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Effective Peripheral Distribution of Base Isolators for Plan Asymmetric Buildings to Minimise Torsion

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Abstract

The naturally occurring ground motion results in disasters such as the collapse of structure and fatality if the built structures are not adequately designed to take the seismic load. Buildings with irregularities in plan and elevation are more prone to seismic damage due to the torsional effect that comes into play because of the eccentricity created between their centre of mass and centre of stiffness. Base isolation is a very effective way to eliminate the ill-effects of seismic forces and is one of the most widely implemented techniques. The main challenge in using base isolation for asymmetric buildings is to address the associated torsional vibrations. This study focusses on the influence of base isolation techniques in mitigating the torsional effect on plan asymmetric buildings. L-shaped buildings with greater plan eccentricity in *X*-direction was chosen for the study. The response of fixed base and base isolated asymmetric structures was compared and analysed using SAP2000 software. The effectiveness of various distribution of isolators was also explored to obtain the most economical option of isolating a building. Among the distributions studied, peripheral distribution gave a similar performance as that of uniform distribution for almost all the cases. Hence, the provision of

isolators under the peripheral columns alone can be an effective way of reducing the total cost incurred in isolating a building.

Keywords

Asymmetric building **Base isolation** **Peripheral distribution**

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