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Analysis of Telecommunication Tower on Residential Apartment at Bhopal City with Building Improvement

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ABSTRACT

The structure is analysis and research under the guise of seismic behavior, six different cases are considered and the final outcome considerations are analyzed, and it showed that the structure is as well structured as the others' experiments. Many analyzes were performed in a different structure near different boundaries. Charges should be placed in earthquake zone III. A total of 6 cases were considered in this study and after that outcome of the worst case scenario we placed another case with the outrigger system and analyzed all cases. The G + 19 structure is considered in the study. Research obtained using STAAD pro software. The various graphs and constraints are shown in the form of a table. In this research project we have especially adapted to the worst case scenario to improve its assets so that the building is not considered too bad.

Keywords: telecommunication towers, Seismic activities, High-rise, tower location, Seismic analysis method, tower

INTRODUCTION-

In this age of communication and the towers of communication play an important role in human society. In times of natural disasters, communication towers have the important function of transferring information quickly from the affected areas to rescue centers. In addition, the operation of infrastructure such as dams, electricity, gas, and petrol stations, depends largely on the information disseminated through these communication towers. The military and defense industries in addition to the television, radio, and telecommunications industries are other areas of use for such towers and thus create the need for further research on communications towers. Communication towers are a tall structure usually built to support parabolic horns that are commonly used for microwave transmission to communicate, and are used to send radio, television signals to remote locations and mounted at a specific height. These towers are self-supporting structures and are divided into three-legged and four-legged structures. The supporting towers are usually square or triangular in shape and are supported on the floor or in buildings. They act as cantilever trusses and are designed to carry air and earthquake loads. These towers though require extra metal but cover a small basic area, because they are suitable in most cases.

Table 1 Details of building

Building configuration	G+19
No. of bays in X direction	5
No. of bays in Z direction	5
Height of building	93 M
Slab Thickness	0.140
Shear wall Thickness	0.135
Dimensions of building	25 X 25 M^2
Size of beam	0.55 X 0.40, 0.50 X 0.35, 0.45 X 0.30
Size of column	0.65 X 0.60 , 0.55 X 0.50 , 0.45 X 0.40
Concrete and Steel Grade	M 30& FE415

Table 2 Detail of loading

Earthquake parameters	Zone III with RF 4 & 5% damping ratio
Period in X & Z direction	1.404&1.404 for both direction
Dead load for floor with waterproofing	2.25KN/m^2& 1KN/M^2
Live load for floor and roof	3KN/M^2&1.2 KN/M^2

RESULT AND DISCUSSION-

Result for Residential Apartment Building

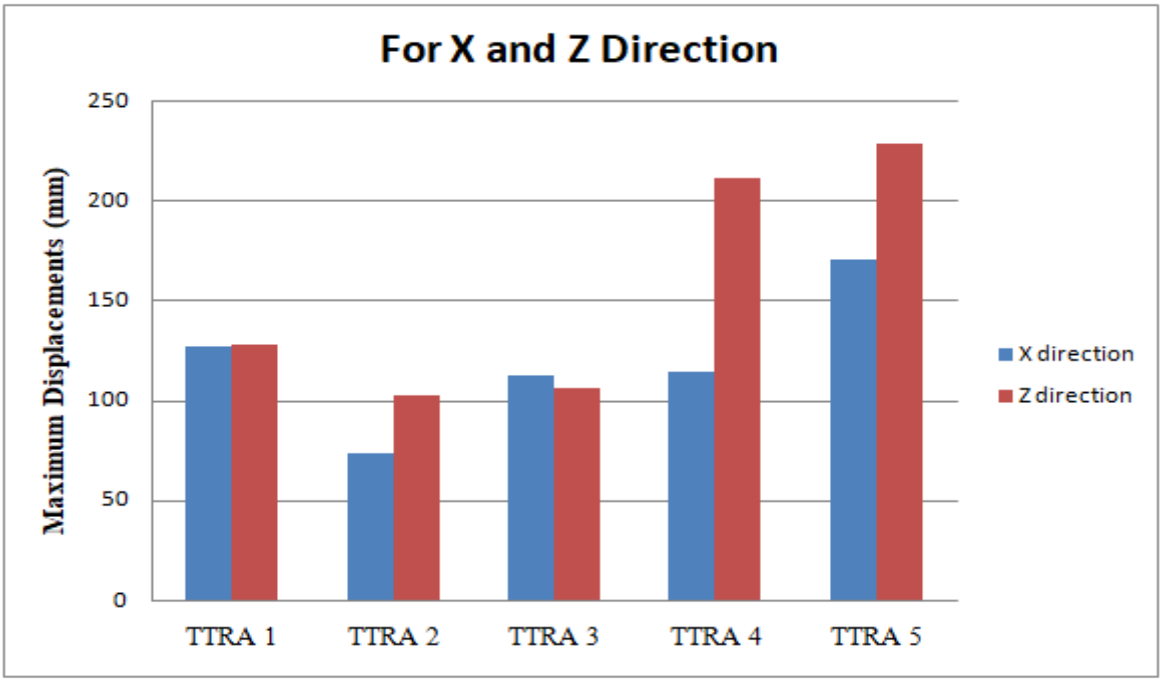

Fig.1: Graphical Representation of Maximum Displacement in X direction and Z direction

