

Study On Influence Mechanism Of Vibration Comfort Of Large-Span Corridor Considering Tower Stiffness

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The large-span corridors have the characteristics of low stiffness, low natural frequency and low damping, which lead to the comfort issue of structural vibration caused by the pedestrian loads. The boundary conditions of the corridor models are fixed joints by ignoring the influence of tower vibration in most of the existing research works. However, the corridor comfort is affected by the vibration characteristics and responses of towers because the towers are not an absolute rigid body, while there is a large deviation between the designed corridor comfort and the actual scenario without considering the tower stiffness. The influence mechanism of vibration comfort of large-span corridor considering tower stiffness is studied in the paper. The vertical acceleration and vibration characteristics of corridor under different tower stiffnesses are studied, in which the various pedestrian loads and connection forms are considered. And the influence mechanism of tower stiffness on the corridor comfort is revealed then. Furthermore, the variations of the normalized acceleration of corridor with the ratio of tower-corridor stiffness are analyzed, and the principle for considering the tower stiffness or not in corridor comfort analysis is given. Finally, such influence mechanism of tower stiffness on the corridor comfort evaluation is verified by an real world engineering project.