Effect of Hard & Soft Soils and Seismic Zones on Shifting Height of SMRF Framed Structures

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***Abstract*- To decide the effect of various soils and seismic zones on various statures of surrounded structures. In tall structure we should worry pretty much all the powers that follow up on a structure, its own load just as the sidelong powers To determine the Effect of Hard & Soft Soils and Seismic Zones on Shifting Height of SMRF Framed Structures this work is carried out. Three different soils types are taken as soft, medium and hard. Stories i.e., G+4,G+5, are taken of statures 15m, 18m, individually are considered and broke down for seismic zones II &,III,. SMRF (Special Moment resisting) and IS 1893-2002/2005 are utilized in STAAD PRO. (V8i)Series investigate all models. This work consist of axial force in column (KN) for all types of heights and to find out the most severe models among all.**

***Index terms*- SMRF, Axial Force in Column, IS 1893-2002/2005), STAAD PRO.(V8i) Series.**

INTRODUCTION

The word seismic tremor is self-clarifying the quakes that implies the earth shakes and we feel the vibration brought about by these movements. Seismic tremor are caused because of many explanation however most ordinarily term quake is utilized when shaking the world's surface is caused because of some aggravation happening inside the earth. At whatever point the earth is upset, vibration are created. These vibration set out every which way from the spot of their source. At whatever point these vibrations travel, a seismic tremor is said to have occurred. These vibration are increasingly exceptional close to their sources. As the separation builds, these become powerless and gradually vanish. In excess of 10,000 seismic tremors happen each year. Be that as it may, a large portion of them are not of extraordinary worry for structural designers, just a couple of them.

LITERATURE REVIEW

- Mahesh Suresh Kumawat and L.G. Kalurkar (2014) [9] Analysis and Design of multistory building using composite structureThe analysis and design of G+5 framed building composite structure at seismic zone-III is carried out. SAP 2000 software is used for 3-D modeling and analysis of the structure. Equivalent Static Method and Response spectrum method are used to analyze Composite and RCC structures. For the same, results are compared and got that composite constructions are more inexpensive.
- Ashiru Muhammad, Chhavi Gupta, Ibrahim B. Mahmoud (2015) [6] Comparative analysis of Seismic Behaviour of Multi-storey Composite Steel and Conventional Reinforced Concrete Framed StructuresIn high rise structures there are many members that are monolithically connected to each other and if yielding takes place in any one of them, then a redistribution of forces takes place. Therefore Seismic analysis is very necessary whenever high rise buildings are to be erected, most especially in areas that are prone to earthquake. In this work, a relative examination of seismic performance of Multistory Composite and Conventional R.C.C. structures for various heights has been carried out and observed that; RCC structure has higher response as compare to the composite structure.

OBJECTIVES

- To determine the effect of soft & hard soil in different seismic zones.
- To find maximum axial force in colume for different height of framed.

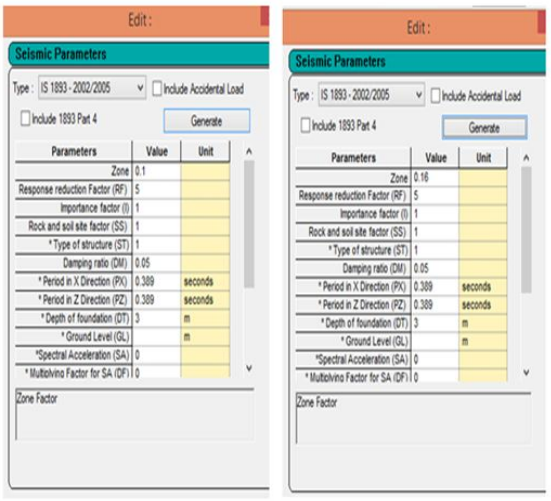
- Impact of unbending help is considered and investigated for the equivalent.