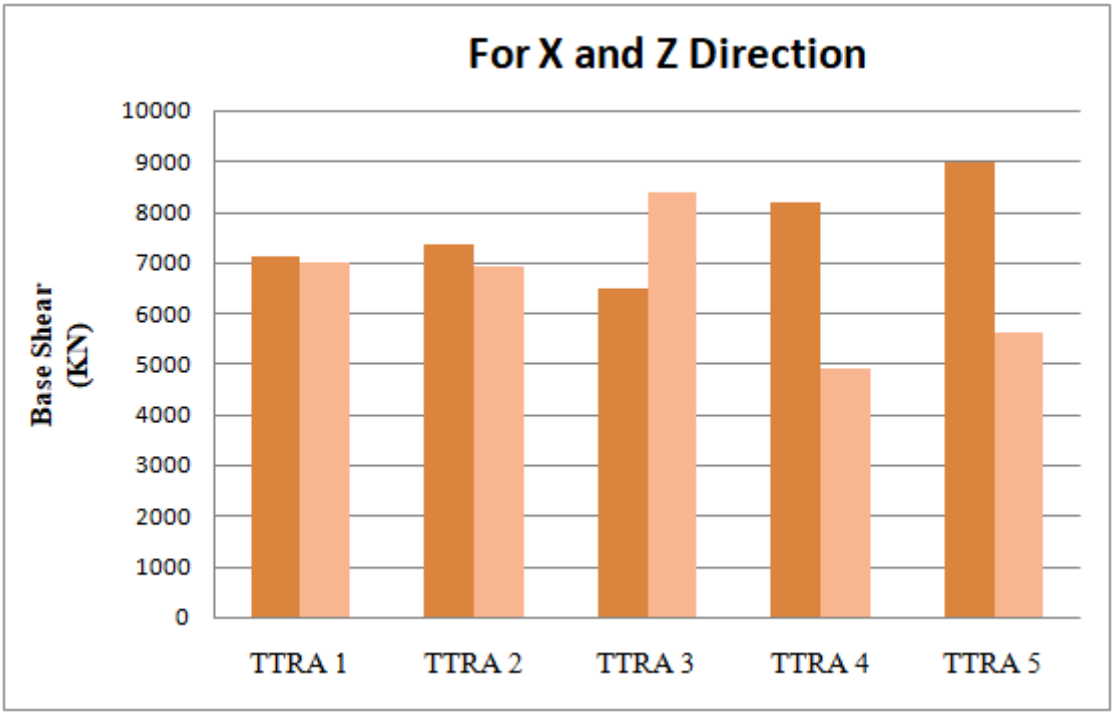

Fig. 2: Graphical Representation of Base Shear in X direction and Z direction

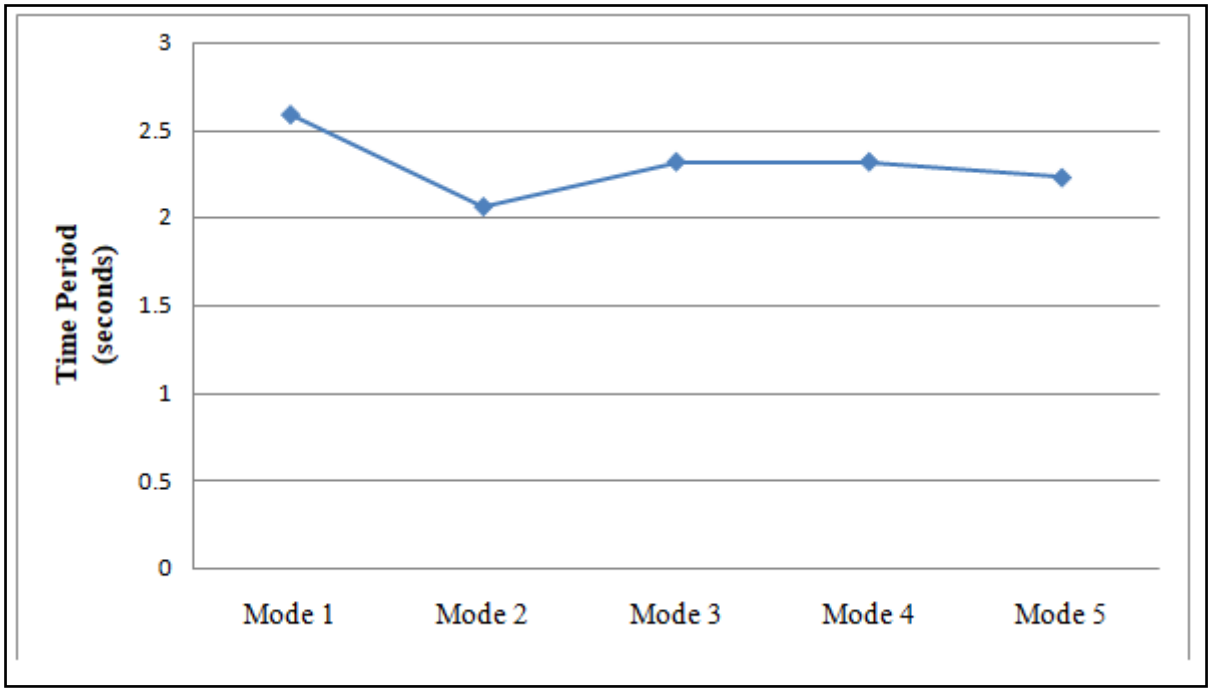

Fig. 3: Graphical Representation of Time Period for all Buildings in Zone III

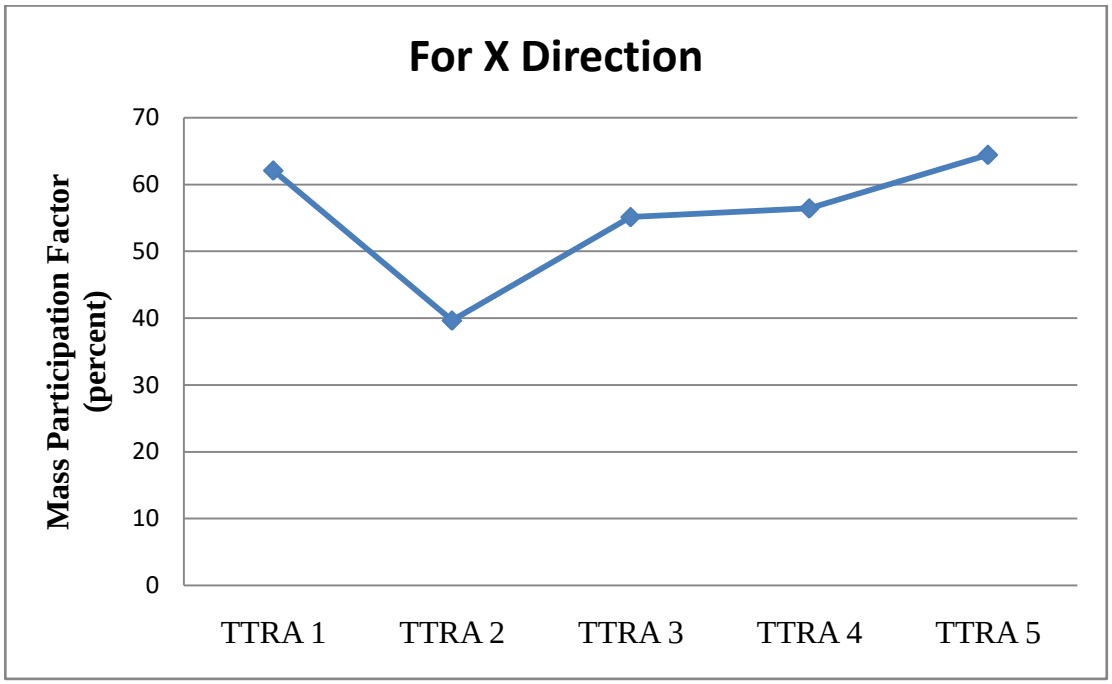

Fig. 4: Graphical Representation of Mass Participation Factor in X direction for all Buildings in Zone III

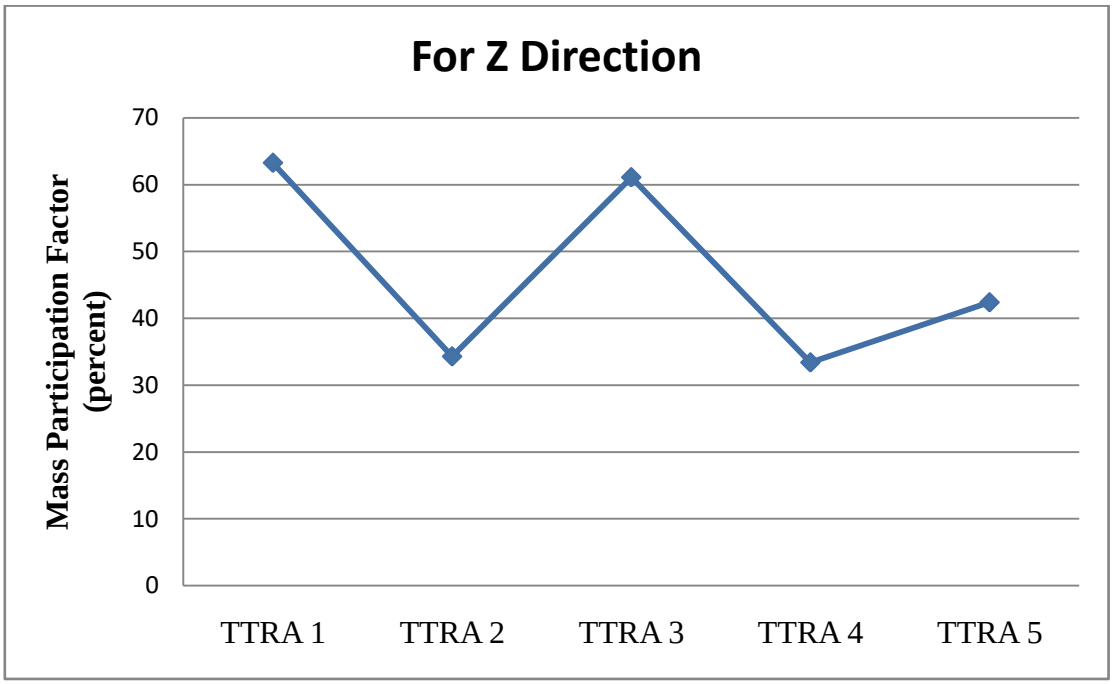

Fig. 5: Graphical Representation of Mass Participation Factor in Z direction for all Buildings in Zone III

