



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

A futuristic digital interface with a glowing Earth globe in the center. The background is dark blue with various data visualizations including bar charts, line graphs, and network diagrams. Text elements like 'BUSINESS', 'NETWORK SEARCH', and 'WORLD' are visible. A person's hand is seen at the bottom, interacting with the interface.

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 10, October 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

 ijrset@gmail.com

 www.ijrset.com

Seismic Analysis of RCC Bracings Of Framed Structures for Multistorey Building

Megha H R, Hussain Imran. K. M

PG Student, Dept. of Civil Engineering, SJMIT, VTU, Chitradurga, Karnataka, India

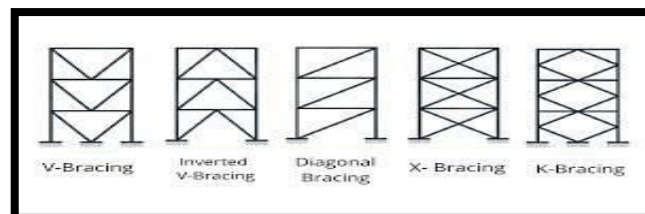
Assistant Professor, Dept. of Civil Engineering, SJMIT, VTU, Chitradurga, Karnataka, India

ABSTRACT: - Steel frames are widely used in the country in this fast modernization era. They are easy to build, maintain & retrofit if needed. Steel bracings are an additional strength increasing structures that can be adopted while constructing steel frames. This report studies the impact of adding different types of braces on steel framed structure and their structural changes like maximum story displacement, maximum story shear, autolateral load on high rised building under various load conditions in csi etabs software under Indian Standards. The main objective of the present work is to investigate the seismic performance of a tall RCC frame building with X-Type bracing, V-Type bracing and inverted V-Type bracing, which give better performance against seismic responses. Analysis is performed by Response Spectrum Analysis as per IS: 1893 (part 1): 2002 have been conducted on hill slope buildings with varying number of bays across slope direction and having varying slope angles with the horizontal using ETABS software. Bracing system is one of the effective structural system which plays a vital role in the structural behavior during earthquake. In the present study, modeling of the steel frame is done under the analysis mentioned above using E-TABS software is and the results so obtained for different bracing systems(X bracing, Diagonal bracing) are compared.

KEYWORDS: : Bracing,Response Spectrum Analysis,story shear,Base Reaction,displacement, Auto lateral load

I. INTRODUCTION

India is rapidly urbanising. Residential and commercial construction demand is rising. The kind of construction chosen depends on cost and time. Multistory structures are best for land shortages. Building height increases danger. We brace the building to avoid wind and earthquake loads. RCC constructions may be braced. However, for cost-effectiveness and simplicity, Steel frames are good. The structure has five main bracings. X braced, V braced, Inverted V, Eccen Forward, Eccen Back. We've tried all kinds of bracing on a 7- story building's exterior. The programme later received structural characteristics. Results were examined. The building has low damage and great energy dissipation. Bracing setup: Many variables determine bracing configuration. These include bay height-to- width ratios and frame elevation open area size and position. These limitations may replace structural optimization. Introducing e/L generalises framing scheme. Reducing eccentricity, e.g. However, active link ductility limits e decrease.



Types Of Bracing

II. RELATED WORK

[1] Author Akhila lakshmi N H1, Swarthy S. Kumar (2013), Dynamic Analysis of an Irregular RC Building with Different Bracing Systems, The drift of the structure is reduced by 53.88% in X direction and 55.23% in Y direction with the use of Mega X- bracing when compared with Unbraced Building.[2] Author Ali paseban, Jalal Jamali (2013), Investigation of the Seismic Behavior of Steel Structures with Zipper Braced Frames, He examined steel constructions with and without bracing systems. They also evaluate seismic steel frames with various bracing techniques. Diagonal, X, Chevron, and V bracing were studied .[3] Author Acxa Kuriakose

et.al (2017), Comparative Study of X-Concentrically Braced Frame, Zipper Frame and Strong Back System, They developed a model of G+14 R.Cstructure and analyzed it using ETABS software for seismic zone V.[4] Author Adithya. M, Swathi Rani K.S(2015),Study On Effective Bracing Systems for HighRise Steel Structures result concluded was the bracing should be placed at the core instead of the building facade.

III. METHODOLOGY

1.GRAVITY ANALYSIS

Building design includes dead and live loads. earthquake load etc.

2. DEAD LOAD

Building design assumes dead weight as material unit weight. Load calculation includes various building component unit weights. IS 875 Part 1 has deadloads.

