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Study Effective of Wind Load on Behavior of ShearWall in Frame Structure

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ABSTRACT
Wind load is really the result of wind pressures acting on the building surfaces during a wind event. This wind pressure is primarily a function of the wind speed because the pressure or load increases with the square of the wind velocity.Structural walls, or shear walls, are elements used to resist lateral loads, such as those generated by wind and earthquakes. Structural walls are considerably deeper than typical beams or columns. This attribute gives structural walls considerable in-plane stiffness which makes structural walls a natural choice for resisting lateral loads. In addition to considerable strength, structural walls can dissipate a great deal of energy if detailed properly. Walls are an invaluable structural element when protecting buildings from seismic events. Buildings often rely on structural walls as the main lateral force resisting system. Shear walls are required to perform in multiple ways. Shear walls can then be designed to limit building damage to the specified degree. The load-deformation response of the structural walls must be accurately predicted and related to structural damage in order to achieve these performance goals under loading events of various magnitudes. The applied load is generally transferred to the wall by a diaphragm or collector or drag member. The performance of the framed buildings depends on the structural system adopted for the structure The term structural system or structural frame in structural engineering refers to load-resisting sub-system of a structure. The structural system transfers loads through interconnected structural components or members. These structural systems need to be chosen based on its height and loads and need to be carried out, etc. The selection of appropriate structural systems for building must satisfy both strength and stiffness requirements. The structural system must be adequate to resist lateral and gravity loads that cause horizontal shear deformation and overturning deformation. The efficiency of a structural system is measured in terms of their ability to resist lateral load, which increases with the height of the frame. A building can be considered as tall when the effect of lateral loads is reflected in the design. Lateral deflections of framed buildings should be limited to prevent damage to both structural and nonstructural elements. In the present study, the structural performance of the framed building with shear wall will be analysis.
Key words-Wind load,Structural walls ,Shear walls ,frame structure, Seismic Load,frame system

I.INTRODUCTION

1.1Wind Load

Each wind load is determined by a probabilistic-statistical method based on the concept of "equivalent static wind load", on the assumption that structural frames and components/cladding behave elastically in strong wind.Usually, mean wind force based on the mean wind speed and fluctuating wind force based on a fluctuating flow field act on a building. The effect of fluctuating wind force on a building orpart thereof depends not only on the characteristics of fluctuating wind force but also on the size and vibration characteristics of the building or part thereof. These recommendations evaluate the maximum loading effect on a building due to fluctuating wind force by a probabilistic- statistical method, and calculate the static wind load that gives the equivalent effect. The design wind load can be obtained from the summation of this equivalent static wind load and the mean wind load. A suitable wind load calculation method corresponding to the scale, shape, and vibration characteristics of the design object is provided here. Wind load is classified into horizontal wind load for structural frames, roof wind load for structural frames and wind load for components/cladding. The wind load for structural frames is calculated from the product of velocity pressure, gust effect factorand projected area. Furthermore, a calculation method for horizontal wind load for lattice structural frames that stand upright from the ground is newly added. The wind load for components/cladding is calculated from the product of velocity pressure, peak wind force coefficient and subject area. For small-scale buildings, a simplified procedure can be applied. These recommendations introduce the wind directionality factor for calculating the design wind speed for each individual wind direction, thus enabling rational design considering the building's orientation with respect to wind direction. Moreover, the topography factor for turbulence intensity is newly added to take into account the increase of fluctuating wind load due to the increase of fluctuating wind speed. Introduction of the wind directionality factor requires the combination of wind loads in along-wind, across-wind and torsional directions. Hence, it is decided to adopt the regulation for the combination of wind loads in across-wind and along-wind directions, or in torsional and along-wind directions explicitly. Furthermore, a prediction formula for the response acceleration of the building for evaluating its habitability to vibration, which is needed in performance design, and information of 1-year-recurrence wind speed are newly added. Besides, information has been provided for the dispersion of wind load.

1.2 Scope of application

1.2.1 Target strong wind

Most wind damage to buildings occurs during strong winds. The wind loads specified here are applied to the design of buildings to prevent failure due to strong wind. The strong winds that occur in this country are mainly those that accompany a tropical or extra tropical cyclone, and down-bursts or tornados. The former are large-scale phenomena that are spread over about 1000km in a horizontal plane, and their nature is comparatively well known. Down-bursts are gusts due to descending air flows caused by severe rainfall in developed cumulonimbus. Since the scale of these phenomena are very small, few are picked up by the meteorological observation network. It is known that tornados are small-scale phenomena several hundred meters wide at most having a rotational wind with a rapid atmospheric pressure descent. The characteristics of the strong wind and pressure fluctuation caused by tornados are not known. The number of occurrences of down-bursts and tornados is relatively large, but their probability of attacking a particular site is very small compared with that of the tropical or extra tropical cyclones. However, the winds caused by down-bursts and tornados are very strong, so they often fatally damage buildings. These recommendations focus on strong winds caused by tropical or extra tropicalcyclones. However, the minimum wind speed takes into account the influence of tornadoes and down-bursts.

1.2.2 Wind loads on structural frames and wind loads on components/cladding

The wind loads provided in these recommendations is composed of those for structural frames and those for components/cladding. The former are for the design of structural frames such as columns and beams. The latter are for the design of finishing's and bedding members of components/cladding and their joints. Wind loads on structural frames and on components/cladding are different, because there are large differences in their sizes, dynamic characteristics and dominant phenomena and behaviors. Wind loads on structural frames are calculated on the basis of the elastic response of the whole building against fluctuating wind forces. Wind loads on components/cladding are calculated on the basis of fluctuating wind forces acting on a small part. Wind resistant design for components/cladding has been inadequate until now. They play an important role in protecting the interior space from destruction by strong wind. Therefore, wind resistant design for components/cladding should be just as careful as that for structural frames.

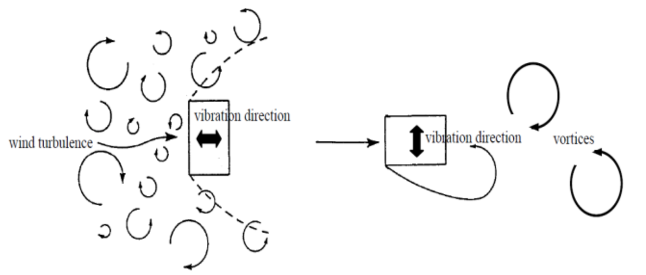
1.3 Estimation principle

1.3.1 Classification of wind load

A mean wind force acts on a building. This mean wind force is derived from the mean wind speed and the fluctuating wind force produced by the fluctuating flow field. The effect of the fluctuating wind force on the building or part thereof depends not only on the characteristics of the fluctuating wind force but also on the size and vibration characteristics of the building or part thereof. Therefore, in order to estimate the design wind load, it is necessary to evaluate the characteristics of fluctuating wind forces and the dynamic characteristics of the building.