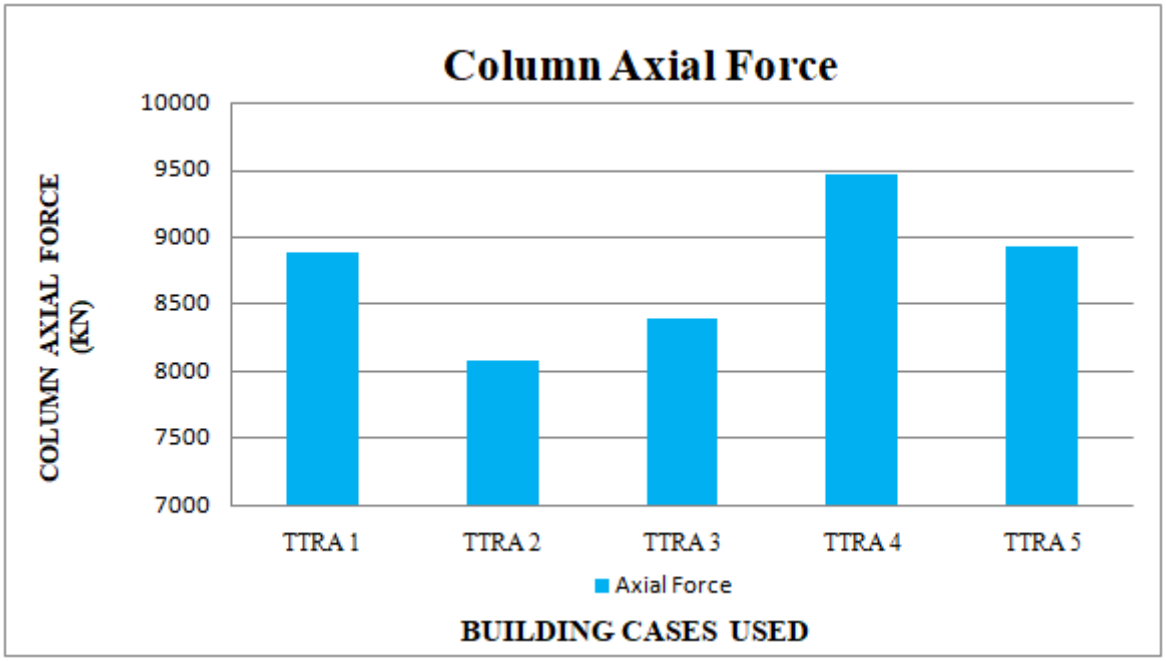

Fig. 6: Graphical Representation of Maximum Axial Forces in Column

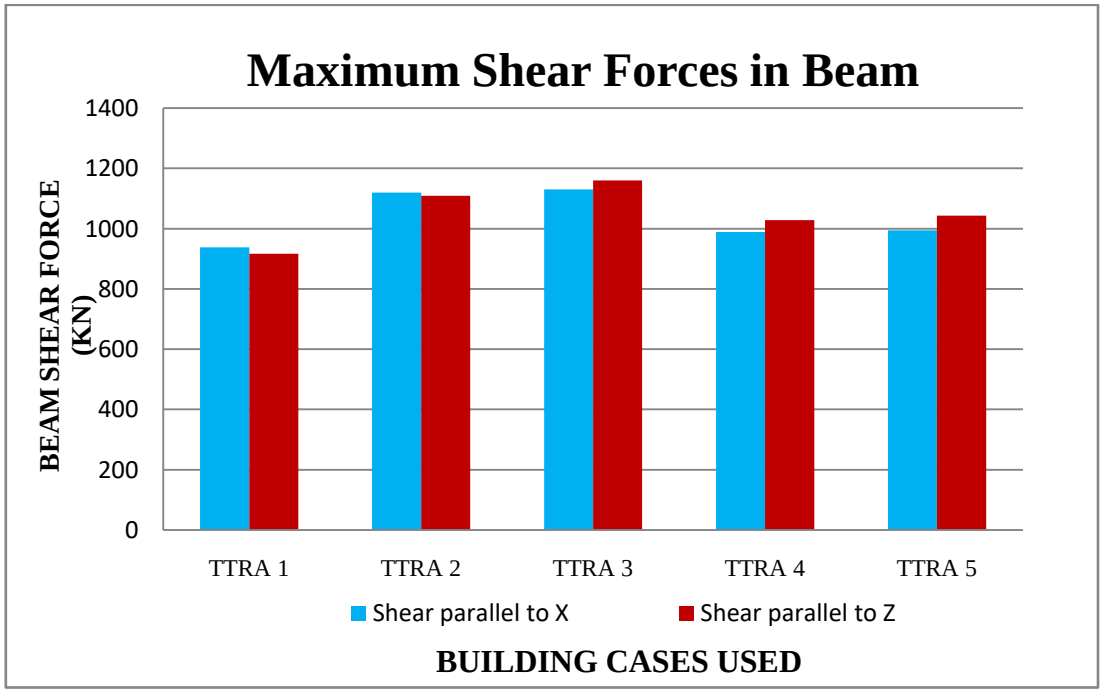

Fig. 7: Graphical Representation of Maximum Shear Force in Column

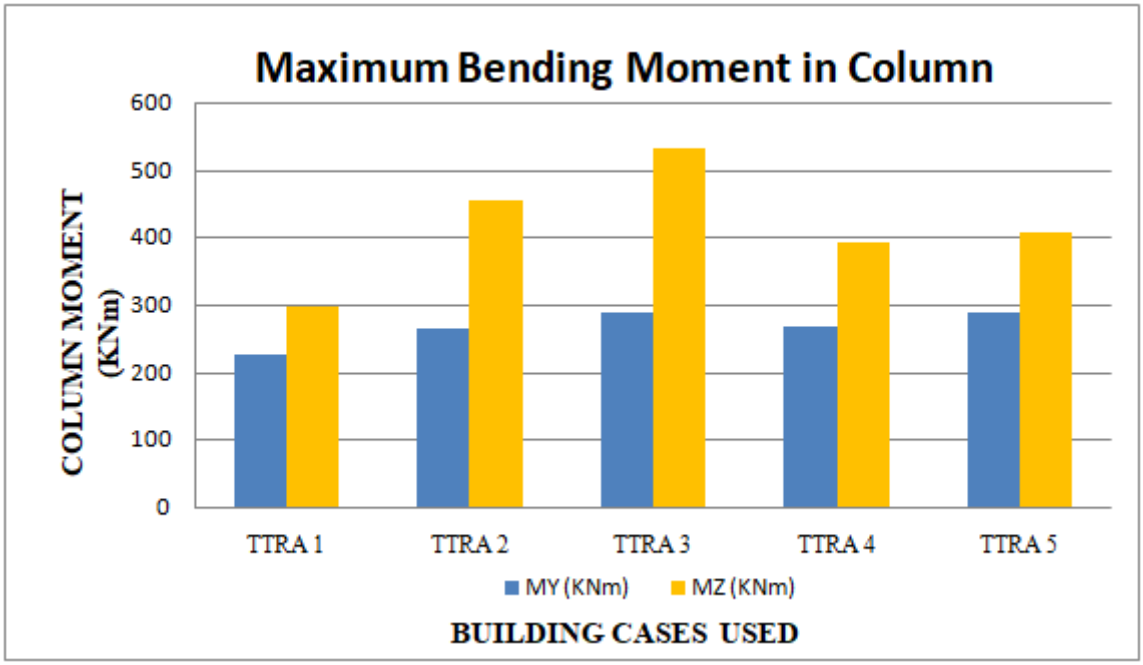

Fig. 8: Graphical Representation of Maximum Bending Moment in Column

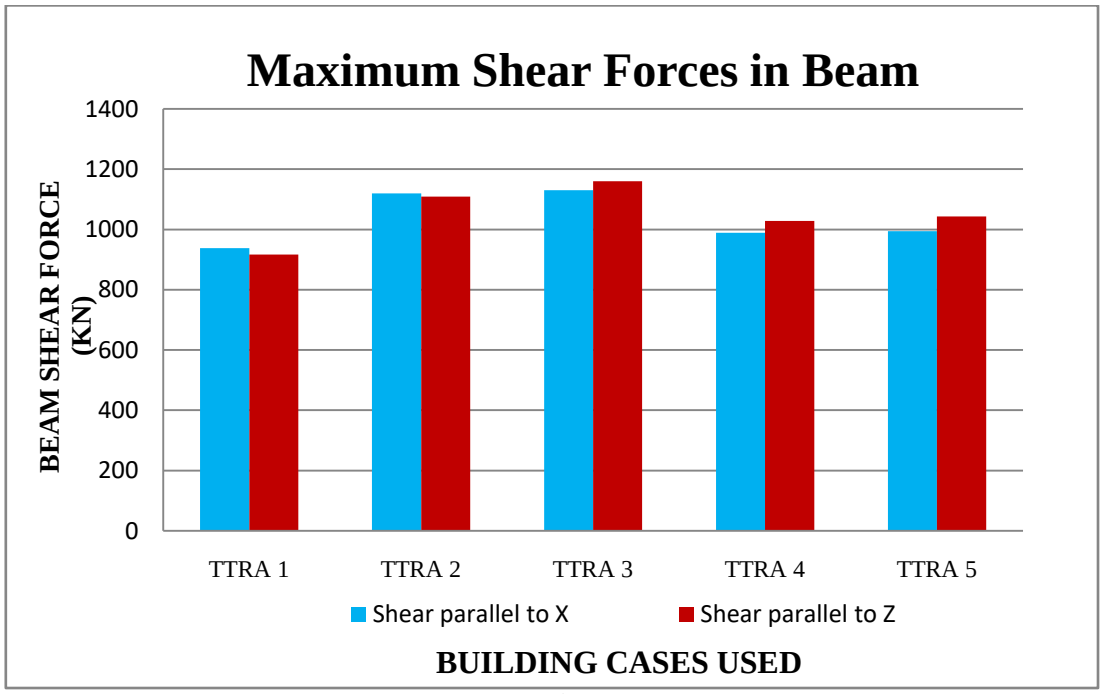

Fig. 9: Graphical Representation of Maximum Shear Force in Beam

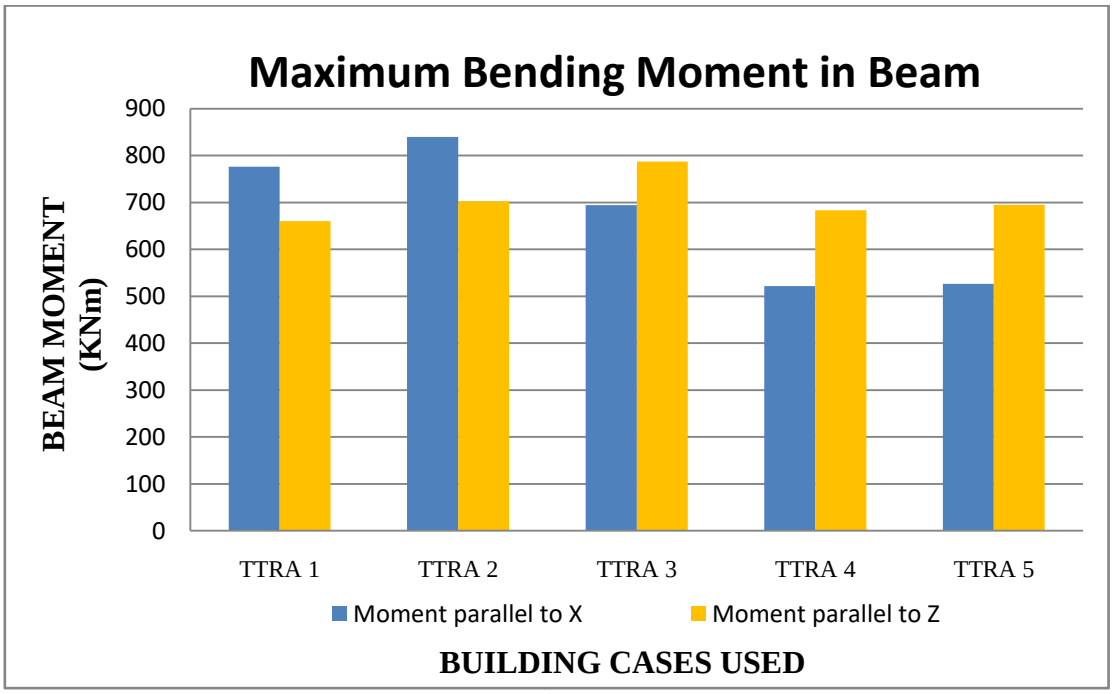

Fig. 10: Graphical Representation of Maximum Bending Moment in Beam

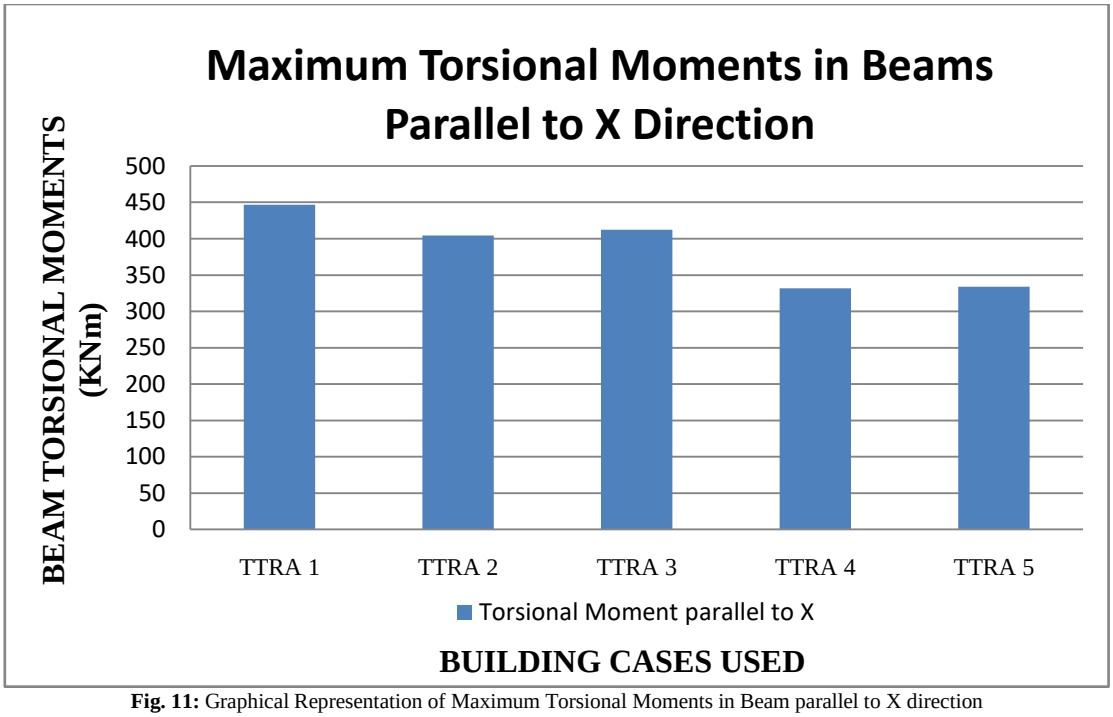

Fig. 11: Graphical Representation of Maximum Torsional Moments in Beam parallel to X direction

