International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)
Impact Factor: 5.22 (SJIF-2017), e-ISSN: 2455-2585
Volume 4, Issue 6, June-2018

A STUDY ON ANALYSIS OF RC MULTISTORIED BUILDING (G+25) IN DIFFERENT SEISMIC ZONES AND DIFFERENT WIND SPEED

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ABSTRACT-At the pointonce a structure is subjected to earthquake, it reacts by vibrating. A seismic earthquake forcemay be settled into 3mutually opposite directions, i.e., the 2 horizontal directions (x and y) and also the vertical direction (z). This motion makes the structure vibrate. it's quite necessary to review the impacts of horizontal loads caused by wind and seismic earthquakes within the analysis of RC structures, significantly for high-rise structures. The fundamental aim of learningaboutseismic earthquake safe structures is that structures need to have the capability to oppose minor quakes while notinflictingharm.The current study covers regarding the concrete multi-storied building with different Seismic zones of India and with four totally different wind speeds using's ETabs. The current study is regardingwhat proportion the structure effectsvaries from different seismic ZONES and different wind speeds.

Keywords: Displacement, Drift, Dampers, storey shear, Equivalent static method,

I. INTRODUCTION

Dynamic actions are effected on buildings by wind and seismic loads or earthquakes. However, design for wind forces & for seismic, are completely distinct. The instinctive logic of structural design utilizes force as the basis, which is stable in wind design, where building is constrained to a stress on its vulnerable surface area, such type is known as force type loading. But, in seismic design, the building is enslaved to irregular motion on ground on its base, which releases inertia forces into the building which effects it to bring out stresses; such type of loading is known as displacement-type loading. Further methods of conveying this dissimilarity is over the load-deformation curve by building. The order or demand on building take place by force in force-type loading enforced through wind pressure, and displacement through displacement-type loading forced through seismic shaking. Along these lines, under wind forces, the building may encounter little vacillations in the stress field, be that as it may, inversion of stresses happens just when the course of wind turns around, which happens just finished a vast term of time. Then again, the movement of the ground amid the seismic earthquake is cyclic about the impartial position of the structure. Hence, the worries in the working because of seismic actions experience numerous total inversions and that to over the little length of seismic earthquake effect.

A) OBJECTIVES OF STUDY

The aims of current study follows:

- How the seismic assessment of a building ought to be completed.
- To understand about the conduct of a working under the activity of seismic loads and wind loads.
- To look at different examination consequences of building under ZONE_II, III, IV and zone V utilizing ETABS Programming.
- The building model in the investigation has G+25 storey's with consistent story stature of 3.2m.
- Diverse estimations of zone factor are taken and their relating impacts are deciphered in the comes about.
- Diverse estimations of wind SPEED are taken for wind examination and their comparing impacts of building structure are deciphered in the result.

B) SCOPE OF STUDY:

- RC structures are initially intended for gravity loads and afterward for seismic burdens.
- The examination has been completed by presenting symmetrical BARE frame building models on various zones utilizing ESM.
- The investigation accentuation and examines the impact of seismic zone factor on the seismic execution of G+25 building structure.
- The whole procedure of demonstrating, examination and plan of all the essential components for every one of the models are conveyed by utilizing ETABS 2016 nonlinear form programming.
- To determine the possible extent behavior that take place when RC building models are subjected to seismic and wind effects.

C) Analysis Method Used

As mentioned in Indian Standard Code 1893:2002 &IS875 Part III after technique for examination have been prescribed to discover the plan sidelong loads,

a. Equivalent Static Analysis (ESA)

D) Modeling Method :

The software ETABs V-2016 is used for analysis & investigation. Displaying of R.C MULTI-STOREYED BUILDING model is used

II. GENERAL

The mass of the building being planned controls seismic plan notwithstanding the building solidness, since seismic earthquake instigates interia forces that are corresponding to the building mass. Planning structures to carry on flexibly amid seismic earthquakes without harm may render the undertaking financially unviable. As a result, it might be essential for the structure to experience harm and accordingly disperse the vitality contribution to it amid the seismic earthquake.

