

Research Article

# A Review on use of Different Heights of Twin Towers High Rise Building

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## Abstract

It is observed that the world's most popular cities are on land shortage crisis therefore it is more important to make high-rise buildings, skyscrapers, twin towers more safe and secure to the people. To make skyscrapers and twin tower high rise buildings safe and secure more research and analysis work is needed. The new ventures and ideas of making twin towers and skyscrapers can reduce the chances of wind and seismic failure and also made them economic as well as safe and secure. After reviewing various papers it is necessary to analyze different heights of twin towers in multistoried building under seismic zone as per Indian standards.

**Keywords:** Twin tower, different height, earthquake zone, seismic loading

## 1. Introduction

In the present scenario to counteract the bad effect of seismic force and wind forces, it is important to take new ideas of constructing twin towers. Due to the variation in the seismic forces it is more important to consider new ideas and analysis of the structures into the various part of the world. Various efforts are made by the engineer and architect in this direction.

Twin tower plays an important role in counteracting such problems it provides more stability to the structure especially in the highly seismic zone. To balance the movement and to provide connection between two building, bridge is constructed at a suitable height.

There can be different heights of twin towers. According to their use and ability they can be different also in the form of shape and size. Their function and objectives can also be different. Like At the time of finishing of the Twin Towers the original one World Trade Center was 1,368 feet (417 m) in height and second World Trade Center was 1,362 feet (415.1 m) in height.

The main factors which are considered in this research work are:

1. Displacement in transitional direction
2. Drift in both transitional direction
3. Base shear in both transitional direction,

4. Maximum column-Axial forces  
Shear forces  
Moment forces  
Torsion forces
5. Maximum beam-Axial forces  
Shear forces  
Moment forces  
Torsion forces
6. Stresses in plate
7. Time period and mass participation factors

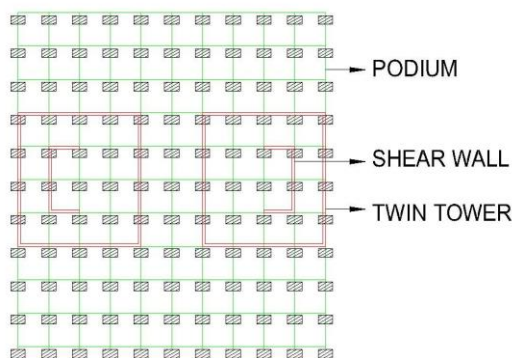


Fig. 1: Twin tower Building with Podium

## 2. Literature Review

HUANG Kunyao, SUN Bingnan, LOU Wenjuan

In the structural analysis proceeded for the double-tower connected tall buildings, there are two kinds of

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simplified methods in dealing with the connection substructure. One is to separate the towers and neglect the connection effect while the other is to treat the two tower floors and the connection floor as an entire floor with infinite stiffness. The former cannot take the connection effect of the substructure into account, while the latter may lead to considerable error as the connection is not so stiff. In this paper the substructure was treated as an elastic beam which can avoid the shortage of the simplified methods. The history analysis was utilized to study the influence of the connection stiffness on the seismic response and the applicable premise of the simplified methods was discussed.

#### **Lou Yu Wang Hongqing Chen Yiming**

Based on analyzing two example structures, a new concept that the same vibrational mode has two mode shapes in two-tower structure or two-tower structure linked by spatial corridors, both with enlarged base, is presented. The principle of choosing vibrational mode numbers in a seismic analysis for this type of highrise building structures is discussed. Their calculating results are compared, and some questions in aseismic design are emphasised. In the end, the useful results for structural aseismic design are given.

#### **R.J. Smith and M.R. Willford**

This paper describes the structural design of two similar 60 storey towers in Manila using performance based procedures for seismic and wind actions. High-rise buildings designed by performance based methods not only perform better than conventionally designed ones, but are also less expensive to construct. The buildings incorporate the Arup Damped Outrigger System, and the savings realized by this are discussed.

#### **Surendra Chaurasiya, Sagar Jamle**

World is now globalized in the globalized world need of metaphorical towers increased. This tower fulfilled the need with its specifications. Twin tower lists are increasing day by day in today's modern world. This paper shows the need and necessity of these towers now a day. These types of structure are connected with each other by bridge. These bridges are made up of steel or R.C.C frames.

