Study of Seismic Effect of Different Type of RC Shear Walls in Concrete Frame Structures

Mahdi Hosseini[1] , Prof.N.V.Ramana Rao[2]

Abstract_ Shear walls are a type of structural system that provides lateral resistance to a building or structure. They resist in-plane loads that are applied along its height. The applied load is generally transferred to the wall by a diaphragm or collector or drag member.Shear walls are analyzed to resist two types of forces: shear forces and uplift forces. Shear forces are created throughout the height of the wall between the top and bottom shear wall connections. Uplift forces exist on shear walls because the horizontal forces are applied to the top of the wall. These uplift forces try to lift up one end of the wall and push the other end down. In some cases, the uplift force is large enough to tip the wall over. Shear walls are analyzed to the provide necessary lateral strength to resist horizontal forces. Shear walls are strong enough, to transfer these horizontal forces to the next element in the load path below them. The seismic motion that reaches a structure on the surface of the earth is influenced by local soil conditions. The subsurface soil layers underlying the building foundation may amplify the response of the building to earthquake motions originating in the bedrock. Three types soil are considered here:Hard soil ,Medium soil,soft soil. In the present work thirty story building with C Shape,Box shape,E Shape,I shape and Plus shape RC Shear wall at the center in Concrete Frame Structure with fixed support conditions under different type of soil for earthquake zone V as per IS 1893 (part 1) : 2002 in India are analyzed using software ETABS by Dynamic analysis. All the analyses has been carried out as per the Indian Standard code books. This paper aims to Study the behaviour of high rise structure with dual system with Different Type of RC Shear Walls (C,Box,E,I and Plus shapes) under different type of soil condition with seismic loading. Estimation of structural response such as; storey displacements, storey moment ,storey shear, storey drift , Time period and frequency is carried out.In dynamic analysis; Response Spectrum method is used.

Keywords_ Response Spectrum method, Soft ,Medium &Hard Soil, Structural Response , C Shape Shear Wall , Box shape, E Shape, I shape , Plus shape RC Shear wall

1 INTRODUCTION

Shear wall structure

The usefulness of shear walls in framing of buildings has long been recognized. Walls situated in advantageous positions in a building can form an efficient lateral-force-resisting system, simultaneously fulfilling other functional requirements. When a permanent and similar subdivision of floor areas in all stories is required as in the case of hotels or apartment buildings, numerous shear walls can be utilized not only for lateral force resistance but also to carry gravity loads. In such case, the floor by floor repetitive planning allows the walls to be vertically continuous which may serve simultaneously as excellent acoustic and fire insulators between the apartments. Shear walls may be planar but are often of L-, T-, I-, or E,C,Box shaped section to better suit the planning and to increase their flexural stiffness.

The positions of shear walls within a building are usually dictated by functional requirements. These may or may not suit structural planning. The purpose of a building and consequent allocation of floor space may dictate required arrangements of walls that can often be readily utilized for lateral force resistance. Building sites, architectural interests or client's desire may lead the positions of walls that are undesirable from a structural point of view. However, structural designers are often in the position to advice as to the most desirable locations for shear walls in order to optimize seismic resistance. The major structural considerations for individual shear walls will be aspects of symmetry in stiffness, torsional stability and available overturning capacity of the foundations (Paulay and Priestley, 1992).

Earthquake Load

The seismic weight of building is the sum of seismic weight of all the floors. The seismic weight of each floor is its full dead load plus appropriate amount of imposed load, the latter being that part of the imposed loads that may reasonably be expected to be attached to the structure at the time of earthquake shaking. It includes the weight of permanent and movable partitions, permanent equipment, a part of the live load, etc. While computing the seismic weight of columns and walls in any storey shall be equally distributed to the floors above and below the storey. Earthquake forces experienced by a building result from ground motions (accelerations) which are also fluctuating or dynamic in nature, in fact they reverse direction some what chaotically. The magnitude of an earthquake force depends on the magnitude of an earthquake, distance from the earthquake source(epicenter), local ground conditions that may amplify ground shaking (or dampen it), the weight(or mass) of the structure, and the type of structural system and its ability to with stand abusive cyclic loading. In theory and practice, the lateral force that a building experiences from an earthquake increases in direct proportion with the acceleration of ground motion at the building site and the mass of the building (i.e., a doubling in ground motion acceleration or building mass will double the load).This theory rests on the simplicity and validity of Newton's law of physics: F = m x a, where 'F' represents force, 'm' represents mass or weight, and 'a' represents acceleration. For example, as a car accelerates forward, a force is imparted to the driver through the seat to push him forward with the car(this force is equivalent to the weight of the driver multiplied by the acceleration or rate of change in speed of the car). As the brake is applied, the car is decelerated and a force is imparted to the driver by the seat-belt to push him back toward the seat.

1
Ph.D. scholar student in Structural Engineering, Dept. of Civil Engineering, Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, Telengana , India,Email: civil.mahdi.hosseini@gmail.com
2
Professor, Dept. of Civil Engineering, Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, & Director of National Institute of Technology Warangal ,Telangana, India,Email: rao.nvr@gmail.com

Similarly, as the ground accelerates back and forth during an earthquake it imparts back-and-forth(cyclic) forces to a building through its foundation which is forced to move with the ground. One can imagine a very light structure such as fabric tent that will be undamaged in almost any earthquake but it will not survive high wind. The reason is the low mass (weight) of the tent. Therefore, residential buildings generally perform reasonably well in earthquakes but are more vulnerable in high-wind load prone areas. Regardless, the proper amount of bracing is required in both cases.

Importance of seismic design codes

Ground vibration during earthquake cause forces and deformations in structures. Structures need to be designed withstand such forces and deformations. Seismic codes help to improve the behavior of structures so that may withstand the earthquake effect without significant loss of life and property. Countries around the world have procedures outlined in seismic code to help design engineers in the planning, designing, detailing and constructing of structures.

A) An earthquake resistant has four virtues in it, namely:

i) *Good Structural Configuration:* its size, shape and structural system carrying loads are such that they ensure a direct and smooth flow of inertia forces to the ground.

ii) *Lateral Strength:* The maximum lateral (horizontal) force that it can resist is such that the damage induced in it does not result in collapse.

iii) *Adequate Stiffness:* Its lateral load resisting system is such that the earthquake – indeed deformations in it do not damage its contents under low-to- moderate shaking.

iv) *Good Ductility*: Its capacity to undergo large deformations under severe earthquake shaking even after yielding is improved by favorable design and detailing strategies.

B) Indian Seismic Codes

Seismic codes are unique to a particular region or country. They take into account the local seismology, accepted level of seismic risk, buildings typologies, and materials and methods used in construction.

The Bureau of Indian Standards (BIS) the following Seismic Codes:

IS 1893 (PART 1) 2002, *Indian Standard Criteria* for Earthquakes Resistant of Design Structures (5th revision).

IS 4326, 1993, Indian Standard Code of practice for Earthquake Resistant Design and Construction of Buildings. (2nd revision).

IS 13827, 1993, Indian Standard Guidelines for improving Earthquake Resistant of Earthen buildings.

IS 13828, 1993 Indian Standard Guidelines for improving Earthquake Resistant of Low Strength Masonry Buildings.

IS 13920, 1993, Indian Standard Code for practice for Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces.

The regulations in these standards do not ensure that structures suffer no damage during earthquake of all magnitude. But, to the extent possible, they ensure that structures are able to respond to earthquake shaking of moderate intensities without structural damage and of heavy intensities wit out total collapse.

Site selection

The seismic motion that reaches a structure on the surface of the earth is influenced by local soil conditions. The subsurface soil layers underlying the building foundation may amplify the response of the building to earthquake motions originating in the bedrock.

For soft soils the earthquake vibrations can be significantly amplified and hence the shaking of structures sited on soft soils can be much greater than for structures sited on hard soils. Hence the appropriate soil investigation should be carried out to establish the allowable bearing capacity and nature of soil. The choice of a site for a building from the failure prevention point of view is mainly concerned with the stability of the ground. The very loose sands or sensitive clays are liable to be destroyed by the earthquake, so much as to lose their original structure and thereby undergo compaction. This would result in large unequal settlements and damage the building. If the loose cohesion less soils are saturated with water they are likely to lose their shear resistance altogether during ground shaking. This leads to liquefaction. Although such soils can be compacted, for small buildings the operation may be too costly and the sites having these soils are better avoided.

For large building complexes, such as housing developments, new colonies, etc. this factor should be thoroughly investigated and the site has to be selected appropriately. Therefore a site with sufficient bearing capacity and free from the above defects should be chosen and its drainage condition improved so that no water accumulates and saturates the ground especially close to the footing level.

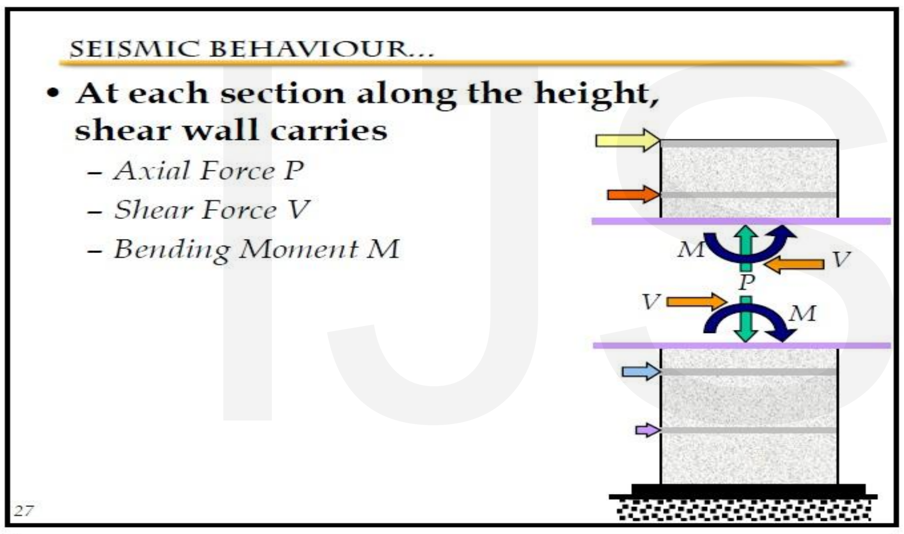
Bearing capacity of foundation soil

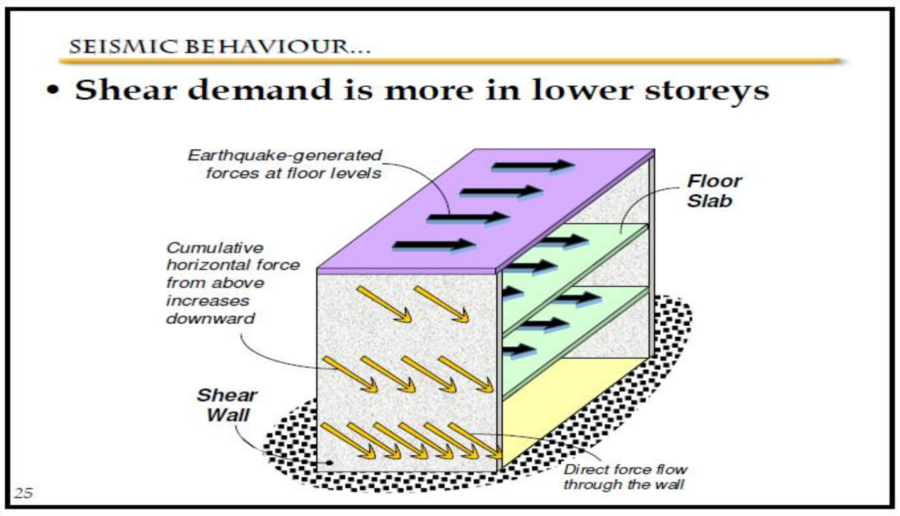
Three soil types are considered here:

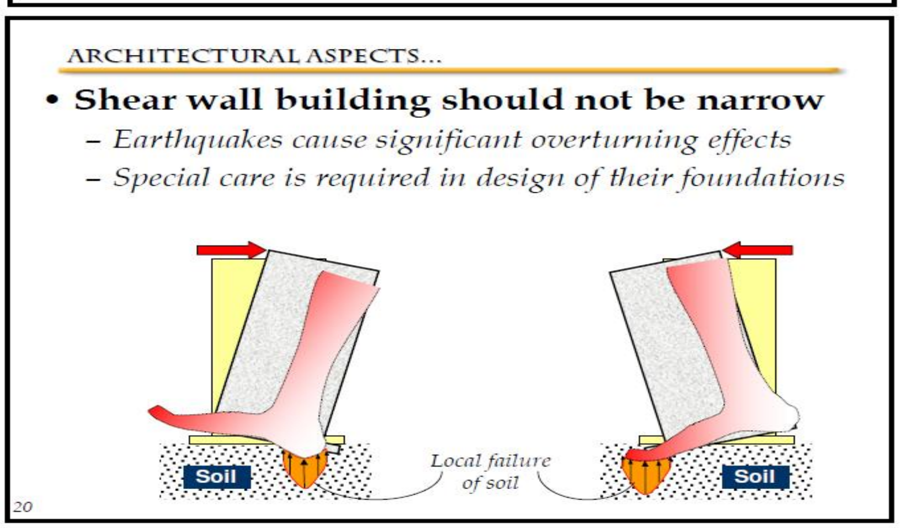
I. Hard- Those soils, which have an allowable bearing capacity of more than 10t/m2.
II. Medium - Those soils, which have an allowable bearing capacity less than or equal to 10t/m2
III. Soft - Those soils, which are liable to large differential settlement or liquefaction during an earthquake.

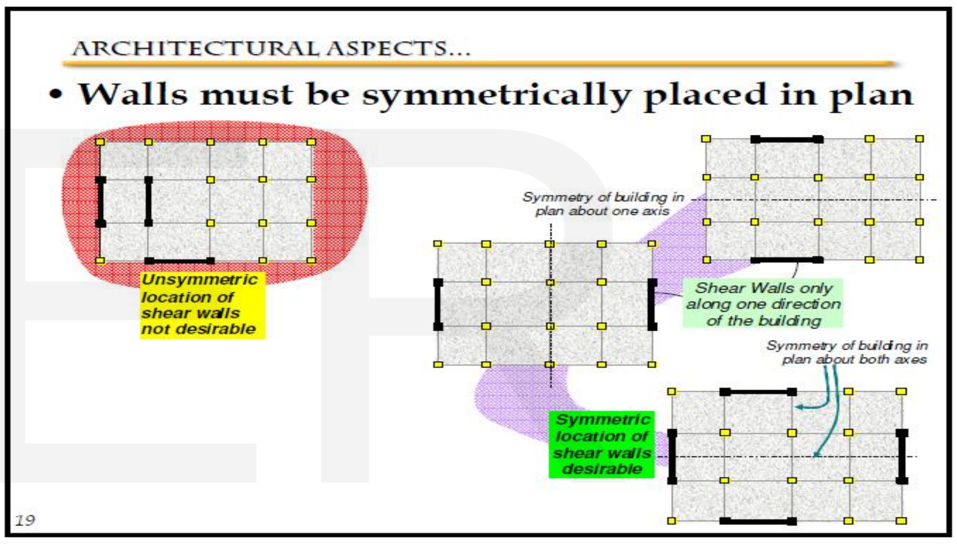
Soils must be avoided or compacted to improve them so as to qualify them either as firm or stiff. The allowable bearing pressure shall be determined in accordance with IS: 1888-1982 load test (Revision 1992). It is a common practice to increase the allowable bearing pressure by one-third, i.e. 33%, while performing seismic analysis of the materials like massive crystalline bedrock sedimentary rock, dense to very dense soil and heavily over consolidated cohesive soils, such as a stiff to hard clays. For the structure to react to the motion, it needs to overcome its own inertia, which results in an interaction between the structure and the soil. The extent to which the structural response may alter the characteristics of earthquake motions observed at the foundation level depends on the relative mass and stiffness properties of the soil and the structure. Thus the physical property of the foundation medium is an important factor in the earthquake response of structures supported on it. There are two aspects of building foundation interaction during earthquakes, which are of primary importance to earthquake engineering. First, the response to earthquake motion of a structure founded on a deformable soil can be significantly different from that would occur if the structure is supported on a rigid foundation. Second, the motion recorded at the base of a structure or in the immediate vicinity can be different from that which would have been recorded had there been no building. Observations of the response of the buildings during earthquakes have shown that the response of typical structures can be markedly influenced by the soil properties if the soils are sufficiently soft. Furthermore, for relatively rigid structures such as nuclear reactor containment structures, interaction effects can be important, even for relatively firm soils because the important parameter apparently is not the stiffness of the soil, but the relative stiffness of the building and its foundation. In terms of the dynamic properties of the building foundation system, past studies have shown that the interaction will, in general, reduce the fundamental frequency of the system from that of the structure on a rigid base, dissipate part of the vibrational energy of the building by wave radiation into the foundation medium and modify the base motion of the structure in comparison to the free- field motion. Although all these effects may be present in some degree for every structure, the important point is to establish under what conditions the effects are of practical significance.

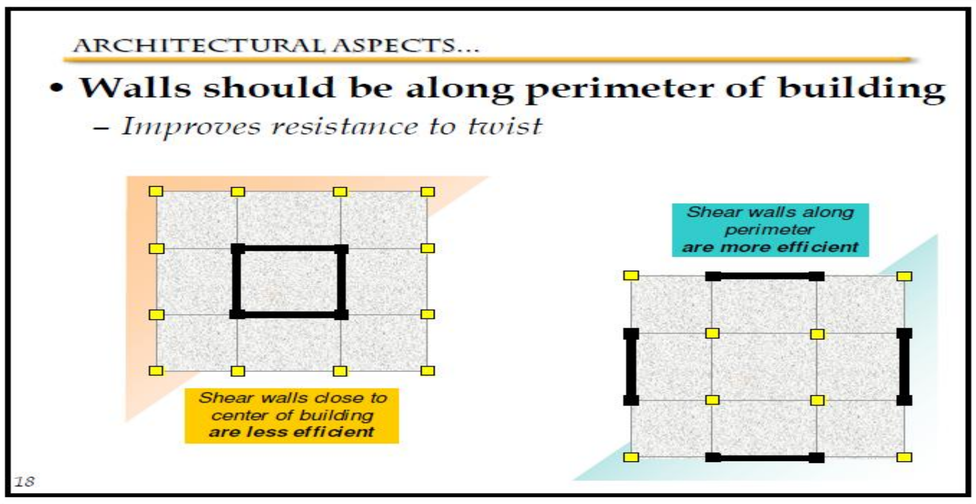
Seismic Behavior of RC Shear Wall

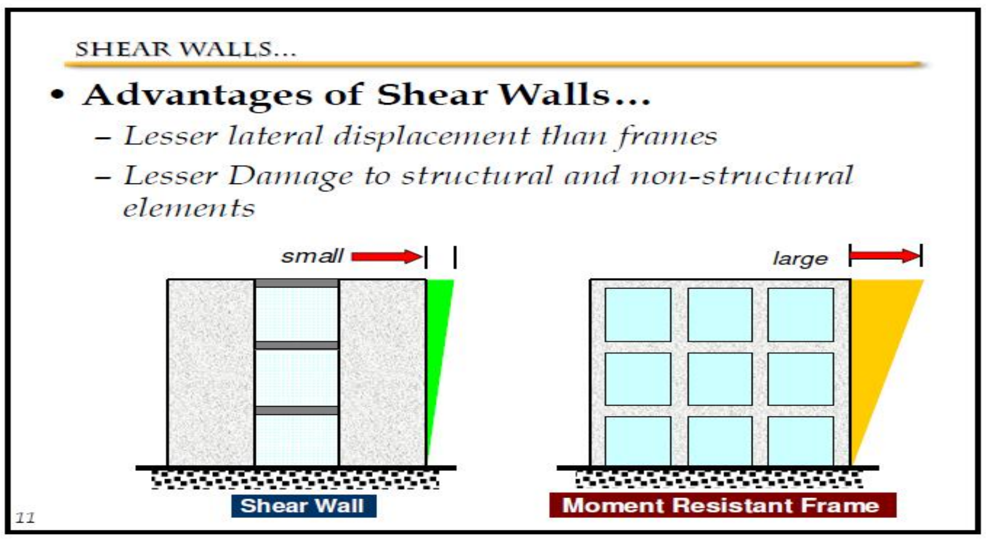


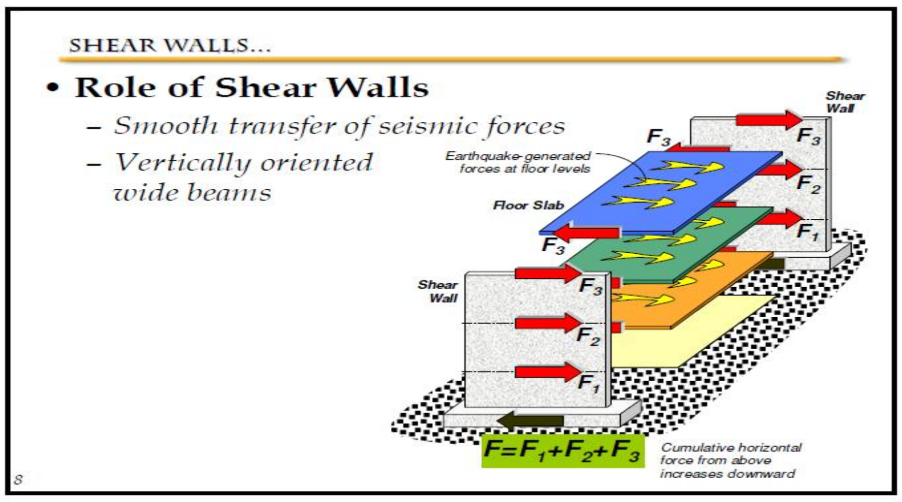


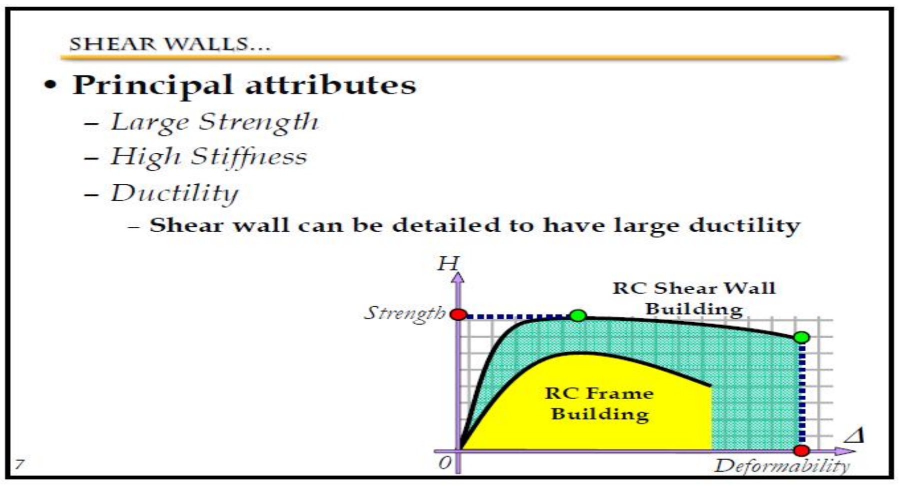












2 METHODOLOGY

Earthquake motion causes vibration of the structure leading to inertia forces. Thus a structure must be able to safely transmit the horizontal and the vertical inertia forces generated in the super structure through the foundation to the ground. Hence, for most of the ordinary structures, earthquake-resistant design requires ensuring that the structure has adequate lateral load carrying capacity. Seismic codes will guide a designer to safely design the structure for its intended purpose.

Quite a few methods are available for the earthquake analysis of buildings; two of them are presented here:

1- Equivalent Static Lateral Force Method (pseudo static method).
2- Dynamic analysis.
I. Response spectrum method.
II. Time history method.

Equivalent lateral Force (Seismic Coefficient) Method

This method of finding lateral forces is also known as the static method or the equivalent static method or the seismic coefficient method. The static method is the simplest one and it requires less computational effort and is based on formulae given in the code of practice.
In all the methods of analyzing a multi storey buildings recommended in the code, the structure is treated as discrete system having concentrated masses at floor levels which include the weight of columns and walls in any storey should be equally distributed to the floors above and below the storey. In addition, the appropriate amount of imposed load at this floor is also lumped with it. It is also assumed that the structure flexible and will deflect with respect to the position of foundation the lumped mass system reduces to the solution of a system of second order differential equations. These equations are formed by distribution, of mass and stiffness in a structure, together with its damping characteristics of the ground motion.

Dynamic Analysis

Dynamic analysis shall be performed to obtain the design seismic force, and its distribution in different levels along the height of the building, and in the various lateral load resisting element, for the following buildings:

Regular buildings: Those greater than 40m in height in zones IV and V, those greater than 90m in height in zone II and III.

Irregular buildings: All framed buildings higher than 12m in zones IV and V, and those greater than 40m in height in zones II and III.
The analysis of model for dynamic analysis of buildings with unusual configuration should be such that it adequately models the types of irregularities present in the building configuration. Buildings with plan irregularities, as defined in Table 4 of IS code: 1893-2002 cannot be modeled for dynamic analysis.

Dynamic analysis may be performed either by the TIME HISTORY METHOD or by the RESPONSE SPECTRUM METHOD

Time History Method

The usage of this method shall be on an appropriate ground motion and shall be performed using accepted principles of dynamics. In this method, the mathematical model of the building is subjected to accelerations from earthquake records that represent the expected earthquake at the base of the structure.

Response Spectrum Method

The word spectrum in engineering conveys the idea that the response of buildings having a broad range of periods is summarized in a single graph. This method shall be performed using the design spectrum specified in code or by a site-specific design spectrum for a structure prepared at a project site. The values of damping for building may be taken as 2 and 5 percent of the critical, for the purposes of dynamic of steel and reinforce concrete buildings, respectively. For most buildings, inelastic response can be expected to occur during a major earthquake, implying that an inelastic analysis is more proper for design. However, in spite of the availability of nonlinear inelastic programs, they are not used in typical design practice because:

1- Their proper use requires knowledge of their inner workings and theories. design criteria, and
2- Result produced are difficult to interpret and apply to traditional design criteria , and
3- The necessary computations are expensive.

Therefore, analysis in practice typically use linear elastic procedures based on the response spectrum method. The response spectrum analysis is the preferred method because it is easier to use.

