightning front time also the lightning current variation.

From the simulation results and analysis showing that the lightning front time variation causing a voltage change which the voltage at the front time of  $1.2 \mu\text{s}$  is higher than the voltage at the front time of  $2 \mu\text{s}$ , this is because the time to reach the top will faster with a little lightning front time. Besides that, getting the result comparison of the voltage change before and after going through arrester. On the results of this study arrester and transformer maximum distance suggested is 29,4 m.

**Keywords:** arrester, *alternative transients program* (ATP), substation, lightning.