Verified RealEstate™

RE REGULATORY RECORD

RERA Document

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DIGITALLY VERIFIED RECORD

DESIGN OF SLAB

Data:

Concrete	M20	fck	=	20	N/mm²
Steel	Fe500	fy	=	500	N/mm²
Shorter Span		Lx	=	2.97	m
Longer Span		Ly	=	5.26	m
Assuming Depth of Slab		D	=	150	mm
Assuming Dia of reinf			=	8	mm
Clear Cover			=	20	mm
Eff.Depth of Slab		d	=	126	mm
Eff.Shorter Span		L_x	=	2.97	m
Eff.Longer Span		L_y	=	5.26	m

1.Load Calculations :

Self weight of slab	(0.15 x	20.00)	=	3.00	kN/m²
Ceiling Plastering			=	0.25	kN/m²
Floor Finish			=	1.00	kN/m²
Weathering Course (Weight Not Applicable)			=	0.00	kN/m²
Live load			=	2.00	kN/m²
Total Load			=	7.00	kN/m²
Load Factor			=	1.50	
Factored Load			=	10.50	kN/m²
Span Ratio		l_y/l_x	=	5.26/2.97	
			=	1.77	

2. Bending Moment Calculation:

Support Condition — Two Adjacent edges discontinuous

continuous)

From IS 456-2000 Table 26

αNx	=	0.086
αPx	=	0.065
αNy	=	0.047
αPy	=	0.035

Shorter Span

Negative Moment (support)	Mnx	= $\alpha_{Nx} \times W_u \times L_x^2$
		= 0.086 x 10.50 x2.97²
		= 7.97kN.m
Positive Moment (Mid Span)	Mpx	= $\alpha_{px} \times W_u \times L_x^2$
		= 0.065 x 10.50 x 2.97²
		= 6.02kN.m

Longer Span:

Negative Moment (Support)	MNy	= $\alpha_{Ny} \times W_u \times L_x^2$
		= 0.047 x 10.50 x 2.97²
		= 4.35kN.m
Positive Moment (Mid span)	Mpy	= $\alpha_{py} \times W_u \times L_x^2$
		= 0.035 x 10.50 x 2.97²
		= 3.24kN.m

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Reinforcement :

$$Mu = 0.87 \times fy \times Ast \times d \left\{ 1 - \frac{(fy \times Ast)}{fck \times bd} \right\}$$

$$= 0.87 \times 500 \times Ast \times 126 \left\{ 1 - \frac{500 \times Ast}{20 \times 1000 \times 126} \right\}$$

Ast in Shorter Span

Support	$=149mm^2$
Mid Span	$=112mm^2$

Ast in Longer Span

Support	$=110mm^2$
Mid Span	$=90mm^2$

	Reinf Required		Reinf Provided
Shorter Span			
Support	8ø @ 340mm c/c	-	8 dia@ 150 mm c/c
Mid Span	8ø @ 320mm c/c	-	8 dia@ 150 mm c/c
Longer Span			
Support	8ø @ 380mm c/c	-	8 dia@ 150 mm c/c
Mid Span	8ø @ 270mm c/c	-	8 dia@ 150 mm c/c

3. Check for deflection

Allowable span / depth Ratio		l/D	=	32
% of Tension reinforcement		pt	=	0.179
Corresponding Compression reinf.		Bar dia	=	8mm
		spacing	=	150mm
% of compression reinforcement		pc	=	0.179
Modification factor for Tension reinf.	F1	=	1.20	(From Fig 4 in IS 456 – 2000)
Modification factor for comp.reinf.	F2	=	1.00	(From Fig 5 in IS 456 – 2000)