3 LITERATURE REVIEW

Generally, the building configuration which is conceived by architects and then accepted by developer or owner may provide a narrow range of options for lateral-load resistant systems that can be utilized by structural engineers. By observing the following fundamental principles relevant to seismic responses, more suitable structural systems may be adopted (Paulay and Priestley, 1992):

1. To perform well in an earthquake, a building should possess simple and regular configurations. Buildings with articulated plans such as T and L shapes should be avoided.
2. Symmetry in plans should be provided, wherever possible. Lack of symmetry in plan may lead to significant torsional response, the reliable prediction of which is often difficult.

3. An integrated foundation system should tie together all vertical structural elements in both principal directions. Foundation resting on different soil condition should preferably be avoided.

4. Lateral force resisting systems with significantly different stiffness such as shear walls and frames within one building should be arranged in such a way that at every level of the building, symmetry in lateral stiffness is not grossly violated. Thus, undesirable torsional effects will be minimized.

5. Regularity in elevation should prevail in both the geometry and the variation of story stiffness.

Prajapati R.J. et al., (2013) carried out study on deflection in high rise buildings for different position of shear walls. It was observed that deflection for building with shear walls provided at the corners in both the directions was drastically less when compared with other models.

Chandurkar P.P. et al., (2013) conducted a study on seismic analysis of RCC building with and without shear walls. They have selected a ten storied building located in zone II, zone III, zone IV and zone V. Parameters like Lateral displacement, story drift and total cost required for ground floor were calculated in both the cases.

Bhat S.M. et al., (2013) carried out study on Eathquake behaviour of buildings with and without shear walls. Parameters like Lateral displacement, story drift etc were found and compared with the bare frame model.

Sardar S.J. et al., (2013) studied lateral displacement and inter-story drift on a square symmetric structure with walls at the centre and at the edges, and found that the presence of shear wall can affect the seismic behaviour of frame structure to large extent, and the shear wall increases the strength and stiffness of the structure.

Sagar K.et al., (2012) carried out linear dynamic analysis on two sixteen storey high buildings.It was concluded that shear walls are one of the most effective building elements in resisting lateral forces during earthquake. Providing shear walls in proper position minimizes effect and damages due to earthquake and winds.

Kumbhare P.S. et al., (2012) carried out a study on shear wall frame interaction systems and member forces. It was found that shear wall frame interaction systems are very effective in resisting lateral forces induced by earthquake. Placing shear wall away from center of gravity resulted in increase in the most of the members forces. It follows that shear walls should be coinciding with the centroid of the building.

Rahman A. et al., (2012) studied on drift analysis due to earthquake load on tall structures. In this study regular shaped structures have been considered. Estimation of drift was carried out for rigid frame structure, coupled shear wall structure and wall frame structure.

Anshuman et al., (2011) conducted a research on solution of shear wall location in multi storey building. An earthquake load was calculated and applied to a fifteen storied building located in zone IV. It was observed that the top deflection was reduced and reached within the permissible deflection after providing the shear wall.

Kameshwari B. et al., (2011) analyzed the effect of various configurations of shear walls on high-rise structure. The drift and inter-storey drift of the structure in the following configurations of shear wall panels was studied and was compared with that of bare frame. Diagonal shear wall configuration was found to be effective for structures in the earthquake prone areas.

Based on the literature review, the salient objective of the present study have been identified as

follows:

- behaviour of high rise structure with dual system with Different Type of RC Shear Walls (C, E,I,Boxand Plus shapes) with seismic loading.
- To examine the effect of different types of soil (Hard, medium and Soft) on the overall interactive behaviour of the shear wall foundation soil system.
- The variation of maximum storey shear, storey moment of the models has been studied.
- The variation of storey drifts of the models has been studied
- The variation of displacement of the models has been studied
- The variation of Time period and frequency has been studied.

Table 1 : Details of The Building

Building Parameters	Details
Type of frame	Special RC moment resisting frame fixed at the base
Building plan	38.5m X 35.5m
Number of storeys	30
Floor height	3.5 m
Depth of Slab	225 mm
Size of beam	(300 × 600) mm
Size of column (exterior)	(1250×1250) mm up to story five
Size of column (exterior)	(900×900) mm Above story five
Size of column (interior)	(1250×1250) mm up to story ten
Size of column (interior)	(900×900) mm Above story ten
Spacing between frames	7.5-8.5 m along x - direction 7.5-5.5 m along y - direction
Live load on floor	4 KN/m2
Floor finish	2.5 KN/m2
Wall load	25 KN/m
Grade of Concrete	M 50 concrete
Grade of Steel	Fe 500
Thickness of shear wall	450 mm
Seismic zone	V
Density of concrete	25 KN/m3
Type of soil	Soft,Medium,Hard Soil Type I=Soft Soil Soil Type II=Medium Soil Soil Type III= Hard Soil
Response spectra	As per IS 1893(Part-1):2002
Damping of structure	5 percent

4 MODELING OF BUILDING

Details of The Building

A symmetrical building of plan 38.5m X 35.5m located with location in zone V, India is considered. Four bays of length 7.5m& one bays of length 8.5m along X - direction and Four bays of length 7.5m& one bays of length 5.5m along Y - direction are provided. Shear Wall is provided at the center core of building model.

Structure 1: In this model building with 30 storey is modeled as a (Dual frame system with shear wall (Plus Shape) at the center of building, The shear wall acts as vertical cantilever.

Structure 2 : In this model building with 30 storey is modeled as (Dual frame system with shear wall (Box Shape) at the center of building ,The shear wall acts as vertical cantilever.

Structure 3 : In this model building with 30 storey is modeled as (Dual frame system with shear wall (C- Shape) at the center of building, The shear wall acts as vertical cantilever.

Structure 4 : In this model building with 30 storey is modeled as (Dual frame system with shear wall (E- Shape) at the center of building ,The shear wall acts as vertical cantilever.

Structure 5 : In this model building with 30 storey is modeled as (Dual frame system with shear wall (I- Shape) at the center of building, The shear wall acts as vertical cantilever.

Load Combinations

As per IS 1893 (Part 1): 2002 Clause no. 6.3.1.2, the following load cases have to be considered for analysis:
1.5 (DL + IL)
1.2 (DL + IL ± EL)
1.5 (DL ± EL)
0.9 DL ± 1.5 EL
Earthquake load must be considered for +X, -X, +Y and –Y directions.

