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M.N.DINESH B.E (Civil), M.E (Structural), C.Eng (I), M.I.E (IND).
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Regn No: S.E/GR-I/19/03/067
Registered Structural Engineer (GCC):
Regn No: RSE 100422019
Registered Structural Engineer (DTCP)
Regn No: CGLRGN/SE/GR-I/2020/08/007
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Date: 31-01-2024

STRUCTURAL STABILITY CERTIFICATE

This is to certify that the Structural design for Proposed Stilt + 3 Residential Building, Plot New No: B, Gandhi Street, Lakshmipuram, Tiruneermalai, Chennai – 600 044, comprised in old server No: 346, New survey No: 346/2B of Thiruneermalai Village, Chennai – 600 044., had been made by has based on the following is design Stilt +3 floors.

The construction is safe and sound.

1. The minimum grade of concrete is M 20.
2. The minimum grade of steel is Fe 500.
3. The design analysis using the code of practice for loading standards as per IS 875 Part1, 2 & IS 456-2000.

M.N.DINESH
Structural Engineer

M.N. DINESH B.E.,(CIVIL),M.E.,(STRUCT.,)
Structural Engineer (Grade-I), GCC
Regn. No. RSE 10042 2019
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DESIGN BASIS REPORT

1. DESIGN ASSUMPTION

a) STRUCTURAL SYSTEM

The structural system of the proposed residential building S+3. Plot No: B, Gandhi Street, Lakshmipuram, Tiruneermalai Chennai – 600 044.

2. DESIGN LOADS

a) Imposed loads

The imposed loads that are envisaged to act permanently (wherever applicable) are as following:-

Item	Intensity in KN/m^2 of plan area
Floor finish	1.5

The superimposed load or otherwise live load is assessed based on the occupancy classifications as per IS: 875 (Part-2)-1987 and are listed as below.

Name of Structure	Occupancy Classification	UDL (KN/m^2)
Residential Buildings	All rooms, Kitchens, Toilet and Bath Rooms	2.00
Residential Buildings	Corridors, Passages & Staircases	3.00
Residential Buildings	Roof with Access	1.50

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3. DESIGN METHODOLOGY

All structures have been designed according to the Limit State Method as specified inIS: 456-2000. Appropriate loads and its combinations, as per relevant clauses in IS 456:2000 code, for the most unfavorable effects are chosen for design.

4. MATERIALS

The self-weight of the various elements are computed based on the built weight of materials as given below:-

Materials	**Unit Weight in KN/m^3**
Steel	78.50
Plain Concrete	24.00
Reinforced Concrete	25.00
Soil	18.00
Water	10.00
Block(Concrete Blocks)	18.00

5. CONCRETE

All the concrete items for the construction have the following characteristics

Grade of Concrete = M20 for Column, Beams, and Slabs.
M20 for Isolated Footing.

Aggregate = 20mm and down size, mechanically crushed Aggregate.

6. STEEL.

Steel reinforcement shall be of Grade Fe500 conforming to IS: 1786-1985

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TAMIL NADU
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7. EXPOSURE CONDITION

Structural elements below Plinth level and Exterior External faces of walls are designedfor Moderate exposure condition and internal faces of walls, floor beams and slabs aredesigned for mild exposure condition as per Table 16 of IS 456-2000.

8. COVER TO REINFORCEMENT

The clear cover to main reinforcement shall be as follows.

Pile cap	=	Bottom: 75mm, Sides: 75mm
Slab	=	20mm
Columns	=	40mm for min thk 225, 25mm for min thk 150
Plinth Beams	=	25mm
Floor Beams	=	25mm or diameter of largest bar, whichever is greater.

9. FOUNDATION SYSTEM

Foundation systems are based on recommendations given as per soil investigation report provided, by **Shanmugha Geotech Consultants, Chennai.**

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Design of Isolated Footing with Moment

Support No = F1

1 Design Forces From STAAD

1. Axial Load on column	=	1000	KN
2. Bending moment along x-x, Mx	=	50	KN.m
3. Bending moment along y-y, My	=	50	KN.m

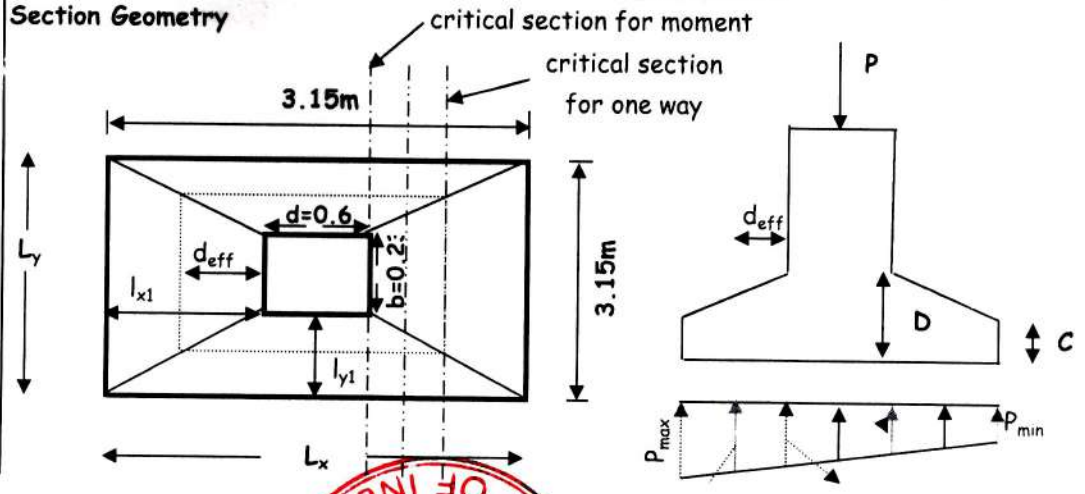
2 Design Datas

3. Compressive strength of Concrete, Fck	=	20	N/mm^2
4 Yield Strength of steel, Fy	=	500	N/mm^2
5.Diameter of Reinforcement, (x-direction)	=	12	mm
6.Diameter of Reinforcement, (y-direction)	=	12	mm
7. Clear cover to the reinforcement, C	=	40	mm
8. Safe bearing capacity of soil, SBC	=	180	KN/m^2
7 Type of Footing	=	Square	
8 Size of pedastal/Column	=	b x d	
	=	0.23 x 0.6	m

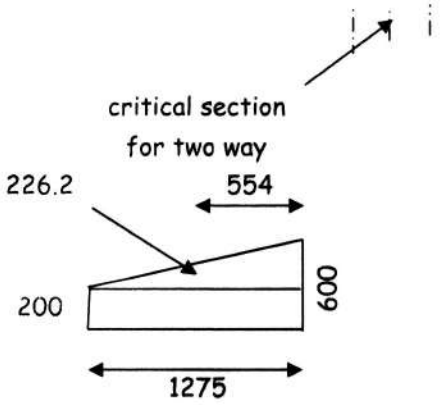
2 Assume trial size of footing

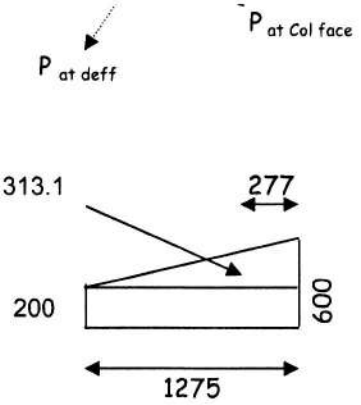
Area of footing	=	Total Load/SBC	
Self Wt. of footing			
(Assume 10% of column load	=	100	KN
		0	
Total Load	=	1100,	KN
Area of footing required	=	1100 / 180	
	=	6.11	m^2
Size Required	B =	2	m
	L =	3	m
Size Provided	B =	3.15	m
	L =	3.15	m
Area of Footing Provided	=	**9.9225**	m^2
		9.9225 > 6.11	
		O.K	