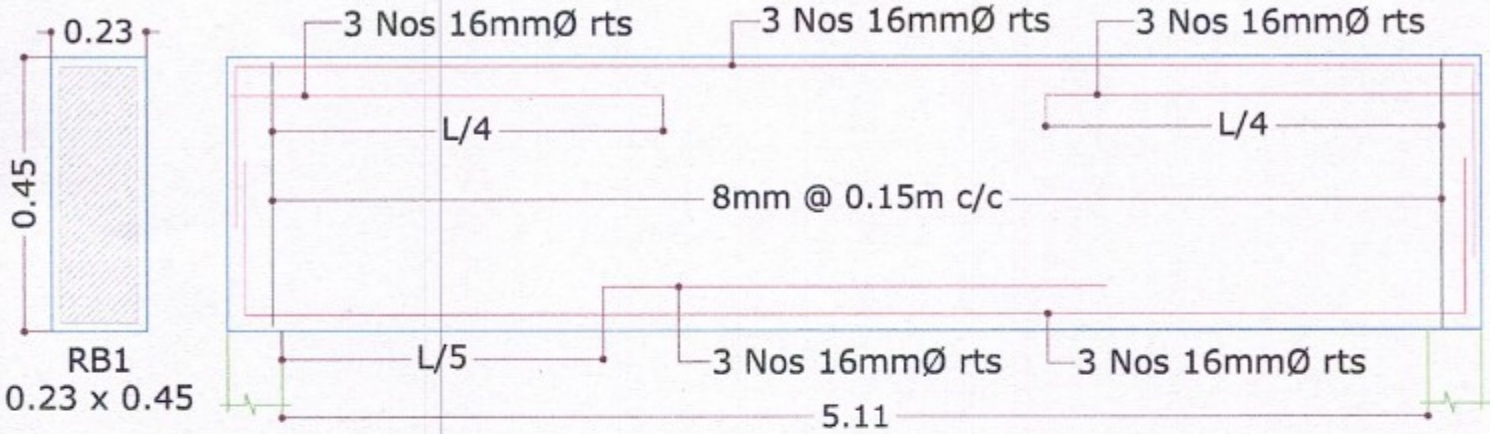
Modified span/ depth ratio = l/d xF1 xF2
= 32 x 1.20 x 1.00
= 38.40

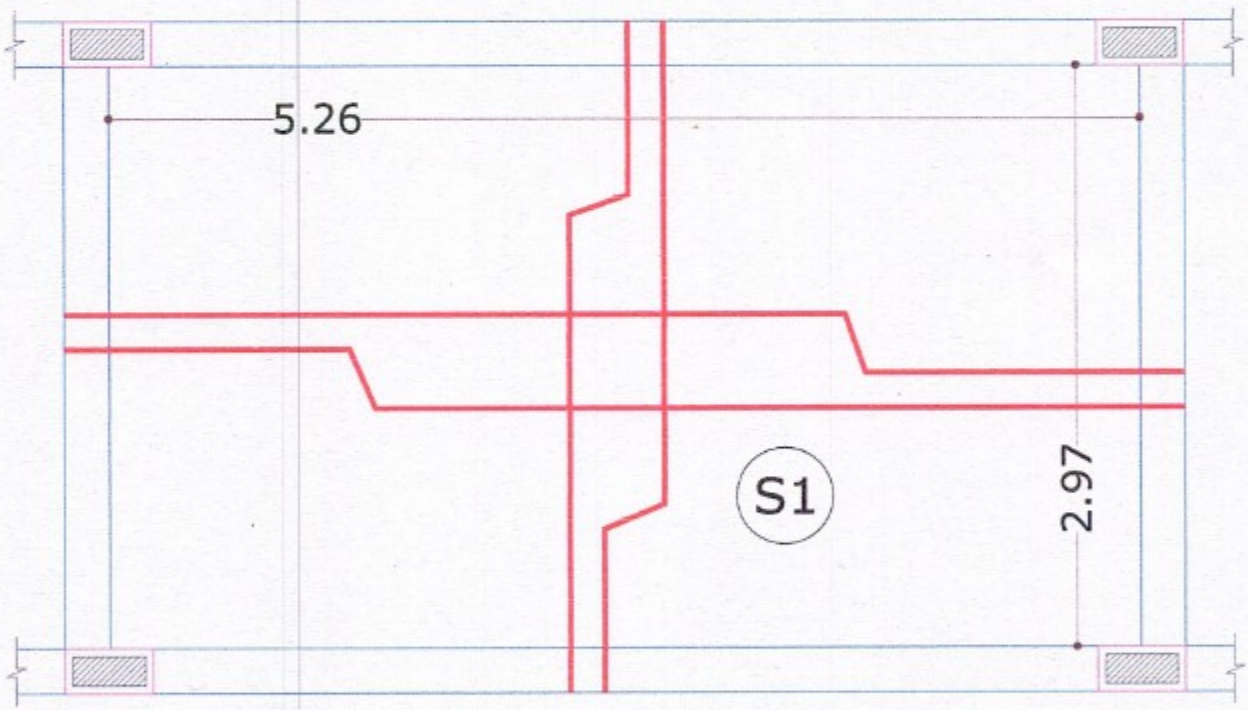
Actual span / depth ratio = 2970 / 126
= 23.57

