International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 01 | Jan 2021 www.irjet.net p-ISSN: 2395-0072

GRAPHICAL PRESENTATION OF STRUCTURAL PARAMETERS FOR RCC MULTISTOREY BUILDING EXPOSED TO SEISMIC LOAD BY PARAMETRIC CONSIDERATION USING STRUCTURAL ANALYSIS PROGRAM

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Abstract :*This paper highlight study of variation in base shear, support reaction, and drift for various positions of shear wall, column orientation in basic direction (along X and Y) and various directions of seismic forces for the building with basic models for seismic zone V. In present study earthquake load is applied on G+10 storey building. The performance of base shear, support reaction and drift has been studied. This analysis is done by using SAP2000 Software.*

Key words: Base shear, support reaction, drift, SAP2000.

I. INTRODUCTION-

Seismic load are the forces that occur during the life of a building. Building should be able to withstand seismic load due to minor earthquake without total collapse. Therefore structural designing requires structural analysis and seismic analysis of any structure. Seismic analysis is the calculation of the response of structure subjected to earthquake excitation. Various seismic data is necessary to carry out the analysis of structure. All over world there is high demand for construction of tall buildings due to increasing urbanization and population. When multi-storeyed structure designed, they are made to fulfill basic aspects and serviceability and should give attention towards behaviour of structure against load imposed. RC buildings frame are most common type of construction in urban India. These are subjected to several types of forces during their lifetime, such as static forces due to dead and live loads and dynamic forces due to wind load and earthquake loads. This project focuses on static and dynamic analysis of building. There are so many parameters affect on building to responding for earthquake. By analysis these parameters we can resist the building by damaging during earthquake. Following are considered for study.

1. Shear wall.

2. Direction of seismic vibration.

3. Orientation of columns. II. Objective of work-

1. To study the behaviour of RCC Building under seismic action for various patterns of shear wall.

2. To study the behaviour of RCC Building under seismic action for column orientation in basic direction (Along X and Y).

3. To study the behaviour of RCC Building under seismic action when subjected to specific directional seismic force (Along X and Y).

To analyse and compare base shear, support reaction and drift for various patterns of shear wall, column orientation in basic direction (Along X and Y) and various directions of seismic forces for the building with basic model.

II. METHODOLOGY:

In this plan area (13.5 x 15 m) for earthquake zone V is consider. The loading is done with referring to code IS1893:2002 (Part1). Modeling and analysis is done by using SAP2000 Software for G+10 storey building.

Table.1. Descriptions of Building Model

Sr.no.	Building parameter	Description
1	Typeof Frame	OMRF
2	Seismic Zone	V[As per IS 1893 (Part 1):2002]
3	Importance Factor (I)	1
4	Response Reduction Factor	
5	Type of Soil	Hard (Type I)
6	Loadings i) Dead Load ii)Floor Finishes iii) Live Load	Self- weight of structural elements 1 KN/M2 3 KN/M2
7	Storey, 5bays in X and 5 in Y Direction	G+10
8	i)OpenGround Storey Height	2.5 m
9	ii)Upper Stories Height	3m (Each)
10	Specific Weight of RCC	25kN/m3
11	Seismic Load Combination	As per IS 1893(Part 1):2002 a.1.5(DL+LL) b.1.2(DL+LL±EQ) c.1.2(DL+LL-EQ) d.1.5(DL+EQ) e. 1.5(DL-EQ) f. 0.9DL+1.5EQ g. 0.9DL-1.5EQ
12	Size of Beam	450 x 4230 mm
13	Column Sizes	450 x 900 mm
14	Thickness of Slab	200 mm
15	Thickness Brick Wall	230 mm
16	Grade of Concrete	M30
17	Grade of Reinforcement	Fe 550

