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Vibration control of footbridges

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Abstract

Longer spans of new footbridges and aesthetic requirements for greater slenderness are resulting in footbridge structures prone to vibrations. Stiffness and mass have decreased which has lead to increased sensitivity to dynamic loadings.

Although the problem of vibration is already elaborated time ago, in the last few years there had been several bridges that experienced excessive sway motions caused by pedestrians. One of the most elaborated is infamous Millennium Bridge in London as the prime example of the vibration serviceability problem of footbridges. Although designed by world famous designers (Foster & Arup), Millennium was designed as a bridge with little or no damping capacity. There are many solutions to this and similar vibration problem, but most effective is to increase damping by installing a various types of damping systems.

This paper gives a brief classification and presentation of damping measures and devices usually used in footbridges. Vibration control is explained through most famous cases of footbridges that experienced this type of serviceability problem.

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