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Design and Analysis of Shear Wall for 10 Storey Building

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ABSTRACT- The consequences of lateral loads like earthquake loads, wind loads, and blast forces are achieving utmost concern nowadays. It is very important to achieve sufficient stability and strength to counter the lateral loads. It is one of the major problems which is faced by structural designers. Therefore, Proper understanding of the Seismic performance of different types of shear walls is necessary for structural engineers to safeguard the structure against lateral loads. Apart from that it shows the comparison of joint displacements and storey drifts data of building with and without shear walls.It also gives information about ductile detailing using CSI detail software which help us to understand about how structural reinforcement must be given.

I. INTRODUCTION-

Shear wall is a structural member used to resist lateral forces i.e. parallel to the plane of the wall.For slender walls where the bending deformation is more, Shear wall resists the loads due to cantilever action. Shear walls are vertical elements of the horizontal force resisting system.Shear walls are especially important in multi storey buildings subject to wind, earthquake, and lateral forces. Generally, shear walls are either plane or flanged in section, while core walls consist of channel sections. Shear walls provide sufficient strength and stiffness to counter lateral displacements. It works like a vertical cantilever beam that is supported at the ground carrying vertical load together with columns.

OBJECTIVE- To create a model of 10 storey building on ETABS with and without shear wall.
Analyse the both the model on ETABS software and compare the storey drift data of both the models.
Create the ductile detailing of shear wall for 10 storey building.

METHODOLOGY- Creating the model on ETABS v.20 software.
Using Indian Standard codes rules for designing the model.
Checking and analysing the model on ETABS only.
Analysing the deformed shape of the building under various load like dead load , live load, earthquake load, wind load.
Extracting the storey drift data of the building with and without the shear wall. And comparing them in graphs.3D Ductile detailing of shear wall in CSI Detail.

PURPOSE OF SHEAR WALL- Shear walls are mainly used for following purposes:

i. To withstandearthquake and wind loads i.e lateral loads.
ii. To counteruplift and shear forces on the structure.
iii. Shear walls provide adequate stiffness to the building.
iv. Shear wallsincrease the strength and durability of the structure.
v. To combat gravity and vertical loads due to its self-weight and other living or moving loads.
vi. Shear wall enhances the stability of the building.

FORCES ACTING ON SHEAR WALLS

Shear wall mainly resists two types of forces:

i. **Shear Force:** These forcesrise in the buildings due to movement of the ground and due to lateral forces like wind and waves. All these forces act all over the height of the wall.

ii. **Uplift Force:** These are produced on the shear walls due to horizontal forces acting on the top of the wall. Uplift forces tend tolift up one end of the wall and push the other end down.These

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forcesproduce greater effect on high rise walls and less effect on low long walls.

ADVANTAGES AND DISADVANTAGES OF SHEAR WALL

ADVANTAGES	**DISADVANTAGES**
Shear walls provide more stability, stiffness and strength to the building.	It has low stiffness and energy dissipation capacity
Shear wall reduces the lateral sway of the building	They give a flimsy appearance.
Shear walls are easy to construct and easily implemented at site.	Loud banging sounds associated with the buckling of web plates.
They are effective in minimizing earthquake damage in structural and non-structural elements	Requires large moment connections.
They are cost effective, fast construction, and give best performance	Shear walls are difficult to construct sometimes.

LITERATURE REVIEW- U.H. Varyaniexplained about shear wall buildings under horizontal loads. Considering in hisdesign "Reinforced concrete framed buildings are adequate for resisting both the vertical and thehorizontal loads acting on shear walls of a building".
S.K. Duggal on his profound interest on structures gave a detailed description about reinforcedconcrete buildings in his book "Earthquake resistant design of structures "describing a wall in abuilding which resist lateral loads originating from wind or earthquakes are known as shearwalls"
INDIAN STANDARD CODES
I.S 456:2000
As per clause 32, design for wall describes design of horizontal shear in clause 32.4 given details of how shear wall have to be constructed.I.S:1893 Criteria of Earth Quake resistant Buildings Part (3) page 23, clause 4.2 gives the estimation of earth quake loads.

In IS: 13920:1993 it gives the ductile detailing of shear wall as per clause 9, where 9.1 give general requirements.
9.2 shear strength
9.3 give flexural strength
9.6 give openings in shear walls.

Ductile detailing, as per the code IS: 13920:1993 is considered very important as the ductile detailing gives the amount of reinforcement required and the alignment of bars.

IMPORTANT CODAL PROVISIONS USED FOR DESIGNING SHEAR WALLS
IS 456:2000

1.The minimum thickness of the wall shall be 100 mm. (Page 61 Clause 32.1)
2.Connections between the wall and the lateral supports are designed to resist horizontal force not less than
i) the simple static reactions to the total applied horizontal forces at the level of lateral support
ii) 2.5 percent of the total vertical load that the wall is designed to carry the level of lateral support. (Page 61 Clause 32.2.1)
3. The design of a wall shall take account of the actual eccentricity of the vertical force subjected to a minimum value of 0.05t. (where t is thickness of the wall) (Page 61 Clause 32.2.2)
4. The ratio of effective height to thickness. H_w/t does not exceed 30. Where H_w is effective height of wall. (Page 61 Clause 32.2.3)
5.Walls subjected to horizontal forces perpendicular to the wall and for which the design axial load does not exceed 0.04. fck Ag shall be designed as slabs. (Page 62 Clause 32.3.2)

6. The critical section for maximum shear shall be taken at a distance from the base of 0.5 L_w or 0.5 H_w whichever is less. (Page 62 Clause 32.4.1)
7.The nominal shear stress τvw in walls shall be obtained as follows:

$\tau_{vw} = V_u / t.d$
where
V_u = shear force due to design loads.
t= wall thickness.
d = 0.8 x L_w where L_w is the length of the wall
(Page 62 Clause 32.4.2)
8.Under, no circumstances there shall the nominal shear stress τ_{vw} in walls exceed 0.17fck in limit state method and 0 12fck in working stress method. (Page 62 Clause 32.4.2.1).

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9.The reinforcement for walls shall be provided as below:
a) the minimum ratio of vertical reinforcement to gross concrete area shall be:
i) 0.0012 for deformed bars not larger than 16 mm in diameter and with a characteristic strength of 415 N/mm2 or greater.
ii) 0.0015 for other types of bars.
iii) 0.0012 for welded wire fabric not larger than 16 mm in diameter,
b) Vertical reinforcement shall be spaced not further apart than three times the wall thickness nor 450mm.
c) The minimum ratio of horizontal reinforcement to gross concrete area shall be:
i) 0.0020 for deformed bars not larger than 16 mm in diameter and with a characteristic strength of 415 N/mm2Nmm2 or greater.
ii) 0.0025 for other types of bars.
iii) 0.002 for welded wire fabric not larger than 16 mm in diameter.3) 0.0020 for welded wire fabric not larger than 16 mm in diameter.
iv) Horizontal reinforcement shalt be spaced not further farther apart than three times the wall thickness nor 450 mm.(Page 62-63 Clause 32.5)
10.For walls having thickness more than 200 mm, the vertical and horizontal reinforcement shall be provided in two grids, one near each face of the wall. (Page 63 Clause 32.5.1)
11.Vertical reinforcement need not be enclosed by transverse reinforcement as given in 26.5.3.2 for column. if the vertical reinforcement is not greater than 0.01 times the gross sectional area or where the vertical reinforcement is not required for compression. (Page 63 Clause 32.5.2).

IS CODE 13920:1993
1. The thickness of any part of the wall shall preferably, not be less than 150 mm. (Page 12 Clause 9.1.2)
2. The effective flange width, to be used in the design of flanged wall sections, shall be assumed to extend beyond the face of the web for a distance which shall be the smaller of:
(a) half the distance to an adjacent shear wall web, and
(b) 1/10th of the total wall height.(Page 12 Clause 9.1.3)
3. Shear walls shall be provided with reinforcement in the longitudinal and transverse directions in the plane of the wall. The minimum reinforcement ratio shall be 0.0025 of the gross area in each direction. This reinforcement shall be distributed uniformly across the cross section of the wall. (Page 12 Clause 9.1.4)
4. If the factored shear stress in the wall exceeds 0.25 fck or if the wall thickness exceeds 200 mm, reinforcement shall be provided in two curtains, each having bars running in the longitudinal and transverse directions in the plane of the wall.(Page 12 Clause 9.1.5)
5. The diameter of the bars to be used in any part of the wall shall not exceed l/10th of the thickness of that part. (Page 12 Clause 9.1.6)
6. The maximum spacing of reinforcement in either direction shall not exceed the smaller of $l_w/5$, $3t_w$, and 450 mm; where lw is the horizontal length of the wall, and t_w is the thickness of the wall web. (Page 12 Clause 9.1.7)The nominal shear stress, τ_v shall be calculated as:
$T_v = V_u / t_w .d_w$
where V_u = factored shear force,
t_w = thickness of the web, and
d_w= effective depth of wall section.
This may be taken as 0.8 l_w , for rectangular sections.(Page 12 Clause 9.2.1)
7. The design shear strength of concrete,τ_c, shall be calculated as per Table 13 of IS 456. (Page 12 Clause 9.2.2
8. The nominal shear stress in the wall, τ_v, shall not exceed τ_c max, as per Table 14 of IS 456. (Page 12 Clause 9.2.3)
9. When $\tau_v$is greater than τ_c, the area of horizontal shear reinforcement, A_h, to be provided within a vertical spacing. S_v, is given byV_{us} = 0.87 fy $A_h d_w$ / S_v
(Page 12 Clause 9.2.5)
10. The vertical reinforcement, that is uniformly distributed in the wall, shall not be less than the horizontal reinforcement. (Page 12 Clause 9.2.6)
11. The cracked flexural strength of the wall section should be greater than its untracked flexural strength. (Page 12 Clause 9.3.2)
12. In walls that do not have boundary elements, vertical reinforcement shall be concentrated at the ends of the wall. Each concentration shall consist of a minimum of 4 bars of 12 mm diameter arranged in at least 2 layers. (Page 12 Clause 9.3.3)
13. Boundary elements are portions along the wall edges that are strengthened by longitudinal and transverse reinforcement. Though they may have the same thickness as that of the wall web it is advantageous to provide them with greater thickness. (Page 12 Clause 9.4)
14. If the gravity load adds to the strength of the wall, its load factor shall be taken as 0.8. (Page 13 Clause 9.4.3)
15. The percentage of vertical reinforcement in the boundary elements shall not be less than 0-8 percent, nor greater than 6 percent. In order to

