

Comparative Study of Flat Slab Structure and Conventional Slab Structure using ETABS Software

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Abstract - These days Flat Slab has become more common in construction field because the use of flat slab reduces the self-weight of the building, reduces the time consumption in construction and providing flat slab in buildings in quite common economical. Before the use of flat slab i.e. in the beginning the use of Conventional Slab is common as this type provides more Stiffness for the structure, Load carrying capacity is more and it was economical and safe too. Hence considering the positive factors of Flat Slab this has become more common now a day. The Flat slab building is used these days because these structures offer many benefits which a normal slab structure does not. The objective of the current work is to differentiate the performance of the multi-storey commercial building having the flat slab with normal beam slab. In this present work we are going to study on the G+5 multi storied structure having flat slab & conventional slab has been analyzed for the various factors such as the base shear, story drift, and displacement. This present work provides reasonable information about the suitability of flat slab for various seismic zones without compromising the performance over the conventional slab structures. The analysis is carried by ETABS 2015 software.

Key Words: Storey Displacement, Storey Shear, Storey Drift, ETBAS.

1. INTRODUCTION

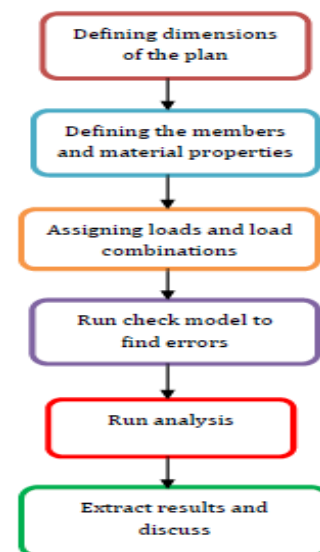
Flat slab buildings are reinforced concrete buildings in which columns are directly supported on the roof slab without beams is known as Flat Slab. Flat slab is consists of Column drop, Column head, and Middle strip. Flat slab buildings are used in places like mall, theatres, restaurant and many other commercial buildings. Still many advantages of the flat slab are that it consumes lesser construction time reduce the floor to floor height, easier form work and hence the flat slab are used in residential building, car parking's and other structures. Flat slab buildings are preferred both from the draughtsman and the customers since of the visual looks and financial purpose. In recent days the flat slab is widely used in India.

1.1 OBJECTIVE OF THE PRESENT WORK

- This work deals the comparison concerning the flat slab & the conventional slab building subjected to various loads and conditions.
- To compare and study the behavior of the both of the structures for the factors like as the storey shear, displacement, and the storey drift and axial forces.
- Comparison of the flat slab building and the conventional slab building is studied for the same parameters described above.

2. METHODOLOGY OF THE PROJECT

The analysis of flat and conventional slab structure has been done by using ETABS software package. Before analysis all the required elements of the structure needs to be defined earlier like material properties, loads, load combinations, size of members, response spectrum etc. once the analysis has been done we can extract the results like displacement, storey shear, bending moment, drift ratio, axial forces for comparing the performance of flat and conventional slab building. The following flow chart shows the steps involved in the analysis by ETABS.

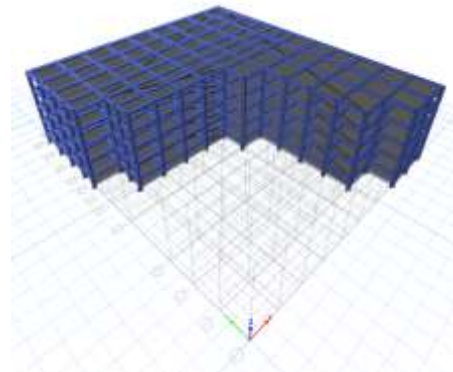
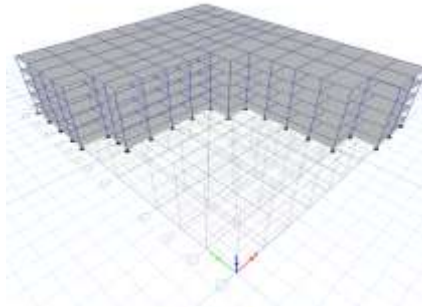
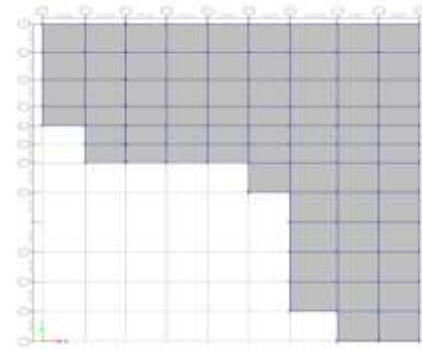
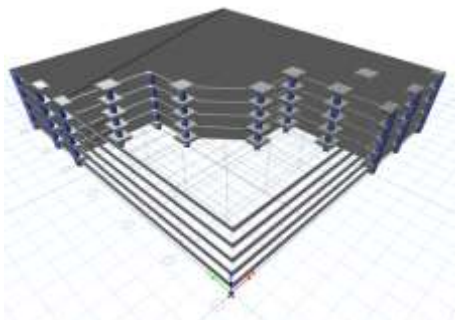
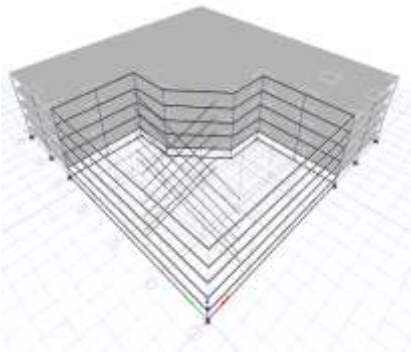
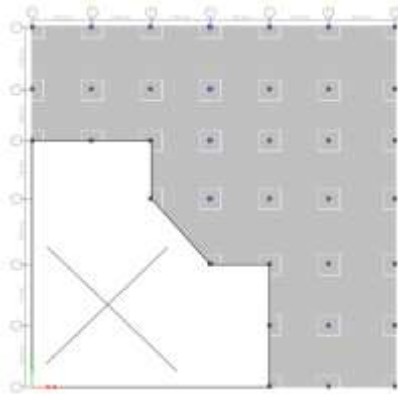


