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DIGITALLY VERIFIED RECORD

P. SENTHIL KUMAR M.E., (Struct), AIV
Chartered Engineer | Structural Consultant
Registered Valuer

THE DESIGN ONE
Architectural and Structural Consultancy

STABILITY CERTIFICATE

(To be furnished while filing application for registration of building)

Date: 25.02.2026

The detailed engineering and structure design of the proposed building comprising of Semi Basement Floor + Ground Floor + First Floor + Second Floor + Third Floor + Terrace Floor, Watchman Booth with 28 Dwelling Units at Ward No:25, Block No: 20, T.S.No:25/6 At Vilankurichi Village, North Taluk, Coimbatore Corporation has been done by me/us based on the report of geotechnical investigation (soil test) done by GEO DESIGN INDIA PVT LTD Report No. GEO-G-107-2023-24 Dated 19.08.2023 and considering the functional requirement of the building.

2. It is certified that among other factors, the proposed building has been designed to resist earthquake. I/We have checked various parameters and found that the proposed building would be safe.

3. I/We further certify that:

(i) The minimum grade of concrete is M20

(ii) The design and analysis has been done using the code of practice for plain and reinforced concrete as per IS 456, design loads as per IS Codes No IS 875-1987 Part(1 to 5) and Design of earth quake resistant structure as per IS Code No 4326-1993

4. The building will be **safe and sound** when used for the purpose for which it is designed.

Stamp and Signature

P. SENTHIL KUMAR M E.(STRUCT),AIV
Reg. No:CBE LPA/SE/GR-I/050/2024
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Cell: 97866 00478

Encl.: Structural Design Calculation

PROJECT	NIVASAN VAKULAM APARTMENT-AT VILANKURICHI,COIMBATORE
CONSULTANT	THE DESIGN ONE
DESIGN OF COLUMN	C1

DESIGN DATA:

Axial Load, P	=	810	kN
Breadth of the column, b	=	200	mm
	=	0.2	m
Depth of the column, D	=	450	mm
	=	0.45	m
Unsupported length of the column in x-x axis, L_x	=	3	m
Unsupported length of the column in y-y axis, L_y	=	3	m
Bending Moment about x-x axis, M_x	=	35.7	kNm
Bending Moment about y-y axis, M_y	=	35.7	kNm
Effective length factor	=	0.85	
Grade of concrete, f_{ck}	=	20	N/mm^2
Grade of steel, f_y	=	500	N/mm^2

EFFECTIVE LENGTH:

Effective length of the column in x-x axis, L_{ex}	=	2.55	m
	=	2550	mm
Effective length of the column in y-y axis, L_{ey}	=	2.55	m
	=	2550	mm

CHECK FOR SLENDERNESS RATIO:

L_{ex}/D	=	5.6666667	
		<12	

Hence, short column

L_{ey}/b	=	12.75	
		>12	

Hence, long column

CHECK FOR MINIMUM ECCENTRIES:

$e_{ex, min.}$	=	$(L_{ex}/500)+(D/30)$	
	=	20.1	mm
	OR	20	mm
$e_{ey, min.}$	=	$(L_{ey}/500)+(b/30)$	
	=	11.766667	mm
	OR	20	mm
Factored Bending moment in x-x axis, M_{ux}	=	53.55	kNm
Factored Bending moment in y-y axis, M_{uy}	=	53.55	kNm
Factored Load, P_u	=	1215	kN
	=	1215000	N
M_{ux}/P_u	=	44.074074	mm
		>20	mm
M_{uy}/P_u	=	44.074074	mm
		>20	mm

Hence, design for uniaxial moment

LONGITUDINAL REINFORCEMENT:

Hence, Factored Bending Moment, M_u	=	53.55	kNm
	=	53550000	Nmm

Governing Axis for Bending is y-y axis

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$M_u/f_{ck}bD^2$	=	0.14875	
	=	0.149	
$P_u/f_{ck}bD$	=	0.675	
	=	0.68	
Effective cover, d'	=	50	
Therefore, d'/D	=	0.25	
	=	0.2	
From Interaction chart of SP 16			
p/f_{ck}	=	0.1	
p	=	2 %	
0.8%<p<4%			
Hence O.K.			
A_s	=	1800 mm^2	
Assume		20 mm dia bars	
No. of bars, N	=	5.7324841	
	=	6 Nos.	
$A_{s\ provided}$	=	1884 mm^2	
Actual p	=	2.0933333 %	
0.8%<p<4%			
Hence O.K.			
Hence, provide		***6 #***	***20 mm dia***

