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DIGITALLY VERIFIED RECORD

STRUCTURAL DESIGN CALCULATION

PROJECT: TULIV, KOVILACHERI, CHENNAI

JOB NO: 10293

CLIENT: G K SHETTY

ARCHITECT: ARCHITECTURE PLUS VALUE

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COLUMN DESIGN CALCULATION

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (FOUNDATION TO STILT)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
STILT	P587	35193.2	9781.9	800	300	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	300
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	300

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	1852	0.0077	0.0026	UDWal2	3018532.17	-60370643.43	-147048265	240000
Bottom	2265	0.0094	0.0026	UDWal30	2930386.01	58607720.2	233036506.24	240000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.75	UDWal30	2408562.07	-113594843	124448.14	126889.95	300107.5
Bottom	Leg 1	0.75	UDWal30	2435562.09	233036506.24	124448.14	139803.29	313020.84

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	300	UDWal30	2903385.99	-113594843	15.65	6
Top–Right	Leg 1	0	UDWal1	0	0	0	0
Bottom–Left	Leg 1	300	UDWal30	2930386.01	-18527683.94	12.79	6
Botttom–Right	Leg 1	300	UDWal30	2930386.01	233036506.24	19.49	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (STILT TO FIRST FLOOR)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
1ST	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	4191	0.0262	0.0025	UDWal30	2449113.59	-63358306.55	-177011557	160000
Bottom	4475	0.028	0.0025	UDWal30	2467113.6	63763306.93	211754743.06	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	2010236.61	-78105015.08	129390.58	105162.83	220641.19
Bottom	Leg 1	0.5	UDWal30	2028236.63	211754743.06	129390.58	105162.83	220641.19

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	300	UDWal30	2449113.59	-78105015.08	18.97	6
Top–Right	Leg 1	0	UDWal1	0	0	0	0
Bottom–Left	Leg 1	200	UDWal32	1568043.56	-14458744.41	10.48	6
Botttom–Right	Leg 1	400	UDWal30	2467113.6	211754743.06	25.35	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (FIRST FLOOR TO SECOND FLOOR)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
2ND	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	3284	0.0205	0.0025	UDWal30	2003640.62	-54789020.78	-219093365	160000
Bottom	3411	0.0213	0.0025	UDWal30	2021640.63	55194021.15	228265499.15	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	1645539.62	-53406181.83	148933.58	105162.83	220641.19
Bottom	Leg 1	0.5	UDWal30	1663539.63	228265499.15	148933.58	105162.83	220641.19

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	300	UDWal30	2003640.62	-219093365	22.79	6
Top–Right	Leg 1	200	UDWal32	1273804.57	1093727.5	8.01	6
Bottom–Left	Leg 1	200	UDWal32	1284604.58	-22730052.53	9.09	6
Botttom–Right	Leg 1	300	UDWal30	2021640.63	228265499.15	23.34	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (SECOND FLOOR TO THIRD FLOOR)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
3RD	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	1959	0.0122	0.0025	UDWal30	1562976.13	-44611957.5	-206883394	160000
Bottom	2036	0.0127	0.0025	UDWal30	1580976.14	45016957.87	210496945.97	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	1292146.22	-45110475.2	138792.34	103749.88	219228.25
Bottom	Leg 1	0.5	UDWal30	1310146.23	210496945.97	138792.34	105162.83	220641.19

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	300	UDWal30	1562976.13	-206883394	19.47	6
Top–Right	Leg 1	200	UDWal32	991951.66	5288298.55	6.45	6
Bottom–Left	Leg 1	200	UDWal32	1002751.67	-7694026.69	6.63	6
Botttom–Right	Leg 1	300	UDWal30	1580976.14	210496945.97	19.75	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (THIRD FLOOR TO FOURTH FLOOR)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
4TH	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	1687	0.0105	0.0025	UDWal30	1131450.46	-34940928.24	-251946098	160000
Bottom	1507	0.0094	0.0025	UDWal30	1149450.48	35345928.61	234772128.87	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	945048.63	-67220363.15	162001.64	97870.06	213348.42
Bottom	Leg 1	0.5	UDWal30	963048.64	234772128.87	162001.64	93109.02	208587.39