The following factors are generally considered in determining the fluctuating wind force.

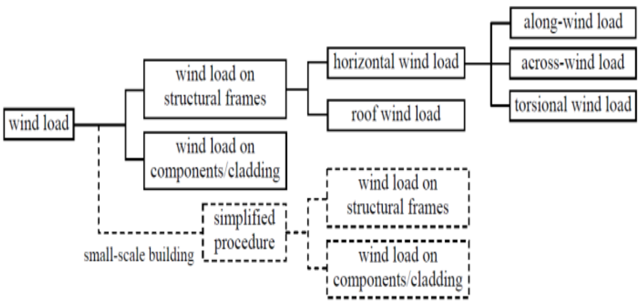
1) wind turbulence (temporal and spatial fluctuation of wind)
2) vortex generation in wake of building
3) interaction between building vibration and surrounding air flow



a) fluctuating wind force caused by wind turbulence
b) fluctuating wind force caused by vortex generation in wake of building

"Fig."**1:**Fluctuating wind force based on wind turbulence and vortex generation in wake of building

Fluctuating wind pressures act on building surfaces due to the above factors. Fluctuating wind pressures change temporally, and their dynamic characteristics are not uniform at all positions on the building surface. Therefore, it is better to evaluate wind load on structural frames based on overall building behavior and that on components/cladding based on the behavior of individual building parts. For most buildings, the effect of fluctuating wind force generated by wind turbulence is predominant. In this case, horizontal wind load on structural frames in the along-wind direction is important. However, for relatively flexible buildings with a large aspect ratio, horizontal wind loads on structural frames in the across-wind and torsional directions should not be ignored. For roof loads, the fluctuating wind force caused by separation flow from the leading edge of the roof often predominates. Therefore, wind load on structural frames is divided into two parts: horizontal wind load on structural frames and roof wind load on structural frames.



"Fig."**2:** Classification of wind load

1.3.2 Combination of wind loads

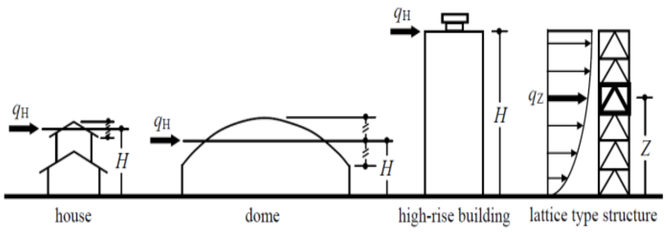
Wind pressure distributions on the surface of a building with a rectangular section are asymmetric even when wind blows normal to the building surface. Therefore, wind forces in the across-wind and torsional directions are not zero when the wind force in the along-wind direction is a maximum. Combination of wind loads in the along-wind, across-wind and torsional directions have not been taken into consideration positively so far, because the design wind speed has been used without considering the effect of wind direction. However, with the introduction of wind directionality, combination of wind loads in the along-wind, across-wind and torsional directions has become necessary. Hence, it has been decided to adopt explicitly a regulation for combination of wind loads in along-wind, across-wind and torsional directions.

1.3.3 Wind directionality factor

Occurrence and intensity of wind speed at a construction site vary for each wind direction with geographic location and large-scale topographic effects. Furthermore, the characteristics of wind forces acting on a building vary for each wind direction. Therefore, rational wind resistant design can be applied by investigating the characteristics of wind speed at a construction site and wind forces acting on the building for each wind direction. These recommendations introduce the wind directionality factor in calculating the design wind speed for each wind direction individually. In evaluating the wind directionality factor, the influence of typhoons, which is the main factor of strong winds in Japan, should be taken into account. However, it was difficult to quantify the probability distribution of wind speed due to a typhoon from meteorological observation records over only about 70 years, because the occurrence of typhoons hitting a particular point is not necessarily high. In these recommendations, the wind directionality factor was determined by conducting Monte Carlosimulation of typhoons, and analysis of observation data provided by the Metrological Agency.

1.3.4 Reference height and velocity pressure

The reference height is generally the mean roof height of the building, as shown in Fig.6.1.3. The wind loads are calculated from the velocity pressure at this reference height. The vertical distribution of wind load is reflected in the wind force coefficients and wind pressure coefficients. However, the wind load for a lattice type structure shall be calculated from the velocity pressure at each height, as shown in Fig.6.1.3.



"Fig."**3:** definition of reference height and velocity pressure

1.3.5 Wind load on structural frames

The maximum loading effect on each part of the building can be estimated by the dynamic response analysis considering the characteristics of temporal and spatial fluctuating wind pressure and the dynamic characteristics of the building. The equivalent static wind load producing the maximum loading effect is given as the design wind load. For the response of the building against strong wind, the first mode is predominant and higher frequency modes are not predominant for most buildings. The horizontal wind load (along-wind load) distribution for structural frames is assumed to be equal to the mean wind load distribution, because the first mode shape resembles the mean building displacement. Specifically, the equivalent wind load is obtained by multiplying the gust effect factor, which is defined as the ratio of the instantaneous value to the mean value of the building response, to the mean wind load. The characteristics of the wind force acting on the roof are influenced by the features of the fluctuating wind force caused by separation flow from the leading edge of the roof andthe inner pressure, which depends on the degree of sealing of the building. Therefore, thecharacteristics of roof wind load on structural frames are different from those of the along-wind load on structural frames. Thus, the roof wind load on structural frames cannot be evaluated by the same procedure as for the along-wind load on structural frames. Here, the gust effect factor is given when the first mode is predominant and assuming elastic dynamic behavior of the roof beam under wind load.

1.3.6 Wind load on components/cladding

In the calculation of wind load on components/cladding, the peak exterior wind pressure coefficient and the coefficient of inner wind pressure variation effect are prescribed, and the peak wind force coefficient is calculated as their difference. Only the size effect is considered. The resonance effect is ignored, because the natural frequency of components/cladding is generally high. The wind load oncomponents/cladding is prescribed as the maximum of positive pressure and negative pressure for each part of the components/cladding for wind from every direction, while the wind load on structural frames is prescribed for the wind direction normal to the building face. Therefore, for the wind load on components/cladding, the peak wind force coefficient or the peak exterior wind pressure coefficient must be obtained from wind tunnel tests or another verification method.

1.3.7 Wind loads in across-wind and torsional directions

It is difficult to predict responses in the across-wind and torsional directions theoretically likealong-wind responses. However, a prediction formula is given in these recommendations based on the fluctuating overturning moment in the across-wind direction and the fluctuating torsional moment for the first vibration mode in each direction.