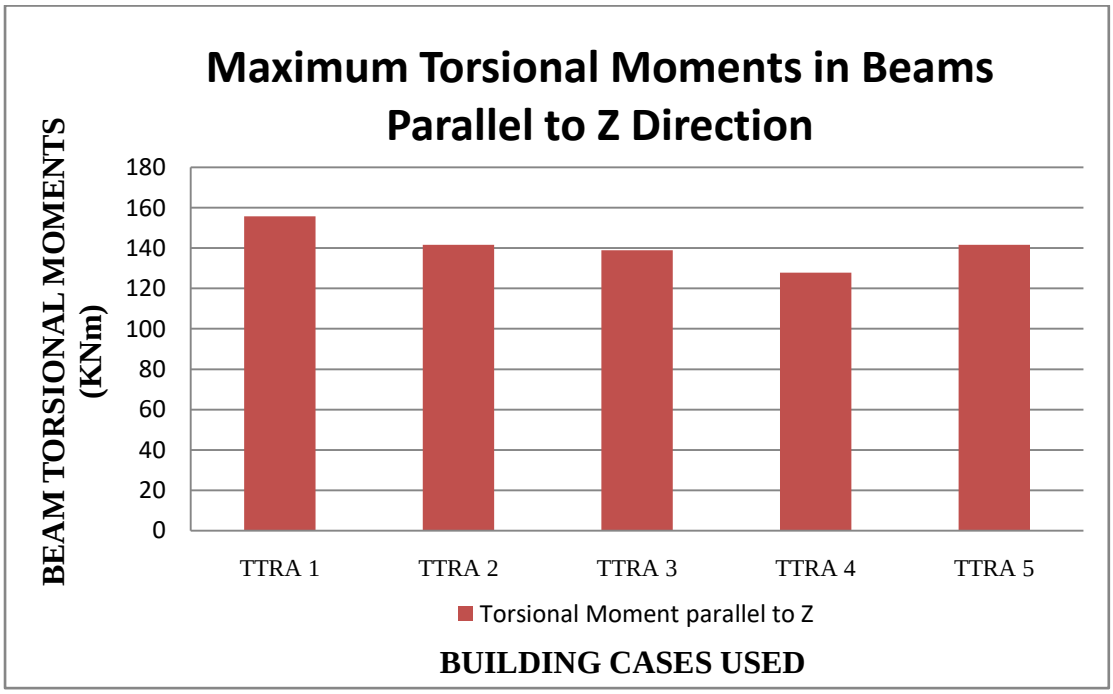

Fig. 12: Graphical Representation of Maximum Torsional Moments in Beam parallel to Z direction

Result for all tower location at building

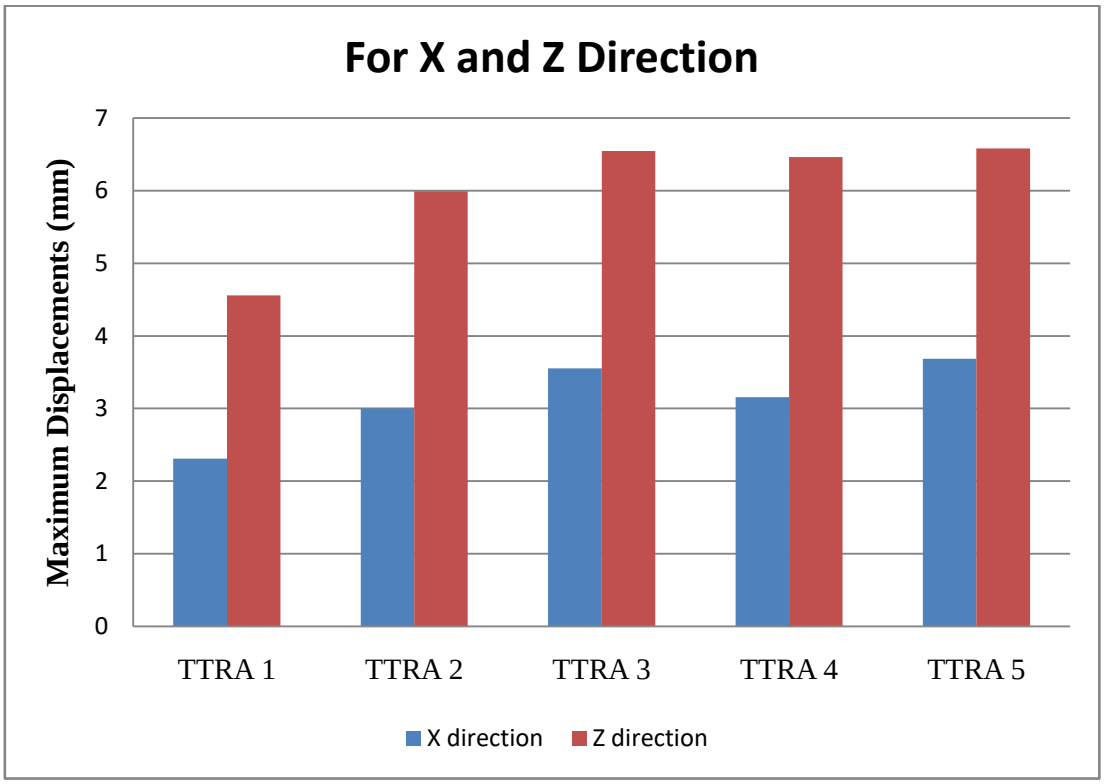

Fig. 13: Graphical Representation of Maximum Displacement in Tower X direction and Z direction