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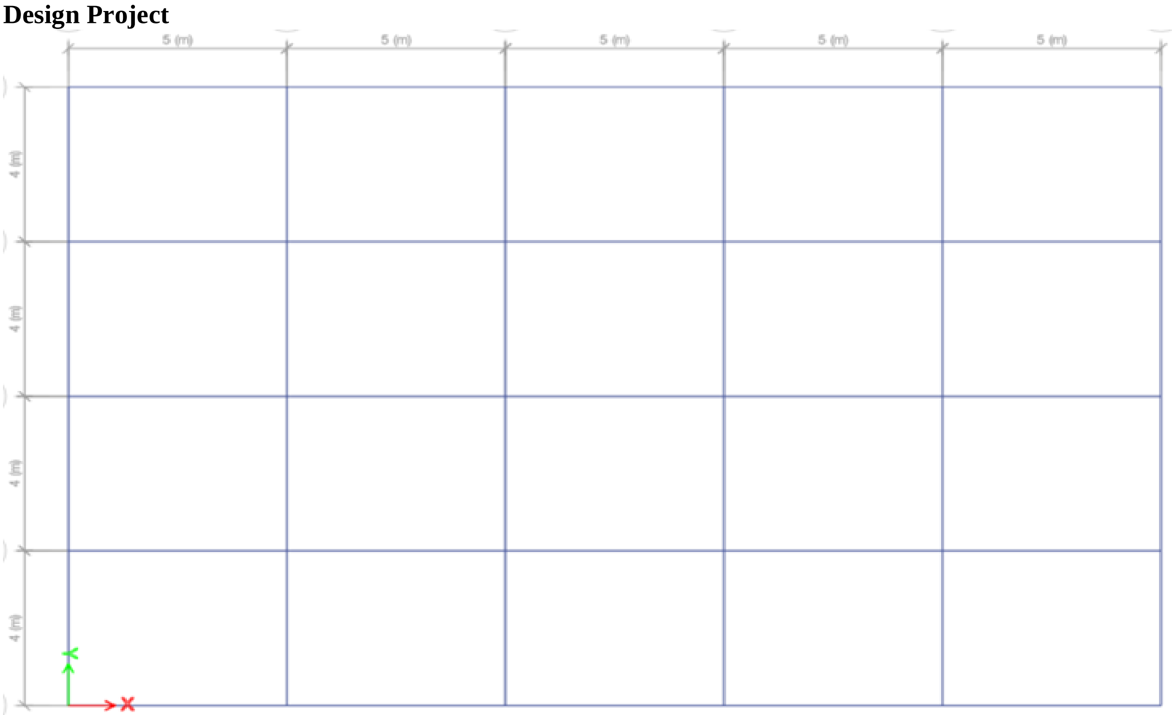
avoid congestion, the practical upper limit would be 4 percent. (Page 13 Clause 9.4.4)
16. The diagonal or horizontal bars of a coupling beam shall be anchored in the adjacent walls with an anchorage length of 1.5 times the development length in tension. (Page 13 Clause 9.5.3)
17. The shear strength of a wall with openings should be checked along critical planes that pass-through openings.(Page 13 Clause 9.6.1)
18. Columns supporting discontinuous walls shall be provided with special confining reinforcement. (Page 13 Clause 9.7)
19. Horizontal reinforcement shall be anchored near the edges of the wall or in the confined core of the boundary elements. (Page 13 Clause 9.9.1).
20. Lateral ties shall be provided around lapped spliced bars that are larger than 16mm in diameter. The diameter of the tie shall not be less that one fourth that of the spliced bar nor less than 6mm. The spacing of ties shall not exceed 150mm center to center.

Design a 10 storey Commercial Building 25m X 16m of area 400 meter square.
Design Shear wall for the building. Construct shear wall on all sides of the building on ETABS.
Design and Analyse beam and column. Create Ductile detailing of Shear wall, beams and columns in CSI detail.
Also Create the 25m X 16m building of 10 storey with the same sizes of Beam and columns but in this building, we will not create the Shear wall. All the other details and loading in the building will be same as the above model.
Analyse both the building model and calculate the Joint Displacement and Story Drifts Data.
Comparison of the Joint displacement and Storey Drift data on Excel sheet and create graphical representation both the data.
Find Shear Force Diagram and Bending moment diagram of the building elements on ETABS.
Find the deformed shape diagram of the building under various load combinations, Dead load, Live load, Earthquake load, Wind load.

Design Project



SPECIFICATIONS OF THE BUILDING

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Grade of Concrete = M30 Grade of Reinforcing Steel = HYSD Fe 500 Grade of Confining Steel = MS Fe 250 Dimensions of Beam = 400mm x600mm Dimensions of Columns = 550mm x 750mm Thickness of Slab = 150mm Thickness of Shear Wall = 200mm Height of Bottom Storey = 3m Height of Remaining storey = 3m Location = Raipur, Chhattisgarh Dead Load = 1KN/m^2 Live Load = 3KN/m^2 Density of Concrete = 25 KN/m^3 Seismic Zone = Zone 2 Site Type = Type II	Type of Soil = Medium (Type II) Importance Factor = 1 Response Reduction Factor = 5 RCC Design Code = IS 456: 2000 Steel Design Code = IS 800:2007 Earthquake Design Code= IS 1893:2016 (Part I) Wind Load Design Code = IS 875 (Part III) Wind Pressure Coefficient = 0.8 (Windward Side) Wind Pressure Coefficient = 0.5 (Leeward Side) Design Wind Speed = 30m/s Terrain Category = II Risk Coefficient k_1 = 1 Topography Factor = 1

DESIGN LOAD COMBINATIONS USED-

i. 1.5 (DL + LL) ii. 1.2 (DL +LL + WL_X) iii. 1.2 (DL + LL + WL_Y) iv. 1.2 (DL + LL + EQ_X) v. 1.2 (DL + LL+ EQ_Y)	vi. 0.9 (DL + LL + WLX) vii. 0.9 (DL + LL + WLY) viii. 0.9 (DL + LL + EQX) ix. 0.9 (DL + LL + EQY)

DL = Dead Load	WLY = Wind Load in Y direction
LL = Live Load	EQX = Earthquake Load in X direction
WLX = Wind Load in X direction	EQY = Earthquake Load in Y direction

LOAD CALCULATIONS

1.Load on **SLAB**

Self-weight of SLAB = 0.150m x 25 KN/m3 = 3.75 KN/m

Where 150 mm is the thickness of the slab. And 25 KN/m3 is Unit weight of concrete

2. Load on **BEAM**

Self-weight of Beam = 0.4 x 0.6m x 25 KN/m3 = 6KN/m

Where 400x600mm is the size of beam. And 25 KN/m3 is Unit weight of concrete.

3.Load on **COLUMN**

Self-weight of Column = 0.55x0.75m x 25 KN/m3 = 10.31 KN/m

Where 550x750mm is the size of the column. And 25 KN/m3 is Unit weight of concrete

4. Load of **FLOOR FINISHES**

Self-Weight of Floor Finishes = 0.50m x 20KN/m3 = 1 KN/m

Where 50mm is the floor thickness. And 20 KN/m3 is the Unit Weight of Mortar.

5. Load of **WALLS**

a)**External Wall Loads** = 0.23m x 20 KN/m3 x 3 = 13.8 KN/m

Where 230mm is Thickness of Brick wall

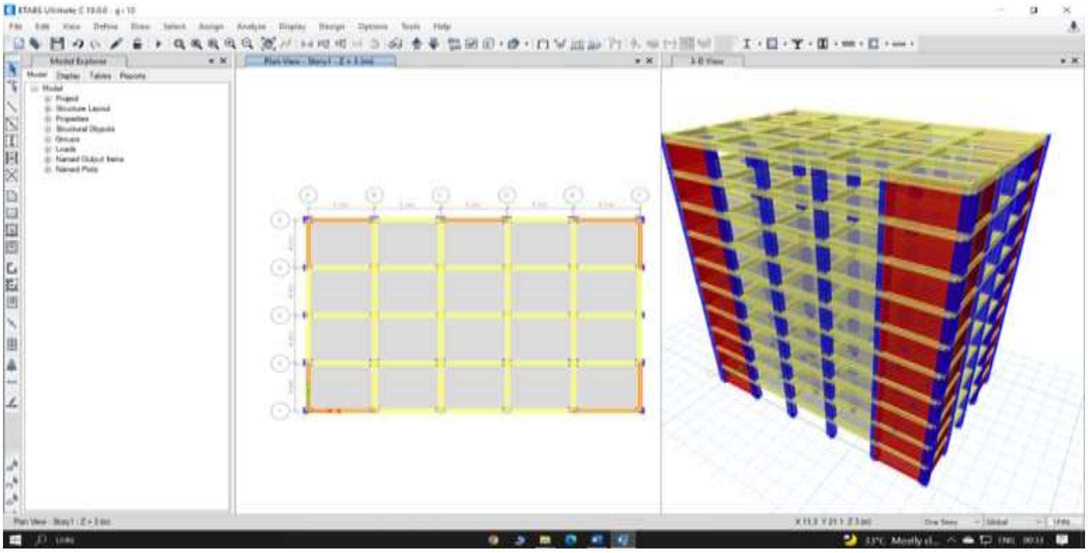
20 KN/m3 is the Unit Weight of Mortar. And 3 metre is height of the wall

b)**Internal Wall Loads** = 0.125m x 20KN/m3 x 3m = 7.5KN/m

Where 125mm is thickness of Partition Wall

20 KN/m3 is the Unit Weight of Mortar. And 3 metre is height of the wall.

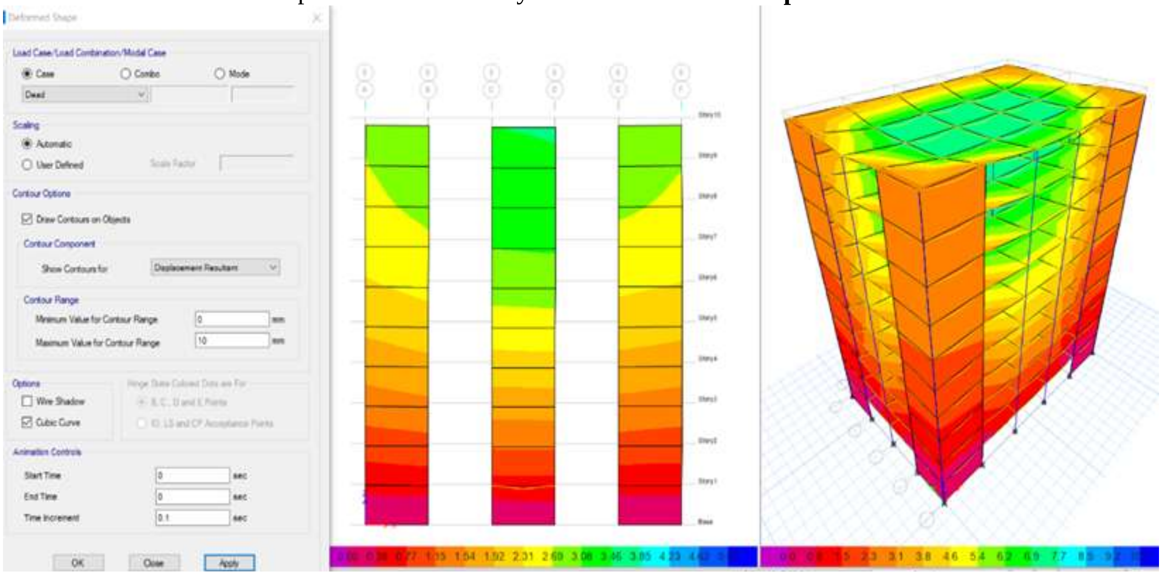
c)**Parapet Wall Load** = 0.125m x 20KN/m3 x 1.2m = 3KN/m
Where 125mm is thickness of Partition Wall
20 KN/m3 is the Unit Weight of Mortar. And 3 metre is height of the wall
Total Load = 13.8 + 20+ 3 = 24.3 KN/m.



