

## Characteristics of unsteady aerodynamic forces on oscillating square prism

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Considering the current trends of lightness and slenderness of tall building, the possibilities of occurrence of instability vibration are increasing, and it has been one of the important issues which should be taken into consideration in many slender and tall building projects. In the present study, the characteristics of the unsteady aerodynamic forces on slender oscillating model with aspect ratio of 9 were investigated using free vibration method by comparing with those on the stationary model. Results show that large and clear differences between stationary and oscillating models were found in across-wind direction. The generalized fluctuating coefficients of the oscillating model are larger than that of the stationary model, and the largest value was shown near the resonant wind speed. And in the lock-in excitation, peak of the Strouhal component and peak of the natural frequency component were observed, which is consistent to the results from forced vibration method. From the pressure coefficients, the cross-correlations of side surface become small and the time lag differences become larger with increasing wind speed.

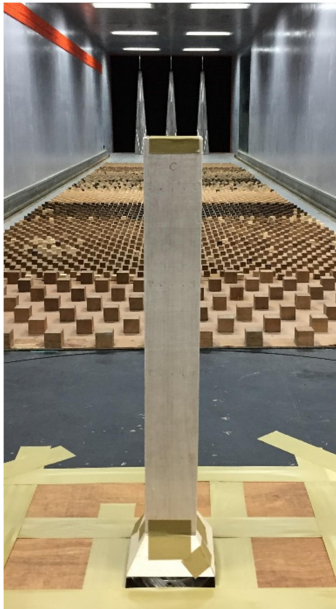


Figure 1. Setting of model.

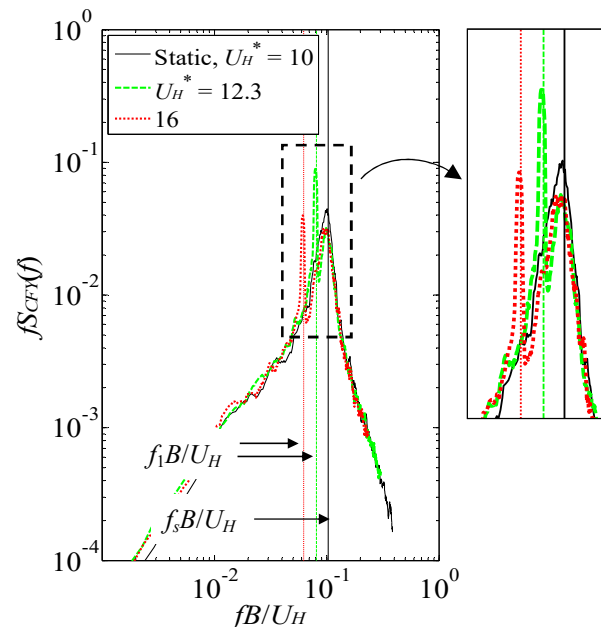


Figure 2. Power spectra of the generalized force.