

## Human Walking Vertical Force and Vertical Vibration of Pedestrian Bridge Induced by Its Higher Components

**Authors :** Masahiro Yoneda

**Abstract :** The purpose of this study is to identify human walking vertical force by using FFT power spectrum density from the experimental acceleration data of the human body. An experiment on human walking is carried out on a stationary floor especially paying attention to higher components of dynamic vertical walking force. Based on measured acceleration data of the human lumbar part, not only in-phase component with frequency of 2 fw, 3 fw, but also in-opposite-phase component with frequency of 0.5 fw, 1.5 fw, 2.5 fw where fw is the walking rate is observed. The vertical vibration of pedestrian bridge induced by higher components of human walking vertical force is also discussed in this paper. A full scale measurement for the existing pedestrian bridge with center span length of 33 m is carried out focusing on the resonance phenomenon due to higher components of human walking vertical force. Dynamic response characteristics excited by these vertical higher components of human walking are revealed from the dynamic design viewpoint of pedestrian bridge.

**Keywords :** simplified method, human walking vertical force, higher component, pedestrian bridge vibration

**Conference Title :** ICCAE 2015 : International Conference on Civil Society and Architectural Engineering

**Conference Location :** Singapore, Singapore

**Conference Dates :** September 10-11, 2015