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Seismic Analysis of Various Shapes of Building

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Abstract - *Seismic analysis of structure is to be the performance of structure during earthquake, now according to modern technology of structure is to be design in lavish formed with minimum specified area. Building plan having a two type of shapes that is regular shape and irregular shape. we have to find that which shape of plan performance well during earthquake. We have consider two shapes of building such as rectangle shape and L-shape building. Structures have done seismic analysis of structure, software is used for analysis is STAAD-PRO V8i. The process is applied for dynamic analysis of Response spectrum method. After the analysis we can conclude that performance of regular plan that is rectangle shape of structure is better as compare to irregular shape of building that is L-shape of building.*

Key Words: Regular shape,Irregular shapes,Response Spectrum Analysis.

1.INTRODUCTION

Seismic Analysis of structure is to find out the seismic forces of structure and also find the effect of structure of various shape of building. Earthquake are unpredictable natural disaster and earthquake are not prevented. So that we are considered the all types of seismic parameter and designed the structure to resisting earthquake (seismic) forces.

We have considered two types of building shape it means regular shape & irregular shape, by considering regular shape we are considered rectangle shape of plan and irregular shape we have considered L-shape of building plan. Area of both regular and irregular plan is same that is 929 SQ. M. means 10,000 SQ.FT.

Generally we have designed structure by considering factor like load distribution, Moment and forces, but we should design structure for earthquake resistant because earthquake are unpredictable and not prevented disaster. We have to calculate Seismic Forces of both shape of structure and after that we can predict that which shape of structure are performance well during earthquake.

In structural design, we are putting structural element that is beam & column in their proper place, we couldn't placing in obstructed position. We have Design G+5 residential building in zone II so we have to consider safety parameter and safety factor during design of structure, structure should be safe is the aim while designing.

In modern and new technique of structural designing, it will challenges for structural designer to design irregular shape of building and is to become safe during earthquake. The main aim to resist the earthquake forces and other seismic forces during Earthquake.

2. METHODOLOGY

To draw architectural plan for planning of G+5 Residential building & Planning should proper and as per client requirement and aesthetics view.

To final architectural plan, now we need to do structural planning as per design specification of the RCC structure. For the structural analysis STAAD-PRO V8i software is used to modelling and analysis of various building shape of structure.

Building shapes of two types of structure like rectangle & L-shape, we have to do seismic analysis of various shape of structure.

After the process of analysis of all shape of structure we can conclude the Seismic effect of various shape of structure.

3. SYSTEM DEVELOPMENT

We know that, for structural analysis and seismic analysis we need structural parameter and earthquake parameter, Location of structure is matter in seismicity. Soil properties is also matter in that region. I have prepared two model in STAAD PRO V8i software, different types of data or parameter are given for to find seismic effect of building shapes of all structure.

Table -1: Building Specification

Properties of Material	Values
Building Area	929 SQ.M.
Column Sizes	300 X 600
Beam Sizes	230 X 600
Building Height	18 M.
Thickness Exterior Wall	150 MM
Thickness of Interior Wall	115 MM
Thickness of Parapet Wall	115 MM
Slab Thickness	125 MM

Table -2: Load Data

Load	Values
Dead Load	B X D X Y
Live Load	2 KN/SQ, M.
Roof Live Load	1.5 KN/SQ.M
Floor Finish	1 KN/SQ.M.

Table -3: Seismic Parameter

Seismic Parameter	Values
Earthquake Zone	II
Zone Factor	0.1
Damping Ratio	5 %
Importance factor	1.2
Response Reduction Factor	3
Type of Structure	1
Type of Soil	3