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	200	UDWal30	1131450.46	-67220363.15	10.22	6
Top–Right	Leg 1	0	UDWal1	0	0	0	0
Bottom–Left	Leg 1	0	UDWal1	0	0	0	0
Botttom–Right	Leg 1	200	UDWal30	1149450.48	234772128.87	18.19	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (FOURTH FLOOR TO FIFTH FLOOR)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
5TH	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	412	0.0026	0.0025	UDWal30	595605.83	-24334475.42	-165076805	160000
Bottom	439	0.0027	0.0025	UDWal30	613605.85	23817175.45	170560287.71	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	595605.83	-44151940.73	111619.18	50938.09	166416.46
Bottom	Leg 1	0.5	UDWal30	613605.85	170560287.71	111619.18	51355.69	166834.06

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	200	UDWal30	707881.89	-44151940.73	6.49	6
Top–Right	Leg 1	0	UDWal1	0	0	0	0
Bottom–Left	Leg 1	0	UDWal1	0	0	0	0
Botttom–Right	Leg 1	200	UDWal30	725881.9	170560287.71	12.53	6

ETABS Shear Wall Design (C587)

IS 456:2000 Pier Design (FIFTH FLOOR TO TERRACE)

Pier Details

Story ID	Pier ID	Centroid X (mm)	Centroid Y (mm)	Length (mm)	Thickness (mm)	LLRF
TERRACE	P587	35193.2	9781.9	800	200	1

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	550	415

Design Code Parameters

Γ_S	Γ_C	IP_{MAX}	IP_{MIN}	P_{MAX}	MinEcc Major	MinEcc Minor
1.15	1.5	0.04	0.0025	0.8	Yes	Yes

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200
Bottom	Leg 1	35135.8	10177.8	35250.6	9386.1	800	200

Flexural Design for P_u, M_{u2} and M_{u3}

Station Location	Required Rebar Area (mm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	P_u N	M_{u2} N-mm	M_{u3} N-mm	Pier A_g mm²
Top	2146	0.0134	0.0025	UDWal30	247889.42	-24417878.46	-310381270	160000
Bottom	1749	0.0109	0.0025	UDWal30	265889.44	24114085.78	264413082.06	160000

Shear Design

Station Location	ID	Rebar mm²/mm	Shear Combo	P_u N	M_u N-mm	V_u N	V_c N	$V_c + V_s$ N
Top	Leg 1	0.5	UDWal30	247889.42	-108506861	191562.6	82992.76	198471.13
Bottom	Leg 1	0.5	UDWal30	265889.44	264413082.06	191562.6	77131.34	192609.71

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	P_u N	M_u N-mm	Stress Comp MPa	Stress Limit MPa
Top–Left	Leg 1	200	UDWal30	293477.65	-108506861	6.92	6
Top–Right	Leg 1	0	UDWal1	0	0	0	0
Bottom–Left	Leg 1	0	UDWal1	0	0	0	0
Botttom–Right	Leg 1	200	UDWal30	311477.67	264413082.06	14.34	6

BEAM DESIGN CALCULATION

ETABS Concrete Frame Design (BEAM AT STILT)

IS 456:2000 Beam Section Design (Envelope)

Beam Element Details

Level	Element	Unique Name	Section ID	Length (mm)	LLRF
STILT	B278	4555	B200X600M25	3150	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
200	600	200	0	50	50

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
25000	25	1	550	415

Design Code Parameters

γ_c	γ_s
1.5	1.15

Flexural Reinforcement for Major Axis Moment, M_{u3}

	End-I Rebar Area mm²	End-I Rebar %	Middle Rebar Area mm²	Middle Rebar %	End-J Rebar Area mm²	End-J Rebar %
Top (+2 Axis)	240	0.2	240	0.2	240	0.2
Bot (-2 Axis)	240	0.2	240	0.2	240	0.2

