International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 11 Issue: 11 | Nov 2024 www.irjet.net p-ISSN: 2395-0072

Comparative Study Of Steel Structure On Plain And Sloping Ground With And Without Bracing

Pratish R. Siddheshware , Prof. Shaikh A.N.

Student, Department of Civil Engineering, M.S.Bidve Engineering College, Latur, Maharashtra, India
Professor, Department of Civil Engineering, M.S.Bidve Engineering College, Latur, Maharashtra, India

---

Abstract - *Unavailability of plain ground in mountainous regions necessitated construction of framed building on sloping ground. In present study, the structure is totally commercial building. The structure is examined for seismic zone III and soil condition is hard consider. The structure is compared the sloping ground and plain ground and also with and with-out bracing system. The different model is done on STAAD.pro software. Some model is analysis on plain ground and sloping ground with-out Bracing system and some model is analysis on plain ground and sloping ground with- Bracing System. The different slope is 10-degree, 20-degree and 30- degree is considered while analysis. The bracing is considered at outer peripherals and at Centre of core. The Models are analysis for various aspects like Story Displacement, Storey overturning moment, Storey Drift, Lateral Displacement, etc. In this research P-delta is not Consider. This help us understand detailed analysis of behaviour of building under different sloping angles and effect of earthquake on building.*

Key Words: STAAD.Pro, Sloping Building, Step back, Bracing system, High rise Building

1.INTRODUCTION

Generally, all buildings are constructed on horizontal plain level ground. In the hilly region having sloping ground it is hard to build the multistorey structures. The constructions of the building now days are progress on sloping ground due to lack of horizontal plain level ground. These hill regions are the most hazardous view shows sometimes due to some natural calamities like land sides and seismic activity.

Earthquakes arise alongside plate margins (where inflate meets) while plate move fast, in the direction or farf rom other, the actions is not always so smooth. Friction causes the plates to get struck. This causes the pressure to build up of pressure released. Earthquakes are usually classified on the basis of causes of origin, depth of focus, Intensity and magnitude of earthquake. Earthquake is measured by using Ritcher magnitude scale anything is greater than magnitude 7 considered as sever type of Earthquake.

Due to increase in population and rapid urbanization, the scarcity of plain ground is happened. Since structures are constructed in hilly area. The construction of building in hilly area is not easy compared to building in plain ground. In some hilly regions of the world are more pronto seismic activity, In India, North and northeast part have large sloping grounds and construction of RC building is popular in sloping ground. Earthquake causes shaking of ground so building resting on slope will experience motion at its base. Even though the base of the building moves with ground. Roof has tendency to stay in original position. But since the walls and columns are connected toit, they drag the roof along with them. Earth quakes are the natural phenomenon which are caused by the release of large strain energy by the moving faults below the surface of the earth, which ultimately causes the shaking of the earth top surface in all possible directions with different amplitudes and intensities of lateral forces.

1.1 LITERATURE REVIEW

Ashraf. (1998)
Ashraf et al. (1998) presents the steps used in performing a pushover analysis of a simple three-dimensional building. SAP2000, a state-of the-art, general purpose, three-dimensional structural analysis program, is used as a tool for performing the pushover. It allows quick and easy implementation of the pushover procedures described in the ATC-40 and FEMA-273 documents for both two and three-dimensional buildings. He suggested that it is easy to investigate the erect of different strengthening schemes and also to stiffen or strengthen the building by changing the member properties and rerunning the analysis.

Armagan Korkamaz
Armagan Korkamaz et al. evaluated the performance of frame structures for various load patterns and variety of natural periods by performing pushover and non-linear dynamic time history analysis. Pushover and non-linear time history analyses results are compared to choose the best load distribution for specific natural period for this type of frame structure. They concluded that the shear failure of the columns is experienced at the larger storey displacements and rectangular distribution always give the higher base shear-weight ratio comparing to other load distributions for the corresponding story displacement. The rectangular load distribution shows maximum seismic demands during the given earthquakes more reasonable than the other load distribution

A.Meher Prasad
A.Meher Prasad et al. (2004) studied the effect of infill stiffness on seismic performance ofmulti-storey RC framed buildings in India. Two typical existing buildings located in moderate seismic zones of India (as per IS: 1893-2002[1]) are identified. Features like plan irregularity and vertical irregularity (soft storey) are found in one of the buildings, while the other is fairly symmetric. Infill's were modelled using the equivalent strut approach. Static analysis (for gravity and lateral loads), response spectrum analysis and non-linear pushover analysis werePerformed. It is observed that the seismic demand at the soft storey level is significantly large when infill stiffness is considered, with larger base shear and larger displacements.

A.Fiore et al. (2012)
A.Fiore et al. (2012) studied about the inuence of infilll panels over the collapse mechanisms activated under pushover analysis. a large number of research studies have been recently devoted to the modelling and analysis of infilled RC framed buildings under seismic actions, and the significant role that the infill plays in the overall structural performance is by now a well acknowledged result. In particular, the extension of N2 method to infilled frame allows the appraisal of this contribution within the framework of a nonlinear static analysis. Numerical analyses were performed by using spatial models, both for the bare frames and in filledframes, in order to appraise the variation of the structural capacity because of the interaction of theinfills with the RC elements.

Anoop Singh , Vikas Srivastava , N.N.Harry
Anoop Singh , Vikas Srivastava , N.N.Harry has concluded that The displacement of beam coming in the building is within the limits of Indian standards. This building is safe for area coming under earthquake zone II. The maximum drift in the building is 2.077 cm which is safe as per IS 1893-2002. The maxim drift in the building is 2.077 cm which is safe as per IS 1893-2002. The maximum beam displacement of 3m span beam is 0.044mm and allowable displacement is 12mm.

Sachin Kumar Dangi , and Saleem Akhtar
Sachin Kumar Dangi , and Saleem Akhtar had said there is significant improvement observed in seismic performance of building on sloping ground by providing shear walls with different configurations since lateral displacement and member forces reduce considerably in building due to provision of shear walls. It is observed that maximum displacement is found in case of45 slope without shear wall. Hence we can say that, risk increases with the inclination of the slope. In this study we found that, the position of the shear wall at periphery is the optimumposition for the lateral load resistance. It is observed that, the position of the shear wall at corner is the optimum position for countering axial loads. It is observed that, maximum shear force and maximum bending moment increase significantly for sloping ground at 45 slope. It is observed that, axial force increases in the buildings with shear wall. Base shear is found maximum in the building with shear wall, due to dead load of the shear wall.