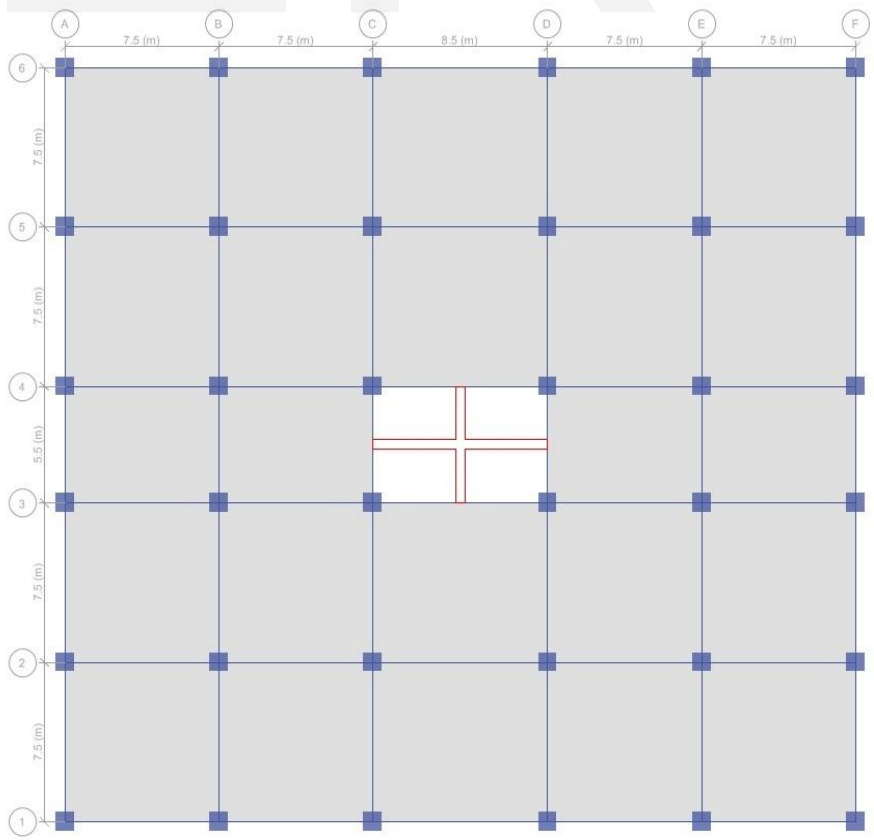


Figure 1. Plan of the Structure 1

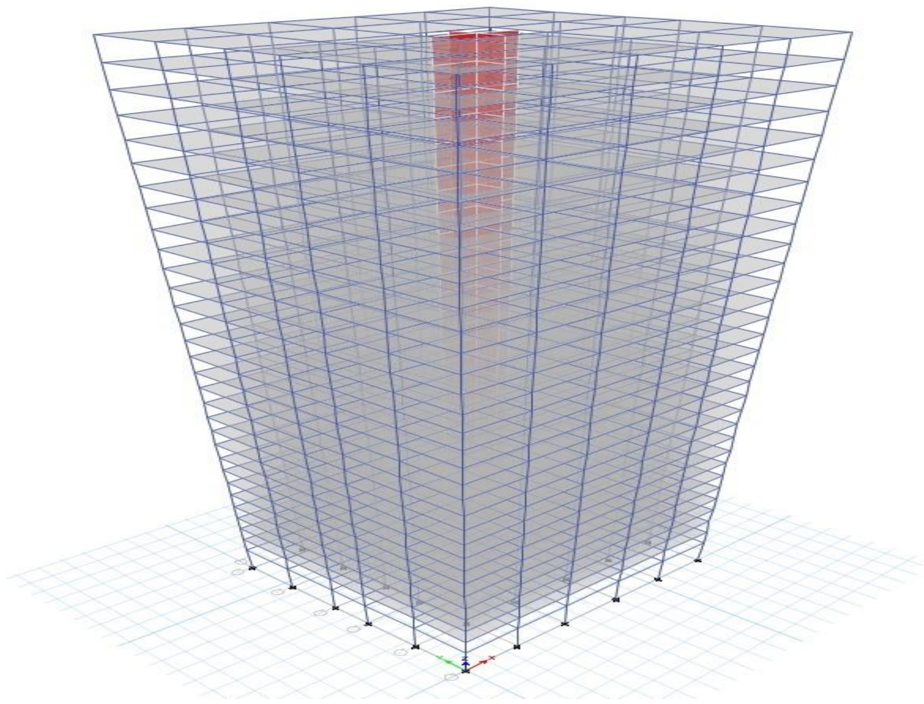


Figure 2. 3D view showing shear wall location for Structure 1

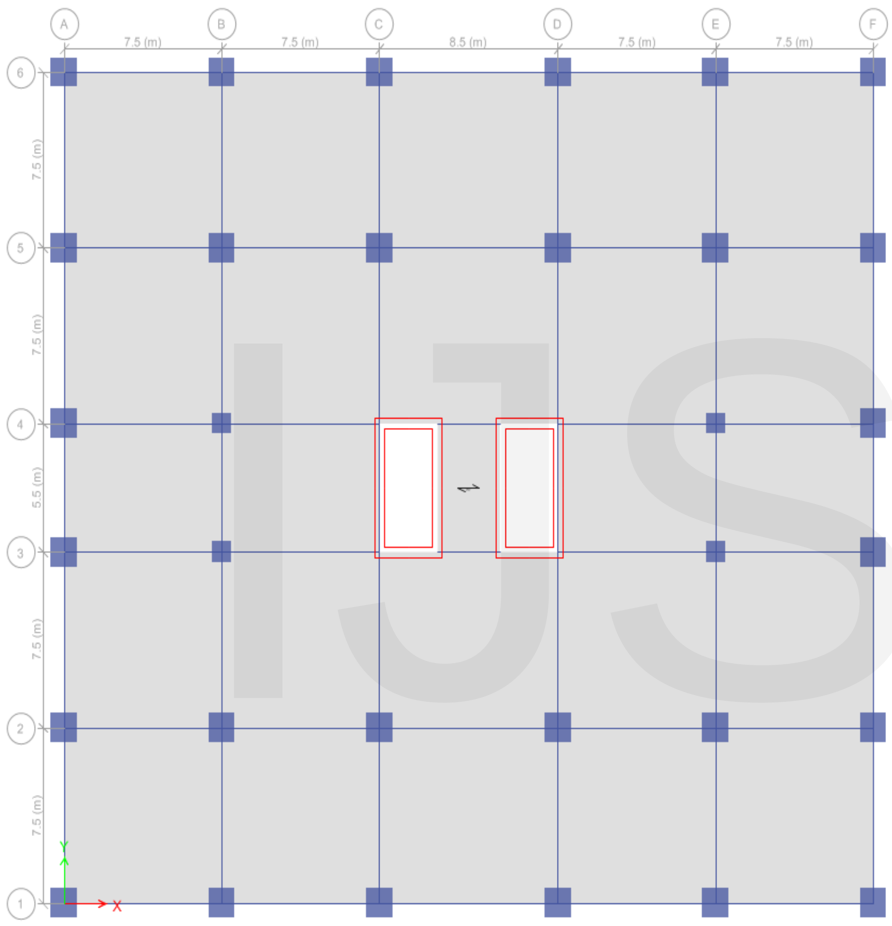


Figure3. Plan of the Structure 2

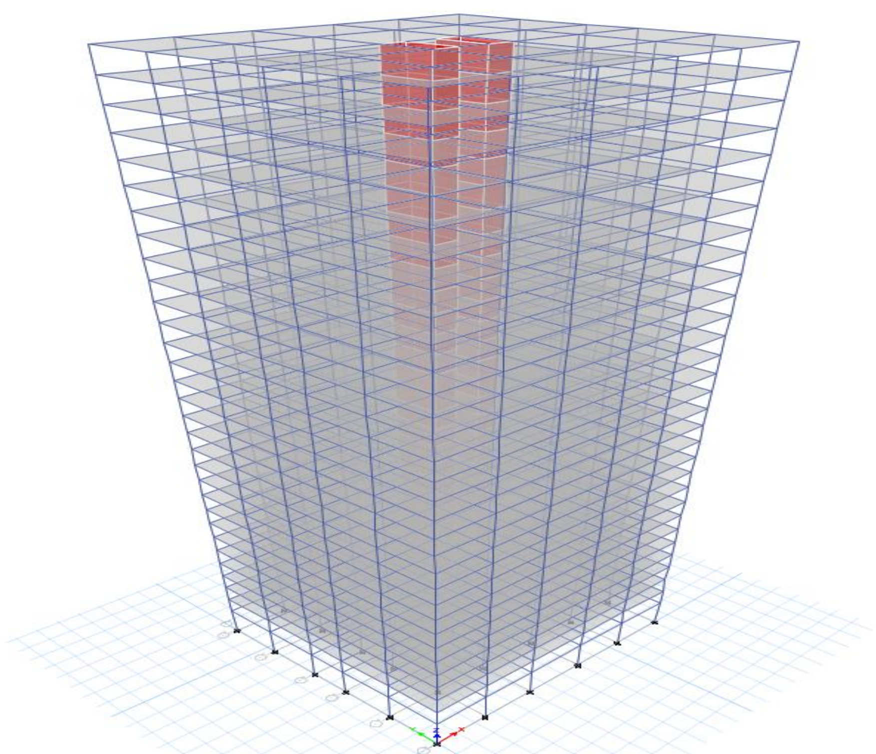


Figure 4. 3D view showing shear wall location for Structure2

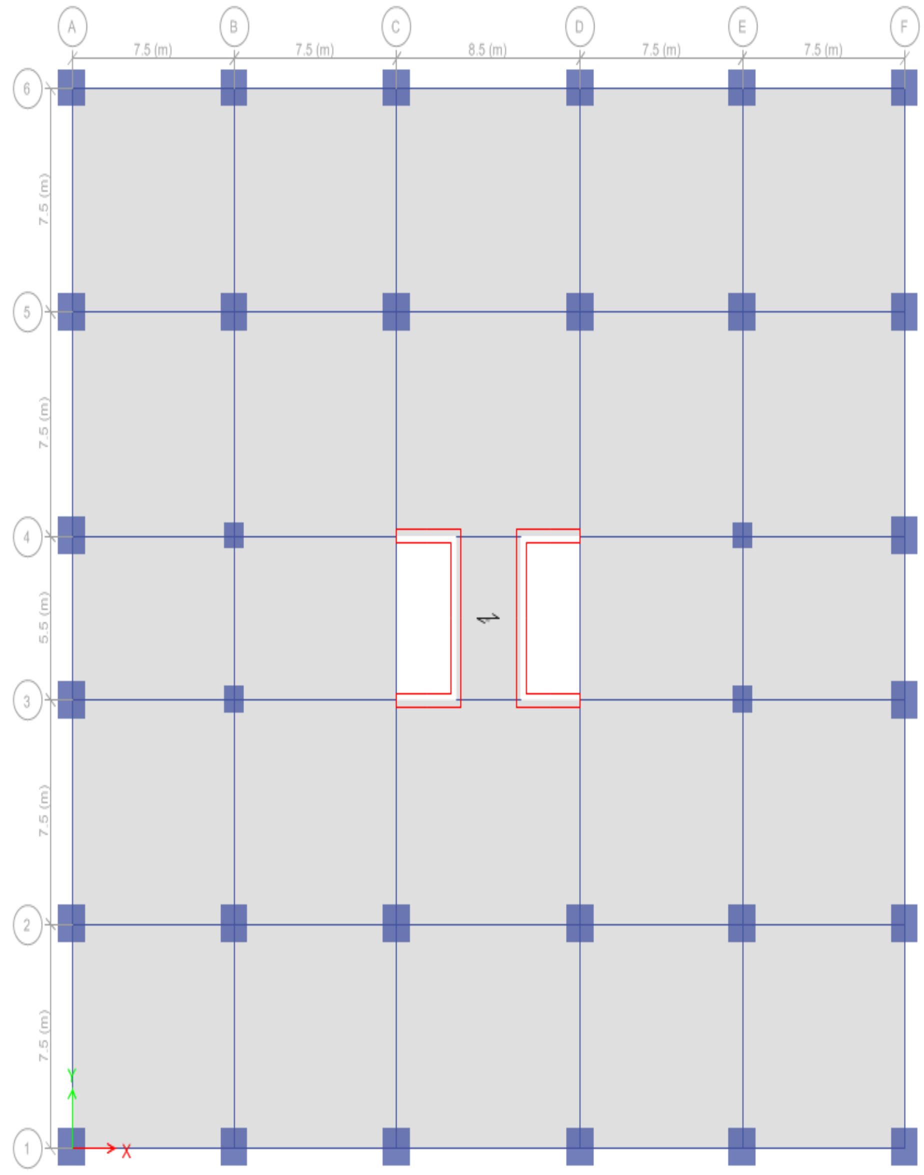


Figure 5. Plan of the Structure 3

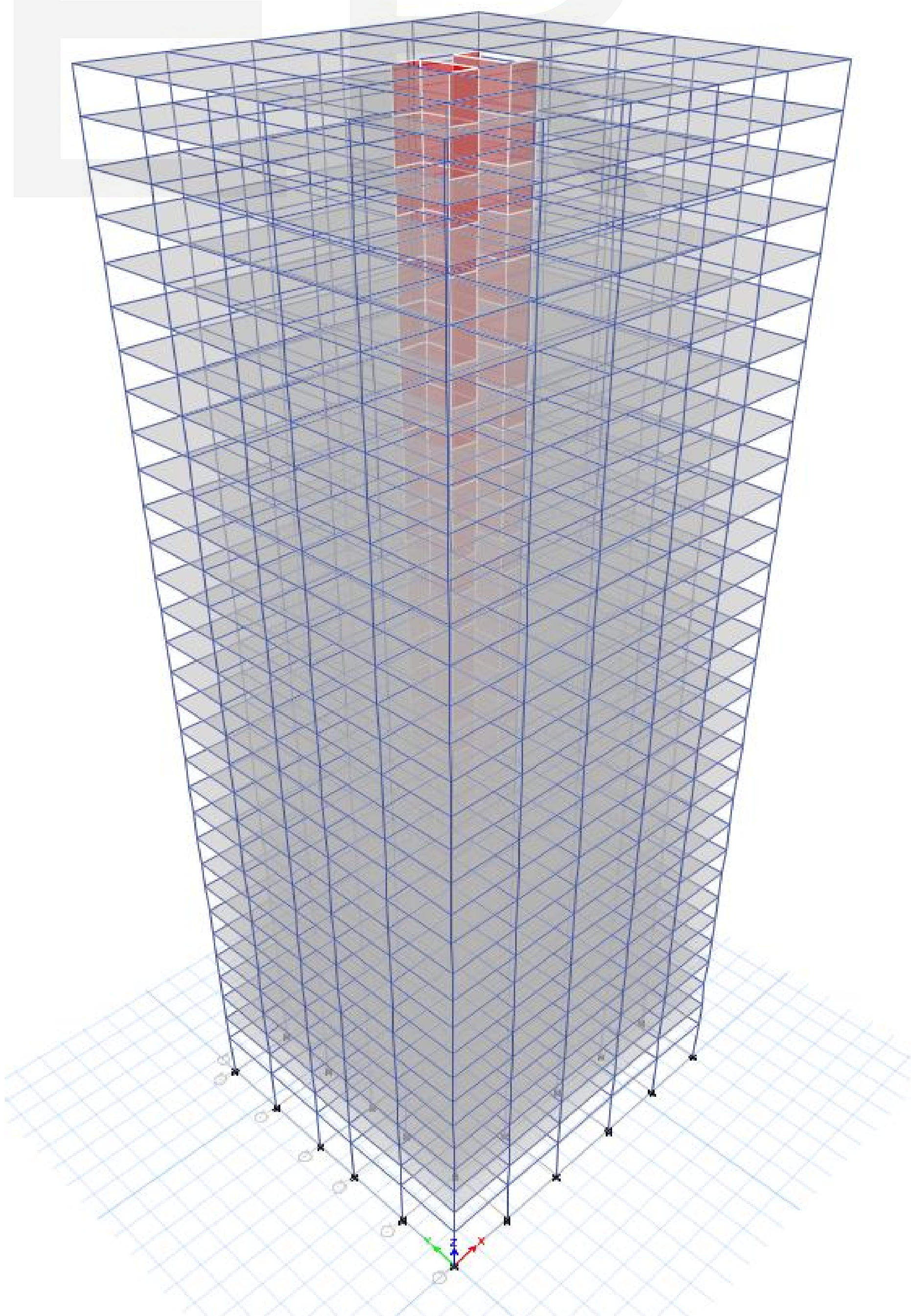


Figure 6. 3D view showing shear wall location for Structure 3

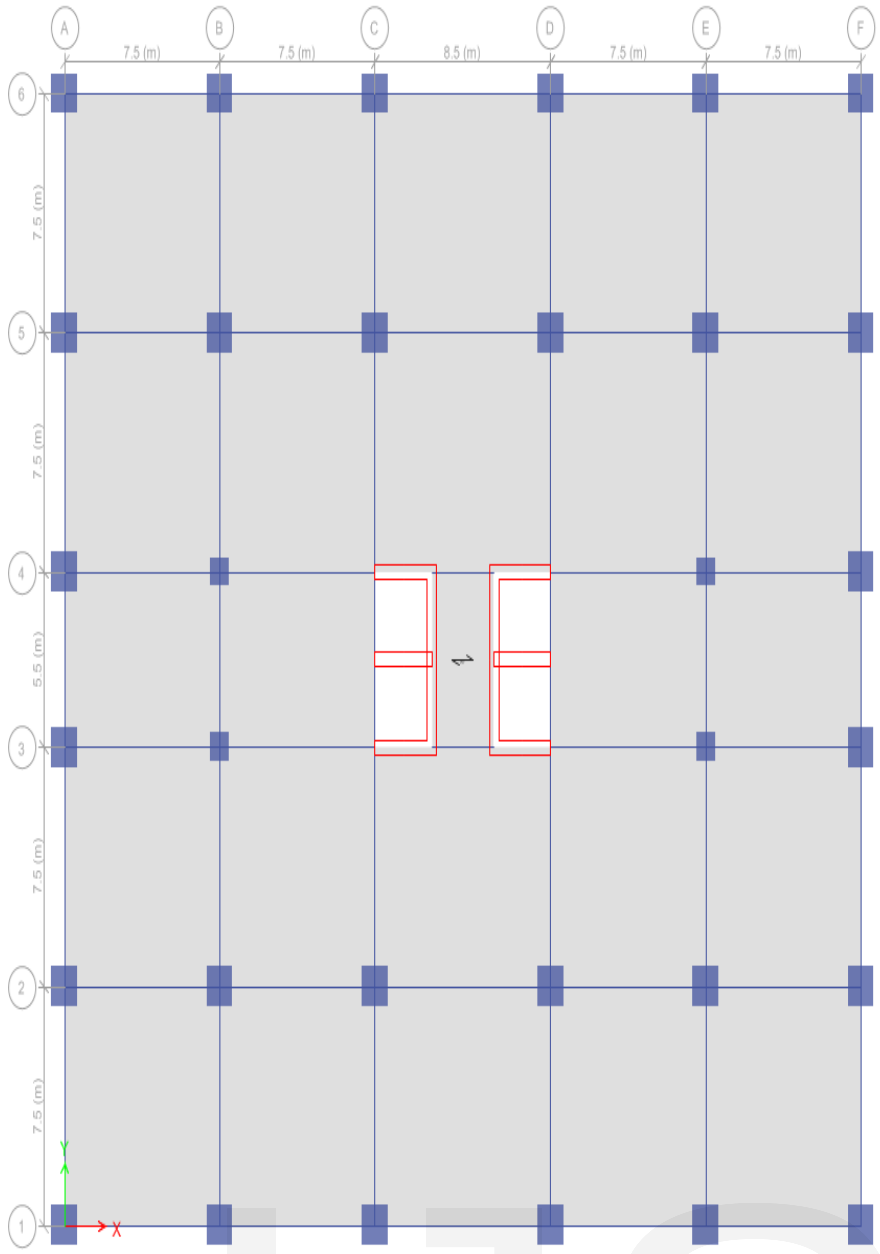


Figure 7. Plan of the Structure 4

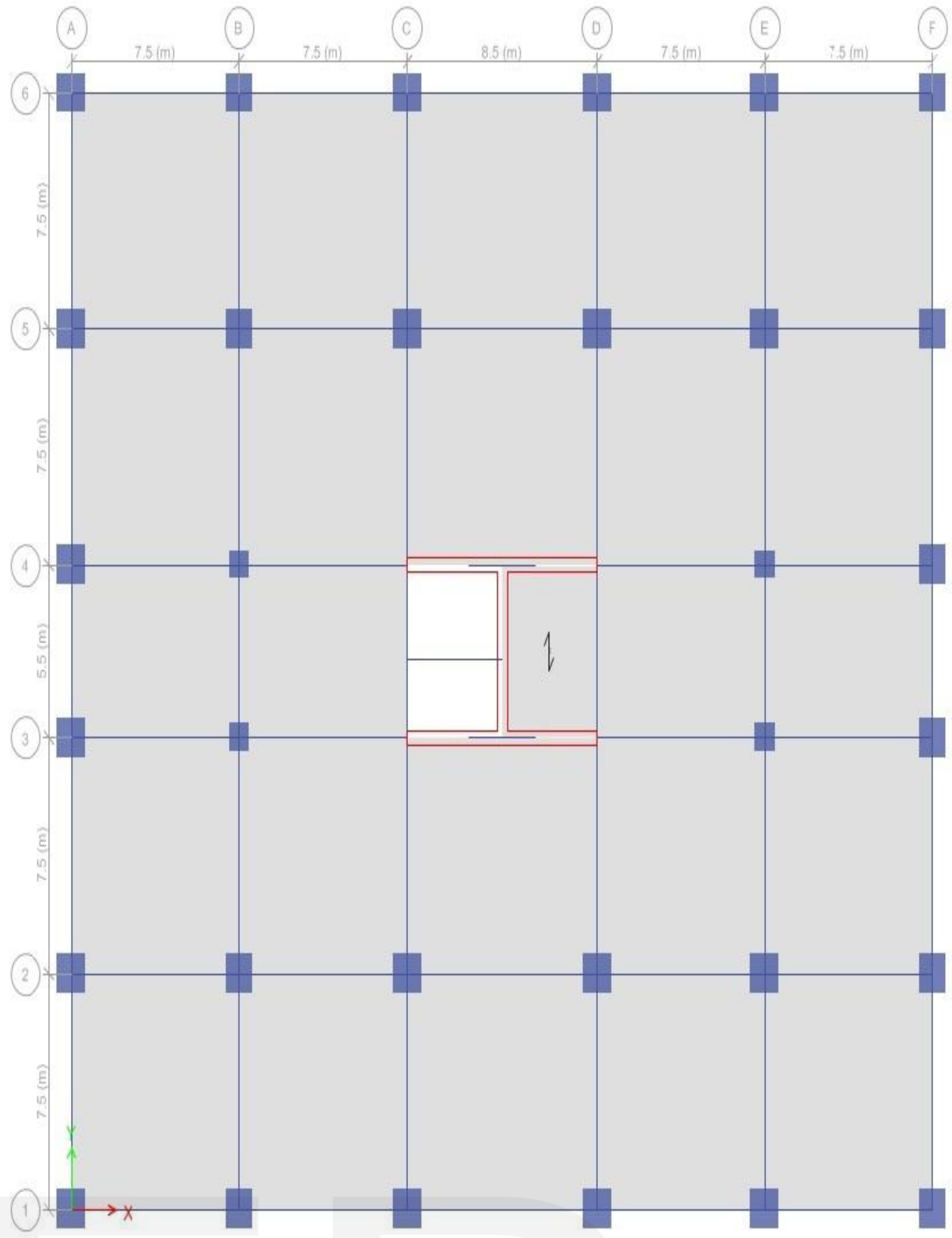


Figure 9. Plan of the Structure 5

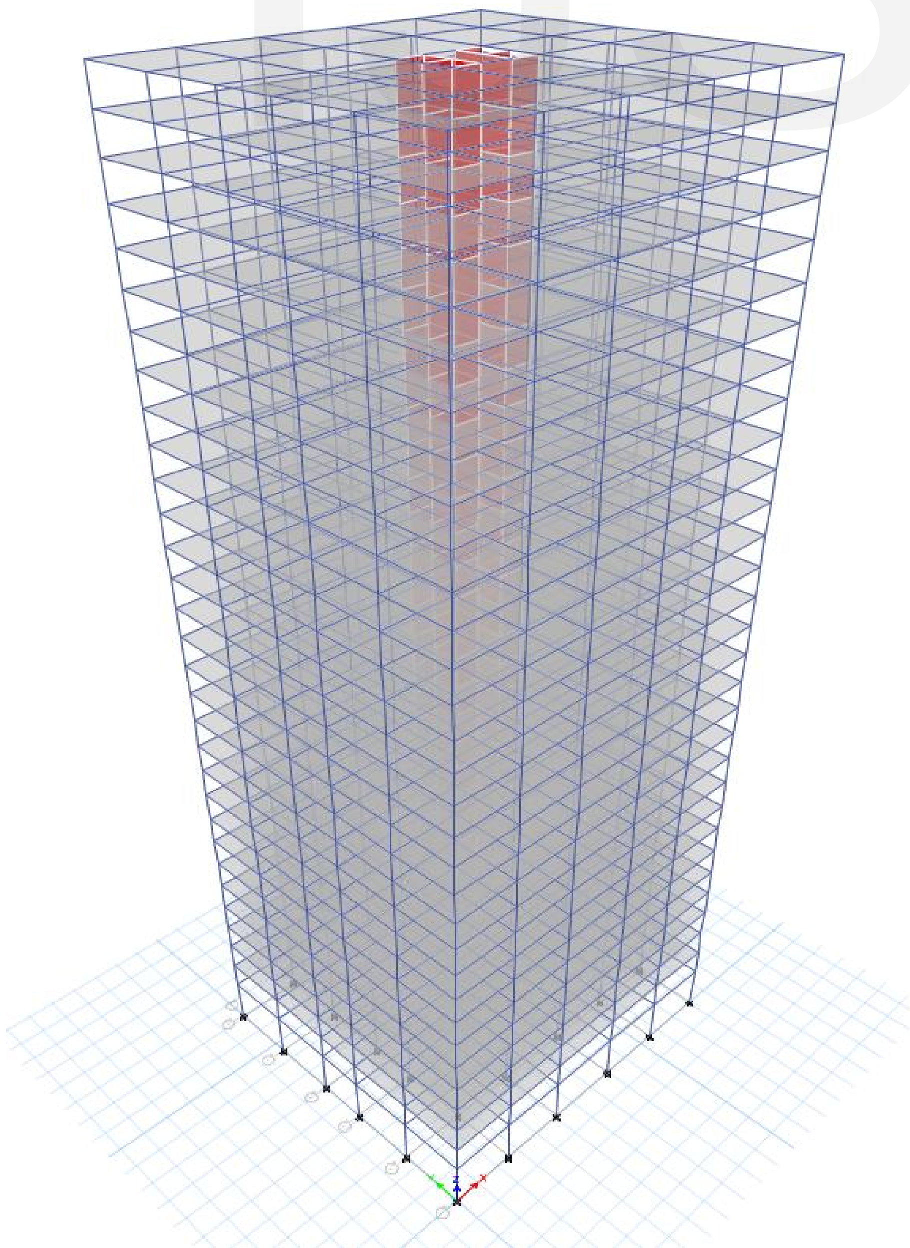


Figure 8. 3D view showing shear wall location for Structure 4

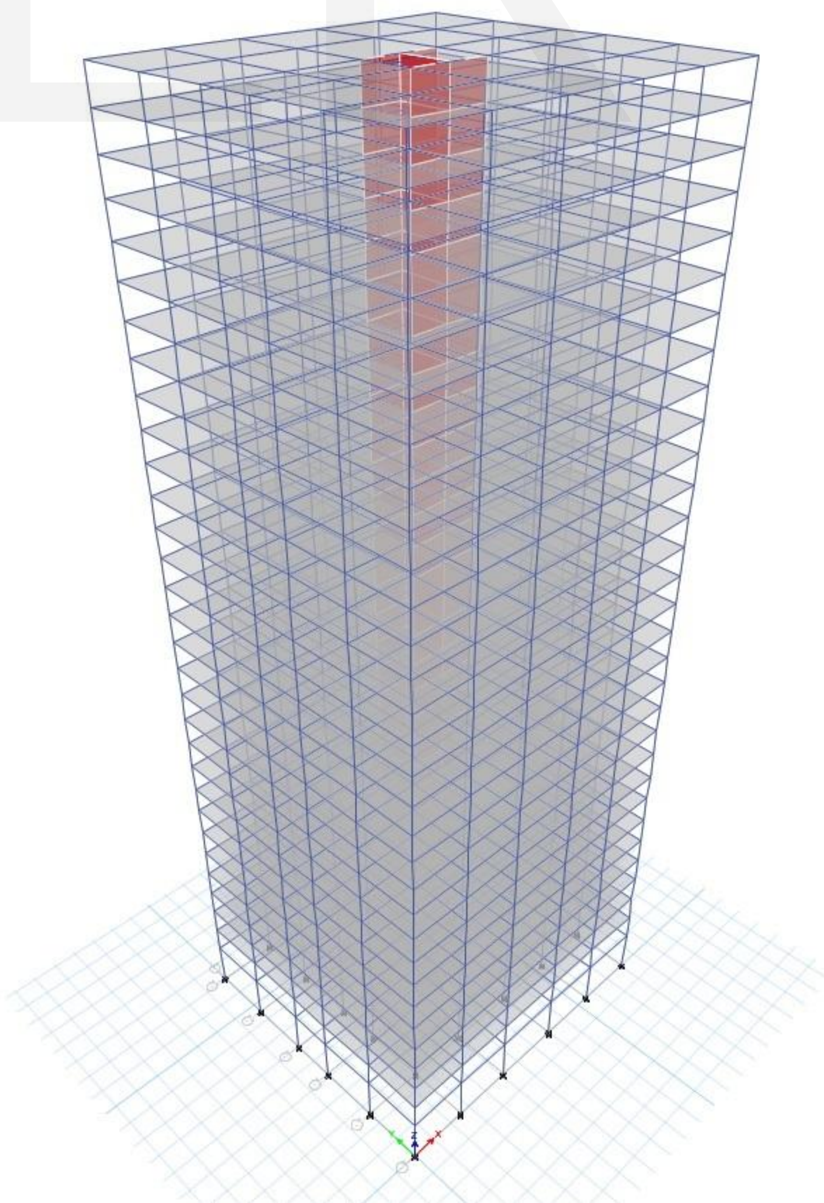


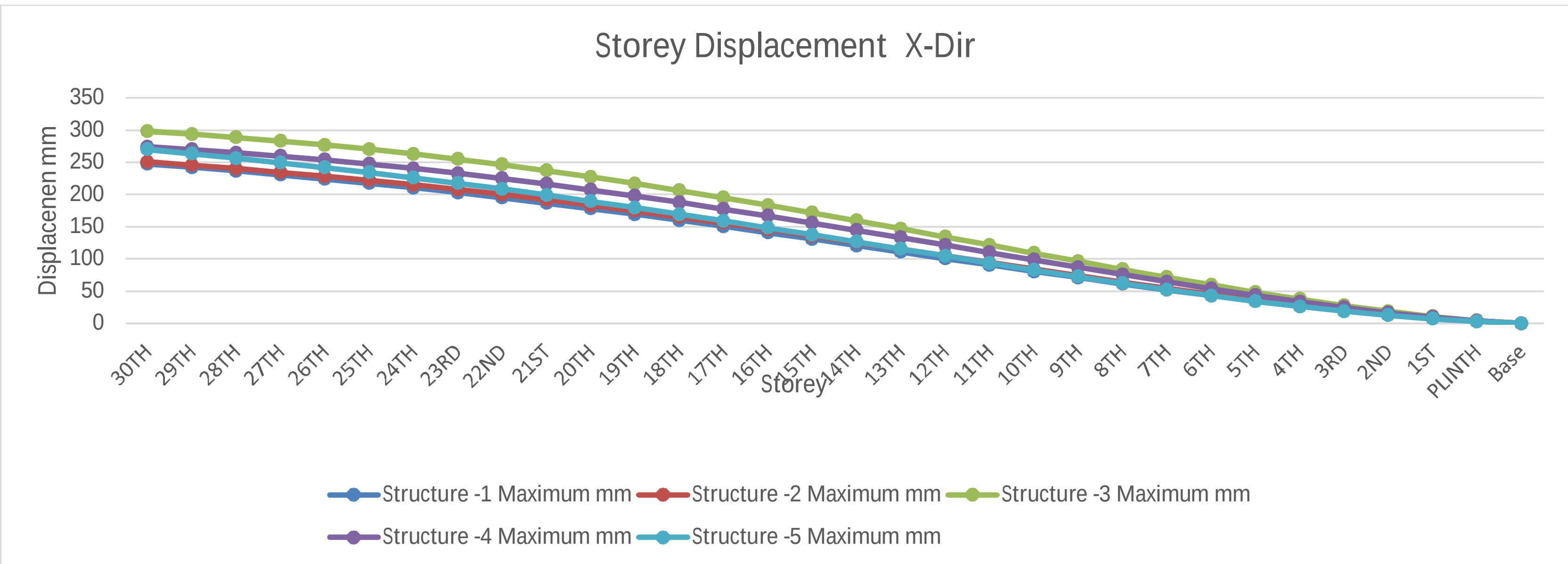
Figure 10. 3D view showing shear wall location for Structure 5

5 RESULTS AND DISCUSSIONS

Table 2: Storey Displacement of Structures in Soft Soil in X - Direction with load combination (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Load Case/Combo	Direction	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements
			mm	mm	mm	mm	mm
30TH	DLLLEQXP	X	247.583	250.645	298.096	274.19	270.038
29TH	DLLLEQXP	X	242.298	245.557	293.564	269.728	263.427
28TH	DLLLEQXP	X	236.611	240.192	288.624	264.919	256.571
27TH	DLLLEQXP	X	230.622	234.508	283.158	259.657	249.446
26TH	DLLLEQXP	X	224.275	228.441	277.083	253.868	241.995
25TH	DLLLEQXP	X	217.536	221.961	270.361	247.513	234.188
24TH	DLLLEQXP	X	210.398	215.05	262.98	240.58	226.008
23RD	DLLLEQXP	X	202.862	207.706	254.95	233.074	217.451
22ND	DLLLEQXP	X	194.94	199.938	246.293	225.011	208.521
21ST	DLLLEQXP	X	186.65	191.762	237.041	216.418	199.231
20TH	DLLLEQXP	X	178.016	183.2	227.233	207.328	189.601
19TH	DLLLEQXP	X	169.068	174.281	216.911	197.776	179.659
18TH	DLLLEQXP	X	159.836	165.037	206.119	187.804	169.435
17TH	DLLLEQXP	X	150.356	155.504	194.905	177.454	158.966
16TH	DLLLEQXP	X	140.667	145.719	183.317	166.77	148.293
15TH	DLLLEQXP	X	130.807	135.726	171.406	155.798	137.462
14TH	DLLLEQXP	X	120.821	125.568	159.222	144.586	126.521
13TH	DLLLEQXP	X	110.754	115.293	146.819	133.184	115.527
12TH	DLLLEQXP	X	100.656	104.952	134.254	121.647	104.537
11TH	DLLLEQXP	X	90.581	94.601	121.591	110.036	93.617
10TH	DLLLEQXP	X	80.58	84.297	108.896	98.413	82.834
9TH	DLLLEQXP	X	70.768	74.139	96.294	86.888	72.296
8TH	DLLLEQXP	X	61.148	64.157	83.813	75.495	62.039
7TH	DLLLEQXP	X	51.811	54.439	71.552	64.327	52.162
6TH	DLLLEQXP	X	42.845	45.08	59.634	53.499	42.764
5TH	DLLLEQXP	X	34.377	36.2	48.227	43.16	33.974
4TH	DLLLEQXP	X	26.571	27.959	37.536	33.492	25.946
3RD	DLLLEQXP	X	19.376	20.363	27.551	24.501	18.666
2ND	DLLLEQXP	X	12.981	13.603	18.526	16.413	12.308
1ST	DLLLEQXP	X	7.564	7.883	10.776	9.503	7.038
PLINTH	DLLLEQXP	X	3.951	3.12	4.115	3.583	2.62
Base	DLLLEQXP	X	0	0	0	0	0

A plot for Storey Displacement of Structures in Soft Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here



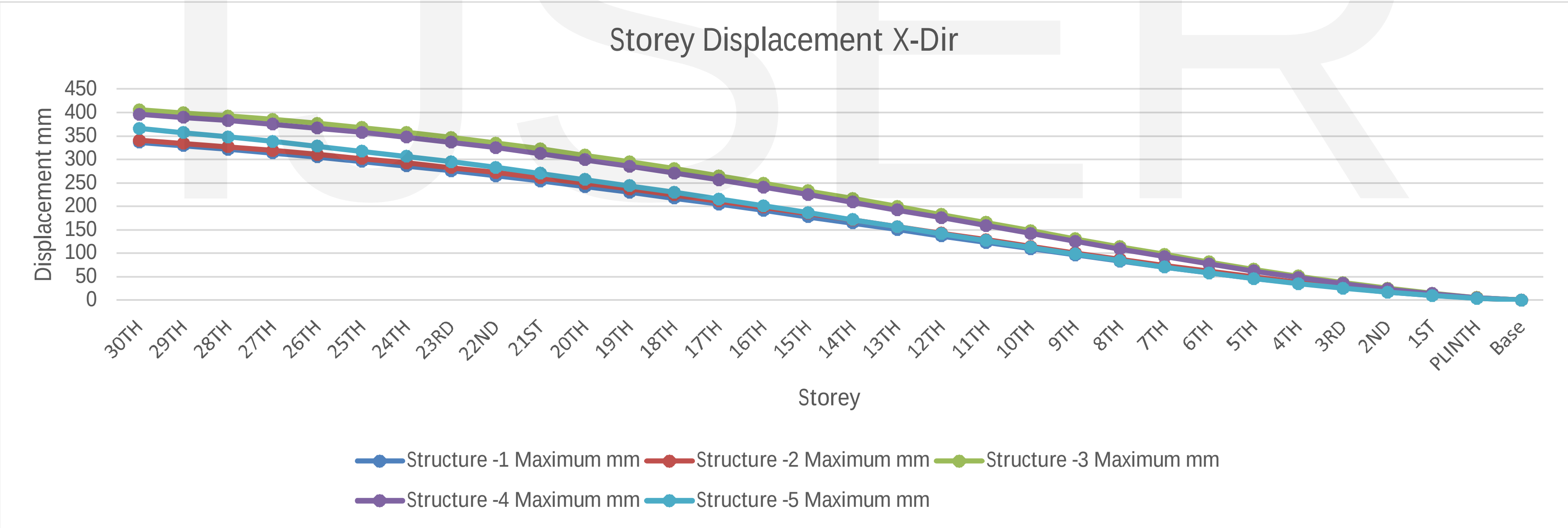
Graph 1: Storey Displacement of Structures in Soft Soil in X - Direction

Table 3: Storey Displacement of Structures in Medium Soil in X - Direction with load combination (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Load Case/Combo	Direction	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements
			mm	mm	mm	mm	mm
30TH	DLLLEQXP	X	336.596	340.877	405.411	395.964	365.912

29TH	DLLLEQXP	X	329.414	333.958	399.246	389.515	356.981
28TH	DLLLEQXP	X	321.685	326.662	392.528	382.567	347.715
27TH	DLLLEQXP	X	313.544	318.93	385.095	374.964	338.083
26TH	DLLLEQXP	X	304.917	310.68	376.833	366.6	328.009
25TH	DLLLEQXP	X	295.757	301.867	367.69	357.419	317.45
24TH	DLLLEQXP	X	286.054	292.468	357.652	347.404	306.383
23RD	DLLLEQXP	X	275.81	282.481	346.731	336.561	294.803
22ND	DLLLEQXP	X	265.041	271.916	334.958	324.916	282.715
21ST	DLLLEQXP	X	253.771	260.796	322.376	312.505	270.137
20TH	DLLLEQXP	X	242.034	249.153	309.037	299.376	257.097
19TH	DLLLEQXP	X	229.869	237.023	294.998	285.582	243.631
18TH	DLLLEQXP	X	217.319	224.451	280.322	271.18	229.781
17TH	DLLLEQXP	X	204.431	211.485	265.071	256.233	215.597
16TH	DLLLEQXP	X	191.258	198.178	249.311	240.804	201.135
15TH	DLLLEQXP	X	177.854	184.587	233.112	224.96	186.456
14TH	DLLLEQXP	X	164.277	170.772	216.541	208.769	171.628
13TH	DLLLEQXP	X	150.59	156.798	199.673	192.305	156.725
12TH	DLLLEQXP	X	136.861	142.734	182.585	175.646	141.826
11TH	DLLLEQXP	X	123.163	128.658	165.364	158.879	127.02
10TH	DLLLEQXP	X	109.565	114.644	148.098	142.096	112.399
9TH	DLLLEQXP	X	96.224	100.829	130.96	125.455	98.109
8TH	DLLLEQXP	X	83.144	87.253	113.985	109.005	84.199
7TH	DLLLEQXP	X	70.449	74.037	97.31	92.879	70.802
6TH	DLLLEQXP	X	58.259	61.309	81.103	77.244	58.053
5TH	DLLLEQXP	X	46.744	49.232	65.589	62.316	46.127
4TH	DLLLEQXP	X	36.13	38.025	51.049	48.357	35.234
3RD	DLLLEQXP	X	26.348	27.693	37.469	35.376	25.353
2ND	DLLLEQXP	X	17.651	18.5	25.196	23.697	16.721
1ST	DLLLEQXP	X	10.286	10.72	14.656	13.72	9.563
PLINTH	DLLLEQXP	X	4.831	4.244	5.596	5.173	3.528
Base	DLLLEQXP	X	0	0	0	0	0

A plot for Storey Displacement of Structures in Medium Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here



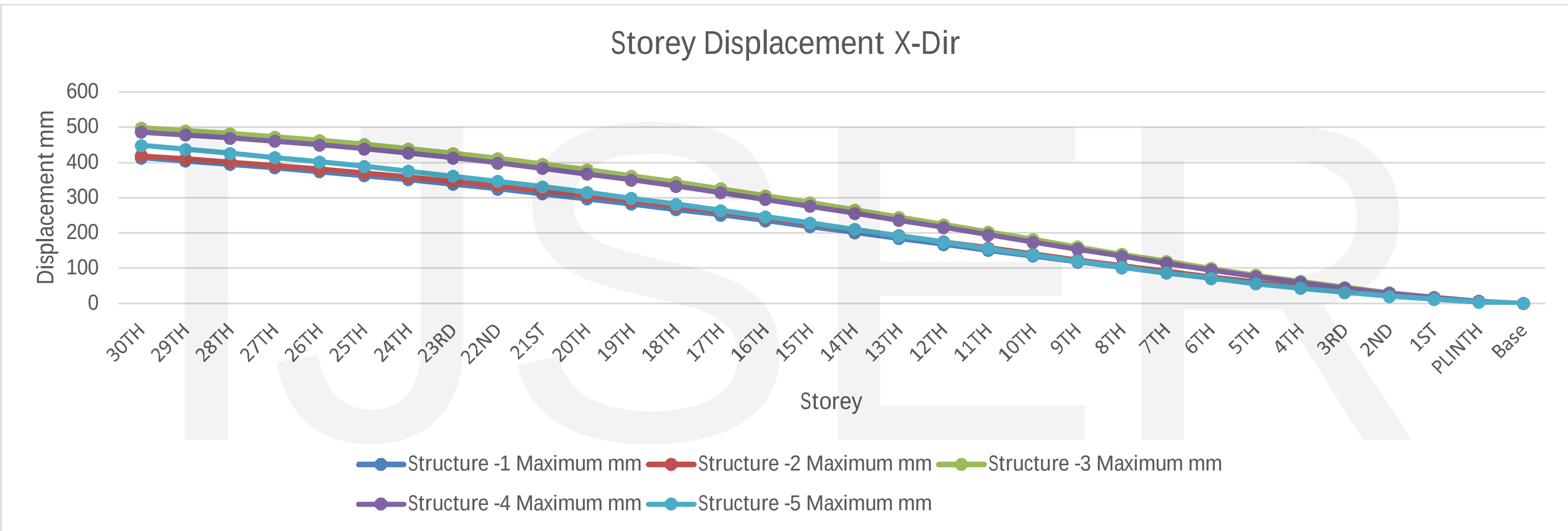
Graph 2: Storey Displacement of Structures in Medium Soil in X - Direction

Table 4: Storey Displacement of Structures in Hard Soil in X - Direction with load combination (DL+LL+EQXP)

Story	Load Case/Combo	Direction	Structure -1 Storey Maximum Displacements mm	Structure -2 Storey Maximum Displacements mm	Structure -3 Storey Maximum Displacements mm	Structure -4 Storey Maximum Displacements mm	Structure -5 Storey Maximum Displacements mm
30TH	DLLLEQXP	X	413.247	418.577	497.82	486.221	448.471
29TH	DLLLEQXP	X	404.43	410.08	490.251	478.302	437.54
28TH	DLLLEQXP	X	394.942	401.121	482.001	469.769	426.2
27TH	DLLLEQXP	X	384.95	391.628	472.874	460.434	414.41
26TH	DLLLEQXP	X	374.358	381.497	462.729	450.163	402.076
25TH	DLLLEQXP	X	363.114	370.674	451.502	438.89	389.147
24TH	DLLLEQXP	X	351.202	359.133	439.176	426.592	375.595
23RD	DLLLEQXP	X	338.626	346.87	425.766	413.277	361.411
22ND	DLLLEQXP	X	325.405	333.897	411.309	398.977	346.604

