

# "Comparative Analysis and Design of High Rise Structure Subjected to Wind by Indian Standard Code and American Standard Code"

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## **Abstract-**

The main aim of this paper is to understand provisions of American standard code and compare them with Indian Standard code. In this paper a comparative study of wind of RC building using different code.

Today, High Rise Structure are worldwide architectural phenomenon. The behaviour of the structure during wind load definitely has a major role not only from structural engineering point of view but also safety of human leaving in the structure.

The Building is modelled in 3D using ETABS, The comparative results are obtained from the different International codes .

## **1.INTRODUCTION**

The rapid increase of the urban population in developing countries such as India, has forced the re-evaluation of the importance of high rise building. In modern era building are made very High slender and asymmetrical with special architectural requirements due to development of new building materials and construction technique. these buildings are becoming much lighter and more slender than earlier buildings of modern era are very susceptible to wind load.

The most prominent tall buildings are called high rise buildings. According to national building codes of india, A building having height more than 50 metre is called as high rise building. The study was conducted on 60 metre high rise building with geometrical building shape such as rectangular. the

comparative results are obtained from the different international wind loading codes and standard by using ETABS software.

## OBJECTIVE :

1. To study and understand indian standard code and american standard code which are being used in these thesis.
2. To assign the loading value and other parameter to the structure according to the code of respective countries.
3. To obtained the structural parameter of the structure and generate the graph.
4. To compare the graph and decide which international code parameters gives good result.

## 2. Literature Review:

1. Rakesh Choudhary, Prof. Vimlesh Agrawal, Prof. Vishal Arekar. Comparative study of along wind response of high rise building using major international codes with Indian code. (2019) - IS code gives the Higher value of base share, story displacement and story drift in comparison to NZ code and ASCE code, The NZ code gives higher value of ASCE code.
2. Md. Ahesan, Amit Yennawar. Comparative study of wind load analysis using different standard.(2018) - the american and australian

standard gives the lower value of axial shear force, torsional moment and bending moment along z-direction as per indian load combination and loading combination prescribed in various code.

3. Kartik N, Varuna Koti. Comparative Analysis of high rise structure using various international codes.(2017) - it is apparent that the united state of american code has low value the structure analysed IS 1893: 2016 has shown better value, since EUROCODE surpasses all the other code when compared in terms of value obtained for structural parameters hence during the Design, Eurocode needs more reinforcement area when compared to other codes due to increase reinforcement area with contrast to EUROCODE is more ductile.

4. Shams Ahmed, Prof. S. Mandal. Comparative study of along wind response of major International codes with Indian code.(2017) - the results obtained are quite different in spite of same basic gust wind velocity with averaging time of 3 second this is due to widely varied definition of wind characteristics in different code and standard. The gust loading factor value estimated buy ASCE-7 and EUROCODE also distinct due to their verried definition of wind characteristics parameter.

5. K. Rama Raju, M. I. Shereef, Nagesh R. Iyer, S. Gopalkrishnan. Analysis of Tall building subjected to wind and seismic load (2013) - In these paper, the response of tall building under wind load as per IS code of practice is studied. the model as 3D using ETABS software. the member force due to

earthquake found using response spectrum method need to be multiplied by factor.

### 3. METHODOLOGY :

\* Description of Building Model: In these present study on RCC G+30 storied residential building models is taken for analysis and design from ETABS software. The grade of reinforcing steel and concrete used in the building are assumed to be Fe500 and M30 respectively.

\* General features of the model structure.

Foundation - 2 m, Plinth - 1.2 m, Storey Height - 3 m, Column - 400×600 mm, Beam -300×450 mm, Corner bar - 25 mm Dia, Others bar - 20 mm Dai, C/C spacing - 40 mm, Stirrups - 10 mm Dia, Thickness of slab - 150 mm.

\* Shear wall provided at only lift.

All wall thickness - 300 mm, Opening width - 1.2 m, Opening Height - 2 m.

Minimum : 4.38 KN

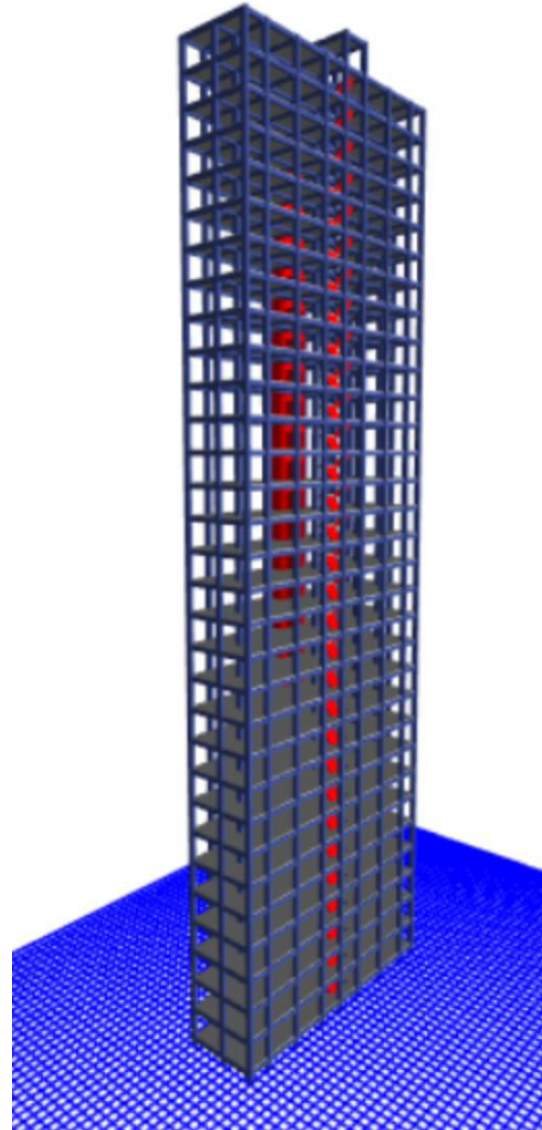


Fig. High Rise Structure

### 4. RESULT OF ANALYSIS :

\*Result obtained by Indian Standard :

Displacement- Maximum : 22.5 MM

Minimum : 0

Bending Moment - Maximum : 44.02 KN/N

Minimum : 7.247 KN/N

Shear force - Maximum : 39.54 KN

\* Result obtained by American standard code :

Displacement- Maximum : 24.5 MM

Minimum : 0

Bending Moment- Maximum : 54.77 KN/M

Minimum : 6.34 KN/M

Shear force- Maximum : 48.32 KN

Minimum : 5.89 KN

## 5. REFERENCES

1. Rakesh Choudhary, Prof. Vimlesh Agrawal, Prof. Vishal Arekar. Comparative study of along wind response of high rise building using major international codes with Indian code. (2019)
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4. Suchana Telrande, A.M. pande, Wind Analysis of High Rise building by Different standard code (2018)
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7. K. Rama Raju, M. I. Shereef, Nagesh R. Iyer, S. Gopalkrishnan. Analysis of Tall building subjected to wind and seismic load (2013).
8. IS 456-2000 Plain and reinforced concrete code of practice, Bureau of Indian standard.
9. IS 875 Part 3 Wind load on building and structure.
10. ASCE7-05 Minimum design load for building and structure.