Guidelines for the Seismic Assessment and Retrofit of URM Structures – Updates to the AS1170.4 Commentary

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Abstract

Australia has a significant stock of existing unreinforced masonry (URM) buildings, the vast majority of which was built before the adoption of seismic design. As demonstrated repeatedly by earthquake events both in Australia and overseas, this class of buildings is among the most earthquake prone and can pose a life-safety risk to both occupants and bystanders. Yet, very limited design guidance is available to designers on the assessment and retrofit of URM specifically for the Australian context. Thus, in the most recent edition of the AS 1170.4-2007 Commentary (2021, second edition), a new section has been included to provide guidance on the topic. The guidelines draw on decades of research in the field in Australia and internationally, as well as lessons learnt from past seismic events, particularly the February 2011 Christchurch earthquake which provides perhaps the starkest demonstration of how Australian URM buildings are expected to perform when a major earthquake strikes. The purpose of the new section is to provide an overview of the main vulnerabilities of URM buildings and the subsequent priority items for retrofit, as well as strategies for undertaking global assessment of the overall building and assessment of components against local (i.e. out-of-plane) collapse. The additions also attempt to highlight some of the main challenges to assessing Australian URM buildings for seismic actions, including characterising the seismic load path and selecting appropriate ductility factors. This presentation, to be delivered at the 2021 AEES conference, will provide an overview of this new section to the code commentary.

Keywords: unreinforced masonry; new and existing structures; assessment and design structural retrofit; global building stability; local out-of-plane collapse