3 Section Geometry



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CHENNAI TAMIL NADU REGD.No.7077





l_{x1} = $(L_x-d)/2$
= (3.15 - 0.6)/2
= **1.275** m

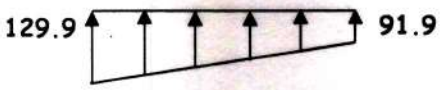
l_{y1} = $(L_y-d)/2$
= (3.15 - 0.23)/2
= **1.46** m

Assume Overall depth of footing, D = 600 mm
Depth at free end, C = 200 mm
d_{eff} at critical moment section = 554 mm
d_{eff} at critical one way shear section = 380.2 mm
d_{eff} at critical two way shear section = 467.1 mm

4 Check for Soil Pressure

A) Along X direction

Eccentricity, e_{xx} = (M_{xx}/P)
= 50 / 1100
= 0.045 m



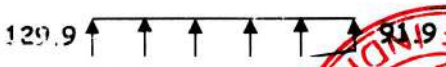
$L_x/6$ = 0.525 m
0.525>0.045
e_{xx} < $L_x/6$

Maximum Pressure, Pmax = P/A(1+6e/B)
= 1100/9.9225(1 + 6 x (0.045+0.045)/3.15)
= **129.9** KN/m^2
129.9<180

Minimum Pressure, Pmin = P/A(1-6e/B)
= 1100/9.9225(1 - 6 x (0.045+0.045/3.15)
= **91.9** KN/m^2
= 91.9<180
Safe

B) Along Y direction

Eccentricity, e_{yy} = (M_{yy}/P)
= 50 / 1100
= 0.045 m



$L_x/6$ = 0.525 m

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PATENT OFFICE
T. JAYASHANKARAN
CLUB NANAI
REGD. NO. 077



0.525>0.045

e_{xx} < $L_y/6$

Maximum Pressure, Pmax = (P/A(1+6e/B)

= 1100/9.9225(1 + 6 x (0.045+0.045)/3.15)

= **129.9** KN/m^2

129.9<180

Minimum Pressure, Pmin = P/A(1-6e/B)

= 1100/9.9225(1 - 6 x (0.045+0.045)/3.15)

= **91.9** KN/m^2

= 91.9<180

Safe

5 **Bending moment calculations**

S.No	Direction	Pmax(net)	Pmin(net)	P at face of the column	Moment, KN/m
1	x	119.82	81.82	97.2	87.34
2	y	119.82	81.82	99.43	118.48

6 **Check for depth (Moment consideratin)**

Mu.lim = (0.36 x Fck x (xu.max/d) x (1- 0.42(xu.max/d)) x bd^2

xu.max/d = 0.48

Mu.lim = 2.76 bd^2

d,reqd = $(Mu.lim/Qb)^{1/2}$

= $(118480000/(2.76 \times 1000))^{1/2}$

= **207.19** mm

207.19 < 554

O.K

7 **Calculation of Reinforcement**

S. N	Direction	Mu/bd^2	pt from SP16	pt, min	pt,provided	Ast, mm^2
1	x	0.28	0.065	0.12	0.120	664.8
2	y	0.39	0.092	0.12	0.120	664.8

pt = 100Ast/bd

Ast = (pt/100)xbd

8 **Spacing of reinforcement**

Spacing, mm		Spacing provided, mm	Ast provided, mm^2
Actual	Minimum		
160	300	150	753.6
160	300	150	753.6

Spacing = (ast x 1000)/Ast

where,

ast= C/s area of bar

Ast=Area of reinforcement provided

pt.max, Provided = 0.136 %

9 **Check for one way shear**

S.No	Direction	Pmax(net)	Pmin(net)	P at critical	Shear, KN



S.No	Direction	Pmax(net)	Pmin(net)	1way shear Xn	Shear, KN
1	x	119.82	81.82	90.52	62.13
2	y	119.82	81.82	92.75	88.98

Nominal Shear stress, tv = Vu/bd
= 88980/1000 x 380.2
= 0.23 N/mm^2

pt.max, Provided = 0.136 %

Allowable shear stress, tc (for pt,max) = 0.2752 N/mm^2

tv < tc

O.K

10 **Check for two way Shear**

Punching Shear,Vu = Net upward pressure x (A_F - A_c)
= 986.09 KN

Punching Shear stress, = Vu/perimeter at critical section*d_{eff}
= 0.5447 N/mm^2

Allowable Stress = 0.25(fck)$^{1/2}$
= 1.118 N/mm^2

O.K

11 **Check for bearing stress**

Actual bearing stress, = 1500 KN

Limiting bearing stress @ Column - footing interface, fbr,max = 0.45 fck (A1/A2)$^{1/2}$

A1 = 344000 mm^2

(A1/A2)$^{1/2}$ = 1

fbr,max = 9 N/mm^2

Limiting bearing stress @ Column - footing interface, fbr,max = 0.45 fck (A1/A2)$^{1/2}$

A1 = 9922500 mm^2

A2 = 344000 mm^2

(A1/A2)$^{1/2}$ = 2

fbr,max = 18 N/mm^2

Limiting Bearing resistance, Fbr = 3096 KN

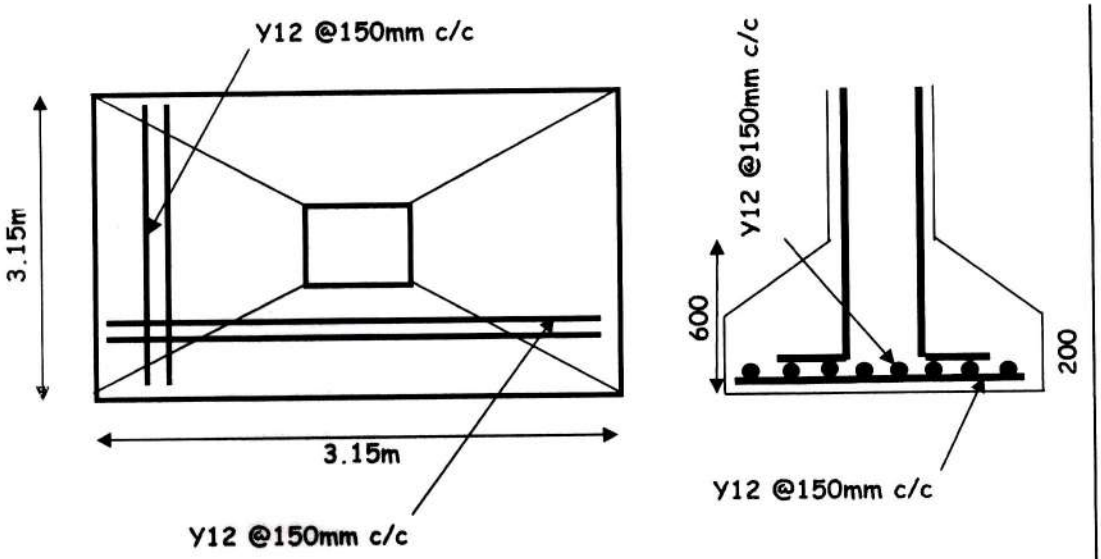
3096>1500

= **O.K**

11 **Reinforcement Details**

Direction	Reinforcement
X	Y12 @150mm c/c
y	Y12 @150mm c/c




Y12 @150mm c/c
3.15m
3.15m
Y12 @150mm c/c
Y12 @150mm c/c
600
200
Y12 @150mm c/c

Design of column with Biaxial Moment SHORT COLUMN

The values are Displayed in Blue color are the Input values

Column No = **C1, STAAD - 17**

1 Design Forces From STAAD Load Case = 100

1. Axial Load on column	=	1500 KN			
2. Bending moment along x-x, Mux	=	50 KN.m	Load Case	=	111
3. Bending moment along y-y, Muy	=	50 KN.m	Load Case	=	110