B.G. Birajdar , S.S. Nalawade
B.G. Birajdar , S.S. Nalawade has said The performance of STEP back building during seismic excitation could prove more vulnerable than other configurations of buildings. The development of torsional moments in Step back buildings is higher than that in the Step back Setback buildings. Hence, Step back Set back buildings are found to be less vulnerable than Step back building against seismic ground motion. In Step back buildings and Step back-Set backbuildings, it is observed that extreme left column at ground level, which are short, are the worstaccepted. Special attention should be given to these columns in design and detailing. Although, theSet back buildings on plain ground attract less action forces as compared to Step back Setback buildings, overall economic cost involved in leveling the sloping ground and other related issues needs to be studied in detail.

2. RESEARCH GAP

Various research paper compared the buildings with different seismic zones, with different climatic conditions, different land profiles but there is very less research regarding effect of slopes on the building with varying seismic zones. In this project we have compared a Building for different slopes like 0, 10, 20, 30 degree slope and vary seismic zones likes I, V.

3 RESEARCH OBJECTIVES

The objective of this project is a Comparative study of the effect of slopes on a building in with and without bracing system . In this project, we are going to analyze multistory building in varying slopes by using software like STAAD. Pro. In this project, we are going to structurally compare the G+10 , G+20,G+30 story building with various slopes like 0, 10, 20, 30 degree and with different seismic conditions like Zone I and Zone V. And at the end we will find some results. The results include

4 Building Configurations

1. Plan Dimension 24 m x 22.5 m
2. Story Height 3.5 m
3. Number of stories
   i) In G+10 = 11 stories
   ii) In G+20 = 21 stories
   iii) In G+30 = 31 stories

The following Wind Load parameters were taken as per IS 875 (Part 3):

- Wind Speed, Vb (m/s) 47

- Terrain category 3
- Structure class C
- Risk Coefficient (k1 factor) 1
- Topography (k3 factor) 1

4.1 Lateral Load Parameters

The following Earthquake Load Parameters were taken as per IS 1893:2002:

- Response reduction factor(R) 5
- Seismic zone - III
- Seismic zone factor(Z)0.16
- Soil type - II
- Importance factor - 1
- Time period Program calculated

4.2 Load Definitions

The following load has been considered to be acting on both the structures:

- Dead load: weight of the structure.
- Superimposed load due to finishing etc.: 1 kN/m2
- Live Load: 3 kN/m2
- Earthquake in X-direction As per IS 1893:2002
- Earthquake in Y-direction: As per IS 1893:2002
- Wind load: As per IS 875 (Part 3)

4.3 Frame sections

Column –I section – I100012B55020
Beam - I section – I80012B50012
Channel Section - ISA 125
Slab Thickness - 120 mm

5. STAAD Pro Models

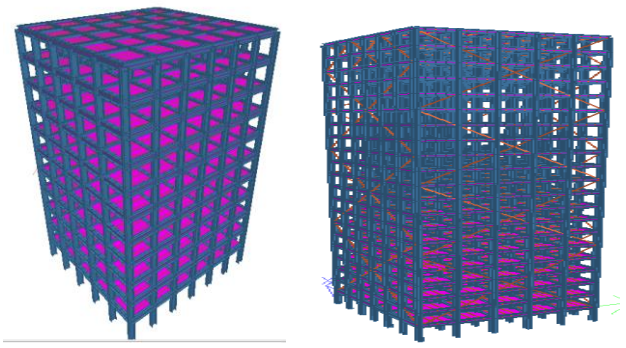


Figure 1 : STAAD Pro Models

6. RESULTS AND DISCUSSION

Response Spectrum analysis for seismic loading while linear static analysis for wind loading has been carried out for all the structures using STAAD.Pro and the results are represented in the following form:

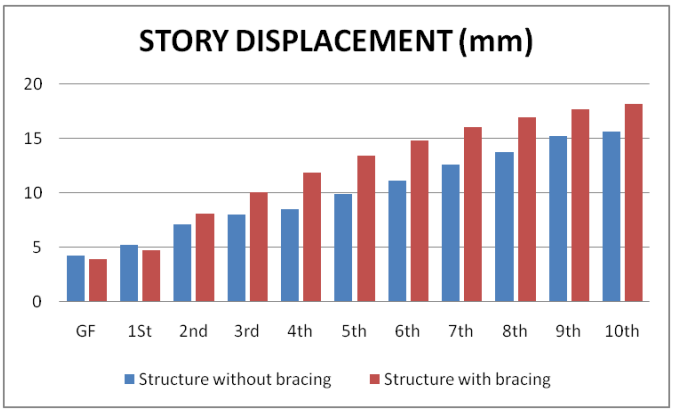
- Maximum top storey displacement
- Inter storey drift

Comparative study between a building on sloping grounds with some slope having with and with bracing system. In this report structure is considered with and without any slope G+10,G+20,G+30 and analyses is done. Tabulated result and graphs are as below

STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	4.25	3.95
1St	5.25	4.77
2nd	7.1	8.11
3rd	8.02	10.08
4th	8.5	11.8
5th	9.9	13.4
6th	11.1	14.8
7th	12.6	16
8th	13.7	16.9
9th	15.2	17.6
10th	15.6	18.1

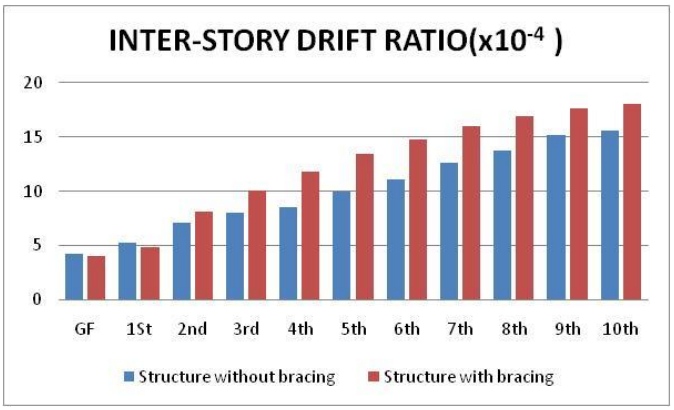
Table -1 –G+10 building without any slope