3. DESCRIPTION ABOUT THE MODEL

My project involves the analysis and design of multi storied buildings which is a comparison study between flat slab building and conventional slab building for various aspects such as Displacements, Storey Drift, Base Shear and Axial Forces.

plan dimension	50m x 50m (G+5)
total height of the building	17.5m
structure	R.C.C (SMRF)
storey height	3.2m
base consideration	Fixed
building consideration	G+5

3.1 ETBAS MODEL GENERATION



4. RESULTS AND DISCUSSION

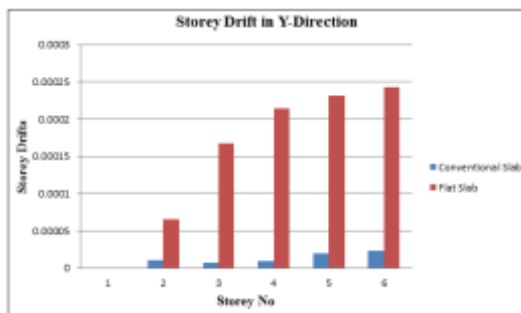
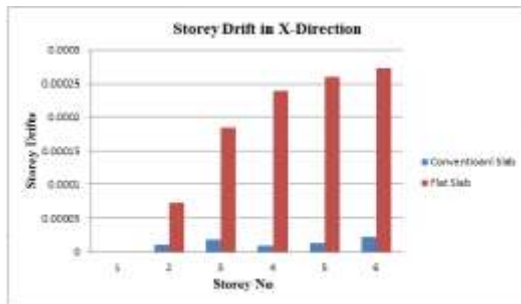
The following work is carried out to examine the comparison between the Flat slab building and Conventional slab building. In this approach the results which were obtained from study between Flat slab buildings and conventionally slab structure by means of ETABS has been formulated. & behavior of the both the structures for various parameters such as Displacement, Storey shear, Storey drift, has been analyzed and charted as follows below.

4.1. STOREY DISPLACEMENT

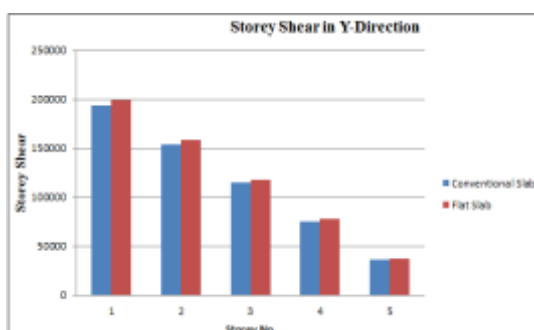




4.2. STOREY DRIFT



4.3. STOREY SHEAR



5. CONCLUSION

- There is maximum storey displacement at roof level than compared to the ground level. The building displacement of the conventional slab building is comparatively lesser than the flat slab building. Hence the storey displacement in this analysis is greater by the flat slab building compared to conventional slab.
- Storey Drift is also compared with both the structures that the conventional slab building and flat slab building. Here also the storey drift for all the number of storeys the flat slab is having maximum of drift than compared to the conventional slab building.

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