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Registered Structural Engineer • Structural Stability Engineer in CMDA, Corporation, DTCP

STABILITY CERTIFICATE

The detailed engineering and structure design of the proposed building comprising of **STILT + 5 FLOORS** at **Site No.10, S.F.No. 3/3C1A2 & 3/3C1A3 at V.K.V Nanjappa Gounder Layout, Vilankurichi Village, Coimbatore** has been done by me/us based on the report of geotechnical investigation (soil test) done by **M/s. SRI KRISHNA GEOTECH, Telungupalayam, Coimbatore**, Report No. **SKG/GIR/78/2024-2025**, Dated **19-10-2024** 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 **M25**

(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 PART 1 – 1987, IS 875 PART 2 – 1987** and design of earthquake resistant structure as per IS Code No. **IS 1893 (PART 1) : 2002**.

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

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Consulting Civil & Structural Engineer
Registered Structural Engineer
CMDA Grade - II
(SE/GR-II/2022/12/326)
Phone : 6380392766
Stamp and Signature

Encl.: Structural Design Calculation

1 Footing Size Design

Load	Pu	850 KN
Design Load	P	623 KN
Moment in x dir	Mux	0 KN-m
Moment in y dir	Muy	0 KN-m
Column size	cx	300 mm
	cy	450 mm
SBC	q	300 KN/sqm
Footing Size required	A req	2.08 sqmm
Footing Size Provided	L	1.60 meters
	B	1.60 meters
Area Provided	A prvd	2.56 meters
	Zx	0.68
	Zx	0.68
Net upward pressure	Nup	243 KNm2

Footing Size OK

2 Slab Design

	lx	0.650
	ly	0.575
Bending Moment in x dir	Mx	77 KN-m
Bending Moment in y dir	My	60 KN-m
Concrete	fck	25 MPa
Steel	fy	500 MPa
Minimum Depth Required	dmin	153
Depth Provided	D	600 mm
Clear Cover	c	50 mm
Effective Cover	d'	56 mm
Effective Depth	d'	544 mm

Area of Steel	Spacing c/c in mm		
	12#	16#	20#
653 sqmm	173 c/c	308 c/c	481 c/c
653 sqmm	173 c/c	308 c/c	481 c/c

Minimum Ast required across x direcion

Minimum Ast required across y direcion

Ast across x direction	12 mm dia @ 100 mm c/c	1131 sqmm
Ast across y direction	12 mm dia @ 100 mm c/c	1131 sqmm

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3 **One Way Shear along x direction**