INTER-STORY DRIFT RATIO ($x10^{-4}$)

Story	Structure Without bracing system	Structure With bracing system
GF	0	0
1St	2.857	2.343
2nd	5.286	9.543
3rd	2.629	5.629
4th	1.371	4.914
5th	4.000	4.571
6th	3.429	4.000
7th	4.286	3.429
8th	3.143	2.571
9th	4.286	2.000
10th	1.143	1.429

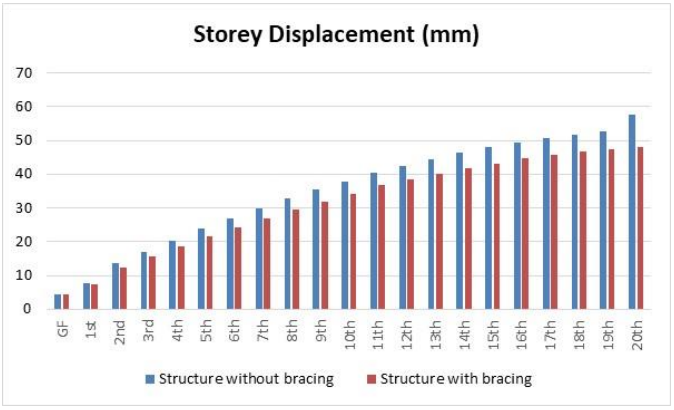
Table -2 –G+10 building without any slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.43	0.424
1st	0.78	0.733
2nd	1.349	1.23
3rd	1.702	1.55
4th	2.04	1.85
5th	2.377	2.15
6th	2.69	2.43
7th	2.99	2.7
8th	3.27	2.95
9th	3.54	3.19
10th	3.79	3.42
11th	4.03	3.69
12th	4.25	3.83
13th	4.45	4.01
14th	4.63	4.17
15th	4.79	4.32
16th	4.93	4.46
17th	5.06	4.57
18th	5.172	4.67
19th	5.26	4.75
20th	5.77	4.82

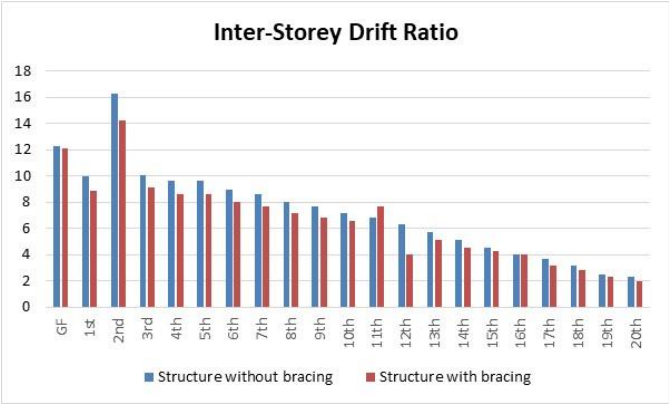
Table -3 –G+20 building without any slope



INTER-STORY DRIFT RATIO (x10-4)

Story	Structure Without bracing system	Structure With bracing system
GF	12.286	12.114
1st	10.000	8.829
2nd	16.257	14.200
3rd	10.086	9.143
4th	9.657	8.571
5th	9.629	8.571
6th	8.943	8.000
7th	8.571	7.714
8th	8.000	7.143
9th	7.714	6.857
10th	7.143	6.571
11th	6.857	7.714
12th	6.286	4.000
13th	5.714	5.143
14th	5.143	4.571
15th	4.571	4.286
16th	4.000	4.000
17th	3.714	3.143
18th	3.200	2.857
19th	2.514	2.286
20th	2.359	2.000

Table -4 –G+20 building without any slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	7.05	6.9
1st	9.85	10.1
2nd	10.7	20.6
3rd	14.9	26.11
4th	28.5	31.69
5th	34.7	37.2
6th	40.9	42.8
7th	47	48.2
8th	53.1	53.5
9th	59.3	58.9

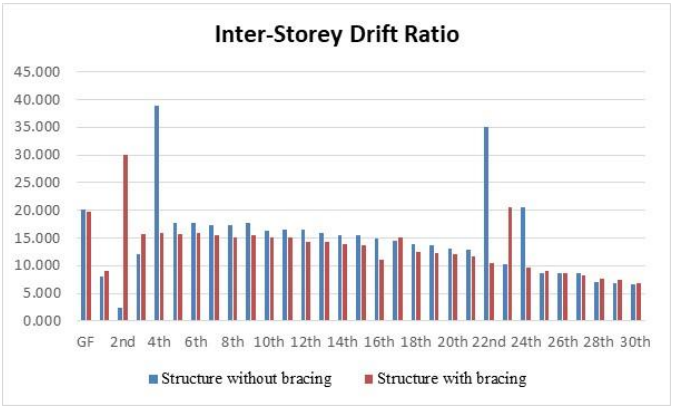
10th	65	64.2
11th	70.8	69.5
12th	76.6	74.5
13th	82.2	79.5
14th	87.6	84.4
15th	93	89.2
16th	98.2	93.1
17th	103.3	98.4
18th	108.2	102.8
19th	113	107.1
20th	117.6	111.3
21st	122.1	115.4
22nd	134.4	119.1
23rd	138	126.3
24th	145.2	129.7
25th	148.2	132.9
26th	151.2	135.9
27th	154.2	138.8
28th	156.7	141.5
29th	159.1	144.1
30th	161.4	146.5