1.3.8 Vortex induced vibration and aero elastic instability

Vortex-induced vibration and aero elastic instability can occur with flexible buildings or structural members with very large aspect ratios. Criteria for across-wind and torsional vibrations are provided for buildings with rectangular sections. Criteria for vortex-induced vibrations are provided for buildings and structural members with circular sections. If these criteria indicate that vortex-induced vibration or aero elastic instability will occur, structural safety should be confirmed by wind tunnel tests and so on. A formula for wind load caused by vortex-induced vibrations is also provided for buildings or structural members with circular sections.

1.3.9 Small-scale buildings

For small buildings with large stiffness, the size effect is small and the dynamic effect can beneglected. Thus, a simplified procedure is employed.

1.3.10 Effect of neighboring buildings

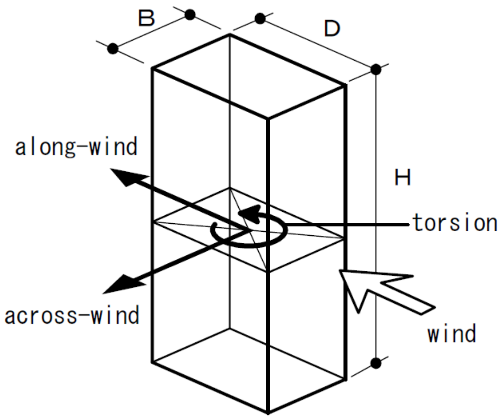
When groups of two or more tall buildings are constructed in proximity to each other, the wind flow through the group may be significantly deformed and cause a much more complex effect than is usually acknowledged, resulting in higher dynamic pressures and motions, especially on neighboring downstream buildings.

1.3.11 Assessment of building habitability

Building habitability against wind-induced vibration is usually evaluated on the basis of themaximum response acceleration for 1-year-recurrence wind speed. Hence, these recommendations show a map of 1-year-recurrence wind speed based on the daily maximum wind speed observed at meteorological stations and a calculation method for response acceleration.

1.3.12 Shielding effect by surrounding topography or buildings

When there are topographical features and buildings around the construction site, wind loads or wind-induced vibrations are sometimes decreased by their shielding effect. Rational wind resistant design that considers this shielding effect can be performed. However, changes to these features during the building’s service life need to be confirmed. Furthermore, the shielding effect should be investigated by careful wind tunnel study or other suitable verification methods, because it is generally complicate and cannot be easily analyzed.Buildings for which particular wind load or wind induced vibration need to be taken intoAccount. Buildings for which horizontal wind loads on structural frames in across-wind and torsional directions need to be taken into account Horizontal wind loads on structural frames imply along-wind load, across-wind load and torsional wind load. Both across-wind load and torsional wind load must be estimated for wind-sensitive buildings that satisfy. Figure 6.1.5 shows the definition of wind direction, 3 component wind loads and building shape.



"Fig."**4:** definition of load and wind direction

Both across-wind vibration and torsional vibration are caused mainly by vortices generated in the building's wake. These vibrations are not so great for low-rise buildings. However, with an increase in the aspect ratio caused by the presence of high-rise buildings, a vortex with a strong period uniformly generated in the vertical direction, and across-wind and torsional wind forces increase. However, with increase in building height, the natural frequency decreases and approaches the vortex shedding frequency. As a result, resonance components increase and building responses become large. In general, responses to across-wind vibration and torsional vibration depending on wind speed increase more rapidly than responses to along-wind vibration. Under normal conditions, along-wind responses to low wind speed are larger than across-wind responses. However, across-wind responses to high wind speed are larger than along-wind responses. The wind speed at which the degrees of along-wind response and across-wind response change places with each other differs depending on the height, shape and vibration characteristics of the building.Wind load is really the result of wind pressures acting on the building surfaces during a wind event. This wind pressure is primarily a function of the wind speed because the pressure or load increases with the square of the wind velocity (i.e., doubling of wind speed results in a four-fold increase in wind load or pressure). Wind load during a hurricane can last hours and a building experiences sustained wind load and short wind impacts (gusts). While the wind pressures are treated as a "static" (do not vary with time) or constant load for purposes of design, the real loads actually fluctuate dramatically with gustiness of wind as well as wind direction. Two fundamental wind effects are of a concern: (1)localized "spikes" in wind pressure that act on small areas of a building to cause damage to items such as roof panels or siding (known as components and cladding wind loads in engineering terms) and (2)averaged wind loads that act on larger areas of the building which the entire structure must resist(known in engineering terms as main wind force resisting system loads). load prone areas. Regardless, the proper amount of bracing is required in both cases.

II.NUMERICAL ANALYSES

2.1 STRUCTURE

G+19 earthquake resistant structure with shear walls

2.2 Geometrical Properties

1.No.of stories of the Building model=20
2.Column size=500 mm x 500 mm
3.Beam size= 700 mm x 500 mm
4.Slab thickness=200mm

2.3 Loads

1.Live Load=3KN/m2
2.Wall Load=12.4KN/m
3.Floor Finishing =1KN/m2
4. Wind load
Wind coefficients
(i) Wind Speed=50m/s
(ii)Terrain Category =2
(iii) Structure Class=B
(iv) Risk Coefficient(k1)=1
(v)Topography(k3)=1
Seismic loading
(i) Seismic zone factor(Z)=0.36
(ii) Soil Type= Medium(II)
(iii) Response Reduction factor(R) =5%
(iv) Story Range=Base to 20
(v) Important factor(I)=1

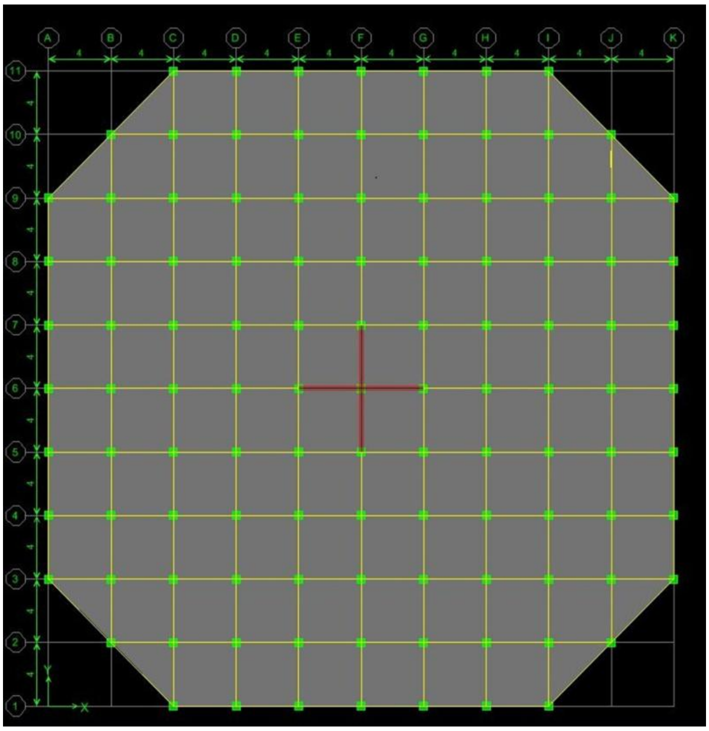
2.4 Material Properties

"Table" **1:** The materials used in structure and their general properties are

Material	Unit weight	Elastic Modulus	Shear Modulus	Poisson Ratio	Thermal expansion coefficient
Text	KN/m3	KN/m2	KN/m2	Unit less	1/C
Concrete	23.563	24855578.28	10356490.95	0.2	0.0000099
Rebar steel	76.973	199947978.8	76903068.77	0.3	0.0000117
Bar steel	76.9730	199947978.8	769030068.77	0.3	0.0000117

