

# Study on Analysis of Multistory Building With Grid Slab Using Beams, Without Beams And Drop Panel In ETABS

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**Abstract-** Grid floor is the best quality system of approach used in the building construction that include of beams which is going to be place at the regular intervals accordingly in the order of the perpendicular way in the direction, monolithic which includes the slab. This is the best quality system and widely adopted in the big size rooms such as auditoriums, vestibules, theatre hall, show room, complex etc. where the need of the regular and its maintains is somewhat low at the consideration levels. In this system the shape and structure is going to be the rectangular or square void formed in the ceiling is which will give the best performance in the results to with stand the seismic levels. The same sizes is employed in beams and it is provided at the regular interval of the perpendicular along with the certain directions are generally we are going to keep it same. Here we will be going to take in to the consideration of the G+5 Building and analysis along with the calculated software consideration accordingly and its design is done for both seismic and also considering the factors of the some pushover analysis which will helps to study the different models without beams and drop panels. In this project the various values and parameters are considered and analysis done thereafter we are going to compare the results with other models the transverse beams in grid floor. We are going to take parameters like the span to depth ratio, spacing of transverse beams, thickness of web and thickness of flange. The value for the depth is considered is 16 to 60. The provide spacing under the consideration of the transverse beams will be range from 0.5m to 2.0 m. Thickness consideration of the slab and also along with the ribs are made with the values of 0.1m and 0.125m. Then we are going to study the maximum story displacement along with the help of results also i.e. the shear and special aspects like the maximum drift are considered and also main points of the seismic load which has been developed in grid floor beams will been obtained from the method approach of the conventional and numerical methods and the results are compared.

**Keywords-** Grid floor, ETABS, wind and earth quake.

## I. INTRODUCTION

**Grid slab:** For the purpose of supporting interconnected systems in grids is been utilized considering buildings along with the bridge decks also taking in to picture about overhead water tanks and its slabs structure. In this kind of grid it is supposed to be a planar and structural in its system composed members to be continuous that is going to be intersecting or else it will be cross to each other. These kinds of Grids is utilized to be covering the considering large column at all free at its areas it is been build in our country and also in abroad. It is subjected to loads applied normally to its plane, the structure is referred as Grid. It is supposed to be considered as continuous member. In addition grids are supposed to appear good in appearance it is very advantageous considering all other types of systems that has been used in roofing.

**Structure grids:** The simplest her is considered to be plank and also considering the beam this will helps to create surfaces like flat and horizontal. Hence greater capacity and good performance is got. The floor and its design will having one slab that considered to be integral and also spanning in two ways of direction the flooring will be supported that to will be a beams which is rectilinear grid and it is called as structural grid.

**Skewed Grids:** If the overall structure supposed not to be a square then by utilizing the skewed grid the efficiency and greater performance will be achieved. Skewed grid will be considered as a Curved and its surface will be in system of Grid. These kind of systems warped in order to get an special curved surface grid and also considering the spans which has the large in along the distances with an manner of efficient. This idea of the arch shaped is added along with that of the skewed grids to get the increase in the vales of greater efficiency.

**Curved surface Grids:** The wrapped style system is supposed to form a curved surface grid along with the spans which will

be a large in terms of the distances and also will be more efficient.

**Advantages of Grid slabs:**

The system is well efficient is considering the concentrated loads that will be working in carrying the loads in all areas.

Lowers the ration involves in the depth to span ratio that is in rectangular grids.

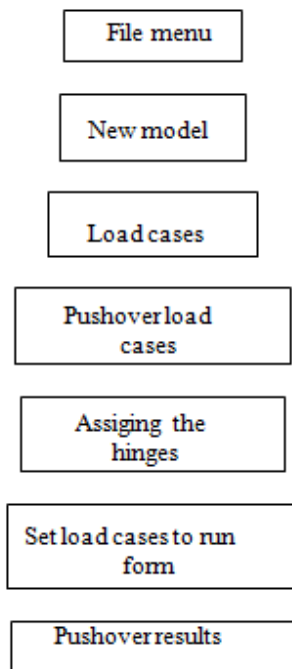
Reducing the criteria of depth, overall economical cost will be reduced along with the height of the structure of building.