3.LIVE LOAD

.Buildings consider live load. It helps move people, furniture, and other items. Air,earthquake, snow, and other

loads are excluded from this load. IS 875 Part 2

4.LOAD COMBINATION

Limit state reinforced concrete structure design considers the following seismic forces. IS1893-2002

1. $1.5(DL \pm IL)$
2. $1.2(DL + IL \pm EL)$
3. $1.5(DL \pm EL)$
4. $0.9DL \pm 1.5LL$

Where DL, LL, and EL represent dead load, imposed load, and intended seismic load response quantities.

3.1 SEISMIC ANALYSIS

1. Linear statics (Equivalent static lateral force method)
2. Linear dynamics (Response spectrum method)
3. Non-linear statics (Pushover analysis)
4. Non-linear dynamics (Time history analysis)

IV. RESULTS AND COMPARISON

Figure shows the results of base reaction v bracing is more than other bracings. As table shows response spectrum is more as in x bracing.displacement in x and y direction inverted bracing is less when compared to x and v bracing, the displacement for the invertedV bracing which is very good for the final consideration. when compared to all other bracing systems. The autolateral load story shear values obtained for the V bracing system are relatively lower when compared to all other bracing systems.The V bracing system minimizes X and Y-direction autolateral load storey shear forces better than the Inverted V and X bracing systems.

MODEL	RS MAX	EQX	BS>84%
X BRACINGS	7618.4179	8523.1753	89.3847
V BRACINGS	7454.3653	8240.3862	90.4614
IN V BRACINGS	7619.9743	8526.5454	89.3677

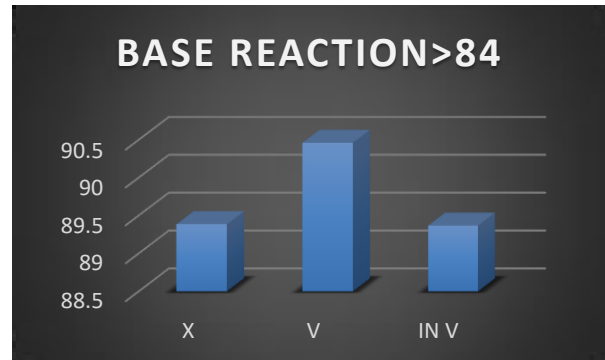


TABLE 1: VALUES OF BASE REACTION

Fig 1: Variation of Base Reaction

MODEL	SUM UX	SUM UY	UX>90 %	UY >90%
X BRACINGS	0.9756	0.9755	97.56	97.55
V BRACINGS	0.9753	0.9749	97.53	97.49
IN V BRACINGS	0.975	0.9748	97.5	97.48

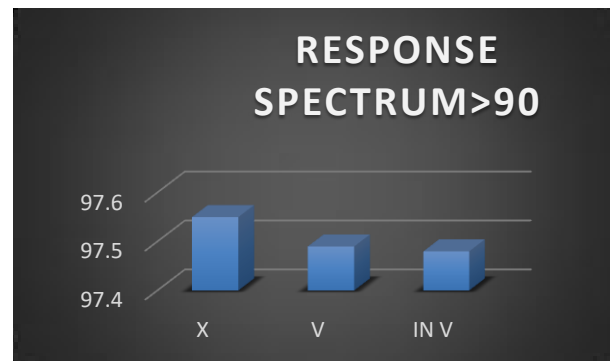


TABLE 2: VALUES OF RESPONSE SPECTRUM

Fig2: Variation Of Response Spectrum

MODEL	X in mm
X BRACING	23.404
V BRACING	24.25
INVERTED V	23.162

MODEL	Y in mm
X BRACING	23.831
V BRACING	24.735
INVERTED V	23.57

TABLE 3: DISPLACEMENT VALUES IN X AND Y DIRECTION

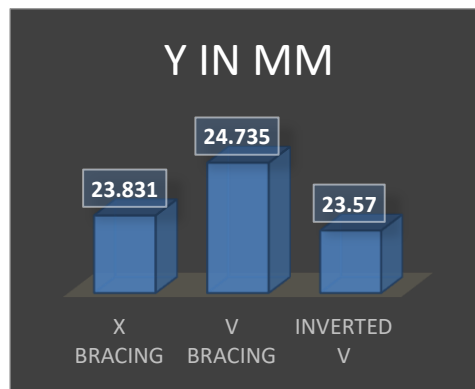
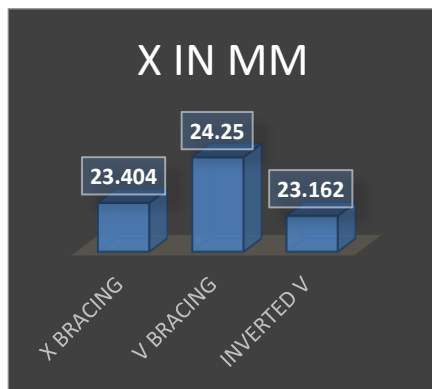


