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Accidental Torsion Effects on Buildings

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ABSTRACT

Accidental torsion is an important parameter that should be taken into account while designing structures. Torsion created because of the eccentricity between centre of mass and centre of stiffness that arises as a result of asymmetry in buildings is called as inherent torsion. Accidental torsion accounts for Non-uniform distribution of mass, stiffness and strength parameters which results in additional eccentricity which ultimately causes the building to rotate under seismic action and they have caused severe damage or collapse of structures in several past earthquakes. In the present study, response of structure due to accidental eccentricity is established by analyzing a building described in SP:22-1982 code. This serves as a basic model from which higher eccentricity values are obtained by including variations such as non-uniform orientation of columns and reduction in the stiffness of beams and columns. Analysis method followed is Equivalent Static Method. Even when the building is symmetrical, uncertainties such as non-uniform distribution of mass, stiffness and strength results in accidental torsion. A building regular in plan is analyzed for with and without accidental torsion effects by including parameters such as non-uniform orientation of columns, Uneven distribution of Live loads, reduction in stiffness of beams and columns and increase in aspect ratio. Response of considered models is ascertained by designing column member for which, member forces and area of reinforcing steel required are obtained for varying Seismic load factors.