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Determination of efficient Shape of twin tower subjected to Seismic Loading

Mahendra Kumawat[1], Ankit Pal[2], Mayank Choudhary[3]

[1]M. Tech. Scholar, Civil Engineering Department, Oriental University, Indore, India
[2] Assistant Professor, Civil Engineering Department, Oriental University, Indore, India
Email: ankit.5792@gmail.com
[3]Assistant Professor, Civil Engineering Department, Oriental University, Indore, India
Email: mayankchoudhary845@gmail.com

***Abstract*— *In this era of multistoried building design and the architectural vision has seen a demanding a new idea. A variety of competitors surrounded by them used to make the structure with their own choices and also the demand of market and the multistoried structure perform as extremely crucial job in innovative and new areas. It should explain the difficulty of manufacture region all along with the architectural and structural point of view. by composite and diverse floor arrangement on similar ground wants the reliability on the structural approach. These types of structure are Twin tower structure used in this contemporary globe. In this investigate, the parameter of evaluation of result such as displacement and storey drift are obtained in requisites of the twin tower multistoried structure located in earthquake Zone-III, earthquake effects are performing on the construction under 5 different Shapes and scrutinize with the assistant of Staad pro design software.*

***Keywords*— Twins Tower, Efficient Shapes, Lateral Loading, Response spectrum analysis, Seismic Effects, Staad pro software.**

I. INTRODUCTION

With the help of high rise structure guide the structural engineer to analyze and design as per severe seismic effects. Recent days, Twin towers are vastly in demand due to its architectural and structural design, individual plan along with more space with same foundation support. For that, we should know the efficient point parameters when these kinds of structures are in the contact of seismic loads.

II. OBJECTIVE

This study analyse the different parameters like displacements in longitudinal and transverse direction. After this, storey drift is calculated in both X as well as Z direction. The most efficient SHAPE will be analyzed after all parameters. There are total 5 Shapes of twin tower multistoried building at medium soil condition under seismic forces for earthquake zone III exist.

III. STRUCTURE MODELING

The twins tower has been modeled in design software Staad pro. The twin tower building detail of the multi storey construction are shown in Table a and Table b and shown graphically with the help of graphs. Top view and front view of various Shapes of G+12 building shown by the help of figures. Table 3 shows various Shapes used in this paper up to 12 floor twin with 13 different Shapes. After than efficient Shapes for each parameter along with its remarks has drawn below each parameters.

Table 1 Details of building

Building configuration	G+17
No. of bays in X direction	10
No. of bays in Z direction	10
Height of building	69.800 M
Dimensions of building	50M X 50M
Size of beam	0.60 X 0.45
Size of column	0.60 X 0.60
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	0.884 & 0.884 for both direction
Dead load for floor and waterproofing	2KN/m^2 & 0.5 KN/m^2
Live load for floor and roof	3.55KN/M^2 & 1 KN/M^2

IV. RESULT AND DISCUSSION

These result is observed by the following cases-

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Table.1: Maximum Displacement in X direction all 5 Shapes in Zone III

Shape	U	V	X	Y	Z
Displacement in X direction(mm)	333.739	333.739	333.739	333.739	333.739

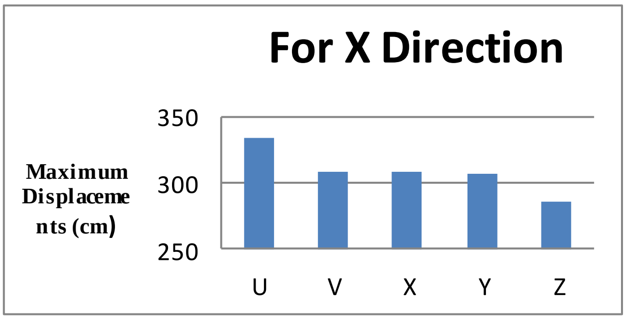

Fig. 1: Maximum Displacement shown in X direction for all 5 Shapes in Zone III

Table.2: Maximum Displacement shown in Z direction all 5 Shapes in Zone III

Shape	U	V	X	Y	Z
Displacement in Z direction(mm)	311.785	311.785	311.785	311.785	311.785