Fig3: Displacement variation in x direction and Y direction

MODEL	X in mm	MODEL	Y in mm
X BRACING	2048.234	X BRACING	2201.56
V BRACING	1983.381	V BRACING	2141.1
INVERTED V	2052.257	INVERTED V	2208.64

TABLE 4 : AUTO LATERAL LOAD VALUES in X and Y DIRECTION

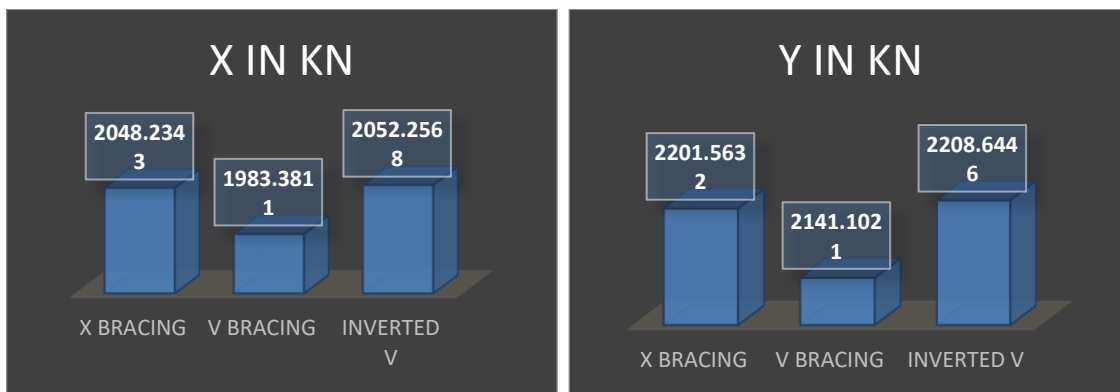


Fig 4:Auto lateral load variation in x direction and y direction

V. CONCLUSION

V bracing model's ultimate displacement, drift, and shear values are satisfactory. V bracing Model outperforms all other models with less value and holds well, according to all tables and graphs. Considering the Displacement in X Direction and Y direction, we can clearly see that the displacement for the V bracing and X Bracing is more when compared the inverted V bracing is less when compared to all other model also in Final comparison with all bracing in X direction and y direction, the inverted V bracing is very good for final consideration. Considering the Autolateral load in X and Y Direction, we can clearly see that the Auto lateral load for the Inverted V bracing and X Bracing is more when compared the V bracing is less when compared to all other model also in Final comparison with all bracing in X and Y direction, the Autolateral for the V bracing which is very good for the final consideration.

REFERENCES

1. Viswanath, Prakash KB, and Anant Desai. "Seismic analysis of steel braced reinforced concrete frames." International Journal of Civil & Structural Engineering 1.1 (2010): 114-122.
2. Patil, Dhanaraj M., and Keshav K. Sangle. "Seismic behaviour of different bracing systems in high rise 2-D steel buildings." Structures. Vol. 3. Elsevier, 2015.
3. Safarizki, Hendramawat A., S. A. Kristiawan, and A. Basuki. "Evaluation of the use of steel bracing to improve seismic performance of reinforced concrete building." Procedia Engineering 54 (2013): 447-456.
4. Rai, D. C., and S. C. Goel. "Seismic evaluation and upgrading of chevron braced frames." Journal of Constructional Steel Research 59.8 (2003): 971-994.
5. Tafheem, Zasiyah, and Shovona Khusru. "Structural behavior of steel building with concentric and eccentric bracing: A comparative study." International Journal of Civil and Structural Engineering 4.1
6. Kamath, Kiran, N. Divya, and Asha U. Rao. "A study on static and dynamic behavior of outrigger structural system for tall buildings." Bonfring international journal of industrial Engineering and Management Science 2.4 (2012): 15-20.
7. Kevadkar, M. D., and P. B. Kodag. "Lateral load analysis of RCC building." International Journal of Modern



Engineering Research (IJMER) 3.3 (2013): 1428-1434.

8. Chimeh, M. N., and P. Homami. "Efficiency of bracing systems for seismic rehabilitation of steel structures." Proceedings of the 15th World Conference on Earthquake Engineering. Libosa, Portugal. 2012.



SJIF Scientific Journal Impact Factor

Impact Factor: 8.423



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details