We have created a 10-storey building including all the elements like shear walls, columns, beams and slabs. After that we will apply all the loads on respectives columns, beams , slabs and shear walls. Then after that we analyze the structure. And chek Joint Displacement and storey drift data of the building with and without shear wall and compare their values. After that we will do the ductile detailing of beams, columns and shear walls on the CSI Detail software.

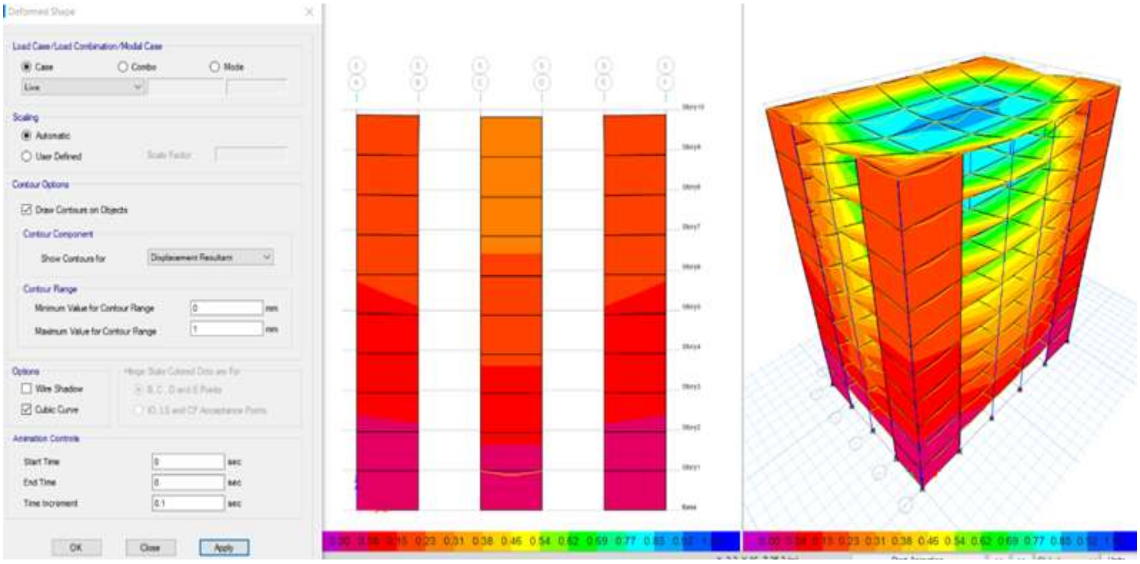
OUTPUT DETAILS FROM THE ANALYSIS

Deformed shaped due to Dead Load



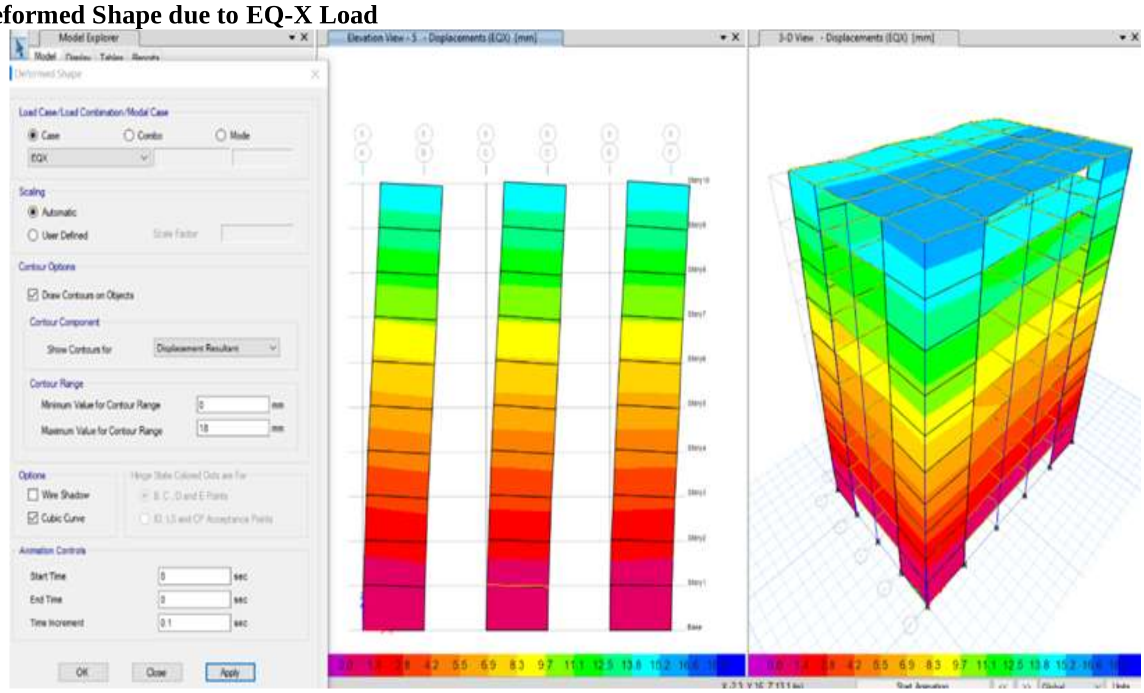
Contour Range 0 – 10 mm. As we can see maximum displacement is around center of the structure which is around 7mm.

Deformed Shape due to Live Load



Contour Range 0-1 mm. As we can see maximum displacement is around center of the structure which is around 1mm.

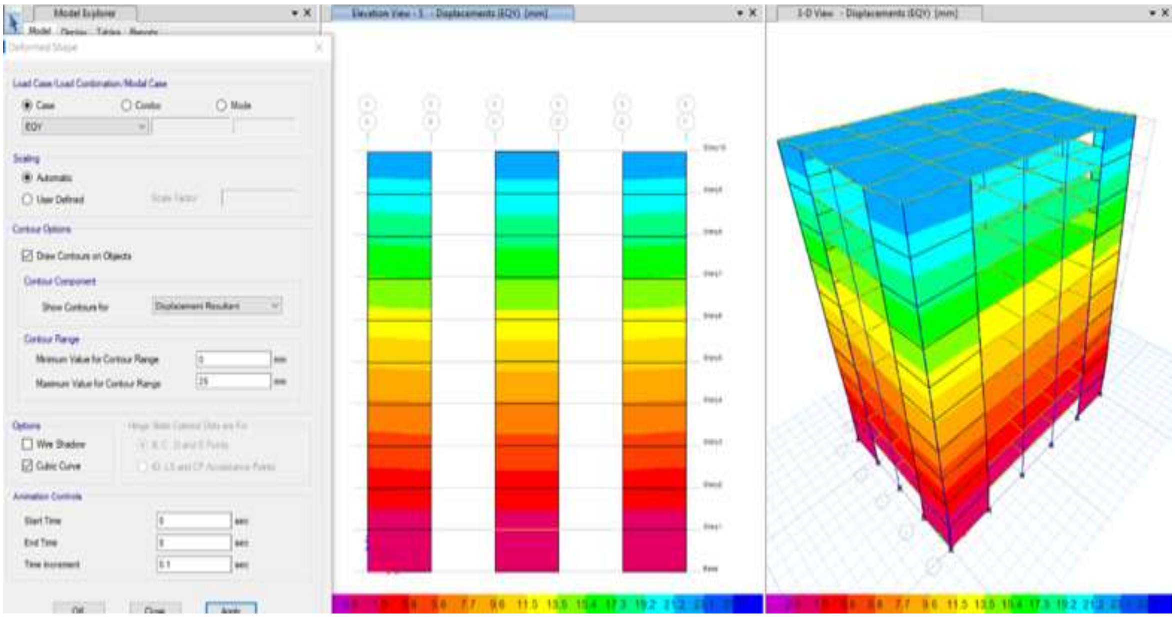
Deformed Shape due to EQ-X Load



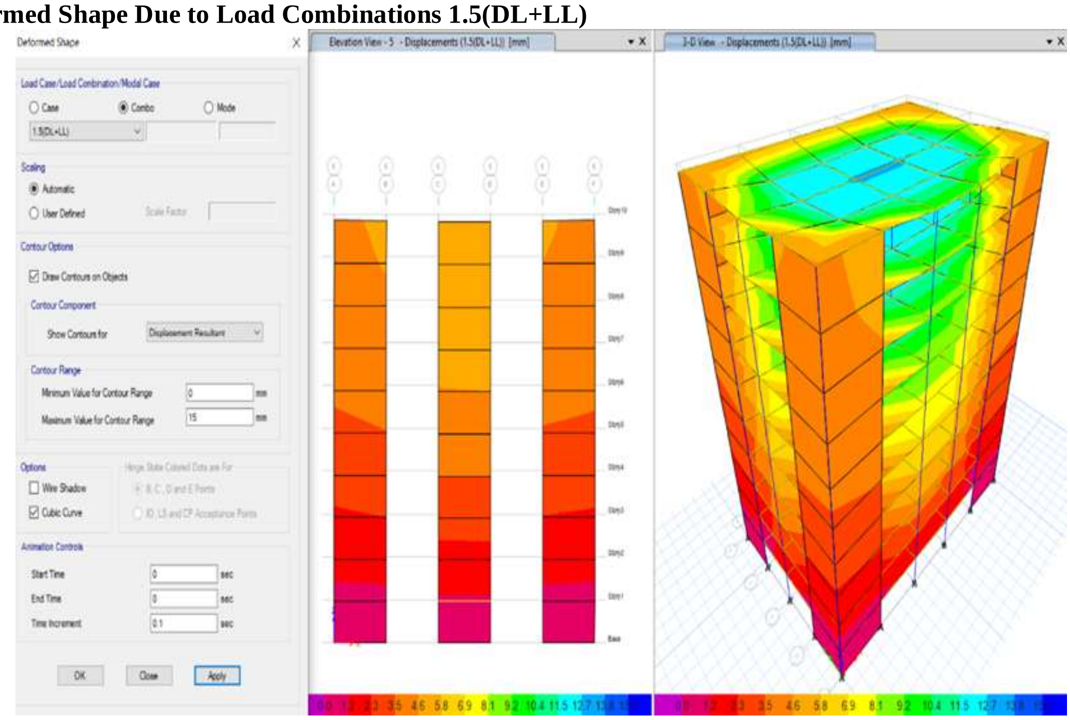
Contour Range 0-18mm. Maximum Displacement = 16 to 17mm at top floor toward Right.

Deformed Shape Due to EQ-Y Load

Contour Range = 0-25mm. Maximum Displacement = 20-22 mm at top floor toward Back.



Deformed Shape Due to Load Combinations 1.5(DL+LL)



Contour Range = 0-15mm. Maximum Displacement = 13-14 mm at top floor toward Center.

