

## **Study on the icing mechanism of bundle conductors considering surface roughness**

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### **ABSTRACT**

The freezing of supercooled water droplets upon impact with the surface of conductors leads to ice accretion, resulting in an increase of the load on conductors and threatening the safe operation of transmission lines. To mitigate ice disasters on transmission lines, it is essential to study the icing mechanism of bundle conductors. In this paper, a three-dimensional airflow model of bundle conductors considering surface roughness was established. The influence of surface roughness on the collision coefficient of four-bundle conductors is studied, and the impact of parameters, such as the median volume diameter of the droplet and temperature on the icing weight of bundle conductors, are discussed. The results indicate that the surface roughness has an impact on the collision coefficient. Under the same environmental conditions, the collision coefficient of stranded conductors is lower than that of smooth circular conductors. Therefore, to accurately calculate ice accretion on conductors, it is necessary to consider the influence of surface roughness. The relative positions between the bundle conductors affect the ice weight on the subconductors. Additionally, the ice weight on the conductors increases with the number of subconductors. However, the growth trend of the ice weight varies for different parameters.

### **REFERENCES**

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