ANALYSIS OF CONVENTIONAL HALL BY USING ETABS SOFTWARE

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Abstract: - A convention hall is a huge structure built to host a gathering of people and groups that come together to promote and share mutual interests. Convention venues often have enough floor space to handle tens of thousands of people. Exhibition halls are very big venues that are appropriate for massive trade events. Concert halls, lecture halls, meeting rooms, and conference rooms are all common features in convention centers. A conference hall is available at several of the larger resort hotels in the region.

In the present study analysis of G+5 convention hall building is carried out by using ETABS Software. The analysis is done in the zone V seismic condition with the help of response spectrum analysis case. The results like storey drift, shear, bending, torsion, time period, frequency values are compared for the building structure.

Keywords: Etabs, Analysis, Response Spectrum, Convention hall

I. INTRODUCTION

A convention hall is a large building that is designed to hold a convention, where individuals and groups gather to promote and share common interests. Convention centers typically offer sufficient floor area to accommodate several thousand attendees. Very large venues, suitable for major trade shows, are sometimes known as exhibition halls. Convention centers typically have at least one auditorium and may also contain concert halls, lecture halls, meeting rooms, and conference rooms. Some large resort area hotels include a convention center.

A conventional hall, conference room, or meeting room is a room provided for singular events such as business conferences and meetings. It is commonly found at large hotels and convention centers though many other establishments, including even hospitals, have one. Sometimes other rooms are modified for large conferences such as arenas or concert halls. Aircraft have been fitted out with conference rooms. Conference rooms can be windowless for security purposes. An example of one such room is in the Pentagon, known as the Tank. Typically, the facility provides furniture, overhead projectors, stage lighting, and a sound system.

Introduction to ETABS Software

The inventive and progressive new ETABS is a definitive coordinated programming bundle for the auxiliary investigation and outline of structures. Joining 40 years of persistent innovative work, this most recent ETABS offers unmatched 3D protest based demonstrating and representation instruments, blazingly quick straight and nonlinear explanatory power, complex and extensive plan capacities for an extensive variety of materials, and astute realistic showcases, reports, and schematic illustrations that enable clients to rapidly and effortlessly translate and comprehend examination and configuration comes about.

From the begin of outline origination through the creation of schematic illustrations, ETABS incorporates each part of the building configuration process. Making of models has never been simpler - natural illustration charges take into consideration the fast age of floor and rise encircling. Computer aided design illustrations can be changed over straightforwardly into ETABS models or utilized as formats onto which ETABS items might be overlaid. The best in class SAPFire 64-bit solver enables greatly vast and complex models to be quickly dissected, and underpins nonlinear displaying procedures, for example, development sequencing and time impacts (e.g., crawl and shrinkage).

Outline of steel and solid edges (with mechanized improvement), composite bars, composite segments, steel joists, and cement and brick work shear dividers is incorporated, similar to the limit check for steel associations and base plates. Models might be practically rendered, and all outcomes can be indicated specifically on the structure.

ETABS gives an unequaled suite of instruments for basic architects planning structures, regardless of whether they are taking a shot at one-story mechanical structures or the tallest business elevated structures. Massively competent, yet simple to-utilize has been the sign of ETABS since its presentation decades back, and this most recent discharge proceeds with that custom by giving architects the innovatively progressed, yet instinctive, programming they require to be their generally beneficial.

1. Modeling of Structural Systems
2. Loading, Analysis, and Design
3. Output, Interoperability, and Versatility
4. Editing and task highlights for plan, height, and 3D sees

II. METHODOLOGY

In the present study, analysis of G+ 5 stories conventional hall building in Zone V seismic zones is carried out in ETABS.