MODELS OF THE BUILDING

Model 1: The structure being modelled as G+25RC Building in zone II

Model 2: The structure being modelled as G+25RC Building in zone III

Model 3: The structure being modelled as G+25RC Building in zone IV

Model 4: The structure being modelled as G+25RC Building in zone V

Model 5: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 44m/s

Model 6: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 39m/s

Model 7: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 49m/s

Model 8: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 50m/s

Model 9: The structure being modelled as G+25RC Building in zone II with dampers

Model 10: The structure being modelled as G+25RC Building in zone III with dampers

Model 11: The structure being modelled as G+25RC Building in zone IV with dampers

Model 12: The structure being modelled as G+25RC Building in zone Vwith dampers

Model 13: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 44m/s with dampers

Model 14: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 39m/s with dampers

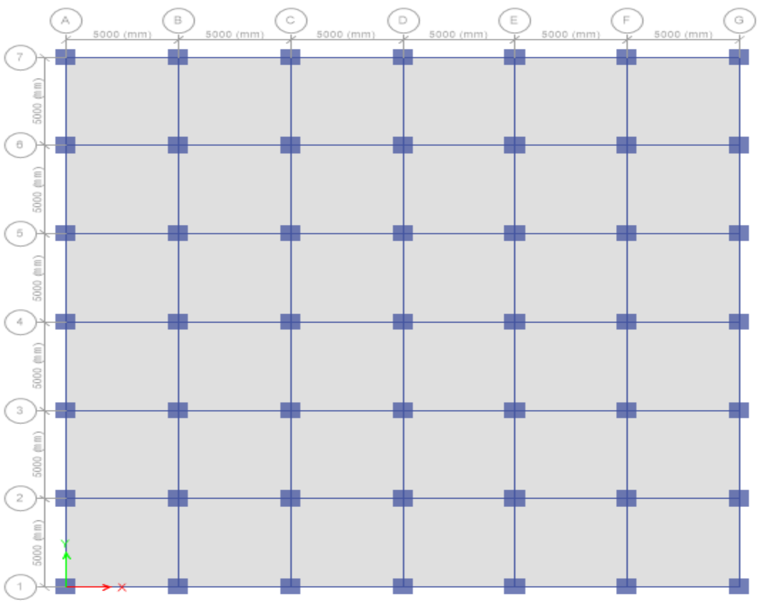
Model 15: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 49m/s with dampers

Model 16: The structure being modelled as G+25RC Building under the action of Basic Wind Speed 50m/s with dampers

Structure Data

The structural plan layout of RC frame building of 25 storied is shown in above Fig. In this study, the plan layout is purposely kept similar for all building models to study the effect of Dampers at Corners. The height of bottom storey is kept 3m & typical height of upper storey's i.e., GF to 25th storey is 3.2m in all building models. The structure is considered to be placed in different seismic Zones and hard Soil Condition. The structural data provided for the structure is detailed below.

III. PLAN USED IN ANALYSIS



Materials Used & Geometrical Properties

PARAMETERS	ZONE_II	ZONE_III	ZONE IV	ZONE V
Seismic zone factor	0.10	0.16	0.24	0.36
Basic wind speed	44 m/s	39 m/s	47 m/s	50 m/s
Response reduction factor	5	5	5	5
Soil condition	Hard	Hard	Hard	Hard
Importance factor	1	1	1	1
Slab thickness	0.150m	0.150m	0.150m	0.150m
Beam size	0.23X0.45m	0.23X0.45m	0.23X0.45m	0.23x0.45m
Column size	0.9X0.9 m	0.9X0.9 m	0.9X0.9 m	0.9X0.9 m
Live load	3 KN /m^2	3 KN /m^2	3 KN /m^2	3 KN/m^2
Dead load	4.5 KN /m^2	4.5 KN /m^2	4.5 KN /m^2	4.5 KN /m^2
Floor finish	1 KN /m^2	1 KN /m^2	1 KN /m^2	1 KN /m^2
Material properties	M40	M40	M40	M40

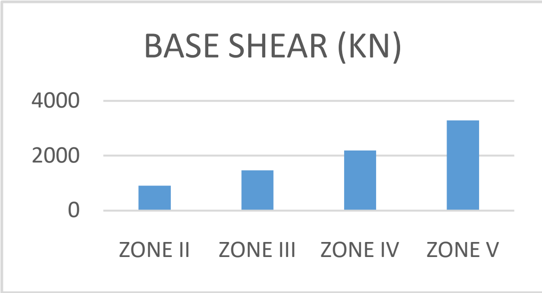
In this chapter, the results of analytical building models studied are presented & discussed. The results are included for building models & the response results are computed using the equivalent static & wind analysis. The analyses of models are achieved through ETABS analysis package.

The results of, lateral displacements, storey drifts & base shear for the distinctive building models for each of above analyses are presented & compared. An exertion has been done to concentrate the influence of dampers at corners on RC.

