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Performance of G+40 story building with and without diagrid at different location.

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ABSTRACT

An abstract is a summary of entire paper should be written in Times new roman with font size- 10. The abstract should not be more than 200 words and written in single paragraph. This electronic document is a "live" template. The abstract includes the overall purpose of the study you investigated, the basic design of the study, results of your analysis and brief summary of your interpretations and conclusion

I. INTRODUCTION

Diagrids is one of the frameworks which improves the seismic presentation of the casing by expanding its sidelong solidness and limit. Diagrid–corner to corner network basic frameworks are generally utilized for tall structures because of its auxiliary effectiveness, adaptability in design arranging, vitality retention limit and tasteful potential given by the one of a kind geometric setup of the framework. Henceforth the diagrid, for basic adequacy and feel has produced restored enthusiasm from compositional and basic architects of tall structures. Diagrids are intended for developing tall structures with steel that makes triangular structures with corner to corner bolster pillar.

The diagrid structural system may be outlined as a diagonal member shaped as a framework created by the intersection of various materials like metals, concrete or wood beams that are used in the construction of buildings and roofs. Diagrid structures of the steel members are efficient in providing a solution both in term of strength and stiffness. But these days a widespread application of diagrid is employed within the giant span and high-rise buildings, significantly after they area unit complicated geometries and arced shapes. Diagrid structure consists of inclined columns on the exterior surface of the building. Due to inclined columns, lateral loads are resisted by axial action of the diagonal compared to bending of vertical columns in framed tube structure. Diagrid structures typically, do not need core because of lateral shear may be carried by the diagonals on the outer boundary of a building.

II. METHODOLOGY

Diagrids rely heavily on the axial stiffness and strength of their diagonals to provide the required lateral and gravity support for the building. The stiffness of the diagonals depends on the Young's modulus of the material, the cross-sectional area of the member, the length of the member, and the angle of the diagonals. The lateral stiffness depends upon the cosine of the angle, while the gravity stiffness depends upon the sine of the angle.

Variation of Stiffness with Theta

As the angle of the diagonals increases, the efficiency of the diagonals at carrying gravity loads increases, while the ability of the diagonals to effectively carry lateral loads decreases. Similarly, as the angle decreases, the diagonals carry lateral loads more efficiently but carry gravity loads less effectively. This dichotomy suggests the existence of an angle at which the structural capability of the member is optimized for both gravity and lateral loadings.

Stiffness Distribution Between Diagrid and Core

The diagonals in a Diagrid carry loads axially, the connections in Diagrids can be pinned connections. However, given the potentially complex nature of the Diagrid's geometry, the connections are often prefabricated to make erection easier. The nodes help the members triangulate and they provide connection opportunities for the slabs and beams to the Diagrid.Current design practices are focused on strength-based design procedures where the design demand values are peak quantities from extreme loading conditions.Members are sized to insure their strength capacity is greater than the strength demand, after which serviceability conditions are

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checked based on parameters like deflection, inter story drift, and floor accelerations

III. MODELING AND ANALYSIS

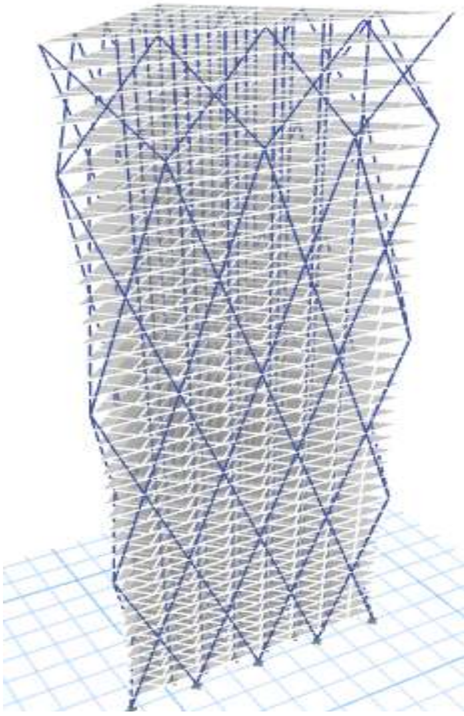

Figure 1: Elevation of G+40 Building with 12 storey module Diagrid system.

