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STUDY OF PUSHOVER ANALYSIS OF G+10 RCC BUILDING WITH SHEAR WALL

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Abstract - *The structure in high seismal areas could also be prone to serve damage. conjointly the high rise structures, it becomes vital to adopt each linear & non-Linear analysis procedure for style of structures. thus considering effects of building during this article used pushover analysis to estimate demand of symmetrical buildings.*

Seismic loads takenIS 1893 (part I) victimization ETABS software package is employed model & analyz 10 floor, Building with completely different Position of shear wall. this text also highlights best positioning system of shear wall. conjointly the parameters base shear, storey drift & Story displacements are been evaluated.

1.INTRODUCTION

Design of civil engineering structures is usually based mostly on prescriptive strategies of building codes. Normally, loads on the ones structures are low and result in elastic structural behavior. However, below a sturdy seismic event, a form may additionally clearly be subjected to forces beyond its elastic limit. Although building codes can provide reliable indication of actual average overall performance of man or woman structural elements, it's miles out of their scope to give an explanation for the anticipated average overall performance of a designed form as a whole, below large forces. Several industries consisting of vehicle and aviation, mechanically assemble full-scale prototypes and perform big testing, in advance than manufacturing plenty of identical structures, that have been analyzed and designed with interest of test results. Unfortunately, this option is not available to building corporation as due to the distinctiveness of conventional man or woman buildings, financial device of large-scale production is unachievable. With the deliver of fast computers, so-known as average overall performance based completely seismic engineering (PBSE), in which inelastic structural assessment is mixed with seismic hazard assessment to calculate anticipated seismic average overall performance of a form, has emerge as increasingly greater feasible. With the help of this tool, structural engineers too, no matter the truth that on a laptop and now now not in a lab, may have a examine anticipated average overall performance of any form beneathneath large forces and regulate format accordingly. Nonlinear response statistics assessment is a likely method to calculate structural response beneathneath a strong seismic event. However, due to the large amount of statistics generated in such assessment, it is not considered practical and PBSE generally consists of nonlinear static assessment, moreover referred to as pushover assessment. From research viewpoint, whilst PBSE stays in developmental degree in which advanced assessment techniques are being researched.

1.1 Importance of Shear Wall

Shear Wall must give lateral shear strength to the structure to resist the horizontal earthquake forces, wind forces, and transfer these forces to the foundation. Shear Walls give large stiffness to structure in the direction of their exposure, which reduces the lateral sway of the structure and therefore reduces damage to the structure.

1.2 Type of Shear Wall

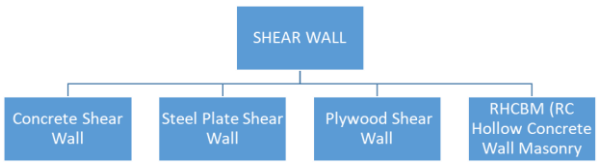


Chart -1: Type of Shear Wall.

2. METHODOLOGY

The various strategies of understanding the issue are clarified from wording, hypothesis and definition of the models for getting a reasonable outcome at the end.

2.1 Model Analysis

General properties of model

1) Length in longitudinal direction – 20 meter.
2) Length in traverse direction – 12 meter.
3) Height of each storey – 3.0 meter.
4) Total height of building – 33.0 meter.
5) Thickness of slab – 100 mm
6) Unit wt of concrete – 25 KN/M^3

7) Dead load – 1.5 KN/M^3

8) Live load intensity – 3 KN/M^2

9) Live load considered in seismic weight calculation in 50%

Section Sizes

Slab	100mm
Beam	300mm X 400
Column	500mm X 500mm
Shear Wall	250mm

Table -1: section properties

Here we are 4 type of model is prepare as following below:

