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Probabilistic Mapping of Ground Displacement Hazard for Allah Bund Fault

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Abstract

The seismic hazard is most commonly described in terms of various parameters defining the intensity ground shaking. Other parameters like liquefaction potential, landslides, ground subsidence, tsunami etc. have been also used. However, permanent ground displacement due to surface rupture along a fault is also an important parameter to be used for characterization of seismic hazard and it occurs only on the fault unlike other hazards. This can cause tremendous damages especially to lifeline structures such as highway bridges, tunnels, buried pipelines (oil and gas pipelines), etc. if they lie across a fault. This study emphasizes the need of estimation of ground displacement using the Probabilistic Seismic Hazard Analysis (PSHA) method. Various examples resulting in the damages due to permanent ground displacement followed by the earthquakes displaying vertical displacements has been presented. Necessary modifications in the commonly used Probabilistic Seismic Hazard Analysis (PSHA) approach have been described for its application to permanent ground displacement which in turn can be helpful to mitigate the risk on buried lifeline system.

Keywords: Probabilistic, Ground displacement hazard, Lifelines