2 Design Datas

1. Compressive strength of Concrete, Fck	=	20 N/mm^2
2. Yield Strength of steel, Fy	=	500 N/mm^2
3.Diameter of Longitudinal Reinforcement,	=	25 mm
4.Diameter of lateral Reinforcement,	=	8 mm
5. Clear cover to the reinforcement, C	=	40 mm
6. Type of column	=	Rectangular
7. Size of Column	=	b x d
	=	230 x 600 mm
8. Unsupported Length of Column along x-x,L_x	=	3 m
9. Unsupported Length of Column along y-y,Ly	=	3 m
10. Effective length factor,	=	0.65
11. Effective Length of Column, along x-x, L_x	=	1.95 m
12. Effective Length of Column, along y-y, Ly	=	1.95 m

2 Check for leff/D

Effective length,lex/Lateral dimensions = L_{ex} / D
= 3.25
= 3.25< 12
= Short Column

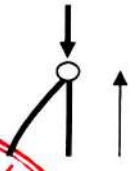
Effective length,ley/Lateral dimensions = L_{ex} / b
= 8.48
= 8.48< 12
= Short Column

3 Section Geometry

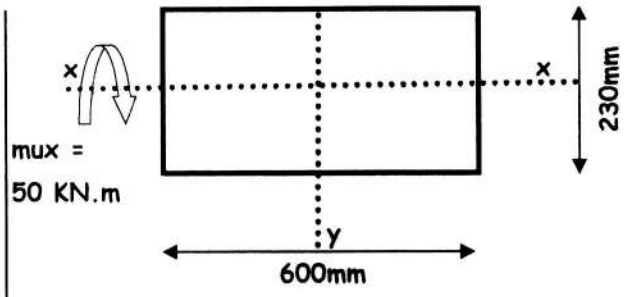


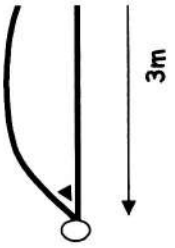
muy = 50 KN.m

Pu = 1500 KN









4 Check for Minimum Eccentricity

As

Applied eccentricties

ex = Mux/Pu
= 50/1500
= 33.333 mm

ey = Muy/Pu
= 50/1500
= 33.333 mm

Minimum eccenticity

e_{xx} = (lex/500)+(D/30)
= (1950/500) + (600/30)
= 23.9 mm or 20 mm
= 23.9 mm

e_{yy} = (ley/500)+(D/30)
= (1950/500) + (230/30)
= 11.567 mm or 20 mm
= 20 mm

5 Moment due to Eccentricity

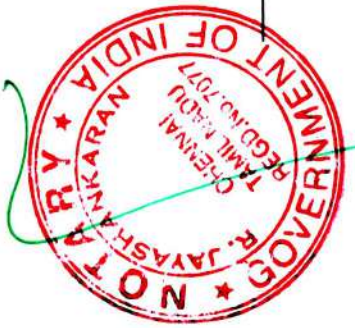
m_{uex} = Pu x e_{xx}
= (1500x23.9)/1000
= 35.85 KN.m

m_{uey} = Pu x e_{yy}
= (1500x11.57)/1000
= 30 KN.m

6 Design Moment

mux = Mux or muex
= 50 KN.m

muy = Mux or muey
= 50 KN.m



7 **Calculation of Longitudinal reinforcement**

Assume percentage of reinforcement = 3.2 %

Asc, required = 3.2/100x 230x600

= 4416 mm^2

No of bars = 10 Nos

Asc, Provided = 4906 mm^2

pt, provided = 3.555 %

Moment Capacity Along x Direction

(Pu/fck b D) = (1500000/20 x 230 x 600)

= 0.54

p/fck = 3.555/20

= 0.18

d'/D = 40/600

= 0.07

From interaction chart, SP16 [chart 48]

$Mux1/fck\ b\ D^2$ = 0.14

Mux1 = 0.14 x 230x600x600x20

= 231.84 KN.m

Moment Capacity Along y Direction

(Pu/fck b D) = (1500000/20 x 230 x 600)

= 0.54

p/fck = 3.555/20

= 0.1778

b'/D = 40/230

= 0.17

From interaction chart, SP16 [chart 50]

$Muy1/fck\ b\ D^2$ = 0.12

Muy1 = 0.12 x 230x600x230x20

= 76.176 KN.m

8 **Check for Moment Capcity**

$(Mux/Mux1)^{an} + (Muy/Muy1)^{an} < 1$

Puz = (0.45 fck.Ac) +(0.75 fy -0.45fck)Asc



Ac	=	138000 mm^2	
Puz	=	3037.596 KN	
Pu/Puz	=	0.494	
an	=	1.49	

$(Mux/Mux1)^{an} + (Muy/Muy1)^{an}$ = 0.636

0.636< 1

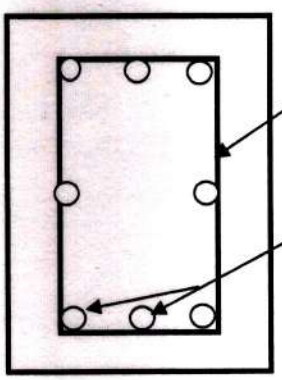
O.K

9 Calculation of Lateral Reinforcement

Spacing of ties

1. Least Lateral Dimensions of column	=	230 mm
2 Sixteen times the least dia of Longi bar	=	400 mm
3. 300mm	=	300 mm
Adopt Spacing	=	**200** mm

10 Details



No of bars = **25mm** **10** Nos



Design of Rectangular Beam

The values which are Displayed in Red color are the Input values

Beam No = 1981 From Staad (Envelope value)

Design Forces From STAAD

From Staad ,

1 Top moment,	Mut	= 150	kNm	load case
2 Bottom moment,	Mub	= 150	kNm	
3 Shear force,	Vu	= 100	kN	

Design data

Span	=	4.08	m
2. Size of the beam	=	b x D	
		230 450	mm
3. Compressive strength of concrete, fck	=	20	N/mm²
4. Yield strength of concrete, fy	=	500	N/mm²
5. Clear cover, c	=	25	mm
6. Effective depth of the beam, d	=	417	mm
7. Max Diameter of top Main reinforcement, dbt	=	16	mm
8. Max Diameter of bottom Main reinforcement, dbb	=	16	mm
9. Factor for checking eff depth, F	=	0.133	(Based on steel grade)

Check for depth

As per 456:2000

$d = \sqrt{Mu,max/(F*fck*b)}$

$= \sqrt{150/0.133x20x230}$

d = 495.15 mm **> D, Hence not safe**

As per 13920:1993

width/depth ratio	=	0.5111	Satisfied
width of the member	=	230	ok
Depth/span ratio	=	0.1103	Satisfied

Design of Top Reinforcement

$Mu/b*d^2$	=	3.751	N/mm²	d'/d	=	0.06	
From SP16, Table							
Pt	=	2.062		Pc	=	0	
Required Ast1	=	1977.7	mm²	Required Asc2	=	0	mm²
Dia of bar	=	16	2				
No of Bars	=	8	4				
Min As required	=	163.05	mm²	0.85*b*d/fy			
Max As	=	4140	mm²				
Provided Asc	=	1621.1	mm²	< Max As, Hence ok			

Increse the Dia of Main reinforcement bar (or) No of bars

Design of Bottom Reinforcement

$Mu/b*d^2$	=	3.751	N/mm²	d'/d	=	0.06	
From SP16, Table							
Pt	=	1.985		Pc	=	0.132	
Required Ast1	=	1903.8	mm²	Required Ast2	=	126.6	mm²
Dia of bar	=	16	2				
No of Bars	=	8	4				
Min Ast required	=	163.05	mm²	0.85*b*d/fy			
Max As	=	4140	mm²				
Provided Ast	=	1621.1	mm²	< Max As Hence ok			

