World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:9, No:03, 2015

Ambient Vibration Testing of Existing Buildings in Madinah

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Abstract : The elastic period has a primary role in the seismic assessment of buildings. Reliable calculations and/or estimates of the fundamental frequency of a building and its site are essential during analysis and design process. Various code formulas based on empirical data are generally used to estimate the fundamental frequency of a structure. For existing structures, in addition to code formulas and available analytical tools such as modal analyses, various methods of testing including ambient and forced vibration testing procedures may be used to determine dynamic characteristics. In this study, the dynamic properties of the 32 buildings located in the Madinah of Saudi Arabia were identified using ambient motions recorded at several, spatially-distributed locations within each building. Ambient vibration measurements of buildings have been analyzed and the fundamental longitudinal and transverse periods for all tested buildings are presented. The fundamental mode of vibration has been compared in plots with codes formulae (Saudi Building Code, EC8, and UBC1997). The results indicate that measured periods of existing buildings are shorter than that given by most empirical code formulas. Recommendations are given based on the common design and construction practice in Madinah city.

Keywords : ambient vibration, fundamental period, RC buildings, infill walls
Conference Title : ICNTE 2015 : International Conference on Nondestructive Testing and Evaluation
Conference Location : Madrid, Spain
Conference Dates : March 26-27, 2015