2.5Load Combinations

Load combination is the foremost important criteria for designing any structure and more important is the distribution of those loads on to various components of the structure like beams, columns, slabs and in our case shears walls and concrete core wall too. There are many kinds of loads existing depending on the location of the where the structure is to be constructed for example in a place where wind is frequent there we have to consider the wind loads and places where rains are heavy rain loads are included and same way all the other loads such as snow loads, earthquake load and etc. are included however DEAD LOADS, LIVE LOADS AND IMPOSEDLOADS are always included. Dead loads are all common depending on the structural components and specific gravity of the structure, to get the self weight of the structural component volume or area of the component is multiplied by the specific gravity of the component. Live loads depend on the purpose we are constructing the building. Imposed loads depend on the seismic loads, dead loads and according to are 1893 part 1 percentage of those values is finally considered.



"Fig."**5:**Basic Plan of The Building

The following Load Combinations have been considered for the design

1. 1.5(DL+ LL)
2. 1.5(DL ± EQXTP)
3. 1.5(DL ± EQYTP)
4. 1.5(DL ± EQXTN)
5. 1.5(DL ± EQYTN)
6. 1.2(DL + LL ± EQXTP)
7. 1.2(DL + LL ± EQYTP)
8. 1.2(DL + LL ± EQXTN)
9. 1.2(DL + LL ± EQYTN)
10. 1.5(DL ± WLX)
11. 1.5(DL ± WLY)
12. 1.2(DL + LL ± WLX)
13. 1.2(DL + LL ± WLY)