Table -5 –G+30 building without any slope

INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	20.143	19.714
1st	8.000	9.143
2nd	2.429	30.000
3rd	12.000	15.743
4th	38.857	15.943
5th	17.714	15.743
6th	17.714	16.000
7th	17.429	15.429
8th	17.429	15.143
9th	17.714	15.429
10th	16.286	15.143
11th	16.571	15.143
12th	16.571	14.286
13th	16.000	14.286
14th	15.429	14.000
15th	15.429	13.714
16th	14.857	11.143
17th	14.571	15.143
18th	14.000	12.571
19th	13.714	12.286
20th	13.143	12.000
21st	12.857	11.714
22nd	35.143	10.571
23rd	10.286	20.571
24th	20.571	9.714
25th	8.571	9.143
26th	8.571	8.571
27th	8.571	8.286
28th	7.143	7.714
29th	6.857	7.429
30th	6.571	6.857

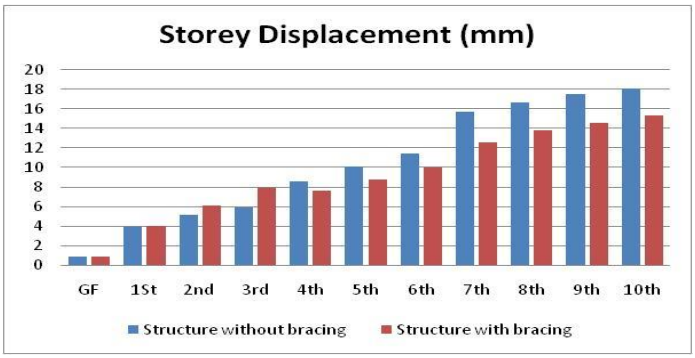
Table -6 –G+30 building without any slope



STORY DISPLACEMENT (mm)

Floor	Structure without bracing	Structure with bracing
GF	0.846	0.846
1St	3.9	3.99
2nd	5.1	6.09
3rd	5.9	7.93
4th	8.6	7.65
5th	10.1	8.8
6th	11.4	10
7th	15.7	12.6
8th	16.7	13.8
9th	17.5	14.6
10th	18.1	15.3

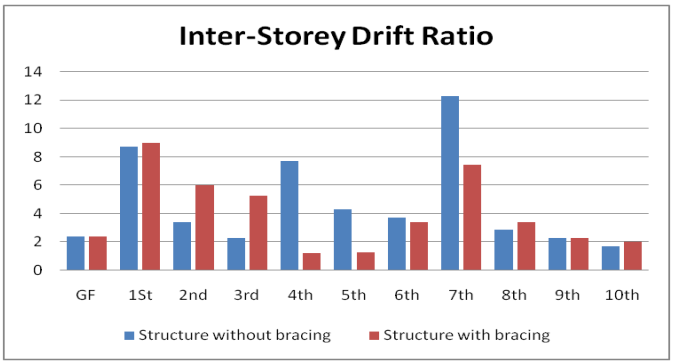
Table -7–G+10 building with 10 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	2.417	2.417
1St	8.726	8.983
2nd	3.429	6.000
3rd	2.286	5.257
4th	7.714	1.200
5th	4.286	1.286
6th	3.714	3.429
7th	12.286	7.429
8th	2.857	3.429
9th	2.286	2.286
10th	1.714	2.000

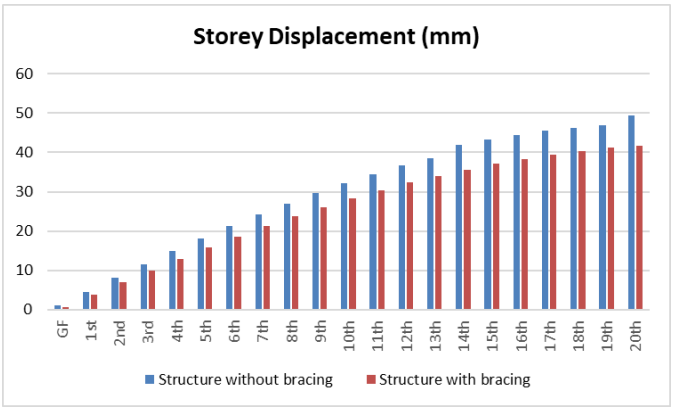
Table -8–G+10 building with 10 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	1.02	0.7
1st	4.565	3.8
2nd	8.14	6.9
3rd	11.6	9.9
4th	15	12.9
5th	18.2	15.8
6th	21.3	18.6
7th	24.3	21.2
8th	27	23.7
9th	29.7	26
10th	32.2	28.3
11th	34.5	30.4
12th	36.6	32.3
13th	38.5	34
14th	41.9	35.6
15th	43.3	37.1
16th	44.5	38.4
17th	45.5	39.5
18th	46.3	40.4
19th	47	41.2
20th	49.5	41.8

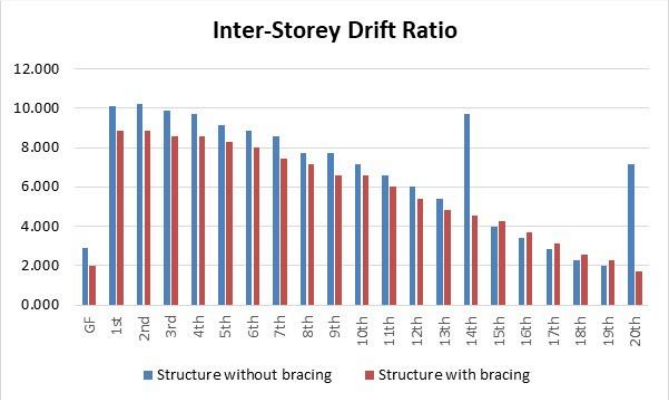
Table -9–G+20 building with 10 degree slope

