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# Study of Behavior of RCC Building With and Without Bracing by Using STAD Pro.V8i

Suraj Deshmukh<sup>1</sup>, Anmol Chachane<sup>2</sup>, Ayushi Jadhav<sup>3</sup>, Manali Bokde<sup>4</sup>, Sanjay Bagade<sup>5</sup> <sup>1, 2, 3, 4, 5</sup>*Civil Engineering, Jd College Of Engineering, Nagpur* 

Abstract: The Behavior of RCC Building Subjected To Earthquake Force Has Been Obtained Is 1893-2000 For RCC Building In Zone3 Used For Better Performance Of Building During And After Earthquake. It Is Proved That Many Of Structure Are Totally Damaged Due To Earthquake. So It Is Necessary To Determine Seismic Structure Of Building And RCC Bracing System Is easy to Handle, It Require less Space, Economical.

The Load Are Produced Due Wind Load And Earthquake to Resist Lateral Load Acting On Building With Different Type Of Bracing. And It Has Potential Advantageous Than Other Bracing Like High Stiffness And Stability bracing System Is One Of Which Reinforced By Steel member Which Increase Tensile As Well As Compressive Strength Of Building. so that's why here we have provided two types of bracing x, v bracing to prevent natural activity by using STAAD Pro.

# I. INTRODUCTION

Seismic analysis is calculating the response of structure to earthquake. In recent year growth of cities have been on rise an any rcc building depend on many factor like strength of material used soil, amount of mass. Bracing are most prominent method used by structural increase lateral load resistance by bracing .

India is fast developing country which demands hybrid structure or building with high seismic resistance. the multistoried building require safety due to earthquake and wind force damage to rcc building cause seismic wave of earthquake and low strength of material used.

Steel bracing mostly used in RCC structure .mostly seen that retrofitting of building more economical then rebuilding or reconstructive most of structure collapse due to seismic. the bracing is provided for peripheral columns and at any two parallel side of building models. Generally the purpose of bracing is provided for is to transfer primary gravity load safely. common gravity load are dead load ,live load also the structure should withstand lateral load caused by earthquake ,blasting and wind depending on terrain category and lateral load reduce stability of structure producing sway moment and induced high stress. So in such case stiffness is more important than strength to resist lateral load.

# A. Objective

- 1) The objective of this paper is evaluate response of braced and unbraced structure subjected to seismic load and to identify the suitable bracing system for resisting seismic load efficiently.
- 2) To find out better strengthening or retrofitting technique that can be adopted in specific zone.
- *3)* Establishing a comparison between the two type of structure and analyzing the result and establishing a needful similarity with effectiveness in tabular form.
- *a)* Following are the different type of model
- *i*) Model without bracing
- *ii)* Model with different bracing system(x bracing, v bracing)
- *iii)* Description of the building:-
- b) The data of modeled building is given below
- *i*) Plan dimension-
- *ii)* No. of storey-G+10
- *iii)* Floor to floor height-3.00m
- *iv)* Type of building- residential
- v) Foundation type-raft or mat foundation
- vi) Soil strata-medium



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- c) Material properties
- *i*) Grade of concrete-M25
- *ii)* Grade of steel-Fe-415
- *iii)* Density of concrete-25KN/m<sup>3</sup>
- *iv*) Density of brick-20KN/m<sup>3</sup>
- *v*) Modulus of elasticity of concrete -25KN/mm<sup>2</sup>
- *vi*) Modulus of elasticity of steel- $2x10^5$  N/mm<sup>2</sup>
- vii) Member properties
- viii) Thickness of slab-0.125m
- ix) Size of beam-(0.23x0.4)m
- x) Column size-(0.4x0.4)m
- *xi*) Steel bracing size-(0.23x0.23)m
- *xii)* External wall thickness-230mm
- *xiii)* Internal wall thickness-115mm
  - d) Load intensity
  - *i*) Floor finish-1.0KN/ $m^2$
  - *ii)* Live load-2kN/m<sup>2</sup>
    - B. Design Preparation
    - 1) Plan of Srtucture



2) Elevation of structure G+10 multistoried building height 33m



So here we have compared these building in which one has not provided and other has provided. so these bracing are provided to prevent natural activity.



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The figures are given below.



II. RESULT AND DISCUSSION

The comparison of rcc building with and without bracing by using stad-pro. Here we have checked different parameter which is on building by using stad-pro.

#### A. Nodal Displacement

				Horizontal	Vertical	Horizontal	Resultant
		Node	L/C	X mm	Ymm	Zmm	mm
Model 1	Max X	284	1 EQ X	138.125	-1.955	-0.005	138.139
Model 2	Max X	295	1 EQ XB	10.564	0.151	0	10.565
Model 3	Max X	437	1 EQ XV	25.581	0.317	0	25.583
60						6 GENERATED GENRAL_STRU Node L/C	INDIAN CODE JCTURES 1 0.022
00						Model 1 Max X	284 1 EQ X
30 <u></u> 60 <u></u>						Model 2 Max X	295 1 EQ XB
20						Model 3 Max X	437 1 EQ XV
20 Horiz	zontal	Vertical	Horiz	ontal Resi			

#### B. Beam and Force





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C. Support Reaction

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# III. QUANTITY OF BUILDING

So here we have calculated quantity of building so as compared to normal building the quantity of concrete in x bracing system is more than 7.32% and v bracing system is more than 10.43%

				TOTAL TOLING OF CONCERDE =	327 6 CT METER	
AL VOLUME OF CONCRETE =	293.4 CU.METER	TOTAL VOLUME OF CONCRETE = 316.6 CU.M		TOTAL FORMES OF CONCRETE -	SETTE COMPLEX	LILK
BAR DIA (in mm) 	WEIGHT (in New)  71495 56861 106299 70268 23286 36613  364822	BAR DIA (in nm) 	WEIGHT (in New)  94616 66972 132853 90624 20674 31296 	BAR DIA (in 1993)  8 10 12 16 20 25 *** IOIAL=	MEIGH7 (in New)  96027 65733 144689 61691 64493 13053  425685	
Norma	al Building	Building w	ith X	Building	with V	

# IV. CONCLUSION

Based on analysis result following conclusion are given

- A. Drift produced due to seismic vibration.
- B. The displacement of building decreases depending upon the different bracing system.
- *C.* The storey drift of braced building decreases as compare to unbraced building which indicated that the overall response of building decreases.
- D. Out of various arrangement of bracing v bracing came out to be least efficient and x bracing was most effective bracing system.
- E. X bracing are also proficient to reduce lateral displacement and storey drift produced due to seismic vibration.

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