International Journal of Advanced and Innovative Research (2278-7844) /
Volume 7 Issue 1

Wind and Seismic Analysis of High Rise Building With and Without Steel Bracing Using ETABS

S.Fayaz Basha[#1], S.Sudheer[*2],

[#1]*PG Student, Department of civil Engineering, Dr K.V.Subba Reddy Institute of Technology, Dupadu Kurnool, Andhra Pradesh, India*

[1]fayazshaik332@gmail.com

[*2] *Assistant Professor, Department of civil Engineering, Dr K.V.Subba Reddy Institute of Technology, Dupadu Kurnool, Andhra Pradesh, India*

[2]*chinna.sudheer10@gmail.com*

***Abstract*— Earthquake effect is becoming a great concern in india as because not a single zone can be designated as earthquake resistant zone. One of the essential viewpoint is to assemble a building structure, which can oppose the seismic power productively. Study is made on the distinctive basic course of action to discover the most upgraded answer for deliver a proficient safe seismic tremor safe building. In the present investigation, a private working with 15 stories is dissected with segments, segments with bracings at various areas were for Zone-III in three unique soils. torsion were thought about for every one of the cases. It is watched that the torsion was decreased by giving the bracings.**

***Keywords*— Bracings, Highrise building, Put your keywords here, keywords are separated by comma.**

I. INTRODUCTION

Humankind has dependably had an interest for tallness and all through our history we have continually looked to figuratively try to achieve the impossible. From the antiquated pyramids to the present current high rise, a human advancement's influence and riches has been more than once communicated through dynamite and momentous structures. Today the image of monetary power and administration is the high rise. There has been a shown intensity that exists in humanity to declare to have the tallest working on the planet.

ENGINEERING SEISMOLOGY

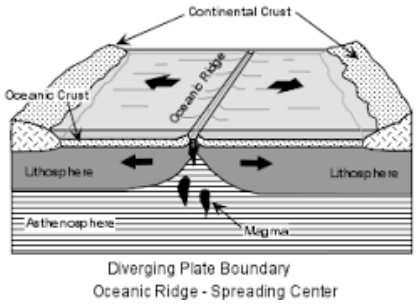


Figure 1 : Schematic representation of divergence boundary

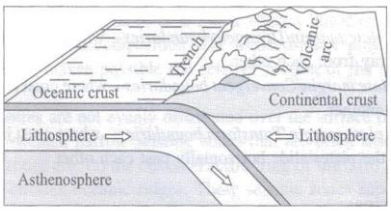


Figure 2 : Schematic representation of oceanic-continental convergence.

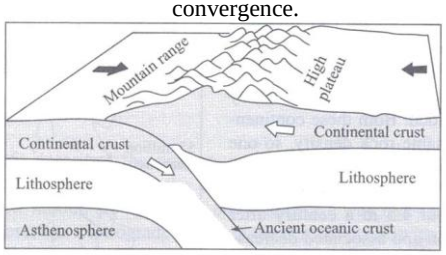
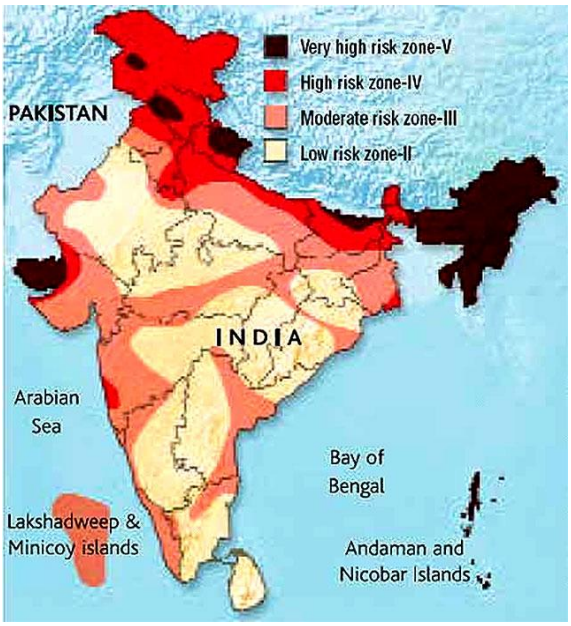


Figure 3 : Schematic representation of transform boundary.