Flexural Design Moment, M_{u3} and Axial Force, P_u

	Station Loc mm	Design M_u N-mm	Design P_u N	Combo Name
Top (+2 Axis) End-I	0	-29865621.6	0	UDCon29
Top (+2 Axis) Middle	787.5	-3097690.72	0	UDCon31
Top (+2 Axis) End-J	3150	-26787424.69	0	UDCon29
Bot (-2 Axis) End-I	525	14697214.45	0	UDCon29
Bot (-2 Axis) Middle	1312.5	21692573.06	0	UDCon29
Bot (-2 Axis) End-J	2625	9925274.08	0	UDCon29

Shear Reinforcement for Major Shear, V_{u2}

End-I Rebar A_{sv} /s mm²/mm	Middle Rebar A_{sv} /s mm²/mm	End-J Rebar A_{sv} /s mm²/mm
0.47	0.38	0.47

Design Shear Force for Major Shear, V_{u2}

End-I Design V_u N	End-I Station Loc mm	Middle Design V_u N	Middle Station Loc mm	End-J Design V_u N	End-J Station Loc mm
93146.52	0	75755.28	787.5	93146.39	3150
UDCon29		UDCon29		UDCon29	

Torsion Reinforcement

Shear Rebar A_{svt} /s mm²/mm

Shear Rebar A_{svt} /s mm²/mm
0

Design Torsion Force

Design T_u N-mm	Station Loc mm	Design T_u N-mm	Station Loc mm
951.52	3150	951.52	3150
UDCon29		UDCon29	

ETABS Concrete Frame Design (BEAM AT FIRST FLOOR TYPICAL)

IS 456:2000 Beam Section Design (Envelope)

Beam Element Details

Level	Element	Unique Name	Section ID	Length (mm)	LLRF
1ST	B278	148C	B200X600M25	3150	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
200	600	200	0	50	50

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
25000	25	1	550	415

Design Code Parameters

ɣc	ɣs
1.5	1.15

Flexural Reinforcement for Major Axis Moment, M_{u3}

	End-I Rebar Area mm²	End-I Rebar %	Middle Rebar Area mm²	Middle Rebar %	End-J Rebar Area mm²	End-J Rebar %
Top (+2 Axis)	240	0.2	240	0.2	240	0.2
Bot (-2 Axis)	240	0.2	240	0.2	240	0.2

Flexural Design Moment, M_{u3} and Axial Force, P_u

	Station Loc mm	Design M_u N-mm	Design P_u N	Combo Name
Top (+2 Axis) End-I	0	-27166148.96	0	UDCon29
Top (+2 Axis) Middle	787.5	-1574262.24	0	UDCon31
Top (+2 Axis) End-J	3150	-23378333.65	0	UDCon29
Bot (-2 Axis) End-I	525	17074478.72	0	UDCon29
Bot (-2 Axis) Middle	1312.5	24385821.91	0	UDCon29
Bot (-2 Axis) End-J	2625	12056374.11	0	UDCon29

Shear Reinforcement for Major Shear, V_{u2}

End-I Rebar A_{sv} /s mm²/mm	Middle Rebar A_{sv} /s mm²/mm	End-J Rebar A_{sv} /s mm²/mm
0.47	0.38	0.47

Design Shear Force for Major Shear, V_{u2}

End-I Design V_u N	End-I Station Loc mm	Middle Design V_u N	Middle Station Loc mm	End-J Design V_u N	End-J Station Loc mm
93146.52	0	75755.28	787.5	93146.39	3150
UDCon29		UDCon29		UDCon29	

Torsion Reinforcement

Shear Rebar A_{svt} /s mm²/mm
0

Design Torsion Force

Design T_u N-mm	Station Loc mm	Design T_u N-mm	Station Loc mm
1182.28	3150	1182.28	3150
UDCon29		UDCon29	

