Comparative Study of Step High Rise Building For Zone 2 & Zone 5

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Abstract- *This report focus on comparison of step structure in Zone II& Zone V . This analysis is done on high rise structure in step shape , considering 2 Zone as per seismic code . Analysis determine the force in the structure due to earthquake which is the essential step in design the structure to resist its deformation .The Response spectrum method use in analysis of structure .The modelling is done in Etabs as per IS 1893-2016-Part-1 .Designing a structure a way to reducing damage during an earthquake making structure uneconomical , as earthquake may or may not occur in lifetime and is rare phenomenon. This analysis addresses the performance and variation of percentage steel and concrete quantity of structure in different seismic zones and influence on full cost of construction. Analyses is to carried out for a models by considering two seismic zones (zone II and zone V) using response spectrum method ,results like to maximum displacements, Scaling factor , Shear Force etc are studied and compared.The results of analysis are used to verify the structure fitness for use, finally thecomparison of all lateral stability checks as been carried a for zone 2 and zone 5. Design and detailing of one critical element as been shown in this study*

I. INTRODUCTION

Earthquakes are carefully studied by many people previous years . Most of the structural designer engineers design the structures mainly for safety, stiffness also parameters performance for structures under various seismic zones. Special codes provisions and guidelines is used for design the buildings. Earthquakes may be due to energy released from focus on rocks for the movements.Structural analysis mainly involves the act for discovering a structure, Such behavior will be due to the weight of objects, such as people, furniture, wind and snow, or other forms of excitation such as earthquakes, ground shaking caused by nearby explosions, and the like. All of these loads is dynamic, including the weight of the structure . The comparison between dynamic and static analysis is based on whether applied motion is sufficient acceleration compared to the natural frequency for the structure. If the load is applied slowly enough, the inertial force (Newton's second law of motion) should be neglected and the analysis can be simplified the static analysis. Therefore, structural dynamics is a structural analysis use to covers the behavior of structures for our loaded dynamically (with high acceleration).

Dynamic loads include people, wind, waves, traffic, earthquakes and explosions in it, Any structure that withstand dynamic loads. Dynamic analysis use to earthquake forces are random in nature and unpredictable, the static and dynamic analysis to the structures for becoming the primary concern of civil engineers. The main parameters for seismic analysis to structures are load carrying capacity, ductility, stiffness, damping and mass. This type of structural model selected is based on external action, the behavior of structure or structural materials, type of structural model selected. High Rise Building-A building having height more then15m As per National Building Code 2005 of India is called High Rise Building. The materials used for the structural system of high-rise buildings is to reinforced concrete and steel. Most North American style skyscrapers is a steel frame, while residential blocks is usually constructed of concrete. There is no clear definition for difference between a tower block and a skyscraper, although a building with fifty or more stores is generally considered to be skyscraper. High-rise structures pose particular design challenges to structural and geotechnical engineers, particularly if situated in a seismically active region or if it underlying soils have geotechnical risk factors such as high compressibility.

A foundation is to the part of a structure which transmits the weight for the structure to the ground. All structures constructed is to the land of a supported on foundations. A foundation is to the a connecting link between the structure proper and the ground which supports it. The bearing strength of a characteristics for foundation soil to major of a design criterion for civil engineering structures. In nontechnical engineering, bearing capacity is to a the capacity of soil to support the loads applied to the ground. The bearing capacity for soil is the maximum is average contact pressure between the foundation of the soil is to which should not produce shear failure in the soil. Ultimate bearing capacity is to a theoretical maximum pressure which is to be supported

without failure; allowable bearing capacity is to the ultimate bearing capacity divided by a factor of safety. Sometimes, it is the soft soil sites, large settlements may occur under loaded foundations without actual shear failure occurring; in such cases of the allowable bearing capacity is to based on the maximum allowable settlement.initiates the weakness is for the structure, thus weakness leads to collapse to the building beneath the earthquake loads.

1.1 Aim of Study

The main objective of the study is to analyses the behavior of the structure under the action of seismic loads. To compare the parameters like storey shear , modal direction ,modal participation ,maximum displacement for different zones of India(Zone II, and V) . To find the difference between same structure in two different zone .

1.2 Objective of Study

1:To study irregularities in structural analysis and design of G+25 storey structure as per code (IS 1893:2002) .

2:To study a behavior of structure without masonry infill if seismic load is applied.

3:To determine displacements subjected to earthquake loading from zone to zone.

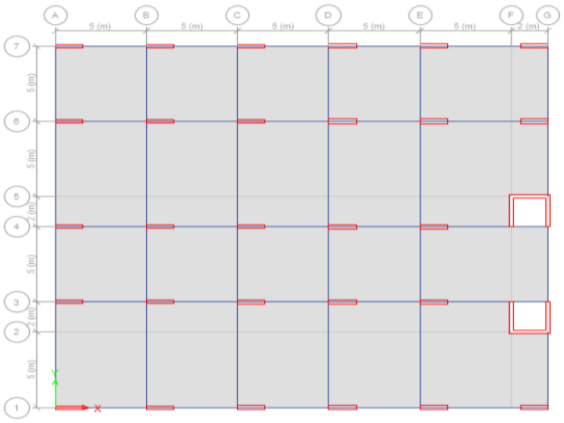
4:To determine the bending moment and shear force selecting any one section for various seismic zones.