A. NUMERICAL MODELLING

II.I BUILDING DIMENSIONS:

The structure is 54m x 54m in plan columns spaced at 6m equally in both the directions. A floor to floor height of 3.0 m is assumed. The location of the building is assumed to be in zone-3 and loose soils.

Size of Structural Members

Column Size:

From ground floor to eighth floor: 300mm x 600mm

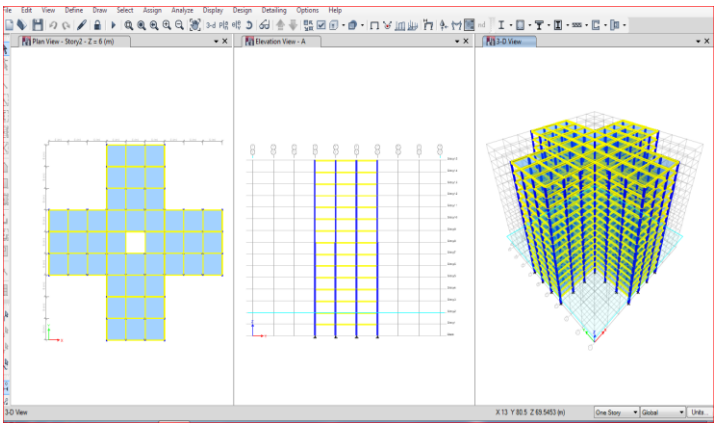
From eighth floor to fifteenth floor: 300 mm X 500 mm

Beam Size: 300 mm X 450 mm

Slab Thickness: 110 mm

Brace Members :Steel Bracing

Grade of Concrete and Steel: M30; HYSD 500



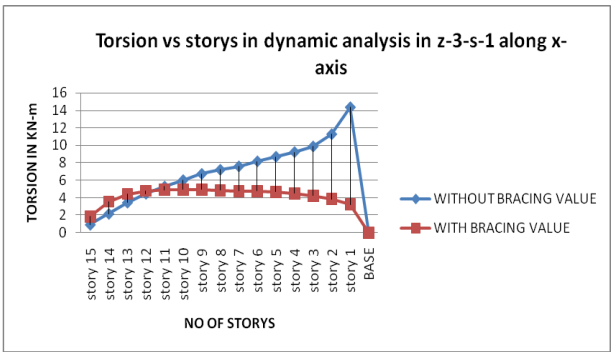
without bracing

II. RESULTS

Case 1: Comparison of torsion in dynamic analysis in zone 3 & zone 5 in soil 1, 2, 3

Table 1 : Torsion comparison values in zone 3 soil 1 in dynamic analysis

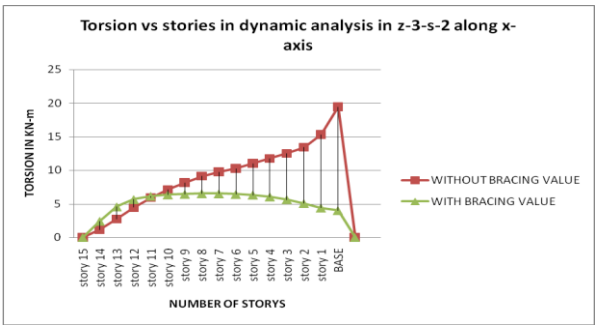
STORYS	WITHOUT BRACING	WITH BRACING
story 15	0.9308	1.8756
story 14	2.1775	3.5558
story 13	3.4632	4.4319
story 12	4.4759	4.7824
story 11	5.2961	4.9067
story 10	6.0261	4.9223
story 9	6.7371	4.9324
story 8	7.2106	4.8563
story 7	7.6023	4.7614
story 6	8.1761	4.7664
story 5	8.7014	4.6771
story 4	9.233	4.4931
story 3	9.8726	4.2367
story 2	11.2709	3.8622
story 1	14.3395	3.2453
BASE	0	0



Graph 1 Variations of displacement along Z-3-S-1 in dynamic analysis.