21ST	DLLLEQXP	X	311.57	320.243	395.859	383.737	331.196
20TH	DLLLEQXP	X	297.161	305.945	379.479	367.616	315.219
19TH	DLLLEQXP	X	282.226	291.05	362.241	350.677	298.718
18TH	DLLLEQXP	X	266.818	275.612	344.218	332.994	281.746
17TH	DLLLEQXP	X	250.996	259.691	325.491	314.639	264.363
16TH	DLLLEQXP	X	234.823	243.351	306.14	295.694	246.638
15TH	DLLLEQXP	X	218.366	226.662	286.247	276.237	228.646
14TH	DLLLEQXP	X	201.697	209.698	265.9	256.356	210.47
13TH	DLLLEQXP	X	184.893	192.539	245.187	236.14	192.201
12TH	DLLLEQXP	X	168.037	175.269	224.204	215.683	173.936
11TH	DLLLEQXP	X	151.219	157.984	203.057	195.094	155.785
10TH	DLLLEQXP	X	134.524	140.776	181.856	174.485	137.858
9TH	DLLLEQXP	X	118.145	123.812	160.812	154.051	120.337
8TH	DLLLEQXP	X	102.085	107.141	139.967	133.851	103.281
7TH	DLLLEQXP	X	86.498	90.913	119.491	114.05	86.853
6TH	DLLLEQXP	X	71.531	75.284	99.59	94.851	71.219
5TH	DLLLEQXP	X	57.393	60.454	80.54	76.52	56.592
4TH	DLLLEQXP	X	44.362	46.692	62.685	59.379	43.231
3RD	DLLLEQXP	X	32.351	34.006	46.01	43.439	31.111
2ND	DLLLEQXP	X	21.673	22.717	30.939	29.099	20.521
1ST	DLLLEQXP	X	12.63	13.164	17.997	16.847	11.738
PLINTH	DLLLEQXP	X	5.241	5.211	6.872	6.352	4.31
Base	DLLLEQXP	X	0	0	0	0	0

A plot for Storey Displacement of Structures in Hard Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here



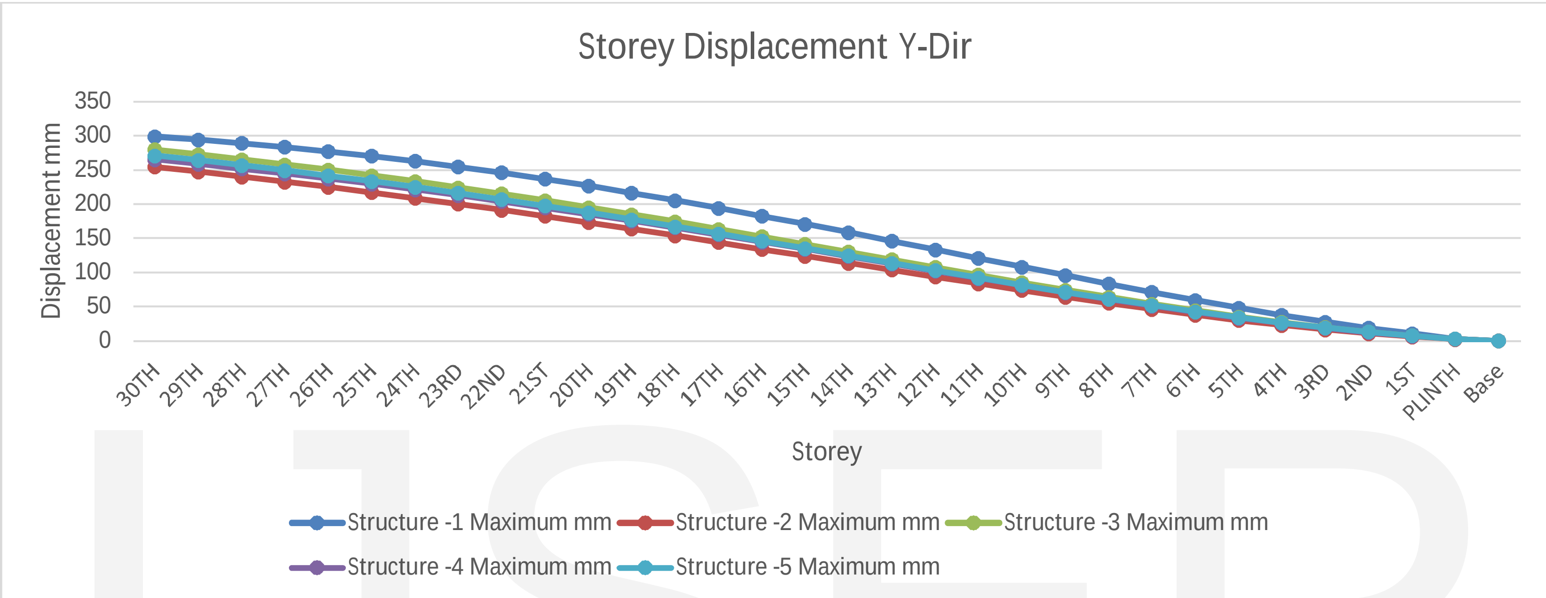
Graph 3: Storey Displacement of Structures in Hard Soil in X - Direction

Table 5: Storey Displacement of Structures in Soft Soil in Y – Direction with load combination (DL+LL+EQYP)

Story	Load Case/Combo	Direction	Structure -1 Storey Maximum Displacements mm	Structure -2 Storey Maximum Displacements mm	Structure -3 Storey Maximum Displacements mm	Structure -4 Storey Maximum Displacements mm	Structure -5 Storey Maximum Displacements mm
30TH	DLLLEQYP	Y	298.758	254.404	279.679	265.397	271.201
29TH	DLLLEQYP	Y	294.166	247.374	272.75	258.816	264.307
28TH	DLLLEQYP	Y	289.096	240.153	265.529	251.96	257.064
27TH	DLLLEQYP	Y	283.5	232.729	258.018	244.831	249.532
26TH	DLLLEQYP	Y	277.293	225.058	250.168	237.381	241.681
25TH	DLLLEQYP	Y	270.439	217.118	241.953	229.584	233.491
24TH	DLLLEQYP	Y	262.93	208.896	233.359	221.429	224.955
23RD	DLLLEQYP	Y	254.778	200.389	224.387	212.915	216.078
22ND	DLLLEQYP	Y	246.009	191.602	215.045	204.049	206.869
21ST	DLLLEQYP	Y	236.656	182.547	205.347	194.847	197.346
20TH	DLLLEQYP	Y	226.758	173.243	195.317	185.33	187.532
19TH	DLLLEQYP	Y	216.358	163.711	184.983	175.523	177.454
18TH	DLLLEQYP	Y	205.503	153.982	174.377	165.46	167.147
17TH	DLLLEQYP	Y	194.239	144.088	163.538	155.175	156.645
16TH	DLLLEQYP	Y	182.615	134.065	152.507	144.708	145.988
15TH	DLLLEQYP	Y	170.681	123.956	141.332	134.104	135.222

14TH	DLLLEQYP	Y	158.489	113.805	130.062	123.409	124.392
13TH	DLLLEQYP	Y	146.092	103.66	118.751	112.677	113.549
12TH	DLLLEQYP	Y	133.548	93.575	107.46	101.963	102.749
11TH	DLLLEQYP	Y	120.921	83.607	96.253	91.33	92.051
10TH	DLLLEQYP	Y	108.27	73.813	85.198	80.84	81.516
9TH	DLLLEQYP	Y	95.744	64.283	74.414	70.608	71.269
8TH	DLLLEQYP	Y	83.342	55.052	63.921	60.651	61.302
7TH	DLLLEQYP	Y	71.167	46.203	53.817	51.063	51.711
6TH	DLLLEQYP	Y	59.342	37.817	44.202	41.94	42.589
5TH	DLLLEQYP	Y	48.031	29.992	35.213	33.411	34.066
4TH	DLLLEQYP	Y	37.459	22.857	27.012	25.627	26.295
3RD	DLLLEQYP	Y	27.565	16.416	19.545	18.541	19.184
2ND	DLLLEQYP	Y	18.609	10.81	12.987	12.32	12.893
1ST	DLLLEQYP	Y	10.901	6.174	7.501	7.115	7.562
PLINTH	DLLLEQXP	Y	2.443	2.271	2.707	2.572	2.858
Base	DLLLEQXP	Y	0	0	0	0	0

A plot for Storey Displacement of Structures in Soft Soil in Y - Direction with load combination (DL+LL+EQYP) has been shown here



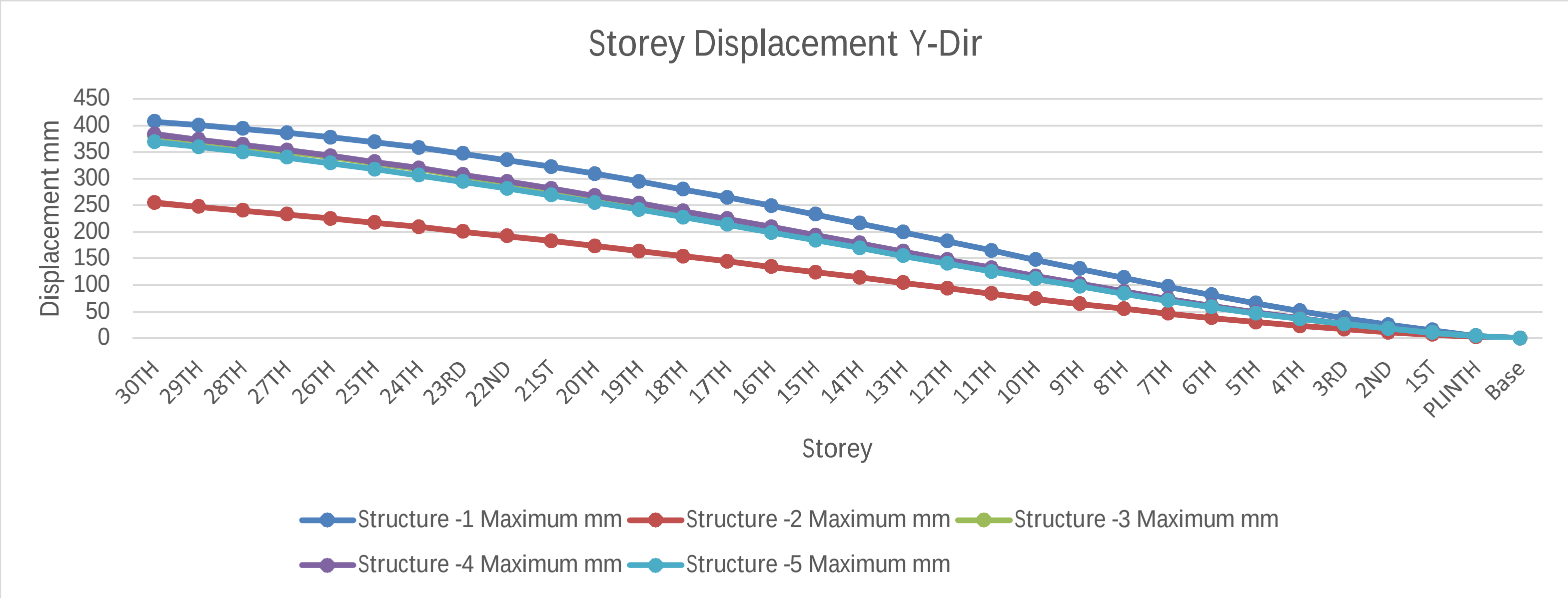
Graph 4: Storey Displacement of Structures in Soft Soil in Y - Direction

Table 6: Storey Displacement of Structures in Medium Soil in Y – Direction with load combination (DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Load Case/Combo	Direction	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements
			mm	mm	mm	mm	mm
30TH	DLLLEQYP	Y	407.017	254.404	380.364	383.274	368.981
29TH	DLLLEQYP	Y	400.75	247.374	370.94	373.766	359.598
28TH	DLLLEQYP	Y	393.829	240.153	361.119	363.862	349.742
27TH	DLLLEQYP	Y	386.194	232.729	350.904	353.563	339.493
26TH	DLLLEQYP	Y	377.726	225.058	340.228	342.801	328.808
25TH	DLLLEQYP	Y	368.377	217.118	329.055	331.538	317.664
24TH	DLLLEQYP	Y	358.137	208.896	317.369	319.759	306.05
23RD	DLLLEQYP	Y	347.024	200.389	305.167	307.462	293.97
22ND	DLLLEQYP	Y	335.071	191.602	292.461	294.657	281.44
21ST	DLLLEQYP	Y	322.324	182.547	279.272	281.366	268.483
20TH	DLLLEQYP	Y	308.835	173.243	265.631	267.62	255.13
19TH	DLLLEQYP	Y	294.664	163.711	251.576	253.458	241.419
18TH	DLLLEQYP	Y	279.874	153.982	237.153	238.924	227.395
17TH	DLLLEQYP	Y	264.527	144.088	222.411	224.071	213.106
16TH	DLLLEQYP	Y	248.692	134.065	207.41	208.956	198.608
15TH	DLLLEQYP	Y	232.436	123.956	192.211	193.642	183.96
14TH	DLLLEQYP	Y	215.828	113.805	176.884	178.199	169.226
13TH	DLLLEQYP	Y	198.943	103.66	161.502	162.701	154.475
12TH	DLLLEQYP	Y	181.858	93.575	146.145	147.229	139.782
11TH	DLLLEQYP	Y	164.66	83.607	130.904	131.874	125.228
10TH	DLLLEQYP	Y	147.429	73.813	115.869	116.727	110.895
9TH	DLLLEQYP	Y	130.371	64.283	101.204	101.952	96.954
8TH	DLLLEQYP	Y	113.481	55.052	86.932	87.574	83.395
7TH	DLLLEQYP	Y	96.901	46.203	73.191	73.73	70.347

6TH	DLLLEQYP	Y	80.798	37.817	60.115	60.557	57.937
5TH	DLLLEQYP	Y	65.395	29.992	47.89	48.241	46.342
4TH	DLLLEQYP	Y	50.999	22.857	36.736	37.002	35.77
3RD	DLLLEQYP	Y	37.527	16.416	26.581	26.771	26.097
2ND	DLLLEQYP	Y	25.333	10.81	17.663	17.788	17.539
1ST	DLLLEQYP	Y	14.839	6.174	10.201	10.273	10.287
PLINTH	DLLLEQXP	Y	3.614	2.271	3.682	3.713	3.888
Base	DLLLEQXP	Y	0	0	0	0	0

A plot for Storey Displacement of Structures in Medium Soil in Y - Direction with load combination (DL+LL+EQYP) has been shown here

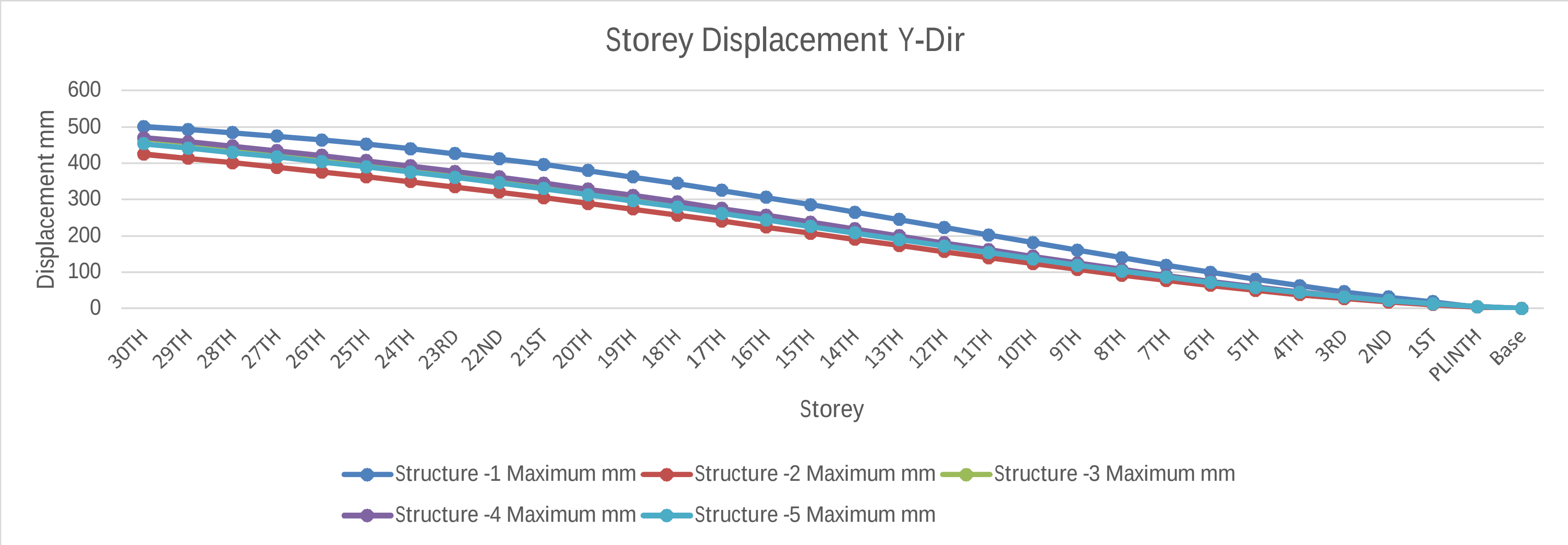


Graph 5: Storey Displacement of Structures in Medium Soil in Y - Direction

Table 7: Storey Displacement of Structures in Hard Soil in Y – Direction with load combination (DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Load Case/Combo	Direction	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements	Storey Maximum Displacements
			mm	mm	mm	mm	mm
30TH	DLLLEQYP	Y	500.24	424.855	467.064	470.638	453.18
29TH	DLLLEQYP	Y	492.53	413.114	455.492	458.962	441.655
28TH	DLLLEQYP	Y	484.016	401.055	443.433	446.801	429.548
27TH	DLLLEQYP	Y	474.624	388.657	430.89	434.155	416.959
26TH	DLLLEQYP	Y	464.21	375.847	417.781	420.939	403.835
25TH	DLLLEQYP	Y	452.712	362.587	404.061	407.11	390.146
24TH	DLLLEQYP	Y	440.122	348.857	389.71	392.645	375.881
23RD	DLLLEQYP	Y	426.459	334.65	374.727	377.545	361.044
22ND	DLLLEQYP	Y	411.763	319.976	359.124	361.821	345.654
21ST	DLLLEQYP	Y	396.093	304.854	342.929	345.501	329.74
20TH	DLLLEQYP	Y	379.512	289.315	326.179	328.622	313.339
19TH	DLLLEQYP	Y	362.094	273.398	308.921	311.231	296.499
18TH	DLLLEQYP	Y	343.915	257.15	291.209	293.385	279.275
17TH	DLLLEQYP	Y	325.054	240.627	273.108	275.146	261.726
16TH	DLLLEQYP	Y	305.592	223.889	254.687	256.585	243.919
15TH	DLLLEQYP	Y	285.613	207.007	236.024	237.781	225.929
14TH	DLLLEQYP	Y	265.204	190.054	217.203	218.818	207.833
13TH	DLLLEQYP	Y	244.453	173.113	198.314	199.787	189.716
12TH	DLLLEQYP	Y	223.457	156.27	179.458	180.789	171.671
11TH	DLLLEQYP	Y	202.324	139.623	160.743	161.934	153.796
10TH	DLLLEQYP	Y	181.15	123.267	142.281	143.334	136.194
9TH	DLLLEQYP	Y	160.188	107.352	124.272	125.191	119.072
8TH	DLLLEQYP	Y	139.433	91.937	106.748	107.536	102.42
7TH	DLLLEQYP	Y	119.061	77.159	89.874	90.536	86.395
6TH	DLLLEQYP	Y	99.273	63.155	73.818	74.361	71.153
5TH	DLLLEQYP	Y	80.347	50.087	58.806	59.237	56.913
4TH	DLLLEQYP	Y	62.659	38.171	45.109	45.436	43.93
3RD	DLLLEQYP	Y	46.106	27.414	32.64	32.874	32.049
2ND	DLLLEQYP	Y	31.123	18.053	21.689	21.843	21.539
1ST	DLLLEQYP	Y	18.23	10.311	12.526	12.615	12.633
PLINTH	DLLLEQXP	Y	4.39	3.792	4.521	4.56	4.774
Base	DLLLEQXP	Y	0	0	0	0	0

A plot for Storey Displacement of Structures in Hard Soil in Y - Direction with load combination (DL+LL+EQYP) has been shown here

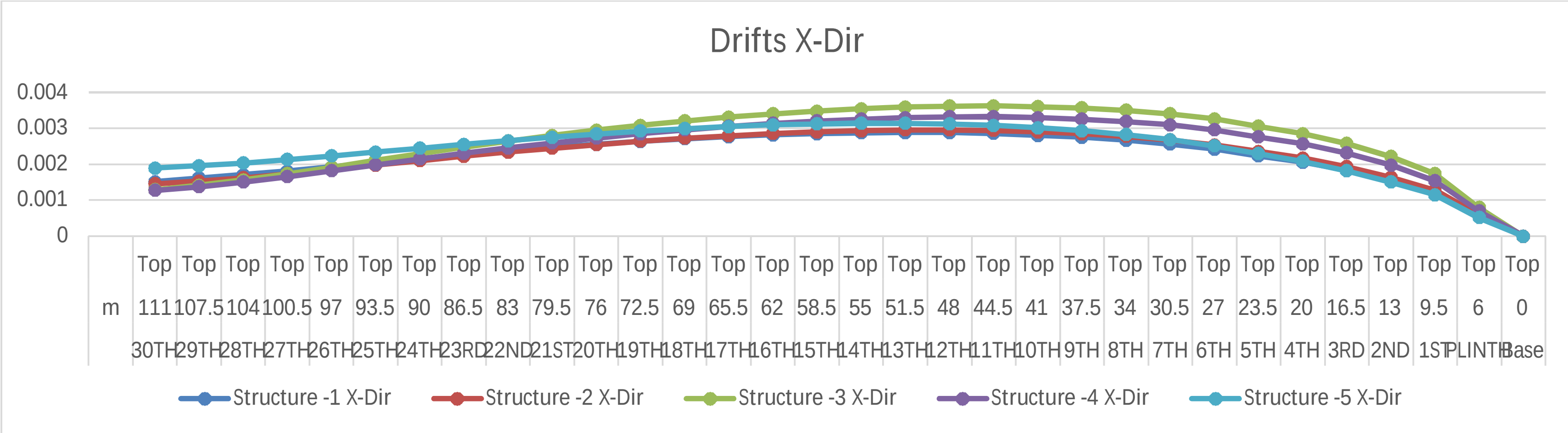


Graph 6: Storey Displacement of Structures in Hard Soil in Y - Direction

Table 8: Storey Drifts of Structures in Soft Soil in X - Direction with load combination (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m						
30TH	111	Top	0.001515	0.001454	0.001295	0.001275	0.001889
29TH	107.5	Top	0.001625	0.001533	0.001411	0.001374	0.001959
28TH	104	Top	0.001711	0.001624	0.001562	0.001503	0.002036
27TH	100.5	Top	0.001814	0.001733	0.001736	0.001654	0.002129
26TH	97	Top	0.001925	0.001852	0.001921	0.001816	0.002231
25TH	93.5	Top	0.00204	0.001975	0.002109	0.001981	0.002337
24TH	90	Top	0.002153	0.002098	0.002294	0.002145	0.002445
23RD	86.5	Top	0.002263	0.002219	0.002473	0.002304	0.002552
22ND	83	Top	0.002369	0.002336	0.002643	0.002455	0.002654
21ST	79.5	Top	0.002467	0.002446	0.002802	0.002597	0.002751
20TH	76	Top	0.002557	0.002548	0.002949	0.002729	0.002841
19TH	72.5	Top	0.002638	0.002641	0.003083	0.002849	0.002921
18TH	69	Top	0.002708	0.002724	0.003204	0.002957	0.002991
17TH	65.5	Top	0.002768	0.002796	0.003311	0.003053	0.003049
16TH	62	Top	0.002817	0.002855	0.003403	0.003135	0.003095
15TH	58.5	Top	0.002853	0.002902	0.003481	0.003203	0.003126
14TH	55	Top	0.002876	0.002936	0.003544	0.003258	0.003141
13TH	51.5	Top	0.002885	0.002955	0.00359	0.003296	0.00314
12TH	48	Top	0.002879	0.002957	0.003618	0.003318	0.00312
11TH	44.5	Top	0.002858	0.002944	0.003627	0.003321	0.003081
10TH	41	Top	0.002803	0.002902	0.0036	0.003293	0.003011
9TH	37.5	Top	0.002749	0.002852	0.003566	0.003255	0.00293
8TH	34	Top	0.002668	0.002776	0.003503	0.003191	0.002822
7TH	30.5	Top	0.002562	0.002674	0.003405	0.003094	0.002685
6TH	27	Top	0.00242	0.002537	0.003259	0.002954	0.002511
5TH	23.5	Top	0.00223	0.002354	0.003055	0.002762	0.002294
4TH	20	Top	0.002056	0.00217	0.002853	0.002569	0.00208
3RD	16.5	Top	0.001827	0.001931	0.002578	0.002311	0.001817
2ND	13	Top	0.001548	0.001634	0.002214	0.001974	0.001506
1ST	9.5	Top	0.00122	0.001277	0.001738	0.001539	0.001151
PLINTH	6	Top	0.00056	0.000581	0.000794	0.000698	0.000513
Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Soft Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here

