

ADDITION OF CONCRET SHEAR WALLS; A TYPICAL RETROFITTING METHOD FOR MASONRY BUILDINGS

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ABSTRACT

Following the destructive bam earthquake of 2003, the Iranian Government initiated a vast program of seismic retrofitting for existing important buildings throughout the country. Based on the obtained experiences, Seismic vulnerability and rehabilitation studies for each of thousands of existing buildings throughout the country, needs a long-term period of time and would make the project with limited budget, unachievable in the defined period. For this reason some new and typical methods for retrofitting of common type of buildings that would result in higher performance of structures and save the occupant lives in probable future earthquakes. Unreinforced masonry buildings which are widely constructed in urban areas of Iran and in many other countries are the most common type. An advantageous method for retrofitting of this type of construction is "Addition of concrete shear walls". In this method some concrete shear walls are added to masonry buildings, along with other retrofitting details for the roof, foundation and masonry walls. This article aims to explain the method along with the scientific base, gained experience, details, governing rules and conditions.

INTRODUCTION

Natural disasters have long posed serious challenges for human kind and the efforts in controlling them, made initiatives for numerous progressions and achievements. Earthquake is undoubtedly is one of the most important natural disasters and the studies for understanding its phenomenon and its related disaster management have been placed in high priorities in last century. Iran is one of the most earthquake prone areas in the world and this situation makes it to be at the top of list of the countries with great casualties and financial losses. Statistics show that there is at least one major earthquake in each decade throughout the country. It is obvious that with public education and awareness, determination of vulnerability of the infrastructures and upgrading the seismic safety in dangerous zones, the loss of lives and financial damages can be declined dramatically (Instruction for seismic rehabilitation of existing buildings, 2007). However, this cannot be achieved without the contribution of the government. One of the most important undertakings of Iranian government in reducing the seismic vulnerability of the country against the earthquake is "Study and performing Retrofitting of the Important Buildings and Lifelines" which covers several important structural groups and was enacted in 2003 after the destructive Bam earthquake.

Based on the obtained experiences, Seismic vulnerability and rehabilitation studies for each of thousands of existing buildings throughout the country, needs a long-term period of time and would make the project with limited budget, unachievable in the defined period. For this reason introduction and use of some new methods for retrofitting of common type of buildings that would result in higher performance of structures in probable future earthquakes seems to be necessary (ElGawady, 2004). These approaches are named partial or typical rehabilitation. The main reason for choosing this term is that by retrofitting a building according to these new approaches, major structural deficiencies can be dealt with; however, some minor ones may remain (FEMA428, 2003). In development of these techniques, three main goals are under