



Your trusted partner for buying, selling, and managing property,
ensuring hassle-free service with 100% transparency.

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate

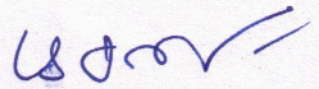
+91 9996 12 9996

Official Property Record

Digitally Verified Record - Powered by Verified  RealEstate™



DESIGN OF COLUMN

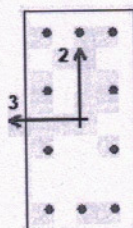


Dr. L.S. JAYAGOPAL B.E., M.Tech., Ph.D., FIE.,
Chartered Engineer (F12987)
CMDA/SE/GR-I/2019/05/117
No: 1, Jawahar Nagar, SAHS P.O.,
Coimbatore - 641 043.

COLUMN ID : C2 (300 x 600) STILT - TERRACE FLOOR (GRID C4)

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
Ground	C6	943	C300x600	UDConS2	0	609.6	0.6

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm ²	Rebar % %
1659.7189	33.1944	10.4983	33.1944	33.7242	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	0.686964	159.6	8.0853	0	33.7242
Minor Bend(M2)	0.680825	159.6	3.0735	0	33.1944

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm ² /m
Major, V_{u2}	37.7683	114.4802	64.8002	0	332.53
Minor, V_{u3}	6.2273	108.0004	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm ²	Shear Ratio Unitless
--	----------------------------	--------------------------	----------------------------	----------------------	----------------------------------	----------------------------

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm^2	Shear Ratio Unitless
Major Shear, V_{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

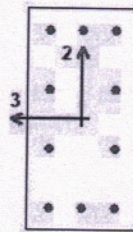
A_g cm^2	A_{sc} cm^2	P_{uz} kN	P_b kN	P_u kN	k Unitless
1800	14.4	2970	1016.0858	1659.7189	0.670593

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.262	600	0.183	12	No	0
Minor Bending (M_2)	Yes	0.262	300	0.362	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
1	C6	6	C300x600	UDConS2	0	3048	0.6

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm ²	Rebar % %
1559.4225	-31.1884	54.4168	31.1884	38.8234	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M_3)	1	2448	30.1919	0	38.8234
Minor Bend(M_2)	1	2448	-0.7518	0	31.1884

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm ² /m
Major, V_{u2}	24.3419	114.4802	64.8002	0	332.53
Minor, V_{u3}	0.9548	108.0004	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V_{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

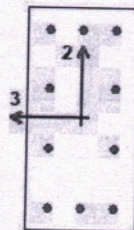
A_g cm ²	A_{sc} cm ²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1800	14.4	2970	1016.0858	1559.4225	0.721924

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.803	600	4.08	12	No	0
Minor Bending (M_2)	Yes	0.803	300	8.16	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
2	C6	791	C300x600	UDConS2	0	3048	0.6

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E _c (MPa)	f _{ck} (MPa)	Lt.Wt Factor (Unitless)	f _y (MPa)	f _{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ _c	γ _s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P _u kN	Design M _{u2} kN-m	Design M _{u3} kN-m	Minimum M ₂ kN-m	Minimum M ₃ kN-m	Rebar Area mm ²	Rebar % %
1288.8156	-25.7763	56.0958	25.7763	32.0864	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	1	2448	25.3307	0	32.0864
Minor Bend(M2)	1	2448	-0.7499	0	25.7763

Shear Design for V_{u2} , V_{u3}

	Shear V _u kN	Shear V _c kN	Shear V _s kN	Shear V _p kN	Rebar A _{sv} /s mm ² /m
Major, V _{u2}	30.7313	114.4802	64.8002	0	332.53
Minor, V _{u3}	1.3354	108.0004	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V _{Top} kN	Shear V _{u,Tot} kN	Shear V _c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V _{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V _{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

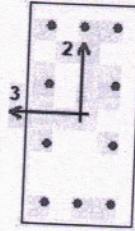
A _g cm ²	A _{sc} cm ²	P _{uz} kN	P _b kN	P _u kN	k Unitless
1800	14.4	2970	1016.0858	1288.8156	0.860419

Additional Moment (IS 39.7.1)

