

Tuned Mass Damper Effects of Stationary People on Structural Damping of Footbridge Due to Dynamic Interaction in Vertical Motion

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Abstract : It is known that stationary human occupants act as dynamic mass-spring-damper systems and can change the modal properties of civil engineering structures. This paper describes the full scale measurement to explain the tuned mass damper effects of stationary people on structural damping of footbridge with center span length of 33 m. A human body can be represented by a lumped system consisting of masses, springs, and dashpots. Complex eigenvalue calculation is also conducted by using ISO5982:1981 human model (two degree of freedom system). Based on experimental and analytical results for the footbridge with the stationary people in the standing position, it is demonstrated that stationary people behave as a tuned mass damper and that ISO5982:1981 human model can explain the structural damping characteristics measured in the field.

Keywords : dynamic interaction, footbridge, stationary people, structural damping

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