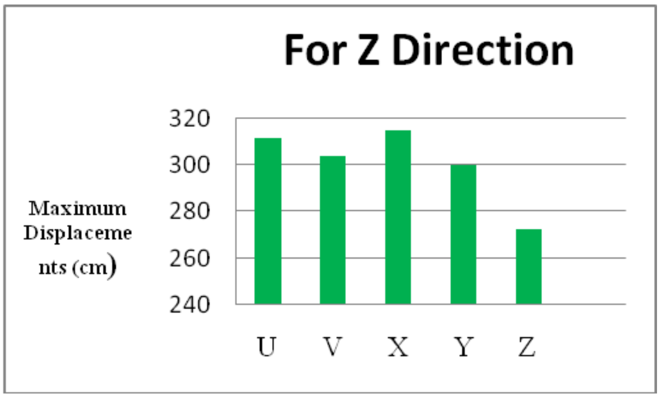

Fig. 2: Maximum Displacement shown in Z direction for all 5 Shapes in Zone III

Table 3: Base Shear shown in X and Z direction for all Building Shapes

Shape	U	V	X	Y	Z
X Direction	17224.46	17224.46	17224.46	17224.46	17224.46
Z Direction	14850.59	14850.59	14850.59	14850.59	14850.59

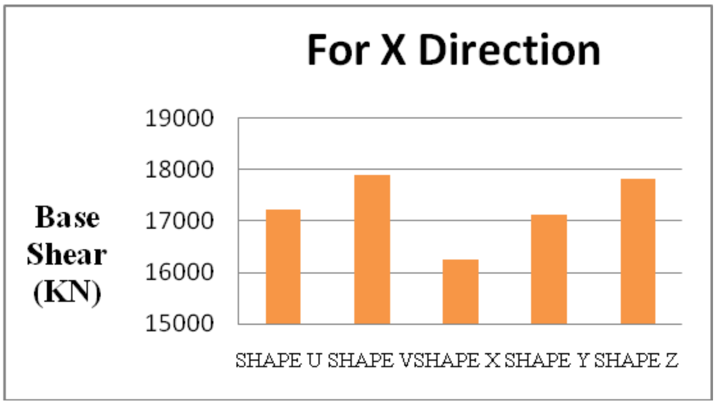

Fig. 3: Base Shear shown in X direction for all Building Shapes

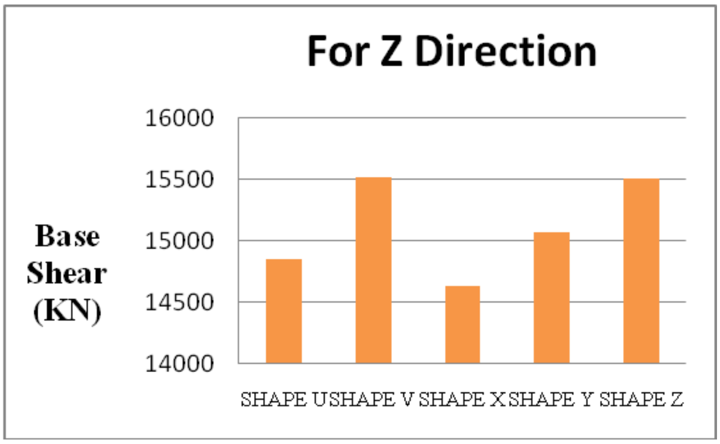

Fig. 4: Base Shear shown in Z direction for all Building Shapes

Table 4: Maximum Axial Forces shown in Column at ground level for all Building Shapes