Increse the Dia of Main reinforcement bar (or) No of bars



Check for Shear

Shear Stress, τv = Vu/b*d

τv = 1.04 N/mm²

ζ = 100*Ast req/b*d

2.062

From Table 19, IS 456:2000

τc = 0.83 N/mm²

From Table 20, IS 456:2000

$\tau c,max$ = 3.1 N/mm²

Provide shear Reinforcement as per IS 456:2000

Safe in Shear,No need to revise the beam sizes

Design of Vertical Shear Reinforcement

Vus	=	20395	N
Diameter of Shear reinforcement	=	10	
Number of legged stirrups	=	4	
Area of shear Reinforcement, Asv	=	314.16	mm²
Spacing of Stirrups, Sv	=	0.87*fy*Asv*d/Vus	
	=	2794	mm

Spacing of Shear Reinforcement

1	0.75*d	=	312.75 mm	(As per Cl 26.5.1.5 of IS 456:2000)
2	300	=	300 mm	
Spacing as per IS 456:2000		=	300 mm	

As per 13920:1993

2*d distance from supports	=	0.834	m
Spacing	=	104.25	mm

Provide104.25 mm c/c spacing for 0.834 m from support on either side

Remaining Distance	=	2.412	m
Spacing	=	208.5	mm

Provide 208.5 mm c/c spacing for 2.412 m in mid span

Check for Side face Reinforcement

Not required

Area of reinforcement	=	0	mm²
No of bars	=	2	
Spacing of bars	=	0	mm
Dia of bar	=	0	mm
Area Provided	=	0	mm²

Check for Deflection

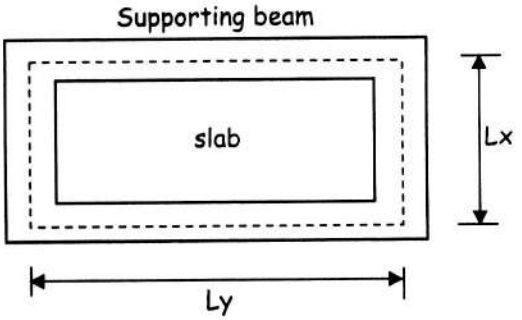
l/d provided		=	9.78	mm			
(l/d)basic		=	20	mm	As per IS 456:2000 Cl 23.2.1		
Modification factors							
k1	fs =	340.58	pt	=	2.06	k1 =	1.7
k2			pc	=	0.13	k2 =	1
k3						k3 =	1
l/d max		=	34	mm			

Safe in deflection



Design of Two way Slab | The values are Displayed in Blue color are the Input values

1 Design Datas



1. Eff. Shorter span between c/c support, Lx	=	2.95	m
2. Eff.Longer span between c/c support, Ly	=	3.63	m
3. Compressive strength of Concrete, Fck	=	20	N/mm^2
4. Yield Strength of steel, Fy	=	500	N/mm^2
5.Diameter of Reinforcement, (Shoter span)	=	8	mm
6.Diameter of Reinforcement, (Longer span)	=	8	mm
7. Fire resistance in hours	=	1.5	hrs
8. Nominal cover to the reinforcement, C	=	20	mm

2 Assume trial depth of slab

Span/depth, ratio l/d (Basic value)	=	26
Assume modification factor, M.F	=	1.5
depth of slab	=	(Span/B.V x M.F)
	=	(2.95 x 1000) / (26 x 1.5)
	=	75.64 mm
Overall depth required, D	=	(d+cc+1/2 dia of bars)
	=	75.64 + 20+ 8 /2
	=	99.64 mm
	=	**125** mm
Eff. Depth,d	=	**101** mm

3 Load Calculations

Unit weight of Concrete	=	25	KN/m^3
Dead load of Slab	=	3.13	KN/m^2
Floor finishes	=	1.5	KN/m^2
Partitions	=	0	KN/m^2
Extra loads due to filling, surki , etc., if any	=	0	KN/m^2
Live Load	=	2	KN/m^2
Total Load	=	**6.63**	KN/m^2
Design Load	=	**9.945**	KN/m^2



4 Calculation of Bending Moment

Edge condition of Slab = 9 9.Four Edges discontineous

Ly/Lx, ratio = 3.63 / 2.95
= **1.2305**
= **The slab is Two way Slab**

S.No	Direction & Sign	Moment Co-efficients	Moment KN.m	
1	X - Negative	0	0	(alpha x * wu *lx^2)
2	X - Positive	0.076	6.58	(alpha x * wu *lx^2)
3	Y- Negative	0	0	(alpha y * wu *lx^2)
4	Y- Positive	0.056	4.85	(alpha y * wu *lx^2)

M,max = **6.58** KN/m

5 Effective depth required

Mu.lim = (0.36 x Fck x (xu.max/d) x (1- 0.42(xu.max/d)) x bd^2

xu.max/d = 0.46

Mu.lim = 2.67 bd^2

d,reqd = (Mu.lim/Qb)$^{1/2}$

= (6580000 / (2.67 x 1000))$^{1/2}$

= **49.64** mm

49.64 < 101

O.K

6 Reinforcement Calculations

S. N	Dn & Sign	Mu/bd^2	pt from SP16	pt, min	pt,provided	Ast, mm^2
1	x -ve	0	0	0.12	0.12	121.2
2	x +ve	0.65	0.155	0.12	0.155	156.55
3	y -ve	0	0	0.12	0.12	121.2
4	y +ve	0.48	0.113	0.12	0.12	121.2

pt = 100Ast/bd

Ast = (pt/100)xbd

7 Spacing of reinforcement

Spacing, mm	Spacing	Ast provided,



Actual	Maximum	provided, mm	mm^2
414.52	300	150	334.93
320.92	300	150	334.93
414.52	300	150	334.93
414.52	300	150	334.93

Spacing = (ast x 1000)/Ast

where,
ast= C/s area of bar
Ast=Area of reinforcement provided

8 **Check for deflection**

close
close

lx/d, Actual = 29.21
l/d, Max = B.V x M.F
pt, = 100Ast/bd
= 0.3316
fs = 0.58x fyx(Ast required/Ast provided)
fs = 135.55 N/mm^2
Modification Factor = 2.76
l/d, Max = 2.76 X 26
= 71.76
71.76>29.21
O.K

9 **Torsional Reinforcement**

		lx		ly	
Size of torsinal reinforcement mesh (lx/5 and ly/5)	=	590	x	726	mm
Ast required to resist the torsion	=	3/4 times of mid-span Ast			
	=	117.41 mm^2			
dia of torsional reinforcement	=	8 mm			
Spacing required	=	427 mm			
Spacing Provided	=	125 mm			
No of layers	=	4 Nos (Each 2 top and bottom)			

NOTE:

1. Torsion reinforcement shall be provided at any corner where the slab is simply supprted on both edges meeting at that corner

2. Torsion reinforcement equal to half that described above shall be provided a at corner contained by edges over only one of which the slab is continuous

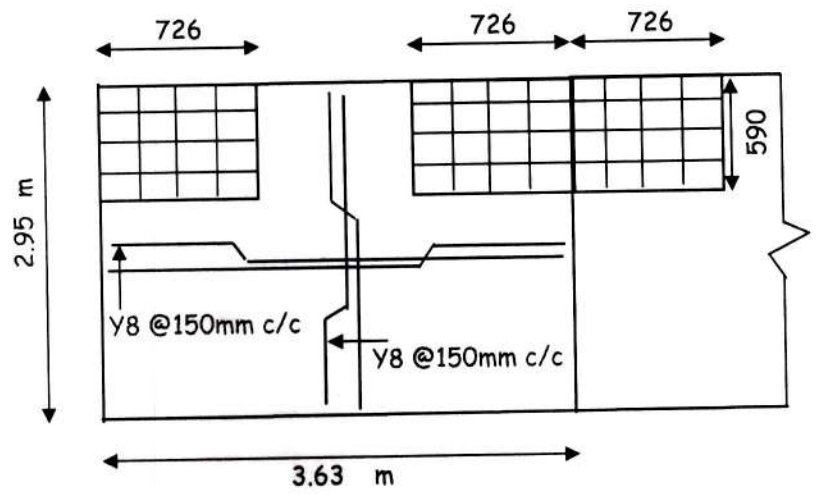
3. Torsion reinforcements need not be provided at any corner contained by edges over both of which the slab is continuous