Deformed Shape Due to Load Combination 0.9(DL+LL+EQX)

Contour Range = 0-15mm. Maximum Displacement =14 mm at top floor toward Right

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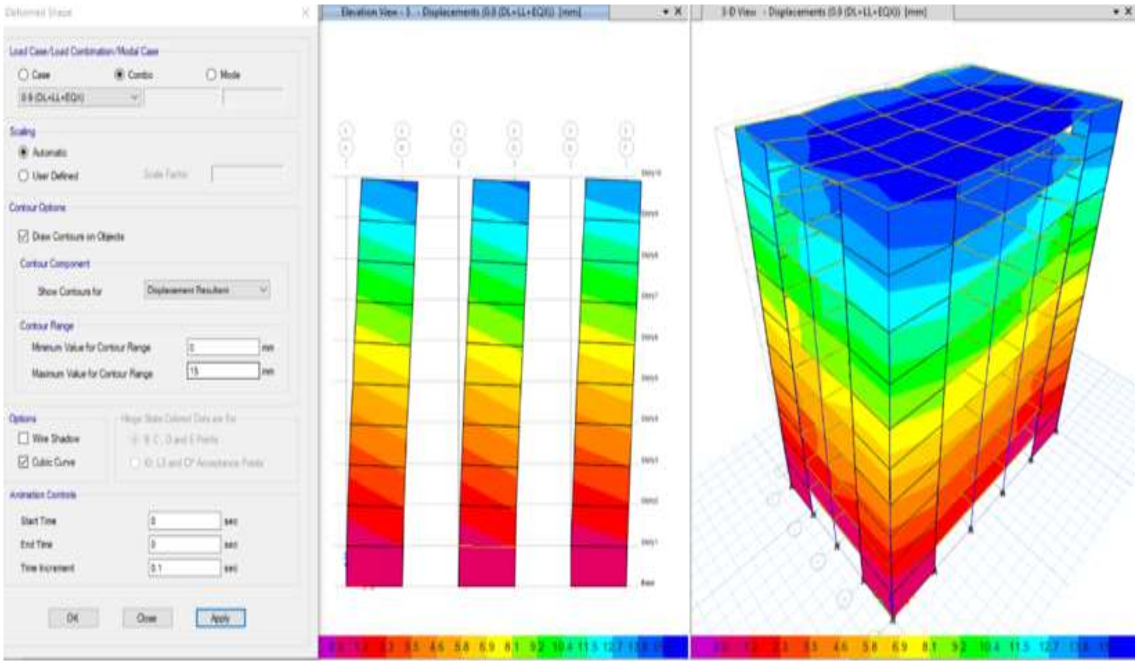
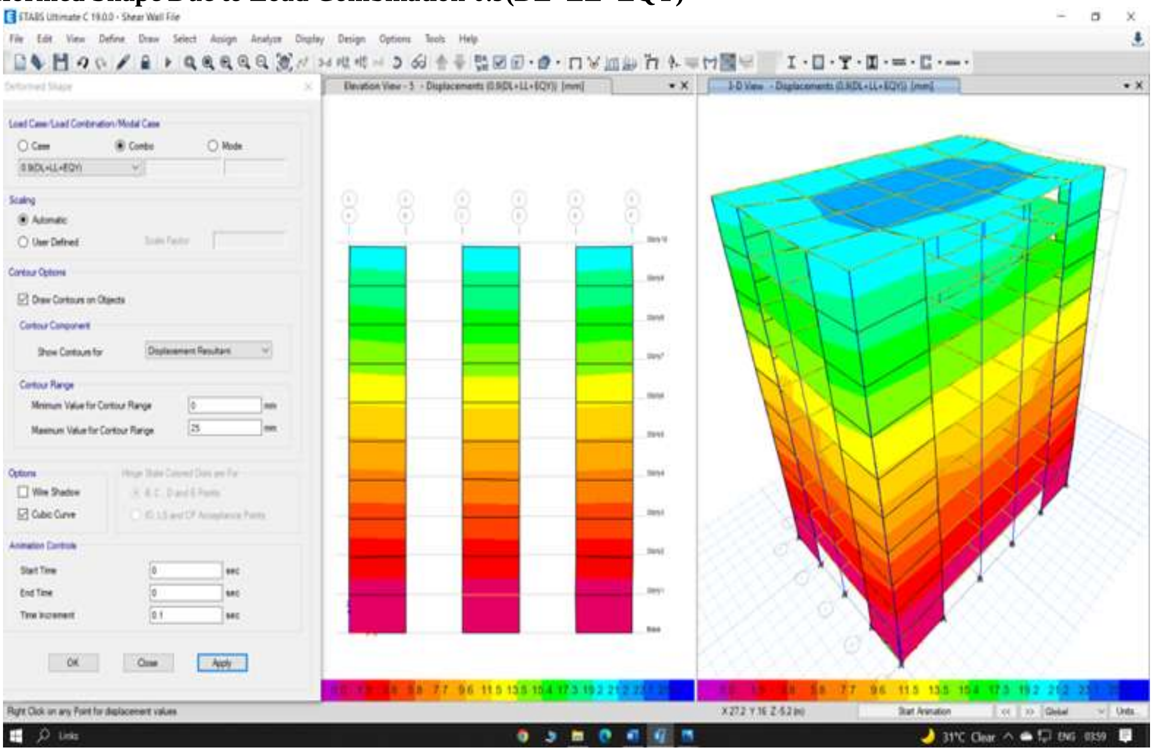


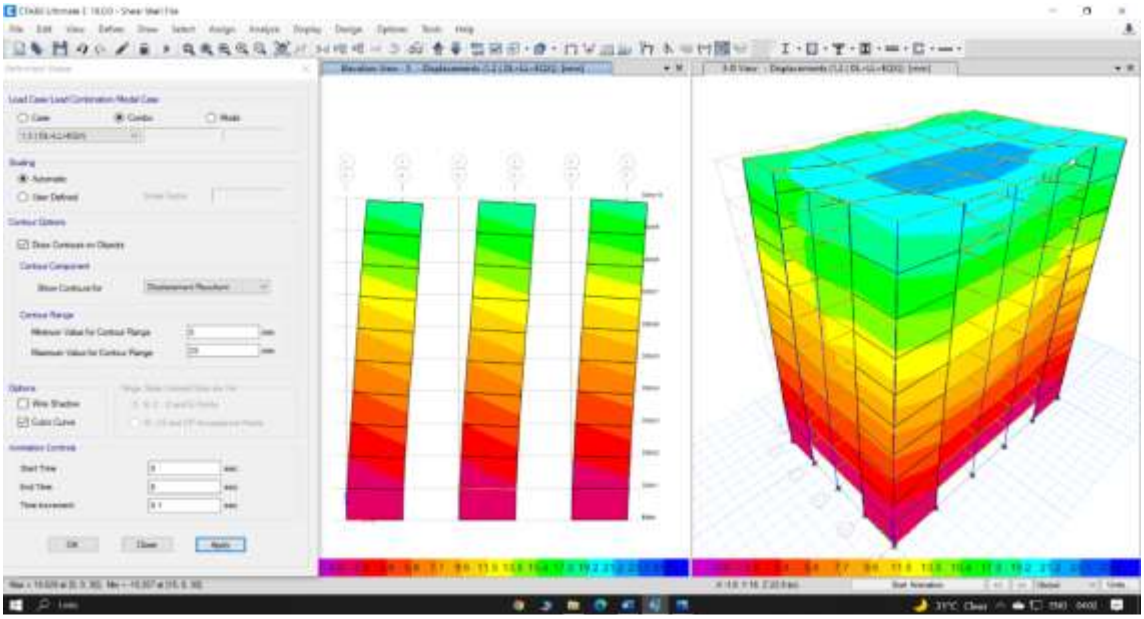
Deformed Shape Due to Load Combination 0.9(DL+LL+EQY)



Contour Range = 0-25mm. Maximum Displacement =21 mm at top floor toward Center.

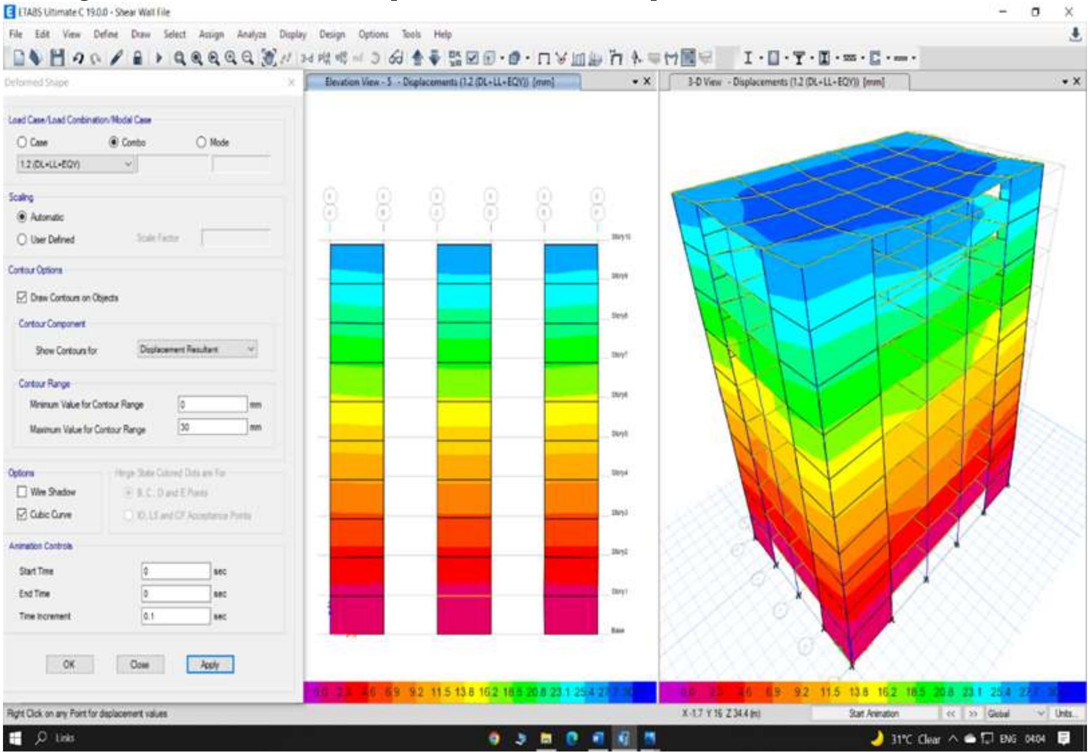
Deformed Shape Due to Load Combination 1.2(DL+LL+EQX)

Contour Range = 0-25mm. Maximum Displacement =22 mm at top floor toward Center.



Deformed Shape Due to Load Combination 1.2(DL+LL+EQY)

Contour Range = 0-30mm. Maximum Displacement =28 mm at top floor toward Center.