But Provided 4Nos 20# and 4 Nos-16# bars uniformly distributed on four sides

LATERAL REINFORCEMENT:

Diameter of Lateral Ties:

Dia of Lateral Ties	=	5 mm	(OR)
Dia of Longitudinal rft./4	=	5 mm	
Whichever is lesser			
Therefore Dia of lateral ties	=	5 mm	
	=	8 mm	

Spacing:

Least lateral dimension of the column	=	200 mm
16*Dia of the longitudinal bar	=	320 mm
	=	300 mm
Whichever is lesser		
Required Spacing	=	200 mm
Therefore, adopt		***8 mm dia lateral ties @ 200 mm c/c***

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PROJECT	NIVASAN VAKULAM APARTMENT- AT VILANKURICHI ,COIMBATORE
CONSULTANT	THE DESIGN ONE
DESIGN OF BEAM	Beam -B1

DESIGN DATA:

Breadth of the beam, b	=	200	mm	=	0.2	m
Effective depth of the beam, d	=	480	mm	=	0.48	m
Width of the supports	=	200	mm	=	0.2	m
Grade of concrete, f_{ck}	=	20	N/mm^2			
Grade of steel, f_y	=	500	N/mm^2			
Moment of Resistance, M	=	97	kNm			
Uniformly Distributed Load, W	=	58.1	kN/m			
Length of the beam,L	=	5.1	m	=	5100	mm

PRELIMINARY DIMENSIONS OF THE BEAM:

Assume effective cover of the beam,c'	=	30	mm	=	0.03	m
Therefore,overall depth of the beam, D	=	510	mm	=	0.51	m
a)Effective Span, $L_{eff.}$	=	L+d	=	5.58	m	
b)Effective Span, $L_{eff.}$	=	L+W	=	5.3	m	
Therefore, adopt Effective Span, $L_{eff.}$	=	***5.3 m (minimum)***				

ULTIMATE MOMENTS:

$x_{u\ lim.}/d$	=	0.48			
Therefore, $x_{u\ lim.}$	=	230.4	mm		
M_u'	=	$0.36*f_{ck}*b*x_u*(d-0.42x_u)$			
	=	127147180	Nmm		
	=	127.14718	kNm		
Ultimate moment, M_u	=	1.5*M	=	145.5	kNm
M_u''	=	M_u-M_u'			
	=	18.35282	kNm		
	=	18352820	Nmm		

TENSILE REINFORCEMENT:

From I.S. 456:2000, pg.no. 96, Annex-G,section G-1.1 a)				
$x_{u\ lim.}/d$	=	$(0.87*f_y*A_{st})/(0.36*f_{ck}*b*d)$		
Therefore, $A_{st\ 1}$	=	762.703448	mm^2	
M_u''	=	$f_{sc}*A_{st\ 2}*(d-d')$		
where d'	=	distance from top fibre to the centre of compression reinforcement.		
	=	50	mm	

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Therefore, $A_{st\,2}$ = 98.1171877 mm^2

Total A_{st} = 860.820636 mm^2

Assume 16 mm dia bars.

a_{st} = 200.96 mm^2

Number of bars, n = 4.28354218 = 5 Nos.

Spacing = 40 mm

Therefore adopt 5 nos. of 16 mm dia bars @ 40 mm c/c. in tension zone.

$A_{st\ provided}$ = 1607.68 mm^2

COMPRESSION REINFORCEMENT:

$A_{st\,2}$ = $(A_{sc}*f_{sc})/(0.87*f_y)$ (In pg.no. 56 in R.C.C. book)

ε_{sc} = $0.0035*((x_u-d')/x)$ By interpolating:

f_{sc} = 353.725 N/mm^2

A_{sc} = 120.661465 mm^2

Assume 16 mm dia bars.

a_{st} = 200.96 mm^2

Number of bars, n = 0.60042528 = 1 Nos.

Spacing = 100 = 100 mm

Therefore adopt 2 nos. of 16 mm dia bars @ 100 mm c/c. in compression zone.

