

## SEISMIC ASSESSMENT DEMAND OF ISOLATED BUILDINGS

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### ABSTRACT

Nowadays, the system of seismic isolation of structures is well known; it is possible that we can offer high security and protection from damage to the structure during the earthquake than an embedded system. The technology of the seismic isolation makes possible to convert weak and vulnerable buildings to resistant and insensitive buildings to earthquake by reducing the transfer of the effect of the ground motion to the building without interruption of its functional operations.

This work aims to clarify the nonlinear static behavior of the structures with and without the seismic isolation system and the influence of these systems in the mitigation of seismic risk and seismic demands.

The objective of the first stage is to evaluate the seismic demands of concrete buildings with and without the isolation systems by the capacity spectrum method of the ATC40 (approach in damping). In the second stage, a comparative study was made in order to quantify the influence of the isolators on the seismic demands.

### INTRODUCTION

Modern buildings contain extremely sensitive and costly equipments that have become vital. In addition, hospitals, communications and emergency centers, police stations and fire stations must be operational when needed most, immediately after an earthquake. The above mention fact spurs a question of - how to protect the important buildings? A simple logical answer to the question is - can the buildings be detached from the ground in such a way that the earthquake motions does not transferred to the building, or at the least greatly reduced ? This simple logic is feasible in the form of seismic base isolation of the buildings.

Seismic isolation consist essentially the installation of mechanisms which decouples the buildings, and/or its content, from partially damaging earthquake induces ground or support motions. This decoupling is achieved by increasing the flexibility of the system, together with providing appropriate damping to resist the amplitude of the motion caused by the earthquake. The advantage of seismic isolation includes the ability to significantly reduce structural and non-structural damage, to enhance the safety of the building contents, and to reduce seismic design forces. This potential benefits are greatest for stiff structures fixed rigidly to the ground such as low and medium rise building, nuclear power plants, bridges etc.