SHEAR FORCE AND BENDING MOMENT DIAGRAM DUE TO DEAD LOAD

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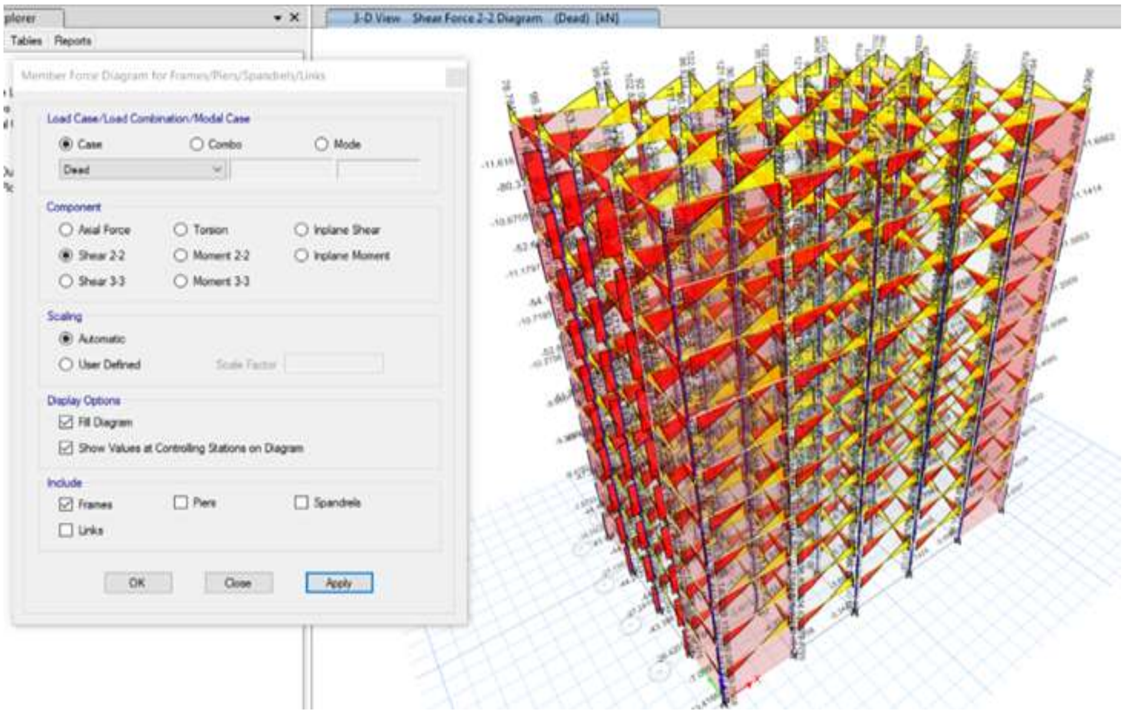
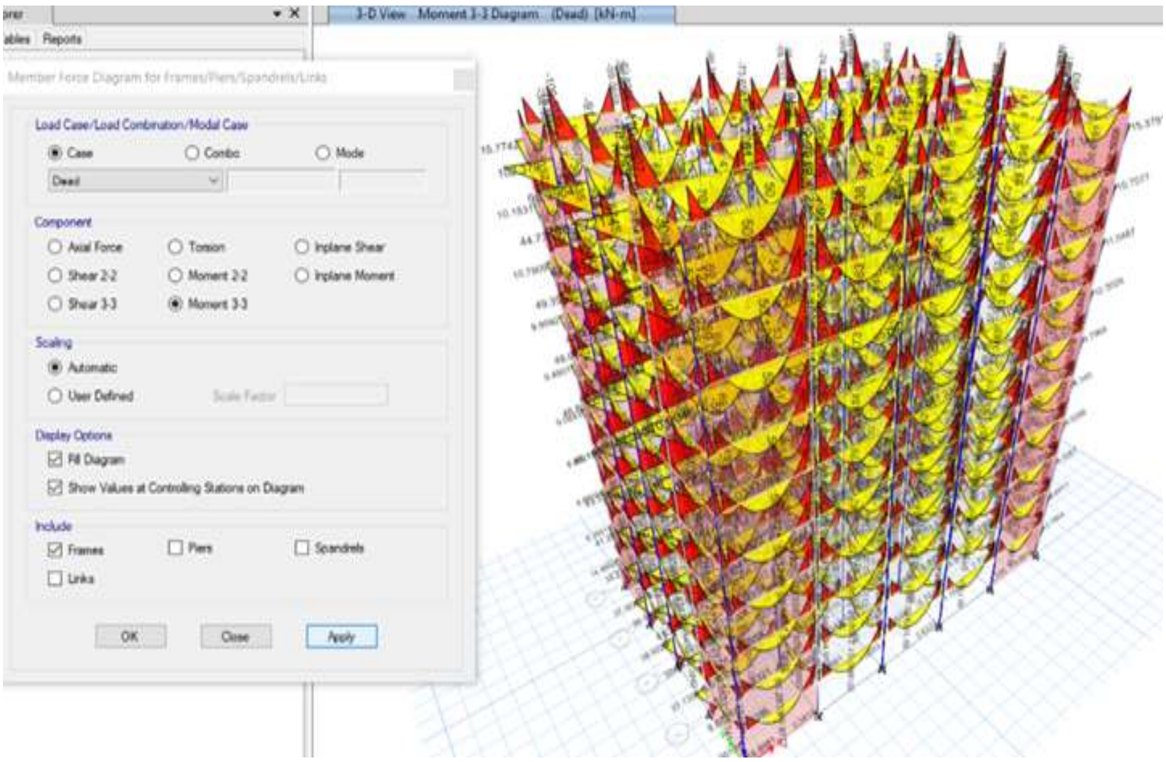


SFD due to Dead Load



BMD due to Dead Load

Ductile Detailing of the Building
Beam

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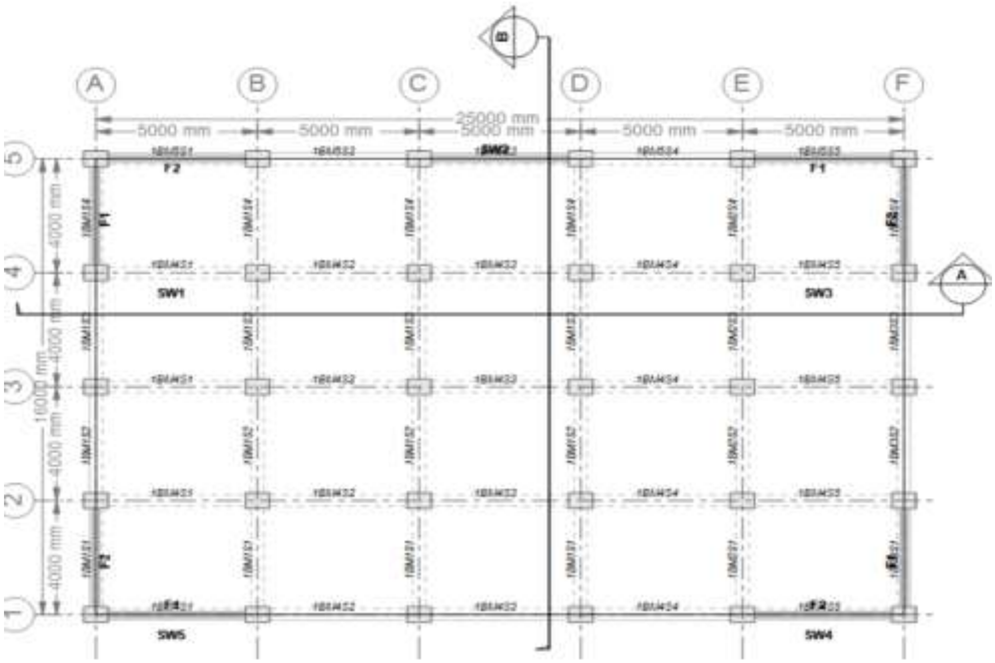

Floor Framing Plan - Story1 (EL. 3000 mm)
(Scale = 1:200)

CONCRETE BEAM REBAR TABLE (SEISMIC) (26 OF 26)

BEAM ID	SPAN NO.	SPAN LENGTH, LC (MM	SECTION SIZE		LONGITUDINAL BARS								L1 (MM)	L2 (MM)	STIRRUPS (ZONE A AND ZONE B ARE SIMILAR TO ZONE C UNLESS OTHERWISE)			TYPICAL ELEVATIONS
			WIDTH (	DEPTH (	A	B	C	D	E	F	G	H			ZONE A	ZONE B	ZONE C	
1BM3	1	3625	400	600	2-20 (600)	-	-	-	2-20 (600)	2-20 (600)	-	-	-	-	15-12 @ 125 MM TYPE A (1.5)	-	-	ELEVATION 35
	2	3450	400	600	-	-	2-20 (600)	-	2-20 (600)	-	-	-	-	-	24-12 @ 125 MM TYPE A (1.3)	-	-	ELEVATION 35
	3	3450	400	600	-	-	2-20 (600)	-	2-20 (600)	-	-	-	-	-	14-12 @ 125 MM TYPE A (1.5)	-	-	ELEVATION 35
	4	3625	400	600	2-20 (600)	-	2-20 (600)	-	-	2-20 (600)	-	-	-	-	12-12 @ 100 MM TYPE A (1.0)	-	5-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
1BM4	1	4425	400	600	2-20 (671)	1-20	-	-	2-20 (600)	2-20 (600)	-	-	1106	-	15-12 @ 75 MM TYPE A (2.3)	-	11-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	2	4250	400	600	-	-	2-20 (671)	1-20	2-20 (600)	-	-	-	-	1063	15-12 @ 75 MM TYPE A (2.0)	-	10-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	3	4250	400	600	-	-	2-20 (600)	-	2-20 (600)	-	-	-	-	-	15-12 @ 75 MM TYPE A (2.0)	-	10-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	4	4250	400	600	-	-	2-20 (600)	-	2-20 (600)	-	-	-	-	-	15-12 @ 75 MM TYPE A (2.0)	-	10-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	5	4425	400	600	2-20 (671)	1-20	2-20 (671)	1-20	-	2-20 (600)	-	-	1106	1106	15-12 @ 75 MM TYPE A (2.3)	-	11-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
1BM5	1	4425	400	600	2-20 (662)	1-20	-	-	2-20 (600)	2-20 (600)	-	-	1106	-	12-12 @ 100 MM TYPE A (1.0)	-	11-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	2	4388	400	600	-	-	2-20 (662)	1-20	2-20 (600)	-	-	-	-	1097	10-12 @ 125 MM TYPE A (1.5)	-	8-12 @ 200 MM TYPE A (1.0)	ELEVATION 35
	3	4388	400	600	-	-	2-20 (671)	1-20	2-20 (600)	-	-	-	-	1097	12-12 @ 100 MM TYPE A (1.0)	-	10-12 @ 150 MM TYPE A (1.3)	ELEVATION 35
	4	4250	400	600	-	-	2-20 (671)	1-20	2-20 (600)	-	-	-	-	1063	10-12 @ 125 MM TYPE A (1.5)	-	7-12 @ 200 MM TYPE A (1.0)	ELEVATION 35
	5	4425	400	600	2-20 (662)	1-20	2-20 (662)	1-20	-	2-20 (600)	-	-	1106	1106	15-12 @ 75 MM TYPE A (2.3)	-	11-12 @ 150 MM TYPE A (1.3)	ELEVATION 35