Actual span / depth ratio < Modified span /depth ratio 23.57 < 38.40

HENCE SAFE & SOUND

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S.NO	REINFORCEMENT IN SHORTER SPAN	REINFORCEMENT IN LONGER SPAN	SL.TK
S1	8mm Ø 0.15m c/c CKD	8mm Ø 0.15m c/c CKD	0.150m

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DESIGN OF BEAM

Data:

Effective length		=	5.11 m
		=	5110 mm
Breadth of Beam		=	230 mm
Overall depth (assumed)		=	450 mm
Characteristic strength of steel			
	fy	=	500 N/mm²
	fck	=	20 N/mm²
	Cover	=	25 mm

Total Load

Dead load from slab		=	3.75 kN/mm²
Ceiling Plastering		=	0.25kN/m²
Floor finish		=	1 kN/mm²
Total dead load		=	5.00 kN/m²
Live load		=	2 kN/m²
	Total Load	=	7.00 kN/m²

Effective Depth = d = 450 - 25 - 25 / 2

= 412.5 mm

Distance of centroid of Compression reinforcement from the extreme compression fibre =

d' = 25 +(25/2)

= 37.5 mm

$\frac{d'}{d} = \frac{37.5}{412.5}$

= 0.09

Minimum Reinforcement

The min.area of tension reinforcement shall not be less than the given,

$\frac{As}{bd} = \frac{0.85}{fy}$

Where,

As = Min.area of tension reinforcement

b = Breadth of the beam or breadth of web of T-beam

d = Effective depth

fy = Characteristic strength of reinforcement

$As = \frac{0.85 \times b \times d}{fy}$

$= \frac{0.85 \times 230 \times 412.5}{500}$

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= 161.29 mm2

Refering Design Aids IS:456,The reinforcement as shown in the sketch

Overall depth of beam = $\frac{1}{12}$ to $\frac{1}{20}$ of the span

Provide over all depth =450 mm

Width of rib =$\frac{2}{3}$ (depth of rib) = $\frac{2}{3}$(450-150)

=200 mm

Loading on the beam

From the Slab = $\frac{Wl_x}{6}\left(3 - \left(\frac{lx}{ly}\right)^2\right)$

= $\frac{7 \times 3.2}{6}\left(3 - \left(\frac{3.2}{5.11}\right)^2\right)$

=9.74 kN/m

D.L of the rib = 0.23 x 0.3 x 25 kN/m

= 1.8 kN/m

Total = 11.54 kN/m

Providing 16 mm dia bars at clear cover 25 mm

Effective cover = 25 + 8

= 33 mm

Effective depth d = 417 mm

Center to center bearing= 5.11 m

Effective span = 5.11 m

Max. BM = $\frac{11.54 \times 3.2 \times 3.2}{8}$

= 14.77 kN.m

Req.depth d = $\left\{\frac{1.5 \times 14.77 \times 10 \wedge 6}{2.75 \times 230}\right\}^{1/2}$

= 187.16 mm

Provided depth, D = 450 mm

$\frac{Mu}{bd^2}$ = $\left\{\frac{1.5 \times 14.77 \times 10 \wedge 6}{230 \times 417 \times 417}\right\}^{1/2}$

= 0.75

pt = $\frac{fck}{2 \times fy}\left(1 - \left(SQRT\left(1 - \frac{4 \times (Mu/b \times d^2)}{0.87 \times fck}\right)\right)\right) \times 100$

= 0.18 %

N.D.S.