Model No. 1

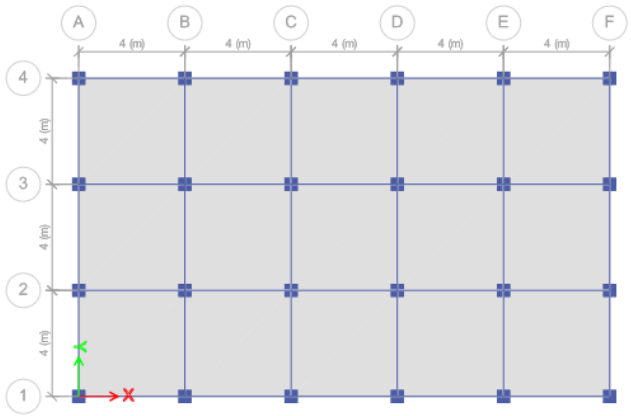


Fig -1: plan view of without shear wall R.C.C. Building

Model No. 2

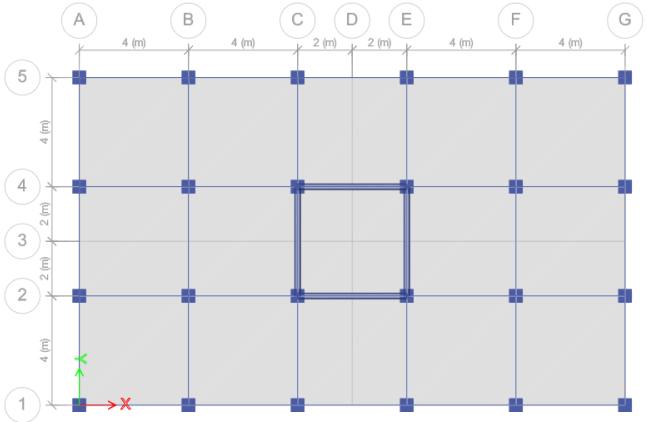


Fig -2: plan view of with core shear wall R.C.C. Building

Model No. 3

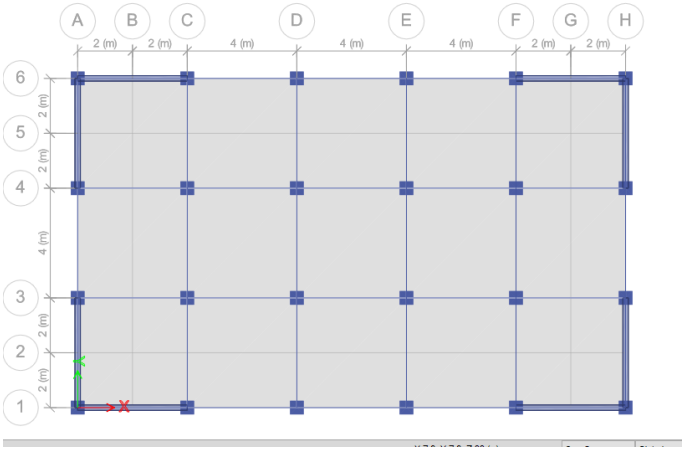


Fig -3: plan view of with corner shear wall R.C.C. Building

Model No. 4

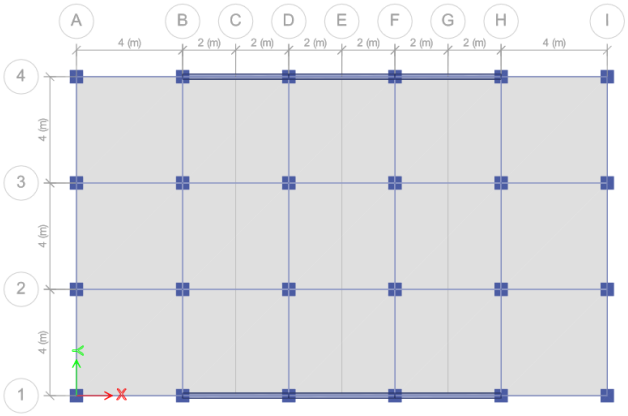


Fig -4: plan view of with adjacent shear wall R.C.C. Building

3. RESULTS

The investigation did with and without shear wall are appeared. The outcomes got from the investigation are thought about dependent on the point of the examination. Subsequent to getting the outcomes these are contrasted with reach the inference from it.