DL – Dead Loa

LL – Live Load

EQTP–Earthqu

With torsion po

EQTN–Earthqu

With torsion ne

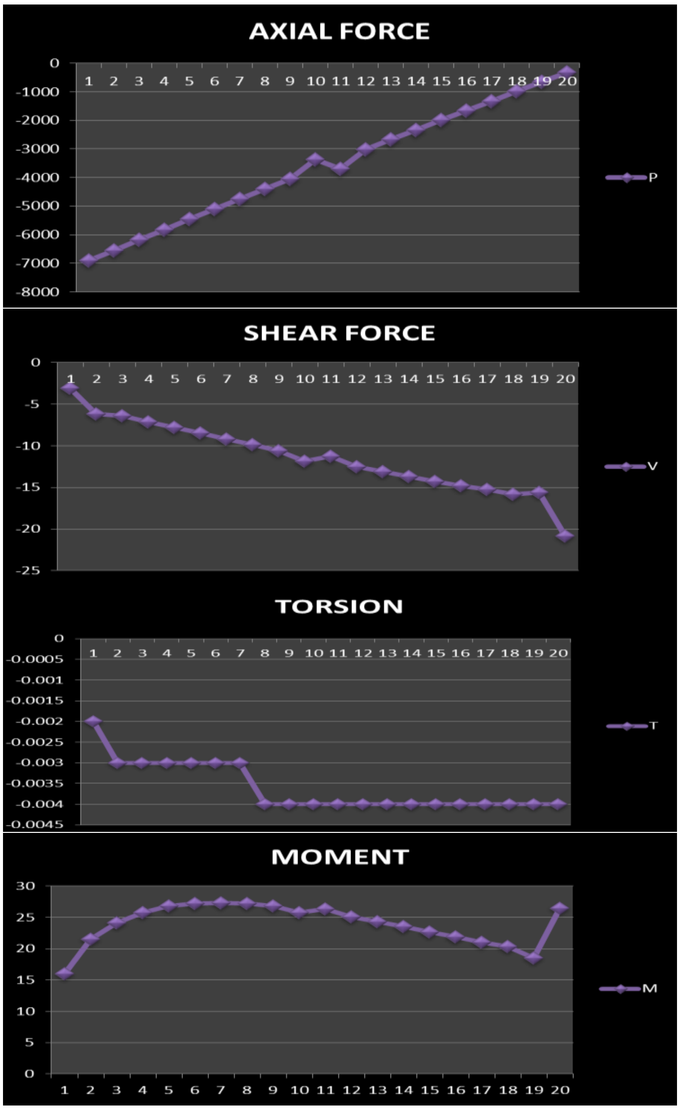
WL- Wind load

"Table" **2:** Axial force, Shear Force, Torsion and Moment for column C1

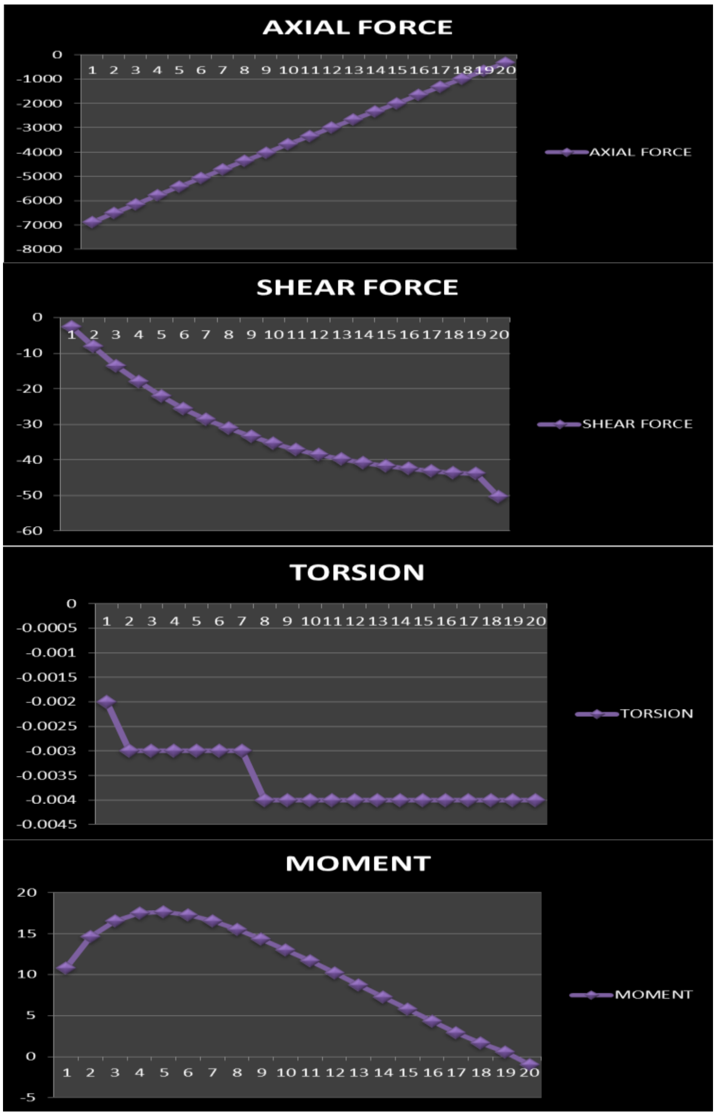
Story	Column	Load	Loc	P	V	T	M
STORY1	C1	1.2DLLLWLX	2.5	-6908.26	-3.11	-0.002	16.038
STORY2	C1	1.2DLLLWLX	2.5	-6543.33	-6.15	-0.003	21.477
STORY3	C1	1.2DLLLWLX	2.5	-6180.25	-6.43	-0.003	24.072
STORY4	C1	1.2DLLLWLX	2.5	-5819.41	-7.12	-0.003	25.804
STORY5	C1	1.2DLLLWLX	2.5	-5461.06	-7.79	-0.003	26.777
STORY6	C1	1.2DLLLWLX	2.5	-5105.23	-8.49	-0.003	27.244
STORY7	C1	1.2DLLLWLX	2.5	-4751.85	-9.19	-0.003	27.348
STORY8	C1	1.2DLLLWLX	2.5	-4400.8	-9.89	-0.004	27.193
STORY9	C1	1.2DLLLWLX	2.5	-4051.9	-10.57	-0.004	26.847
STORY11	C1	1.2DLLLWLX	2.5	-3359.95	-11.89	-0.004	25.753
STORY10	C1	1.2DLLLWLX	2.5	-3705.01	-11.24	-0.004	26.357
STORY12	C1	1.2DLLLWLX	2.5	-3016.59	-12.52	-0.004	25.069
STORY13	C1	1.2DLLLWLX	2.5	-2674.78	-13.13	-0.004	24.322
STORY14	C1	1.2DLLLWLX	2.5	-2334.41	-13.71	-0.004	23.528
STORY15	C1	1.2DLLLWLX	2.5	-1995.35	-14.27	-0.004	22.701
STORY16	C1	1.2DLLLWLX	2.5	-1657.5	-14.8	-0.004	21.86
STORY17	C1	1.2DLLLWLX	2.5	-1320.76	-15.28	-0.004	21
STORY18	C1	1.2DLLLWLX	2.5	-984.99	-15.82	-0.004	20.334
STORY19	C1	1.2DLLLWLX	2.5	-650.08	-15.59	-0.004	18.485
STORY20	C1	1.2DLLLWLX	2.5	-315.63	-20.88	-0.004	26.482

"Table" **3:** Axial force, Shear Force, Torsion and Moment for column C4

Story	Column	Load	Loc	AXIAL FORCE	SHEAR FORCE	TORSION	MOMENT
STORY1	C4	1.2DLLLWLX	2.5	-6894.18	-2.61	-0.002	10.764
STORY2	C4	1.2DLLLWLX	2.5	-6513.07	-8.16	-0.003	14.657
STORY3	C4	1.2DLLLWLX	2.5	-6141.22	-13.51	-0.003	16.58
STORY4	C4	1.2DLLLWLX	2.5	-5776.25	-18.06	-0.003	17.491
STORY5	C4	1.2DLLLWLX	2.5	-5417.05	-22.07	-0.003	17.636
STORY6	C4	1.2DLLLWLX	2.5	-5062.59	-25.55	-0.003	17.26
STORY7	C4	1.2DLLLWLX	2.5	-4712.08	-28.57	-0.003	16.52
STORY8	C4	1.2DLLLWLX	2.5	-4364.86	-31.19	-0.004	15.524
STORY9	C4	1.2DLLLWLX	2.5	-4020.4	-33.46	-0.004	14.349
STORY10	C4	1.2DLLLWLX	2.5	-3678.27	-35.41	-0.004	13.046
STORY11	C4	1.2DLLLWLX	2.5	-3338.11	-37.09	-0.004	11.652
STORY12	C4	1.2DLLLWLX	2.5	-2999.63	-38.53	-0.004	10.204
STORY13	C4	1.2DLLLWLX	2.5	-2662.59	-39.77	-0.004	8.726
STORY14	C4	1.2DLLLWLX	2.5	-2326.78	-40.83	-0.004	7.239
STORY15	C4	1.2DLLLWLX	2.5	-1992.04	-41.73	-0.004	5.763
STORY16	C4	1.2DLLLWLX	2.5	-1658.22	-42.5	-0.004	4.319
STORY17	C4	1.2DLLLWLX	2.5	-1325.2	-43.16	-0.004	2.933
STORY18	C4	1.2DLLLWLX	2.5	-992.95	-43.71	-0.004	1.63
STORY19	C4	1.2DLLLWLX	2.5	-661	-43.86	-0.004	0.562
STORY20	C4	1.2DLLLWLX	2.5	-332.31	-50.37	-0.004	-1.021