IV. RESULTS OF ANALYSIS

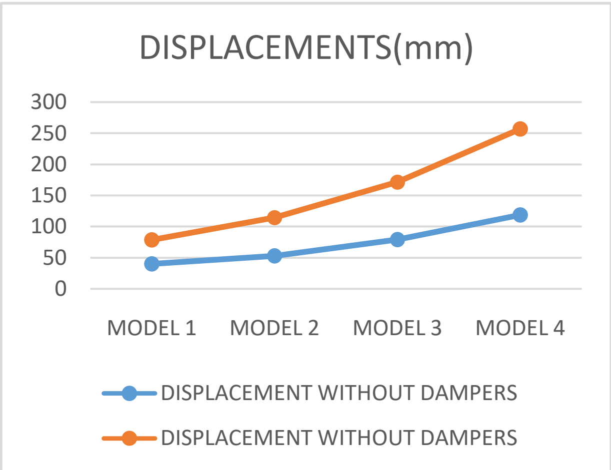
BASE SHEAR

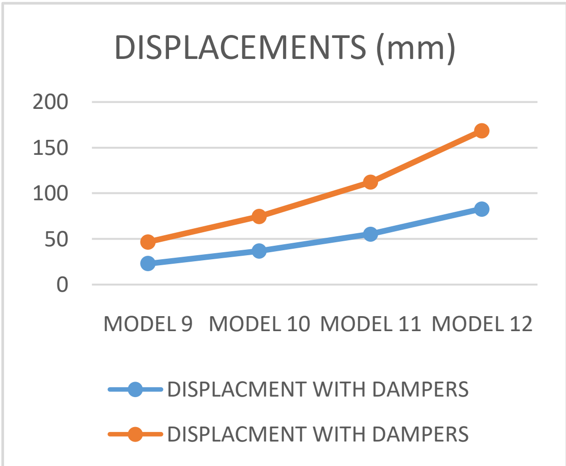
ZONES	BASE SHEAR (KN)
ZONE II	915.049
ZONE III	1464.078
ZONE IV	2196.117
ZONE V	3294.1763



DISPLACEMENT DUE TO DIFFERENT SEISMIC ZONES

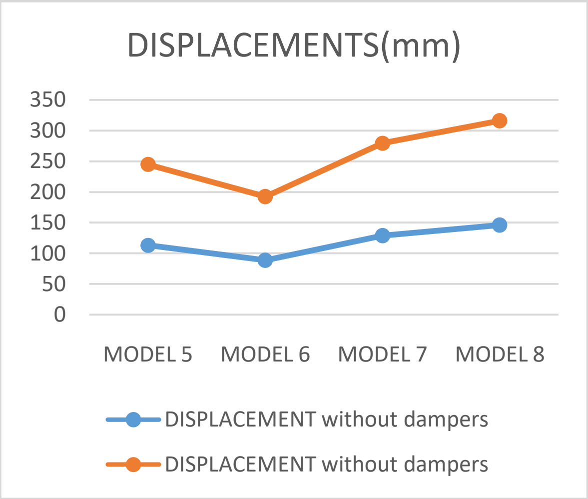
MODEL No.	DISPLACEMENT WITHOUT DAMPERS		MODEL No.	DISPLACMENT WITH DAMPERS	
	EQX	EQY		EQX	EQY
1	39.992	38.379	9	23.042	23.744
2	52.787	61.409	10	36.868	37.991
3	79.181	92.11	11	55.302	56.986
4	118.771	138.165	12	82.953	85.48