Shape	U	V	X	Y	Z
Axial Force	11713.396	11713.396	11713.396	11713.396	11713.396

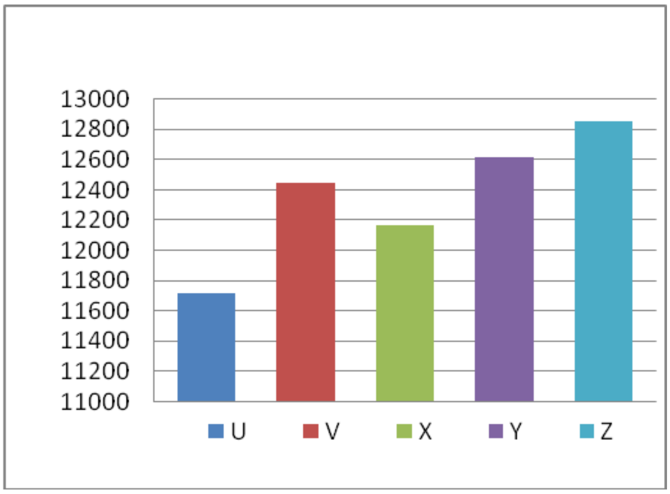

Fig. 5: Maximum Axial Forces shown in Column at ground level for all Building Shapes

Table 5: Maximum Shear Forces shown in Columns for all Building Shapes

Shape	U	V	X	Y	Z
X Direction	341.434	341.434	341.434	341.434	341.434
Z Direction	297.931	297.931	297.931	297.931	297.931

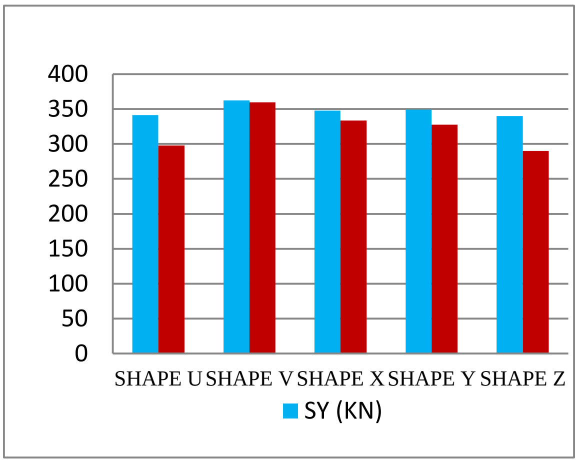

Fig. 6: Maximum Shear Forces shown in Columns for all Building Shapes

Table 6: Maximum Bending Moment shown in Columns for all Building Shapes

Shape	U	V	X	Y	Z
X Direction	587.355	587.355	587.355	587.355	587.355
Z Direction	624.836	624.836	624.836	624.836	624.836

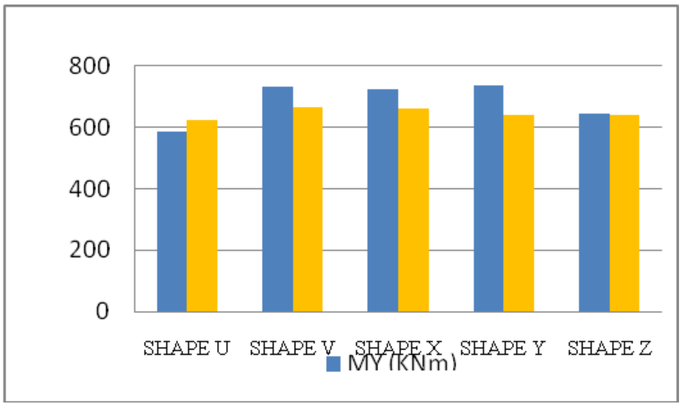

Fig. 7: Maximum Bending Moment shown in Columns for all Building Shapes

Table 7: Maximum Shear Forces shown in beams parallel to X and Z direction for all Building Shapes