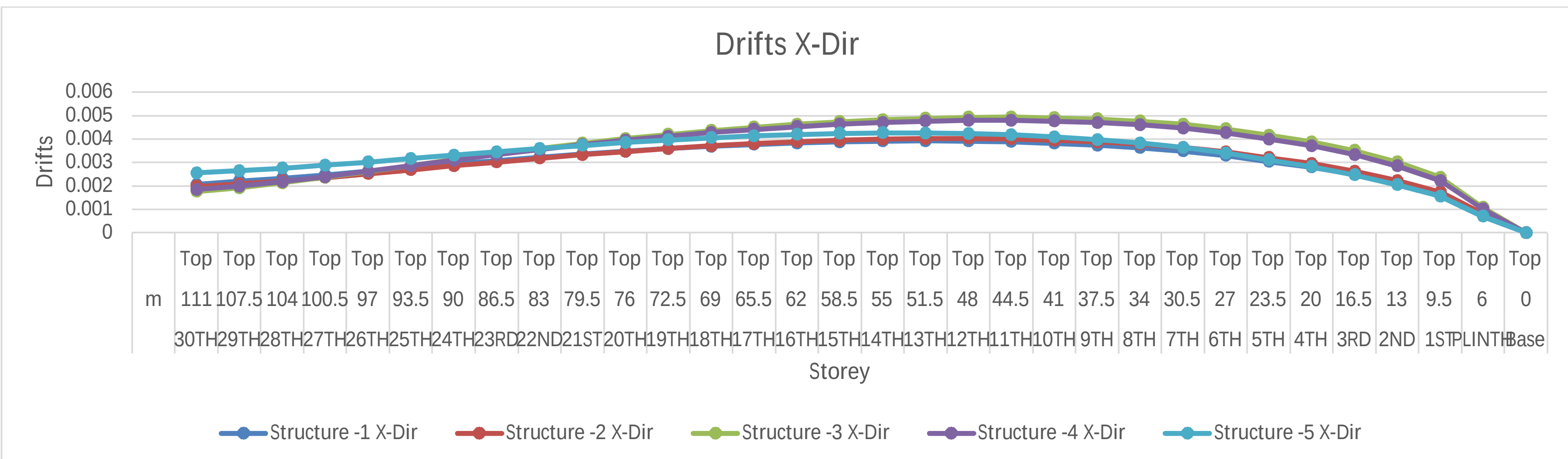


Graph 7: Storey Drifts of Structures in Soft Soil in X - Direction

Table 9: Storey Drifts of Structures in Medium Soil in X - Direction with load combination (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m						
30TH	111	Top	0.002059	0.001977	0.001761	0.001843	0.002552
29TH	107.5	Top	0.002208	0.002085	0.00192	0.001985	0.002647
28TH	104	Top	0.002326	0.002209	0.002124	0.002172	0.002752
27TH	100.5	Top	0.002465	0.002357	0.00236	0.00239	0.002878
26TH	97	Top	0.002617	0.002518	0.002612	0.002623	0.003017
25TH	93.5	Top	0.002772	0.002685	0.002868	0.002861	0.003162
24TH	90	Top	0.002927	0.002853	0.00312	0.003098	0.003309
23RD	86.5	Top	0.003077	0.003018	0.003364	0.003327	0.003454
22ND	83	Top	0.00322	0.003177	0.003595	0.003546	0.003594
21ST	79.5	Top	0.003353	0.003327	0.003811	0.003751	0.003726
20TH	76	Top	0.003476	0.003466	0.004011	0.003941	0.003848
19TH	72.5	Top	0.003586	0.003592	0.004193	0.004115	0.003957
18TH	69	Top	0.003682	0.003705	0.004357	0.004271	0.004053
17TH	65.5	Top	0.003764	0.003802	0.004503	0.004408	0.004132
16TH	62	Top	0.00383	0.003883	0.004628	0.004527	0.004194
15TH	58.5	Top	0.003879	0.003947	0.004734	0.004626	0.004237
14TH	55	Top	0.003911	0.003993	0.004819	0.004704	0.004258
13TH	51.5	Top	0.003923	0.004018	0.004882	0.00476	0.004257
12TH	48	Top	0.003914	0.004022	0.00492	0.004791	0.00423
11TH	44.5	Top	0.003885	0.004004	0.004933	0.004795	0.004177
10TH	41	Top	0.003812	0.003947	0.004897	0.004755	0.004083
9TH	37.5	Top	0.003737	0.003879	0.00485	0.0047	0.003974
8TH	34	Top	0.003627	0.003776	0.004764	0.004607	0.003828
7TH	30.5	Top	0.003483	0.003637	0.004631	0.004467	0.003643
6TH	27	Top	0.00329	0.003451	0.004433	0.004265	0.003407
5TH	23.5	Top	0.003032	0.003202	0.004154	0.003988	0.003112
4TH	20	Top	0.002795	0.002952	0.00388	0.003709	0.002823
3RD	16.5	Top	0.002485	0.002627	0.003507	0.003337	0.002466
2ND	13	Top	0.002104	0.002223	0.003011	0.002851	0.002045
1ST	9.5	Top	0.001656	0.001733	0.00236	0.002218	0.001561
PLINTH	6	Top	0.00076	0.000787	0.001079	0.001006	0.000695
Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Medium Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here

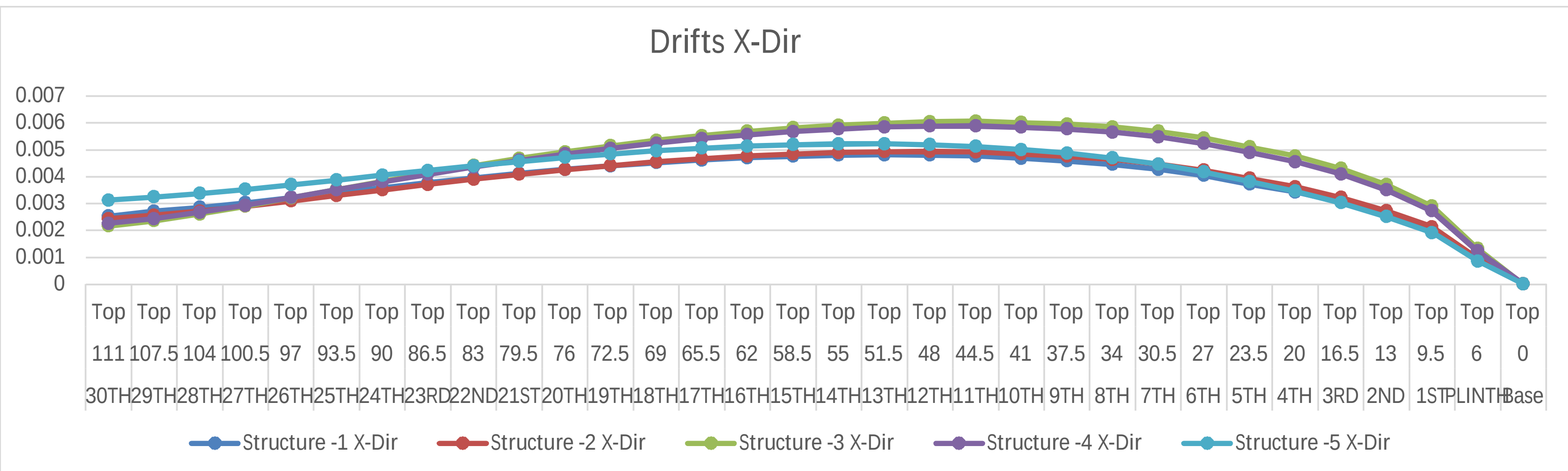


Graph 8: Storey Drifts of Structures in Medium Soil in X - Direction

Table 10: Storey Drifts of Structures in Hard Soil in X - Direction with load combination (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m						
30TH	111	Top	0.002527	0.002428	0.002163	0.002263	0.003123
29TH	107.5	Top	0.002711	0.00256	0.002357	0.002438	0.00324
28TH	104	Top	0.002855	0.002713	0.002608	0.002667	0.003369
27TH	100.5	Top	0.003026	0.002894	0.002899	0.002935	0.003524
26TH	97	Top	0.003213	0.003092	0.003208	0.003221	0.003694
25TH	93.5	Top	0.003403	0.003297	0.003522	0.003514	0.003872
24TH	90	Top	0.003593	0.003504	0.003832	0.003804	0.004052
23RD	86.5	Top	0.003777	0.003706	0.004131	0.004086	0.004231
22ND	83	Top	0.003953	0.003901	0.004414	0.004354	0.004402
21ST	79.5	Top	0.004117	0.004085	0.00468	0.004606	0.004565
20TH	76	Top	0.004267	0.004256	0.004925	0.00484	0.004715
19TH	72.5	Top	0.004402	0.004411	0.005149	0.005053	0.004849
18TH	69	Top	0.004521	0.004549	0.005351	0.005244	0.004967
17TH	65.5	Top	0.004621	0.004669	0.005529	0.005413	0.005064
16TH	62	Top	0.004702	0.004768	0.005684	0.005559	0.005141
15TH	58.5	Top	0.004762	0.004847	0.005814	0.00568	0.005193
14TH	55	Top	0.004801	0.004903	0.005918	0.005776	0.00522
13TH	51.5	Top	0.004816	0.004934	0.005995	0.005845	0.005219
12TH	48	Top	0.004805	0.004939	0.006042	0.005883	0.005186
11TH	44.5	Top	0.00477	0.004917	0.006057	0.005888	0.005122
10TH	41	Top	0.00468	0.004847	0.006013	0.005838	0.005006
9TH	37.5	Top	0.004588	0.004763	0.005956	0.005771	0.004873
8TH	34	Top	0.004454	0.004637	0.00585	0.005657	0.004694
7TH	30.5	Top	0.004276	0.004466	0.005686	0.005485	0.004467
6TH	27	Top	0.004039	0.004237	0.005443	0.005237	0.004179
5TH	23.5	Top	0.003723	0.003932	0.005101	0.004897	0.003817
4TH	20	Top	0.003432	0.003625	0.004764	0.004554	0.003463
3RD	16.5	Top	0.003051	0.003225	0.004306	0.004097	0.003026
2ND	13	Top	0.002584	0.002729	0.003698	0.0035	0.002509
1ST	9.5	Top	0.002031	0.002126	0.002896	0.002721	0.001913
PLINTH	6	Top	0.000932	0.000967	0.001324	0.001235	0.000852
Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Hard Soil in X - Direction with load combination (DL+LL+EQXP) has been shown here



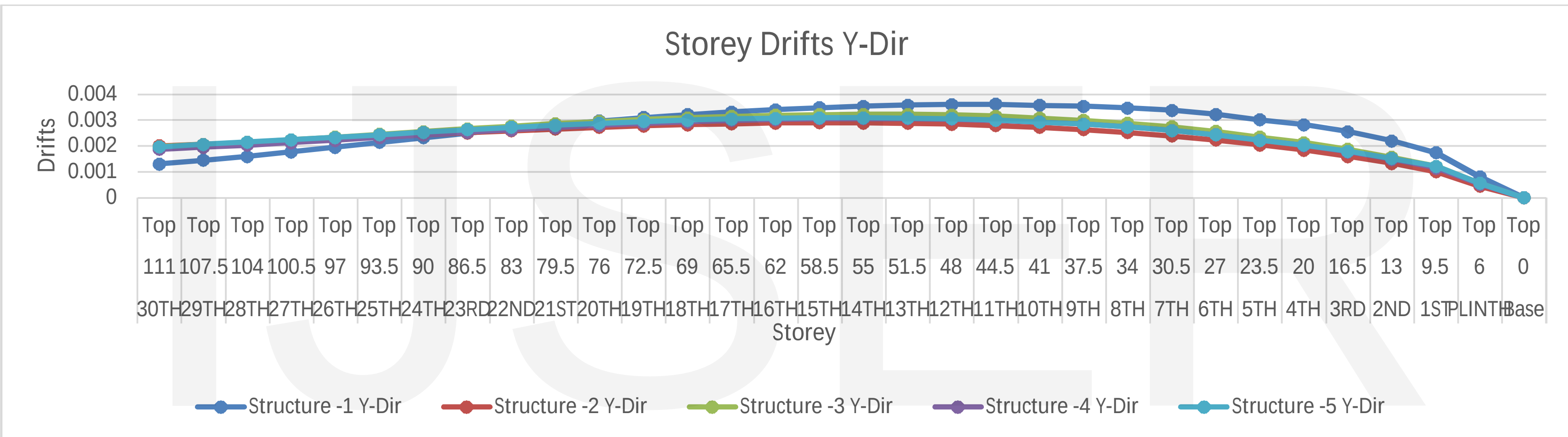
Graph 9: Storey Drifts of Structures in Hard Soil in X - Direction

Table11: Storey Drifts of Structures in Soft Soil in Y - Direction with load combination (DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m						
30TH	111	Top	0.001312	0.002009	0.00198	0.00188	0.00197
29TH	107.5	Top	0.001449	0.002063	0.002063	0.001959	0.002069
28TH	104	Top	0.001599	0.002121	0.002146	0.002037	0.002152
27TH	100.5	Top	0.001773	0.002192	0.002243	0.002129	0.002243
26TH	97	Top	0.001958	0.002269	0.002347	0.002228	0.00234
25TH	93.5	Top	0.002145	0.002349	0.002455	0.00233	0.002439
24TH	90	Top	0.002329	0.002431	0.002563	0.002433	0.002536

23RD	86.5	Top	0.002505	0.002511	0.002669	0.002533	0.002631
22ND	83	Top	0.002672	0.002587	0.002771	0.002629	0.002721
21ST	79.5	Top	0.002828	0.002659	0.002866	0.002719	0.002804
20TH	76	Top	0.002971	0.002723	0.002953	0.002802	0.002879
19TH	72.5	Top	0.003102	0.00278	0.00303	0.002875	0.002945
18TH	69	Top	0.003218	0.002827	0.003097	0.002939	0.003001
17TH	65.5	Top	0.003321	0.002864	0.003152	0.00299	0.003045
16TH	62	Top	0.00341	0.002888	0.003193	0.00303	0.003076
15TH	58.5	Top	0.003483	0.0029	0.00322	0.003055	0.003094
14TH	55	Top	0.003542	0.002898	0.003232	0.003066	0.003098
13TH	51.5	Top	0.003584	0.002881	0.003226	0.003061	0.003086
12TH	48	Top	0.003608	0.002848	0.003202	0.003038	0.003057
11TH	44.5	Top	0.003615	0.002798	0.003159	0.002997	0.00301
10TH	41	Top	0.003579	0.002723	0.003081	0.002924	0.002928
9TH	37.5	Top	0.003544	0.002637	0.002998	0.002845	0.002848
8TH	34	Top	0.003478	0.002528	0.002887	0.002739	0.00274
7TH	30.5	Top	0.003379	0.002396	0.002747	0.002606	0.002606
6TH	27	Top	0.003232	0.002236	0.002568	0.002437	0.002435
5TH	23.5	Top	0.003021	0.002039	0.002343	0.002224	0.00222
4TH	20	Top	0.002827	0.00184	0.002133	0.002024	0.002032
3RD	16.5	Top	0.002559	0.001602	0.001874	0.001778	0.001797
2ND	13	Top	0.002202	0.001325	0.001568	0.001487	0.001523
1ST	9.5	Top	0.001748	0.001011	0.001217	0.001155	0.001213
PLINTH	6	Top	0.00081	0.00045	0.000551	0.000523	0.000564
Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Soft Soil in Y - Direction with load combination (DL+LL+EQXP) has been shown here



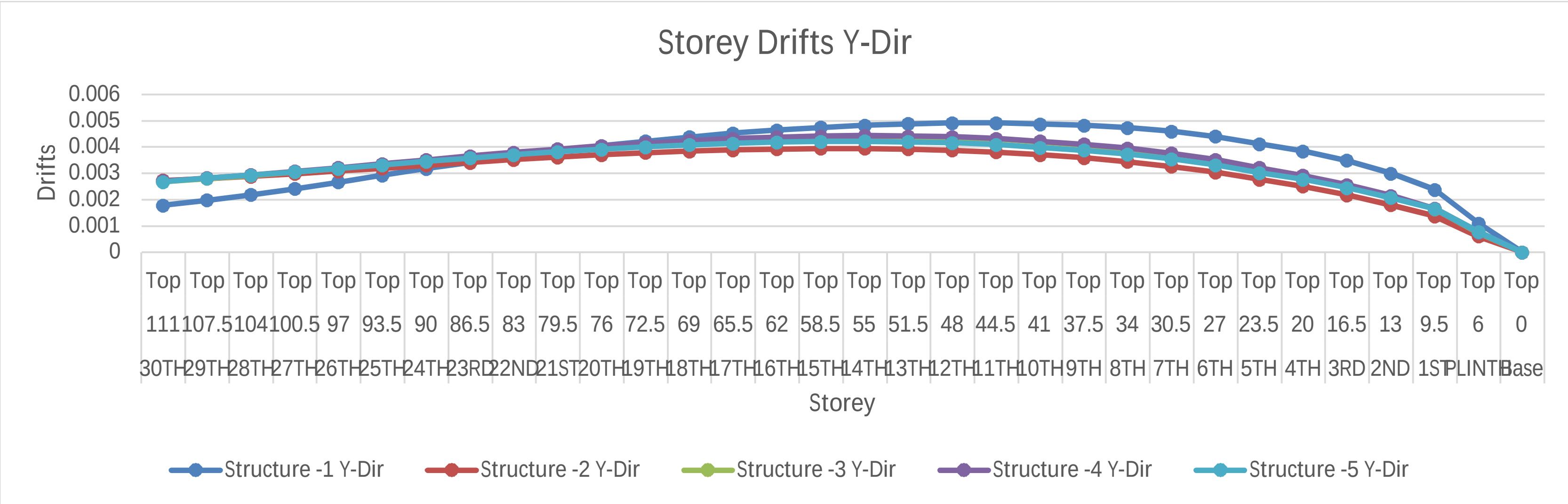
Graph 10: Storey Drifts of Structures in Soft Soil in Y - Direction

Table 12: Storey Drifts of Structures in Medium Soil in Y - Direction with load combination (DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m						
30TH	111	Top	0.001791	0.002732	0.002693	0.002717	0.002681
29TH	107.5	Top	0.001977	0.002806	0.002806	0.00283	0.002816
28TH	104	Top	0.002182	0.002885	0.002918	0.002942	0.002928
27TH	100.5	Top	0.002419	0.002981	0.00305	0.003075	0.003053
26TH	97	Top	0.002671	0.003085	0.003192	0.003218	0.003184
25TH	93.5	Top	0.002926	0.003195	0.003339	0.003365	0.003318
24TH	90	Top	0.003175	0.003306	0.003486	0.003514	0.003451
23RD	86.5	Top	0.003415	0.003414	0.00363	0.003659	0.00358
22ND	83	Top	0.003642	0.003518	0.003768	0.003797	0.003702
21ST	79.5	Top	0.003854	0.003616	0.003897	0.003927	0.003815
20TH	76	Top	0.004049	0.003704	0.004016	0.004046	0.003917
19TH	72.5	Top	0.004226	0.003781	0.004121	0.004153	0.004007
18TH	69	Top	0.004385	0.003845	0.004212	0.004244	0.004082
17TH	65.5	Top	0.004524	0.003894	0.004286	0.004319	0.004142
16TH	62	Top	0.004645	0.003928	0.004342	0.004375	0.004185
15TH	58.5	Top	0.004745	0.003945	0.004379	0.004412	0.00421
14TH	55	Top	0.004824	0.003942	0.004395	0.004428	0.004215
13TH	51.5	Top	0.004882	0.003919	0.004387	0.00442	0.004198
12TH	48	Top	0.004914	0.003873	0.004355	0.004387	0.004158
11TH	44.5	Top	0.004923	0.003806	0.004296	0.004328	0.004095
10TH	41	Top	0.004874	0.003703	0.00419	0.004222	0.003983

9TH	37.5	Top	0.004826	0.003587	0.004077	0.004108	0.003874
8TH	34	Top	0.004737	0.003438	0.003926	0.003955	0.003728
7TH	30.5	Top	0.004601	0.003259	0.003736	0.003764	0.003546
6TH	27	Top	0.004401	0.00304	0.003493	0.003519	0.003313
5TH	23.5	Top	0.004113	0.002773	0.003187	0.003211	0.003021
4TH	20	Top	0.003849	0.002503	0.002901	0.002923	0.002764
3RD	16.5	Top	0.003484	0.002178	0.002548	0.002567	0.002445
2ND	13	Top	0.002998	0.001801	0.002132	0.002147	0.002072
1ST	9.5	Top	0.002376	0.001372	0.001652	0.001663	0.001647
PLINTH	6	Top	0.001102	0.00061	0.000749	0.000754	0.000766
Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Medium Soil in Y - Direction with load combination (DL+LL+EQYP) has been shown here



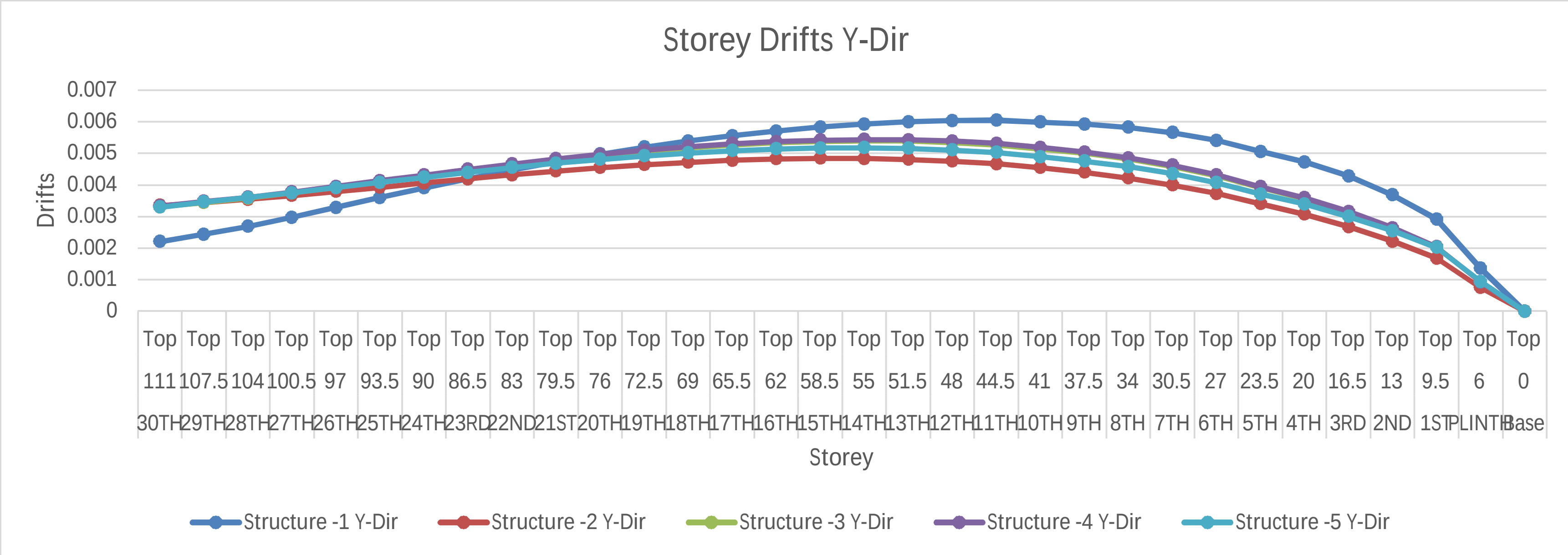
Graph 11: Storey Drifts of Structures in Medium Soil in Y - Direction

Table 13: Storey Drifts of Structures in Hard Soil in Y - Direction with load combination (DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m						
30TH	111	Top	0.002203	0.003354	0.003306	0.003336	0.003293
29TH	107.5	Top	0.002433	0.003446	0.003446	0.003475	0.003459
28TH	104	Top	0.002683	0.003542	0.003584	0.003613	0.003597
27TH	100.5	Top	0.002976	0.00366	0.003746	0.003776	0.00375
26TH	97	Top	0.003285	0.003789	0.00392	0.003951	0.003911
25TH	93.5	Top	0.003597	0.003923	0.0041	0.004133	0.004076
24TH	90	Top	0.003904	0.004059	0.004281	0.004314	0.004239
23RD	86.5	Top	0.004199	0.004193	0.004458	0.004492	0.004397
22ND	83	Top	0.004477	0.00432	0.004627	0.004663	0.004547
21ST	79.5	Top	0.004737	0.00444	0.004786	0.004823	0.004686
20TH	76	Top	0.004977	0.004548	0.004931	0.004969	0.004811
19TH	72.5	Top	0.005194	0.004642	0.00506	0.005099	0.004921
18TH	69	Top	0.005389	0.004721	0.005172	0.005211	0.005014
17TH	65.5	Top	0.005561	0.004782	0.005263	0.005303	0.005088
16TH	62	Top	0.005708	0.004824	0.005332	0.005373	0.00514
15TH	58.5	Top	0.005831	0.004844	0.005378	0.005418	0.00517
14TH	55	Top	0.005929	0.00484	0.005397	0.005437	0.005176
13TH	51.5	Top	0.005999	0.004812	0.005388	0.005428	0.005156
12TH	48	Top	0.006038	0.004756	0.005347	0.005387	0.005107
11TH	44.5	Top	0.00605	0.004673	0.005275	0.005314	0.005029
10TH	41	Top	0.005989	0.004547	0.005145	0.005184	0.004892
9TH	37.5	Top	0.00593	0.004404	0.005007	0.005044	0.004758
8TH	34	Top	0.005821	0.004222	0.004821	0.004857	0.004578
7TH	30.5	Top	0.005654	0.004001	0.004587	0.004621	0.004355
6TH	27	Top	0.005407	0.003733	0.004289	0.004321	0.004069
5TH	23.5	Top	0.005054	0.003405	0.003913	0.003943	0.00371
4TH	20	Top	0.004729	0.003073	0.003563	0.003589	0.003394
3RD	16.5	Top	0.004281	0.002675	0.003129	0.003152	0.003003
2ND	13	Top	0.003684	0.002212	0.002618	0.002637	0.002545
1ST	9.5	Top	0.002917	0.001683	0.002026	0.00204	0.00202
PLINTH	6	Top	0.001354	0.000749	0.00092	0.000926	0.00094

Base	0	Top	0	0	0	0	0

A plot for Storey Drifts of Structures in Hard Soil in Y - Direction with load combination (DL+LL+EQYP) has been shown here

