

# An Immense Review on Effects of Telecommunication Tower over Multistoried Building under Lateral Effects

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**Abstract**— As tower plays an important role for wireless communication network, the disappointment of such structure in hazardous situation will ultimately leads to loss of communication. In this research study, a review is taken with the theme of telecommunication tower over multistoried structure for different parts and situations of the entire world.. Usually, for telecommunication persistence, the four-legged subsidiary tower are used extensively. In the last few ages there has been excessive growth in the communication industries outcome in the appropriate of huge amount of tower for stability of network and to increase the revelation area. The obtainability of terrestrial in city areas is very limited for sustaining the perfect connection of tower thus giving no substitute but to accept roof top towers. The review has been conducted to show the effects of telecommunication tower over multistoried building under lateral effects with different approaches along with different point of views.

**Keywords**— *Seismic Analysis, Telecommunication Tower, Response Spectrum, Sloping Ground, Step Back, Step Back Set Back.*

## I. INTRODUCTION

In today's biosphere growth of cities and human colonies increasing day by day that is causing our agricultural lands and villages. To prevent unnecessary use of land high-rised buildings plays an important role. It reduces extra land use and cost. Therefore now a days towers are shifted upon buildings to save land from unnecessary construction. Tower companies are using building for towers they can use buildings as rental or permanent basis for towers.

The construction and safety of these towers are main issue for the engineers therefore to prevent it from earthquake and wind load analysis is required. The analysis can be done by using several software such as-

1. E- TABS
2. SAP 2000
3. STAAD PRO
4. CATIA
5. REVIT STRUCTURE

Modeling through these software helps to find strength of the structure against lateral and vertical loads. Analysis

result shows the safety of the structure against lateral and vertical loads.



Fig. 1: Tower placed over multistoried building

It is healthy recognized that high-rise buildings act as equal important character in modern cities. First of all, tall structures can be excellently used to meet the necessities of contemporary civilization and resolve the problem of

limitation of building site properties. On the other site, they are the indications of economic properties and civilization. These days, multistory building density increase higher and higher, with added floors which are more complex and separate plan elevation criteria, such as multi-tower structures.



Fig. 2: Tower placed over multistoried building in city

## II. LITERATURE REVIEW

### Nitin Bhosale et. al.

Mobile communication growth has increased from last three years. Therefore the need of communication towers and buildings is increased. The competition between mobile operators is also increased therefore the need of rooftop antenna has increased from last three years. The operators are adopting rooftop antennas now a day because it cost less than cost of land. In the present study, the comparison is shown in between ground tower members and rooftop tower at the same elevation.

### M.A. Barkhordari, et. al.

Telecommunication towers are steel structure and their seismic response against seismic loads is different than concrete structure therefore an analysis is carried out against seismic loads on steel telecommunication towers in iran. This analysis is done on four legged telecommunication tower of height of 18 to 67 meters. The Dynamic, shear and vertical reaction of the tower are calculated.

### Ghyslaine Mcclure, et. al.

In today's modern world telecommunication business at its top and the need of telecommunication rooftop towers increasing day by day because of increasing Teli-users. And they are obviously builtd in dense populated areas therefore it safety against seismic loads, lateral loads, wind loads is more important.

The study shows the time history analysis for maximum seismic base shear and also for the overturning moment of rooftop towers by showing correlation between them.

### K. Jagan Mohan et. al.

Transmission towers consume about 28 to 42 percent of the transmission line cost. The requirement of electricity is increasing rapidly all over the world therefore to meet its demand economically development of light weight tower is in use.

In this paper, the effort is made to make cost effective transmission line by converting the shape and type of transmission line structures. By Using STAAD-PRO software analysis is carried on three towers. The wind load calculation is carried out and repeated again and again for the analysis and design of the towers.

### S. R. Massah, et. al.

The telecommunication structures are basic structures now a day all over the world. Therefore it seems important to keep it safe from natural disasters like earthquake and heavy wind loads.

This paper shows the investigation of seismic reaction of four legged self-supporting towers. Total ten no. of telecommunication towers are studied in Iran under the seismic and wind effect with the help of Iranian seismic code of practice.

### Suyash Malviya, et. al.

The usage of the complete preparation of the placing of the telecommunication towers which is supposed to be over a multistoried building, the researchers take care of it as per the provisions. The main theme in their work was that that they have not known if there will be telecommunication tower should be placed in future over roof. The telecommunication tower comes with the complete arrangement with its fixtures.

The load calculated to design a multistoried building is enough to resist itself under the effect of the earthquake. The main idea of their research was if additional load applied in the future will going to be a catastrophe to a multistoried building. In introduction, they tell and explain the same. They adopt the aims includes diverse output parameters such as the assessment of bending moments and shear in beam members, torsional moments and dynamic parameters for the same topic.

