

Title Seismic Retrofitting of Mid-Rise Reinforced Concrete Frame Buildings with a Soft/Weak First Story using Buckling Restrained Braces.

Year 2009

Author Jimmy Chandra

Exam Committee Dr. Pennung Warnitchai (Chairman)
Dr. Naveed Anwar (Co-Chairman)
Dr. Kyung-Ho Park (Member)
Dr. Sun Sayamipuk (Member)

Abstract

In this study, the application of BRBs for retrofitting GLD buildings with soft/weak story is presented. A typical six story residential building with a soft/weak first story taken from field survey data in Bangladesh is investigated. The seismic performance evaluation of the GLD building before and after being retrofitted is performed using three dimensional nonlinear dynamic time history analysis. Furthermore, the effectiveness of BRBs to be used as an alternative retrofit technique for irregular GLD buildings is evaluated in terms of enhancing the seismic performance of the building. Later on, this recent retrofit technique using BRBs is compared with traditional retrofit techniques such as concrete jacketing and adding masonry infill walls. The analysis results are presented in terms of roof drift time history, maximum floor displacement, maximum story drift, maximum story shear, and location where damages occur during the analysis. From the results, it can be concluded that BRBs can significantly improve the seismic performance of the GLD building. The retrofitted GLD building using BRBs can withstand up to severe earthquake without collapse. Moreover, as compared to traditional retrofit techniques, it seems that BRBs give a better solution in terms of the seismic performance, effect to the building's occupancy, and post-earthquake repairing or rehabilitation. Therefore, it can be concluded that BRBs can serve as a good and effective retrofit technique for GLD buildings with soft/weak story.

Keywords GLD building, soft/weak story, seismic performance, retrofit technique, buckling restrained braces (BRBs).