



IMPLEMENTATION OF EXPERIMENTAL RESULTS OBTAINED BY IN-SITU TESTING IN EVALUATION OF SEISMIC STABILITY OF STRUCTURES-CASE STUDIES

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Dynamic characteristics of structures obtained by experimental full scale in-situ testing are structural properties necessary for reliable estimation of seismic stability when structures are located in seismically active regions. The importance of in-situ testing becomes even greater when sophisticated non-linear methods for analysis are used to check structural stability, as well as when an investigation requires verification by shaking table testing of representative scaled models. A short presentation of the ambient vibration testing method, procedure and equipment available at IZIS will be given, together with 3 recently tested structures - case studies where in-situ experimental testing results have been used for evaluation of their seismic stability. For data analysis, ARTEMIS software was used.

Case study No. 1: Sidoni Palace, Castelnuovo of San Pio, Italy

The Sidoni Palace is a monumental stone masonry structure in the old medieval nucleus of Castelnuovo. After L'Aquila earthquake in 2009 no damage was recorded in the building facade, whereas significant damages and collapses of part of masonry vaults took place inside. Presented in Fig. 1 are the Palace, test set-up during ambient vibration test and peak-picking of the dominant frequencies. The experimental results have been further used for the analytical investigation of the Sidoni palace, that will be presented in details in the paper.

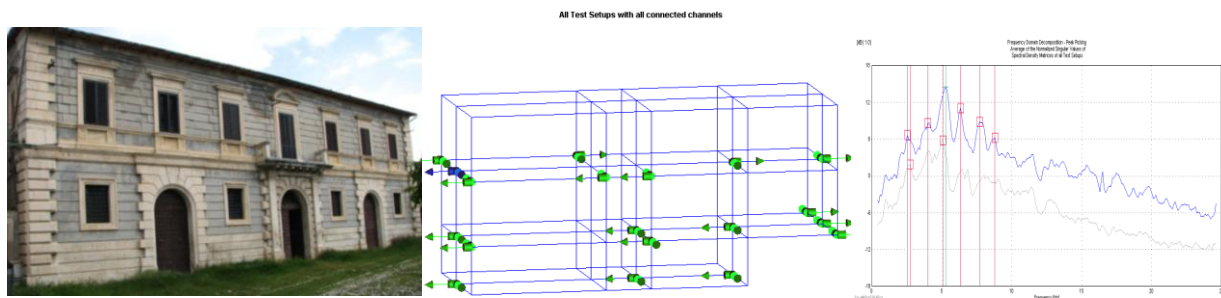


Figure 1. Sidoni Palace, test set-up and dominant frequencies

Case study No. 2: Nova Banka building in Banja Luka, Bosnia and Hercegovina

"Nova Banka" structure is located in the centre of the city of Banja Luka. The building is designed and constructed as a reinforced concrete mixed system of frames and shear walls and it consists of two wings - part A and part B, separated by a construction joint. The obtained experimental data represented a very good and comprehensive basis for calibration and updating of the finite element model of the structure and evaluation of its seismic behaviour. Presented in Fig. 2 are the building, test set-up during ambient vibration test and peak-picking of the dominant frequencies.

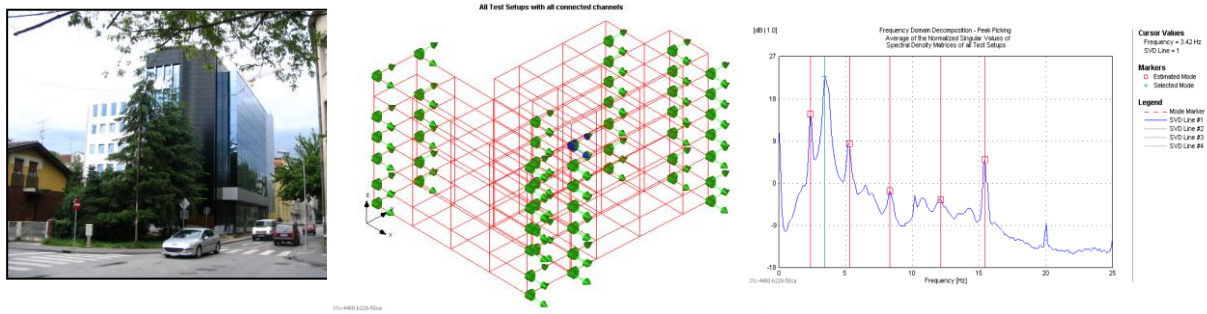


Figure 2. Nova Banka building, test set-up and dominant frequencies

Case study No. 3: RC Residential building, Skopje, Macedonia

This high-rise RC residential building is located in Zelezara settlement in Skopje. It is a 16 floor level structure built in 1980. In 2012 its dynamic properties were measured using Four Ranger seismometers. The obtained results were then used to calibrate the numerical model and to perform seismic analysis for the structure applying SAP2000 and the method of equivalent static load (equivalent static analysis) according to the Macedonian Design Code. Appearance of the building, test set-up and dominant frequencies are presented in Fig. 3.

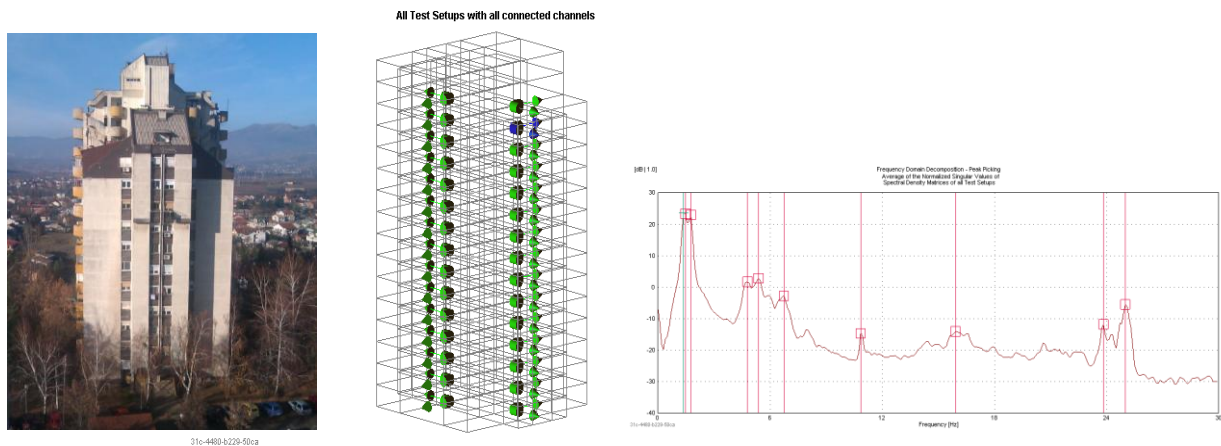


Figure 3. RC Residential building in Skopje - Test set-up and peak-picking of dominant frequencies

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