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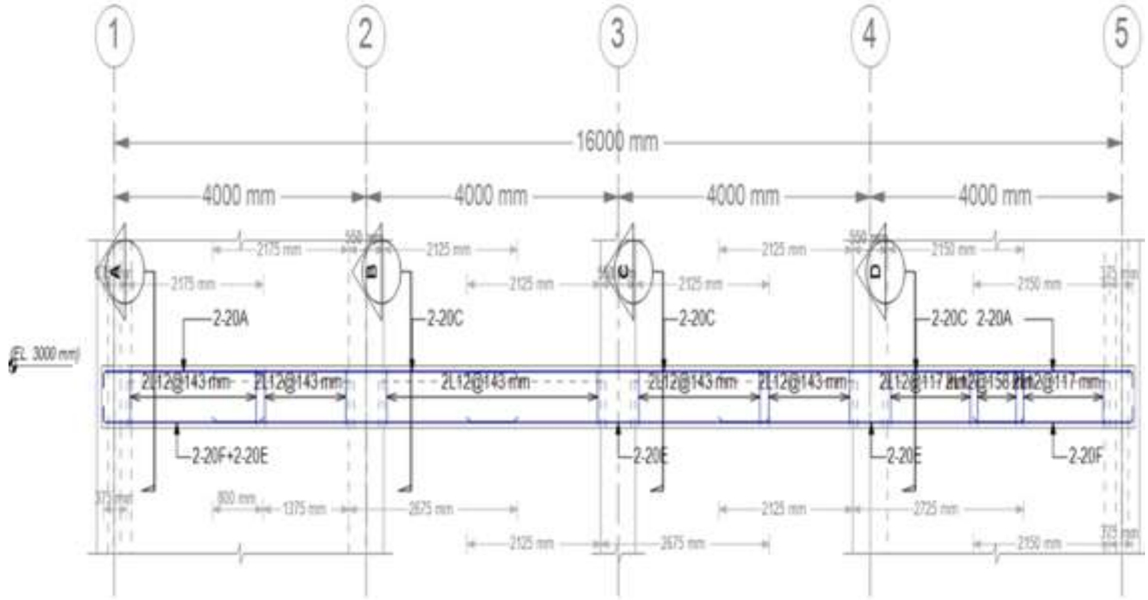
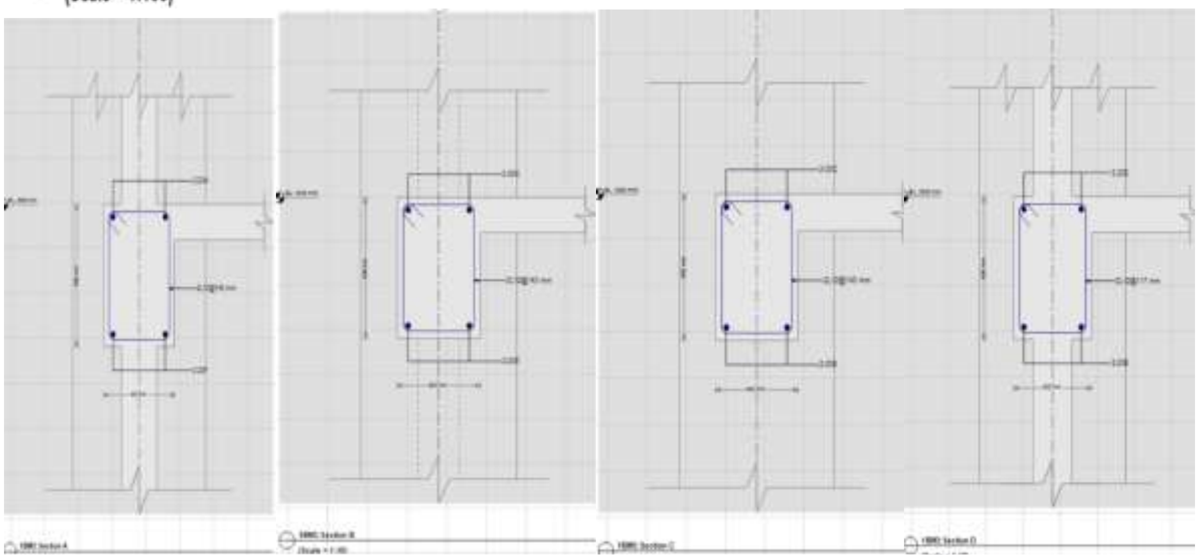


1BM3:Elevation
(Scale = 1:100)



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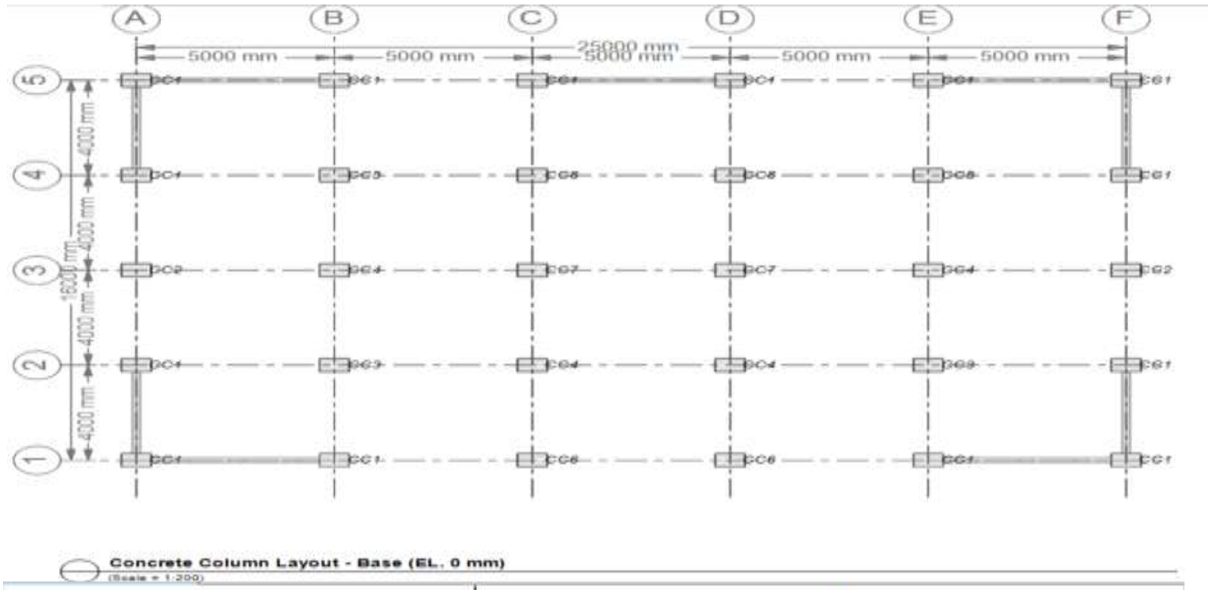
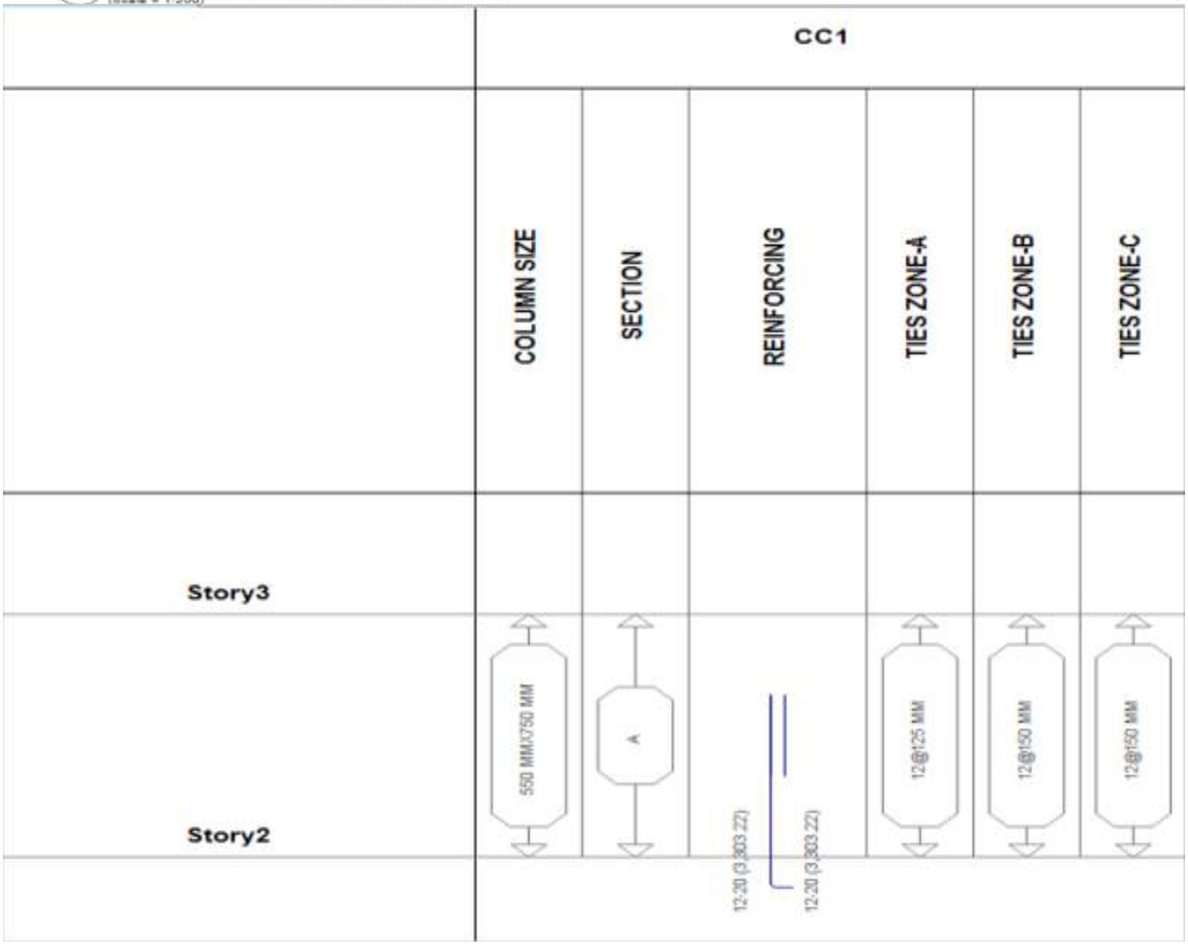
Rebar Cage view of Beam