Vu1	62 KN
ζv	0.071 MPa
ζc	0.263 MPa
Vc1	229 KN

One Way Shear Check OK

4 **One Way Shear along y direction**

Vu1	18 KN
ζv	0.021 MPa
ζc	0.263 MPa
Vc1	229 KN

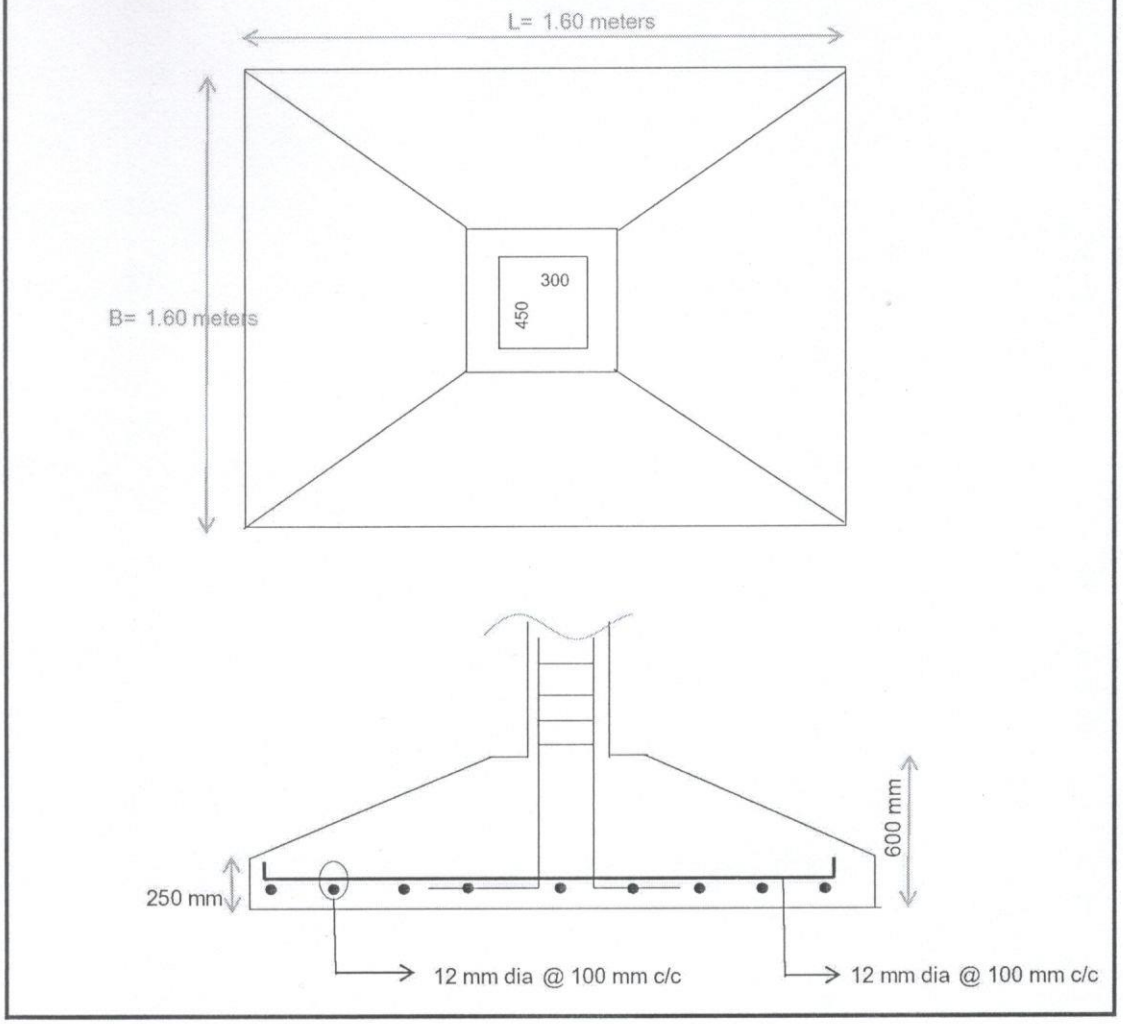
One Way Shear Check OK

5 **Two Way Shear**

Vu2	629 KN
ζv	0.314 MPa
ks*ζc	1.250 MPa
Vc1	2500 KN

Two Way Shear Check OK

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Column Design

Design Loads

Load	Pu	2000 KN
Moment	Mu	150 KN-m

Column Data

width	b	300 mm
depth	d	600 mm
length	l	3.05 meters

Grade

Concrete	fck	25 MPa
Steel	fy	500 MPa

Pu/(fckbd)	0.44
Mu/(fckbd^2)	0.09
d'/d	0.05

Minimum eccentricity

ex	1.61 mm	OK
ey	2.61 mm	OK

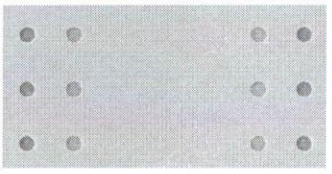
Refer Chart 35 of SP 16, Page no: 120

pt/fck	0.1

pt	2.50%
Ast	4500 sqmm

Number of bars

dia	nos	ast
25 mm	6	2945 sqmm
20 mm	6	1885 sqmm
-	-	
Total	12	4830 sqmm



6- 25#

6- 20#

Steel provided OK

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Beam Design

Beam Data

width	200 mm
depth	600 mm
clear cover to main	20 mm

d'	36 mm	.= cc+ sdia + mdia/2
eff depth	564 mm	.= d - d'