	Consider M _a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M _a Moment (kN-m)
Major Bending (M ₃)	Yes	0.803	600	4.08	12	No	0
Minor Bending (M ₂)	Yes	0.803	300	8.16	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
3	C6	639	C300x600	UDConS2	0	3048	0.7

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm ²	Rebar % %
1043.2243	-20.8645	48.9404	20.8645	25.9721	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	1	2448	19.5762	0	25.9721
Minor Bend(M2)	1	2448	-0.8785	0	20.8645

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv}/s mm ² /m
Major, V_{u2}	29.5506	114.4802	64.8002	0	332.53
Minor, V_{u3}	1.5063	108.0004	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V_{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

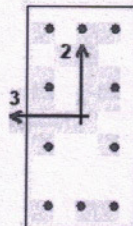
A_g cm ²	A_{sc} cm ²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1800	14.4	2970	1016.0858	1043.2243	0.986111

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.803	600	4.08	12	No	0
Minor Bending (M_2)	Yes	0.803	300	8.16	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
4	C6	487	C300x600	UDConS2	0	3048	0.8

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm ²	Rebar % %
789.0749	-15.7815	49.4914	15.7815	19.6448	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	1	2448	19.7966	0	19.6448
Minor Bend(M2)	1	2448	-1.0675	0	15.7815

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm ² /m
Major, V_{u2}	31.2704	109.777	64.8002	0	332.53
Minor, V_{u3}	1.8199	103.5634	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V_{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

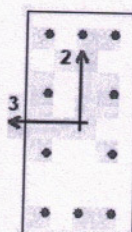
A_g cm ²	A_{sc} cm ²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1800	14.4	2970	1016.0858	789.0749	1

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.803	600	4.08	12	No	0
Minor Bending (M_2)	Yes	0.803	300	8.16	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
5	C6	335	C300x600	UDConS2	0	3048	0.9

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E _c (MPa)	f _{ck} (MPa)	Lt.Wt Factor (Unitless)	f _y (MPa)	f _{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ _c	γ _s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P _u kN	Design M _{u2} kN-m	Design M _{u3} kN-m	Minimum M ₂ kN-m	Minimum M ₃ kN-m	Rebar Area mm ²	Rebar % %
523.9407	-10.4788	45.359	10.4788	13.044	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	0.881273	2448	18.1436	0	13.044
Minor Bend(M2)	0.800188	2448	-1.1101	0	10.4788

Shear Design for V_{u2} , V_{u3}

	Shear V _u kN	Shear V _c kN	Shear V _s kN	Shear V _p kN	Rebar A _{sv} /s mm ² /m
Major, V _{u2}	27.9426	98.5353	64.8002	0	332.53
Minor, V _{u3}	1.7387	92.958	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V _{Top} kN	Shear V _{u,Tot} kN	Shear V _c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V _{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V _{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

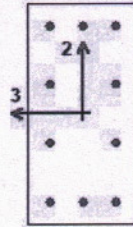
A _g cm ²	A _{sc} cm ²	P _{uz} kN	P _b kN	P _u kN	k Unitless
1800	14.4	2970	1016.0858	523.9407	1

Additional Moment (IS 39.7.1)

	Consider M _a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M _a Moment (kN-m)
Major Bending (M ₃)	Yes	0.803	600	3.596	12	No	0
Minor Bending (M ₂)	Yes	0.803	300	6.53	12	No	0

ETABS Concrete Frame Design

IS 456:2000 Column Section Design



Column Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
Terrace	C6	183	C300x600	UDConS2	2448	3048	1

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm ²	Rebar % %
230.5132	4.6103	-53.7208	4.6103	5.7389	1440	0.8

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	0.842693	2448	-21.4883	0	5.7389
Minor Bend(M2)	0.754049	2448	-1.4972	0	4.6103

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm ² /m
Major, V_{u2}	43.3394	86.0939	64.8002	0	332.53
Minor, V_{u3}	2.6097	81.2208	57.6005	0	665.06

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm ²	Shear Ratio Unitless
Major Shear, V_{u2}	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_{u3}	N/A	N/A	N/A	N/A	N/A	N/A