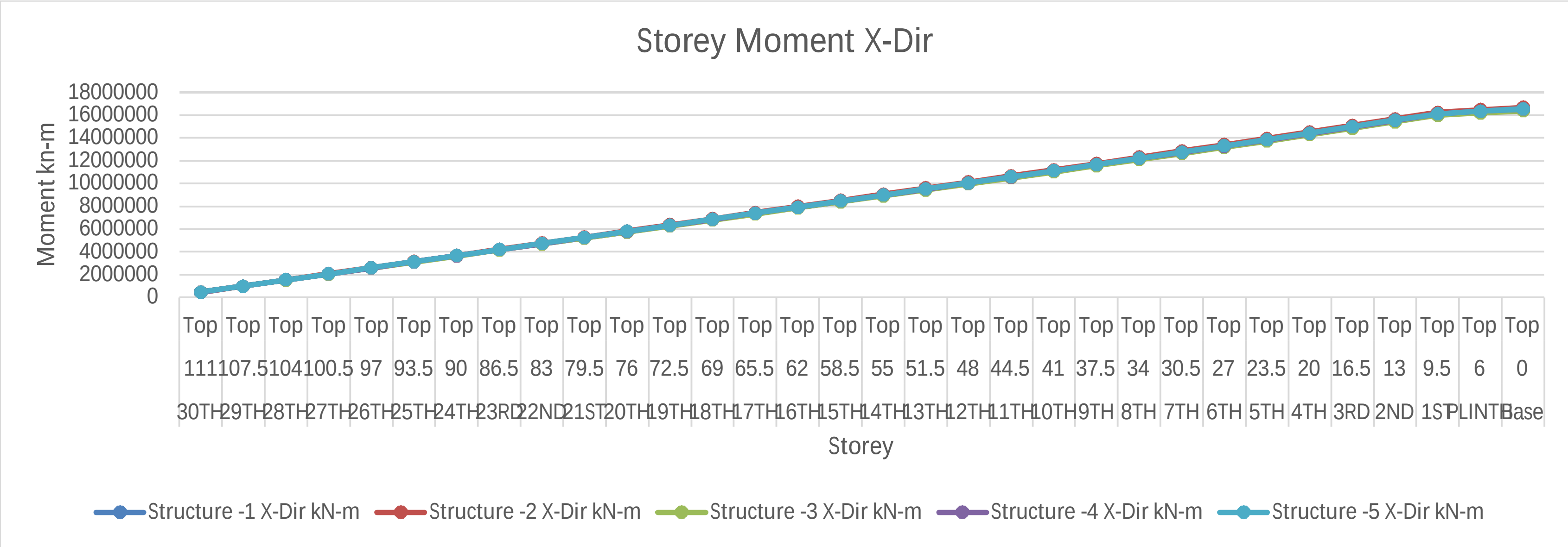


Graph 12: Storey Drifts of Structures in Hard Soil in Y - Direction

Table 14: Storey Moment of Structures in Soft Soil in X - Direction with load combination 1.2(DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	465614.6719	461302.62	461302.62	461302.62	465839.1825
29TH	107.5	Top	995789.2594	998590.3275	989364.765	993977.5463	998857.2337
28TH	104	Top	1525964	1535878	1517427	1526652	1531875
27TH	100.5	Top	2056138	2073166	2045489	2059327	2064893
26TH	97	Top	2586313	2610453	2573551	2592002	2597911
25TH	93.5	Top	3116488	3147741	3101613	3124677	3130929
24TH	90	Top	3646662	3685029	3629675	3657352	3663947
23RD	86.5	Top	4176837	4222317	4157738	4190027	4196966
22ND	83	Top	4707011	4759604	4685800	4722702	4729984
21ST	79.5	Top	5237186	5296892	5213862	5255377	5263002
20TH	76	Top	5767361	5834180	5741924	5788052	5796020
19TH	72.5	Top	6297535	6371467	6269986	6320727	6329038
18TH	69	Top	6827710	6908755	6798048	6853402	6862056
17TH	65.5	Top	7357884	7446043	7326111	7386077	7395074
16TH	62	Top	7888059	7983331	7854173	7918752	7928092
15TH	58.5	Top	8418233	8520618	8382235	8451427	8461110
14TH	55	Top	8948408	9057906	8910297	8984101	8994128
13TH	51.5	Top	9478583	9595194	9438359	9516776	9527146
12TH	48	Top	10008757	10132481	9966421	10049451	10060164
11TH	44.5	Top	10538932	10669769	10494483	10582126	10593182
10TH	41	Top	11068570	11206520	11022009	11114264	11125663
9TH	37.5	Top	11609427	11754491	11560754	11657622	11669365
8TH	34	Top	12150285	12302461	12099499	12200980	12213066
7TH	30.5	Top	12691142	12850432	12638244	12744338	12756767
6TH	27	Top	13232000	13398403	13176989	13287696	13300468
5TH	23.5	Top	13771918	13945434	13714795	13830115	13843229
4TH	20	Top	14339886	14520515	14280650	14400583	14414041
3RD	16.5	Top	14907854	15095596	14846506	14971051	14984852
2ND	13	Top	15475821	15670677	15412361	15541519	15555663
1ST	9.5	Top	16043789	16245758	15978216	16111987	16126474
PLINTH	6	Top	16264437	16479932	16203165	16341549	16356379
Base	0	Top	16445051	16677511	16384929	16531220	16538861

A plot for Storey Moment of Structures in Soft Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here

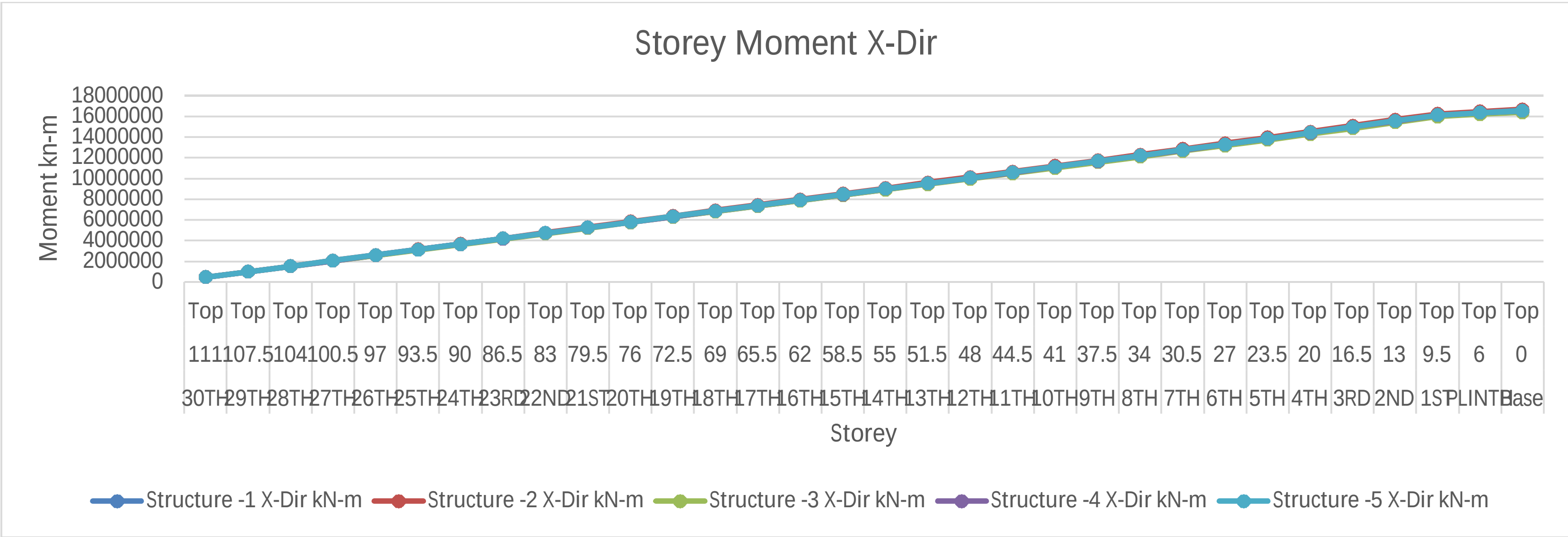


Graph 13: Storey Moment of Structures in Soft Soil in X – Direction

Table 15: Storey Moment of Structures in Medium Soil in X - Direction with load combination 1.2(DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	465614.6719	461302.62	461302.62	461302.62	465839.1825
29TH	107.5	Top	995789.2594	998590.3275	989364.765	993977.5463	998857.2337
28TH	104	Top	1525964	1535878	1517427	1526652	1531875
27TH	100.5	Top	2056138	2073166	2045489	2059327	2064893
26TH	97	Top	2586313	2610453	2573551	2592002	2597911
25TH	93.5	Top	3116488	3147741	3101613	3124677	3130929
24TH	90	Top	3646662	3685029	3629675	3657352	3663947
23RD	86.5	Top	4176837	4222317	4157738	4190027	4196966
22ND	83	Top	4707011	4759604	4685800	4722702	4729984
21ST	79.5	Top	5237186	5296892	5213862	5255377	5263002
20TH	76	Top	5767361	5834180	5741924	5788052	5796020
19TH	72.5	Top	6297535	6371467	6269986	6320727	6329038
18TH	69	Top	6827710	6908755	6798048	6853402	6862056
17TH	65.5	Top	7357884	7446043	7326111	7386077	7395074
16TH	62	Top	7888059	7983331	7854173	7918752	7928092
15TH	58.5	Top	8418233	8520618	8382235	8451427	8461110
14TH	55	Top	8948408	9057906	8910297	8984101	8994128
13TH	51.5	Top	9478583	9595194	9438359	9516776	9527146
12TH	48	Top	10008757	10132481	9966421	10049451	10060164
11TH	44.5	Top	10538932	10669769	10494483	10582126	10593182
10TH	41	Top	11068570	11206520	11022009	11114264	11125663
9TH	37.5	Top	11609427	11754491	11560754	11657622	11669365
8TH	34	Top	12150285	12302461	12099499	12200980	12213066
7TH	30.5	Top	12691142	12850432	12638244	12744338	12756767
6TH	27	Top	13232000	13398403	13176989	13287696	13300468
5TH	23.5	Top	13771918	13945434	13714795	13830115	13843229
4TH	20	Top	14339886	14520515	14280650	14400583	14414041
3RD	16.5	Top	14907854	15095596	14846506	14971051	14984852
2ND	13	Top	15475821	15670677	15412361	15541519	15555663
1ST	9.5	Top	16043789	16245758	15978216	16111987	16126474
PLINTH	6	Top	16264437	16479932	16203165	16341549	16356379
Base	0	Top	16445051	16677511	16384929	16531220	16538861

A plot for Storey Moment of Structures in Medium Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here

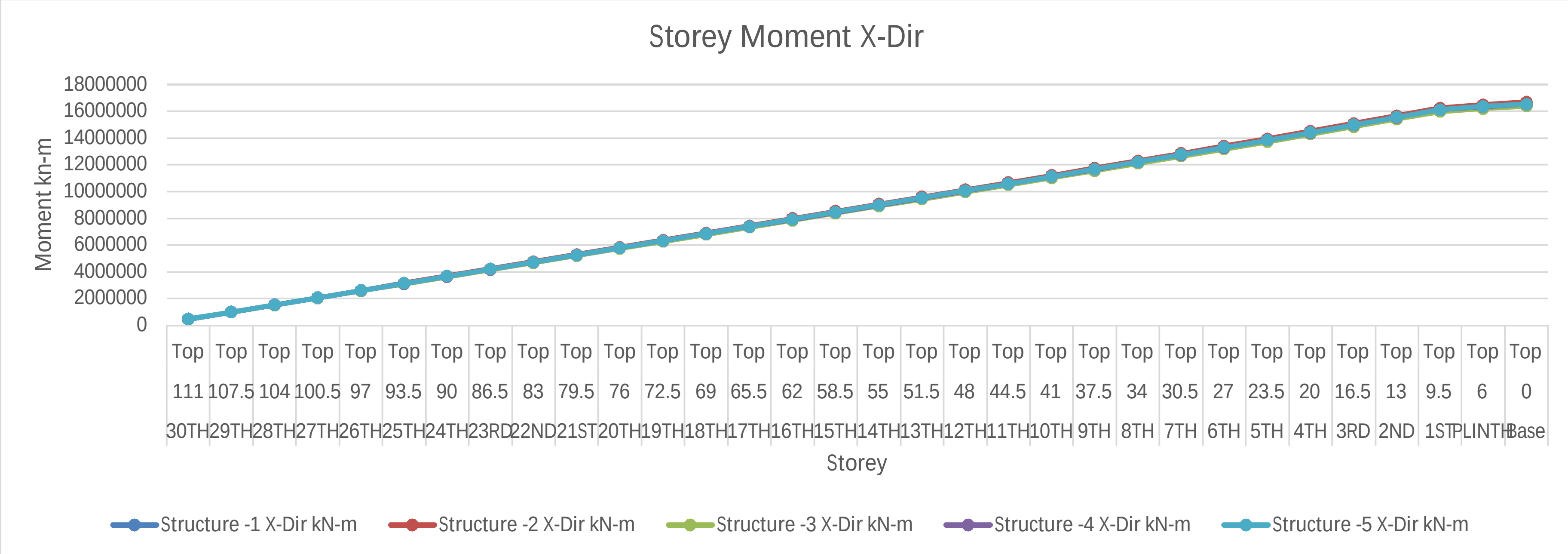


Graph 14: Storey Moment of Structures in Medium Soil in X - Direction

Table 16: Storey Moment of Structures in Hard Soil in X - Direction with load combination 1.2(DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	465614.6719	461302.62	461302.62	461302.62	465839.1825
29TH	107.5	Top	995789.2594	998590.3275	989364.765	993977.5463	998857.2337
28TH	104	Top	1525964	1535878	1517427	1526652	1531875
27TH	100.5	Top	2056138	2073166	2045489	2059327	2064893
26TH	97	Top	2586313	2610453	2573551	2592002	2597911
25TH	93.5	Top	3116488	3147741	3101613	3124677	3130929
24TH	90	Top	3646662	3685029	3629675	3657352	3663947
23RD	86.5	Top	4176837	4222317	4157738	4190027	4196966
22ND	83	Top	4707011	4759604	4685800	4722702	4729984
21ST	79.5	Top	5237186	5296892	5213862	5255377	5263002
20TH	76	Top	5767361	5834180	5741924	5788052	5796020
19TH	72.5	Top	6297535	6371467	6269986	6320727	6329038
18TH	69	Top	6827710	6908755	6798048	6853402	6862056
17TH	65.5	Top	7357884	7446043	7326111	7386077	7395074
16TH	62	Top	7888059	7983331	7854173	7918752	7928092
15TH	58.5	Top	8418233	8520618	8382235	8451427	8461110
14TH	55	Top	8948408	9057906	8910297	8984101	8994128
13TH	51.5	Top	9478583	9595194	9438359	9516776	9527146
12TH	48	Top	10008757	10132481	9966421	10049451	10060164
11TH	44.5	Top	10538932	10669769	10494483	10582126	10593182
10TH	41	Top	11068570	11206520	11022009	11114264	11125663
9TH	37.5	Top	11609427	11754491	11560754	11657622	11669365
8TH	34	Top	12150285	12302461	12099499	12200980	12213066
7TH	30.5	Top	12691142	12850432	12638244	12744338	12756767
6TH	27	Top	13232000	13398403	13176989	13287696	13300468
5TH	23.5	Top	13771918	13945434	13714795	13830115	13843229
4TH	20	Top	14339886	14520515	14280650	14400583	14414041
3RD	16.5	Top	14907854	15095596	14846506	14971051	14984852
2ND	13	Top	15475821	15670677	15412361	15541519	15555663
1ST	9.5	Top	16043789	16245758	15978216	16111987	16126474
PLINTH	6	Top	16264437	16479932	16203165	16341549	16356379
Base	0	Top	16445051	16677511	16384929	16531220	16538861

A plot for Storey Moment of Structures in Hard Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here

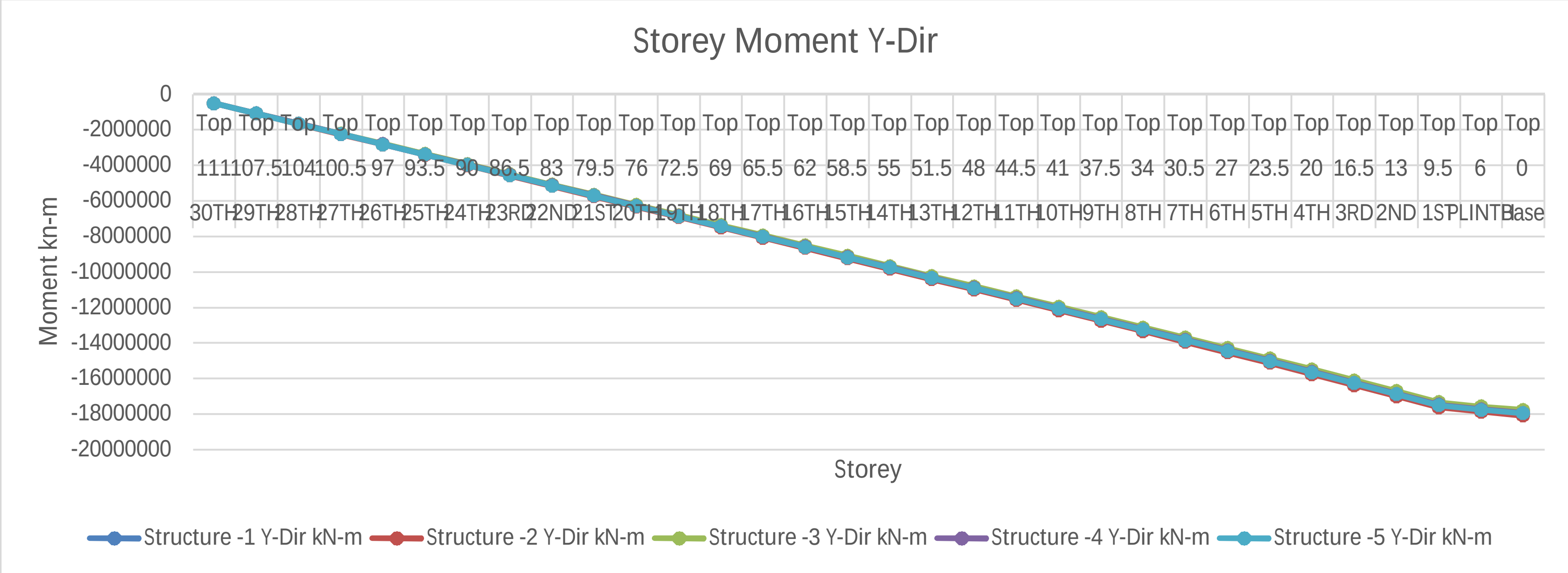


Graph 15: Storey Moment of Structures in Hard Soil in X - Direction

Table 17: Storey Moment of Structures in Soft Soil in Y - Direction with load combination 1.2(DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	-504851	-500286	-500286	-500286	-505702
29TH	107.5	Top	-1080107	-1082978	-1072973	-1077976	-1084260
28TH	104	Top	-1655363	-1665671	-1645660	-1655665	-1662817
27TH	100.5	Top	-2230620	-2248363	-2218347	-2233355	-2241375
26TH	97	Top	-2805876	-2831055	-2791034	-2811045	-2819933
25TH	93.5	Top	-3381133	-3413747	-3363722	-3388734	-3398491
24TH	90	Top	-3956389	-3996440	-3936409	-3966424	-3977049
23RD	86.5	Top	-4531645	-4579132	-4509096	-4544114	-4555606
22ND	83	Top	-5106902	-5161824	-5081783	-5121804	-5134164
21ST	79.5	Top	-5682158	-5744517	-5654470	-5699493	-5712722
20TH	76	Top	-6257414	-6327209	-6227157	-6277183	-6291280
19TH	72.5	Top	-6832671	-6909901	-6799844	-6854873	-6869838
18TH	69	Top	-7407927	-7492594	-7372531	-7432562	-7448395
17TH	65.5	Top	-7983184	-8075286	-7945218	-8010252	-8026953
16TH	62	Top	-8558440	-8657978	-8517906	-8587942	-8605511
15TH	58.5	Top	-9133696	-9240670	-9090593	-9165632	-9184069
14TH	55	Top	-9708953	-9823363	-9663280	-9743321	-9762627
13TH	51.5	Top	-10284209	-10406055	-10235967	-10321011	-10341184
12TH	48	Top	-10859466	-10988747	-10808654	-10898701	-10919742
11TH	44.5	Top	-11434722	-11571440	-11381341	-11476390	-11498300
10TH	41	Top	-12009396	-12153550	-11953446	-12053498	-12076276
9TH	37.5	Top	-12596238	-12747828	-12537719	-12642774	-12666419
8TH	34	Top	-13183081	-13342106	-13121992	-13232049	-13256563
7TH	30.5	Top	-13769923	-13936384	-13706265	-13821325	-13846706
6TH	27	Top	-14356765	-14530662	-14290538	-14410600	-14436850
5TH	23.5	Top	-14942589	-15123922	-14873792	-14998857	-15025975
4TH	20	Top	-15558832	-15747601	-15487466	-15617533	-15645520
3RD	16.5	Top	-16175075	-16371280	-16101140	-16236210	-16265064
2ND	13	Top	-16791318	-16994959	-16714814	-16854887	-16884609
1ST	9.5	Top	-17407562	-17618639	-17328488	-17473563	-17504154
PLINTH	6	Top	-17646856	-17872602	-17572447	-17722524	-17753983
Base	0	Top	-17842733	-18086878	-17769570	-17928224	-17951886

A plot for Storey Moment of Structures in Soft Soil in Y - Direction with load combination 1.2(DL+LL+EXP) has been shown here



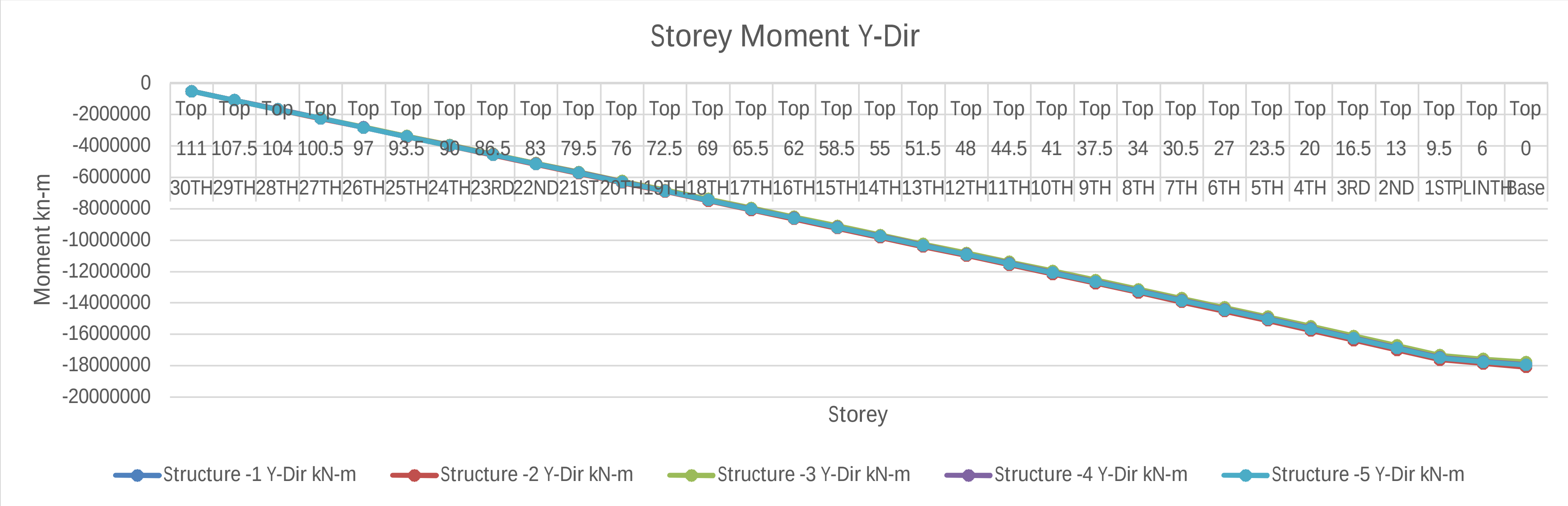
Graph 16: Storey Moment of Structures in Soft Soil in Y - Direction

Table 18: Storey Moment of Structures in Medium Soil in Y - Direction with load combination 1.2(DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	-504851	-500286	-500286	-500286	-505702
29TH	107.5	Top	-1080107	-1082978	-1072973	-1077976	-1084260
28TH	104	Top	-1655363	-1665671	-1645660	-1655665	-1662817
27TH	100.5	Top	-2230620	-2248363	-2218347	-2233355	-2241375
26TH	97	Top	-2805876	-2831055	-2791034	-2811045	-2819933
25TH	93.5	Top	-3381133	-3413747	-3363722	-3388734	-3398491
24TH	90	Top	-3956389	-3996440	-3936409	-3966424	-3977049
23RD	86.5	Top	-4531645	-4579132	-4509096	-4544114	-4555606
22ND	83	Top	-5106902	-5161824	-5081783	-5121804	-5134164
21ST	79.5	Top	-5682158	-5744517	-5654470	-5699493	-5712722
20TH	76	Top	-6257414	-6327209	-6227157	-6277183	-6291280
19TH	72.5	Top	-6832671	-6909901	-6799844	-6854873	-6869838
18TH	69	Top	-7407927	-7492594	-7372531	-7432562	-7448395
17TH	65.5	Top	-7983184	-8075286	-7945218	-8010252	-8026953
16TH	62	Top	-8558440	-8657978	-8517906	-8587942	-8605511
15TH	58.5	Top	-9133696	-9240670	-9090593	-9165632	-9184069
14TH	55	Top	-9708953	-9823363	-9663280	-9743321	-9762627
13TH	51.5	Top	-10284209	-10406055	-10235967	-10321011	-10341184
12TH	48	Top	-10859466	-10988747	-10808654	-10898701	-10919742
11TH	44.5	Top	-11434722	-11571440	-11381341	-11476390	-11498300
10TH	41	Top	-12009396	-12153550	-11953446	-12053498	-12076276
9TH	37.5	Top	-12596238	-12747828	-12537719	-12642774	-12666419
8TH	34	Top	-13183081	-13342106	-13121992	-13232049	-13256563
7TH	30.5	Top	-13769923	-13936384	-13706265	-13821325	-13846706
6TH	27	Top	-14356765	-14530662	-14290538	-14410600	-14436850
5TH	23.5	Top	-14942589	-15123922	-14873792	-14998857	-15025975
4TH	20	Top	-15558832	-15747601	-15487466	-15617533	-15645520
3RD	16.5	Top	-16175075	-16371280	-16101140	-16236210	-16265064
2ND	13	Top	-16791318	-16994959	-16714814	-16854887	-16884609
1ST	9.5	Top	-17407562	-17618639	-17328488	-17473563	-17504154
PLINTH	6	Top	-17646856	-17872602	-17572447	-17722524	-17753983
Base	0	Top	-17842733	-18086878	-17769570	-17928224	-17951886

.