Table 2 Torsion comparison values in zone 3 soil 2 in dynamic analysis

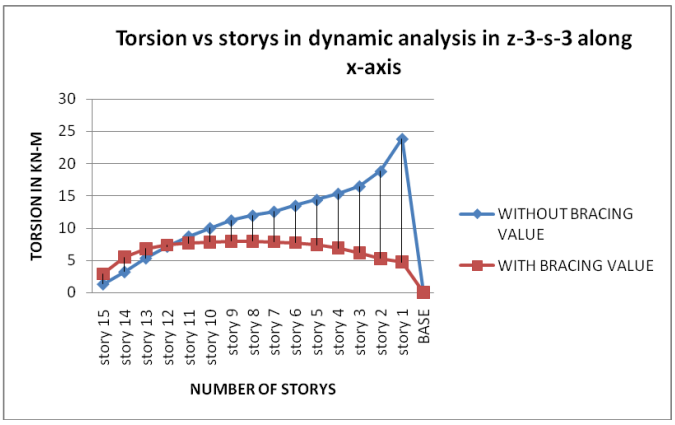
STORYS	WITHOUT BRACING	WITH BRACING
story 15	1.1399	2.4209
story 14	2.7399	4.5733
story 13	4.4808	5.6662
story 12	5.9284	6.1531
story 11	7.1289	6.3622
story 10	8.157	6.4519
story 9	9.1314	6.5436
story 8	9.7535	6.5112
story 7	10.2612	6.4252
story 6	11.0234	6.3245
story 5	11.7454	6.052
story 4	12.5061	5.6511
story 3	13.42	5.075
story 2	15.3213	4.4022
story 1	19.4473	4.0158
BASE	0	0



Graph 2 Variations of displacement along Z-3-S-2 in dynamic analysis

STORYS	WITHOUT BRACING	WITH BRACING
story 15	1.3079	2.9072
story 14	3.2027	5.4841
story 13	5.3301	6.8095
story 12	7.1526	7.3783
story 11	8.6886	7.6563
story 10	9.9893	7.8018
story 9	11.1901	7.9541
story 8	11.9358	7.9498
story 7	12.5384	7.8654
story 6	13.4634	7.7484
story 5	14.3606	7.4028
story 4	15.3242	6.8844
story 3	16.4722	6.1428
story 2	18.8038	5.2713
story 1	23.8358	4.723
BASE	0	0

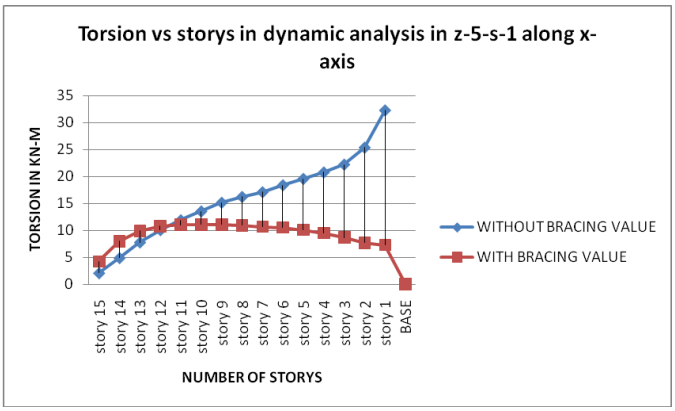
Table 3 Torsion comparison values in zone 3 soil 3 in dynamic analysis



Graph 3 Variations of displacement along Z-3-S-3 in dynamic analysis.