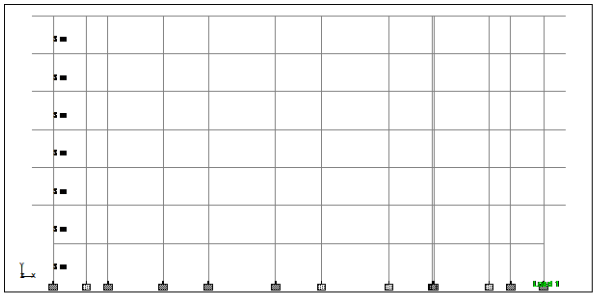

Fig -1: Elevation of Rectangle shape

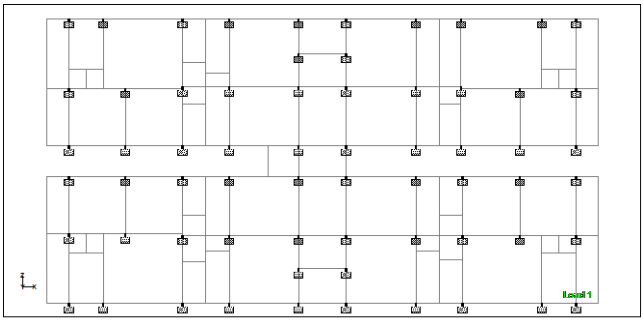

Fig -2: Plan of Rectangle shape

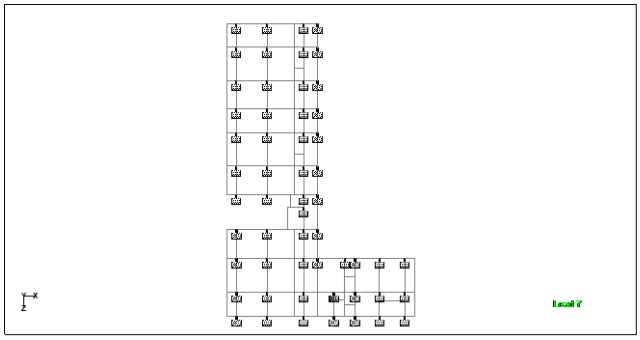

Fig -3: Plan of L-shape

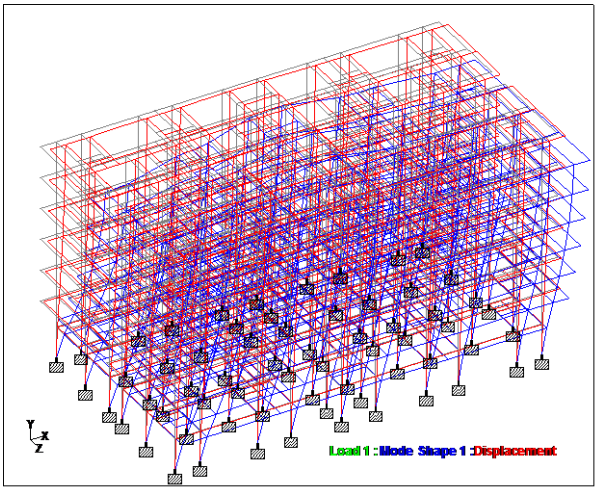

Fig -4: Deflection Diagram of Rectangle Shape

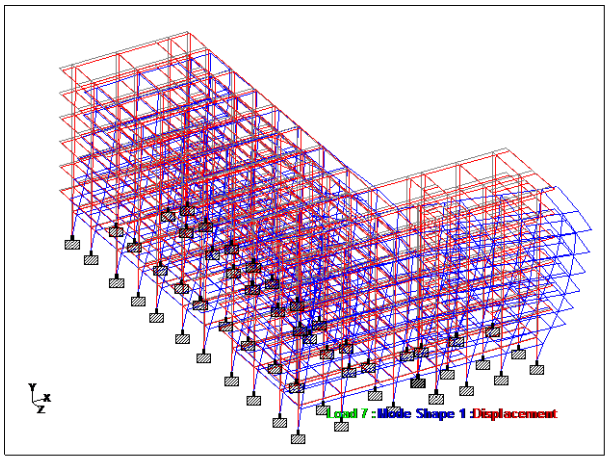

Fig -5: Deflection Diagram of L-Shape

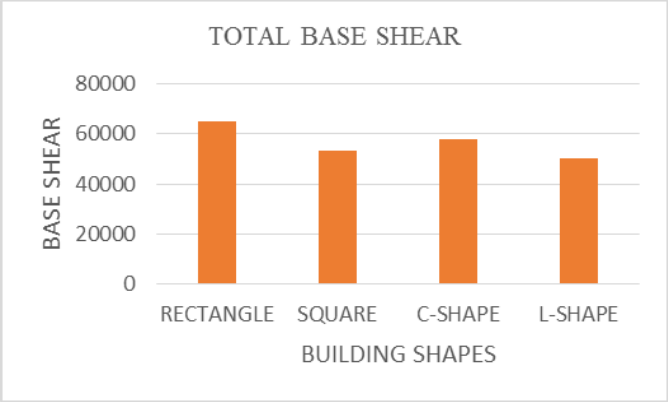

Chart -1: Total Base Shear

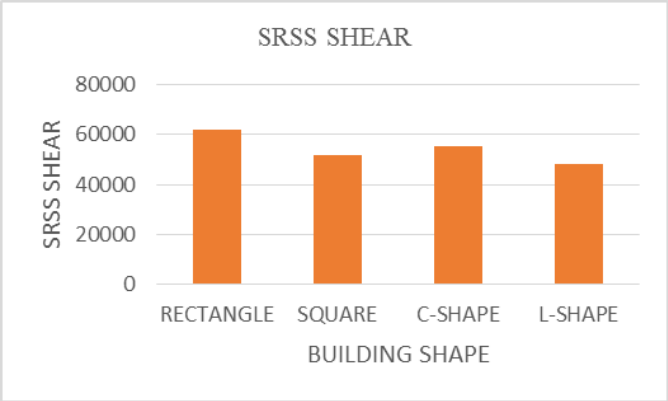

Chart -2: Total SRSS Shear

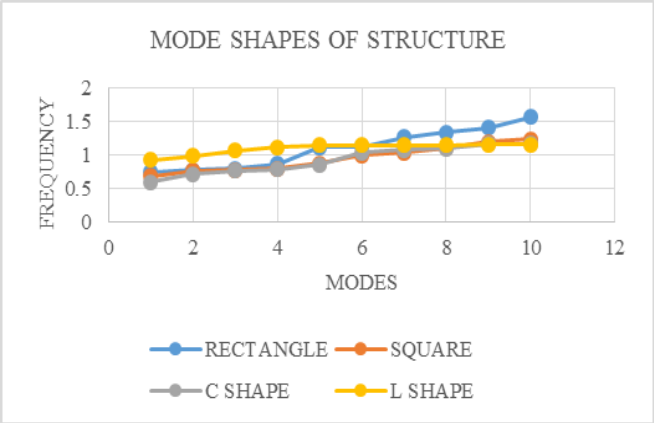

Chart -3: Frequency of Structures

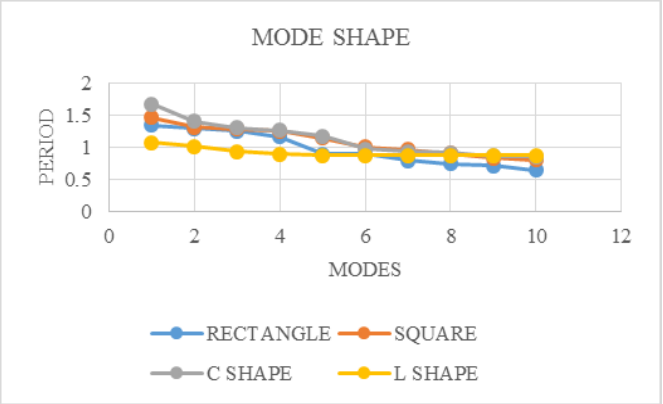

Chart -4: Time Period of Structures

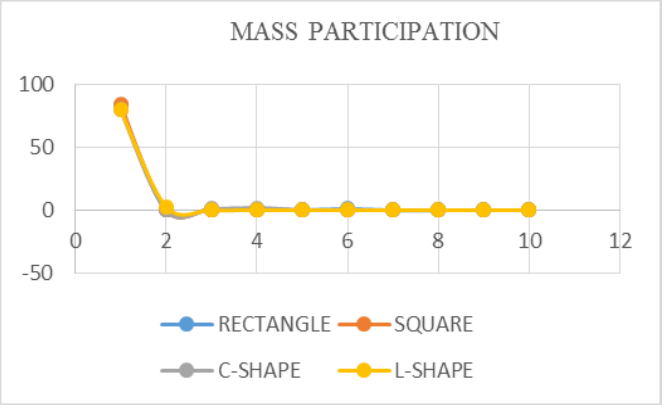

Chart -5: Mass Participations

4. CONCLUSIONS

Seismic analysis of above two shape of structure, maximum deflection is observed in L-SHAPE of Building as compared to Rectangle shape of the Building.

Considering the effect of earthquake, maximum Base shear is found on Rectangle shape of building and minimum Base shear is Found on L-shape of building, this is conclude from above graph chart.

We can conclude that, maximum SRSS Total Shear is found in Rectangle shape of structure as compared to L shape building.

On seismic analysis of regular and irregular plan we can conclude that, during earthquake Regular plan performance are well as compared to irregular plans of structures.

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