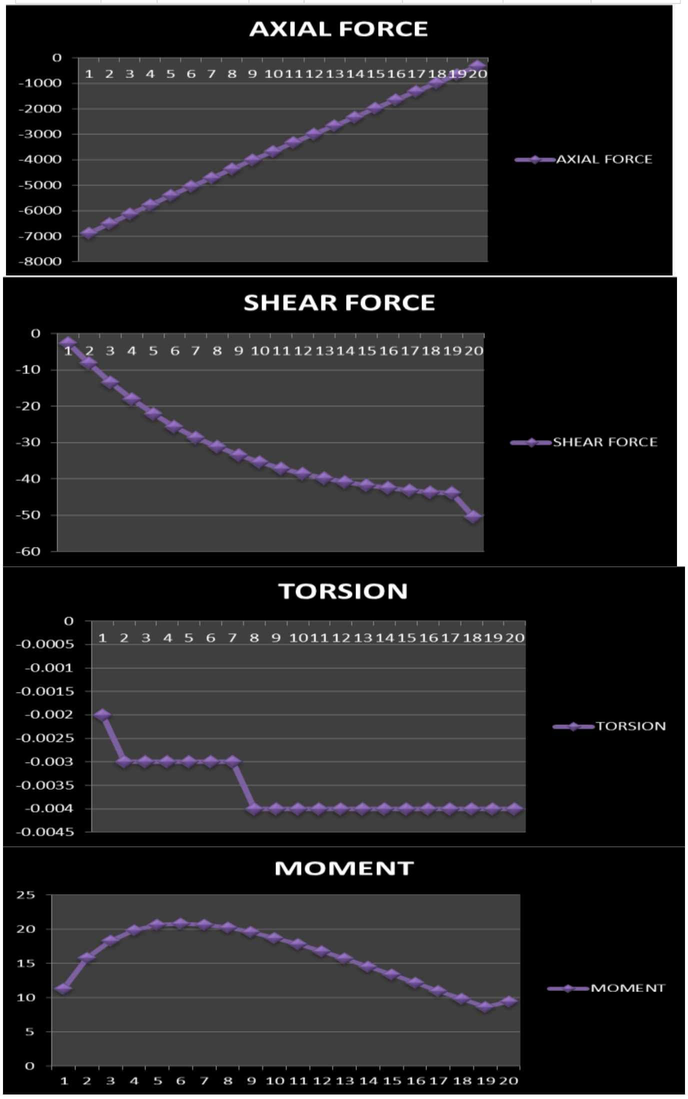
"Fig."**6:**Axial force, Shear Force, Torsion and Moment for column C1



"Fig."**7**: Axial force ,Shear Force, Torsion and Moment for column C4

"Table" **4:**Axial force, Shear Force, Torsion and Moment for column C6

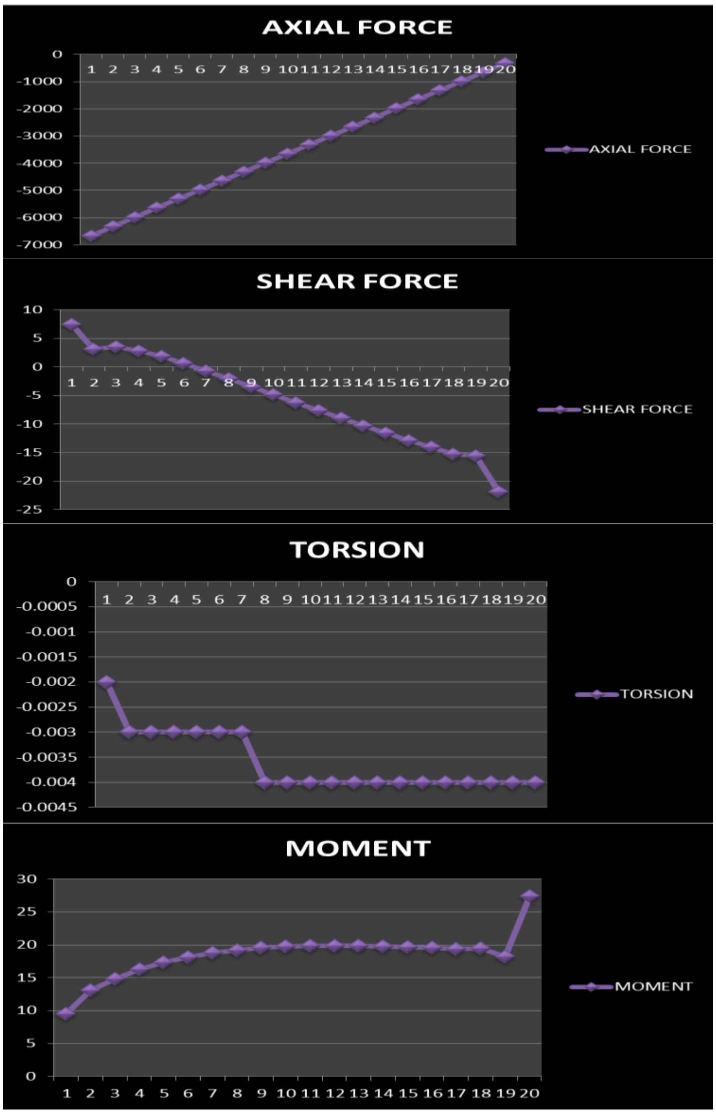
Story	Column	Load	Loc	AXIAL FORCE	SHEAR FORCE	TORSION	MOMENT
STORY1	C6	1.2DLLLWLX	2.5	-6882.81	-2.6	-0.002	11.279
STORY2	C6	1.2DLLLWLX	2.5	-6501.77	-8.13	-0.003	15.804
STORY3	C6	1.2DLLLWLX	2.5	-6130.02	-13.49	-0.003	18.352
STORY4	C6	1.2DLLLWLX	2.5	-5765.21	-18.05	-0.003	19.881
STORY5	C6	1.2DLLLWLX	2.5	-5406.22	-22.05	-0.003	20.63
STORY6	C6	1.2DLLLWLX	2.5	-5052.04	-25.54	-0.003	20.843
STORY7	C6	1.2DLLLWLX	2.5	-4701.85	-28.56	-0.003	20.673
STORY8	C6	1.2DLLLWLX	2.5	-4355.02	-31.19	-0.004	20.226
STORY9	C6	1.2DLLLWLX	2.5	-4011.02	-33.45	-0.004	19.573
STORY10	C6	1.2DLLLWLX	2.5	-3669.41	-35.41	-0.004	18.761
STORY11	C6	1.2DLLLWLX	2.5	-3329.85	-37.09	-0.004	17.826
STORY12	C6	1.2DLLLWLX	2.5	-2992.02	-38.53	-0.004	16.799
STORY13	C6	1.2DLLLWLX	2.5	-2655.7	-39.76	-0.004	15.703
STORY14	C6	1.2DLLLWLX	2.5	-2320.67	-40.82	-0.004	14.554
STORY15	C6	1.2DLLLWLX	2.5	-1986.76	-41.72	-0.004	13.369
STORY16	C6	1.2DLLLWLX	2.5	-1653.82	-42.49	-0.004	12.169
STORY17	C6	1.2DLLLWLX	2.5	-1321.72	-43.16	-0.004	10.974
STORY18	C6	1.2DLLLWLX	2.5	-990.42	-43.7	-0.004	9.835
STORY19	C6	1.2DLLLWLX	2.5	-659.45	-43.85	-0.004	8.631
STORY20	C6	1.2DLLLWLX	2.5	-331.78	-50.38	-0.004	9.473



