

国家重点基础研究项目

大气参数对导线交流起晕电压的影响及校正

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摘要:

高海拔线路走廊的环境温度、气压及湿度变化较大,这对导线的电晕特性会产生一定的影响,目前关于这些大气参数综合作用下的导线电晕特性研究较少。在大型人工气候室改变气温、湿度及气压,对4种直径的光滑导线模型进行了交流电晕试验。结果表明:在气压与绝对湿度一定的情况下,单纯改变气温对起晕电压的影响很小;气压对起晕电压的影响随绝对湿度的增加而减小;在低湿度区,起晕电压随绝对湿度的增加缓慢上升,在高湿度区则会下降。模型计算结果与试验值在低湿度区吻合较好,但在高湿度区偏差较大。指出现有模型未考虑高湿度下导线表面的凝露是导致计算结果与试验结果误差较大的原因,得出了考虑不同导线直径、气压、湿度影响的起晕电压计算公式与预测方法。

关键词:

Effect of Atmospheric Factors on AC Corona Inception Voltage of Conductors and Its Correction

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Abstract:

Variation of air temperature, pressure and humidity along the line corridor in high altitude area will affect the corona characteristics of conductors. However, the research on comprehensive effects of these atmospheric factors is rare. Therefore, AC corona discharge experiments on four kinds of smooth conductors with different diameter are performed in large-scale artificial climate chamber where air temperature, pressure and humidity can be adjusted. Experimental results indicate that the effect of variation of air temperature on corona inception voltage is not obvious when air pressure and absolute humidity keep constant. With the increase of absolute humidity, the effect of air pressure on corona inception voltage will reduce, shows such features that in region of low humidity, corona inception voltage increases slowly with the increase of absolute humidity, and good accordance is achieved between the measured and calculated results, while in region of high humidity, corona inception voltage decreases, and the difference between the measured and calculated results is big due to condensation on conductor, which distorts the surface electric field of conductors. Besides, The calculation formula and predicting method for corona inception voltage are presented, with conductor diameter, air pressure and humidity considered.

Keywords:

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