



## Alternate Load-Path Analysis for Mid-Rise Mass-Timber Buildings

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**Summary:**

This paper presents an investigation of possible disproportionate collapse for a nine-storey flat-plate timber building, designed for gravity and lateral loads. The alternate load-path analysis method is used to understand the structural response under various removal speeds. The loss of the corner and penultimate ground floor columns are the two cases selected to investigate the contribution of the cross-laminated timber (CLT) panels and their connections, towards disproportionate collapse prevention. The results show that the proposed building is safe for both cases, if the structural elements are removed at a speed slower than 1 sec. Disproportionate collapse is observed for sudden element loss, as quicker removal speed require higher moments resistance, especially at the longitudinal and transverse CLT floor-to-floor connections. The investigation also emphasises the need for strong and stiff column-to-column structural detailing as the magnitude of the vertical downward forces, at the location of the removed columns, increases for quicker removal.

Online Access: Payment Required

**Resource Link**

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