EFFECTS OF PULSE-LIKE GROUND MOTIONS PARAMETERS ON MAXIMUM INTER-STORY DRIFT SPECTRA

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ABSTRACT

This article attempts to study the effect of various pulse-like ground motion parameters on the linear response of different multi-story buildings with special shear and flexural behavior. A total of 61 near-fault pulse-like ground motions are selected for this study. The effects of peak ground velocity (PGV), arias intensity (I) and earthquake magnitude (M_w) on maximum inter-story drift spectra (MIDS) are evaluated. The multi-story buildings are modeled using a combination of a shear and flexural beams with representative lateral stiffness ratios . The results indicate that The effects of PGV and arias intensity (I) on maximum inter-story drift spectra are very significant. The near-fault pulse-like ground motions are more dangerous for multi-story buildings with Flexural behavior than those with shear behavior.

INTRODUCTION

Near-field records often have obvious long period pulses that emerge mainly at the beginning of the record and affect the response of structures. The prevailing approaches for depicting behavior of structure subjected to pulse-like ground motions can be classified two general groups. The first approach tries to simplify the input and the equivalent pulse procedure is one example of this group. The second set of these approaches tries to use a simpler model of structure instead of simplifying the input but in return it considers the propagation of waves more precisely when developing the governing equations of structural behavior. The shear or the shear-flexural beam can be referred to as an example of this group. For the first time the idea of equivalent undamped shear beam model introduced by Westergaard (1933). Iwan et al.(1997) presented a new measure of inter-story drift demands by using a continuous shear-beam model for earthquake ground motion and called it the drift spectra. Drift spectra are suitable tool for defining the local displacement demand, particularly of pulse-like ground motions. In fact, the drift spectra provides important information to near-field ground motions that cannot be obtained from the response spectra. Many research works have examined the evaluation of drift demands of structures by using a continuous shear beam model (Chopra and Chintanapakdee, 2001; Akkar and Gülkan, 2002; Akkar *et al*., 2005) .The idea of using equivalent shear beams was extended to the combination of continuous shear and flexural beams by Khan and Sbarounis (1964). For estimate the maximum inter-story drift demands in multi-story building Miranda and akkar (2006) using a shear-flexural beam model consisting of two shear and flexural cantilever beams connected by an infinite number of axially rigid members, they proposed the so-called “generalized inter-story drift spectrum”. They used the derivatives of the mode shapes of the continuous shear-flexural beams to approximate the drift ratios. More recently, Khaloo and Khosravi (2008) and (Dixiong Yang et al., 2010) used the model to estimate maximum inter-story drift demands in buildings subjected to pulse-like ground