

Expected Damage Assessment of Reinforced Concrete Bridge Columns Under Seismic Loading and Methods of Performance Improvement¹

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Abstract

Current principles of bridge seismic design allow some degree of damage without collapse. This concept means that the bridge column can behave as inelastic when it is subjected to earthquakes greater than design earthquake. This is called ductility.

In this research the damage indices, which are used in assessment of seismic performance of reinforced concrete columns, were reviewed. Six kinds of columns were studied to evaluate their seismic performance under Syrian response spectrum. Three of them had 0.02 reinforcing ratio and 0.34 vertical load ratio. The other three had 0.02 reinforcing ratio too and 0.15 vertical load ratio. Shear resistance of all the columns were considered adequate.

Then, studying probability of improvement the seismic performance by concrete jacketing were performed. For this purpose a concrete jacket with 10cm, 20cm and 30cm was added for every column. So, all samples in this research became 16 samples. These 16 samples were numbered as 1,2 and 3 for main samples and 1-1, 1-2, 1-3 for secondary samples of sample 1. (for 10cm, 20cm and 30 cm thickness of jacket respectively).

Keywords: Bridges- Columns- Earthquakes- Seismic- Nonlinear- Pushover-Assessment- Damage.

¹ For the paper in Arabic see pages (59-93).

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