Seismic assessment of Heritage buildings in Bulgaria

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ABSTRACT

Earthquakes are some of the most serious causes of degradation and destruction of the heritage buildings. The earthquake can cause different damages, directly and indirectly to the historical buildings and their elements. The biggest part of the heritage buildings were built essentially following empirical rules, refining the proportions of structural elements by an intuitive perception of the structural behavior. In most cases, this trial took only static actions into consideration, so, since seismic horizontal actions modify the baviour in a significant way, an earthquake may frequently produce cracks and local collapses. Seismic assessment of heritage buildings is relevant for any preservation project. Using specific investigations and checks, the best retrofit method can be chosen. Based on different case studies, the aim of the paper is to recommend useful framework and easy applicable assumptions for practicing engineers to evaluate the vulnerability of the historic structures and the possibilities of further steps in their development. Seismic assessment of historic buildings remains a challenging task. There is a high level of complexity compared with the assessment of standard buildings. The assessment and the diagnosis of heritage buildings in seismic areas require an extensive knowledge on the structural typologies and behaviour of heritage buildings. The investigation on previous damages from earthquakes is very important. Adequate and realistic computer modelling of complicated historic structures requires significant designers' expertise. It is probably best to start with the simplest realistic model and then, if necessary, develop a model that reflects more structural features and complexity. The presented paper investigates the challenges posed by, and solutions needed, to ensure the structural longevity of historic structures. Finding the potential for future development of heritage buildings is an important task of the contemporary construction sector. The paper presents only 3 specific case studies, but based on the results it is possible to produce some more general recommendations concerning the seismic assessment, the possibility to identify the vulnerability of historic structures and to give the recommendations for extending the service life of Heritage buildings.

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