

## Effects of Bolt Connection Loosening on the Mechanical Behavior of Angle-steel Transmission Tower

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### ABSTRACT

Bolt connections are widely used in a transmission tower for assembling members together. Bolts are easy to be loosened due to reciprocating actions, e.g., the wind fluctuation. The resultant changes in the mechanical behavior of bolt connections make adverse effects on the stability of tower subjected to extreme events. The research investigates the influence of bolt loosening on transmission tower, from the perspectives of joints, segments and the structure system in turn, using numerical simulations. Concerning different degrees of looseness, solid-element joint models are established first, with which a mixed-element modeling is accomplished for the tower segment and structure system (Fig. 1). The quasi-static loading results indicate that bolt loosening significantly weakens the stiffness of joints; the performance of tower segment remains constant within a certain range of loose degree; the loosening of splice joints of main members makes critical impacts on the overall bearing capacity of tower.

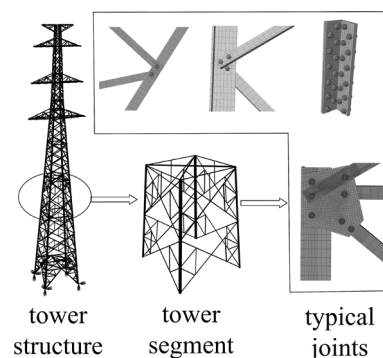


Fig. 1 Mixed-element modeling for angle-steel transmission tower

### REFERENCES

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