Basic parameters considered for the analysis are

1. Number of Halls	: 5 (Each floor 1 HALL)
2. Grade of concrete	: M30
3. Grade of Reinforcing steel	: HYSD Fe500
4. Dimensions of beam	: 350mmX500mm
5. Dimensions of column	: 350mmX350mm and 500mmX500mm
6. Thickness of slab	: 150mm
7. Height of bottom story	: 4m
8. Height of Remaining story	: 3m
9. Live load	: 3 KN/m2
10. Dead load	: 2 KN/m2
11. Density of concrete	: 25 KN/m3
12. Seismic Zones	: Zone 5
13. Site type	: II
14. Importance factor	: 1.5
15. Response reduction factor	: 5
16. Damping Ratio	: 5%
17. Structure class	: C
18. Basic wind speed	: 55m/s
19. Risk coefficient (K1)	: 1.08
20. Terrain size coefficient (K2)	: 1.14
21. Topography factor (K3)	: 1.36
22. Wind design code	: IS 875: 1987 (Part 3)
23. RCC design code	: IS 456:2000
24. Steel design code :	IS 800: 2007
25. Earth quake design code	IS 1893: 2002 (Part 1)

MODEL IN ETABS

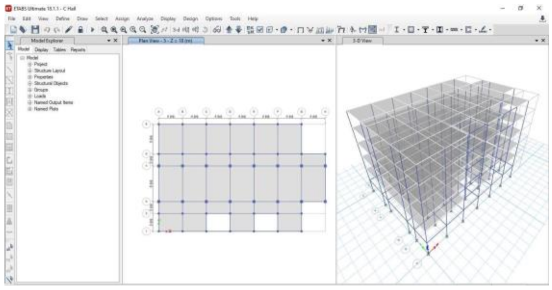

Fig 1.Model in Etabs

IV. RESULTS & DISCUSSION

RSA X Results Storey Drift

Table 1 Storey Drift in X direction

Storey Number	Load case	Storey drift in X direction
5	RSA X	0.000239
4	RSA X	0.000428
3	RSA X	0.000593
2	RSA X	0.000722
1	RSA X	0.000814
G	RSA X	0.000614

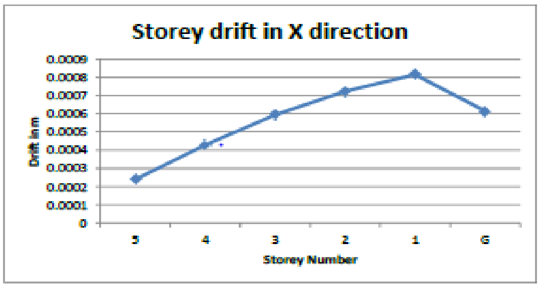

Fig 1 Storey drift in X direction

Table 2 Storey Acceleration

Storey Number	Load case	Storey acceleration
5	RSA X	1191.89
4	RSA X	1070.99
3	RSA X	939.46
2	RSA X	791.99
1	RSA X	614.74
G	RSA X	307.29

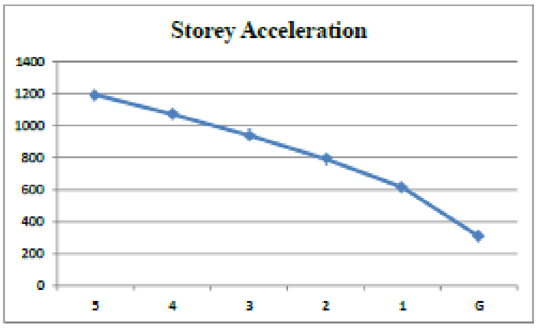

Fig 2 Storey Acceleration

Storey Shear Values X Direction

Table 3 Storey Shear values in X direction

Storey Number	Load case	Storey shear in X Direction
5	RSA X	321.5177
4	RSA X	631.8782
3	RSA X	893.9518
2	RSA X	1101.474
1	RSA X	1245.997
G	RSA X	1279.216

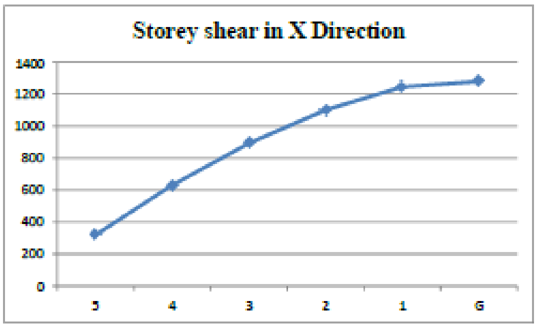

Fig 3 Storey Shear in X direction

Y Direction

Table 4 Storey Shear values in Y direction

Storey Number	Load case	Storey shear in Y Direction
5	RSA X	8.2043
4	RSA X	14.439
3	RSA X	19.5713
2	RSA X	23.526
1	RSA X	26.2003
G	RSA X	26.9982