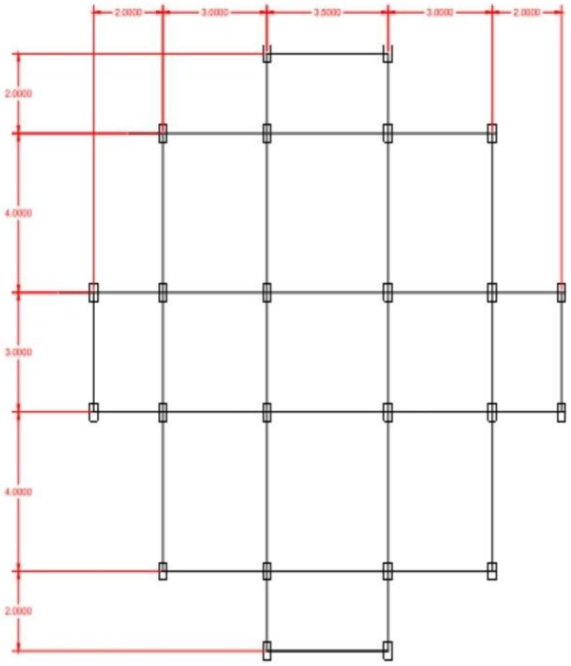
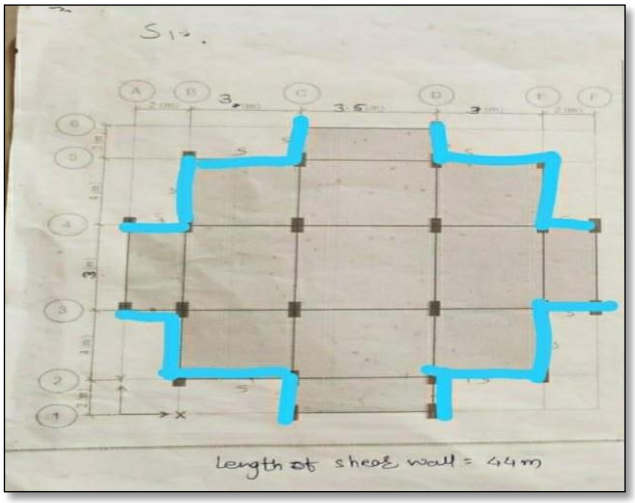
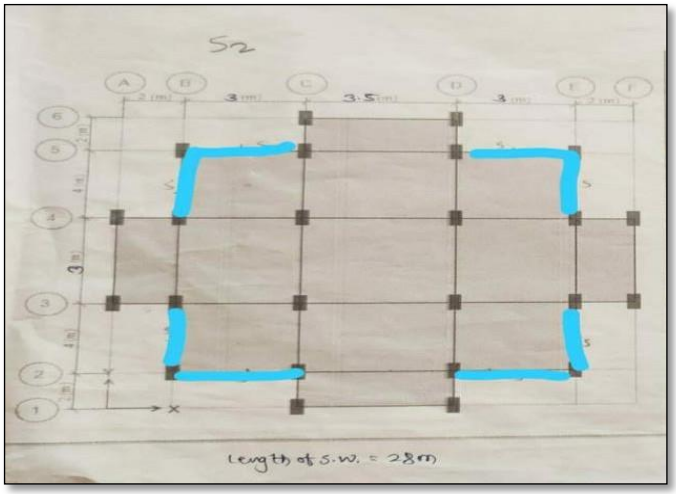