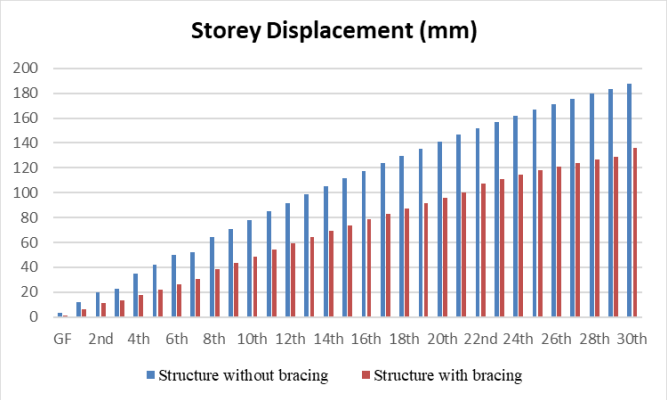


INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	2.914	2.000
1st	10.129	8.857
2nd	10.214	8.857
3rd	9.886	8.571
4th	9.714	8.571
5th	9.143	8.286
6th	8.857	8.000
7th	8.571	7.429
8th	7.714	7.143
9th	7.714	6.571
10th	7.143	6.571
11th	6.571	6.000
12th	6.000	5.429
13th	5.429	4.857
14th	9.714	4.571
15th	4.000	4.286
16th	3.429	3.714
17th	2.857	3.143
18th	2.286	2.571
19th	2.000	2.286
20th	7.143	1.714

Table -10–G+20 building with 10 degree slope





STORY DISPLACEMENT (mm)

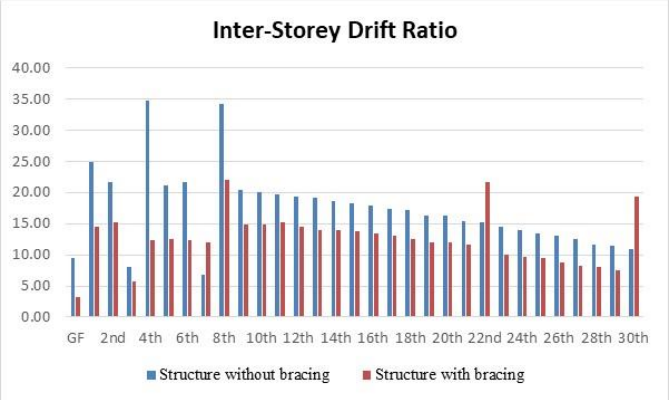
Story	Structure Without bracing system	Structure With bracing system
GF	3.3	1.1
1st	12	6.2
2nd	19.6	11.5
3rd	22.4	13.5
4th	34.6	17.8
5th	42	22.2
6th	49.6	26.5
7th	52	30.7
8th	63.96	38.4
9th	71.1	43.6
10th	78.1	48.8
11th	85	54.1
12th	91.8	59.2
13th	98.5	64.1
14th	105	69
15th	111.4	73.8
16th	117.7	78.5
17th	123.8	83.1
18th	129.8	87.5
19th	135.5	91.7
20th	141.2	95.9
21st	146.6	100
22nd	151.9	107.6
23rd	157	111.1
24th	161.9	114.5
25th	166.6	117.8
26th	171.2	120.9
27th	175.6	123.8
28th	179.7	126.6
29th	183.7	129.2
30th	187.5	136

Table -11–G+30 building with 10 degree slope

INTER-STORY DRIFT RATIO ($x10^{-4}$)

Story	Structure Without bracing system	Structure With bracing system
GF	9.43	3.14
1st	24.86	14.57
2nd	21.71	15.14
3rd	8.00	5.71
4th	34.86	12.29
5th	21.14	12.57
6th	21.71	12.29
7th	6.86	12.00
8th	34.17	22.00
9th	20.40	14.86
10th	20.00	14.86
11th	19.71	15.14
12th	19.43	14.57
13th	19.14	14.00
14th	18.57	14.00
15th	18.29	13.71
16th	18.00	13.43
17th	17.43	13.14
18th	17.14	12.57
19th	16.29	12.00
20th	16.29	12.00
21st	15.43	11.71
22nd	15.14	21.71
23rd	14.57	10.00
24th	14.00	9.71
25th	13.43	9.43
26th	13.14	8.86
27th	12.57	8.29
28th	11.71	8.00
29th	11.43	7.43
30th	10.86	19.43

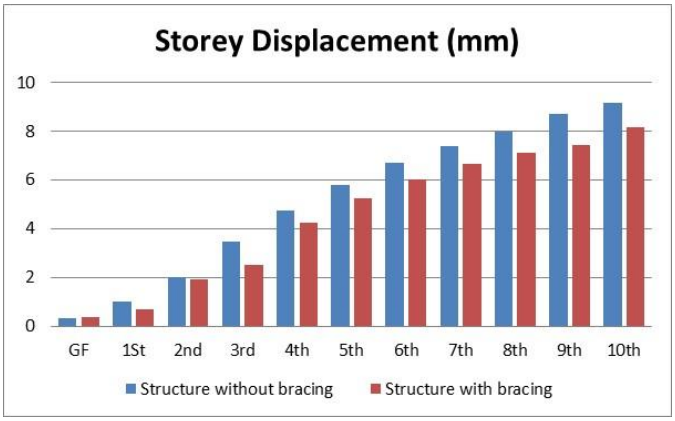
Table -12–G+30 building with 10 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.33	0.368
1St	0.99	0.68
2nd	2	1.9
3rd	3.48	2.5
4th	4.75	4.26
5th	5.8	5.23
6th	6.7	6.03
7th	7.4	6.67
8th	8	7.14
9th	8.7	7.45
10th	9.16	8.15

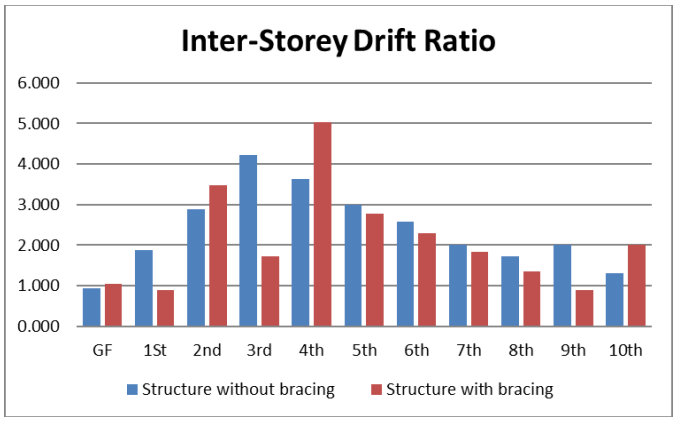
Table -13–G+10 building with 20 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	0.943	1.051
1St	1.886	0.891
2nd	2.886	3.486
3rd	4.229	1.714
4th	3.629	5.029
5th	3.000	2.771
6th	2.571	2.286
7th	2.000	1.829
8th	1.714	1.343
9th	2.000	0.886
10th	1.314	2.000