9 **Reinforcement Details**

Direction	Reinforcement



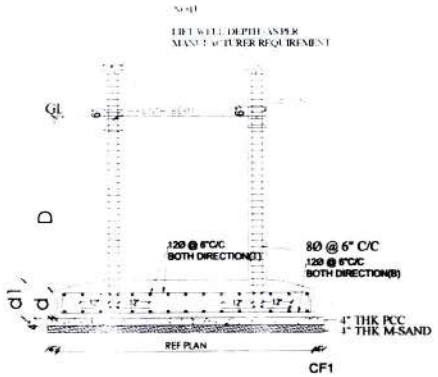
X	Y8 @150mm c/c
Y	Y8 @150mm c/c



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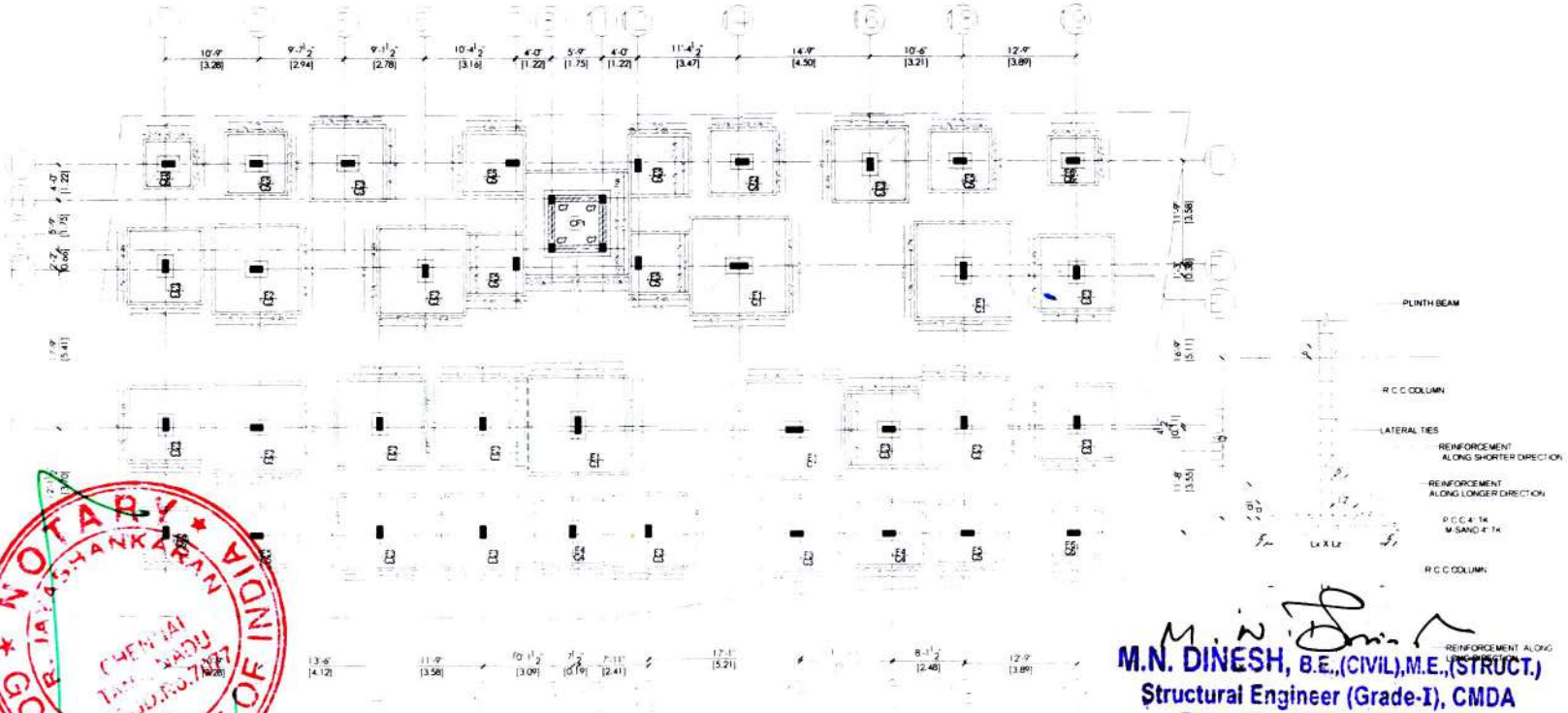
SCHEDULE OF FOOTING

NO	NAME OF FOOTING	GRID REFERENCE	SIZE Lx X Ly	d	d1	D	REINFORCEMENT DETAILS SHORTER SPAN	REINFORCEMENT DETAILS LONGER SPAN	NO OF FOOTING
1	F1	B15,D10,E18,F15	10'6"X 10'6"	10"	24"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	4
2	F2	C18,D2,4,6,F2,6	9'6" X 9'6"	10"	22"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	6
3	F3	A4,6,13,15,B17.	8'0" X 8'0"	10"	20"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	11
4	F4	A9,A17,I14	7'0" X 7'0"	10"	18"	6'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	3
5	F5	A2,16,F7,12,I2,7.	6'6" X 6'6"	10"	17"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	8
6	F6	A1,A19,I1,I19	5'0" X 5'0"	10"	16"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	4
7	CF1	G8,G11,H8,H11	Ref plan	12"	24"	7'0"	12Ø AT 6"C/C	12Ø AT 6"C/C	1



1. All Dimensions are in feet and inches.
2. Use of concrete - M25 (Design mix).
3. Minimum cement content shall not be less than 330 kg/cu.m for M25.
4. Concrete mix shall be M20 for footing & M25 for all other R.C.C works conforming to I.S:456-2000 unless otherwise specified.
5. Y Denotes TOR40 Steel conforming to I.S. 1786 - 1985. Grade - Fe 500D
6. Clear cover to the main steel 50mm for Footings , Raft Slabs & Raft Beams,40mm for Columns **30mm for R.C.C Wall , Lintel & Beams,25mm for Sunshade & Slab.**
7. Lap length shall be 50 d (Max. dia) for all bars
8. Development length of bar Ld as 50d Where d = Dia of bar
9. Provide Y 8 at 200 as Distribution steel for all top Reinforcement.
10. Spacer Bar to be Provided in Between Two Layers of Reinforcement of Same Dia at Every 1000 C/C.
11. Not more than 40% of Reinforcement shall be Lapped at any particular junction.
12. Cantilever props should not be released until the roof is concreted.
13. Structure is designed for Stilt plus three floors only.
14. The safe bearing capacity of soil is taken as 180 Kn/m2 at 2.0m
15. No admixtures shall be added without permission of consultant.
16. Removal of form works :
    i) For Slabs :
        a. Slabs spanning upto 4.5 m (15'-0") - 7 days
        b. Slabs spanning over 4.5 m (15'-0") - 14 days
    ii) For Beams and Arches :
        c. **Beams and Arches spanning upto 6 m (20'-0") - 14days**
        d. Beams and Archgs spanning over 6 m (20'-0") - 21days