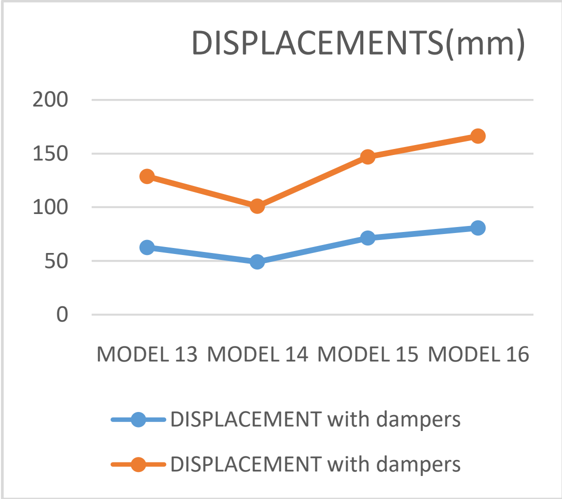




DISPLACEMENT DUE TO DIFFERENT WIND SPEEDS

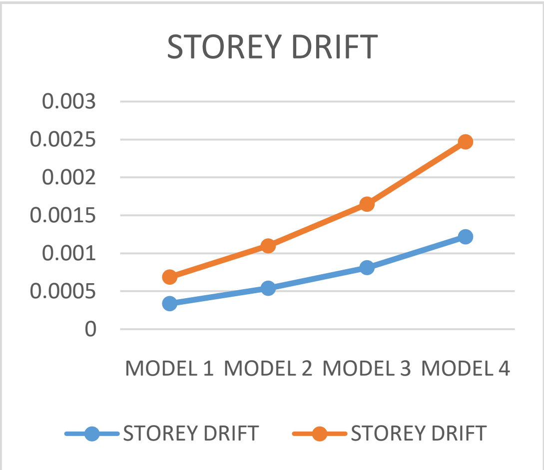
MODEL No.	DISPLACEMENT without dampers		MODEL No.	DISPLACEMENT with dampers	
	EQX	EQY		EQX	EQY
5	113.33	131.567	13	62.673	66.153
6	89.037	103.364	14	49.238	51.973
7	129.311	150.119	15	71.51	75.482
8	146.346	169.895	16	80.93	85.425

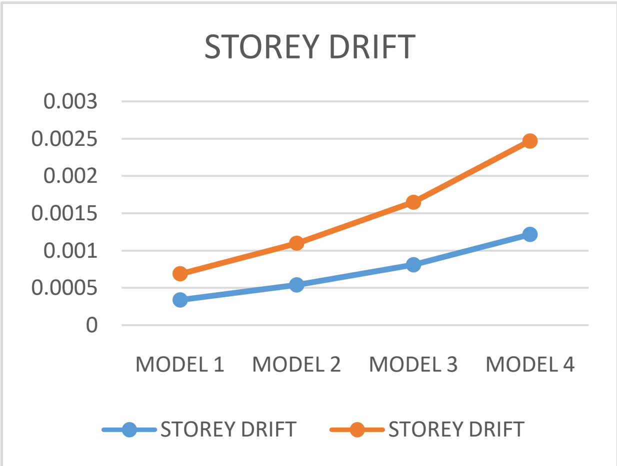




STOREY DRIFT DUE TO DIFFERENT SEISMIC ZONES

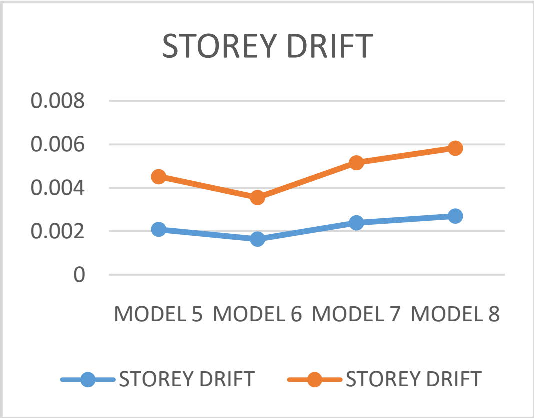
MODEL No.	STOREY DRIFT		MODEL No.	STOREY DRIFT with dampers	
	EQX	EQY		EQX	EQY
1	0.000338	0.000348	13	0.000915	0.000963
2	0.000541	0.000557	14	0.000719	0.000756
3	0.000811	0.000836	15	0.001044	0.001099
4	0.001217	0.001254	16	0.001181	0.001243

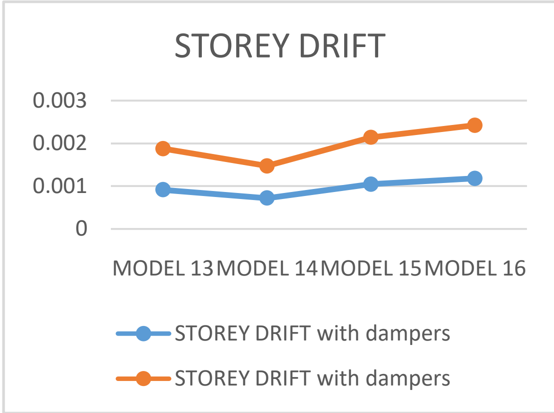




STOREY DRIFT FOR WIND SPEEDS

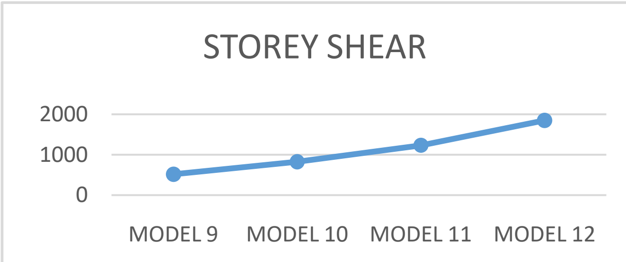
MODEL No.	STOREY DRIFT		MODEL No.	STOREY DRIFT with dampers	
	EQX	EQY		EQX	EQY
5	0.002089	0.002425	13	0.000915	0.000963
6	0.001642	0.001905	14	0.000719	0.000756
7	0.002384	0.002767	15	0.001044	0.001099
8	0.002698	0.003132	16	0.001181	0.001243





