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Study of Structural Performance of Multi-Storey Regular and Irregular RC Buildings Located in Zone III Under Seismic Loads

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Abstract: this analysis shows it is based on carrying the foundation of the shear and the level of performance of the building under the Indian severe zone. The result marks the conclusion that, in the case of a building with poorly constructed strength, it provides stability and attracts the storey shear. The soft computer software and commercial software CSI-ETABS is used for modeling and analysis.
Keywords: Irregularity, lump mass, drift, displacement, ETABS, dynamic

I. INTRODUCTION

Today, many buildings are irregularly marked in both vertical and horizontal positions. Inadequacies in buildings mean a lack of balance which means a significant difference between the bulk of the structures and the strength structures, resulting in damage associated with the combined response. In addition, in order to design and analyse an unusual structure properly, high levels of engineer and designer effort are required, and a poor designer will design and analyse the structure by leaving many unimaginable parameters leading to unsafe construction, to design and analyse unusual structure. effectively, high levels of engineering and designer efforts are required. Therefore, unfamiliar structures may require additional analysis, and careful design to improve their flexible response to earthquakes. Poor positioning is one of the main causes of structural failure, during an earthquake. For example, softwood floors are the most significant of the collapses. Therefore, the impact of direct earthquakes on building earthquakes becomes increasingly important. Variations in relation to height and size provide flexible features for these structures that are different from a typical structure. IS 1893 is a description of a straightforward distribution in terms of quantity, strength and durability near the height of a building. When such structures are built at high altitudes, analysis and design are extremely difficult. During an earthquake, structural failure begins — with fluctuations in weak areas. This weak point arises from the abandonment of bulk, rigidity and geometry of the structure. The systems with this configuration are called abnormal systems. Informal buildings contribute to a large portion of the city's infrastructure. Inadequacies are one of the main causes of systemic failure during an earthquake. The impact of misalignment during global earthquake operations will be significant. High-density variations in strength and weight make the flexible features of those structures different from the conventional structure. The instability inside the building structures may be due to the unusual distribution of their size, strength and durability of the building. Although such structures are built at high altitudes, analysis and design become more complex.

II. IN-PLANE DISCONTINUITY

Structural irregularity can be classified into two types, i.e. plan and vertical, these can be characterized into five different types such as torsional, re-entrant corners, membrane discontinuity, out-of-plane displacement and non-parallel system for plan irregularity and also vertical irregularity such as stiffness (soft storey), mass, vertical geometric, in-plane discontinuity in vertical members resisting lateral force and capacity discontinuity (weak storey) (IS 1893 (Part I) : 2002) Code, IS 1893 (Part I) : 2002 defined discrepancies re- entrant corners as shown below.Plan irregularity configurations of the entering corner of a structure and its lateral force resisting system include penetration corners where both projections of the structure beyond the corner of the entering opening are greater than 15 percent of its plan dimension in a given direction (IS 1893 (Part I): 2002). In addition, IS 1893 states that when an irregular building is more than 12 m in height and located in high seismic zones i.e. IV and V it should be analyzed either by time history method or response spectrum (IS 1893 (Part I): 2002). This study develops a nonlinear model for planar moment frames using rigid diaphragms and applies it to a five-story building with eight different floor plan configurations. A common plan configuration served as a comparison. The whole models were analyzed by ETABS 9.7 software.

The guidelines and methodology of Indian Standard Practice IS 1893 (Part I): 2002 are used to analyze the structures.

