World Academy of Science, Engineering and Technology
International Journal of Structural and Construction Engineering
Vol:10, No:08, 2016

System Identification of Timber Masonry Walls Using Shaking Table Test

Authors : Timir Baran Roy, Luis Guerreiro, Ashutosh Bagchi

Abstract : Dynamic study is important in order to design, repair and rehabilitation of structures. It has played an important role in the behavior characterization of structures; such as bridges, dams, high-rise buildings etc. There had been a substantial development in this area over the last few decades, especially in the field of dynamic identification techniques of structural systems. Frequency Domain Decomposition (FDD) and Time Domain Decomposition are most commonly used methods to identify modal parameters; such as natural frequency, modal damping, and mode shape. The focus of the present research is to study the dynamic characteristics of typical timber masonry walls commonly used in Portugal. For that purpose, a multi-storey structural prototypes of such walls have been tested on a seismic shake table at the National Laboratory for Civil Engineering, Portugal (LNEC). Signal processing has been performed of the output response, which is collected from the shaking table experiment of the prototype using accelerometers. In the present work signal processing of the output response, based on the input response has been done in two ways: FDD and Stochastic Subspace Identification (SSI). In order to estimate the values of the modal parameters, algorithms for FDD are formulated, and parametric functions for the SSI are computed. Finally, estimated values from both the methods are compared to measure the accuracy of both the techniques.

Keywords : frequency domain decomposition (fdd), modal parameters, signal processing, stochastic subspace identification (ssi), time domain decomposition
Conference Title : ICSE 2016 : International Conference on Structural Engineering
Conference Location : Venice, Italy
Conference Dates : August 08-09, 2016

Open Science Index, Structural and Construction Engineering Vol:10, No:08, 2016 publications.waset.org/abstracts/53765/pdf