The various output parameters assessed for both X and Z direction on horizontal plane. Structure was assumed to be placed at seismic zone IV. The roof was supposed to have different tower positions, hence total 5 cases have selected as per positions. From Case A o Case E, position P1 to P5 have decided respectively. An efficient column head was

added in various comparable output tables for describing efficient column position.

By the help of different graphs, the data was described and in conclusion they proved each of the efficient case for each result.

#### **Vafaei, et. al.**

The design codes say wind load is the major lateral load except for some cases in the design of telecommunication towers. This study shows the seismic performance of total no. of 10 four-legged telecommunication towers. The investigation is done on towers whose height is in between 18 to 67 meters and the origin of investigation is country Iran.

#### **Shailesh S. Goral et. al.**

The telecommunication industry is the fastest growing industry in human society and therefore it catches more attention than any other industry. The earthquake and wind analysis plays an important role in telecommunication structure like towers. Natural hazards like earthquake and wind storms are the major issues for the safety of towers.

In this research the staad-pro software is used for the analysis of seismic and wind loads. The square shape plan and different bracing systems has been used in the design of these towers. Non linear dynamic method is used in the analysis of these towers.

#### **Mohd. Arif Lahori, et. al.**

The plain construction land is not available easily now a day's therefore it is shifted on hill sites. On hill sites it is not easy to construct on steep slopes and also it is not easy to maintain structure under seismic loads. The main aim of the paper is to study and analysis and comparison between buildings on plane ground and sloping ground.

#### **Hemal J shah et. al.**

The television towers are constructed for the purpose of transmitting signals from one place to another they also transmit the radio signals and telecommunication signals. Therefore their design and construction are most important under seismic zones.

This study presents seismic response of 4 towers of different height and different bracing system of towers. The SAP 2000 software is used to analyses these towers.

#### **Ravi Mane et. al.**

Coronavirus has affected several millions of people causing cardiovascular issues, and other health problems, which has caused the economy to slow down, increasing mortality rate.

#### **Narendra Tak, et. al.**

Researcher said that we can conclude that tower on building saves the extra land cost and if the analysis and modeling of the structure is accurate we can easily find out the safety of the structure against lateral loads and against sliding. The main aim of the paper is to study and analysis and comparison between buildings on plane ground and sloping ground with different angle.

#### **Neeraj Patel et. al.**

The possibilities of the usage of wall belt supported system in this work used in multistoried building the authors cope with it sincerely. As per review done, the various possibilities of the demand and supply of stability improvement system, the work compared the same.

The main criteria in this work were to show the lateral load handling capacity. With total 14 cases with the usage of RSA will be used under Zone V with zone factor 0.36 respectively, they secretly exposed in their upcoming work.

The main idea of their research was the Shear wall at corners with belt connecting over its periphery column members. They conclude that their main focus will be shear strip which was the modified part of the concrete wall system, after reviewing the various researchers and then outline of the proposed work were pointed out. If the height at which the shear strip behaves effective and out if the width and thickness were kept fixed will be their optimum case, they pointed out.

#### **Mohd. Arif Lahori, et. al.**

The construction of R.C. structures are commonly asymmetrical in shape on slope of mountains. The main aim of the study is to investigate, compare and earthquake analysis of the structure under five different configurations like steep back building 200, regular building, step back building 300 And the response spectrum method is used in it.

#### **Narendra Tak, et. al.**

Researcher conclude that the structures are fundamentally manufactured on a typical plain ground. These days due to lack of land area, construction has been done on a sloping ground. The mountainous areas are the majority exaggerated due to earthquake activity.

High damage experienced by the high rise structure in the mountainous region, as outcome causes harm and breaking up; hence reason of designing towards protection in opposition to natural disasters. The key point is to analyze the seismic task applied by Multi-Storied RC structure on a sloping ground with specific angle 29 degree.

The Multi-Storied building is taken at different position of tower of slope angle. The outcomes have been evaluated with the structure taken without slope and with sloping ground 29 degree angle having on plane ground. Thus the seismic analysis is the part of Dynamic analysis. There are two types of arrangements taken for the study along sloping ground i.e. set back and step back set back. Hence G+10 RCC building is considered with different location of building with sloping ground with set back and step back condition for analyzing.

The analysis was carried by the Seismic Analysis Method. The whole process and the methods are carried out by IS-1893-2016. STAAD pro software is used to explore the Response Spectrum Method.

All the operations performed are the part of procedure which gives the result that the step back set back building is more suitable than other methods.

### III. CONCLUSION AND OUTLINE OF THE PROPOSED WORK

After reading all of the researches, we conclude that tower on building saves the extra land cost and if the analysis and modeling of the structure is accurate, we can easily find out the safety of the structure against lateral loads and against sliding. Important point is to be designing the multistoried building with tower and its location over it and it has must needed to know before construction for extra load that will commence if there will a provision for telecommunication tower.

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