

Numerical Study of Out-of-Plane Behaviour of Timber Retrofitted Masonry Prisms

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ABSTRACT

In other to study the application of oriented strand board (OSB) timber panel in retrofitting masonry wall that have been identified as vulnerable elements with limited flexural strength and deformation capacity [1] to resist out-of-plane actions. An experimental study [2] has been carried out to establish the improved flexural performances of timber retrofitted masonry prism. This paper presents the numerical analysis on 665 x 215 x 102.5 mm masonry prism to complement the findings in [2]. Here, the masonry prism model was created using three-dimensional solid (or continuum) elements in ABAQUS. In particular, hexahedral 8-node linear brick, reduced integration, hourglass control (C3D8R) which has an improved convergence and accuracy was selected to generate the mesh that represents the brick unit and mortar joint. The nonlinear properties of mortar joint, brick unit and unit-joint interface that have already been calibrated in [3] were used. The observed damage pattern and load- displacement plots compared with the experimental observations are in good agreement. The calibrated model can then be extended into more complex model and thus fit for a parametric analysis to analyse further the efficiency of the proposed timber masonry retrofit technique.

Keywords: ABAQUS, Flexure, Masonry, Numerical, OSB

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