

RECENT SEISMIC RETROFIT TECHNIQUES OF EXISTING RC BUILDINGS IN JAPAN

YOSHIAKI NAKANO
Associate Professor
Institute of Industrial Science
University of Tokyo, Japan

SUMMARY

Following the 1995 Hyogoken-nambu Earthquake, seismic evaluation and retrofit of existing buildings designed in accordance with dated seismic codes have been accelerated. This trend caused the increase in number and structural type of buildings to retrofit, and hence structural designers more often find it difficult to retrofit a building using conventional schemes. To solve such problems, both communities of researchers and practitioners in Japan are currently trying to develop new but reliable and cost-effective retrofit techniques, and some of them have been applied to existing buildings. This report will briefly overview techniques for seismic retrofit and their applications in Japan, which were recently developed and applied, or will be applied in the near future

1. INTRODUCTION

The 1995 Hyogoken-nambu Earthquake (Kobe Earthquake) which caused devastating damage to urban centers triggered a new direction in the seismic retrofit of existing vulnerable buildings in Japan. The widespread damage especially to older buildings designed to meet the code criteria of the time of their construction revealed the urgency of implementing retrofit of seismically vulnerable buildings. On December 25, 1995, a new law to promote seismic retrofit of existing buildings was enforced, and retrofit is currently an upsurge among nationwide projects concerning earthquake preparedness planning.

Before the Kobe Earthquake, retrofitted buildings, most of which were schools or governmental offices, were localized in Tokyo Metropolitan Area including Chiba and Kanagawa prefectures, or in Shizuoka prefecture where a large-scale earthquake named "hypothetical Tokai Earthquake" is predicted to occur in the near future from the seismological point of view. Basically conventional retrofit schemes such as installation of new shear walls or steel framed braces into existing frames, and jacketing of existing columns with steel profiles have been applied to them. However, since the new law is applied throughout Japan, covering hospitals, apartment houses, commercial buildings such as hotels, department stores, offices etc. as well