

Comparison of Seismic Response for Two RC Curved Bridges with Different Column Shapes

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Abstract : This paper presents seismic risk assessment of two bridge structure, based on the probabilistic performance-based seismic assessment methodology. Both investigated bridges are tree span continuous RC curved bridges with the difference in column shapes. First bridge (type A) has a wall-type pier and second (type B) has a two-column bent with circular columns. Bridges are designed according to European standards: EN 1991-2, EN1992-1-1 and EN 1998-2. Aim of the performed analysis is to compare seismic behavior of these two structures and to detect the influence of column shapes on the seismic response. Seismic risk assessment is carried out by obtaining demand fragility curves. Non-linear model was constructed and time-history analysis was performed using thirty five pairs of horizontal ground motions selected to match site specific hazard. In performance based analysis, peak column drift ratio (CDR) was selected as engineering demand parameter (EDP). For seismic intensity measure (IM) spectral displacement was selected. Demand fragility curves that give probability of exceedance of certain value for chosen EDP were constructed and based on them conclusions were made.

Keywords : RC curved bridge, demand fragility curve, wall type column, nonlinear time-history analysis, circular column

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