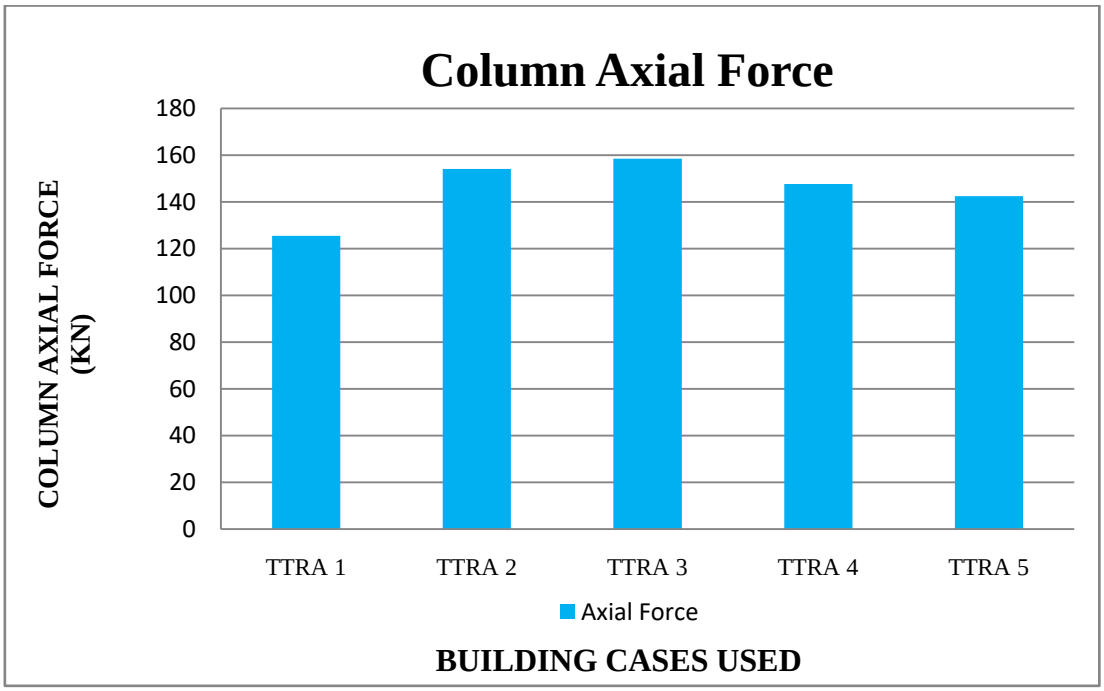

Fig. 14: Graphical Representation of Maximum Axial Forces in Tower Column

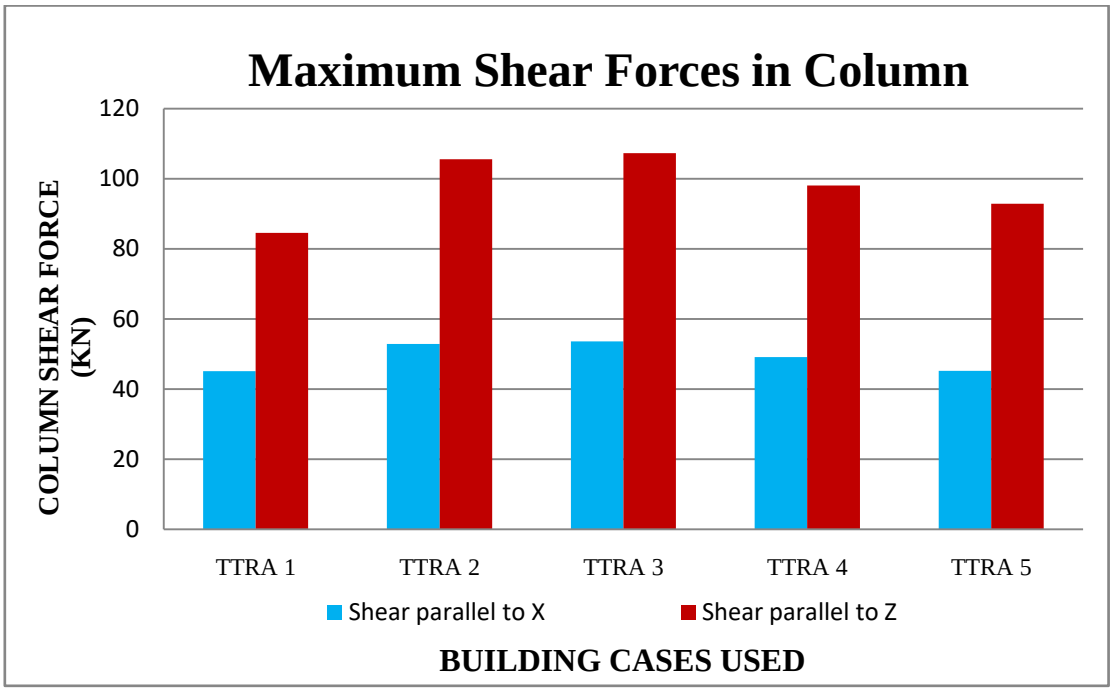

Fig. 15: Graphical Representation of Maximum Shear Force in Tower Column

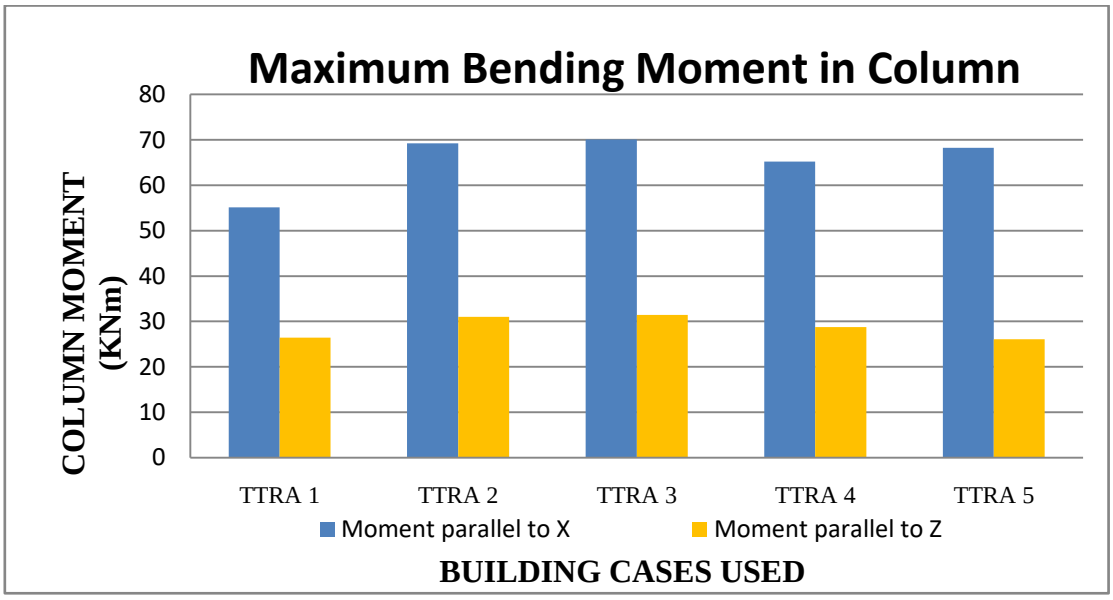

Fig. 16: Graphical Representation of Maximum Bending Moment in Tower Column

By comparing many cases against various parameters among others, it has been noted that the best case already available would be Case TTRA1 with a total of 8 parameters and the worst case case would be TTRA3 with a total of 8 cases.

If there is no provision to keep the tower in good condition, and the provision in the planning stage that the tower will be in a very bad condition as in this study, should be preceded by the provision of an exit plan to be carried out. more stable than before. A comparative analysis of the worst case and its suspended case is shown below:-

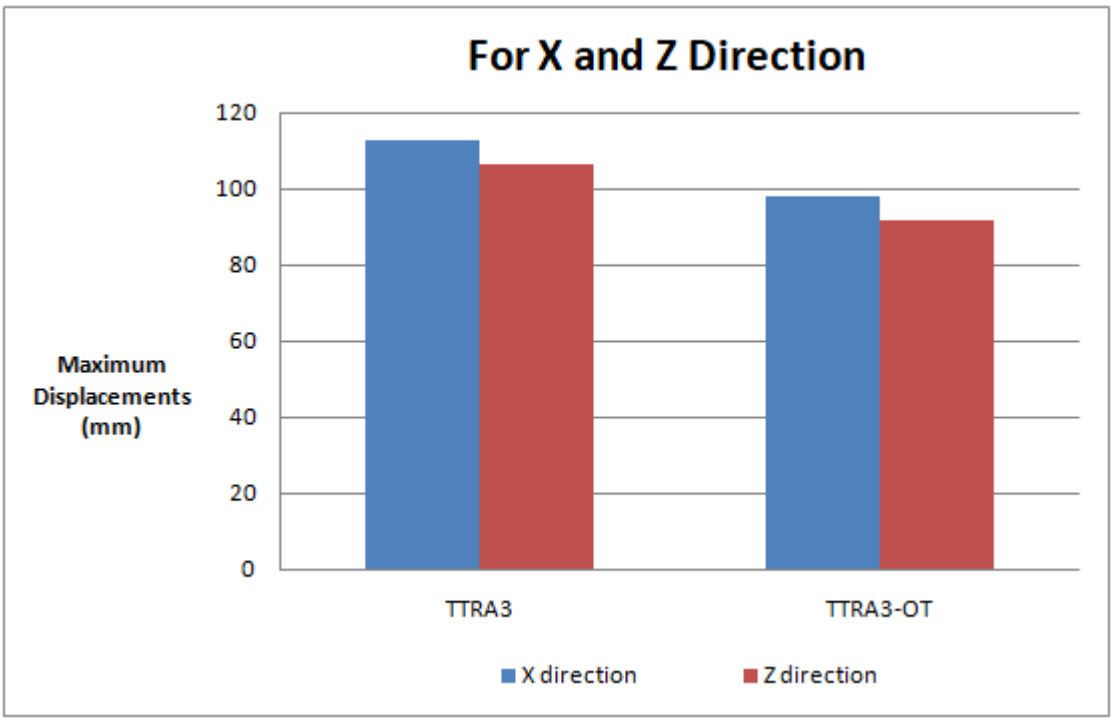

Fig. 17: Comparative representation of Maximum Displacement in X and Z direction obtained in Worst Case and Erected Case for Residential Apartment Building

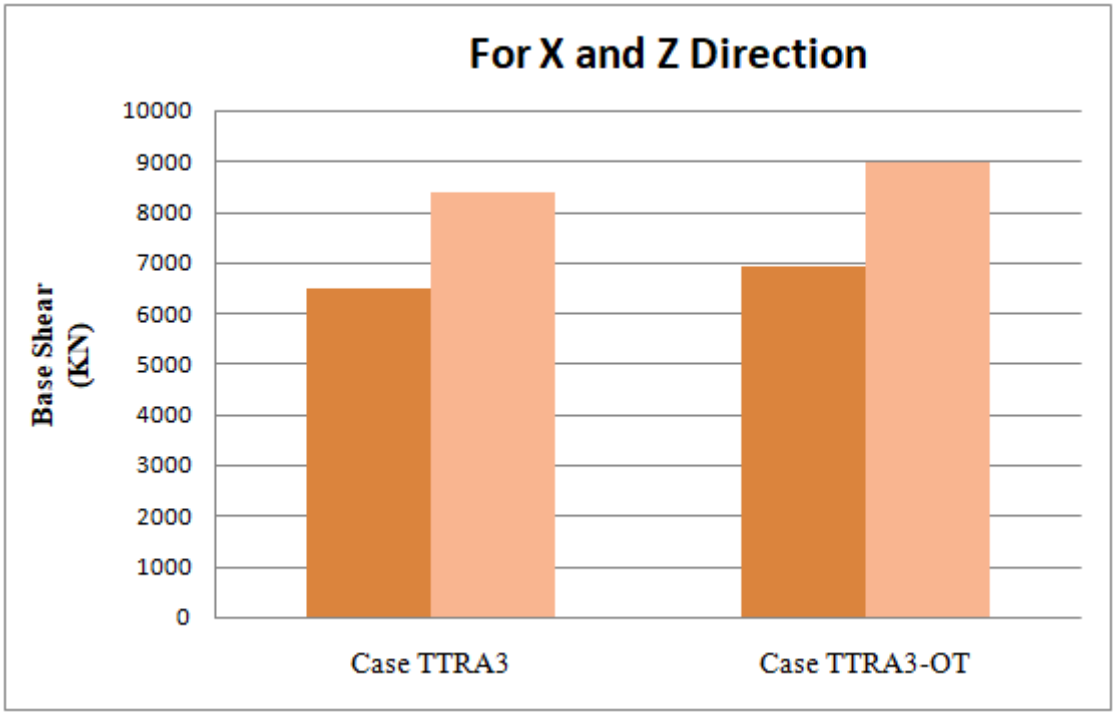

Fig. 18: Graphical Representation of Base Shear in X direction and Z direction obtained in Worst Case and Erected Case for Residential Apartment Building