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A_{st} $= \left\{ \frac{0.18 \times 230 \times 417}{100} \right\}$

$= 2884\ mm^2$

Provided 6 – Y16

Check for Shear

$V = \frac{1.5 \times 11.54 \times 5.11}{2}$

$= 44.22\ kN$

$T_c = 0.54\ N/mm^2$

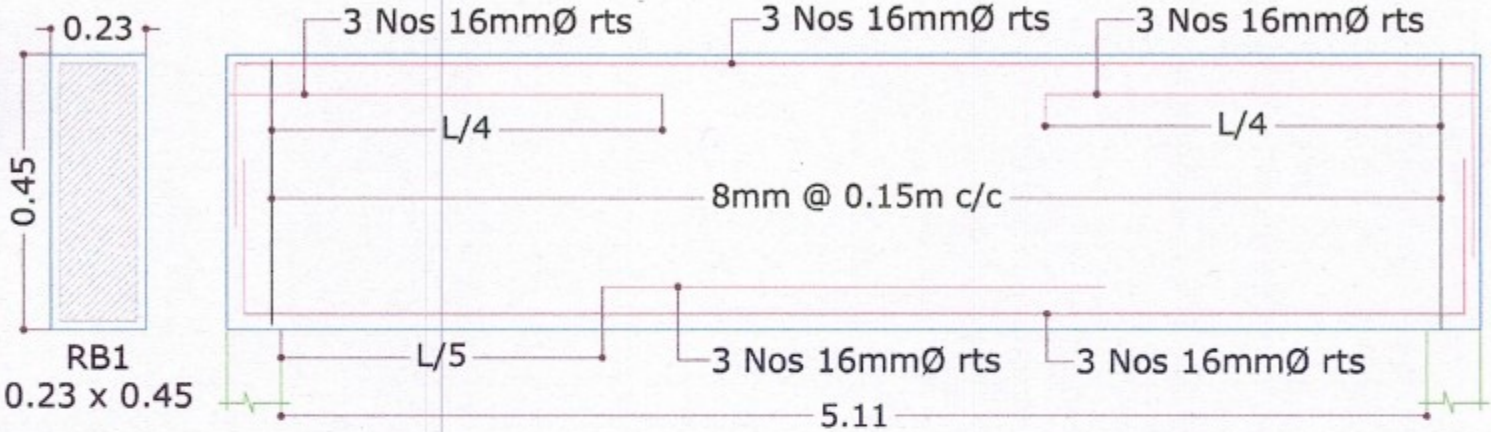
$V_{uc} = \frac{0.48 \times 230 \times 417}{1000}$

