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Effects of Near-Fault Ground Motions on Earthquake-Induced Pounding Response of RC Buildings

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Abstract : In ground motions recorded in recent major earthquakes such as 1994 Northridge earthquake in US, 1995 Kobe earthquake in Japan, 1999 Chi-Chi earthquake in Taiwan, and 1999 Kocaeli earthquake in Turkey, it is noticed that they have large velocity pulses. The ground motions with the velocity pulses recorded in the vicinity of an earthquake fault are quite different from the usual far-fault earthquake ground motions. The velocity pulse duration in the near-fault ground motions is larger than 1.0 sec. In addition, the ratio of the peak ground velocity (PGV) to the peak ground acceleration (PGA) of the near-fault ground motions is larger than 0.1 sec. The ground motions having these characteristics expose the structure to high input energy in the beginning of the earthquake and cause large structural responses. Therefore, structural response to near-fault ground motions has received much attention in recent years. Interactions between neighboring, inadequately separated buildings have been repeatedly observed during earthquakes. This phenomenon often referred to as earthquake-induced structural pounding, may result in substantial damage or even total destruction of colliding structures during strong ground motions. This study focuses on effects of near-fault ground motions on earthquake-induced pounding response of RC buildings. The program SAP2000 is employed in the response calculations. The results obtained from the pounding analyses for near-fault and far-fault ground motions are compared with each other.

Keywords : near-fault ground motion, pounding analysis, RC buildings, SAP2000
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