A. Pushover Curve Analysis Graph

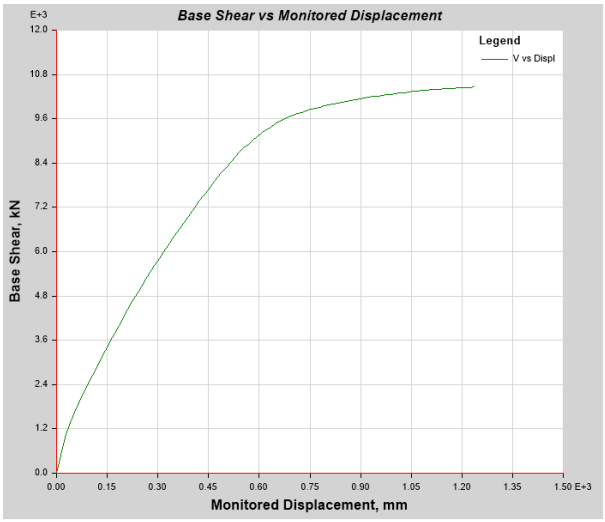


Chart -2: pushover curve without shear wall

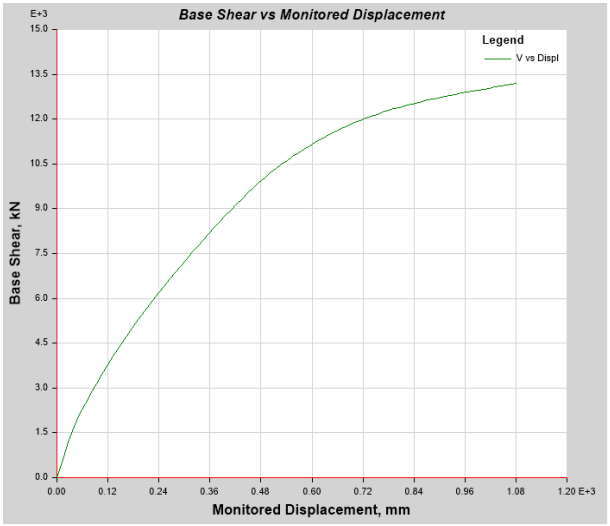


Chart -3: pushover curve with core shear wall

Chart -3: pushover curve with corner shear wall

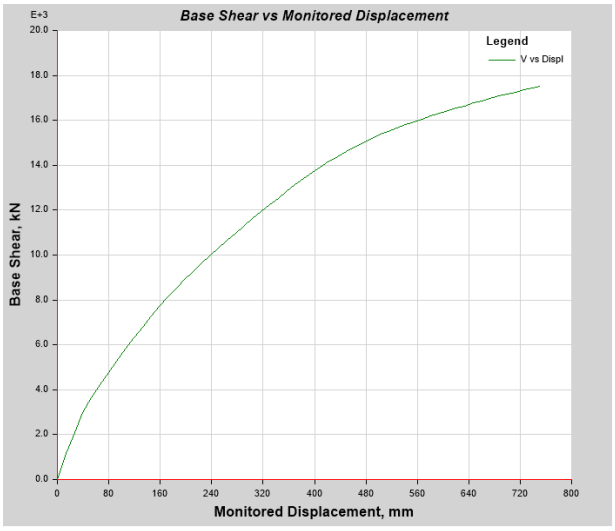


Chart -5: pushover curve with adjacent shear wall

B. Storey Displacement Table

Story	Elevation	Location	X-Dir	Y-Dir
	m		mm	mm
Story11	33	Top	13.196	0.014
Story10	30	Top	12.857	0.013
Story9	27	Top	12.297	0.011
Story8	24	Top	11.491	0.01
Story7	21	Top	10.446	0.009
Story6	18	Top	9.182	0.007
Story5	15	Top	7.727	0.006
Story4	12	Top	6.115	0.005
Story3	9	Top	4.387	0.003
Story2	6	Top	2.612	0.002
Story1	3	Top	0.953	0.001
Base	0	Top	0	0

Table -2: Storey Displacement curve without shear wall

Story	Elevation	Location	X-Dir	Y-Dir
	m		mm	mm
Story11	33	Top	13.193	0.008
Story10	30	Top	12.49	0.008
Story9	27	Top	11.667	0.007
Story8	24	Top	10.71	0.006
Story7	21	Top	9.617	0.005
Story6	18	Top	8.399	0.004

Story	Elevation	Location	X-Dir	Y-Dir
	m		mm	mm
Story5	15	Top	7.07	0.004
Story4	12	Top	5.654	0.003
Story3	9	Top	4.185	0.002
Story2	6	Top	2.707	0.001
Story1	3	Top	1.256	0.001
Base	0	Top	0	0

