



JAPANESE EXPERIENCE ON BUILDING REHABILITATION: THE CASE OF KOBE CITY

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ABSTRACT

A great number of buildings in Kobe area suffered damage due to the 1995 Hyogoken-Nanbu Earthquake. And now, some of the damaged buildings had been demolished, some of them are still left as the condition just after the Earthquake. But some of them were applied the evaluation method of seismic performance of damaged buildings and they had been rehabilitated or are under rehabilitation.

Most of the damaged buildings had been constructed before the revision of the Japanese Building Code in 1981 and they were designed according to the seismic provisions in the Japanese Building Code of 1950 edition. And the buildings constructed in the same period as the damaged buildings are actually spread in all over Japan. This Earthquake gave Japanese people a shock that the existing buildings have a possibility of suffering the same damage. It is important that the seismic performance of existing buildings should be evaluated and rehabilitation should be applied to the existing buildings as well as the rehabilitation of damaged buildings, if necessary.

The evaluation method of seismic performance of existing and damaged buildings, rehabilitation techniques, and application of the techniques to the buildings are described in this paper.

Guidelines for Evaluation Method of Seismic Performance. The guidelines are applied to evaluate the seismic performance of existing and damaged buildings. The seismic index of structure I_s for the seismic performance of building can be evaluated by applying the guidelines to the building. The I_s means corresponding value to the maximum elastic response shear coefficient to which the story can resist. The seismic safety of buildings is judged by comparing I_s with the seismic judgment index of structure I_{so} . Buildings with the equal or larger value of I_s that I_{so} value can be considered to have enough seismic performance against the severe earthquakes in Japan.

Rehabilitation Techniques. The aims of rehabilitation are to provide (a) increased strength, (b) increased ductility, and (c) a proper combination of these two features, so as to satisfy the required seismic capacity. Typical rehabilitation techniques are discussed.

Application to the Damaged Buildings. Rehabilitation examples of the damaged buildings due to the Hyogoken-Nanbu Earthquake are introduced with discussing the technical and economical feasibility.

KEYWORDS

Building rehabilitation; existing building; damaged building; 1995 Hyogoken-Nanbu earthquake; reinforced concrete building; steel building; evaluation method; rehabilitation method.