

# Wind Tunnel Test on Load Transferring Mechanism in Transmission Tower-wire Coupling System

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**ABSTRACT:** To clarify the wind load transferring mechanism of tower-wire coupling system, a wind tunnel test on a four-span tower-line system model was carried out with the prototype in the Huainan-Shanghai 1 000 kV ultra high voltage (UHV) electric power transmission project. An aero-elastic model of the double circuit tower and eight-bundled conductors coupling system was designed. Besides the measurement of acceleration and displacement, Fiber Bragg grating sensors were used to measure the dynamic strain of the conductors, insulators and tower main members. It is found from the analysis that the dynamic characteristics of power transmission tower-line system under wind load are greatly influenced by the tower-conductor coupling effects. As wind speed goes up, the contribution of higher order vibration modes of the conductors to the total energy of the system increases as well.

**KEY WORDS:** transmission lines; coupling effects; dynamic strain; fiber Bragg grating sensor; wind tunnel test; wind load transferring mechanism