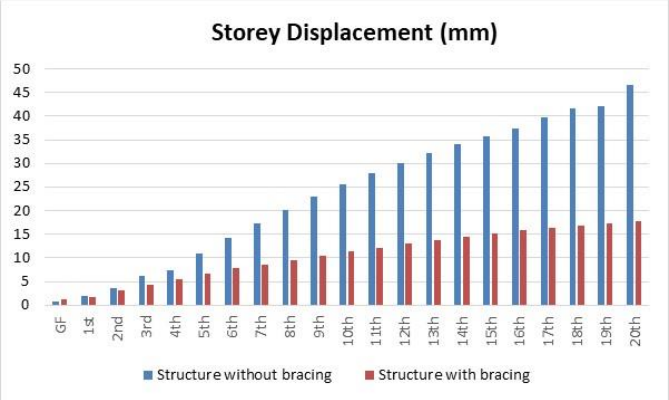
Table -14–G+10 building with 20 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.88	1.268
1st	1.9	1.655
2nd	3.5	3.06
3rd	6.22	4.33
4th	7.39	5.46
5th	11	6.66
6th	14.26	7.77
7th	17.3	8.65
8th	20.1	9.52
9th	22.9	10.4
10th	25.5	11.3
11th	27.9	12.2
12th	30.1	13
13th	32.2	13.7
14th	34.1	14.4
15th	35.8	15.1
16th	37.3	15.8
17th	39.8	16.4
18th	41.6	16.9
19th	42.2	17.4
20th	46.7	17.8

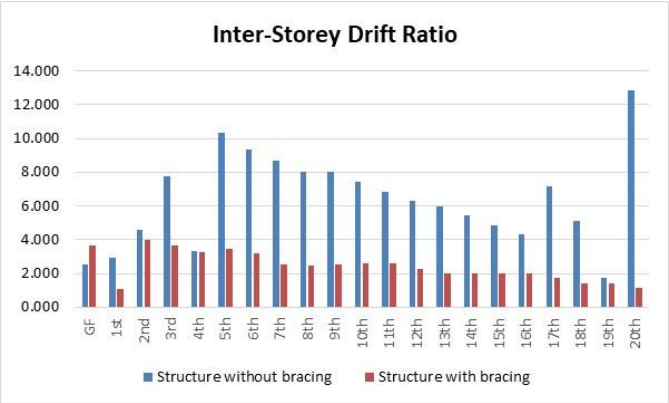
Table -15–G+20 building with 20 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	25	36
1st	29	11
2nd	46	40
3rd	78	36
4th	33	32
5th	103	34
6th	93	32
7th	87	25
8th	80	25
9th	80	25
10th	74	26
11th	69	26
12th	63	23
13th	60	20
14th	54	20
15th	49	20
16th	43	20
17th	71	17
18th	51	14
19th	17	14
20th	129	11

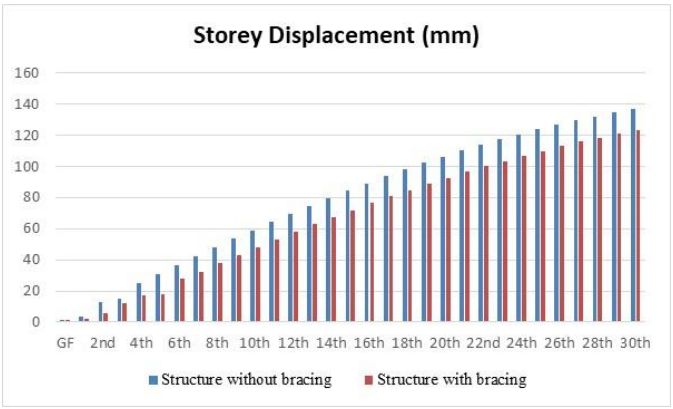
Table -16–G+20 building with 20 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	1.49	1.59
1st	3.17	2.4
2nd	13.1	5.5
3rd	15.2	12
4th	24.9	17.2
5th	30.8	18
6th	36.6	27.8
7th	42.3	31.9
8th	48	38
9th	53.5	43.1
10th	59	48.2
11th	64.3	53.2
12th	69.6	58
13th	74.7	62.7
14th	79.6	67.3
15th	84.5	71.9
16th	89.2	76.4
17th	93.7	80.7
18th	98.1	84.8
19th	102.3	88.8
20th	106.3	92.7
21st	110.1	96.5
22nd	113.8	100
23rd	117.3	103.5
24th	120.7	106.8
25th	123.8	110
26th	126.7	113
27th	129.5	115.8
28th	132.1	118.4
29th	134.5	120.85
30th	136.7	123.2

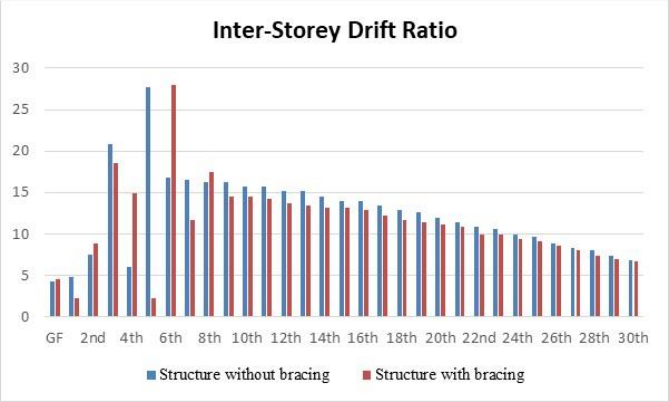
Table -17–G+30 building with 20 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	4.257	4.543
1st	4.800	2.314
2nd	7.514	8.857
3rd	20.857	18.571
4th	6.000	14.857
5th	27.714	2.286
6th	16.857	28.000
7th	16.571	11.714
8th	16.286	17.429
9th	16.286	14.571
10th	15.714	14.571
11th	15.714	14.286
12th	15.143	13.714
13th	15.143	13.429
14th	14.571	13.143
15th	14.000	13.143
16th	14.000	12.857
17th	13.429	12.286
18th	12.857	11.714
19th	12.571	11.429
20th	12.000	11.143
21st	11.429	10.857
22nd	10.857	10.000
23rd	10.571	10.000
24th	10.000	9.429
25th	9.714	9.143
26th	8.857	8.571
27th	8.286	8.000
28th	8.000	7.429
29th	7.429	7.000
30th	6.857	6.714