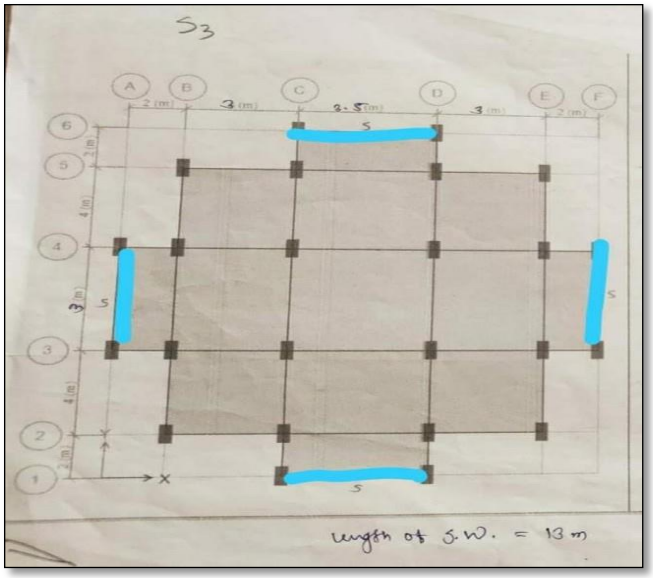
Figure 1: Plan area of 13.5mx15m

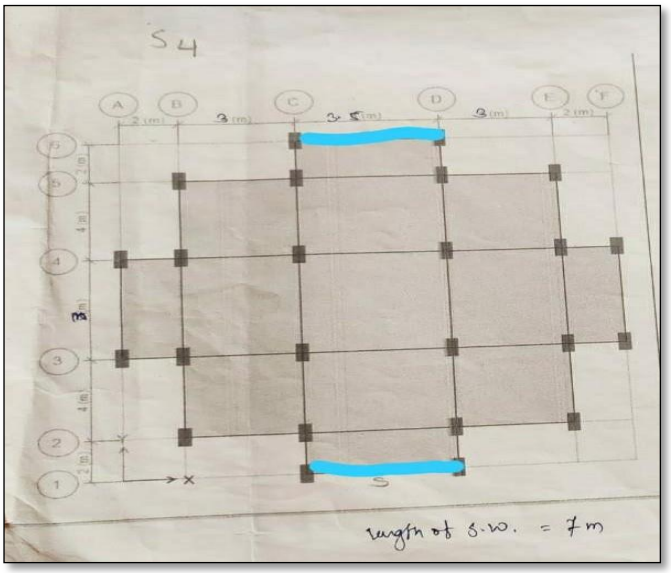
Shear wall positions -





Position 1- S1 Position 2-S2





Position 3- S3 Position 4- S4

Results-

Table.1 Result for base shear

Sr. No.	Group	Model	Fz(KN)	Remark	Percentage Change
1	**A**	RS0-CX-EX	66470.95	Reference for Group A	NA
2		S1-CX-EX	115582.60		73.88
3		S2-CX-EX	71459.83		4.32
4		S3-CX-EX	31568.02		-48.84
5		S4-CX-EX	67332.94		1.28
6	**B**	RS0-CY-EX	66470.95	Reference for Group B	NA
7		S1-CY-EX	72290.48		8.75
8		S2-CY-EX	71250.12		6.71
9		S3-CY-EX	67686.98		1.80
10		S4-CY-EX	68553.02		3.04
11	**C**	RS0-CX-EY	65998.66	Reference for Group C	NA
12		S1-CX-EY	76662.99		16.16
13		S2-CX-EY	72244.52		8.65
14		S3-CX-EY	66362.38		0.55
15		S4-CX-EY	68192.09		3.22
16	**D**	RS0-CY-EY	65863.04	Reference for Group D	NA
17		S1-CY-EY	75344.49		14.40
18		S2-CY-EY	70969.22		7.19
19		S3-CY-EY	66379.06		0.78
20		S4-CY-EY	69079.95		4.66

Table 2. Result for support reaction

Sr. No.	Group	Model	F3(KN)	Remark	Percentage Change
1	**A**	RS0-CX-EX	4442.27	Reference for Group A	NA

2		S1-CX-EX	6108.77		37.51
3		S2-CX-EX	5587.52		20.50
4		S3-CX-EX	4018.81		-10.54
5		S4-CX-EX	4022.03		-10.45
6	**B**	RS0-CY-EX	4054.11	Reference for Group B	NA
7		S1-CY-EX	4627.63		12.39
8		S2-CY-EX	4921.36		17.62
9		S3-CY-EX	3971.36		-2.08
10		S4-CY-EX	4157.03		2.48
11	**C**	RS0-CX-EY	4057.06	Reference for Group C	NA
12		S1-CX-EY	4732.07		14.26
13		S2-CX-EY	4448.85		8.81
14		S3-CX-EY	3840.76		-5.63
15		S4-CX-EY	4016.20		-1.02
16	**D**	RS0-CY-EY	3996.20	Reference for Group D	NA
17		S1-CY-EY	6616.68		39.60
18		S2-CY-EY	4967.05		19.55
19		S3-CY-EY	3536.36		-13.00
20		S4-CY-EY	4144.46		3.58

Observations from above table:

1. From above table 1 Shear wall position 3 gives optimum result for base shear, with reference to basic model**.**
2. From above table2 Shear wall position 3 gives optimum result for Support reaction, with reference to basic model.

CONCLUSION-

From the above results it is concluded that, among the different position of shear wall, shear wall position 3 gives the best results. As per defined frame of the building, section property, loading pattern, load combination deformation in major seismic direction is approximately zero. Therefore drift ratio for all storey remains zero consistently

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8. IS codes–

[1] IS 1893(Part 1):2002 – Criteria for Earthquake Resistant Design of structures

[2] IS 456:2000 code of practice for plain and reinforce.