Table 4 Torsion comparison values in zone 5 soil 1 in dynamic analysis

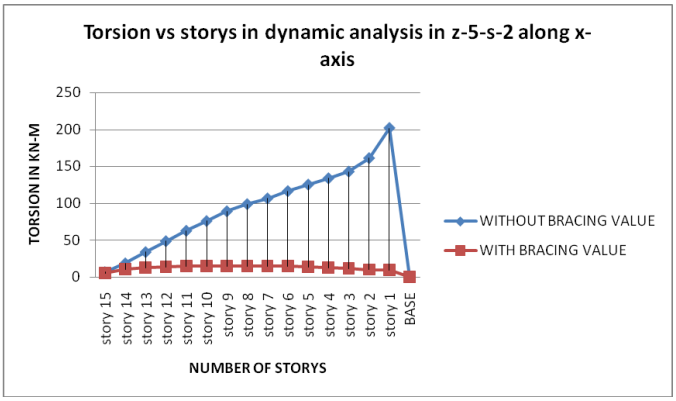
STORYS	WITHOUT BRACING	*WITH BRACING*
story 15	2.0943	*4.2202*
story 14	4.8944	8
story 13	7.7922	9.918
story 12	10.0706	10.7603
story 11	11.916	11.04
story 10	13.5452	11.0753
story 9	15.1584	11.098
story 8	16.2238	10.9267
story 7	17.105	10.7131
story 6	18.3961	10.5235
story 5	19.5781	10.1094
story 4	20.7735	9.5326
story 3	22.2189	8.6899
story 2	25.3609	7.7193
story 1	32.2604	7.3007
BASE	0	0



Graph 4 Variations of displacement along Z-5-S-1 in dynamic analysis

Table 5 Torsion comparison values in zone 5 soil 2 in dynamic analysis

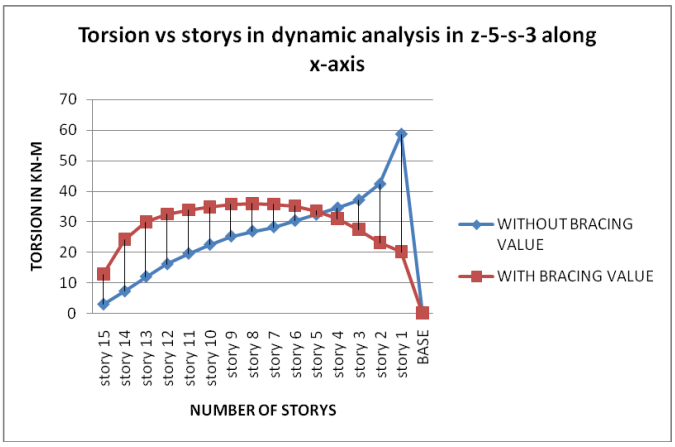
STORYS	WITHOUT BRACING	WITH BRACING
story 15	6.6782	5.447
story 14	18.5479	10.291
story 13	33.825	12.7938
story 12	48.5553	13.8444
story 11	62.6391	14.3149
story 10	75.8701	14.5167
story 9	89.01	14.7232
story 8	98.6634	14.6502
story 7	106.4271	14.4568
story 6	116.2824	14.2301
story 5	125.1308	13.6171
story 4	133.637	12.715
story 3	142.7066	11.4187
story 2	160.9176	9.9649
story 1	201.7035	9.0335
BASE	0	0



Graph 5 Variations of displacement along Z-5-S-2 in dynamic analysis

Table 6 Torsion comparison values in zone 5 soil 3 in dynamic analysis

STORYS	WITHOUT BRACING	WITH BRACING
story 15	2.9428	12.8244
story 14	7.2061	24.1344
story 13	11.9928	29.9107
story 12	16.0933	32.4753
story 11	19.5493	33.883
story 10	22.476	34.7772
story 9	25.1777	35.7267
story 8	26.8556	35.9324
story 7	28.2114	35.6813
story 6	30.2926	35.1885
story 5	32.3113	33.5426
story 4	34.4795	31.0129
story 3	37.0625	27.4134
story 2	42.3085	23.1406
story 1	58.6307	20.1324
BASE	0	0