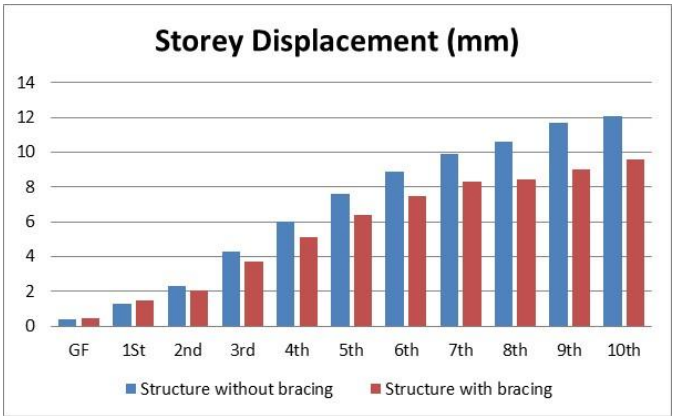
Table -18–G+30 building with 20 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.375	0.437
1St	1.28	1.47
2nd	2.29	2.05
3rd	4.29	3.69
4th	6	5.1
5th	7.6	6.4
6th	8.9	7.5
7th	9.89	8.3
8th	10.6	8.4
9th	11.7	9
10th	12.1	9.6

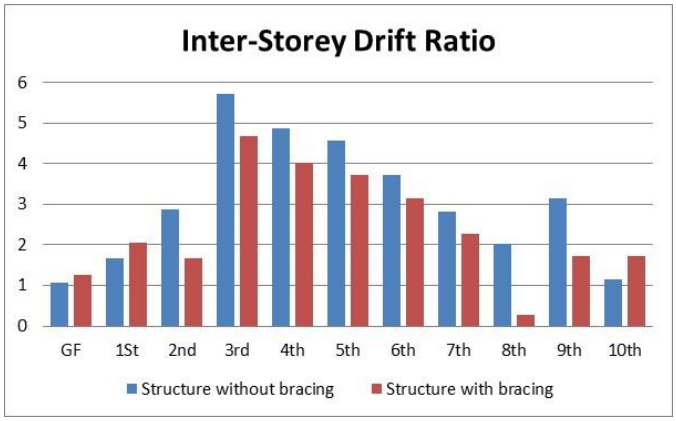
Table -19–G+10 building with 30 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	1.071	1.249
1St	1.657	2.057
2nd	2.886	1.657
3rd	5.714	4.686
4th	4.886	4.029
5th	4.571	3.714
6th	3.714	3.143
7th	2.829	2.286
8th	2.029	0.286
9th	3.143	1.714
10th	1.143	1.714

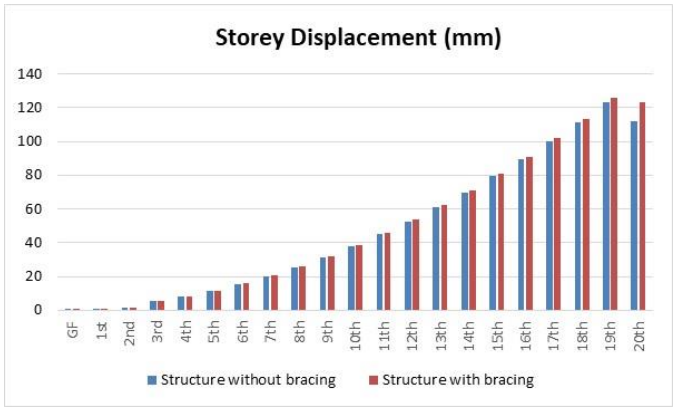
Table -20–G+10 building with 30 degree slope



STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.06	0.0061
1st	0.464	0.469
2nd	1.321	1.35
3rd	5.156	5.232
4th	8.048	8.201
5th	11.482	11.701
6th	15.525	15.82
7th	20.176	20.56
8th	25.435	25.92
9th	31.304	31.9
10th	37.781	38.5
11th	44.822	45.677
12th	52.56	53.561
13th	60.862	62.022
14th	69.773	71.103
15th	79.293	80.804
16th	89.422	91.125
17th	100.159	102.067
18th	111.504	113.627
19th	123.458	125.809
20th	112.088	123.402

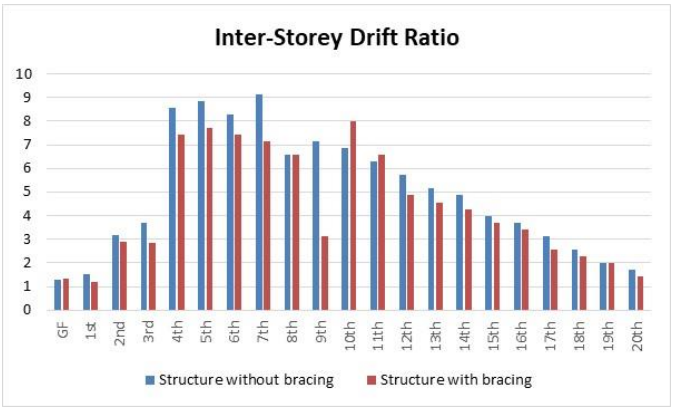
Table -21–G+20 building with 30 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	1.300	1.343
1st	1.500	1.197
2nd	3.200	2.889
3rd	3.714	2.857
4th	8.571	7.429
5th	8.857	7.714
6th	8.286	7.429
7th	9.143	7.143
8th	6.571	6.571
9th	7.143	3.143
10th	6.857	8.000
11th	6.286	6.571
12th	5.714	4.857
13th	5.143	4.571
14th	4.857	4.286
15th	4.000	3.714
16th	3.714	3.429
17th	3.143	2.571
18th	2.571	2.286
19th	2.000	2.000
20th	1.714	1.429