A plot for Storey Moment of Structures in Medium Soil in Y - Direction with load combination 1.2(DL+LL+EXP) has been shown here

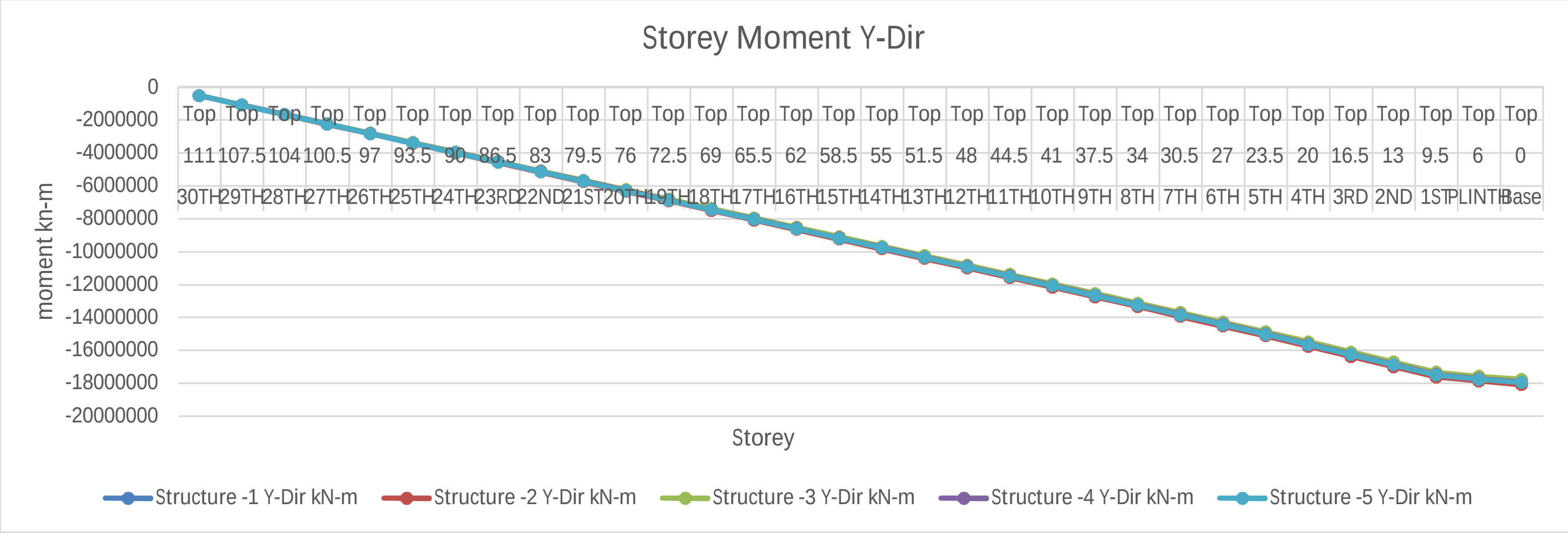


Graph 17: Storey Moment of Structures in Medium Soil in Y - Direction

Table 19: Storey Moment of Structures in Hard Soil in Y - Direction with load combination 1.2(DL+LL+EQYP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	Y-Dir	Y-Dir	Y-Dir	Y-Dir	Y-Dir
	m		kN-m	kN-m	kN-m	kN-m	kN-m
30TH	111	Top	-504851	-500286	-500286	-500286	-505702
29TH	107.5	Top	-1080107	-1082978	-1072973	-1077976	-1084260
28TH	104	Top	-1655363	-1665671	-1645660	-1655665	-1662817
27TH	100.5	Top	-2230620	-2248363	-2218347	-2233355	-2241375
26TH	97	Top	-2805876	-2831055	-2791034	-2811045	-2819933
25TH	93.5	Top	-3381133	-3413747	-3363722	-3388734	-3398491
24TH	90	Top	-3956389	-3996440	-3936409	-3966424	-3977049
23RD	86.5	Top	-4531645	-4579132	-4509096	-4544114	-4555606
22ND	83	Top	-5106902	-5161824	-5081783	-5121804	-5134164
21ST	79.5	Top	-5682158	-5744517	-5654470	-5699493	-5712722
20TH	76	Top	-6257414	-6327209	-6227157	-6277183	-6291280
19TH	72.5	Top	-6832671	-6909901	-6799844	-6854873	-6869838
18TH	69	Top	-7407927	-7492594	-7372531	-7432562	-7448395
17TH	65.5	Top	-7983184	-8075286	-7945218	-8010252	-8026953
16TH	62	Top	-8558440	-8657978	-8517906	-8587942	-8605511
15TH	58.5	Top	-9133696	-9240670	-9090593	-9165632	-9184069
14TH	55	Top	-9708953	-9823363	-9663280	-9743321	-9762627
13TH	51.5	Top	-10284209	-10406055	-10235967	-10321011	-10341184
12TH	48	Top	-10859466	-10988747	-10808654	-10898701	-10919742
11TH	44.5	Top	-11434722	-11571440	-11381341	-11476390	-11498300
10TH	41	Top	-12009396	-12153550	-11953446	-12053498	-12076276
9TH	37.5	Top	-12596238	-12747828	-12537719	-12642774	-12666419
8TH	34	Top	-13183081	-13342106	-13121992	-13232049	-13256563
7TH	30.5	Top	-13769923	-13936384	-13706265	-13821325	-13846706
6TH	27	Top	-14356765	-14530662	-14290538	-14410600	-14436850
5TH	23.5	Top	-14942589	-15123922	-14873792	-14998857	-15025975
4TH	20	Top	-15558832	-15747601	-15487466	-15617533	-15645520
3RD	16.5	Top	-16175075	-16371280	-16101140	-16236210	-16265064
2ND	13	Top	-16791318	-16994959	-16714814	-16854887	-16884609
1ST	9.5	Top	-17407562	-17618639	-17328488	-17473563	-17504154
PLINTH	6	Top	-17646856	-17872602	-17572447	-17722524	-17753983
Base	0	Top	-17842733	-18086878	-17769570	-17928224	-17951886

A plot for Storey Moment of Structures in Hard Soil in Y - Direction with load combination 1.2(DL+LL+EYP) has been shown here



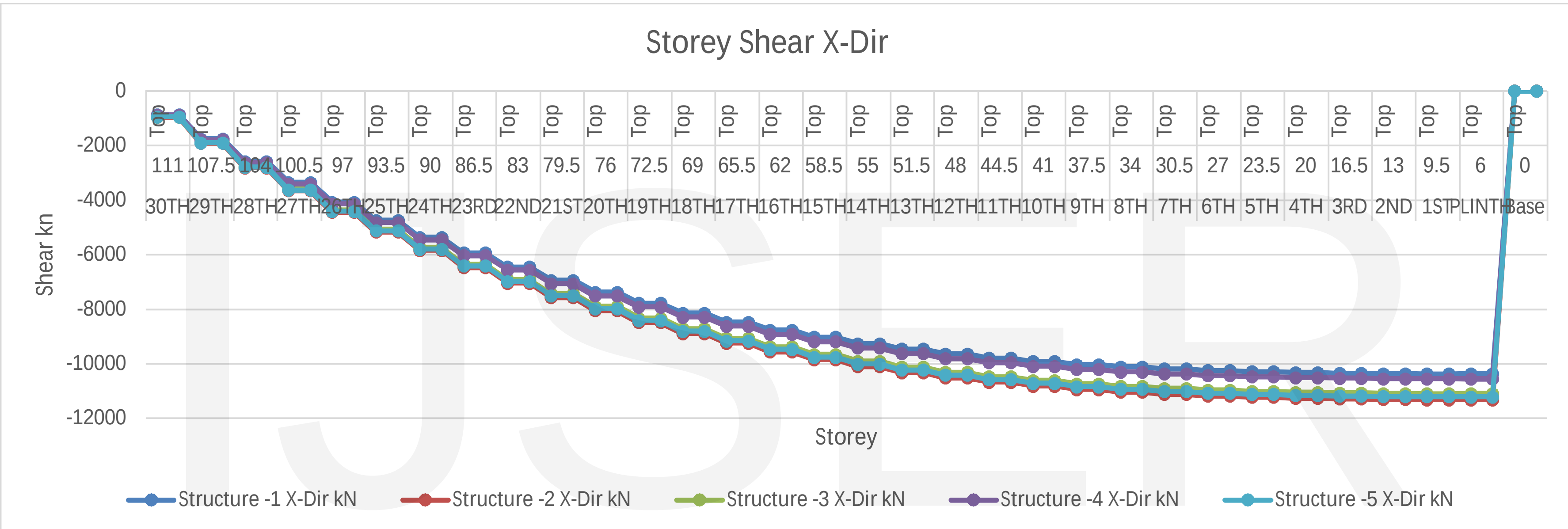
Graph 18: Storey Moment of Structures in Hard Soil in Y - Direction

Table 20: Storey Shear of Structures in Soft Soil in X - Direction with load combination1.2 (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN	kN	kN	kN	kN
30TH	111	Top	-870.0895	-945.6987	-935.1713	-881.5928	-944.7656
		Bottom	-870.0895	-945.6987	-935.1713	-881.5928	-944.7656
29TH	107.5	Top	-1752.5342	-1908.8798	-1879.1815	-1780.1594	-1898.1949
		Bottom	-1752.5342	-1908.8798	-1879.1815	-1780.1594	-1898.1949
28TH	104	Top	-2578.4528	-2810.3632	-2762.7219	-2621.1672	-2790.551
		Bottom	-2578.4528	-2810.3632	-2762.7219	-2621.1672	-2790.551
27TH	100.5	Top	-3349.7161	-3652.1908	-3587.794	-3406.5212	-3623.8553
		Bottom	-3349.7161	-3652.1908	-3587.794	-3406.5212	-3623.8553
26TH	97	Top	-4068.195	-4436.4046	-4356.399	-4138.1264	-4400.1292
		Bottom	-4068.195	-4436.4046	-4356.399	-4138.1264	-4400.1292
25TH	93.5	Top	-4735.7604	-5165.0467	-5070.5384	-4817.8879	-5121.394
		Bottom	-4735.7604	-5165.0467	-5070.5384	-4817.8879	-5121.394
24TH	90	Top	-5354.283	-5840.1591	-5732.2135	-5447.7107	-5789.6711
		Bottom	-5354.283	-5840.1591	-5732.2135	-5447.7107	-5789.6711
23RD	86.5	Top	-5925.6337	-6463.7837	-6343.4256	-6029.4997	-6406.9817
		Bottom	-5925.6337	-6463.7837	-6343.4256	-6029.4997	-6406.9817
22ND	83	Top	-6451.6833	-7037.9626	-6906.1762	-6565.1601	-6975.3472
		Bottom	-6451.6833	-7037.9626	-6906.1762	-6565.1601	-6975.3472
21ST	79.5	Top	-6934.3028	-7564.7378	-7422.4665	-7056.5968	-7496.7889
		Bottom	-6934.3028	-7564.7378	-7422.4665	-7056.5968	-7496.7889
20TH	76	Top	-7375.3629	-8046.1513	-7894.298	-7505.7148	-7973.3282
		Bottom	-7375.3629	-8046.1513	-7894.298	-7505.7148	-7973.3282
19TH	72.5	Top	-7776.7344	-8484.245	-8323.6721	-7914.4193	-8406.9864
		Bottom	-7776.7344	-8484.245	-8323.6721	-7914.4193	-8406.9864
18TH	69	Top	-8140.2883	-8881.061	-8712.59	-8284.6151	-8799.7848
		Bottom	-8140.2883	-8881.061	-8712.59	-8284.6151	-8799.7848
17TH	65.5	Top	-8467.8952	-9238.6414	-9063.0531	-8618.2073	-9153.7447
		Bottom	-8467.8952	-9238.6414	-9063.0531	-8618.2073	-9153.7447
16TH	62	Top	-8761.4262	-9559.0281	-9377.0629	-8917.101	-9470.8875
		Bottom	-8761.4262	-9559.0281	-9377.0629	-8917.101	-9470.8875
15TH	58.5	Top	-9022.752	-9844.263	-9656.6206	-9183.2011	-9753.2346
		Bottom	-9022.752	-9844.263	-9656.6206	-9183.2011	-9753.2346
14TH	55	Top	-9253.7435	-10096.3883	-9903.7276	-9418.4127	-10002.8072
		Bottom	-9253.7435	-10096.3883	-9903.7276	-9418.4127	-10002.8072
13TH	51.5	Top	-9456.2715	-10317.4459	-10120.3854	-9624.6408	-10221.6267
		Bottom	-9456.2715	-10317.4459	-10120.3854	-9624.6408	-10221.6267
12TH	48	Top	-9632.2068	-10509.4779	-10308.5952	-9803.7903	-10411.7144
		Bottom	-9632.2068	-10509.4779	-10308.5952	-9803.7903	-10411.7144
11TH	44.5	Top	-9783.4203	-10674.5262	-10470.3584	-9957.7665	-10575.0916
		Bottom	-9783.4203	-10674.5262	-10470.3584	-9957.7665	-10575.0916
10TH	41	Top	-9913.2648	-10816.1126	-10609.1551	-10089.9567	-10715.2584
		Bottom	-9913.2648	-10816.1126	-10609.1551	-10089.9567	-10715.2584

9TH	37.5	Top	-10023.2579	-10935.9262	-10726.634	-10201.9125	-10833.8835
		Bottom	-10023.2579	-10935.9262	-10726.634	-10201.9125	-10833.8835
8TH	34	Top	-10113.6771	-11034.4184	-10823.2069	-10293.9453	-10931.3986
		Bottom	-10113.6771	-11034.4184	-10823.2069	-10293.9453	-10931.3986
7TH	30.5	Top	-10186.4387	-11113.6765	-10900.9206	-10368.0053	-11009.8705
		Bottom	-10186.4387	-11113.6765	-10900.9206	-10368.0053	-11009.8705
6TH	27	Top	-10243.4591	-11175.7879	-10961.8217	-10426.0433	-11071.3658
		Bottom	-10243.4591	-11175.7879	-10961.8217	-10426.0433	-11071.3658
5TH	23.5	Top	-10287.9104	-11224.094	-11009.21	-10471.2659	-11119.2042
		Bottom	-10287.9104	-11224.094	-11009.21	-10471.2659	-11119.2042
4TH	20	Top	-10321.0818	-11260.0559	-11044.5064	-10504.9963	-11154.8267
		Bottom	-10321.0818	-11260.0559	-11044.5064	-10504.9963	-11154.8267
3RD	16.5	Top	-10343.6591	-11284.5324	-11068.5301	-10527.954	-11179.0722
		Bottom	-10343.6591	-11284.5324	-11068.5301	-10527.954	-11179.0722
2ND	13	Top	-10357.674	-11299.7264	-11083.4429	-10542.2051	-11194.1227
		Bottom	-10357.674	-11299.7264	-11083.4429	-10542.2051	-11194.1227
1ST	9.5	Top	-10365.1583	-11307.8403	-11091.4066	-10549.8156	-11202.1601
		Bottom	-10365.1583	-11307.8403	-11091.4066	-10549.8156	-11202.1601
PLINTH	6	Top	-10366.7741	-11309.5557	-11093.0427	-10551.4929	-11203.8264
		Bottom	-10366.7741	-11309.5557	-11093.0427	-10551.4929	-11203.8264
Base	0	Top	0	0	0	0	0
		Bottom	0	0	0	0	0

A plot for Storey Shear of Structures in Soft Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here



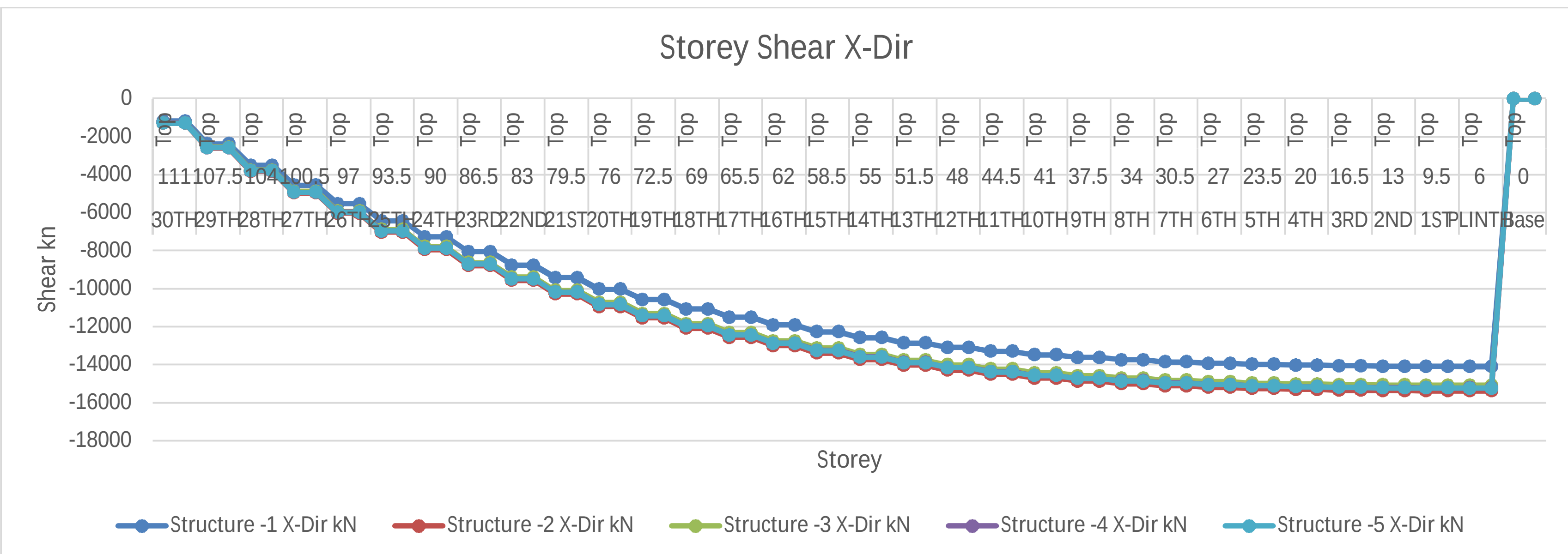
Graph 19: Storey Shear of Structures in Soft Soil in X - Direction

Table 21: Storey Shear of Structures in Medium Soil in X - Direction with load combination1.2 (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN	kN	kN	kN	kN
30TH	111	Top	-1183.3217	-1286.1502	-1271.8329	-1278.9934	-1284.8813
		Bottom	-1183.3217	-1286.1502	-1271.8329	-1278.9934	-1284.8813
29TH	107.5	Top	-2383.4465	-2596.0765	-2555.6868	-2575.8833	-2581.545
		Bottom	-2383.4465	-2596.0765	-2555.6868	-2575.8833	-2581.545
28TH	104	Top	-3506.6958	-3822.0939	-3757.3018	-3789.6994	-3795.1493
		Bottom	-3506.6958	-3822.0939	-3757.3018	-3789.6994	-3795.1493
27TH	100.5	Top	-4555.6139	-4966.9795	-4879.3998	-4923.191	-4928.4432
		Bottom	-4555.6139	-4966.9795	-4879.3998	-4923.191	-4928.4432
26TH	97	Top	-5532.7452	-6033.5103	-5924.7026	-5979.1077	-5984.1757
		Bottom	-5532.7452	-6033.5103	-5924.7026	-5979.1077	-5984.1757
25TH	93.5	Top	-6440.6341	-7024.4636	-6895.9322	-6960.199	-6965.0959
		Bottom	-6440.6341	-7024.4636	-6895.9322	-6960.199	-6965.0959
24TH	90	Top	-7281.8248	-7942.6164	-7795.8103	-7869.2143	-7873.9527
		Bottom	-7281.8248	-7942.6164	-7795.8103	-7869.2143	-7873.9527
23RD	86.5	Top	-8058.8618	-8790.7459	-8627.0588	-8708.9032	-8713.4951
		Bottom	-8058.8618	-8790.7459	-8627.0588	-8708.9032	-8713.4951
22ND	83	Top	-8774.2894	-9571.6292	-9392.3996	-9482.0151	-9486.4722
		Bottom	-8774.2894	-9571.6292	-9392.3996	-9482.0151	-9486.4722
21ST	79.5	Top	-9430.6518	-10288.0434	-10094.5545	-10191.2996	-10195.6329

		Bottom	-9430.6518	-10288.0434	-10094.5545	-10191.2996	-10195.6329
20TH	76	Top	-10030.4935	-10942.7657	-10736.2453	-10839.5061	-10843.7263
		Bottom	-10030.4935	-10942.7657	-10736.2453	-10839.5061	-10843.7263
19TH	72.5	Top	-10576.3588	-11538.5732	-11320.194	-11429.3841	-11433.5015
		Bottom	-10576.3588	-11538.5732	-11320.194	-11429.3841	-11433.5015
18TH	69	Top	-11070.792	-12078.243	-11849.1224	-11963.6831	-11967.7073
		Bottom	-11070.792	-12078.243	-11849.1224	-11963.6831	-11967.7073
17TH	65.5	Top	-11516.3375	-12564.5523	-12325.7522	-12445.1526	-12449.0928
		Bottom	-11516.3375	-12564.5523	-12325.7522	-12445.1526	-12449.0928
16TH	62	Top	-11915.5397	-13000.2782	-12752.8055	-12876.5421	-12880.4071
		Bottom	-11915.5397	-13000.2782	-12752.8055	-12876.5421	-12880.4071
15TH	58.5	Top	-12270.9427	-13388.1977	-13133.004	-13260.6011	-13264.399
		Bottom	-12270.9427	-13388.1977	-13133.004	-13260.6011	-13264.399
14TH	55	Top	-12585.0911	-13731.0881	-13469.0696	-13600.079	-13603.8178
		Bottom	-12585.0911	-13731.0881	-13469.0696	-13600.079	-13603.8178
13TH	51.5	Top	-12860.5292	-14031.7265	-13763.7241	-13897.7254	-13901.4123
		Bottom	-12860.5292	-14031.7265	-13763.7241	-13897.7254	-13901.4123
12TH	48	Top	-13099.8012	-14292.89	-14019.6894	-14156.2898	-14159.9315
		Bottom	-13099.8012	-14292.89	-14019.6894	-14156.2898	-14159.9315
11TH	44.5	Top	-13305.4516	-14517.3556	-14239.6874	-14378.5216	-14382.1246
		Bottom	-13305.4516	-14517.3556	-14239.6874	-14378.5216	-14382.1246
10TH	41	Top	-13482.0401	-14709.9131	-14428.4509	-14569.182	-14572.7514
		Bottom	-13482.0401	-14709.9131	-14428.4509	-14569.182	-14572.7514
9TH	37.5	Top	-13631.6307	-14872.8597	-14588.2223	-14730.541	-14734.0816
		Bottom	-13631.6307	-14872.8597	-14588.2223	-14730.541	-14734.0816
8TH	34	Top	-13754.6008	-15006.8091	-14719.5615	-14863.1853	-14866.7022
		Bottom	-13754.6008	-15006.8091	-14719.5615	-14863.1853	-14866.7022
7TH	30.5	Top	-13853.5566	-15114.6	-14825.252	-14969.926	-14973.4239
		Bottom	-13853.5566	-15114.6	-14825.252	-14969.926	-14973.4239
6TH	27	Top	-13931.1044	-15199.0716	-14908.0775	-15053.5745	-15057.0574
		Bottom	-13931.1044	-15199.0716	-14908.0775	-15053.5745	-15057.0574
5TH	23.5	Top	-13991.5582	-15264.7678	-14972.5255	-15118.6467	-15122.1177
		Bottom	-13991.5582	-15264.7678	-14972.5255	-15118.6467	-15122.1177
4TH	20	Top	-14036.6713	-15313.676	-15020.5288	-15167.1024	-15170.5643
		Bottom	-14036.6713	-15313.676	-15020.5288	-15167.1024	-15170.5643
3RD	16.5	Top	-14067.3763	-15346.9641	-15053.2009	-15200.0825	-15203.5382
		Bottom	-14067.3763	-15346.9641	-15053.2009	-15200.0825	-15203.5382
2ND	13	Top	-14086.4366	-15367.6278	-15073.4823	-15220.5551	-15224.0069
		Bottom	-14086.4366	-15367.6278	-15073.4823	-15220.5551	-15224.0069
1ST	9.5	Top	-14096.6153	-15378.6628	-15084.313	-15231.4879	-15234.9377
		Bottom	-14096.6153	-15378.6628	-15084.313	-15231.4879	-15234.9377
PLINTH	6	Top	-14098.8127	-15380.9958	-15086.5381	-15233.767	-15237.204
		Bottom	-14098.8127	-15380.9958	-15086.5381	-15233.767	-15237.204
Base	0	Top	0	0	0	0	0
		Bottom	0	0	0	0	0

A plot for Storey Shear of Structures in Medium Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here



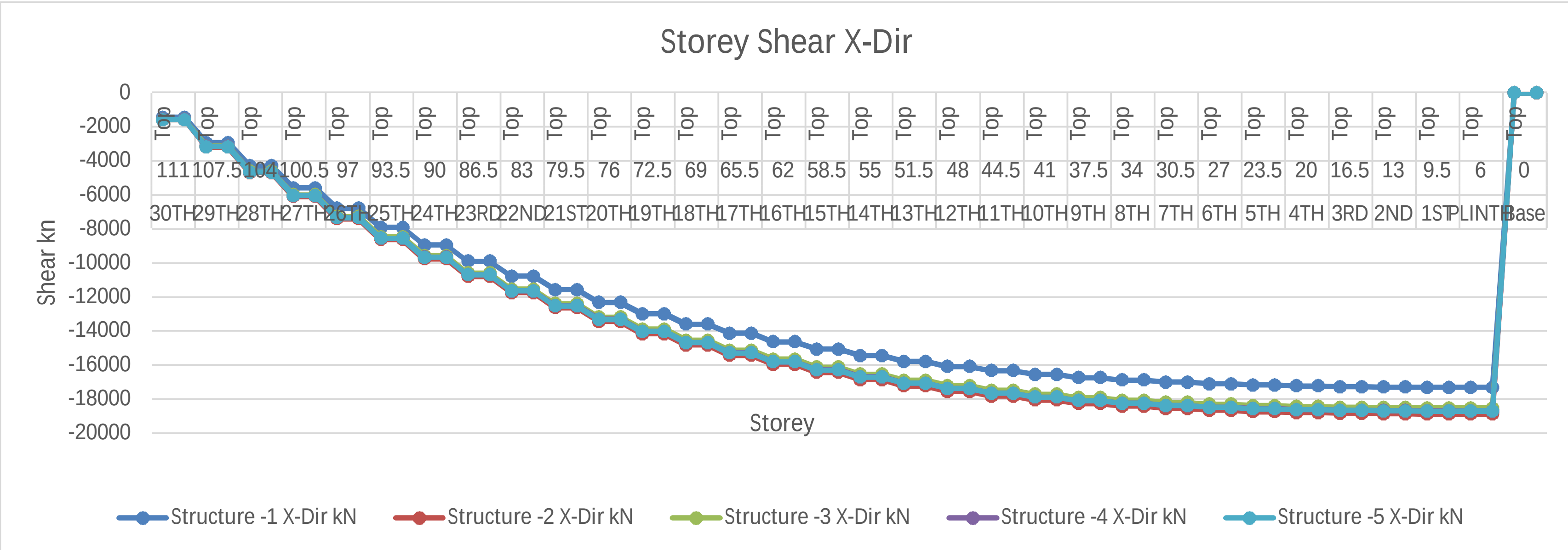
Graph 20: Storey Shear of Structures in Medium Soil in X - Direction