Material Grades

Concrete	25 MPa
Steel	500 MPa

Moment	138 KN-m	
Mu/bd^2	2.17	
xumax	257	.= (700/(1100 * (0.87 * fy)) * d
Mulim	212	.= 0.36*fck*b*xumax*(d-(0.42*xumax))
$Mulim/bd^2$	3.33	

Beam is designed as Singly Reinforced Beam

Area of Steel	Tension (Ast)	Compr (Asc)
Percentage	0.562 %	-------
Area of Steel	634 sqmm	600 sqmm

Refer Table 2 SP 16 pg 48

Tension Reinforcement

Type	Bar dia	Nos	Area of Steel	
Layer 1	16 mm	3	603 sqmm	
Layer 2	16 mm	2	402 sqmm	
Layer 3	-	2		
		Total Steel Provided	1005 sqmm	0.891 %

Provided Steel OK

Compression Reinforcement

Type	Bar dia	Nos	Area of Steel	
Layer 1	16 mm	3	603 sqmm	
Layer 2	-			
Layer 3			0 sqmm	
		Total Steel Provided	603 sqmm	0.535 %

Provided Steel OK

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DESIGN OF FLOOR SLAB

Design Data

Dimensions of the slab (c/c distance b/w supports),

Length of short span, L_x = 3.05 m

Length of long span, L_y = 3.7 m

f_{ck} = 25 N/mm²

f_y = 500 N/mm²

SS	10	3.05
LS	12	3.66

Width of the supporting beam, = 230 mm

Clear cover to main reinforcement = 20 mm

Assume dia. of reinforcement steel = 10 mm

Calculations

Assume the thickness of slab as 125 mm ; Effective depth, d = 100 mm

Effective span, l_x = 3.04878048780488 m (or) 2.919 m whichever is le d = 2.919 m

l_y = 3.65853658536585 m (or) 3.529 m whichever is le d = 3.529 m

(l_y / l_x) = 1.21 < 2 ; Here, (l_y / l_x) is less than 2, Hence design the slab as two way slab

Load Calculations

Dead Load of slab = 0.125 x 25 = 3.13 KN/m²

Finishes load on slab = 1.25 KN/m²

Live Load on slab = 2.0 KN/m²

Total Dead load acting on the Structure = 4.38 KN/m²

Total live load acting on the Structure = 2.0 KN/m²

Factored Design Load w = 9.57 KN/m²

Support Condition (Type of panel according to support condition)

Three Edges Discontinuous (One Long Edge Continuous)

Short span coefficient for (l_y / l_x) = 1.21,

For negative moment, a_x = 0.0715

For positive moment, a_x = 0.0534

For this support condition,

Long span coefficient,

For negative moment, a_y = 0

For positive moment, a_y = 0.043

Moment Calculation

Max. BM per unit width, $M_x = a_x w l_x^2$ & $M_y = a_y w l_x^2$

	M_u KNm	M_u / bd^2 N/mm²	p_t %	$A_{st,req}$ mm²
For Short Span,				
At mid span,	4.35	0.44	0.1245	125
At supports,	5.83	0.58	0.1653	165
For Long span,				
At mid span,	3.51	0.43	0.1216	122
At supports,	0.00	0.00	0	0

$A_{st,min}$ = (0.12/100) bD = 150 mm²

Reinforcement details

Provide Y 8 @ # 125 mm c/c at midspan & supports for short span (A_{st} pro. = 402 mm²)

Provide Y 8 @ 165 mm c/c at midspan & supports for long span (A_{st} pro. = 305 mm²)

Check for Deflection

Percentage of tension reinforcement = 0.40 %

$f_s = 0.58 f_y (A_{st\,req} / A_{st\,pro})$ = 90.1

Refer Fig. 4 of IS 456,

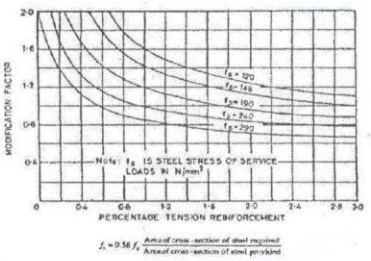
Modification factor = 1.6

Allowable (Span / d_{eff}) ratio = 41.6

Effective depth required = 70 mm

< d prov.

Hence OK



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