SLAB DESIGN

DESIGN OF TWO WAY SLAB

FIRST FLOOR TYPICAL

Slab Marked :		S2											
Short Span Lx		3.40	mt.										
Long Span Ly	=	4.50	mt.										
LET Depth D	=	150	mm		Main	=		500		N/sqmm			
Dead load	=	3.75	KN/m^2		Main	=		10		mm			
Live load	=	2.00	KN/m^2		Fck	=		30		N/sqmm			
Floor finish	=	1.5	KN/m^2		Cover	=		25		mm			
Filling/Steps	=	0.00	KN/m^2		Effective Depth	=		120		mm			
TOTAL LOAD	=	7.250	KN/m^2										
B.M.	=											Kx =	0.094
(Ref Table 22 pg 138 IS - 456 - 1978)						Ly/Lx	=	1.32				Ky =	0.054
ǁ to short span													
(-)	=	1.5	x	0.094	x (	3.40	)^2 x	7.25			=	11.85	KN-m/m
ǁ to long span													
(-)	=	1.5	x	0.054	x (	3.40	)^2 x	7.25			=	6.77	KN-m/m
Mu x-axis	=	11.85	KN-m/m							A_{st}	=	235	mm^2
Provide	Φ	10	@	150	c/c					A_{st}	=	524	mm^2
Mu y-axis	=	6.77	KN-m/m							A_{st}	=	132	mm^2
Provide	Φ	10	@	200	c/c					A_{st}	=	393	mm^2
Refer to fig.4 pg 38 IS 456:2000													
f_s	=	130.1	N/mm^2										
P_t prov	=	0.44	%										
Read MF	=	1.26											
Required d	=	3400			=	103.8	mm		<	d_{prov}		**SAFE**	
		1.26	x	26									
SUMMARY													
D	=	150	mm										
ǁ to short span	=	Φ	10	@		150	c/c	(alt. bar Bent up)					
ǁ to long span	=	Φ	10	@		175	c/c	(alt. bar Bent up)					

DESIGN OF ONE WAY SLAB

FIRST FLOOR TYPICAL

Span Marked		S1										
Short Span L	=	2.8	mt.			Fy	Main	=	500	N/sqmm		
Let Depth D	=	125	mm			Dia.	Main	=	8	mm		
Dead load	=	3.125	KN/m^2			Fy	Distribution	=	500	N/sqmm		
Live load	=	2.00	KN/m^2			Dia.	Distribution	=	8	mm		
Floor finish	=	1.50	KN/m^2				Fck	=	30	N/sqmm		
Filling/Steps	=	0.00	KN/m^2				Cover	=	25	mm		
TOTAL LOAD	=	6.63	KN/m^2				Effective Depth	=	96	mm		
B.M	=	1.5	x	6.63	x(	2.8	)^2					
	=	7.791	KN-m/m			10						
									A_{st}	=	193	mm^2
Provide	Φ	8	@	150	c/c				A_{st}	=	335.10	mm^2

Refer to fig.4 pg 38 IS 456:2000

$$f_s = 0.58 \times Fy \times \frac{A_{st}}{A_{st}}$$

$$= 0.58 \times 500 \times \frac{193.1}{335.1}$$

f_s	=	167.1	N/mm^2									
P_t prov	=	0.35	%									
Read MF	=	1.2										
Required d	=	2800 / (1.2 x 26)			=	89.744	mm		< d_{prov}		SAFE	
Distribution Reinf	=	0.12	x	1250	=	150	mm^2 / m					
									Reqd. spacing =		335	mm
									Provided spacing =		200	mm

SUMMARY					
D	=	125	mm		
REINFORCEMENT					
Main Steel	=	8	@	150	mm c/c
Distribution Steel	=	8	@	200	mm c/c

THE LANDLENS SUITE

Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
/landlens/one

Verify My Land
Every record check run on one property and returned as a single report.
/landlens/verify-my-land

Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
/landlens

One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
/landlens/one/map

PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
/landlens/pricemap

Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
/landlens/build-scope

Property Tracker
Watch a property and hear about it when something new is registered against it.
/landlens/property-tracker

Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
/landlens/deal-room

FREE TOOLS · NO ACCOUNT NEEDED

Twenty-four checks you can run yourself, at no cost.

Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

Every free tool
/tools

Services we run for you
/services

The LandLens suite
/landlens/one

Verified RealEstate™

Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

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Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.