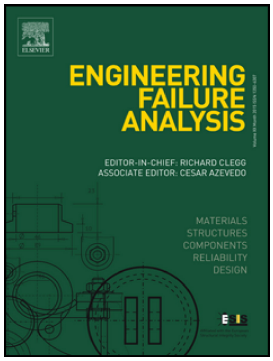

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Seismic Vulnerability of Masonry Jack Arch Slabs

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Abstract

After the industrial revolution, the use of jack arch slabs (JAS) was quite common in many historical structures with the availability of iron and steel in structural engineering field. JAS is a composite system of steel I-beams and masonry bricks, which are placed between steel I-beams. This study focuses on the structural failures and weaknesses of masonry structures with JAS. The aims of this paper are to deeply illustrate the structural vulnerability of masonry JAS and to summarize the positive and negative effects of JAS on structural behavior. Within the scope of this study, this study focuses on historical American Boarding School for Girls in Merzifon, Turkey, which has one-way masonry JAS. It essentially assesses the structural behavior of the school and investigates the seismic vulnerability of JASs. For this purpose, the mechanical properties of the structural materials have been primarily evaluated with experimental tests. Then the finite element analyses have been carried out with the use of three dimension numerical model in order to investigate the structural behavior of the structure.

Key Words: Masonry Structures, JASs, structural behavior, finite element method.

1. Introduction

One of the major problems in civil engineering is passing over openings. New slab forms and construction techniques were developed to find efficient solutions to this problem.

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