**Characteristics of Slabs:**

- 1) Provides good results without consideration of any improvement or repairing.
- 2) Great capability for resist on fire for a total certain period
- 3) Also Resistance considering the heat transmitting

**II. METHODOLOGY**

The analysis and design of structure is performed on E-Tab software in accordance with IS 1893-2002 and IS 456-2000 is shown through flow chart below.

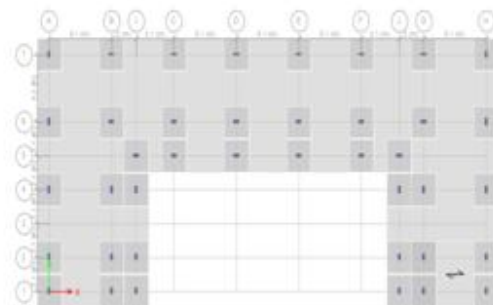


**Fig 3.1: Flow Chart**

**III. MODELING AND ANALYSIS**

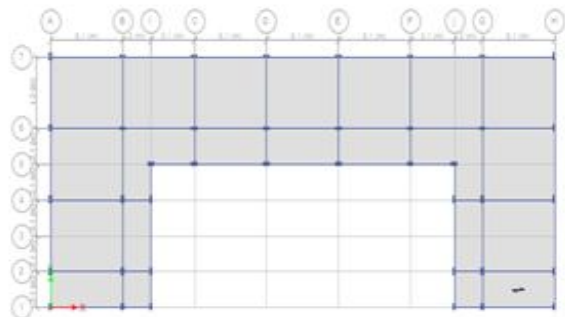
The FEM based structura software is used for modelling and analysis of the building. The analysis is carried out using ETABS software.

**1) Modeling and Analysis of Building with Drop panels:**



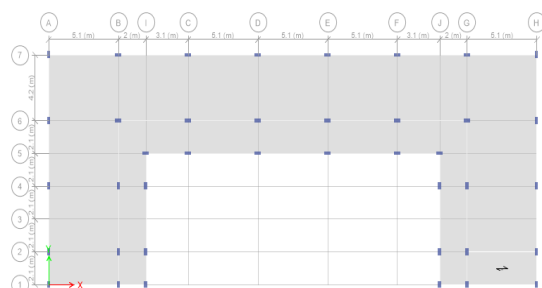
**Fig: Floor Plan**

**2) Modeling and Analysis of Building with beams and without Drop panels:**



**Fig: Floor Plan**

**3) Modeling and Analysis of Building without beams and Drop panels:**



**Fig: Floor Plan**

IV. RESULTS

1) MAXIMUM STORY DISPLACEMENT

Comparison of Maximum Story Displacement for PushX

	x dir	y dir
with beam	44.986	14.261
without beam	48.219	15.647
drop panel	47.465	16.17

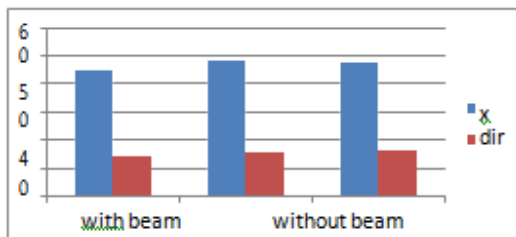


Fig: comparison of max story displacement for push x

Comparison of Max Story Displacement for PushY

	x dir	y dir
with beam	22.524	62.588
without beam	15.682	61.221
drop panel	19.84	58.176

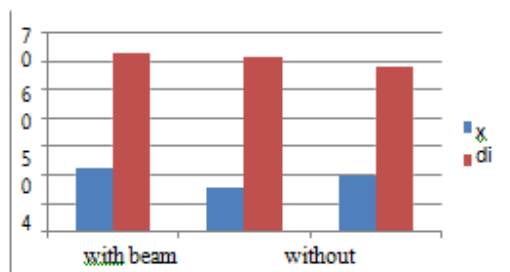


Fig: comparison of max story displacement for push y

2) MAXIMUM STORY DRIFT

Comparison of Maximum Story Drift for Push X

	x dir	y dir
with beam	0.004412	0.001665
without beam	0.00473	0.001897
drop panel	0.00462	0.001807