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

Additional Moment Reduction Factor k (IS 39.7.1.1)

A_g cm ²	A_{sc} cm ²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1800	14.4	2970	1016.0858	230.5132	1

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.803	600	3.438	12	No	0
Minor Bending (M_2)	Yes	0.803	300	6.153	12	No	0

PROVIDED

STILT - FIRST FLOOR

MAIN REINFORCEMENT : 10-Y20

STIRRUPS: 4 legged Y8 stirrups & 1 link @ 8" c/c

FIRST - TERRACE FLOOR

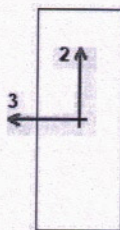
MAIN REINFORCEMENT : 10-Y16

STIRRUPS: 4 legged Y8 stirrups & 1 link @ 8" c/c

DESIGN OF BEAM

ETABS Concrete Frame Design

IS 456:2000 Beam Section Design



Beam Element Details Type: Seismic Super I (Summary)

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
1	B57	94	B 230x600	UDConS2	150	6743.7	1

Section Properties

b (mm)	h (mm)	b _f (mm)	d _s (mm)	d _{ct} (mm)	d _{cb} (mm)
230	600	230	0	40	40

Material Properties

E _c (MPa)	f _{ck} (MPa)	Lt.Wt Factor (Unitless)	f _y (MPa)	f _{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ _c	γ _s
1.5	1.15

Factored Forces and Moments

Factored M _{u3} kN-m	Factored T _u kN-m	Factored V _{u2} kN	Factored P _u kN
-191.6076	0.044	211.4953	-5.5895

Design Moments, M_{u3} & M_t

Factored Moment kN-m	Factored M _t kN-m	Positive Moment kN-m	Negative Moment kN-m
-191.6076	0.0934	0	-191.701

Design Moment and Flexural Reinforcement for Moment, M_{u3} & T_u

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar mm ²	+Moment Rebar mm ²	Minimum Rebar mm ²	Required Rebar mm ²
Top (+2 Axis)	-191.701		857	6	857	339
Bottom (-2 Axis)		0	428	6	0	428

Shear Force and Reinforcement for Shear, V_{u2} & T_u

Shear V_e kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm ² /m
211.4953	72.0508	139.7506	0	691.54

Torsion Force and Torsion Reinforcement for Torsion, T_u & V_{u2}

T_u kN-m	V_u kN	Core b_1 mm	Core d_1 mm	Rebar A_{svt} /s mm ² /m
0.044	211.4953	170	540	0

ETABS Concrete Frame Design

IS 456:2000 Beam Section Design (Envelope)

Beam Element Details

Level	Element	Unique Name	Section ID	Length (mm)	LLRF
1	B57	94	B 230x600	6743.7	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
230	600	230	0	40	40

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Flexural Reinforcement for Major Axis Moment, M_{u3}

	End-I Rebar Area mm ²	End-I Rebar %	Middle Rebar Area mm ²	Middle Rebar %	End-J Rebar Area mm ²	End-J Rebar %
Top (+2 Axis)	857	0.62	339	0.25	625	0.45
Bot (-2 Axis)	428	0.31	572	0.41	339	0.25

Flexural Design Moment, M_{u3}

	End-I Design M_u kN-m	End-I Station Loc mm	Middle Design M_u kN-m	Middle Station Loc mm	End-J Design M_u kN-m	End-J Station Loc mm
Top (+2 Axis)	-191.701	150	0	4520.1	-142.1472	6293.7
Combo	UDConS2		UDConS2		UDConS2	
Bot (-2 Axis)	0	150	130.7972	3216.7	0	6293.7
Combo	UDConS2		UDConS2		UDConS2	

Shear Reinforcement for Major Shear, V_{u2}

End-I Rebar A_{sv} /s mm ² /m	Middle Rebar A_{sv} /s mm ² /m	End-J Rebar A_{sv} /s mm ² /m
715.84	254.94	514.04

Design Shear Force for Major Shear, V_{u2}

End-I Design V_u kN	End-I Station Loc mm	Middle Design V_u kN	Middle Station Loc mm	End-J Design V_u kN	End-J Station Loc mm
197.2912	608.4	79.2644	4520.1	167.0561	6293.7
UDConS2		UDConS2		UDConS2	

