

The Simulation of Ambient Vibration Signal of High-Tech Factory Buildings

Ground Base

鄭凱仁, 李錫霖, 楊捷宇

Civil Engineering

Architecture

leesl@chu.edu.tw

Abstract

These precision instruments and equipments install inside the high-tech factory buildings have highly tendency of sensitiveness to ambient vibration; therefore, the criteria of ambient vibration have extremely strict requirements in relatively. For comply ambient vibration to have in accordance with the vibration standards, access the principle of increasing the product defect-free rate, the most common solution is applied by enhance the strength of its earth ground base. Nowadays the foundation base design of high-tech factory buildings is not like Seismic Design can be calculated by formulas and acquired the advance ambient vibration results from the software simulations; hence after the finalization of the factory building construction, it is necessary to have in-filed detection with inspection to makeup these improvements. As a matter of fact the weak signal can be hardly detected, so it reply on specific sensor to transform the signal into low current or low voltage then use an amplifier to magnify its amplitude; in the meanwhile, it not only enlarge the required signal but also the unnecessary noise in the whole process. This study apply Ensemble Empirical Mode Decomposition (EEMD) method to analyze the original signal, and the mean period of the Intrinsic Mode Function (IMF) derived partial components to proceed Fast Fourier Transform (FFT) transformation in order to get partial signal frequency; hereafter apply the white noise to substitute the first signal then reorganized it as the source of ambient vibration signal, a comparison is being made between the background vibration value of its actual measurement and the earth ground base response of its real measurement value. It anticipates having control the influential value of ambient vibration of the construction under the phase when design the factory building in order to elevate the reliable degree of foundation

construction design in the future.

Keyword : high-tech factory buildings, ambient vibration, white noise