

## STRUCTURAL VERSUS AESTHETICAL CONCERNS IN RECONSTRUCTION OF HISTORICAL MASONRY BUILDINGS

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### SUMMARY

Assessment of historical buildings presents specific engineering task, considering the ways they were built and the materials, which were used. Many of them belong to cultural heritage and merit special care and protection. This concerns also the historical buildings in Bosnia and Herzegovina. The country is situated in seismic active region of South-East Europe and the majority of the historical buildings were made of stone-masonry. In the case of stronger earthquake motion such buildings could suffer heavy damages. The damages are sometimes cumulated through many years and many causes. Substantial damages were caused by recent war disaster, as well. The aim is to preserve and reveal their aesthetic and historical values and to use original materials and original way of construction, if possible. In most cases seismic assessment procedures result in the requirements for the strengthening or retrofit of the old masonry building structures. Design and construction procedures of repair and strengthening of two medieval stone masonry buildings are presented. Equilibrium between aesthetic and structural demands is discussed.

**Keywords:** *Historical Structures, Stone masonry, Earthquake, Strengthening.*

### 1. INTRODUCTION

Structural assessment of existing buildings presents specific engineering task, while the attention should be paid to additional aspects, which are usually not considered in the design and construction of the new buildings [1, 2, 3]. Namely, the engineers have to consider the ways the existing buildings were built and the materials, which were used. Among existing buildings, special chapter is devoted to historical buildings, while a lot of historical buildings belong to cultural heritage and merit special care and protection. In addition to the common members of the project team, in the case of any significant intervention on historical buildings, special government agencies and experts in heritage conservation are usually involved. Their concerns about preservation of original building structures and materials cause additional requirements for structural engineers, who are mostly concerned about structural reliability and durability. Sometimes it takes considerable time before the decisions are made how to repair or reconstruct these buildings and to preserve their aesthetic and cultural values. Historical buildings, especially those belonging to cultural heritage in Bosnia and Herzegovina and neighboring region are mostly built of stone masonry. Generally they have robust but brittle structure and in the case of stronger earthquakes could suffer substantial or heavy damages, even collapse of the structure. Evaluation analyses usually show that those buildings generally don't fulfill the demands of modern engineering standards, especially seismic codes. In most cases seismic assessment procedures result in the requirements for the strengthening or retrofit of the old masonry building structures [4]. Where traditional techniques prove inadequate some modern construction and conservation techniques should be implemented. Similar problems occur with traditional construction materials. In order to provide necessary resistance and ductility and also to fulfill the demands of new building codes the contemporary building materials have to be carefully implemented.