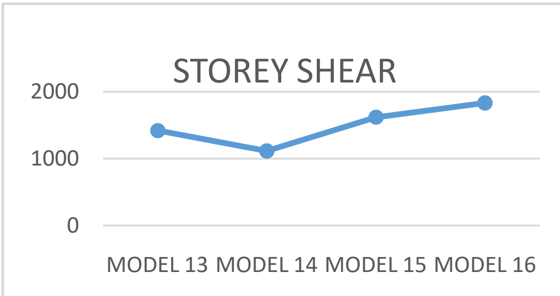
STOREY SHEAR ALL SEISMIC ZONES USING DAMPERS

MODEL No.	STOREY SHEAR
9	514.366
10	822.986
11	1234.48
12	1851.72



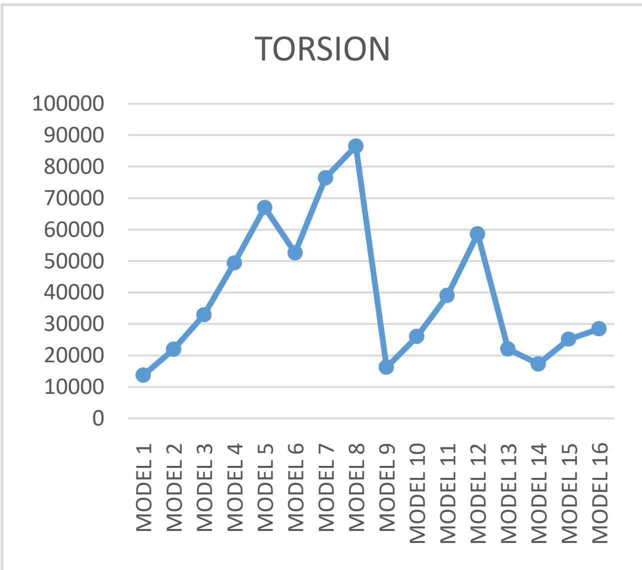
STOREY SHEAR ALL WIND SPEED USING DAMPERS

MODEL No.	STOREY SHEAR
13	1417.4765
14	1113.6269
15	1617.3582
16	1830.419



TORSIONAL FORCE

MODEL No.	TORSION	MODEL No	TORSION
1	13725.7346	9	16292.1158
2	21961.1753	10	26067.3853
3	32941.763	11	39101.078
4	49412.6445	12	58651.6169
5	67029.3691	13	22069.5729
6	52660.9868	14	17338.7502
7	76481.3411	15	25181.6563
8	86556.52	16	28498.932



V. CONCLUSIONS

- The base shear of structure increases as we go to higher seismic zones. For a comparative building, the base shear estimation of ZONE_II is 915.049 KN and ZONE V is 3294.176 KN. This implies base shear increments by 360% if seismic ZONE changes from II to V.
- The Displacement of building models increments with the expanding of seismic Zones. The Displacement is high at rooftop and low at the base. The displacement happen at the ZONE_II is 39.992 mm and ZONE IV is 118.771 mm. This implies base shear increments by over 30% if seismic ZONE changes from II to V.
- The displacement of building models increments with the expanding of wind weight. The displacement is high at rooftop and low at the base. The displacement happens at the wind speed 39 m/s is 89.037 mm and at the breeze speed 50 m/s is 146.349 mm. This implies the relocation is increments by more than 60 % from wind speed 39 m/s to 50 m/s.
- The story drift because of wind load is greatest at the center of the structure i.e., at 8th floor and it is steadily expanding by expanding the wind pressure.
  The estimation of story drift at wind speed 39 m/s is 0.01621 and at high wind speed (50 m/s) is 0.02664. this implies the story float is increments by over 160% if the wind speed changes low wind speed (39 m/s) to high wind speed (50 m/s).

ACKNOWLEDGEMENTS

The authors sincerely thank to, Asst. Professor Md Mansoor Ahmed, Professor Shaik Abdulla,Asst. Professor Syed ArfathDepartment of Civil Engineering,Khaja Bandanawaz College Of Engineering, Gulbarga for their encouragement and for providing facilities to carry out this research work as a part of M. Techproject.

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