

AMBIENT VIBRATION TESTING OF DAMAGED RC BUILDING STRUCTURE

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ABSTRACT

This paper presents the results of an ambient vibration test conducted on a 4 stories reinforced concrete school building located in Bukit Tinggi, Bentong, Pahang, Malaysia. The test was intended to determine preliminary information on the dynamic properties of the building. Vibration response measurements were taken on selected locations of the building to determine the overall modal parameters such as mode shapes, modal frequencies and modal damping. Output-only modal identification methods, the Enhanced Frequency Domain Decomposition (EFDD) method in frequency domain and the Stochastic Subspace Identification (SSI) in time domain were implemented in the estimation of the modal parameters of the building. In addition, microtremor measurements were also conducted in the vicinity of the building to determine the frequency of the site and assess the potential effects of soil-structure interaction, which could have a significant effect on the seismic performance of the building during earthquake. This paper describes the building tested, the tests and results, the methodologies and the equipment used.

Keywords: Ambient Vibration Testing, Earthquake, Soil-Structure Interaction, Damaged Building Structure, Enhanced Frequency Domain Decomposition (EFDD), Stochastic Subspace Identification (SSI).