Torsion Reinforcement

Shear Rebar A_{svt} /s mm ² /m
0

Design Torsion Force

Design T_u kN-m	Station Loc mm	Design T_u kN-m	Station Loc mm
0.0634	6293.7	0.0634	6293.7
UDConS1		UDConS1	

PROVIDED

TOP REINFORCEMENT : 3-Y16+2-Y16

BOTTOM REINFORCEMENT : 3-Y16+2-Y16

SHEAR REINFORCEMENT : 2 legged Y8 stirrups @ 6" c/c

DESIGN OF SLAB

Design of Slab

1 Size of the slab

Breadth of the slab

$$l_x = 3.58 \text{ m}$$

Length of the slab

$$l_y = 5.00 \text{ m}$$

2 Assumed thickness of slab

$$D = 150 \text{ mm}$$

3 Grade of concrete

$$f_{ck} = 30 \text{ N/mm}^2$$

4 Grade of steel

$$f_y = 500 \text{ N/mm}^2$$

5 Condition of slab

= Two adjacent edges discont.

6 Load considerations :

Self weight of the slab

$$W_{se} = 3.75 \text{ kN/m}^2$$

Live load on slab

$$W_{LL} = 2.00 \text{ kN/m}^2$$

Floor Finish Load on slab

$$W_{FF} = 1.50 \text{ kN/m}^2$$

Total dead load on slab

$$W_{td} = 5.25 \text{ kN/m}^2$$

Total live load on slab

$$W_{tl} = 2.00 \text{ kN/m}^2$$

7 Bending moment & A_{st} Calculations :

Edge condition of the slab

= Two adjacent edges discont.

Shorter direction steel requirements :

Support condition	Coeff	BM				Bar spacing (mm)		
	α	M_u	M_u/bd^2	P_t	A_{st}	8 ϕ	10 ϕ	12 ϕ
				% A_{st}	mm^2			
Continues supp.	0.074	10.3	0.6	0.14	185.8	270	390	390
Span moment	0.055	7.7	0.46	0.11	180.0	280	390	390
Discont. Support	0.042	5.8	0.34	0.08	180.0	280	390	390

Longer direction steel requirements :

Support condition	Coeff	BM				Bar spacing (mm)		
	α	M_u	M_u/bd^2	P_t	A_{st}	8 ϕ	10 ϕ	12 ϕ
				% A_{st}	mm^2			
Continues supp.	0.045	6.3	0.37	0.09	180.0	280	390	390
Span moment	0.034	4.7	0.28	0.07	180.0	280	390	390
Discont. Support	0.042	5.8	0.34	0.08	180.0	280	390	390

8 Check for under reinforced section :

Limiting moment of resistance

$$M_{u \text{ lim}} = 0.133 \times f_{ck} \times b d^2$$

As per IS 456-2000,

$$= 67.4 \text{ KN.m} > 10.3 \text{ KN.m}$$

Under reinforced

Depth required for flexure

$$d = 49.8 \text{ mm} < 130 \text{ mm}$$

Depth is sufficient

9 **Check the depth for deflection :**

Diameter of the rod used	ϕ = 10 mm	As per,
provided spacing	150	
Percentage of steel	$\%A_{st}$ = 0.40 %	0.40 IS 456-2000
MF due to effect of tension steel	MF = 3.34	
Depth required for deflection	d = 41 mm < 130 mm	Slab safe

