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Assessment of dynamic behavior of ice-shedding jump of conductor with numerical analysis

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ABSTRACT

To investigate the dynamic behavior of the ice-shedding jump of transmission line in heavy icing area is significant for the ice-resistance electrical and structural design. In order to investigate the characteristics of interphase gap of compact transmission lines, a typical 500kV three-phase compact transmission line under ice-shedding jump was analyzed as prototype by finite element method in this paper. The numerical results show that the minimum interphase gap usually occurs near to the interphase-spacers due to the interaction between the phases conductors with interphase-spacers, which is different from the previous studies focused on the mid-span of conductor. In the condition of ice-shedding at lower phase conductor, the interphase-spacers will increase the gap between upper phase and ground wire; however, it is decreased on the upper and lower phase, even if the original purpose of interphase-spacers is to prevent the ice-galloping. Furthermore, the phase conductor with V-type insulator shows a higher jump than the tension insulator. Finally, an optimized distribution of interphase-spacers for the prototype is proposed, which can increase the interphase gap by about 20% compare to the original design.

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