



## Historical review on utilization of base isolators

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### Abstract

Application of base isolation techniques in Iran goes back to hundreds of years ago and even to ancient times. Installing pieces of wood between the foundation and the walls of buildings is among the earthquake resistant construction techniques that have been applied in some areas of Iran in the past. However, contrary to other technologies which are generally adapted soon after their development, modern seismic base isolation technology took almost a quarter of a century to be adapted and utilized in Iran. This paper presents the historical as well as the modern application of seismic base isolation technology in Iran.

**Keywords:** base isolation, structure, seismic behaviour

### 1. INTRODUCTION

Iran is located in an active seismic area and we frequently observe heavy casualties and damages due to destructive earthquakes. Therefore, people have tried to cope with this natural hazard using different techniques throughout the history. Application of base isolation concept is one of the techniques that have been used in some areas of the country in the past. However, modern base isolation technology was not used in Iran until very recently. One important reason for the long delay can be referred to the fact that it is difficult to change the mentality of the builders from their current way of construction to a newly developed technology. However, this can be acceptable to some extent, as it is human nature to resist against change, and life would certainly be easier if engineering practices and building construction remained unchanged. We should note that advances in earthquake engineering and the construction practice that follow are as dynamic as the world we live in. In order to use the latest technology and ensure highest level of safety in the built environment, it is imperative that the design and construction communities utilize the most current technologies available.

### 2. BASE ISOLATION TECHNOLOGY IN IRAN

#### 2.1. Historical Structures

Study of historical structures in Iran show that some base isolation techniques had been utilized to reduce seismic impacts on some types of structures throughout the history. For instance, construction of multi-layer stones, pouring sand between the ground and the bearing walls, and installing pieces of woods (timbers) between the ground and the bearing walls of some traditional structures were among the techniques that use to be applied in earthquake resistant construction.

##### 2.1.1. Multi-Layer Stones

The first application of the base isolation concept in Iran goes back to ancient times when some structures were built on multi-layer stones with flat and smoothed surfaces. The smooth surface of the stones would contribute to an easier slide of the structure with respect to the foundation during earthquakes. Therefore, it can be concluded that application of multi-layer stones which uses a base isolation concept, could overcome to the earthquake effects.

##### 2.1.2. Pouring Sand between the Ground and Walls