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EARTHQUAKE DAMAGE ASSESSMENT OF BRIDGES IN KARACHI

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Abstract:
Bridges are an essential component of a road network which are termed as lifeline structures. It is vital that bridges remain functional in case of a natural calamity to facilitate relief operations. This paper presents the studies which were conducted to assess vulnerability of existing bridges in Karachi to the seismic ground motion. Physical surveys were conducted to gather the information about bridges and their structural systems. Three types of piers were identified for the bridges. Each type was further divided into three classes for the presented studies based on the cross-sectional shape or dimensions. As a result, a total of nine bridge types were numerically analysed. A nonlinear static pushover analysis was carried out and the bridge pushover curves were obtained. Fragility curves for each bridge type were also plotted. A computer programme was employed to carry out damage estimation using the numerical models of the bridges corresponding to 150, 475 and 1000 year return periods. It was found that a

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significant number of bridges may not be able to resist a large magnitude earthquake and may either collapse or be extensively damaged.

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