PROVIDED

SLAB THICKNESS : 150mm

TOP REINFORCEMENT : SHORTER - Y10 @ 150mm, LONGER - Y10 @ 150mm

BOTTOM REINFORCEMENT : SHORTER - Y10 @ 150mm, LONGER - Y10 @ 150mm

DESIGN OF PILECAP

Design of Pilecap : P1-C2

Design of Pile Cap for Two Pile Cluster using Truss Theory			
Input:			
No of pile	n	2	no's
Grade of steel	f_y	500	N/mm ²
Grade of concrete	f_{ck}	30	N/mm ²
Factored Load	P_u	1787	kN
Dia of Pile	h_p	500	mm
Spacing of piles	k_{hp}	1300	mm
Column Size in Cap Length Direction	a	230	mm
Column Size in Cap Width Direction	b	600	mm
Projection of pile cap beyond pile		175	mm
Dia of Main Reinforcement		16	mm
Depth Provided	D	1150	mm
Min Depth Required	D_{reqd}	733	mm
Pile cap Size in Cap Length Direction		2150	mm
pile cap Size in Cap Width Direction		850	mm
Effective Depth Provided	d	1067	mm
Shear Span	a_v	385	mm
Shear Span to Depth Ratio	a_v/d	0.36	-
Check for Truss Action	Truss Action		
Punching shear capacity:			
Perimeter	p	5928	mm
stress(actual)	σ_{act}	0.26	N/mm ²
stress(allowable)	σ_{all}	1.37	N/mm ²
Interaction Check	0.19		
Punching Shear Check	Depth safe for Punching shear		
Tension Steel Calculation:			
Tension	T_{xx}	539	kN
Area of Steel Required in pile region	A_{st}	1238	mm ²
Minimum Area of Steel Required	$Min A_{st}$	640	mm ²
Area of Steel Provided	$A_{st} \text{ Provided}$	1238	mm ²
% of Area of Steel Provided	% $A_{st} \text{ Provided}$	0.23	%
Area of one Rod	$A_{st} \text{ of (1) Rod}$	201	mm ²
No of Rods	n	6.16	no's
Spacing of Main Reinforcement Rods	St	81	mm
Distributors Steel			
Min A_{st}	$A_{st} \text{ Min}$	1280	mm ²
Dia of Distributors		12	mm
Spacing of rods	sd	88	mm
Check for Oneway Shear			
V_u	V_u	894	kN
T_v	T_v	0.99	N/mm ²

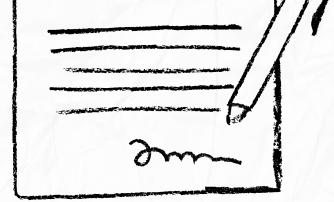
$T_c mAx$	$T_c mAx$	0.36	N/mm ²
T_c'	T_c'	1.98	N/mm ²
$T_c max$	$T_c max$	3.50	N/mm ²
T_c	T_c	1.98	N/mm ²
Interaction Check	0.50		
Oneway Shear Check	Safe		

PROVIDED

PILE SIZE : 2.133m x 0.84m x 1.145m
TOP REINFORCEMENT : Y16 @ 100mm c/c
BOTTOM REINFORCEMENT : Y16 @ 100mm c/c
Pile Reinforcement : 10-Y16
Pile stirrups : Y8 @ 150mm c/c

Uston

Dr. L.S. JAYAGOPAL B.E., M.Tech., Ph.D., FIE.,
 Chartered Engineer (F12987)
 CMDA/SE/GR-I/2019/05/117
 No: 1, Jawahar Nagar, SAHS P.O.,
 Coimbatore 641 043.



our services doesn't just end there



Buying & Selling Services

Property Buying Assistance, Property Selling Support, Market Price Analysis, Owner Outreach and Negotiation.



Legal & Documentation Services

Certified EC, Patta, legal opinions, property verification, due diligence, litigation solutions, and legal heir certificates.



Property Development & Approvals

Building plan approvals, construction, layout and sub-division approvals, zone conversion, and occupancy certification.



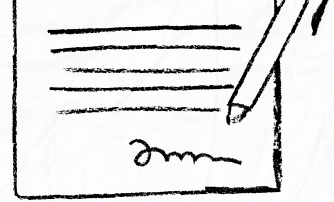
NRI & Investment Services

Escrow Services, Rentals, Litigation Solutions, Property Valuation and Property Management



Compliance & Special Services

Demolition, Vaasthu checks, regularization of unauthorized buildings, and office space solutions.



 **empowering your real estate decisions**
with smart tools



Property Valuation & Cost Estimation

Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter



Ownership, Compliance & Legal Verification

Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer



Zoning & Land Use Analysis

Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator



Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary



Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management



We're honored to be part of your
real estate journey

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
[+91 9996 12 9996](tel:+919996129996)
www.verified.realestate