Shape	U	V	X	Y	Z
X Direction	276.949	276.949	276.949	276.949	276.949
Z Direction	2.584	2.584	2.584	2.584	2.584

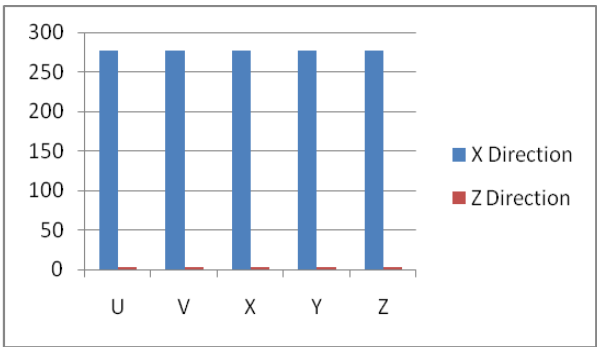

Fig. 8: Maximum Shear Force shown in Beam for X and Z direction for all Building Shapes

Table 8: Maximum Bending Moment shown in beams parallel to X and Z direction for all Building Shapes

Shape	U	V	X	Y	Z
X Direction	12.650	12.650	12.650	12.650	12.650
Z Direction	435.701	435.701	435.701	435.701	435.701

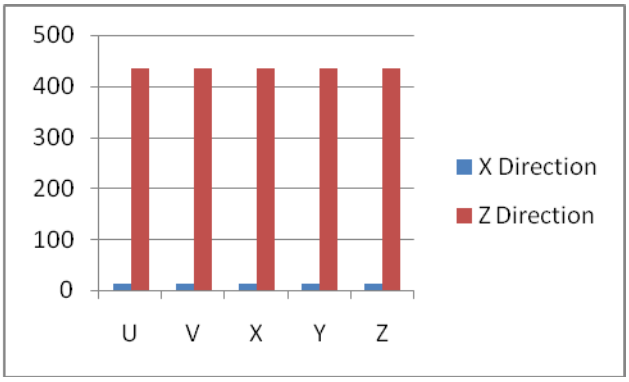

Fig. 9: Maximum Bending Moment shown in beams parallel to X and Z direction for all Building Shapes

Table 9: Maximum Torsional Moment shown in beams parallel to X and Z direction for all Building Shapes

Shape	*U*	*V*	*X*	*Y*	*Z*
X Direction	61.761	61.761	61.761	61.761	61.761
Z Direction	32.315	32.315	32.315	32.315	32.315

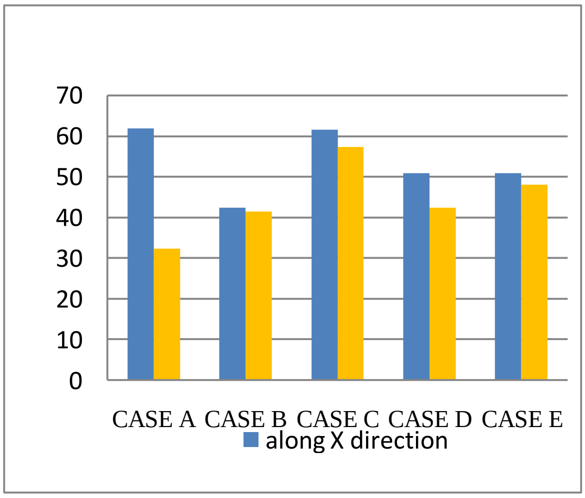

Fig. 10: Maximum Torsional Moment in beams parallel to X and Z direction for all Building Shapes

V. CONCLUSION

The design of twin towers building subjected to seismic effects the analytical results obtained from 5 shape of twins tower multistoried structure. As seen in results the maximum displacement in shape X and Z direction, maximum base shear in shape X and Z, maximum axial force in shape U , maximum column shear force in shape Z , maximum column bending moment shape Z , beam shear force shape U. That means shape Z and U is very efficient cases for twins tower.

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