

Survey of Influence of Opening Area to Wall Area Ratio on Stiffness and Yielding resistance of Concrete Shear Wall System

Peyman Ghaderi^{1,*} Allaedin Behraves²

¹ Department of Civil Engineering, Mahabad science and Research Branch, Islamic Azad University, Mahabad ·Iran
Peyman.ghaderi99@gmail.com

¹ Department of Civil Engineering, Mahabad science and Research Branch, Islamic Azad University, Mahabad ·Iran
Behraves@tabrizu.ac.ir

ABSTRACT

The presence of openings in the concrete shear wall system reduce the power of the system in loading, so in this study first using a valid experimental specimen validity of results from an ANSYS software has been done. after ensuring the modeling and obtained results concrete frame with concrete shear wall system return function have been investigated using modeling the structures with different percentage of opening to whole of wall in ANSYS software and doing the non-linear static analysis (hysteresis) according to ATC 24 results from hysteresis analysis of models show the system power reduction and they're complicity of the system collapse in energy dissipation in cycling loading.

Keywords: shear wall, finite element method, energy absorption, hardness

1. INTRODUCTION

millions of years have taken place in the world and will happen in the future as it has been in the past. this natural phenomenon becomes a major human calamity that occurs in a dense city with dense texture. the effects of this accident in the major earthquake in iran , such as the 2003 bam earthquake and 2017 kermanshah province, are not hidden. in spite of the knowledge of many factors occurring in this phenomenon , it is impossible to prevent this phenomenon from occurring with current human knowledge, but it is possible to reduce the effect of earthquake powerful vibration in the form of loss of damages, damages, and especially loss of life. earthquake engineering has effects on the effects of earthquake on humans and its environment as well as the methods to reduce these effects. the study of the earthquake and its effects due to written documents belonging to the Japanese earthquake and the east mediterranean region dates back to about 1,600 years ago. the history of earthquake studies in the active region of america is only about 200 to 350 years ago. but humans have been aware of this phenomenon for millions of years, but his experience and knowledge of earthquake science is much less than life expectancy. Earthquake engineering was born at the beginning of the 20th century and reached its full perfection at the end of it[4]. Since 1908 in Italy, the terms of seismic loading were initiated and implemented in many countries around the world. however , it has been 40 years before the seismic design relies on dynamic analysis of the structure. during the 1960 s, by the late 70 s, efforts have been spent mainly on reconciling the previous criteria and new findings and introducing the results of these reconciliation efforts. besides knowing the nature of the earthquake and how to force power into buildings, what the earthquake force is capable of , the building itself and the system that has the necessary resistance to vibrations has been considered by the structural engineers. the development and development of a variety of mud structures from clay buildings to skyscrapers from brick and wood use to design vibration frames using concrete and steel and composite materials (composite) are all evidence of this issue. but what is important is the shaking design and the equations of equations present in the evolution path to design based on seismic performance of the structure. something that has experienced a new field of seismic design and the necessity of research and searching in this field before the engineers of the structur[5]. The construction of shear walls in high and medium buildings and even in short buildings causes the building resistance to increase significantly and will also be the best way to control the lateral bracing of the buildings.[6]. In most cases, shear walls are able to withstand the greatest contribution of the base cutting force, which significantly increases the