



EVALUATION OF SEISMIC BEHAVIOUR OF HIGH-RISE RC WALL BUILDINGS

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Abstract

Bearing wall structures (known as tunnel form), are used in earthquake-prone areas because of their acceptable seismic performance and high construction speed. However, seismic codes didn't specifically focus on these types of structures. As a result, the design of these types of structures are done with conventional design methods of buildings with shear walls including height restriction. In this study, a closer look at the seismic performance of tall buildings with bearing wall structure have been investigated. For this purpose, three structures of 15, 20 and 25-story with this seismic system have been modelled and examined by the help of fiber elements. Terms such as response modification factor, performance point, have been evaluated by conducting nonlinear static and dynamic analysis on these three structures. Then to complete the required studies, nonlinear time history dynamic analysis was performed to verified nonlinear static analysis.

Keywords: Bearing wall structure, Shear wall, Nonlinear static analysis (Pushover), Nonlinear time history analysis, Ductility, Response modification factor

1. INTRODUCTION

Bearing wall structures (known as tunnel form), are used in buildings. In this structural system, both vertical and lateral seismic loads are transferred to building foundation by reinforced concrete slabs and walls, and the common bearing elements such as beam and column are eliminated from bearing system of the structure. In recent years this type of structure has been used in countries like Chile, Japan, Italy, Turkey and Iran. Due to modular technical manufacturing methods, bearing wall systems are considered widely in mass industry. High stiffness of seismic bearing system in comparison to other systems used, high construction speed and being economical in mass projects are among the most positive features of this structural system.

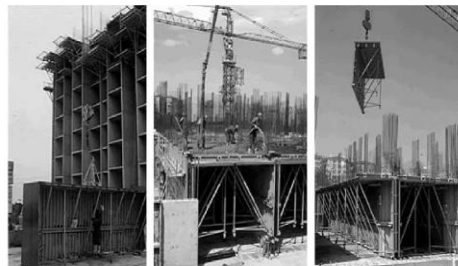


Figure 1. Bearing wall structures

Despite of popularity of this construction method, there has been few considerable researches for realistic evaluation of behavior of these structures. Hence these buildings are designed in accordance with the design methods recommended in codes for common shear walls. It's true that due to the inherent characteristics