METHODOLOGY

MODELING OF STRUCTURES

A structure is a get together of individual segments, for example, bars, segments, chunks, plates and so forth.. In STAAD, outline components and plate components might be utilized to demonstrate the auxiliary parts. The present models of this work are appeared as follows,

- Model of 15m SMRF
- Model of 18m SMRF



(a)Seismic Requirements for seismic zone II (b) Seismic Requirements for seismic Zone III

1. LOAD CALCULATION

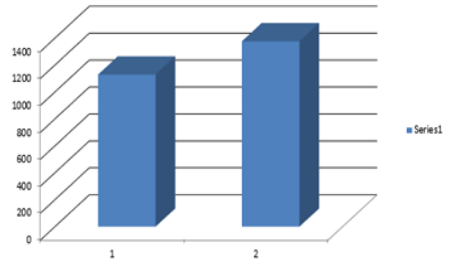
The dead and live load calculations are given in Table as,

Table 2 : Dead and live load calculations

1.	Dead Load (DL)		
	a. Wall load(outer)	=	thickness of wall x unit weight of brick x net height of wall
		=	0.23 x 18 x (3-0.18-0.3)
		=	10.432 KN/m(say 10.5 KN/m)
	a. Wall load(interior)	=	thickness of wall x unit weight of brick x net height of wall
		=	0.115 x 18 x (3-0.18-0.3)
		=	5.2164 KN/m(say 5.5 KN/m)
	c. Parapet load	=	thickness of wall x unit weight of brick x height of wall
		=	0.23 x 18 x 1
		=	4.14 KN/m(say 4.5 KN/m)
	d. Floor load (FL) (Typical)	=	thickness x unit weight of RCC + floor finish
		=	0.18 x 25 + 2
		=	6.5 KN/m^2
	e. Floor load (FL) (Top floor)	=	thickness x unit weight of RCC + floor finish
		=	0.18 x 25 + 1
		=	5.5 KN/m^2
2.	Live Load (LL)		
	Live load 5 KN/sq.m is considered for typical floors (except top floor) and 1.5 KN/sq.m for top floor		

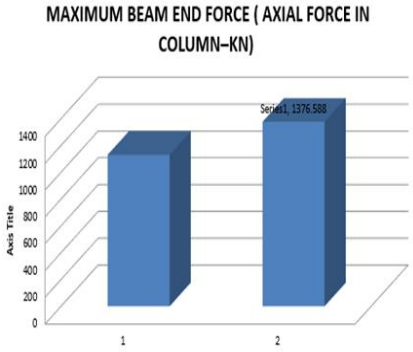
RESULTS & DISCUSSIONS

SEISMIC ZONE-II
MAXIMUM BEAM END FORCE (AXIAL FORCE IN COLUMN–KN)



Model 1 (G+4) and Model 2 (G+5) in Hard Soil

SEISMIC ZONE-III
MAXIMUM BEAM END FORCE (AXIAL FORCE IN COLUMN–KN)



When height of SMRF are increased the Axial force in columns are also increased it will effect the different soils condition for different seismic zones. These graph Shows the values of Axial force in column at different heights and seismic zone II & Seismic Zones III.

CONCLUSIONS

- For greatest axial power, Seismic Zone-II &Seismic Zone - III shows practically same variety.
- As the tallness of the structure outline is expands the estimations of most extreme pivotal power in segment are additionally increments.

REFERENCES

[1] Mahesh Suresh Kumawat and L.G. Kalurkar (2014) Analysis and Design of multistory building using composite structure.
[2] Ashiru Muhammad, Chhavi Gupta, Ibrahim B. Mahmoud (2015) Comparative analysis of Seismic Behaviour of Multi-storey Composite Steel and Conventional Reinforced Concrete Framed Structures.
[3] P. Jayachandran and S. Rajasekaran (2006) Structural Design of Multi-story Residential Building for in Salem, India.
[4] V.Varalakshmi, G. Shiva Kumar and R. Sunil Sarma (2014) Analysis and Design of G+5 residential building.
[5] Sudhir K Jain, H.J.Shah Design Example of a Six Storey Building
[6] S.A. Raji, A.A. Bello, O.I. Adeyanju, O.L. Tazou (2017) Analysis of a Six Storey Steel Frame Structure using AutodeskRevit, Staadpro and SAP2000.
[7] IS: 456-2000(Indian Standard Plain Reinforced Concrete Code of Practice)– Fourth Revision.
[8] IS: 875-1987 (part-2) for Live Loads or Imposed Loads, code practice of Design loads (other than earthquake) for buildings and structures.
[9] IS: 1893-2002 (part-1) "criteria for earthquake resistant design of structures" fifth revision, Bureau of Indian Standards, New Delhi.