*THIS DRAWING ONLY APPROVAL PURPOSE



FOUNDATION LAYOUT

LEGENDS

- PLOT BOUNDARY LINE
- COLUMN CENTER LINE
- EXCAVATION LINE
- COLUMN

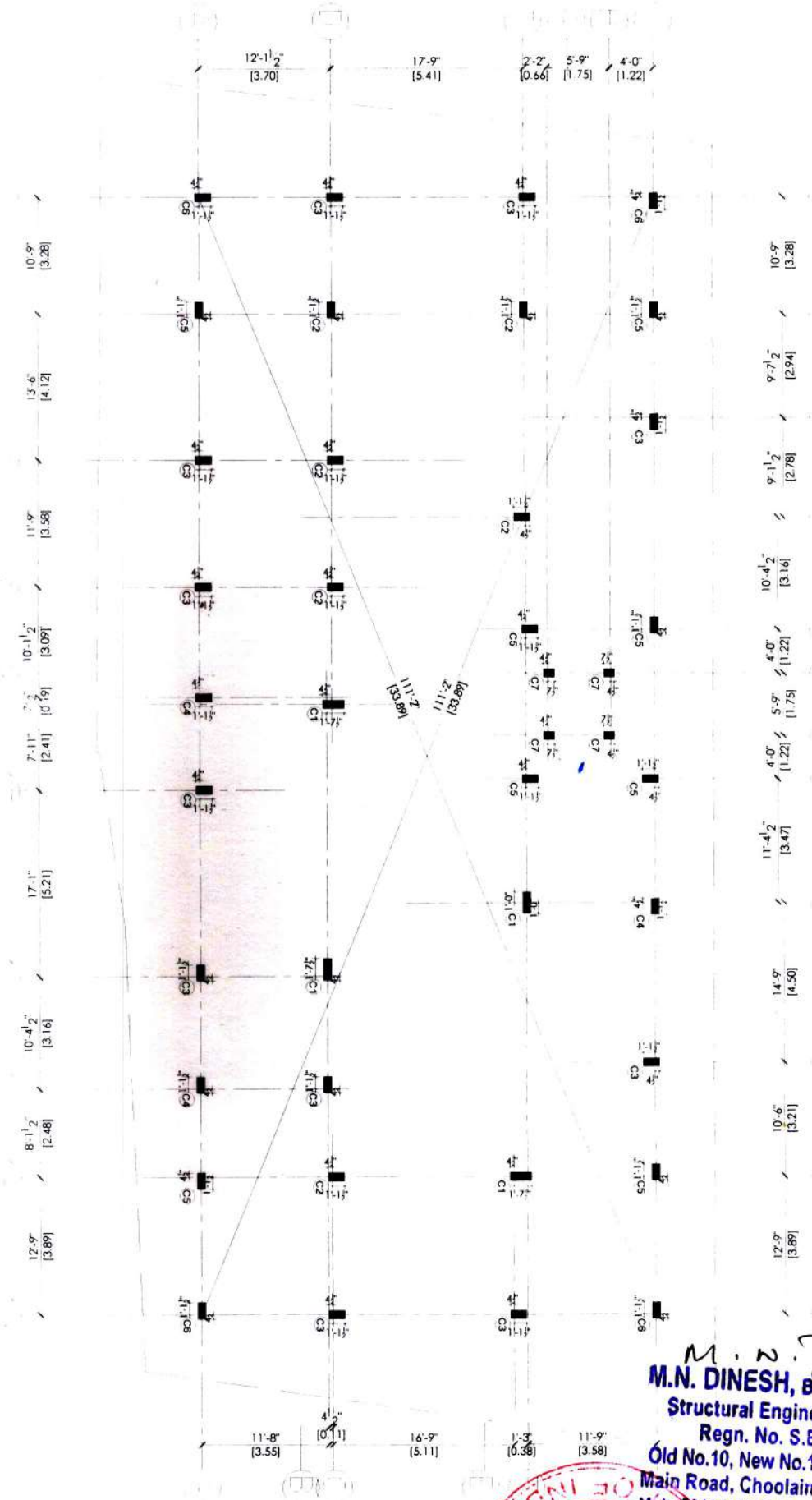
M.N.DINESH B.E., M.E.(Struct.).

PROPOSED RESIDENTIAL BUILDING
FOUNDATION LAYOUT

SCALE NTS
CLIENT

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COLUMN CENTER LINE LAYOUT PLAN

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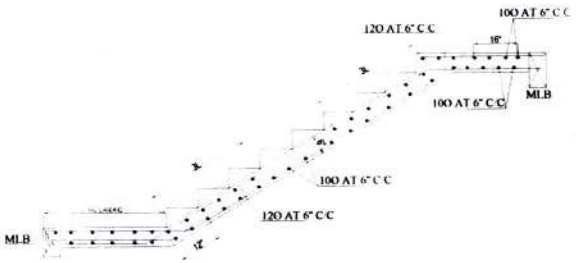
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PROPOSED RESIDENTIAL BUILDING
COLUMN LAYOUT
SCALE: NTS
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104

DETAIL OF BEAM SHOWING LINK SPACING

NOTE: FOR 25Ø & 32Ø MAIN BARS ADOPT 10Ø STIRRUPS IN PLACE OF 8Ø



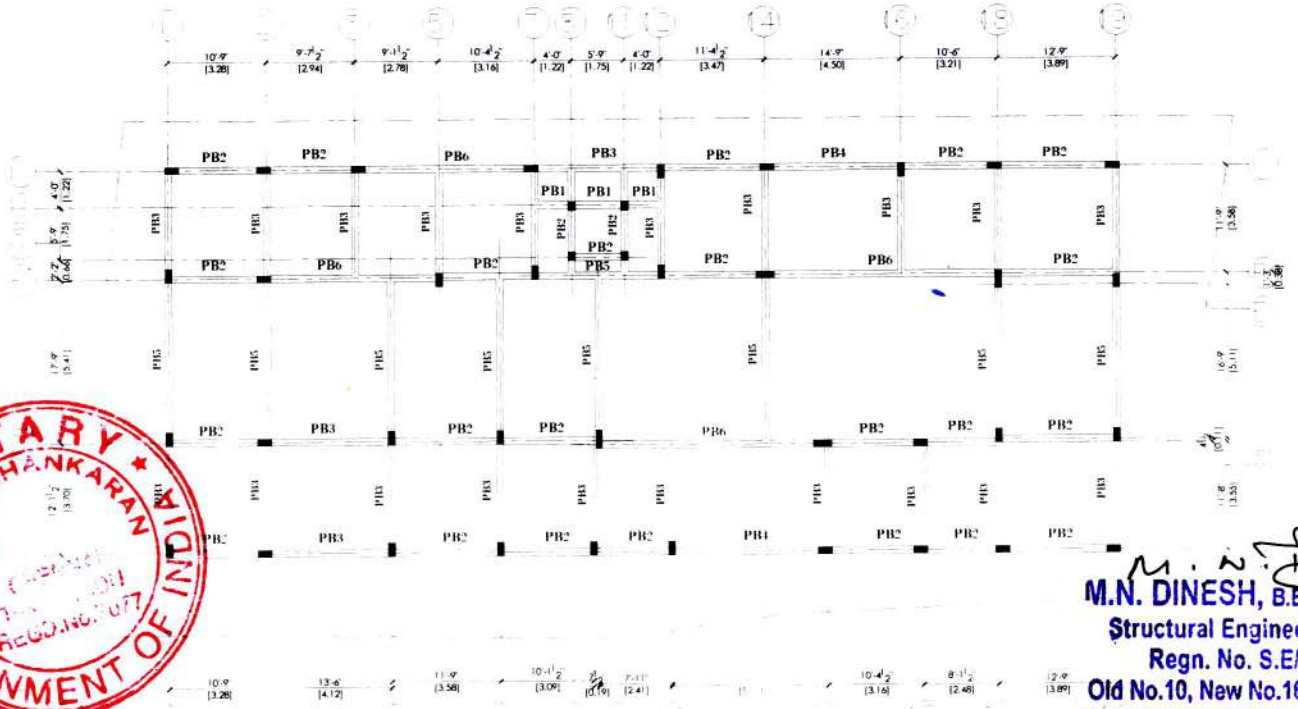
SECTION AT FIRST FLIGHT
Not to Scale

SCHEDULE OF PLINTH BEAM

NO	NAME OF BEAM	SIZE OF BEAM	SHAPE OF BEAM (END SPAN)	SHAPE OF BEAM (MID SPAN)	SHAPE OF TIES	REINFORCEMENT TOP	REINFORCEMENT BOTTOM	STIRRUPS
1	PB1	9" X 15"				2-12Ø	2-12Ø	8Ø AT 6" C/C
2	PB2	9" X 15"				2-12Ø	3-12Ø	8Ø AT 6" C/C
3	PB3	9" X 15"				2-12Ø	2-16Ø	8Ø AT 6" C/C
4	PB4	9" X 15"				2-16Ø 1-16Ø(TE)	2-16Ø 1-12Ø	8Ø AT 6" C/C
5	PB5	9" X 15"				2-16Ø 1-16Ø(TE)	3-16Ø	8Ø AT 6" C/C
6	PB6	9" X 15"				2-16Ø 2-16Ø(TE)	4-16Ø	8Ø AT 6" C/C