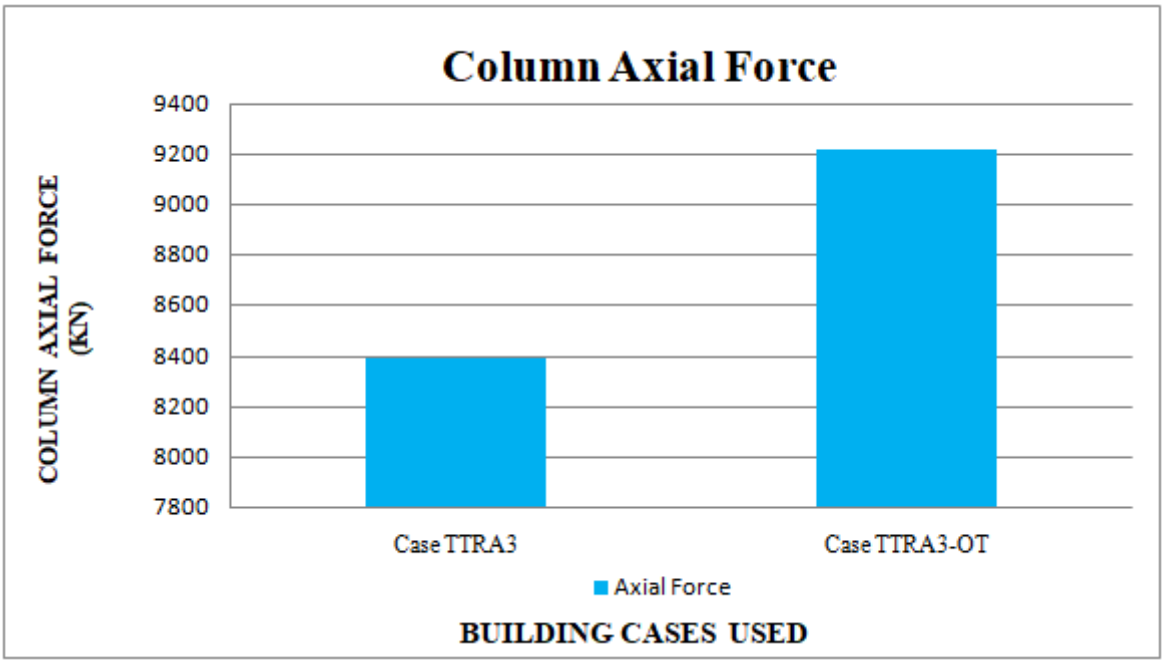

Fig. 19: Graphical Representation of Maximum Axial Forces in Column obtained in Worst Case and Erected Case for Residential Apartment Building

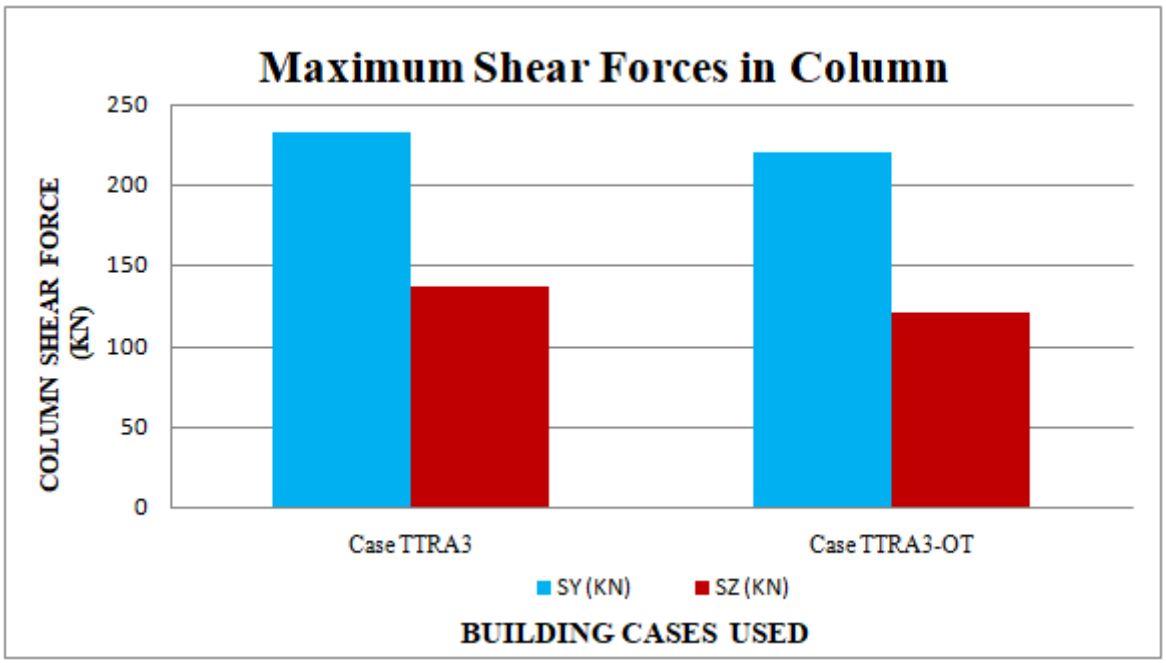

Fig. 20: Graphical Representation of Maximum Shear Force in Column obtained in Worst Case and Erected Case for Residential Apartment Building

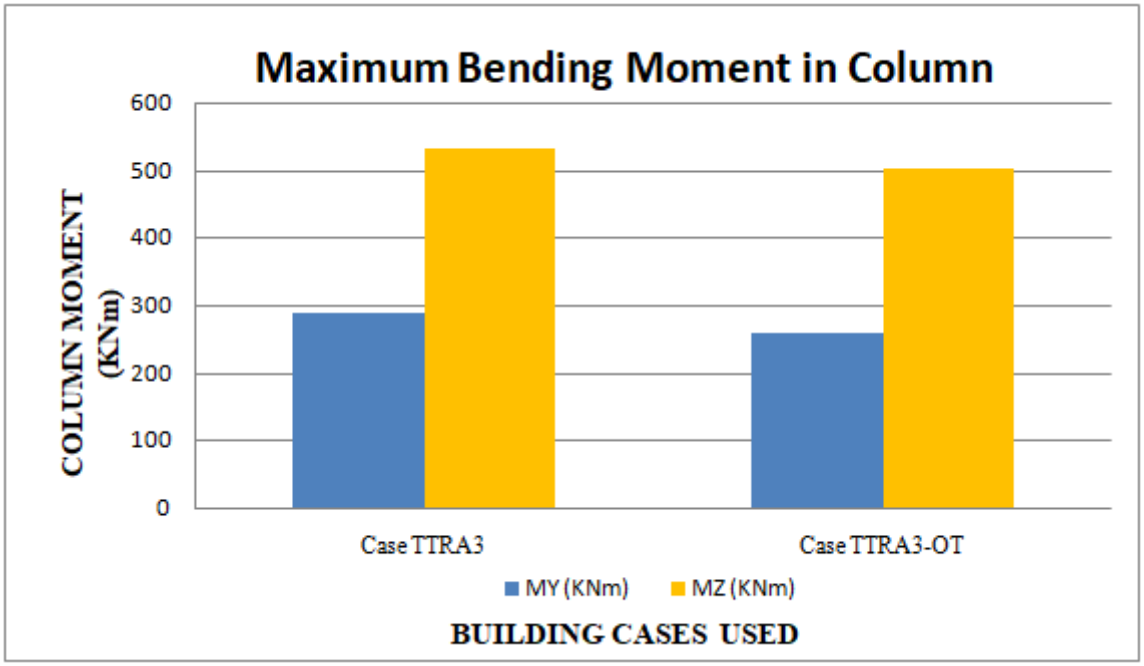

Fig. 21: Graphical Representation of Maximum Bending Moment in Column obtained in Worst Case and Erected Case for Residential Apartment Building

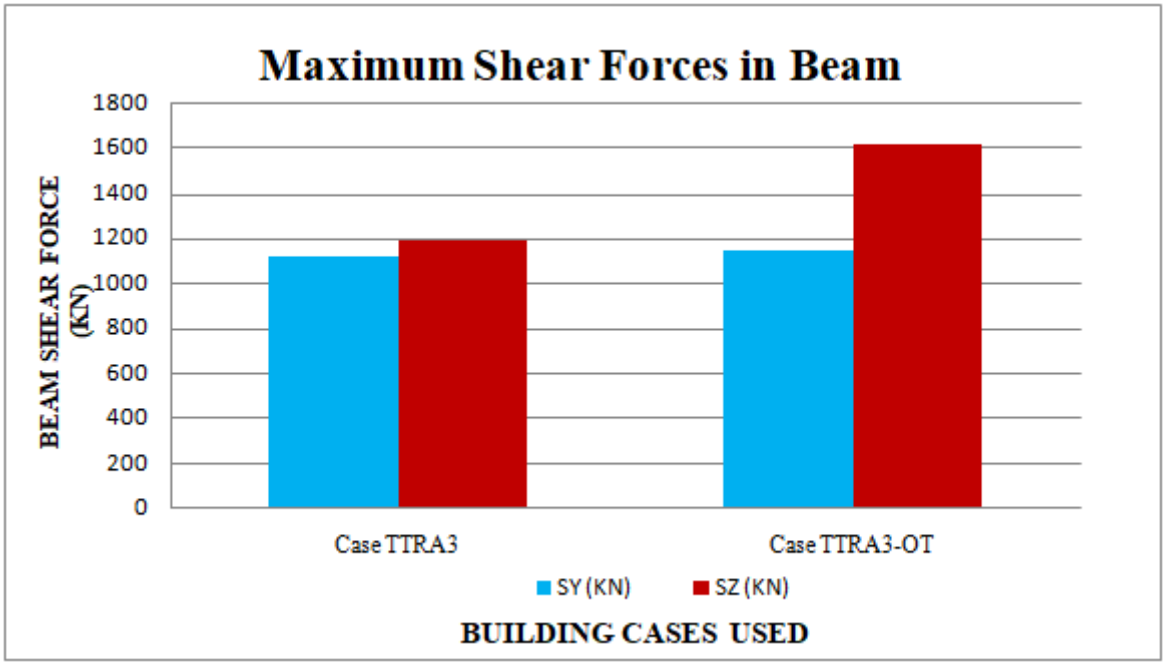

Fig. 22: Graphical Representation of Maximum Shear Force in Beam obtained in Worst Case and Erected Case for Residential Apartment Building