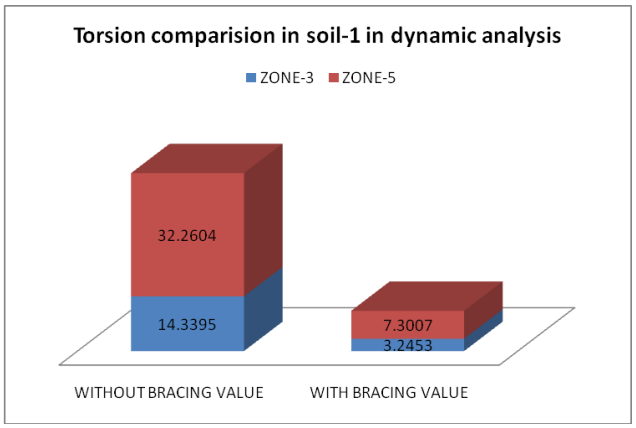


Graph 6 Variations of displacement along Z-5-S-3 in dynamic analysis

Case 10 : Zone wise comparison of torsion along soil 1, 2, 3

Table 7 Torsion compression values along soil-1 in Z-3 & Z-5

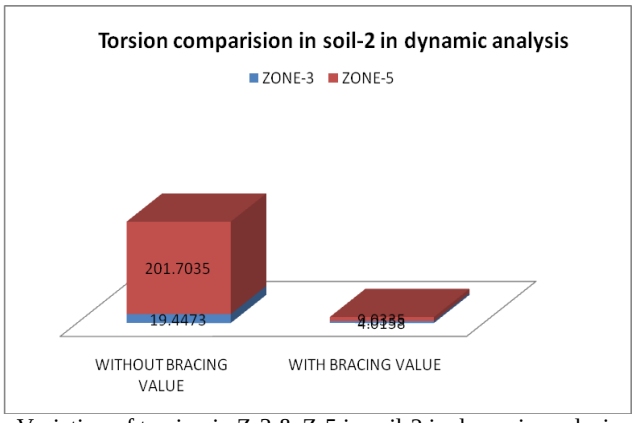
	SOIL-1	
ZONES	WITHOUT BRACING VALUE	WITH BRACING VALUE
zone-3	14.3395	3.2453
zone-5	32.2604	7.3007



Graph 7 Variation of torsion in Z-3 & Z-5 in soil-1 in dynamic analysis

Table 8 Torsion compression values along soil-2 in Z-3 & Z-5

	SOIL-2	
ZONES	WITHOUT BRACING	WITH BRACING
zone-3	19.4473	4.0158
zone-5	201.7035	9.0335

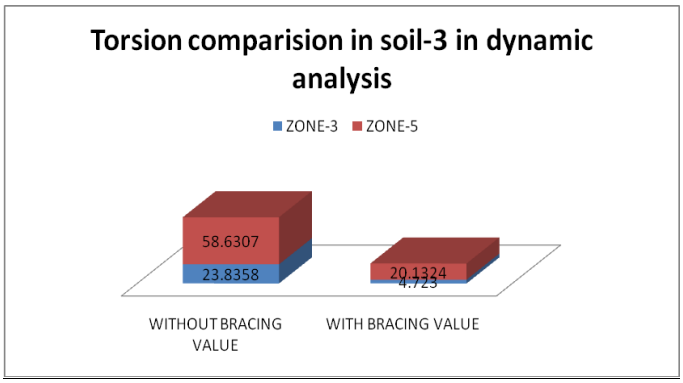


Variation of torsion in Z-3 & Z-5 in soil-2 in dynamic analysis

Table 9 Torsion compression values along soil-3 in Z-3 & Z-5

	SOIL-3	
ZONES	WITHOUT BRACING VALUE	WITH BRACING VALUE
zone-3	23.8358	4.723

zone-5	58.6307	20.1324



Graph 8 Variation of torsion in Z-3 & Z-5 in soil-3 in dynamic analysis

IV.CONCLUSIONS

1. By providing steel bracing it is observed that displacement id reduced by 40%.
2. By providing the bracings the stiffness of the structure is increased and storey shear is decreased with increase in height of structure.

V.REFERENCES

1. Mahmoud R. Maheri, R. Akbari (2003) "*Seismic behavior factor, R, for steel X-braced and knee-braced RC buildings*" Engineering Structures, Vol.25, 14 May 2003, pp 1505-1513.

2. J.C.D. Hoenderkamp and M.C.M. Bakker (2003) "*Analysis of High-Rise Braced Frames with Outriggers*" The structural design of tall and special buildings, Vol. 12, 10 July 2003, pp 335-350.

3. K.S.Jagadish, B.K.R.Prasad and P.V.Rao,"*The Inelastic Vibration Absorber Subjected To Earthquake Ground Motions."Earthquake engineering and Structural Dynamics.* 7, 317-326 (1979).