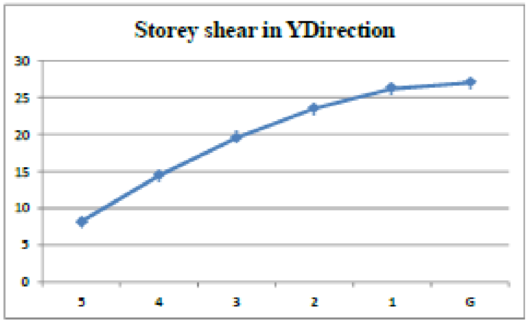

Fig 4 Storey Shear in X direction

Table 5 Storey Bending values in Y direction

Storey Number	Load case	Storey bending in Y Direction
5	RSA X	964.5531
4	RSA X	2854.389
3	RSA X	5518.195
2	RSA X	8789.132
1	RSA X	12479.97
G	RSA X	16283.01

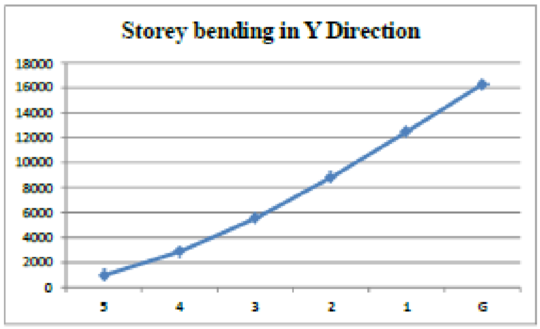

Fig 5 Storey Bending in Y direction

RSA Y Results Storey drift

Table 6 Storey drift in Y direction

Storey Number	Load case	Storey drift in Y direction
5	RSA Y	0.000138
4	RSA Y	0.000231
3	RSA Y	0.000312
2	RSA Y	0.000373
1	RSA Y	0.000411
G	RSA Y	0.000305

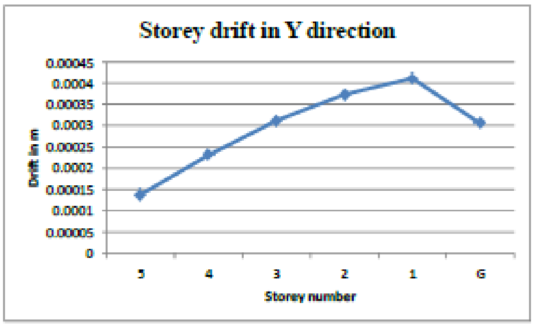

Fig 6 Storey drift in Y direction

Table 7 Storey Acceleration

Storey Number	Load case	Storey acceleration
5	RSA Y	64.35
4	RSA Y	54.51
3	RSA Y	50.33
2	RSA Y	46.2
1	RSA Y	42.81
G	RSA Y	28.29

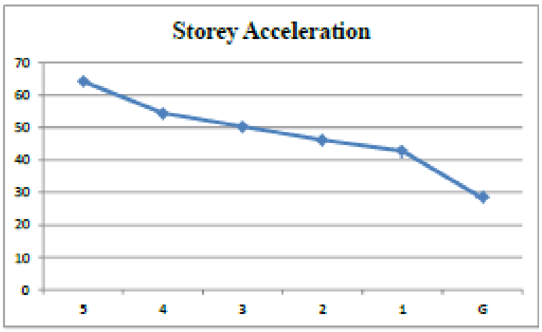

Fig 7 Storey Acceleration

Table 8 Storey Shear Values in Y direction

Storey Number	Load case	Storey shear in Y Direction
5	RSA Y	349.5423
4	RSA Y	680.531
3	RSA Y	955.2893
2	RSA Y	1170.536
1	RSA Y	1319.874
G	RSA Y	1354.357