Table 22: Storey Shear of Structures in Hard Soil in X - Direction with load combination1.2 (DL+LL+EQXP)

			Structure -1	Structure -2	Structure -3	Structure -4	Structure -5
Story	Elevation	Location	X-Dir	X-Dir	X-Dir	X-Dir	X-Dir
	m		kN	kN	kN	kN	kN
30TH	111	Top	-1453.0495	-1579.3168	-1561.736	-1570.5287	-1577.7586
		Bottom	-1453.0495	-1579.3168	-1561.736	-1570.5287	-1577.7586
29TH	107.5	Top	-2926.7321	-3187.8293	-3138.233	-3163.0332	-3169.9854
		Bottom	-2926.7321	-3187.8293	-3138.233	-3163.0332	-3169.9854
28TH	104	Top	-4306.0161	-4693.3065	-4613.7456	-4653.5279	-4660.2201
		Bottom	-4306.0161	-4693.3065	-4613.7456	-4653.5279	-4660.2201
27TH	100.5	Top	-5594.0259	-6099.1586	-5991.6159	-6045.3889	-6051.8384
		Bottom	-5594.0259	-6099.1586	-5991.6159	-6045.3889	-6051.8384
26TH	97	Top	-6793.8857	-7408.7957	-7275.1863	-7341.9925	-7348.2158
		Bottom	-6793.8857	-7408.7957	-7275.1863	-7341.9925	-7348.2158
25TH	93.5	Top	-7908.7198	-8625.6281	-8467.7991	-8546.7149	-8552.728
		Bottom	-7908.7198	-8625.6281	-8467.7991	-8546.7149	-8552.728
24TH	90	Top	-8941.6526	-9753.0657	-9572.7965	-9662.9322	-9668.7507
		Bottom	-8941.6526	-9753.0657	-9572.7965	-9662.9322	-9668.7507
23RD	86.5	Top	-9895.8083	-10794.5188	-10593.5207	-10694.0208	-10699.6594
		Bottom	-9895.8083	-10794.5188	-10593.5207	-10694.0208	-10699.6594
22ND	83	Top	-10774.3112	-11753.3976	-11533.3142	-11643.3568	-11648.8298
		Bottom	-10774.3112	-11753.3976	-11533.3142	-11643.3568	-11648.8298
21ST	79.5	Top	-11580.2857	-12633.1121	-12395.5191	-12514.3164	-12519.6375
		Bottom	-11580.2857	-12633.1121	-12395.5191	-12514.3164	-12519.6375
20TH	76	Top	-12316.856	-13437.0726	-13183.4777	-13310.2758	-13315.4581
		Bottom	-12316.856	-13437.0726	-13183.4777	-13310.2758	-13315.4581
19TH	72.5	Top	-12987.1465	-14168.6892	-13900.5323	-14034.6113	-14039.6672
		Bottom	-12987.1465	-14168.6892	-13900.5323	-14034.6113	-14039.6672
18TH	69	Top	-13594.2814	-14831.372	-14550.0253	-14690.6991	-14695.6406
		Bottom	-13594.2814	-14831.372	-14550.0253	-14690.6991	-14695.6406
17TH	65.5	Top	-14141.3851	-15428.5311	-15135.2987	-15281.9153	-15286.7537
		Bottom	-14141.3851	-15428.5311	-15135.2987	-15281.9153	-15286.7537
16TH	62	Top	-14631.5818	-15963.5768	-15659.695	-15811.6362	-15816.3822
		Bottom	-14631.5818	-15963.5768	-15659.695	-15811.6362	-15816.3822
15TH	58.5	Top	-15067.9959	-16439.9193	-16126.5564	-16283.2381	-16287.9018
		Bottom	-15067.9959	-16439.9193	-16126.5564	-16283.2381	-16287.9018
14TH	55	Top	-15453.7516	-16860.9685	-16539.2252	-16700.097	-16704.688
		Bottom	-15453.7516	-16860.9685	-16539.2252	-16700.097	-16704.688
13TH	51.5	Top	-15791.9733	-17230.1347	-16901.0436	-17065.5893	-17070.1165
		Bottom	-15791.9733	-17230.1347	-16901.0436	-17065.5893	-17070.1165
12TH	48	Top	-16085.7853	-17550.8281	-17215.354	-17383.0911	-17387.563
		Bottom	-16085.7853	-17550.8281	-17215.354	-17383.0911	-17387.563
11TH	44.5	Top	-16338.3119	-17826.4588	-17485.4985	-17655.9787	-17660.403
		Bottom	-16338.3119	-17826.4588	-17485.4985	-17655.9787	-17660.403
10TH	41	Top	-16555.1522	-18062.908	-17717.2889	-17890.0985	-17894.4815
		Bottom	-16555.1522	-18062.908	-17717.2889	-17890.0985	-17894.4815
9TH	37.5	Top	-16738.8406	-18262.9968	-17913.4788	-18088.2378	-18092.5855
		Bottom	-16738.8406	-18262.9968	-17913.4788	-18088.2378	-18092.5855
8TH	34	Top	-16889.8407	-18427.4788	-18074.7556	-18251.1172	-18255.4357
		Bottom	-16889.8407	-18427.4788	-18074.7556	-18251.1172	-18255.4357
7TH	30.5	Top	-17011.3526	-18559.8398	-18204.5374	-18382.1886	-18386.4837
		Bottom	-17011.3526	-18559.8398	-18204.5374	-18382.1886	-18386.4837
6TH	27	Top	-17106.5767	-18663.5658	-18306.2422	-18484.904	-18489.1808
		Bottom	-17106.5767	-18663.5658	-18306.2422	-18484.904	-18489.1808
5TH	23.5	Top	-17180.8104	-18744.2369	-18385.3806	-18564.8088	-18569.0709
		Bottom	-17180.8104	-18744.2369	-18385.3806	-18564.8088	-18569.0709
4TH	20	Top	-17236.2066	-18804.2933	-18444.3258	-18624.3095	-18628.5605
		Bottom	-17236.2066	-18804.2933	-18444.3258	-18624.3095	-18628.5605
3RD	16.5	Top	-17273.9107	-18845.1692	-18484.4453	-18664.8072	-18669.0506
		Bottom	-17273.9107	-18845.1692	-18484.4453	-18664.8072	-18669.0506
2ND	13	Top	-17297.3156	-18870.543	-18509.3496	-18689.9463	-18694.185
		Bottom	-17297.3156	-18870.543	-18509.3496	-18689.9463	-18694.185
1ST	9.5	Top	-17309.8143	-18884.0932	-18522.6491	-18703.3712	-18707.6073
		Bottom	-17309.8143	-18884.0932	-18522.6491	-18703.3712	-18707.6073

PLINTH	6	Top	-17312.5127	-18886.9581	-18525.3814	-18706.1697	-18710.3902
		Bottom	-17312.5127	-18886.9581	-18525.3814	-18706.1697	-18710.3902
Base	0	Top	0	0	0	0	0
		Bottom	0	0	0	0	0

A plot for Storey Shear of Structures in Hard Soil in X - Direction with load combination 1.2(DL+LL+EXP) has been shown here

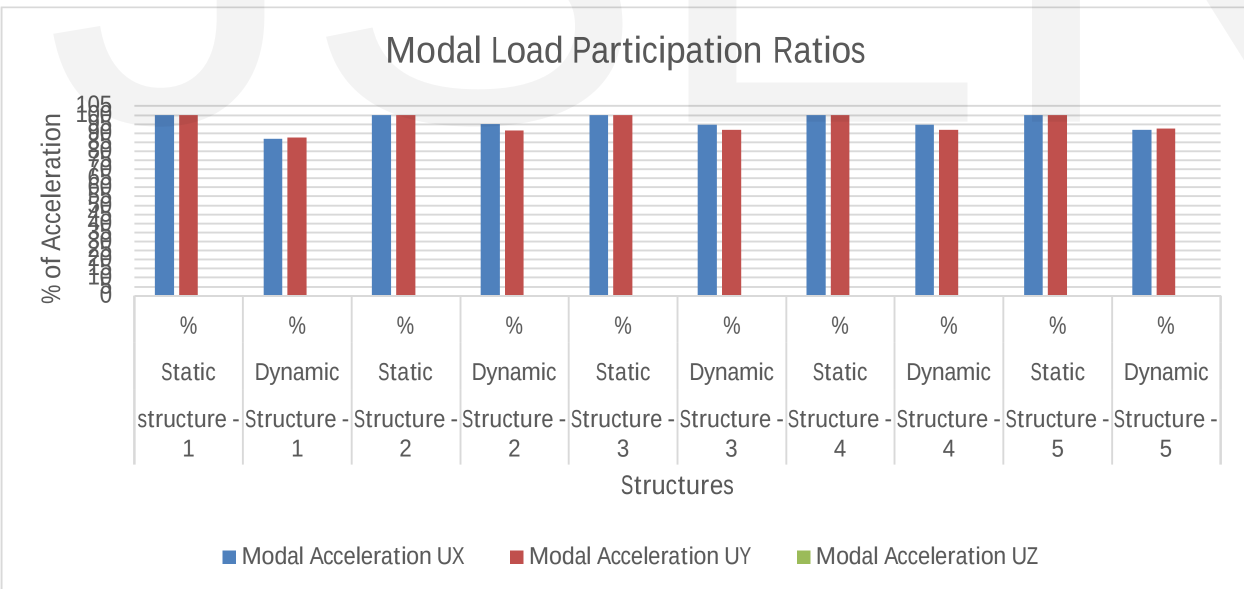


Graph 21: Storey Shear of Structures in Hard Soil in X - Direction

TABLE 23: Modal Load Participation Ratios

TABLE: Modal Load Participation Ratios			structure 1	Structure 1	Structure 2	Structure 2	Structure 3	Structure 3	Structure 4	Structure 4	Structure 5	Structure 5
Case	Item Type	Item	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic
			%	%	%	%	%	%	%	%	%	%
Modal	Acceleration	UX	99.82	86.71	99.99	94.7	99.98	94.59	99.99	94.54	99.97	91.54
Modal	Acceleration	UY	99.79	87.46	99.98	91.46	99.97	91.85	99.97	91.83	99.97	92.51
Modal	Acceleration	UZ	0	0	0	0	0	0	0	0	0	0

A plot for Modal Load Participation Ratios of Structures in Soft Soil , Medium Soil and Hard Soil has been shown here



Graph 6: Modal Load Participation Ratios of Structures in Soft Soil , Medium Soil and Hard Soil

Table 23: Modal Periods and Frequencies

		Structure -1		Structure -2	Structure -2	Structure -3	Structure -3	Structure -4	Structure -4	Structure -5	Structure -5
Case	Mode	Period	Frequency	Period	Frequency	Period	Frequency	Period	Frequency	Period	Frequency
		sec	cyc/sec	sec	cyc/sec	sec	cyc/sec	sec	cyc/sec	sec	cyc/sec
Modal	1	6.298	0.159	5.785	0.173	6.415	0.156	6.375	0.157	6.382	0.157
Modal	2	6.248	0.16	5.606	0.178	6.32	0.158	6.21	0.161	5.694	0.176
Modal	3	5.545	0.18	4.684	0.213	5.767	0.173	5.792	0.173	5.642	0.177
Modal	4	2.062	0.485	1.701	0.588	2.114	0.473	2.102	0.476	2.088	0.479
Modal	5	1.952	0.512	1.547	0.646	1.958	0.511	1.901	0.526	1.565	0.639
Modal	6	1.603	0.624	1.475	0.678	1.568	0.638	1.575	0.635	1.524	0.656
Modal	7	1.191	0.84	0.9	1.112	1.219	0.82	1.212	0.825	1.19	0.84
Modal	8	1.027	0.974	0.838	1.193	1.028	0.972	0.983	1.017	0.791	1.264
Modal	9	0.803	1.245	0.645	1.551	0.82	1.22	0.815	1.226	0.711	1.406
Modal	10	0.782	1.279	0.613	1.632	0.711	1.406	0.714	1.401	0.703	1.423
Modal	11	0.645	1.55	0.5	2.002	0.641	1.56	0.604	1.656	0.565	1.769
Modal	12	0.581	1.72	0.45	2.222	0.592	1.689	0.589	1.697	0.423	2.363

DISCUSSION ON RESULTS

When a structure is subjected to earthquake, it responds by vibrating. An example force can be resolved into three mutually perpendicular directions-two horizontal directions (X and Y directions) and the vertical direction (Z). This motion causes the structure to vibrate or shake in all three directions; the predominant direction of shaking is horizontal. All the structures are primarily designed for gravity loads-force equal to mass time's gravity in the vertical direction. Because of the inherent factor used in the design specifications, most structures tend to be adequately protected against vertical shaking. Vertical acceleration should also be considered in structures with large spans those in which stability for design, or for overall stability analysis of structures. The basic intent of design theory for earthquake resistant structures is that buildings should be able to resist minor earthquakes without damage, resist moderate earthquakes without structural damage but with some non-structural damage. To avoid collapse during a major earthquake, Members must be ductile enough to absorb and dissipate energy by post elastic deformation. Redundancy in the structural system permits redistribution of internal forces in the event of the failure of key elements. When the primary element or system yields or fails, the lateral force can be redistributed to a secondary system to prevent progressive failure.

The structural prototype is prepared and lots of data is been collected from the prototype. All the aspects such as safety of structure in shear, moment and in story drift have been collected. So now to check whether to know whether the structure is safe with established shear walls and all construction of core wall in the center we need to compare the graphical values of structure with the shear wall and a simple rigid frame structure.

Story Drift

Therefore, it is very important for the structure to have sufficient strength against vertical loads together with adequate stiffness to resist lateral forces. So lateral forces due to wind or seismic loading must be considered for tall building design along with gravity forces vertical loads. Tall and slender buildings are strongly wind sensitive and wind forces are applied to the exposed surfaces of the building, whereas seismic forces are inertial (body forces), which result from the distortion of the ground and the inertial resistance of the building. These forces cause horizontal deflection is the predicted movement of a structure under lateral loads and story drift is defined as the difference in lateral deflection between two adjacent stories. Lateral deflection and drift have three effects on a structure; the movement can affect the structural elements (such as beams and columns); the movements can affect non-structural elements (such as the windows and cladding); and the movements can affect adjacent structures. Without proper consideration during the design process, large deflections and drifts can have adverse effects on structural elements, nonstructural elements, and adjacent structures. When the initial sizes of the frame members have been selected, an approximate check on the horizontal drift of the structures can be made. If the rigid frame is slender, a contribution to drift caused by the overall bending of the frame, resulting from axial deformations of the columns, may be significant. If the frame has height width ratio less than 4:1, the contribution of overall bending to the total drift at the top of the structure is usually less than 10% of that due to racking.. Drift problem as the horizontal displacement of all tall buildings is one of the most serious issues in tall building design, relating to the dynamic characteristics of the building during earthquakes and strong winds. Drift shall be caused by the accumulated deformations of each member, such as a beam, column and shear wall. In this study analysis is done with different shape of shear walls to observe the effect on the drift (lateral deflection) of the tall building due to earthquake loading.

Is 1893 Part 1 Codal Provoisions For Storey Drift Limitations

The storey drift in any storey due to the minimum specified design lateral force, with partial load factor of 1.0, shall not exceed 0.004 times the storey height For the purposes of displacement requirements only, it is permissible to use seismic force obtained from the computed fundamental period (T) of the building without the lower bound limit on design seismic force specified in dynamic analysis.

The result obtained from the analysis models will be discussed and compared as follows:

It is observed that

- The time period is 6.298 Sec for structure1 and it is same for different type of soil.
- The Frequency is 0.159 cyc/sec for structure1 and it is same for different type of soil.
- The time period is 5.785 Sec for structure2 and it is same for different type of soil.
- The Frequency is 0.173 cyc/sec for structure2 and it is same for different type of soil.
- The time period is 6.415 Sec for structure3 and it is same for different type of soil.
- The Frequency is 0.156 cyc/sec for structure3 and it is same for different type of soil.
- The time period is 6.375Sec for structure4 and it is same for different type of soil.
- The Frequency is 0.157 cyc/sec for structure4 and it is same for different type of soil.
- The time period is 6.382 Sec for structure5 and it is same for different type of soil.
- The Frequency is 0.157 cyc/sec for structure5 and it is same for different type of soil.

It is observed that

- The percentage of displacement in X& Y direction is more by 35.94 % for structure 1 in medium soil and 66.90 % of model in hard soil compared with model in soft soil.
- The percentage of displacement in X& Y direction is more by 36 % for structure 2 in medium soil and 67 % of model in hard soil compared with model in soft soil.
- The percentage of displacement in X& Y direction is more by 36 % for structure 3 in medium soil and 66.99 % of model in hard soil compared with model in soft soil.
- The percentage of displacement in X& Y direction is more by 44.5 % for structure 4 in medium soil and 77.5 % of model in hard soil compared with model in soft soil.
- The percentage of displacement in X& Y direction is more by 35.77 % for structure 5 in medium soil and 66.5 % of model in hard soil compared with model in soft soil.

It is observed that

- The maximum storey drift in X-direction occurred at storey 13 th for structure1 in hard ,medium and soft soil.
- The percentage of storey drift in X- direction for structure1 is decreased by placing shear wall as shown below :-
- 35.90 % of model in medium soil compared with model in soft soil.
- 66.79 % of model in hard soil compared with model in soft soil.

- The maximum storey drift in X-direction occurred at storey 12 th for structure 2 in hard ,medium and soft soil.
- The percentage of storey drift in X- direction for structure 2 is decreased by placing shear wall as shown below :-
- 36 % of model in medium soil compared with model in soft soil.
- 67 % of model in hard soil compared with model in soft soil.

- The maximum storey drift in X-direction occurred at storey 11 th for structure 3 in hard ,medium and soft soil.
- The percentage of storey drift in X- direction for structure 3 is decreased by placing shear wall as shown below :-
- 35.98 % of model in medium soil compared with model in soft soil.
- 67.02 % of model in hard soil compared with model in soft soil.

- The maximum storey drift in X-direction occurred at storey 11 th for structure 4 in hard ,medium and soft soil.
- The percentage of storey drift in X- direction for structure 4 is decreased by placing shear wall as shown below :-
- 44.5 % of model in medium soil compared with model in soft soil.
- 77.4 % of model in hard soil compared with model in soft soil.

- The maximum storey drift in X-direction occurred at storey 14 th for structure 5 in hard ,medium and soft soil.
- The percentage of storey drift in X- direction for structure 5 is decreased by placing shear wall as shown below :-
- 35.62 % of model in medium soil compared with model in soft soil.
- 66.25 % of model in hard soil compared with model in soft soil.

It is observed that

- There is considerable difference in storey shear force in x-direction for all the structures with a type of soils.
- The value of the storey shear force in x-direction for all the structures decreases with increase in storey level.
- The value of the storey shear force in x-direction for all the structures in soft soil is more compared with the structure in hard and medium soil.

It is observed that

- There is not difference in a storey moment in x-direction for all the structures with a different type of soils.
- There is not difference in a storey moment in y-direction for all the structures with a different type of soils.

6 CONCLUSIONS

In this paper, reinforced concrete shear wall buildings were analyzed with the procedures laid out in IS codes. Seismic performance of building model is evaluated.
From the above results and discussions, following conclusions can be drawn:

- Building with box shape Shear Walls provided at the center core showed better performance in terms of maximum storey displacements and storey drifts.
- Shear Walls must be coinciding with the centroid of the building for better performance. It follows that a centre core Shear wall should be provided.
- The shear wall and it is position has a significant influenced on the time period. The time period is not influenced by the type of soil.
- shear is effected marginally by placing of the shear wall, grouping of shear wall and type of soil. The shear is increased by adding shear wall due to increase the seismic weight of the building.
- Provision of the shear wall, generally results in reducing the displacement because the shear wall increases the stiffness of the building. The displacement is influenced by type and location of the shear wall and also by changing soil condition. The better performance for all the structures with soft soil because it has low displacement.
- The shear force resisted by the column frame is decreasing by placing the shear wall and the shear force resisted by the shear wall is increasing. This can be concluded indirectly by observing the maximum column shear force and moment in both directions.
- As per code, the actual drift is less than permissible drift. The parallel arrangement of shear wall in the center core and outer periphery is giving very good result in controlling drift in both the direction. The better performance for all the structures with soft soil because it has low storey drift.
- The moment resisting frame with shear walls are very good in lateral force such as earthquake and wind force. The shear walls provide lateral load distribution by transferring the wind and earthquake loads to the foundation. And also impact on the lateral stiffness of the system and also carries gravity loads.
- It is evident that shear walls which are provided from the foundation to the rooftop, are one of the excellent mean for providing earthquake resistant to multistory reinforced building with different type of soil.
- The vertical reinforcement that is uniformly distributed in the shear wall shall not be less than the horizontal reinforcement .This provision is particularly for squat walls (i.e. Height-to-width ratio is about 1.0).However ,for walls whit height-to-width ratio less than 1.0, a major part of the shear force is resisted by the vertical reinforcement. Hence ,adequate vertical reinforcement should be provided for such walls.
- It is observed that the There is not difference in a storey moment for all the structures with a different type of soils.
- It is evident from the observing result that for combination loads 1.2(DLLLEQX) maximum value of moment at story one .The Moment is maximum when the shear force is minimum or changes sign.
- Based on the analysis and discussion ,shear wall are very much suitable for resisting earthquake induced lateral forces in multistoried structural systems when compared to multistoried structural systems whit out shear walls. They can be made to behave in a ductile manner by adopting proper detailing techniques.
- For both X and Y directions, the behaviour of the displacement graph is similar for all the structures in Soft Soil , Medium Soil and Hard Soil. The order of maximum storey displacement in both the directions for the models is same.
  - As per Indian standard, Criteria for earthquake resistant design of structures, IS 1893 (Part 1) : 2002, the story drift in any story due to service load shall not exceed 0.004 times the story height. The height of the each storey is 3.5 m. So, the drift limitation as per IS 1893 (part 1) : 2002 is 0.004 X 3.5 m = 14 mm. The models show a similar behaviour for storey drifts as shown in graph.
- According to IS-1893:2002 the number of modes to be used in the analysis should be such that the total sum of modal masses of all modes considered is at least 90 percent of the total seismic mass. Here the maximum mass for structure 2 is 94.7 percent and minimum mass for structure 1 is 86.71 percent.

REFERENCES

[1] Duggal, S.K., "Earthquake Resistant Design of Structures" Oxford University Press, New Delhi 2010

[2] Chopra, A.K., "Dynamics of Structures: Theory and Application to Earthquake Engineering", Pearson Education, 4th edition, 2012.

[3] Bureau of Indian Standars, IS 456 : 2000, "Plain and Reinforced Concrete-Code of practice", New Delhi, India.

[4] Bureau of Indian Standards: IS 13920 : 1993, "Ductile detailing of reinforced concrete structures subjected to seismic forces— Code of Practice", New Delhi, India.

[5] Bureau of Indian Standards: IS 875(part 1) : 1987, "Dead loads on buildings and Structures", New Delhi, India.

[6] Bureau of Indian Standards: IS 875(part 2) : 1987, "Live loads on buildings and Structures",New Delhi, India.

[7] Bureau of Indian Standards: IS 1893 (part 1) : 2002, "Criteria for earthquake resistant design of structures: Part 1 General provisions and buildings", New Delhi, India.

[8] Berkeley "ETABS Integrated Building Design Software", Computers and Structure, Inc., California, USA, February 2003.

[9] Gary R.scarer and Sigmund A.Freeman " Design drifts requirement for long period structures " , 1 3 ' World conference on earth quake engineering Vancouver,B.C, Canada ,Aug 2004 paper no-3292 .

[10] J.L.Humar and S.Yavari "Design of concrete shear wall buildings for earthquake induced torsion". 4'1" structural conference of the Canadian society for civil engineering June-2002.

[11] Mo and Jost ,"the seismic response of multistory reinforced concrete framed shear walls using a nonlinear model" , Volume 15, Structure Engineering , Issue 3, 1993, Pages 155–166 .

[12] Paulay,T., and Priestley, M.J.N., 'Seismic design of reinforced concrete and masonry buildings', 1992.

[13] Anand, N. , Mightraj, C. and Prince Arulraj, G. "Seismic behaviour of RCC shear wall under different soil conditions" Indian geotechnical conference, Dec – 2010, pp 119-120.

[14] Anshuman, S., Dipendu Bhunia, Bhavin Ramjiyani,"Solution of shear wall location in multistory building", International journal of civil and structural engineering, Vol. 4, Issue 5, pp. 22-32 ,2011.

[15] Chandiwala, A., "Earthquake Analysis of Building Configuration with Different Position of Shear Wall", International Journal of Emerging Technology and Advanced Engineering ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 2, Issue 12, December 2012

[16].Chandurkar, P.P., Dr. Pajgade, P.S., "Seismic analysis of RCC building with and without shear wall", International Journal of Modern Engineering Research. Vol. 3, Issue 3, pp. 1805-1810, 2013.

[17]. Rahangdale, H., Satone, S.R., "Design and analysis of multi-storied building with effect of shear wall", International journal of engineering research and application", Vol. 3, Issue 3, pp. 223-232, 2013.