

# Study on Simulation Experiment on Impulse Characteristics of Grounding Devices In the Freeze-thaw Soil

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In seasonally frozen soil areas, the soil which at the surface and under a certain depth of ground undergoes a periodic freezing and melting process during the period of winter and spring. The impulse characteristics of grounding devices is closely related to the soil which is around, in comparison of common soil, studies on the impulse characteristics of grounding devices in freeze-thaw soil is really few. As the seasonal characteristic of frozen soil, the depth of frozen layer changes with environment temperature which affects the soil conductivity and causes the relative changes of impulse characteristic of grounding device in it. Meanwhile, with the expansion of human activities and the regional power grid interconnection, the increasing number of transmission lines and power distribution stations set up in the freeze-thaw areas is inevitable. Therefore, considering the lightning protection of transmission engineering, it's necessary to take some research into the impulse characteristic of grounding device which buried in freeze-thaw soil. In order to get the impulse characteristic of grounding device and considering easy-controlling of each testing variables, this paper based on dimensional similarity principle and using of the impulsive  $8/20\mu\text{s}$  current source produced by ICGS impulsive current generator in high voltage laboratory in Chongqing university. The simulative test of the impulse characteristic of grounding device depend on the changes of freeze-thaw soil layer is designed. Taking the simple grounding device for example, the impulsive resistance of grounding device and ground potential is measured when buried in different depth of freeze-thaw soil. The relative principle can be got from the test results which can be explained combined with conducting principle of soil. The conclusion is helpful to know and evaluate the characteristics of grounding device in freeze-thaw soil under ice and snow conditions and to guide the grounding design of transmission lines and substations under lightning condition.