

Earthquake Response Analysis of Buildings by the IT Strong Motion Seismometer System: for the Structural Health Monitoring

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The earthquake-proof performance of building structures decreases from damages by natural disaster such as earthquakes and typhoons, or from the aging deterioration after the completion. Structural health monitoring is used to detect these damage and deterioration, and to look after whether to have recovered up to which extent by the reinforcement.

There is a building vibration observation in one of the means of structural health monitoring. In past research, there are many study examples using microtremor observation carried out in the silent environment without the earthquake but there are not so many study examples using the building vibration observation by weak earthquake motion of about JMA seismic intensity 1.

We are investigating the utility of the IT strong motion seismometer system which observe the building vibration of weak earthquake motion by installing many sensors in the building and actually we set it up in some buildings of The University of Tokyo.

In this presentation, we report on the result of investigating the change in the transfer function in the building before and after earthquake-proof reinforcement, the change in the natural vibration frequency, the change in the mode of vibration like the first and the second mode, and the twisting vibrations by analyzing data of the building vibration observed at a weak seismic ground motion. In addition, we report on the twist at the earthquake and the vibration mode shape of each building vibration about some buildings where the material and the structure are different.