$A_{sc\ provided}$ = 401.92 mm^2

ε_{sc}	f_{sc}
0.00276	351.8
0.00298	353.725
0.0038	360.9

CHECK FOR SHEAR:

From I.S. 456:2000, pg.no. 73, Annex-B-5.1)

Nominal shear stress, τ_v = v_u/bd

where shear force ,v_u = 222.2325 kN

= 222232.5 N

τ_v = 2.31492188 N/mm^2

% of tensile reinforcement, p_t = 1.67466667

FROM IS 456:2000 pg.no.:73 table 19:

p_t	τ_c
1.5	0.75
1.674666667	0.76397333
2	0.79

Design shear stress, τ_c = 0.76397333 N/mm^2

$\tau_v > \tau_c$ **Hence not safe**

Hence provide shear reinforcement

v_{us} = $v_u-\tau_c bd$

= 148891.06 N

= 148.89106 kN

Use 2 legged 8 mm dia bars

A_{sv} = 100.48 mm^2

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s_v	=	$(0.87*f_y*Asv*d)/v_{us}$	
	=	140.909897	mm
	=	140	mm
s_v	>	0.75d	
	=	360	mm
Adopt	**2**	**legged**	**8 mm dia bars**
	@	**140 mm c/c**	**near the support &**
		350 mm c/c	**at mid-span.**

CHECK FOR DEFLECTION:

$(l/d)_{act}$	=	10.625	
$(l/d)_{max}$	=	$(l/d)_{basic}*k_t*k_c*k_f$	
p_t	=	1.67466667	
p_c	=	0.41866667	
Refering the diagram,			
k_t	=	0.93	
k_c	=	1.1	
k_f	=	1	
Therefore, $(l/d)_{max}$	=	20.46	
		Hence safe against deflection	

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PROJECT	NIVASAN VAKULAM APARTMENT-AT VILANKURICHI, COIMBATORE
CONSULTANT	THE DESIGN ONE
DESIGN OF SLAB	5.1X2.3m

DESIGN DATAS:

Length of the slab in x-direction, L_x	=	2.3 m	=	2300 mm
Length of the slab in x-direction, L_y	=	5.1 m	=	5100 mm
Thickness of the supporting wall, t	=	200 mm	=	0.2 m
Live load on the slab	=	3 kN/m^2		
Floor Finish	=	1 kN/m^2		
Grade of concrete, f_{ck}	=	20 N/mm^2		
Grade of steel, f_y	=	500 N/mm^2		

TYPE OF SLAB:

L_y/L_x = 2.2173913 >2

Hence the given slab is a one-way slab

LOAD CALCULATION:

Assume overall depth, D	=	125 mm	=	0.125 m
Unit weight of concrete	=	25 kN/m^3		
Self-weight of the slab	=	3.125 kN/m^2		
Live load on the slab	=	2 kN/m^2		
Floor Finish	=	1 kN/m^2		
Total load, W	=	6.125 kN/m^2		
Factored load, W_u	=	***9.1875 kN/m^2***		

EFFECTIVE SPAN:

$L_{eff.}$	=	L_x+d		
Effective cover to the slab, c'	=	25 mm	=	0.025 m
Effective Depth of the slab, d	=	100 mm	=	0.1 m
$L_{eff.}$	=	2.4 m		
(OR)				
$L_{eff.}$	=	L_x+t =		2.5 m
whichever is smaller				
Required $L_{eff.}$	=	***2.4 m***		

BENDING MOMENT:

Bending Moment, M	=	$(W_u*L_{eff.}^2)/8$	
	=	6.615 kNm	
	=	6615000 Nmm	

CHECK FOR EFFECTIVE DEPTH:

$M_{u\,lim.}$	=	$0.138*f_{ck}*b*d^2$	
Consider		1 m width of the slab	
	=	1000 mm width of the slab	
Effective depth, d	=	48.956502 mm	

Slab Depth is correct

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AREA OF STEEL REINFORCEMENT:

M_u = $0.87*f_y*A_{st}*d*(1-((f_y*A_{st})/(b*d*f_{ck})))$

By Quadratic Equation A = $f_y/(b*d*f_{ck})$ = 0.0003

B = -1

C = $M_u/(0.87*f_y*d)$ = 152.07

$A_{st\ 1}$ = $(-B+sqrt(B^2-4AC)/2B$ = 3841.7 mm^2

$A_{st\ 2}$ = $(-B-sqrt(B^2-4AC)/2B$ = 158.34 mm^2

Required A_{st} = 158.33658 mm^2

Assume 10 mm dia bars

a_{st} = 78.5 mm^2

No. of bars = 2.0170265 Nos.