Column





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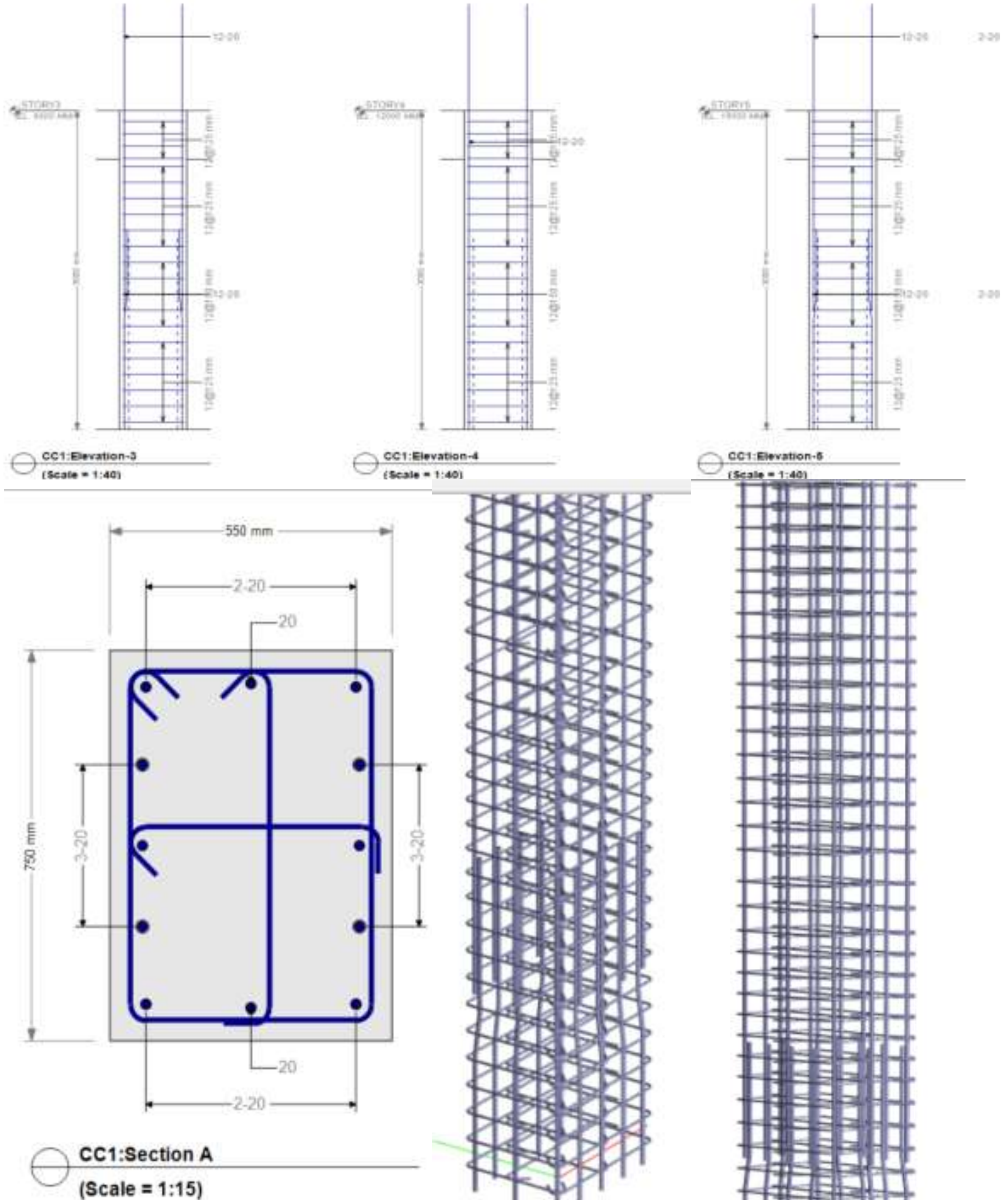
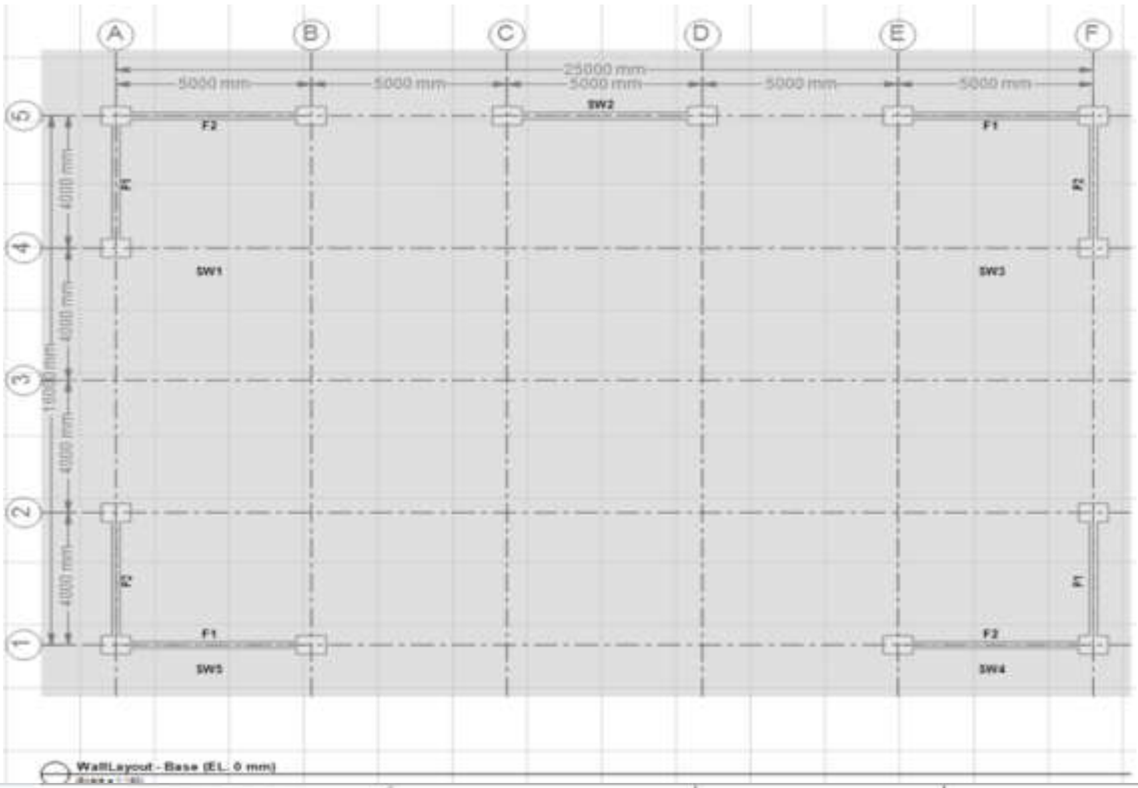
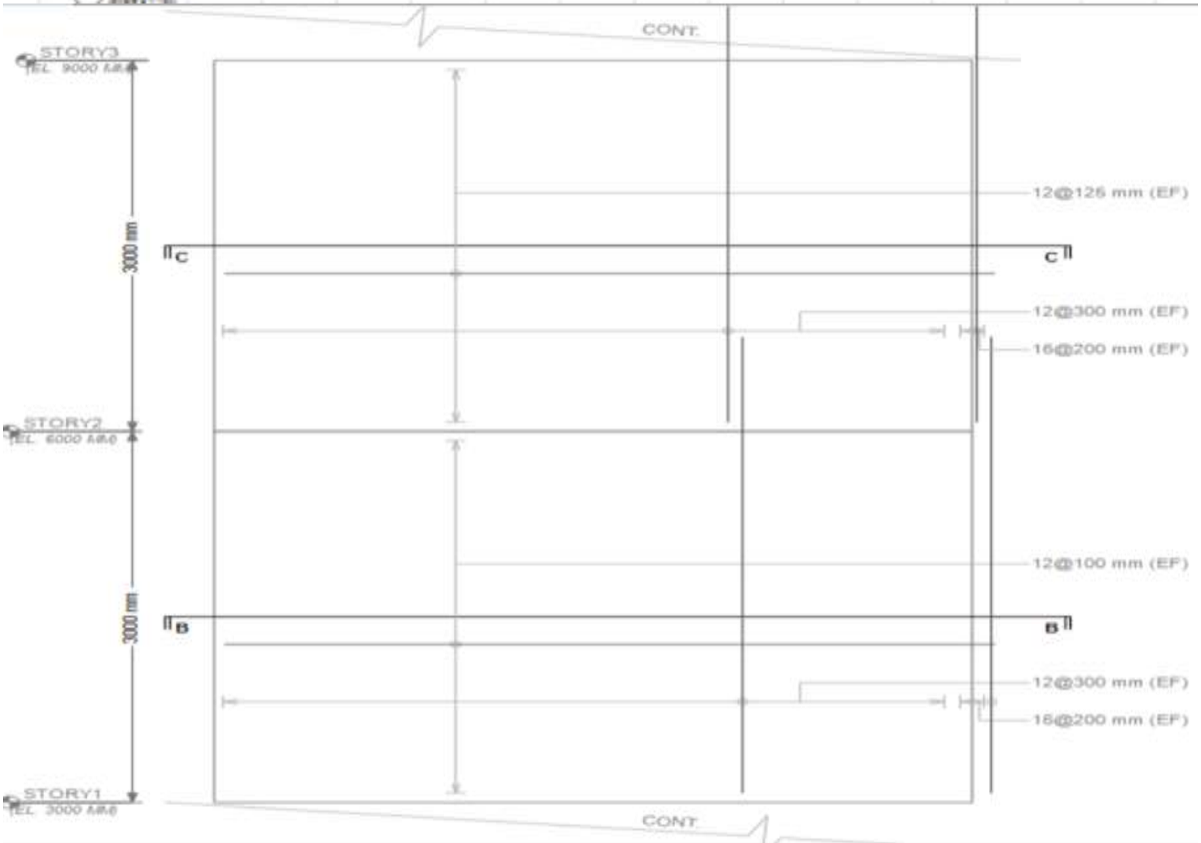
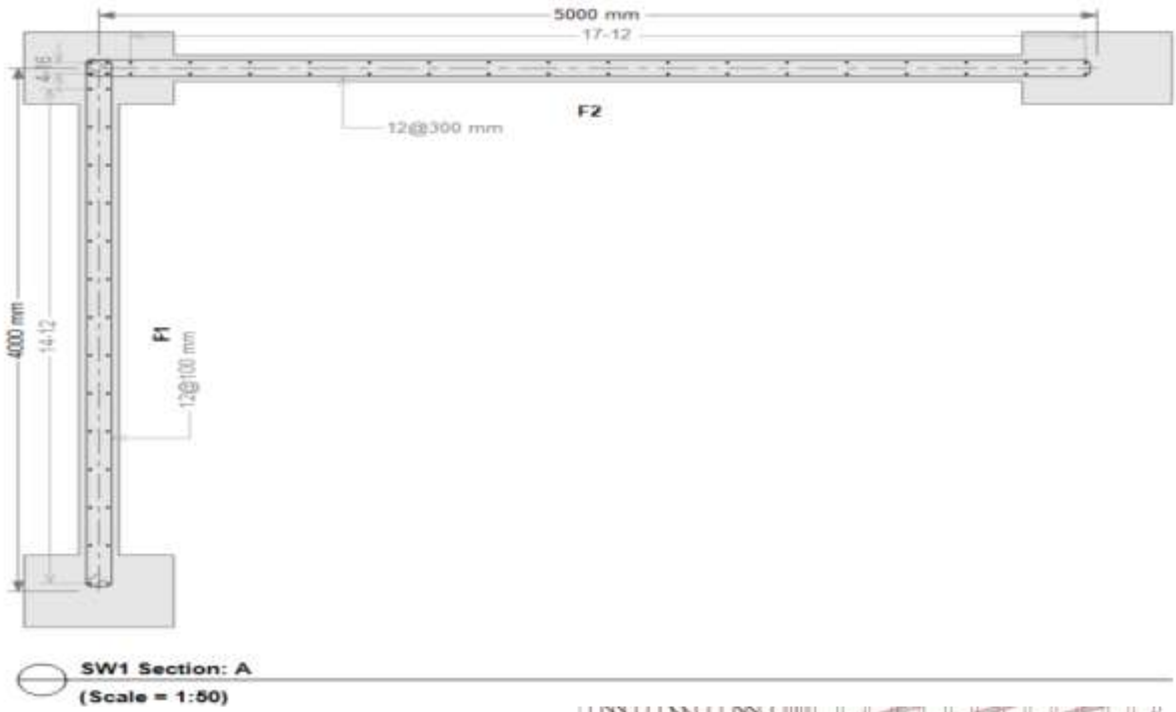