1. All dimensions are in feet and inches
2. Use concrete - M25 (Design mix)
3. Minimum cement content shall not be less than 340 kg/cu.m for M25
4. Concrete mix shall be M20 for footing & M25 for all other R.C.C works confirming to I.S.456-2000 unless otherwise specified
5. Y Denotes TOR40 Steel confirming to I.S. 1786 - 1985. Grade - Fe 500D
6. Clear cover to the main steel 50mm for Footings , Raft Slabs & Raft Beams,40mm for Columns **30mm for R.C.C Wall , Lintel & Beams,25mm for Sunshade & Slab.**
7. Lap length shall be 50 d (Max. dia) for all bars
8. Development length of bar Ld as 50d Where d = Dia of bar
9. Provide Y 8 at 200 as Distribution steel for all top Reinforcement
10. Spacer Bar to be Provided in Between Two Layers of Reinforcement of Same Dia at Every 1000 C/C
11. Not more than 40% of Reinforcement shall be Lapped at any particular junction
12. Cantilever props should not be released until the roof is concreted
13. Structure is designed for Stilt plus three floors only
14. No admixtures shall be added without permission of consultant
15. Removal of form works :
    i) For Slabs :
    a. Slabs spanning upto 4.5 m (15'-0") - 7 days
    b. Slabs spanning over 4.5 m (15'-0") - 14 days
    ii) For Beams and Arches :
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    d. Beams and Archgs spanning over 6 m (20'-0") -21days

*THIS DRAWING ONLY APPROVAL PURPOSE



PLINTH BEAM LAYOUT

LEGENDS
TE TOP EXTRA BAR
PLOT BOUNDARY LINE
COLUMN CENTER LINE
COLUMN

M.N.DINESH B.E., M.E.(Struct.).

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PROPOSED RESIDENTIAL BUILDING
PLINTH BEAM LAYOUT
SCALE NTS
CLIENT

105

SCHEDULE OF FLOOR BEAM

NO	NAME OF BEAM	SIZE OF BEAM	SHAPE OF BEAM (END SPAN)	SHAPE OF BEAM (MID SPAN)	SHAPE OF TIES	REINFORCEMENT TOP	REINFORCEMENT BOTTOM	STIRRUPS
1	FB1	9" X 15"				2-12Ø	2-16Ø	8Ø AT 6" C/C
2	FB2	9" X 15"				2-12Ø	2-16Ø + 1-12Ø	8Ø AT 6" C/C
3	FB3	9" X 15"				2-12Ø	3-16Ø	8Ø AT 6" C/C
4	FB4	9" X 18"				2-16Ø 1-16Ø(TE)	4-16Ø	8Ø AT 6" C/C
5	FB5	9" X 18"				2-16Ø 3-16Ø(TE)	5-16Ø	8Ø AT 6" C/C
6	FB6	9" X 18"				2-16Ø 3-16Ø(TE)	3-20Ø + 2-16Ø	8Ø AT 6" C/C
7	FB7	9" X 21"				2-20Ø 3-20Ø(TE)	5-20Ø	8Ø AT 6" C/C

DETAIL OF BEAM SHOWING LINK SPACING
NOTE: FOR 25Ø & 32Ø MAIN BARS, ADOPT 10Ø STIRRUPS IN PLACE OF 8Ø

1. All dimensions are in feet and inches
2. Use concrete - M25 (Design mix)
3. Minimum cement content shall not be less than 340 kg/cu.m for M25
4. Concrete mix shall be M20 for footing & M25 for all other R.C.C works conforming to I.S.456-2000 unless otherwise specified.
5. Y Denotes TOR40 Steel confirming to I.S. 1786 - 1985. Grade - Fe 500D
6. Clear cover to the main steel 50mm for Footings, Raft Slabs & Raft Beams. 40mm for Columns 30mm for R.C.C Wall, Lintel & Beams, 25mm for Sunshade & Slab.
7. Lap length shall be 50 d (Max. dia) for all bars
8. Development length of bar Ld as 50d. Where d = Dia of bar.
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12. Cantilever props should not be released until the roof is concreted.
13. Structure is designed for Stilt plus three floors only.
14. No admixtures shell be added without permission of consultant.
15. Removal of form works :
    i) For Slabs :
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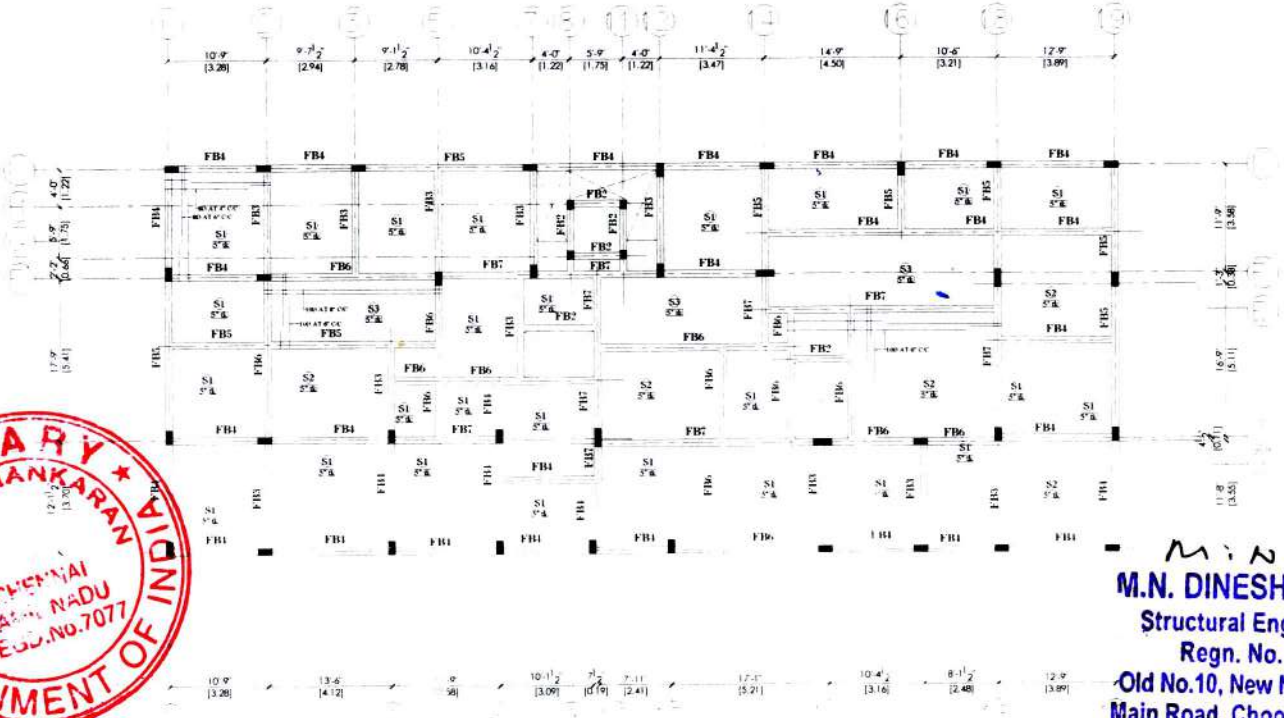
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LEGENDS