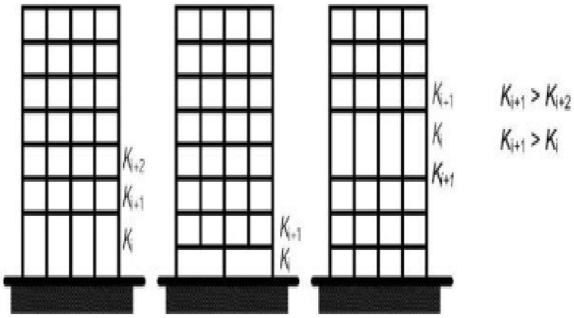

Fig 1: Stiffness Irregularity

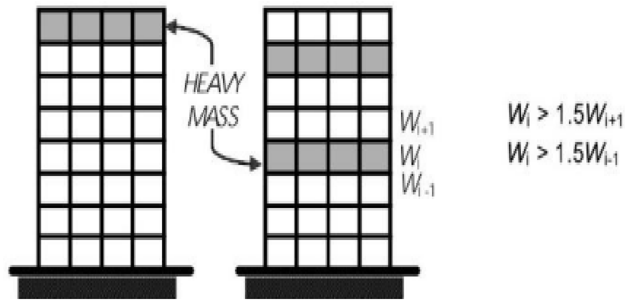

Fig 2: Mass Irregularity

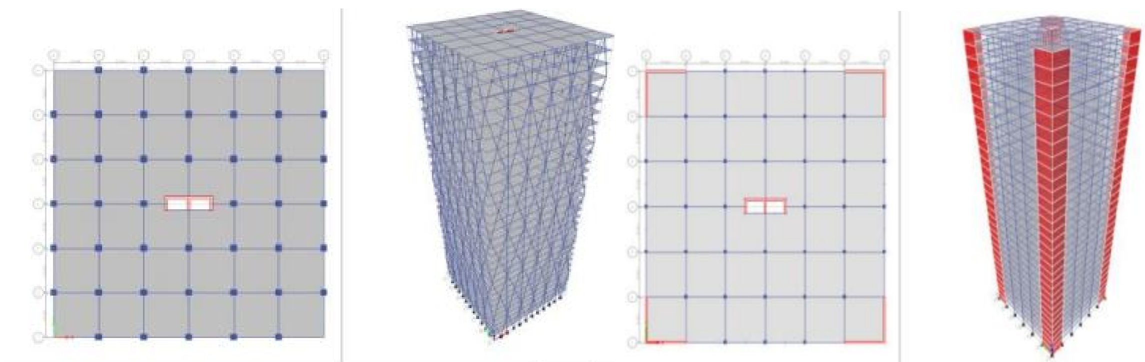

Figure 3: 3D view of diagrid and shear plan view and wall building

III. MODELLING AND ANALYSIS

Build without the inconvenience called a common building or an unconventional building 0%. Vertical geometric inaccuracies introduced by reducing the width of the structure to where in our study consider X. The number of ports in the X-direction decreases to maintain vertical geometric irregularities.

Table 1: Section properties

Size of the column	750mmx750mm
Size of beam	300mmx600mm
Thickness of slab	125mm
Property modifier for column (M2. M3)	0.75
Property modifier for beam (M3)	0.5
Diagrid properties	
Section for diagrid	ISMB350
Total depth	350mm
Flange width	140mm
Flange thickness	14.2mm
Web thickness	8.1mm
Fillet radius	7mm

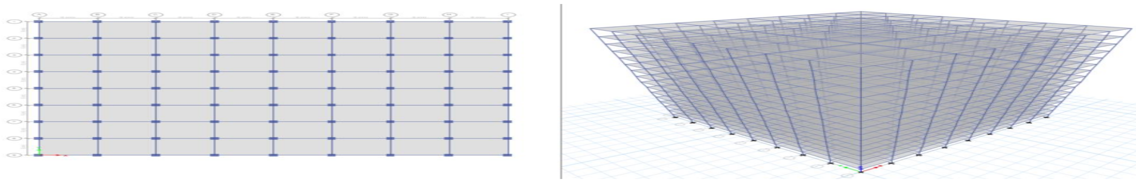

Fig 4: Plan view and 3D view of Regular building

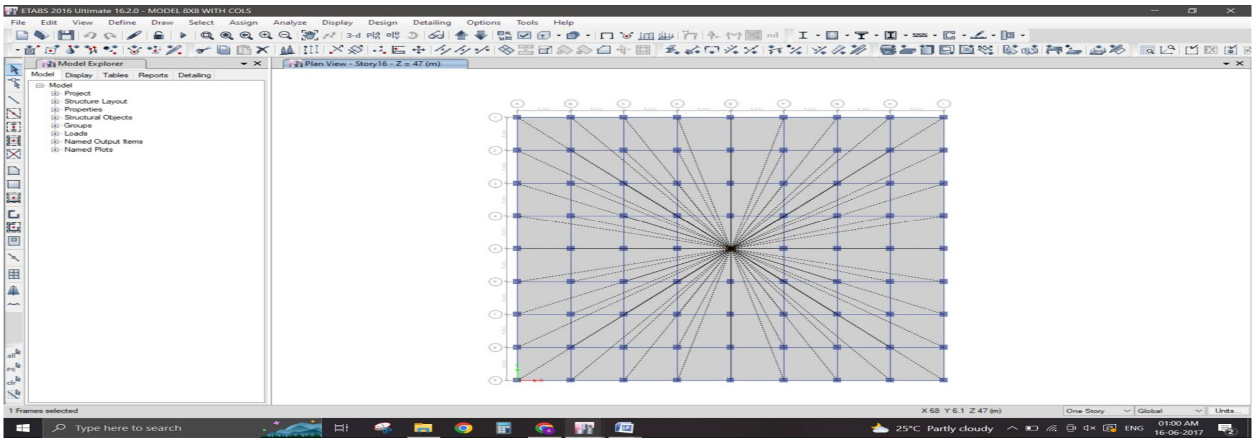

Fig 5: Diaphragm of Regular building mode

IV. CONCLUSIONS

Maximum storey drift results are also high in horizontal irregular model without diagrid.The maximum drifts is within the value of target drift that is assumed. The behaviour of the structure is significant to resist the lateral loads.