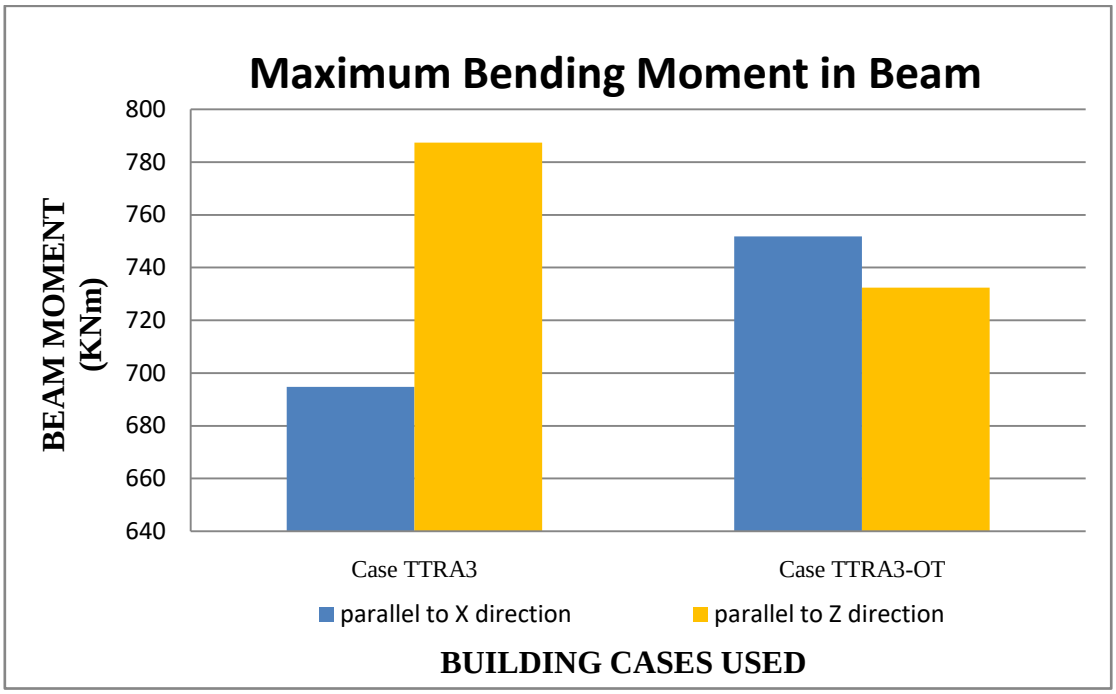

Fig. 23: Graphical Representation of Maximum Bending Moment in Beam obtained in Worst Case and Erected Case for Residential Apartment Building

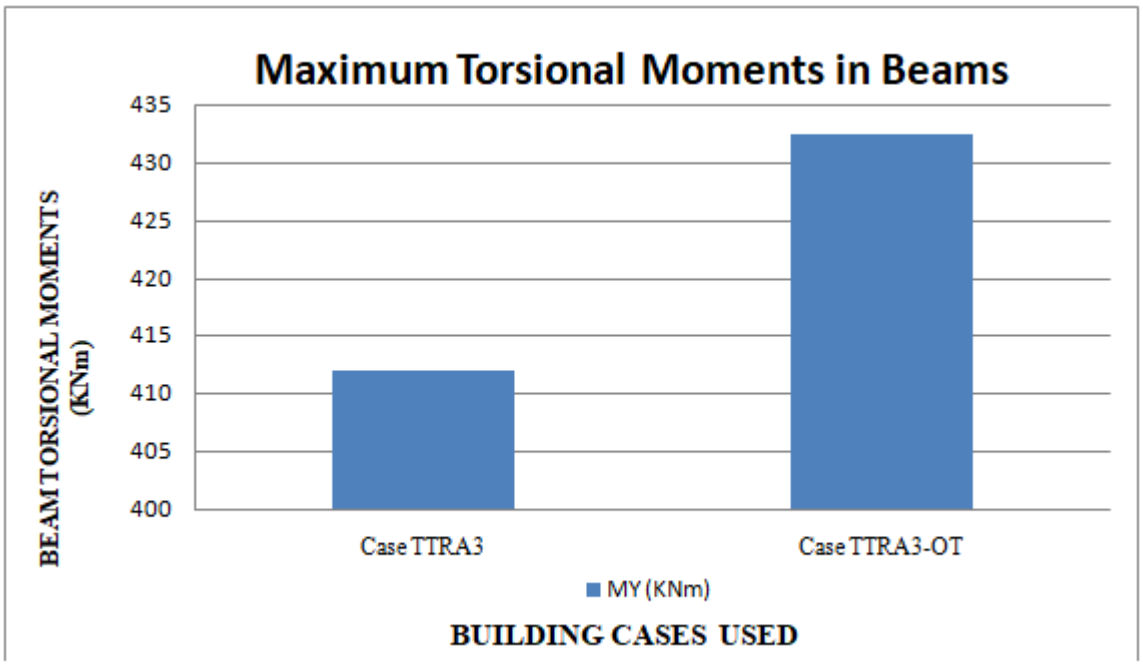

Fig. 24: Graphical Representation of Maximum Torsional Moments in beams obtained in Worst Case and Erected Case for Residential Apartment Building

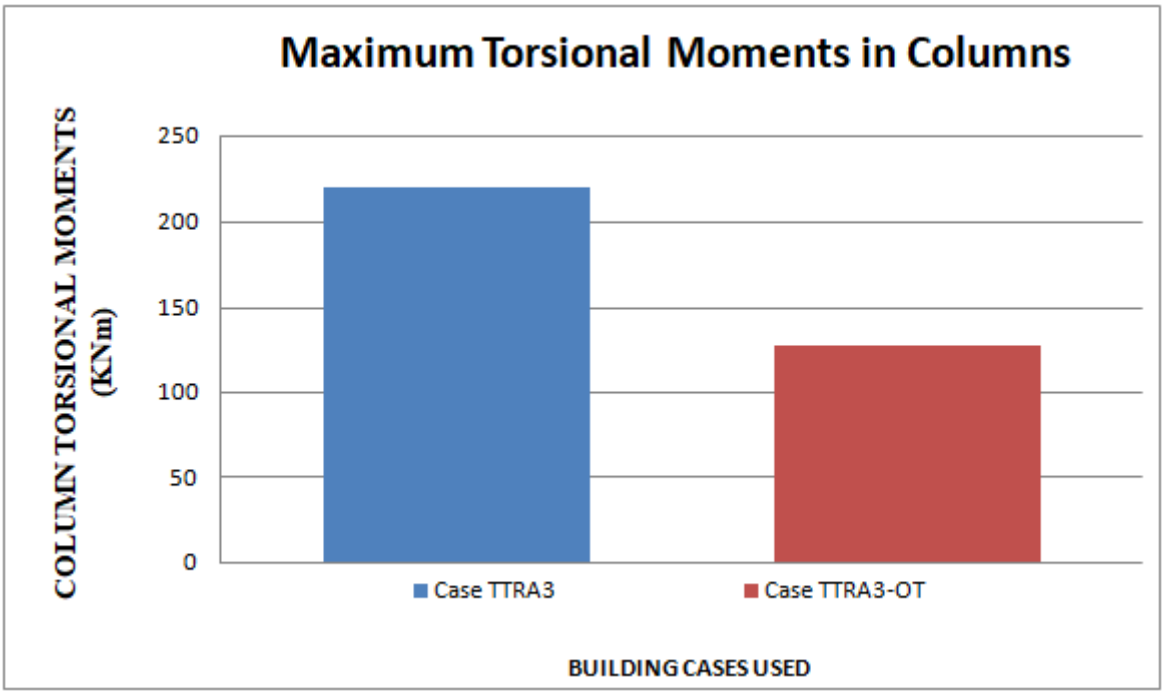

Fig. 25: Graphical Representation of Maximum Torsional Moments in columns obtained in Worst Case and Erected Case for Residential Apartment Building

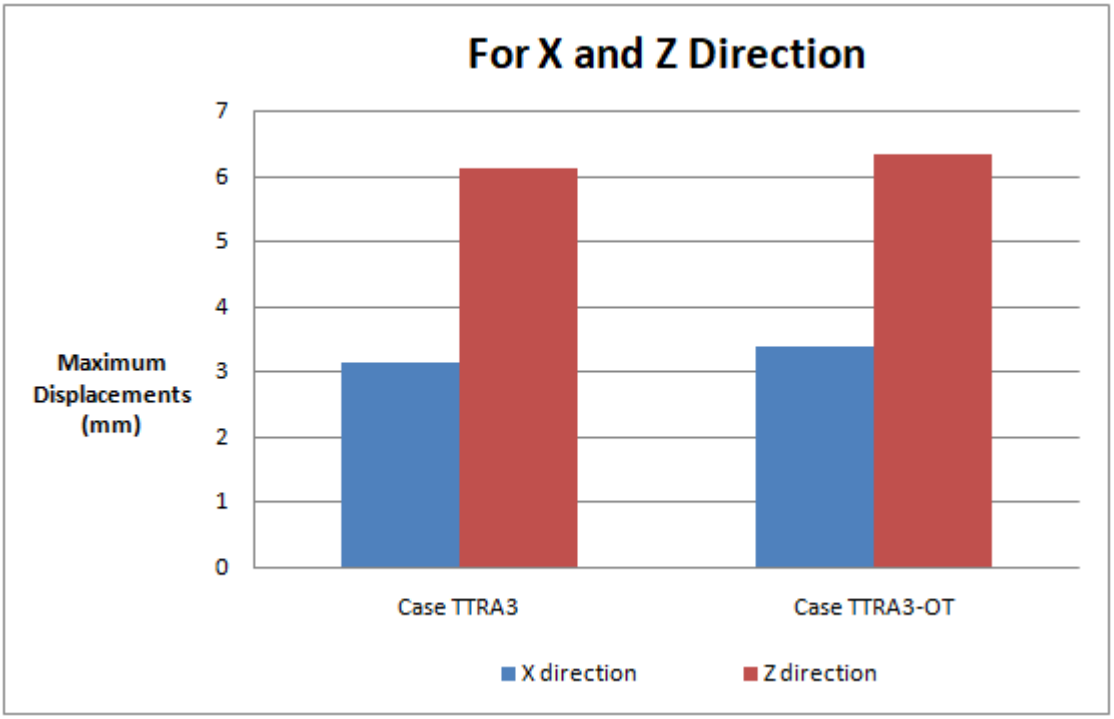

Fig. 26: Comparative representation of Maximum Displacement in X and Z direction obtained in Worst Case and Erected Case for Tower