#### **Wensheng LU and Xilin LU**

The paper briefs about the tests of some scaled high-rise multi-tower structure models on the trembling table. By considering the effect of flexible transfer floor in a new analytic model is shown. The test result considers the theoretical dynamic behavior comparison. The combination floors between towers at top levels, and the stiffness of foundation role to structural dynamic behavior is also described in this

paper. Many suggestions and theoretical guidelines are also accomplished.

#### **Surendra Chaurasiya and Sagar Jamle**

As per author, they suggested about the different types of structures used in this current scenario. Now a day's Architectural vision of multistoried building design is in the demanding growth. They suggested the need of high rise building in this modern world to beat the competitors. Their studies suggested the parametric study of total 13 cases abbreviated from case A to M of G+12 twin tower high rise building. Response spectrum method is used in this approach. In Storey displacement and storey drift calculation, Case M will be the best of all, comparatively percentage decrease has proved to be around 20 percent and Z direction by around 18 percent. Around 90 percent of mass participation factor has achieved in their study as per Indian Standardizations. Plan of the structure divides whole part into two parts from podium itself suggested in their topic.

#### **Henry Petroski**

The skyscrapers final design, especially tallest one in the world cannot be developed from only with architect's drawings. It is very challenging to design the superstructure of the building. Among the first decisions in front of structural professional Thornton and his acquaintances at Ranhill Bersekutu (Malaysia) was the selection between concrete and steel.

#### **H. Emreilgin**

Accelerated wind at ground level caused by Tall buildings, which may affect the safety and comfort of the pedestrians. Tall buildings are huge projects demanding extreme management and logistics. They cause national economy, building industry, and require huge amount of financial investment.

#### **Erik hallebrand and Wilhelm Jakobsson**

In this paper it is studied that the factors of response spectrum that affect the structure such as acceleration and resonance frequencies should be noted down. Different models are studied and the parametric values such as moments, forces are noted down. The variation between prefabricated model and concrete structure are mentioned in their analysis with comparative analysis of their investigation.

#### **H. Emreilgin January**

The paper examines the strategies and critical design factors that guarantee to achieve sustainable or high-performance high-rise buildings with innovative technologies. This paper shows that by adopting the appropriate strategies high performance tall buildings are achievable.

## Mindala Rohini, T. Venkat Das

An earthquake occurs by seismic waves due to unexpected discharge of force and results in ground quaking. When earthquake occurs, seismic waves spread through the soil which results in structural harm because of movements in the earth's crust. It affects building Components like foundation, underlying soils and also overall structure behavior. The behavior of a building depends on strength, distribution of mass and stiffness during earthquake. The buildings are generally subjected to various types of forces all through their existence. Because of dead and live loads the forces can be static forces and dynamic forces due to earthquake. In this study, the analysis is carried out for seismic response of (G+15) residential building for zone-III and Zone-V regions through time history method and response spectrum method into ETABS. For specific zones the parameters like storey displacement, storey drift, and storey shear are observed.

## Akash kumar , Er. Kundan Kulbhushan

To study the all common parts of building at the story level to high level, also consider the gravity load, dead load, wind load or seismic forces, and drift forces. Currents more use full design of high rise building by the structural design software. These are software design of building frames in beams, columns, slabs of structures and also design the bending moments, shear force, stiffness, rotations, torsion and deflection in frames and its other parts of the structures. We have to consider better design to make a high rise building. In India show that 54% of the land living is unsafe to earthquake. Earthquakes are very serious problems since they are evaluate that this phenomena by some techniques as base isolation, dampers, wire and other methods. Also works to better design to resist the seismic waves. We have to take better high quality materials and given better factor of safety in design process.

## Conclusions

By reviewing and analyzing various research processes it is seem that in field of stability of twin towers with different heights against seismic and wind loads. It is required to observe that the structure with various possibilities of stability with its optimum location. It is also observed that in the area of (displacement in both transitional directions, drift in both transitional direction, base shear in transitional direction, maximum column, maximum beam and stresses in plate, time period and mass participation factors) very few or zero number of research works has been done.

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