Table -3: Storey Displacement curve with core shear wall

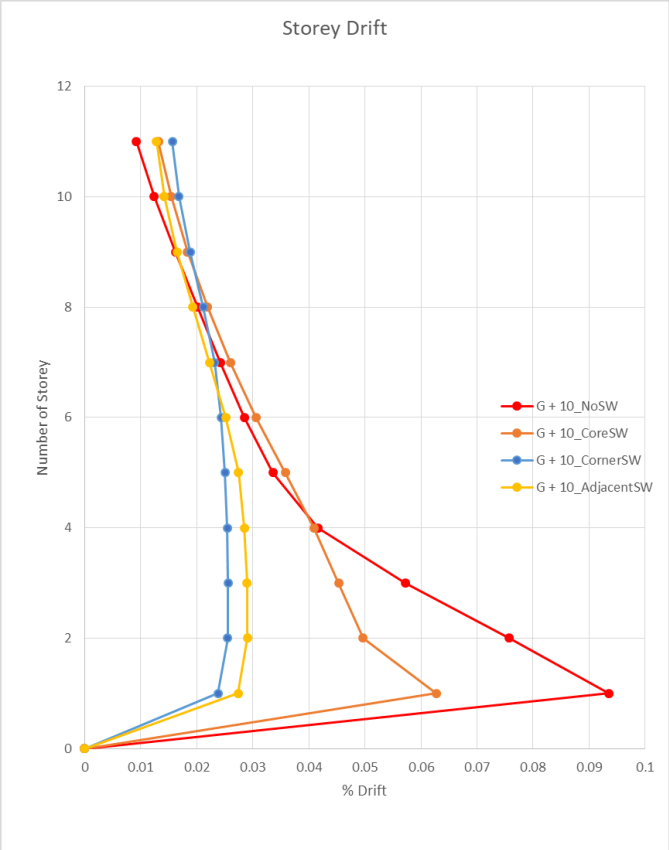
Story	Elevation	Location	X-Dir	Y-Dir
	m		mm	mm
Story11	33	Top	13.199	0.041
Story10	30	Top	12.144	0.037
Story9	27	Top	10.979	0.033
Story8	24	Top	9.707	0.029
Story7	21	Top	8.339	0.025
Story6	18	Top	6.899	0.02
Story5	15	Top	5.424	0.016
Story4	12	Top	3.963	0.011
Story3	9	Top	2.585	0.007
Story2	6	Top	1.374	0.004
Story1	3	Top	0.445	0.001
Base	0	Top	0	0

Table -4: Storey Displacement curve with corner shear wall

Story	Elevation	Location	X-Dir	Y-Dir
	m		mm	mm
Story11	33	Top	13.302	0.101
Story10	30	Top	12.194	0.094
Story9	27	Top	10.985	0.087
Story8	24	Top	9.677	0.078
Story7	21	Top	8.283	0.068
Story6	18	Top	6.824	0.057
Story5	15	Top	5.338	0.046
Story4	12	Top	3.879	0.035
Story3	9	Top	2.514	0.023
Story2	6	Top	1.324	0.013
Story1	3	Top	0.426	0.004
Base	0	Top	0	0

Table -4: Story Displacement curve with adjacent shear wall

C. Storey Drift Graph



Graph -1: comparative Graph of Storey Drift

3. CONCLUSIONS

Based on the results and discussion given in chapter 5 the following conclusions are drawn.

1. From the storey response we also concluded displacement of building without shear wall is more than 57.14% as compare to core of shear wall.

2. Story drift is 70 % greater when providing shear wall as compare to without shear wall building.

3. Base shear is greater when providing shear wall as compare to without shear wall building.

4. Providing Core shear wall has less displacement as compared to providing other position of shear wall.

5. Core placement of shear wall is more effective than other provision of shear wall.

FUTURE SCOPE

The following are the limitations have been considered while arriving to the conclusions.

1. The inclusion of the shear walls and effect of soil-structure interaction can be used forfurther study to show their effects on the RC buildings fragility assessment.

2. For better comparison of seismic performance in a probabilistic way, it is highly recommended to use more ground motions to obtain more dependable fragility curves.

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