Evaluation seismic behavior of tall reinforced concrete structures subjected to near field earthquake with considering the height effect

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ABSTRACT

Due to the good performance of concrete structures most recent articles with different conditions and methods, seismic performance of these structures was investigated. One of the cases that affect the seismic performance of these structures is its height. In this article, using the ETABS software, a Seismic evaluation of reinforced concrete structures subjected to near field earthquake Considering the height effect presented. the results of this article demonstrated with increasing height, the using of a shear wall in reinforced concrete structures in causing better seismic performance in terms of displacement.

Keywords: reinforced concrete, seismic performance, height effect, near field earthquake

1. INTRODUCTION

Concrete structures due to proper seismic performance than other structures have attracted the attention of the creators and scientists. That's why in recent studies, it has been attempted to improve the seismic performance of these structures better than before. For example: Cao et al. in 2009 investigated the seismic performance of low-rise concrete shear wall with different recycled coarse aggregate (RCA) replacements [1]. Mitesh Surana and et al. in 2015 presented seismic performance and fragility of reinforced-concrete frame shear-wall buildings designed for Indian codes are investigated using the displacement-based design methodology of ASCE 41 and capacity spectrum approach of HAZUS, respectively [2]. Vesna Terzic and et al. in 2019 investigates implications of using three conceptually different modeling approaches for reinforced concrete (RC) shear walls on seismic performance of several building designs including low-rise and mid-rise office and hospital buildings [3]. Haijuan Duan and Mary Beth D. Hueste in 2012 considered the seismic performance of a multi-story reinforced concrete frame building designed according to the provisions of the current Chinese seismic code (GB50011-2010) [4]. Qingtian Zhang and et al. in 2019 considered the seismic performance of seawater sea-sand concrete (SSC) shear wall reinforced with glass fiber reinforced plastic (GFRP) bars. Zheng Lu and et al in 2019 tested A series of new L-shaped insulated concrete sandwich shear walls integrated with heat preservation function for its seismic performance [5]. Kolozvari et al. in 2017 used three different approaches for modeling RC walls to predict the seismic losses of a 5-story RC shear wall building for three hazard levels [6]. Mohammad R. Salami and et al. in 2019 considered Influence of advanced structural modeling technique, mainshock-aftershock sequences, and ground-motion types on seismic fragility of low-rise RC structures [7]. In recent article demonstrated that existence wall shear in concrete structures cause improved seismic performance of these structures. Perez et al. in 2007 conducted a cyclic loading test considering various parameters to test the seismic performance of self-centering RC shear walls [8]. Dejian Shen and et al in 2019 considered the feasibility of using BFRP as externally bonded jackets applied on the surface of the RC shear walls [9]. Mayssa Dabaghi and et al. in 2019 examined the behavior of reinforced concrete shear wall buildings subjected to strong earthquake ground motions, with a focus on collapse performance [10]. Jalali and Dashti in 2010 studied the non-linear behavior of shear walls using macroscopic and microscopic modelling approaches, in order to simulate flexural and shear behavior [11]. Beyer et al. in 2008 the two most commonly employed analytical models, namely, the equivalent-frame model (EFM) (shear wall modelled as a wide column) and the finite-element method model (FEM) (shear wall modelled using shell elements) have been compared with available experimental results [12]. Stephen et al in 2003 used some experimental tests to investigate the effect of steel fibers on the seismic behavior of RC columns [13]. Lee et al. in 2007 studied the influence of addition of steel fibers into concrete on seismic performance of RC columns under earthquakes [14].