TE TOP EXTRA BARS

COLUMN CENTER LINE

COLUMN



TERRACE FLOOR BEAM LAYOUT

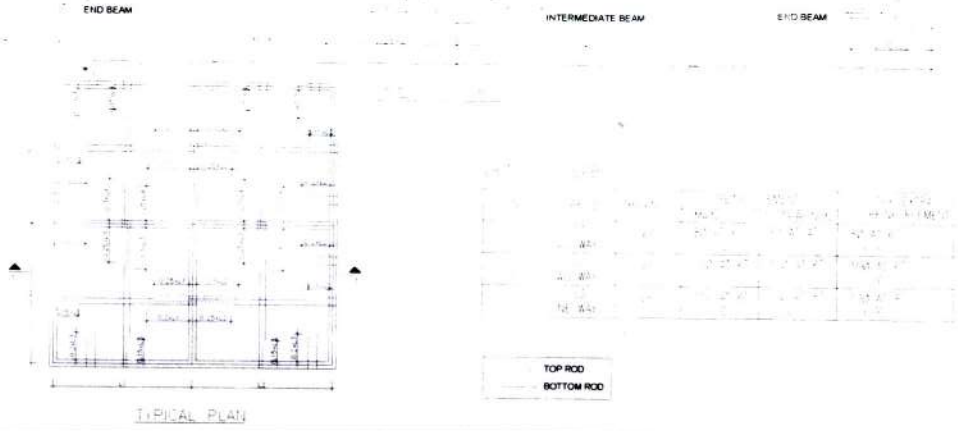
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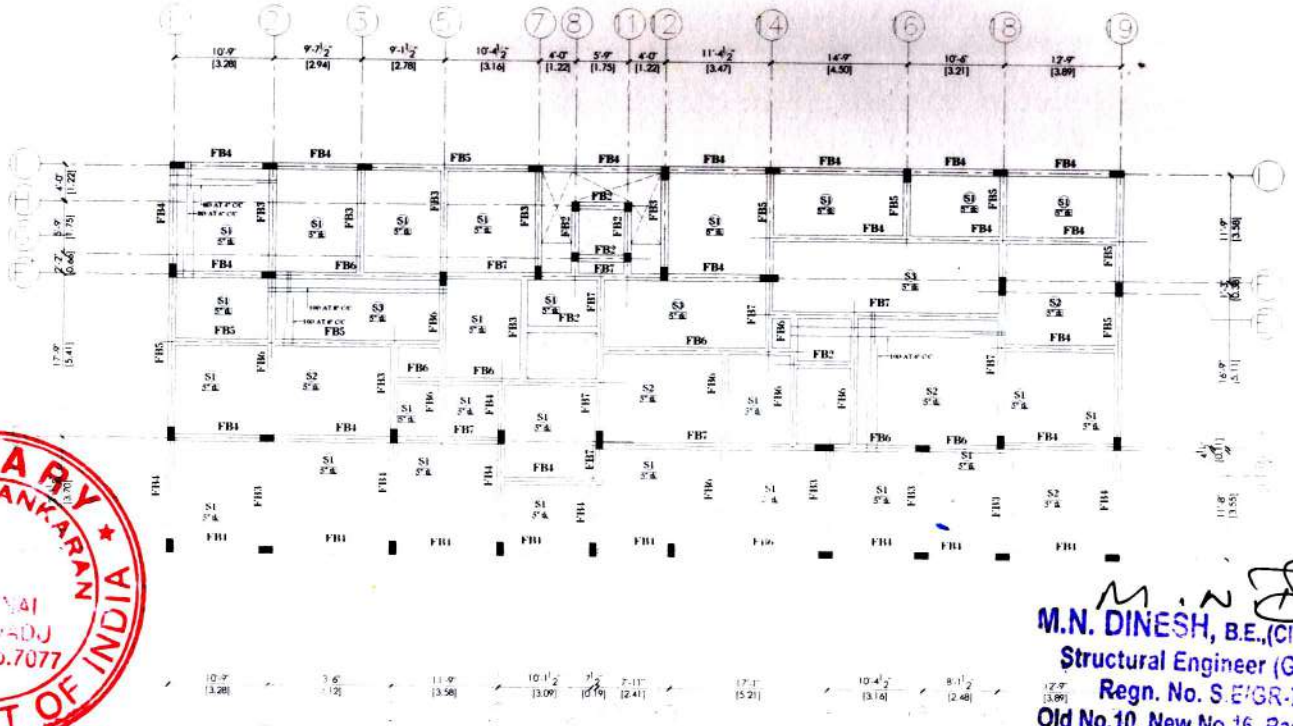
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PROPOSED RESIDENTIAL BUILDING | SCALE: NTS
TERRACE FLOOR BEAM LAYOUT | CLIENT

106



TYPICAL PLAN



TERRACE FLOOR SLAB LAYOUT

1. All dimensions are in feet and inches
2. Use concrete - M25 (Design mix)
3. Minimum cement content shall not be less than 340 kg/cu m for M25
4. Concrete mix shall be M20 for footing & M25 for all other R C C works confirming to I S 456-2000 unless otherwise specified
5. Y Denotes TOR 40 Steel confirming to I.S. 1786 - 1985. Grade - Fe 500D
6. Clear cover to the main steel
   50mm for Footings . Raft Slabs & Raft Beams.40mm for Columns
   30mm for R.C.C Wall , Lintel & Beams,25mm for Sunshade & Slab.
7. Lap length shall be 50 d (Max. dia) for all bars
8. Development length of bar Ld as 50d Where d = Dia of bar
9. Provide Y 8 at 200 as Distribution steel for all top Reinforcement
10. Spacer Bar to be Provided in Between Two Layers of Reinforcement of Same Dia at Every 1000 C/C
11. Not more than 40% of Reinforcement shall be Lapped at any particular junction.
12. Cantilever props should not be released until the roof is concreted.
13. Structure is designed for Stilt plus three floors only
14. No admixtures shall be added without permission of consultant .
15. Removal of form works
    i) For Slabs :
       a. Slabs spanning upto 4.5 m (15'-0") - 7 days
       b. Slabs spanning over 4.5 m (15'-0") - 14 days
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       c. Beams and Arches spanning upto 6 m (20'-0") -14days
       d. Beams and Archgs spanning over 6 m (20'-0") -21days

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LEGENDS

TE TOP EXTRA BARS
COLUMN CENTER LINE
COLUMN

M.N.DINESH B.E., M.E (Struct.).

NOTARY R. JAYASHANKARAN CHENNAI TAMIL NADU REGD.No.7077 GOVERNMENT OF INDIA

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PROPOSED RESIDENTIAL BUILDING
TERRACE FLOOR SLAB LAYOUT
SCALE
CLIENT

106.A

106-C

GREATER CHENNAI CORPORATION
WORKSDEPARTMENT

PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that **Thiru. Dinesh M N** has been enrolled as **Registered Structural Engineer Grade- I (RSE)** in Greater Chennai Corporation (GCC) who has the qualification of **M.E.,(Structural Engg.) with minimum** of 5 years experience in the relevant field.

The Registration No. is **RSE100422019** dated **30.09.2019** It is informed herewith to comply with the scope of work, duties and responsibilities as prescribed by the Government of Tamil Nadu 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 04.02.2019.

This Registration is valid upto **29.09.2024.**



30/9/19

Superintending Engineer (Works)
Greater Chennai Corporation.

RGN No: RSE100422019
Dated: 30.09.2019

30/09/19

30/09/19

For R.K.N. CONSTRUCTION

Proprietor



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.

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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

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