

GENERATING ANALYTICAL FRAGILITY CURVES FOR GYPSUM PARTITION WALLS WITH DIFFERENT ASPECT RATIOS

E. "Manos" Maragakis^{1,a}

¹Dean of College of Engineering, University of Nevada, Reno, Nevada, 89557, USA

^amaragaki@unr.edu

Abstract

Since generating experimental-based fragility curves for gypsum partition walls are cost-consuming, such curves have been conducted for only limited aspect ratios of wall specimens. To fill this gap, a reliable numerical modelling methodology is necessary to generate comprehensive simulation-based fragility curves. As part of this study, a previously-verified experimental-based analytical model is adopted to develop a procedure to generate seismic fragility curves for the gypsum partition walls. Additionally, five categories of 36 wall specimens with aspect ratios of 0.5, 1, 1.5, 2, and 3 of the gypsum partition walls are modelled and, for the first time, their corresponding seismic fragility curves are generated. Besides wall aspect ratios, the effects of construction quality and connection variations are examined through these numerical simulations. Results from this methodology are then compared against values presented in FEMA P-58. This comparison showed that the medians of partition fragility curves obtained from this study are in close agreement with those in FEMA P-58 for the similar aspect ratios.

Keywords: Gypsum partition wall, Analytical study, Fragility curve, Aspect ratios, Risk assessment.