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Full-Scaled Experimental Studies Conducted in Real-Life Structures

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Abstract

Experimental studies in Civil Engineering research are mostly conducted in laboratories. These tests require extensive and expensive laboratory facilities. Moreover, the results obtained from them are usually suspicious due to the differences related to the use of artificial specimens and application of external effects such as loading. Even the shake table tests contains the approximation, neglecting, scaling and loading errors due to the use of scaled or full scaled specimen produced for the aim of testing in laboratory. Recently, the experiments conducted on real structures with operational modal analysis (OMA) take attention. The vibrations records are analyzed to obtain the dynamic properties of existing structures. Since the obtained data are inherent features determining the main characteristics of structures, they can be used in researches efficiently. Besides, the cost of the technical equipment is not so expensive. In this keynote speech, the presenter has summarized his experimental activities conducted in existing structures to search different types of civil engineering problems with operational modal analysis. The outline of the speech covers the required testing equipment for dynamic identification, the tools for analyzing the data and derivation of dynamic parameters, and different types of structures that can be a main subject for a scientific work. The last section contains the examples of conducted studies in existing structures. Scientific works conducted on reinforced concrete buildings, timber buildings, masonry buildings, post tensioned bridges, and historic bridges are summarized.