



Seismic Analysis of Three-Hinge Glulam Tudor Arches Using the FEMA P-695 Methodology

<https://research.thinkwood.com/en/permalink/catalogue693>

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Summary:

This paper discusses the determination of the ASCE 7 seismic response modification factor R for three-hinge glulam Tudor arches. In an attempt to meet this objective, a limited application of the methods and procedures outlined in FEMA P-695 were used to assess the performance of a variety of arch designs. Computational models were created using finite elements within OpenSees to accurately depict the behaviour of the arch. When the crown connections were redesigned using load combinations incorporating over-strength, all of the light gravity load designs systems were successfully able to demonstrate a probability of collapse of less than ten percent when subjected to Maximum Considered Earthquake (MCE) level of ground shaking. Systems designed for heavy gravity did not pass; however, a variety of sidestudies on the influence of inelastic behaviour in the base connections, and varied levels of damping indicate that acceptance criteria of FEMA P-695 may be met through refined modeling assumptions based on results of testing.

Online Access: Free

Resource Link

http://schd.ws/hosted_files/wcte2014/34/ABS437_Charney_web.pdf