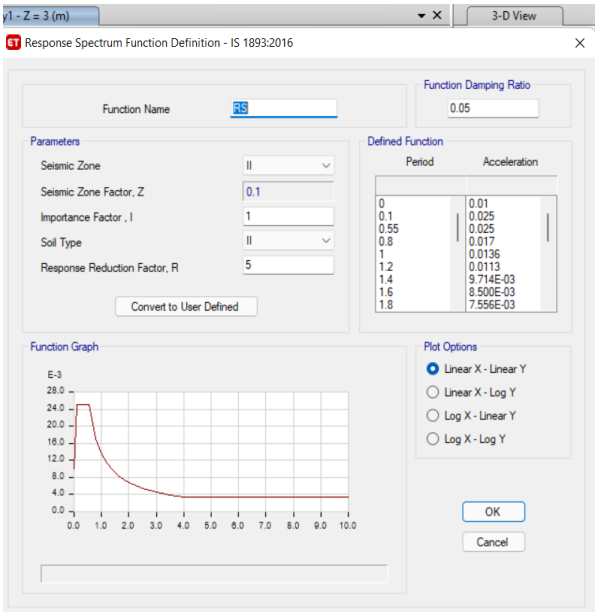
5:Comparative study of the building by considering two seismic zones (Zone II and Zone V)

6:To study various responses to a Maximum displacement , Storey shear , Bending moment etc. of buildings and comparing these responses between Zone II and Zone V to know the rate of change is responses between these two zones.

1.3Response spectrum method

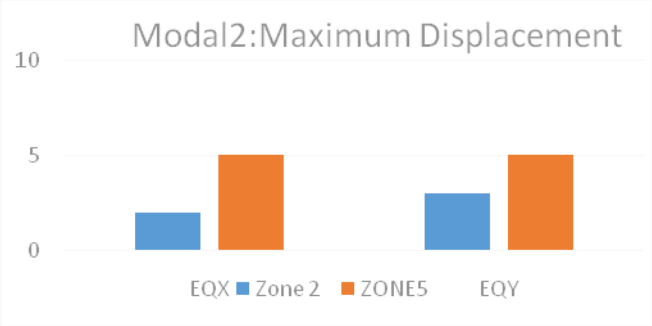
Response spectrum analysis is a technique for estimating the structural response to transient dynamic events that are brief and non-deterministic. Earthquakes and shocks are examples of such phenomena. It's difficult to undertake a time-dependent analysis because the load's exact temporal history is unknown.. Response spectrum analysis is a technique for estimating the structural response to transient dynamic events that are brief and non-deterministic. Earthquakes and shocks are examples of such phenomena. It's difficult to undertake a time-dependent analysis because the load's exact temporal history is unknown.The goal is to offer an input that specifies a limit on how much an eigen mode with a given natural frequency and damping can be aroused by a given event. Most of the time, an engineer conducting a response spectrum analysis is given a design response spectrum, in which case the first two components can be regarded background material.A response spectrum is a plot of the peak response of a simple harmonic oscillator when it is subjected to a transient event as a function of frequency or period. The response spectrum is determined by the oscillator's intrinsic frequency and dampening. As a result, it isn't a precise representation of frequency.

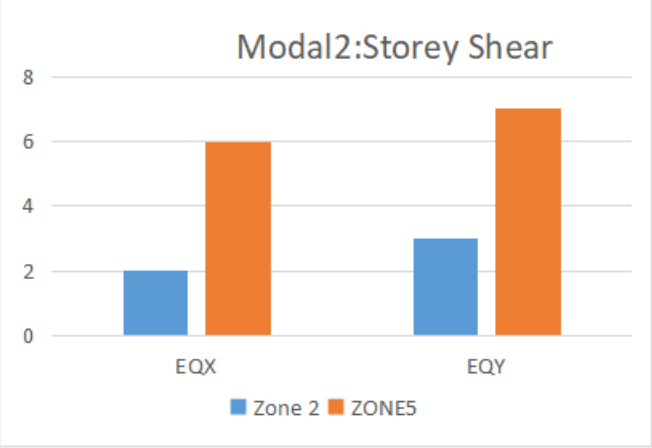


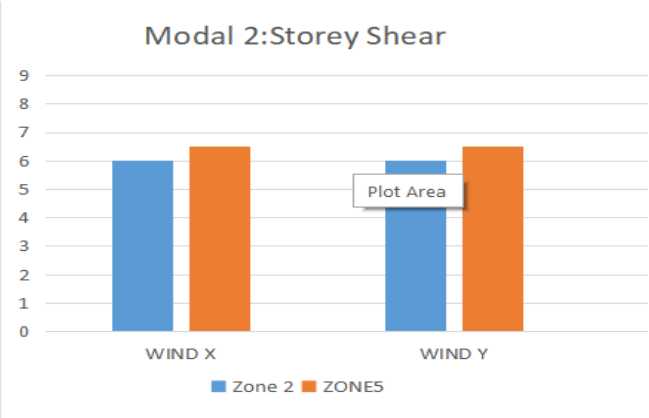


Model 2 Description	
Number of Stories	25
Floor height	3
No. of bays in X direction	5
No. of bays in Y direction	4
Beam sizes	250X300mm
Slab thickness	175mm
Live Load	3kN/m^2
Floor Finish Load	1kN/m^2
Concrete grade	M25 & M30
Shear wall	200X1500mm 230X1500mm 250X1500mm 300X1500mm

1.4 Result And Comparison







II. CONCLUSION & FUTURE SCOPE

In this project I have done analysis using dual system ,but it was fail in first system so by using higher safety standard I have done second system, in this I have compare my dual system in two Zone, Zone2 & Zone 5, and all the result such as Maximum displacement, Storey shear etc are bigger in Zone 5 as compare to Zone 2 . In future scope for high rise building you should use shear wall an do analysis and compare in all Zone an find result .

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