"Fig."**8:**Axial force, Shear Force, Torsion and Moment for column C6

"Table" **5:**Axial force, Shear Force, Torsion and Moment for column C1

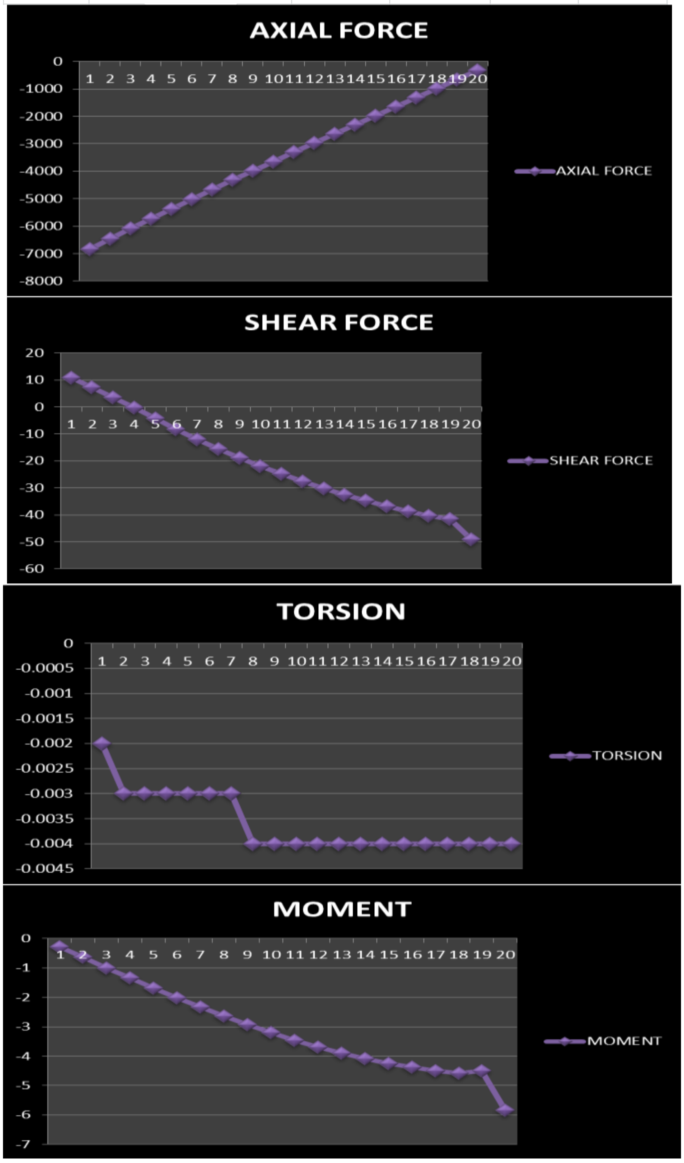
Story	Column	Load	Loc	AXIAL FORCE	SHEAR FORCE	TORSION	MOMENT
STORY1	C1	1.2DLLLWLY	2.5	-6658.58	7.44	-0.002	9.518
STORY2	C1	1.2DLLLWLY	2.5	-6315.76	3.11	-0.003	13.124
STORY3	C1	1.2DLLLWLY	2.5	-5976.3	3.52	-0.003	14.803
STORY4	C1	1.2DLLLWLY	2.5	-5639.57	2.84	-0.003	16.247
STORY5	C1	1.2DLLLWLY	2.5	-5304.78	1.85	-0.003	17.334
STORY6	C1	1.2DLLLWLY	2.5	-4971.38	0.64	-0.003	18.16
STORY7	C1	1.2DLLLWLY	2.5	-4638.94	-0.68	-0.003	18.775
STORY8	C1	1.2DLLLWLY	2.5	-4307.17	-2.06	-0.004	19.219
STORY9	C1	1.2DLLLWLY	2.5	-3975.83	-3.47	-0.004	19.525
STORY10	C1	1.2DLLLWLY	2.5	-3644.71	-4.87	-0.004	19.718
STORY11	C1	1.2DLLLWLY	2.5	-3313.65	-6.26	-0.004	19.819
STORY12	C1	1.2DLLLWLY	2.5	-2982.51	-7.64	-0.004	19.848
STORY13	C1	1.2DLLLWLY	2.5	-2651.17	-8.98	-0.004	19.82
STORY14	C1	1.2DLLLWLY	2.5	-2319.51	-10.3	-0.004	19.749
STORY15	C1	1.2DLLLWLY	2.5	-1987.44	-11.59	-0.004	19.65
STORY16	C1	1.2DLLLWLY	2.5	-1654.86	-12.85	-0.004	19.538
STORY17	C1	1.2DLLLWLY	2.5	-1321.67	-14.04	-0.004	19.404
STORY18	C1	1.2DLLLWLY	2.5	-987.78	-15.28	-0.004	19.465
STORY19	C1	1.2DLLLWLY	2.5	-653.18	-15.62	-0.004	18.207
STORY20	C1	1.2DLLLWLY	2.5	-317.46	-21.83	-0.004	27.411



