

## Vortex-induced vibration characteristics and elimination countermeasure of a closed-box bridge

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### ABSTRACT

The vortex-induced vibration characteristics of a closed-box bridge are investigated by field measurement and wind tunnel test. The result indicates that there are three different VIV modes of this bridge, which are the third-order symmetric vertical bending vibration with a frequency of 0.368hz, the second-order symmetric vertical bending vibration with a frequency of 0.225hz and the second-order antisymmetric vertical bending vibration with a frequency of 0.275hz. The first VIV is caused by the joint effect of the external maintenance vehicle tracks and temporary roadblocks. The second and third VIVs are caused by the reduction of structural damping ratio after a long period of vibration. The installation of wooden deflectors on the top of the railings can effectively suppress the VIV, which is selected as the temporary elimination countermeasure owing to convenience in fabrication and installation. Moving the external maintenance vehicle tracks inwards can eliminate VIVs, which can be used as permanent solutions.

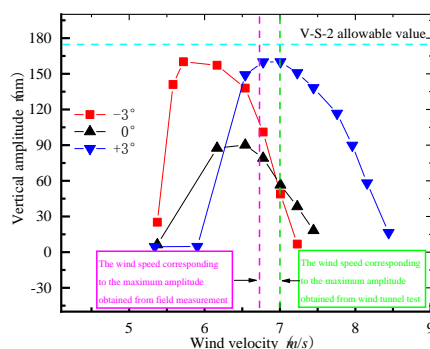


Fig. 1 VIV amplitude obtained from field measurement and wind tunnel test

### REFERENCES

Ma, C. M., Wang, J. X., Li, Q. S., et al. 2018. "Vortex-Induced Vibration Performance and Suppression Mechanism for a Long Suspension Bridge with Wide Twin-Box Girder." *J. Struct. Eng.* **144**(11): 04018202. DOI: 10.1061/(ASCE)ST.1943-541X.0002198.

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