Table -22–G+20 building with 30 degree slope

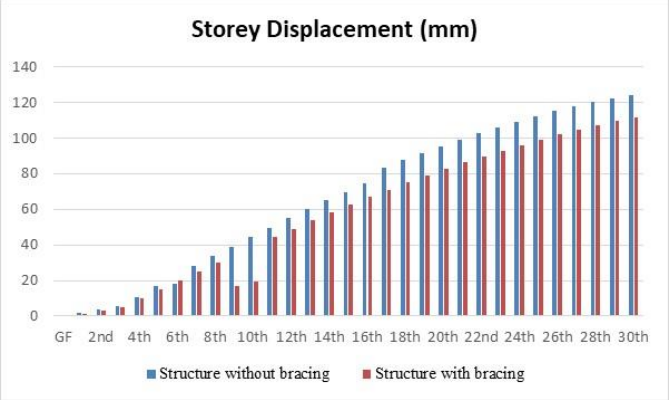


STORY DISPLACEMENT (mm)

Story	Structure Without bracing system	Structure With bracing system
GF	0.67	0.198
1st	1.525	1.479
2nd	3.481	3.23
3rd	5.464	5
4th	10.8	9.8
5th	16.78	14.9
6th	17.9	19.9
7th	28.1	24.9
8th	33.6	29.8
9th	39.1	16.7

10th	44.5	19.5
11th	49.8	44.5
12th	55	49.1
13th	60.1	53.7
14th	65.1	58.2
15th	69.9	62.6
16th	74.6	66.9
17th	83.5	71.1
18th	87.7	75
19th	91.7	78.9
20th	95.6	82.7
21st	99.3	86.3
22nd	102.9	89.7
23rd	106.2	93
24th	109.4	96.2
25th	112.4	99.2
26th	115.2	102
27th	117.8	104.7
28th	120.2	107.1
29th	122.5	109.5
30th	124.5	111.6

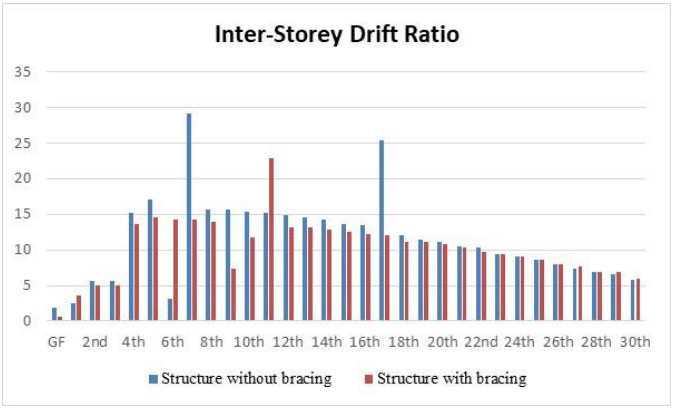
Table -23–G+30 building with 30 degree slope



INTER-STORY DRIFT RATIO (x10^{-4})

Story	Structure Without bracing system	Structure With bracing system
GF	1.914	0.566
1st	2.443	3.660
2nd	5.589	5.003
3rd	5.666	5.057
4th	15.246	13.714
5th	17.086	14.571
6th	22.869	14.286
7th	29.143	14.286
8th	15.714	14.000
9th	15.714	7.429
10th	15.429	11.714
11th	15.143	22.857
12th	14.857	13.143
13th	14.571	13.143
14th	14.286	12.857
15th	13.714	12.571
16th	13.429	12.286
17th	25.429	12.000
18th	12	11.143
19th	11.429	11.143
20th	11.143	10.857
21st	10.571	10.286
22nd	10.286	9.714
23rd	9.429	9.429
24th	9.143	9.143
25th	8.571	8.571
26th	8	8.000
27th	7.429	7.714
28th	6.857	6.857
29th	6.571	6.857
30th	5.714	6.000

Table -24–G+30 building with 30 degree slope



3. CONCLUSIONS

Following conclusion observed after analysizing different G+10, G+20, G+30, structure with different sloping angle as 0 , 10, 20 and 30 degree. Results are compared for story displacement, maximum base share and story share, which show behaviours of structure with and without bracing, and which are below,

1. For story displacement

a. Considering G+10 building results are compared which shows that, Building with out bracing without for same loading and same section property. It has been observed that story displacement is increased with height of the building and which is varying from 9 mm to 16 mm. Same observation made building with bracing that story displacement is decreased with height of the building and which is in the range of 8.15 mm to 15.3 mm except for zero degree slope. Overall improvement in story displacement which is around 5 to 6 % less for building

with bracing. Hence results show that story displacements in the structure reduced when structure is provided with bracing.

b. Considering G+20 building results are compared which shows that, Building without bracing without for same loading and same section property. It has been observed that story displacement is increased with height of the building and which is varying from 9.1 mm to 112 mm. Same observation made building with bracing that story displacement is decreased with height of the building and which is in the range of 4.1 to 41.8 mm except for thirty degree slope. Overall improvement in story displacement which is around 20 %less for building with bracing. Hence results show that story displacements in the structure reduced when structure is provided with bracing.

c. Considering G+30 building results are compared which shows that, Building without bracing without for same loading and same section property. It has been observed that story displacement is increased with height of the building and which is varying from 124mm to 187 mm. Story displacement is decreased with height of the building for structure bracing and which is in the range of 111 to 146 mm. Overall improvement in story displacement which is around 20 %less for building with bracing. Hence results show that story displacements in the structure reduced when structure is provided with bracing.

REFERENCES

D. Kornack and P. Rakic, "Cell Proliferation without Neurogenesis in Adult Primate Neocortex," Science, vol. 294, Dec. 2001, pp. 2127-2130, doi:10.1126/science.1065467.

M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

K. Elissa, "Title of paper if known," unpublished.