

Low-Level Forced and Ambient Vibration Tests on URM Building Strengthened by Dampers

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Abstract : The aim of the paper is to investigate the dynamic behavior of an unreinforced masonry (URM) building strengthened by DC-90 dampers by ambient and low-level forced vibration tests. Ambient and forced vibration techniques are usually applied to reinforced concrete or steel buildings to understand and identify their dynamic behavior, however, less is known about their applicability for masonry buildings. Ambient vibrations were measured before and after strengthening of the URM building by DC-90 dampers system. For forced vibration test, a series of low amplitude steady state harmonic forced vibration tests were conducted after strengthening using eccentric mass shaker. The resonant frequency curves, mode shapes and damping coefficients as well as stress distribution in the steel braces of the DC-90 dampers have been investigated and could be defined. It was shown that the dynamic behavior of the masonry building, even if not regular and with deformable floors, can be effectively represented. It can be concluded that the strengthening of the building does not change the dynamic properties of the building due to the fact of low amplitude excitation which do not activate the dampers.

Keywords : ambient vibrations, masonry buildings, forced vibrations, structural dynamic identification

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