

## **Multi-mode vortex-induced vibration and its suppression of long-span suspension bridges**

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Vortex-induced vibration is a kind of fluid-structure interaction. It may occur at relatively low wind velocity, and is therefore an important design concern for bridges. In 2020, three major suspension bridges in China experienced severe vortex-induced vibrations, which attracted public concern. Suspension bridges have closely-spaced vertical vibration modes, and each mode may develop VIV in turn with increase of wind velocity. The evolution of VIV amplitude of each mode needs to be quantified, as higher mode tends to give rise large acceleration. In this talk, we discuss the modelling and prediction of VIV amplitude of vertical modes of suspension bridges both from numerical and experimental aspects. A new multi-supported aeroelastic model is proposed to reproduce the closely-spaced mode of suspension bridges and to predict the VIV amplitude as well. Moreover, the suppression of multi-mode VIV will also be addressed.

### **Bio-sketch of Xugang Hua**



Xugang Hua received a Ph.D in Civil and Structural Engineering from Hong Kong Polytechnic University, a M.Eng and a B.Eng in Civil Engineering from Central South University. He is currently a Professor of College of Civil Engineering, Hunan University and directs the Key Laboratory for Wind and Bridge Engineering in Hunan Province, China. He was awarded the National Science Fund for Distinguished Young Scholars in 2020 and the National Outstanding Youth Science Fund in 2014. He is a member of ASCE. He has published over 100 journal articles, 2 technical monographs and 6 patents and edited 2 standards. His research interests include wind-induced vibration and vibration suppression of bridges, structural health monitoring and condition assessment of bridges and structural dynamics of bottom-fixed and floating offshore wind turbines.