

**Title** Seismic Performance of Masonry School Buildings Retrofitted with RC Jacket and Splint-Bandage

**Year** 2015

**Author** Sandip Adhikari

**Exam Committee** Dr. Punchet Thammarak (Chairman)  
Dr. Naveed Anwar (Co-Chairman)  
Prof. Pennung Warnitchai (Member)

**Abstract**

According to Department of Education (DoE), 160 school buildings in Nepal are retrofitted with reinforced concrete (RC) jacket and splint-bandage. Many school buildings inside and outside Kathmandu valley are proposed for the retrofitting in future. Reinforced concrete jacket and splint-bandage techniques for retrofitting is traditional and well established strengthening technique that enhance the structural performance and proves as a best option for the engineers in seismic active areas. The qualities of this technique are increase in stiffness, strength, ductility and overall structural performance along with easy construction procedures using locally available materials and man power. Recently, a strong earthquake hit western region of Nepal causing loss of thousands of people and property damage. The earthquake mostly affects old masonry constructions and poorly designed reinforced concrete (RC) buildings. The effect of earthquake was also concentrated in the areas like Gongabu, Sitapaila, Bhaktapur durbar square, Patan durbar square, Tokha, Sankhu, Goldhunga, Dharmasthali etc. The devastating earthquake provides a rare opportunity to evaluate the reinforced concrete jacket and splint-bandage retrofit applied to masonry school buildings and to document its performance when subjected to actual earthquake. Seismic performance of this retrofitting technique is assessed based on comparison made between retrofitted and non-retrofitted school buildings of similar configurations at or near same site. Simplified numerical modelling is carried in SAP 2000 to obtain and compare the response of retrofitted and non-retrofitted school building. This study successfully compare the performance of retrofitted and non-retrofitted school buildings after earthquake at different locations in Kathmandu valley by site survey and simplified numerical analysis. Overall performance of the school building is enhanced by reinforced concrete jacket and splint bandage.

**Keywords** Department of Education (DoE), Retrofitting, Reinforced concrete jacket, Splint-bandage, Strength, Stiffness, Ductility, Simplified numerical modelling