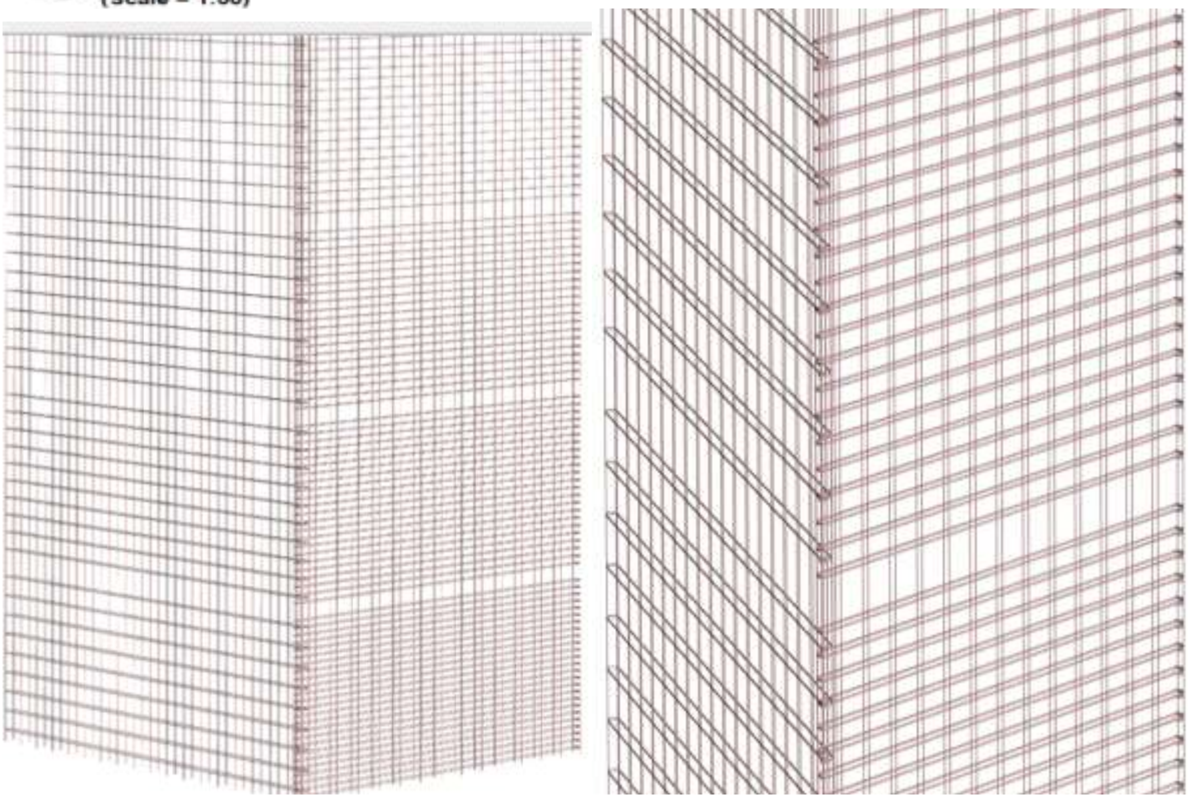
Rebar Cage View of Column

Shear Wall


A
B
C
D
E
F
25000 mm
5000 mm
5000 mm
5000 mm
5000 mm
5000 mm
5
4
3
2
1
4000 mm
4000 mm
4000 mm
4000 mm
F1
F2
SW1
SW2
SW3
SW4
SW5
WallLayout - Base (EL. 0 mm)


CONT.
STORY3
EL 9000 mm
3000 mm
12@125 mm (EF)
C
C
12@300 mm (EF)
16@200 mm (EF)
STORY2
EL 6000 mm
3000 mm
12@100 mm (EF)
B
B
12@300 mm (EF)
16@200 mm (EF)
STORY1
EL 3000 mm
CONT.





Rebar Cage View of Shear Wall

Comparison of Joint Displacements in Structure with and without Shear Wall

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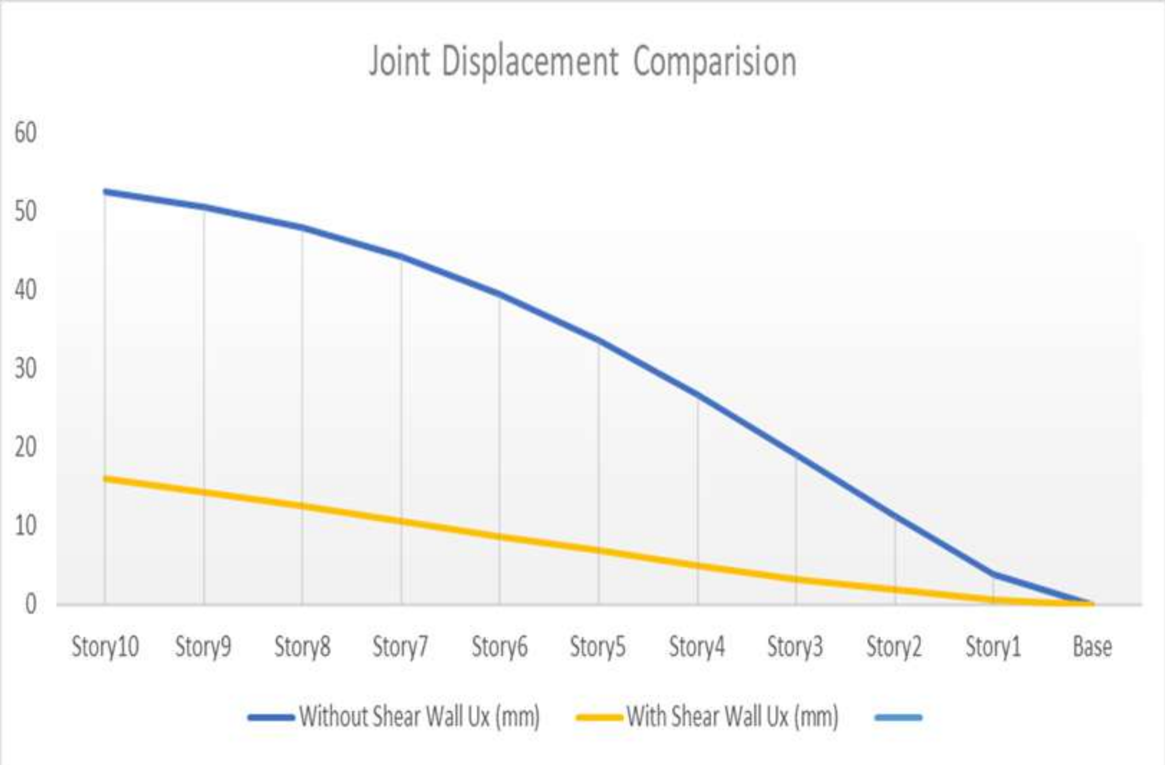
Storey	Without Shear Wall Ux (mm)	With Shear Wall Ux (mm)
Story10	52.365	16.037
Story9	50.578	14.293
Story8	47.892	12.488
Story7	44.156	10.621
Story6	39.353	8.723
Story5	33.515	6.835
Story4	26.718	5.011
Story3	19.127	3.317
Story2	11.142	1.835
Story1	3.814	0.667
Base	0	0



As we can see that Joint displacement of the structure without Shear Wall is more than Joint displacement of structure with Shear Wall.

Comparison of Storey Drifts in Structure with and without Shear Wall

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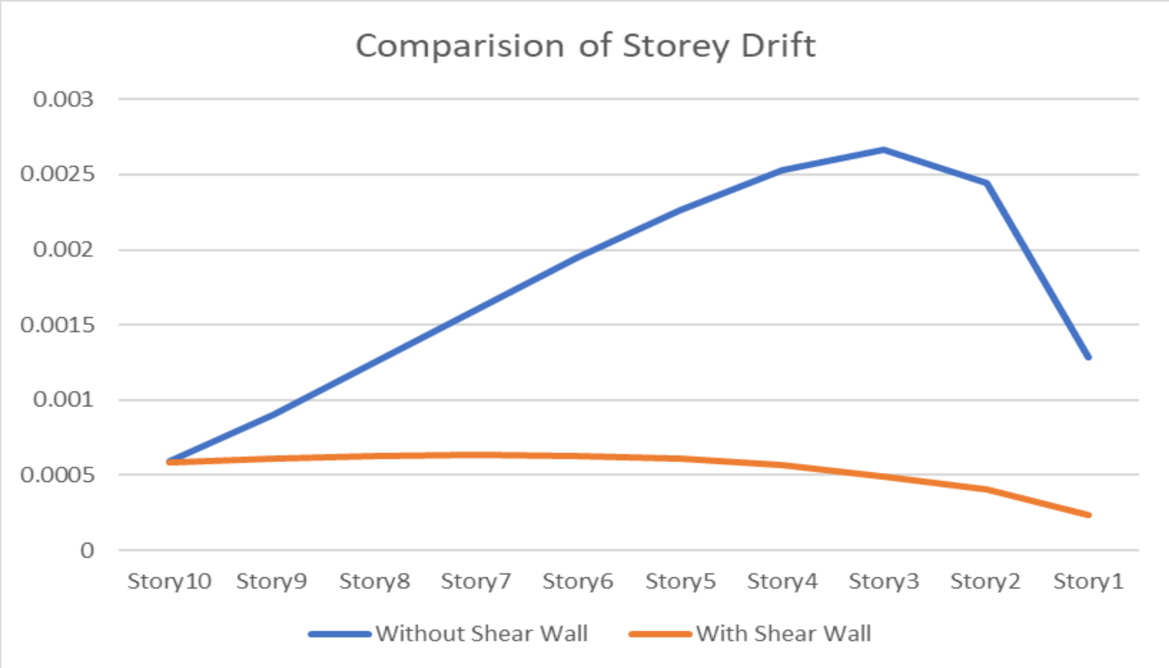
Story	Without Shear Wall	With Shear Wall
Story10	0.000596	0.000581
Story9	0.000897	0.000607
Story8	0.001246	0.000623
Story7	0.001601	0.000633
Story6	0.001946	0.000629
Story5	0.002266	0.000608
Story4	0.00253	0.000565
Story3	0.002662	0.000494
Story2	0.002444	0.000403
Story1	0.001282	0.000232



As we can see Storey Drift of the structure with Shear wall is less than the storey drift of structure without Shear wall.

II. CONCLUSIONS

- We have created the model on ETABS and analysed the structure and created the ductile detailing on CSI Detail.
- We have viewed various deformed shapes under various loading conditions and different load combinations. From those result we found that maximum displacement is at top floor at centre.
- We have created the ductile detailing of shear wall, beams, and columns whose data is mentioned above. There were no signs of failure in beams, columns, and shear wall.
- We have calculated the Bill of Quantities and Rebar Quantities of beams, and Cage views of columns, and shear wall in CSI Detail.
- Due to Shear wall the Joint Displacements of the structure was lot less than that of the

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structure without shear wall. We have made a graphical representation of the data of each storey and compared it.

- Due to Shear wall the Storey Drifts of the structure was comparatively less than that of the structure without shear wall. We have made a graphical representation of the data of each storey and compared it via graph.
- We also created Shear force and Bending moment diagrams of structural elements under various load cases and load combinations.
- Lastly, I would like to conclude that Structure with shear wall have a lot less displacement and deflections as compared to the building without shear wall. Also Shear wall at core of the structure would also be suitable to increase the structural stability.

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