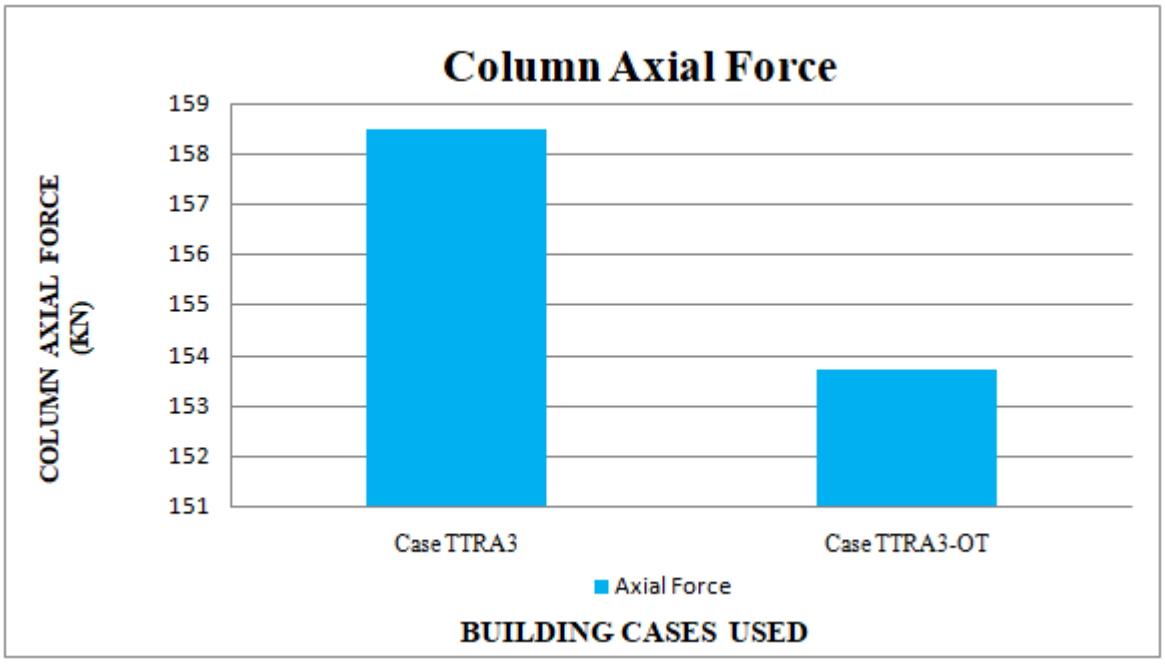

Fig. 27: Graphical Representation of Maximum Axial Forces in obtained in Worst Case and Erected Case for Tower

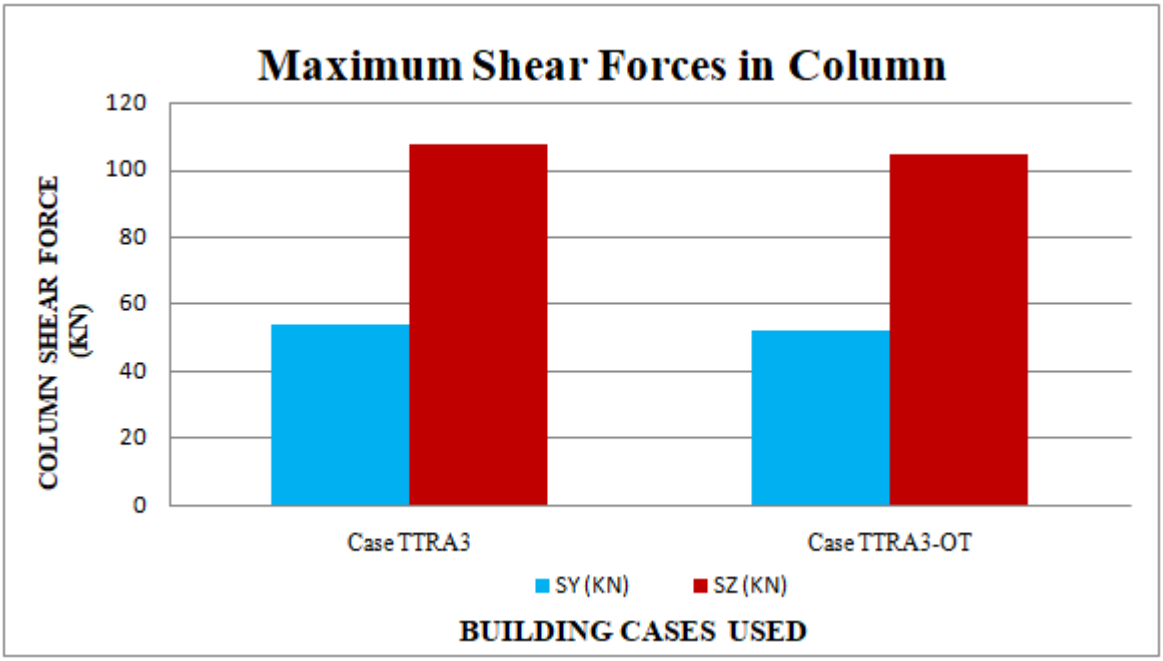

Fig. 28: Graphical Representation of Maximum Shear Force obtained in Worst Case and Erected Case for Tower

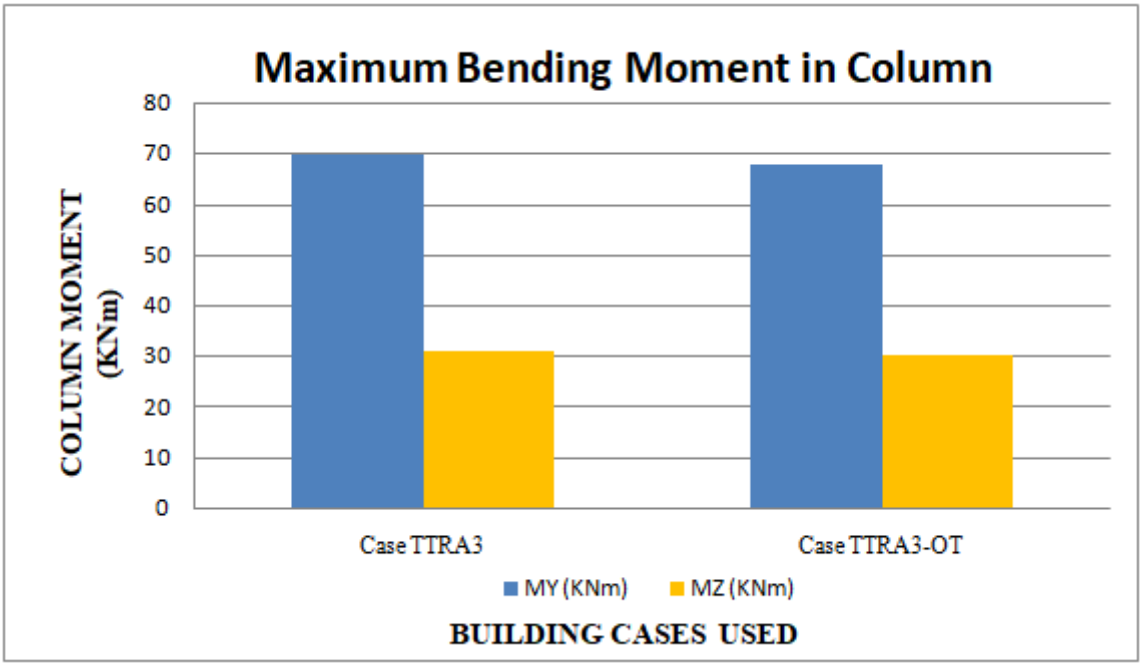

Fig. 29: Graphical Representation of Maximum Bending Moment obtained in Worst Case and Erected Case for Tower

Conclusion

We read about the Telecommunication Tower on Residential Apartment in Bhopal City with Building Improvement Analysis in Staad Pro and there are 5 cases in the Staad Pro model. In this research project we study the Telecommunication Tower on Residential Apartment in Bhopal City on the Staad Pro Building Development Analysis. On the basis of the above parameters the following results are obtained from this comparative study.

Results for Residential Apartment Building

1. By comparison it has been concluded that the largest shift is the X-directional curve obtained in the TTRA 2 case at the lowest value respectively and the higher deviation is the X-directional direction found in the TTRA 2 case at the lower value.

2. As with the comparative results, TTRA 1 and TTRA 4 are the basis for cutting the core in the X direction and the Z-directional values work well in all cases.
3. As a result of comparison in axial force, TTRA 2 is more effective than other cases.
4. As with the comparative results, TTRA 2 and TTRA 1 shear power column on the X-directional guide and the Z-directional values are effective in all cases.
5. As with the comparative results, the TTRA 1 and TTRA 1 column curved directional X and Z-directional values work well in all cases.
6. As with the comparative results, TTRA 1 and TTRA 1 Beam shear force in the X direction and the Z direction direction values work well in all cases.
7. As a result of comparisons, TTRA 1 and TTRA 5 for Beam Bending Moment are straight to X and the Z-guide values are valid for all conditions.
8. When analyzing the Torsional Moment on the TTRA 4 bars it works very well and the Torsional Moment in column TTRA 2 works very well.

Results for Tower

1. By comparing the results of the Tower it has been concluded that the X-side shift limit obtained in the TTRA 2 case is respectively low and the maximum displacement is the Z-direction found in the TTRA 1 case with the lowest value.
2. As a result of comparison in axial force, TTRA 5 is more effective than other cases.
3. As with the comparative results of the Tower, the TTRA 5 and TTRA 5 shear power column in the X direction and the Z-direction values work well in all cases.
4. As with the comparative results of the Tower, the TTRA 4 and TTRA 5 column bend the direction of the X and the directional values of the Z work well in all cases.

By comparing many cases against various parameters among others, it has been noted that the best case already available would be Case TTRA1 with a total of 8 parameters and the worst case case would be TTRA3 with a total of 8 cases.

If there is no provision to keep the tower in good condition, and the provision in the planning stage that the tower will be in a very bad condition as in this study, should be preceded by the provision of an exit plan to be carried out. more stable than before.

As a comparison between the worst case scenario and the established case, it has been proven that when such a type of provision emerges, the provision of the analysis phase should be made prior to construction to reduce the high parametric values as discussed in this study..

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