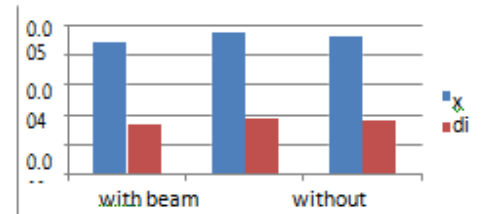


Fig: comparison of max story drift for push x

Comparison of Maximum Story Drift for Push Y

	x dir	y dir
with beam	0.002342	0.006263
without beam	0.001714	0.006253
drop panel	0.001937	0.005885

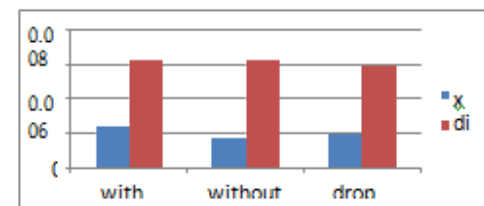


Fig: comparison of max story drift for push y

3) SHEAR

Comparison of Shear for Push X

	x dir	y dir
with beam	141808.2	0
without beam	141361.7	0
drop panel	140819.9	0

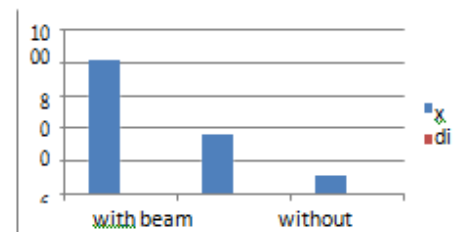


Fig: comparison of shear for push x

Comparison of Shear for Push Y

	x dir	y dir
with beam	0	113059.3
without beam	0	113179
drop panel	0	114224

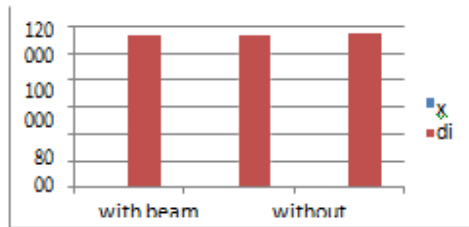


Fig: comparison of shear for push y

4) SEISMIC LOAD

Comparison of Seismic Loads in X Direction

	x dir
with beam	485.4418
without beam	420.4291
drop panel	551.0431



Fig : comparison of seismic loads in x direction

Comparison of Seismic Loads in Y Direction

	Y dir
with beam	485.4418
without beam	420.4291
drop panel	551.0431

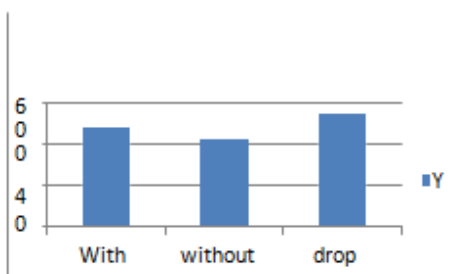


Fig : comparison of seismic loads in y direction

V. CONCLUSION

As after depth study of the project and its different models by applying similar conditions but different kinds of constructions shapes or factors like flats lab and flat plates with grid system we have obtained certain values that are eventually show good performance when comparison analysis and its results are studied . so the grid system show as good and great response values when compared with that of normal building constructions that’s been considered from many years the following are the observation made in the results.

1. The pushover analysis is a simple way to explore the nonlinear behavior of building.
2. In this analysis some of the values like the weak elements which incorporates the predicting the failure points . Shapes or factors like flats lab and flat plates with grid system.
3. Grid system directly resting shows good response and performing good stability for the earth quake loads as per load combinations that as taken in to account.
4. Resultant displacements between multistory buildings with grid slab with beams without beams and drop panels, in this with beam model is safe
5. Base shear in three different types of model in x and y direction is drop panel and with beam model
6. Drift is safe for with beam model in x direction and for drop panel in y direction.
7. Sismic load in x direction and y direction is safe for drop panel building
8. Designing by Software’s like ETABS reduces ton of your time in design work.
9. Accuracy is improved by using software

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