"Fig."**9:**Axial force ,Shear Force, Torsion and Moment for column C1

"Table" **6:**Axial force, Shear Force, Torsion and Moment for column C4

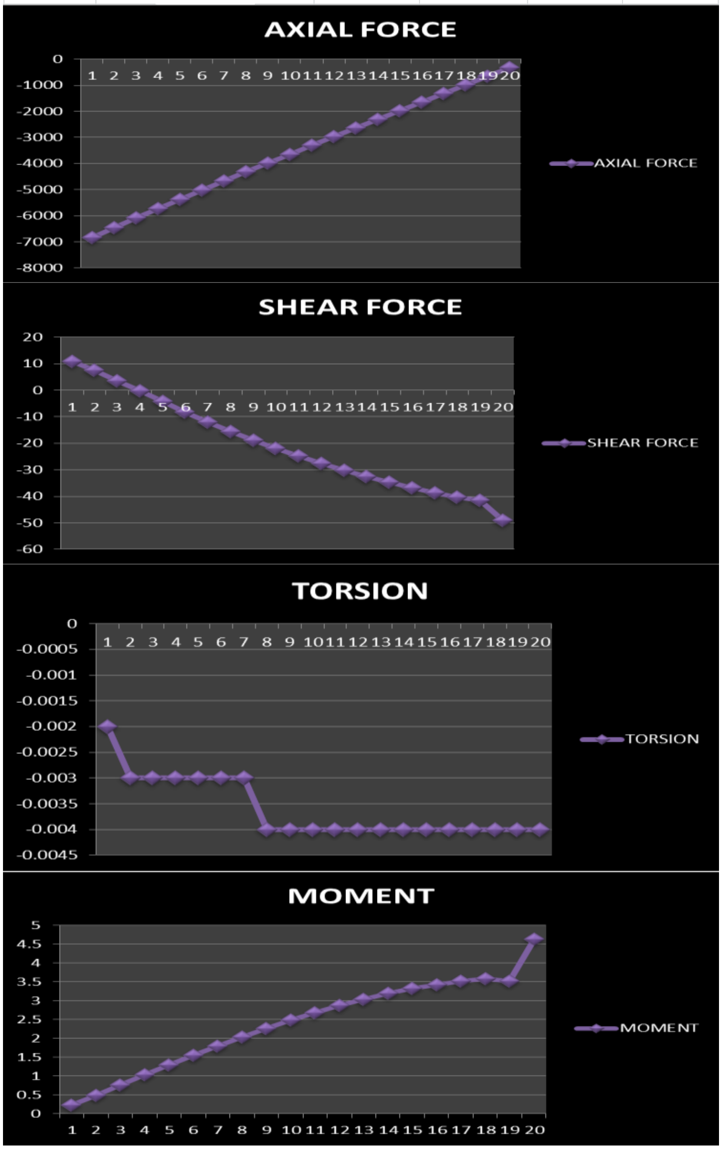
Story	Column	Load	Loc	AXIAL FORCE	SHEAR FORCE	TORSION	MOMENT
STORY1	C4	1.2DLLLWLY	2.5	-6845.07	10.9	-0.002	-0.276
STORY2	C4	1.2DLLLWLY	2.5	-6462.55	7.42	-0.003	-0.646
STORY3	C4	1.2DLLLWLY	2.5	-6090.31	3.6	-0.003	-1
STORY4	C4	1.2DLLLWLY	2.5	-5725.64	-0.26	-0.003	-1.347
STORY5	C4	1.2DLLLWLY	2.5	-5367.4	-4.27	-0.003	-1.687
STORY6	C4	1.2DLLLWLY	2.5	-5014.5	-8.2	-0.003	-2.018
STORY7	C4	1.2DLLLWLY	2.5	-4666.03	-11.97	-0.003	-2.337
STORY8	C4	1.2DLLLWLY	2.5	-4321.26	-15.52	-0.004	-2.642
STORY9	C4	1.2DLLLWLY	2.5	-3979.58	-18.86	-0.004	-2.932
STORY10	C4	1.2DLLLWLY	2.5	-3640.47	-21.98	-0.004	-3.205
STORY11	C4	1.2DLLLWLY	2.5	-3303.52	-24.89	-0.004	-3.458
STORY12	C4	1.2DLLLWLY	2.5	-2968.38	-27.6	-0.004	-3.69
STORY13	C4	1.2DLLLWLY	2.5	-2634.77	-30.13	-0.004	-3.9
STORY14	C4	1.2DLLLWLY	2.5	-2302.45	-32.49	-0.004	-4.086
STORY15	C4	1.2DLLLWLY	2.5	-1971.23	-34.69	-0.004	-4.247
STORY16	C4	1.2DLLLWLY	2.5	-1640.96	-36.75	-0.004	-4.381
STORY17	C4	1.2DLLLWLY	2.5	-1311.51	-38.66	-0.004	-4.486
STORY18	C4	1.2DLLLWLY	2.5	-982.87	-40.39	-0.004	-4.577
STORY19	C4	1.2DLLLWLY	2.5	-654.56	-41.61	-0.004	-4.503
STORY20	C4	1.2DLLLWLY	2.5	-329.7	-49.05	-0.004	-5.844



"Fig."**10:**Axial force ,Shear Force, Torsion and Moment for column C4

"Table" **7:**Axial force, Shear Force, Torsion and Moment for column C6

Story	Column	Load	Loc	AXIAL FORCE	SHEAR FORCE	TORSION	MOMENT
STORY1	C6	1.2DLLLWLY	2.5	-6845.4	10.92	-0.002	0.234
STORY2	C6	1.2DLLLWLY	2.5	-6462.88	7.44	-0.003	0.493
STORY3	C6	1.2DLLLWLY	2.5	-6090.63	3.63	-0.003	0.763
STORY4	C6	1.2DLLLWLY	2.5	-5725.96	-0.24	-0.003	1.031
STORY5	C6	1.2DLLLWLY	2.5	-5367.71	-4.25	-0.003	1.293
STORY6	C6	1.2DLLLWLY	2.5	-5014.8	-8.18	-0.003	1.55
STORY7	C6	1.2DLLLWLY	2.5	-4666.32	-11.94	-0.003	1.799
STORY8	C6	1.2DLLLWLY	2.5	-4321.54	-15.5	-0.004	2.039
STORY9	C6	1.2DLLLWLY	2.5	-3979.84	-18.84	-0.004	2.268
STORY10	C6	1.2DLLLWLY	2.5	-3640.71	-21.96	-0.004	2.485
STORY11	C6	1.2DLLLWLY	2.5	-3303.75	-24.87	-0.004	2.688
STORY12	C6	1.2DLLLWLY	2.5	-2968.59	-27.58	-0.004	2.874
STORY13	C6	1.2DLLLWLY	2.5	-2634.96	-30.11	-0.004	3.043
STORY14	C6	1.2DLLLWLY	2.5	-2302.61	-32.47	-0.004	3.193
STORY15	C6	1.2DLLLWLY	2.5	-1971.37	-34.67	-0.004	3.322
STORY16	C6	1.2DLLLWLY	2.5	-1641.07	-36.73	-0.004	3.43
STORY17	C6	1.2DLLLWLY	2.5	-1311.6	-38.64	-0.004	3.514
STORY18	C6	1.2DLLLWLY	2.5	-982.93	-40.37	-0.004	3.587
STORY19	C6	1.2DLLLWLY	2.5	-654.6	-41.59	-0.004	3.519
STORY20	C6	1.2DLLLWLY	2.5	-329.72	-49.03	-0.004	4.631



"Fig."**11:**Axial force ,Shear Force, Torsion and Moment for column C2

III.DISCUSSION ON RESULTS

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.

The tallness of a structure is relative and cannot be defined in absolute terms either in relation to height or the number of stories. The council of Tall Buildings and Urban Habitat considers building having 9 or more stories as high-rise structures. But, from a structural engineer's point of view the tall structure or multi-storied building can be defined as one that, by virtue of its height, is affected by lateral forces due to wind or earthquake or both to an extent. Lateral loads can develop high stresses, produce sway movement or cause vibration. 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 . 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. In this study analysis is done with changing structural parameters to observe the effect on the lateral deflection of the tall building due to earthquake loading. There are three major types of structures were identified in this study, such as rigid frame, coupled shear wall and wall frame structures

IV. CONCLUSION

- It is evident from the observing result that the shear wall are making value of torsion very low.
- The Moment is maximum when the shear force is minimum or changes sign.
- For the columns located away from the shear wall the torsion is high when compared with the columns connected to the shear wall.
- For the columns located away from the shear wall the Bending Moment is high and shear force is less when compared with the columns connected to the shear wall.
- 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.

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