

Vibration-Based Damage Detection in Historical Adobe Structures: Laboratory and Field Applications

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© 2019, © 2019 Taylor & Francis. Structural Health Monitoring (SHM) has demonstrated to be a fundamental tool for detecting damage in early stages in existent civil engineering structures. This paper explores the accuracy of vibration-based SHM for identifying the existence of damage in adobe constructions, a widespread structural system but on which limited experimental and numerical applications of the technique are available. Two damage detection methodologies are investigated: (i) Autoregressive Models to predict the structural dynamic response taking into account the environmental parameters as input; and (ii) Principal Component Analysis to detect patterns and anomalies in this response without the need of information about environmental conditions. The results of the laboratory tests on a real scale adobe wall positively indicate the capabilities of these two methodologies to accurately identify damage. They also evidence the importance of monitoring several modes as their sensit