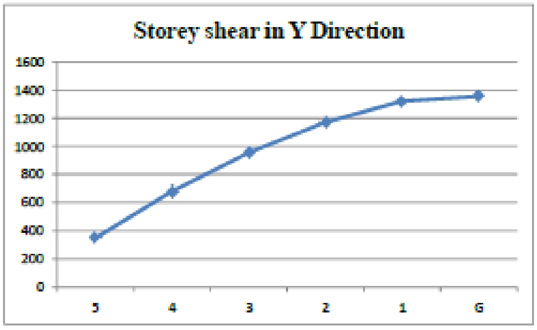

Fig 8 Storey Shear in Y direction

V. CONCLUSIONS

From the above analysis the following conclusions were made for conventional building:

1. The storey drift values for both RSAX and RSAY case increases from top storey to bottom storey for the G+5 building.

2. The storey acceleration values for both RSAX and RSAY case decreases from top storey to bottom storey for the G+5 building.

3. The storey shear, bending torsion values in both the cases increases from the bottom storey to the top storey for the building structure in the both RSA X and RSA Y load case.

4. The time period values are decreasing from mode 1 to mode 12 and frequency values are increasing from the mode 1 to mode 12 in two load cases namely RSA X and RSA Y.

5. The analysis of the building is carried out by using ETABS software with the help of response spectrum analysis case.

REFERENCES

1) Mayuri D. Bhagwat, Dr.P.S.Patil, "Comparative Study of Performance of Rcc Multistory Building For Koyna and Bhuj Earthquakes" ,International Journal of Advanced Technology in Engineering and Science www.ijates.com Volume No.02, Issue No. 07, July 2014 ISSN (online): 2348 – 7550.
2) Himanshu Bansal, Gagandeep, "Seismic Analysis and Design of Vertically Irregular RC Building Frames" International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064, Impact Factor (2012): 3.358.
3) Mohit Sharma, Dr. Savita Maru, " Dynamic Analysis of Multistoried Regular Building" IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) eISSN: 2278-1684,p-ISSN: 2320-334X, Volume 11, Issue 1 Ver. II (Jan. 2014), PP 37-42 www.iosrjournals.org.
4) A. B. M. Saiful Islam*, Mohammed Jameel and Mohd Zamin Jummat, "Study on optimal isolation system and dynamic structural responses in

multistorey buildings" International Journal of the Physical Sciences Vol. 6(9), pp. 2219-2228, 4 May, 2011 Available online at http://www.academicjournals.org/IJPS DOI: 10.5897/IJPS10.441 ISSN 1992 - 1950 ©2011 Academic Journals.

5) A S Patil and P D Kumbhar, "Time History Analysis of MultistoriedRcc Buildings For Different Seismic Intensities " ISSN 2319 – 6009 www.ijscer.com Vol. 2, No. 3, August 2013 © 2013 IJSCER.

6) Md. Arman Chowdhury, Wahid Hassan, "Comparative study of the Dynamic Analysis of Multi-storey Irregular building with or without Base Isolator" International Journal of Scientific Engineering and Technology (ISSN : 2277-1581) Volume No.2, Issue No.9, pp : 909-912 1 Sept. 2013.

7) P. P. Chandurkar, Dr. P. S. Pajgade, " Seismic Analysis of RCC Building with and Without Shear Wall" International Journal of Modern Engineering Research (IJMER) www.ijmer.com Vol. 3, Issue. 3, May - June 2013 pp-1805-1810 ISSN: 2249-6645.

8) Prof. S.S. Patil, ,Miss. S.A. Ghadge, ,Prof. C.G. Konapure, , Prof. Mrs. C.A. Ghadge. " Seismic Analysis of High-Rise Building by Response Spectrum Method" International Journal Of Computational Engineering Research (Ijceronline.Com) Vol. 3 Issue. 3. 62

9) IS: 1893 (Part 1), (2007), Indian Standard Criteria for Earthquake Resistant Design of Structures, Bureau of Indian Standards, New Delhi.

10) IS: 456, (2000), Indian Standard Code of Practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi.