V. ACKNOWLEDGMENT

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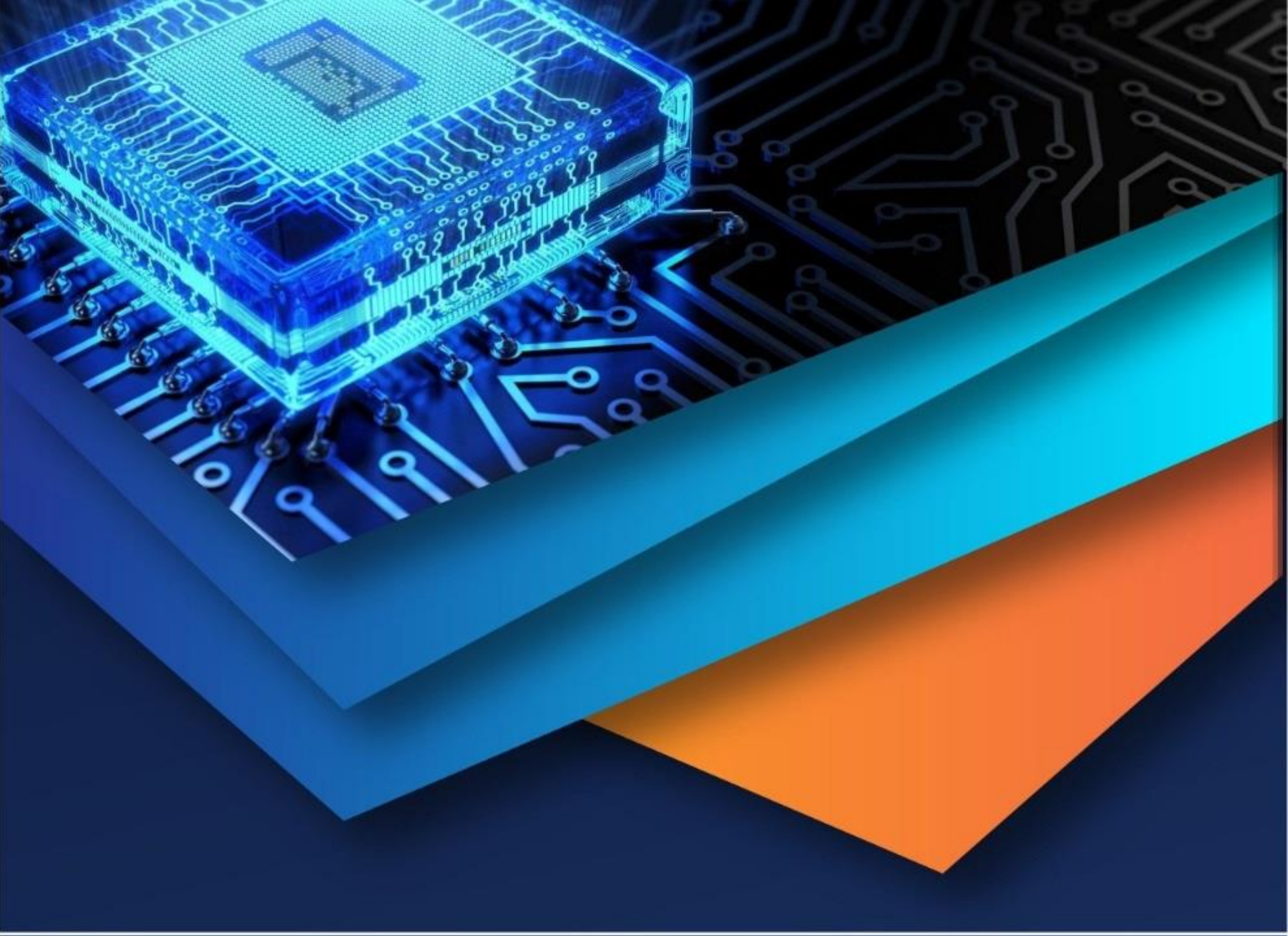

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