

# Analysis of Impact of Cut-Out Irregularity on Building Performance: Investigating Size, Shape, and Distribution Factors

Danish Ahmad Ashwar and Neelam Rani

*Department of Civil Engineering, Dr B R Ambedkar National Institute of Technology  
G.T. Road, Amritsar Bypass, Jalandhar- 144011, Punjab, India*

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**Abstract**—Numerous building failures during earthquakes are attributed to structural irregularities. As a precautionary measure, specific guidelines have been introduced in design codes to address this issue. However, these guidelines are often presented in a general manner, and further research is necessary to examine the impact of irregularity-causing components' shape and distribution in buildings. In this study, the impact of cut-out irregularity in a building model with a moment-resisting frame system was analyzed using ETABS. The size, shape, and position of the cut-out were varied, and the dynamic analysis results were compared to evaluate the effect of cut-out irregularity. The study also aimed to expand the limits specified in IS 1893:2016 (Part 1) to investigate the possibility of developing more meaningful guidelines that accurately reflect the structure's behavior.