= 3 Nos.

Spacing = 333.33333 mm

(OR)

= 3d = 147 mm

(OR)

= 300 mm

Whichever is smaller

Required Spacing = 150 mm

Provide 10 mm dia bars @ 150 mm c/c.

CRANK DISTANCE:

$L_{eff.}/4$ = 0.6 m

= 600 m

DISTRIBUTORY REINFORCEMENT:

$A_{st\ D}$ = 0.12%*c/s area = 150 mm^2

Assume 8 mm dia bars

a_{st} = 50.24 mm^2

No. of bars = 2.9856688 Nos.

= 3 Nos.

Spacing = 333.33333 mm

= 334 mm

(OR)

= 5d

= 500 mm

(OR)

= 300 mm

Whichever is smaller

Required Spacing = 300 mm

Provide 8 mm dia bars @ 300 mm c/c.

CHECK FOR SHEAR STRESS:

Nominal shear stress, τ_v = $V_u/b*d$

V_u = $(W_u*L_{eff.})/2$

= 11.025 kN

τ_v = 0.11025 N/mm^2

$A_{st\ provided}$ = 235.5 mm^2

$(100*A_{st\ provided})/(b*d)$ = 0.2355 %

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Interpolation from I.S. 456-2000

τ_c (for f_{ck}=25 N/mm^2)	(100*$A_{st\ provided}$)/(b*d)
0.36	0.25
0.35246	0.236
0.49	0.5

Permissible Shear stress, τ_c = 0.35246 N/mm^2

Hence safe agaist shear

CHECK FOR DEFLECTION:

From I.S. 456-2000, pg.no.: 38, fig. 4:

Steel Stress of service, f_s = $0.58*f_y*(A_{st\ required}/A_{st\ provided})$

= 194.97923 N/mm^2

p_t = 0.2355 %

Modification factor, M = 1.4

Allowable deflection, $\delta_{all.}$ = $k_f*k_c*k_t*M$

kf = 1

kc = 1

kt = $L_{eff.}/d$ = 24

$\delta_{all.}$ = 33.6 mm

But actual deflection, $\delta_{act.}$ = L_x/D = 18 mm

Hene safe against deflection

P. Senthil

P. SENTHIL KUMAR M.E.(STRUCT),AIV
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GOVT. OF TAMILNADU

DIRECTORATE OF TOWN & COUNTRY PLANNING

DISTRICT TOWN & COUNTRY PLANNING OFFICE,COIMBATORE

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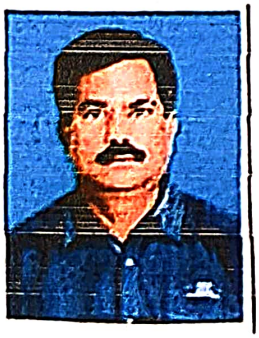
Phone : 0422-2380243 ,E- Mail : Kovaidisttcp@gmail.com

PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the Thiru. **P.SENTHIL KUMAR** has enrolled as **Structural Engineer Grade –I (SE)** with District Town and country Planning ,Coimbatore who has the qualification of **M.E(Structural Engineering)** and experience in the relevant field for 26 years.

He has been given the Registration No. **Coimbatore LPA/SE/GR-I /050/2024 on 01.07.2024.** He shall be required to comply with the duties and responsibilities prescribed by the government of tamilnadu in part V, "Registration of Professionals " ,Tamil Nadu Combined Development and Building Rules ,2019 approved vide G.O (Ms) No .18 MAWS (MA1) Dept.Dated .04.02.2029

This Registration Certificate is valid upto **30.06.2029**



JOINT DIRECTOR (I/C)

DISTRICT TOWN AND COUNTRY PLANNING,

COIMBATORE

P. SENTHIL KUMAR M.E.(STRUCT),AIV
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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

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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.