IV. RESULTS AND DISCUSSION

Table 1. Lateral Displacement (X-direction-mm)

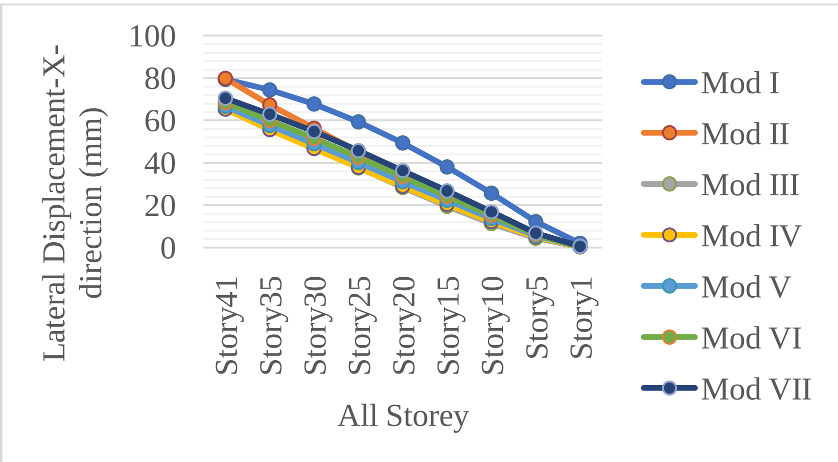

Figure 2: Lateral Displacement-X-direction (mm) for all models

From the above figure it is observed that Lateral Displacement-X-direction (mm) found to be minimum in Model IV: G+40 Building with 6 storey module Diagrid system and maximum in the Model II: G+40 Building with 2 storey module Diagrid system with value of 80 mm. the lateral displacement goes on decreasing from the storey 41 to the storey-1 for all the models. From these results it is observed that the Model IV: G+40 Building with 6 storey module Diagrid system is found satisfactory results as compared to the other models. A per the IS code all the models are under the permissible limit of maximum displacement of

H/500 i.e. 246 mm. So the all models found to be performed satisfactorily.

V. CONCLUSION

1. From the above results it is observed that Lateral Displacement-X-direction (mm) found to be minimum in the model-IV and maximum in the model-II with value of 80 mm. Also, it is observed that Lateral Displacement-Y-direction (mm) found to be minimum in the model-IV and maximum in the model-II with value of 170 mm.
2. From the above results it is observed that Storey Drift-X-direction (mm) found to be minimum in the model-III and maximum in the model-I with value of 3.1 mm. Also, it is observed that Storey Drift-y-direction (mm) found to be minimum in the model-I and maximum in the model-II with value of 5.1 mm.
3. From the above results it is observed that Storey Forces -X-direction-(kN) found to be minimum in the model-III and maximum in the model-II with value of 5100 kN. Also, it is observed that Storey Forces -X-direction-(kN) found to be minimum in the model-III and maximum in the model-II with value of 4100 kN.
4. From the above results it is observed that Storey Stiffness--X-direction-(kN/m) found to be minimum in the model-IV and maximum in the model-II with value of 1300000 kN/m. Also, it is observed that Storey Stiffness--Y-direction-(kN/m) found to be minimum in the model-IV and maximum in the model-I with value of 700000 kN/m.
5. From the above results it is observed that Fundamental Time Period of Building found to be minimum in the model-IV and maximum in the model-II with value of 5.4 sec. Also, it is observed that Lateral Displacement (mm)-X-direction for model-I found to be increasing as the number of storey increases with maximum value of 80 mm.
6. From the above results it is observed that Lateral Displacement (mm)-X-direction for model-III found to be increasing as the number of storey increases with maximum value of 65 mm. Also, it is observed that Lateral Displacement (mm)-X-direction for model-V found to be increasing as the number of storey increases with maximum value of 68 mm.
7. From the above results it is observed that Lateral Displacement (mm)-X-direction for model-VII found to be increasing as the number of storey increases with maximum value of 70 mm. Also, it is observed that Storey Drift(mm)-X-direction for model-I found to be increasing up to storey-5 with maximum value of 3 mm.

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