

Effect of Site Amplification on Seismic Safety Evaluation of Flyover Pier

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Abstract : Bangladesh is a developing country in which a lot of multi-span simply/continuous supported flyovers are being constructed in its major cities. Being situated in a seismically active region, seismic safety evaluation of flyovers is essential for seismic risk reduction. Effects of site amplification on seismic safety evaluation of flyover piers are the main concern of this study. In this regard, failure mode, lateral strength and displacement ductility of piers of a typical multi-span simply supported flyover have been evaluated by Japan Road Association (JRA) recommended guidelines, with and without considering site amplification. Ultimate flexural strengths of piers have been computed using the pushover analysis results. Shear capacity of piers has been calculated using the guidelines of JRA. Lateral strengths have been determined depending on the failure modes of the piers. Displacement ductility of piers has been computed using yield and ultimate displacements of the piers obtained from the pushover analysis results. Selected earthquake time history is used in seismic safety evaluation of the flyover piers. Finally, the ductility design method is used to conduct the seismic safety evaluation of the piers with and without considering site amplification. From the numerical results, it has been revealed that the effects of site amplification on seismic safety evaluation of bridge structures should be carefully taken into account.

Keywords : displacement ductility, flyover pier, lateral strength, safety evaluation, site amplification

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