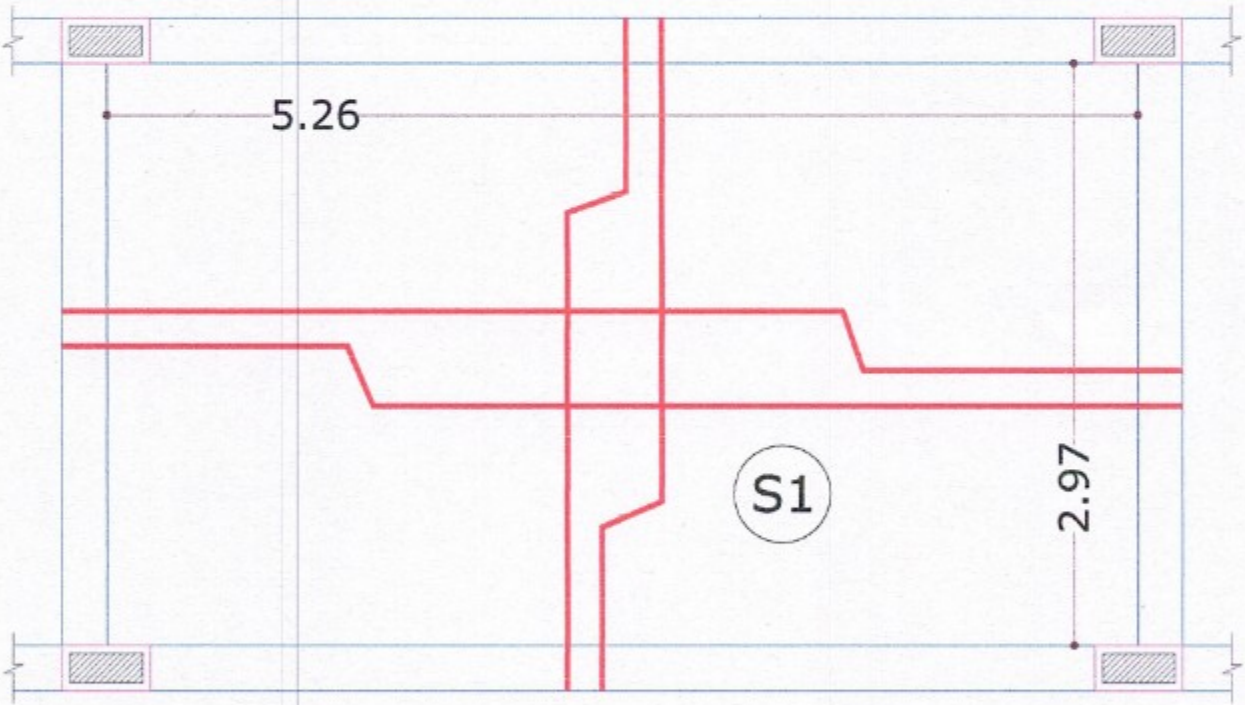
$= 46.1\ kN$

$V_{uc} > $ Shear at support

Provide Y8 @ 150 c / c (stirrups)

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S1	8mm Ø 0.15m c/c CKD	8mm Ø 0.15m c/c CKD	0.150m

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DESIGN OF COLUMN

Data:

Total No. of floors		=	5
Total No. of Roof		=	6
Storey height		=	3 m
Breadth of column	b	=	230 m
		=	0.23 m
Depth of column	D	=	600 mm
		=	0.60 m
	fck	=	20 N/mm^2

Total axial load

Dead load & live load from one floor		=	280 kN
Total axial load all floors		=	6 x 280
		=	1680 kN
Column dimension		=	230 x 600 mm
Self weight of column		=	0.23 x 0.60 x 6 x 20 x 3
		=	50 kN
Total load		=	(1680 + 50) x 1.5
	Pu	=	2595 kN

Area of Reinforcement

$$\frac{d'}{D} = 0.08$$

$$d' = 50 \text{ mm}$$

$$\frac{Pu}{fck \times b \times D} = \frac{2595 \times 10^3}{20 \times 230 \times 600} = 0.95$$

$$\frac{Mu}{fck \times b \times D2} = \frac{1.5 \times 30.48 \times 10^6}{20 \times 230 \times 600^2} = 0.02$$

Refering to chart in SP : 16 for values

$$\frac{Pu}{fck.b.D} = 0.95 \quad : \quad \frac{Mu}{fck.b.D^2} = 0.02$$

The value of $\frac{P}{fck} = 0.05$

$$P = 0.05 \times 20 = 1.0$$

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$$As = \frac{p \times b \times D}{100}$$

$$= \frac{1.6 \times 230 \times 600}{100}$$

$$= 2208 \text{ mm}^2$$

Provide 12 – Y16 bars.

Design of Lateral Ties

Dia of lateral ties $= \frac{1}{4} \times 16 = 4$ mm

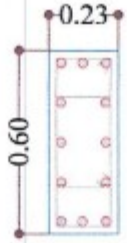
Hence 8mm dia bar is adopted

Pitch is min. of the following – (as per IS: 456)

a. Least lateral dimension = 300 mm
b. 16 x dia of bar
c. 300 mm

Hence provide Y8 @ 150mm c/c
Similarly other columns are calculated.

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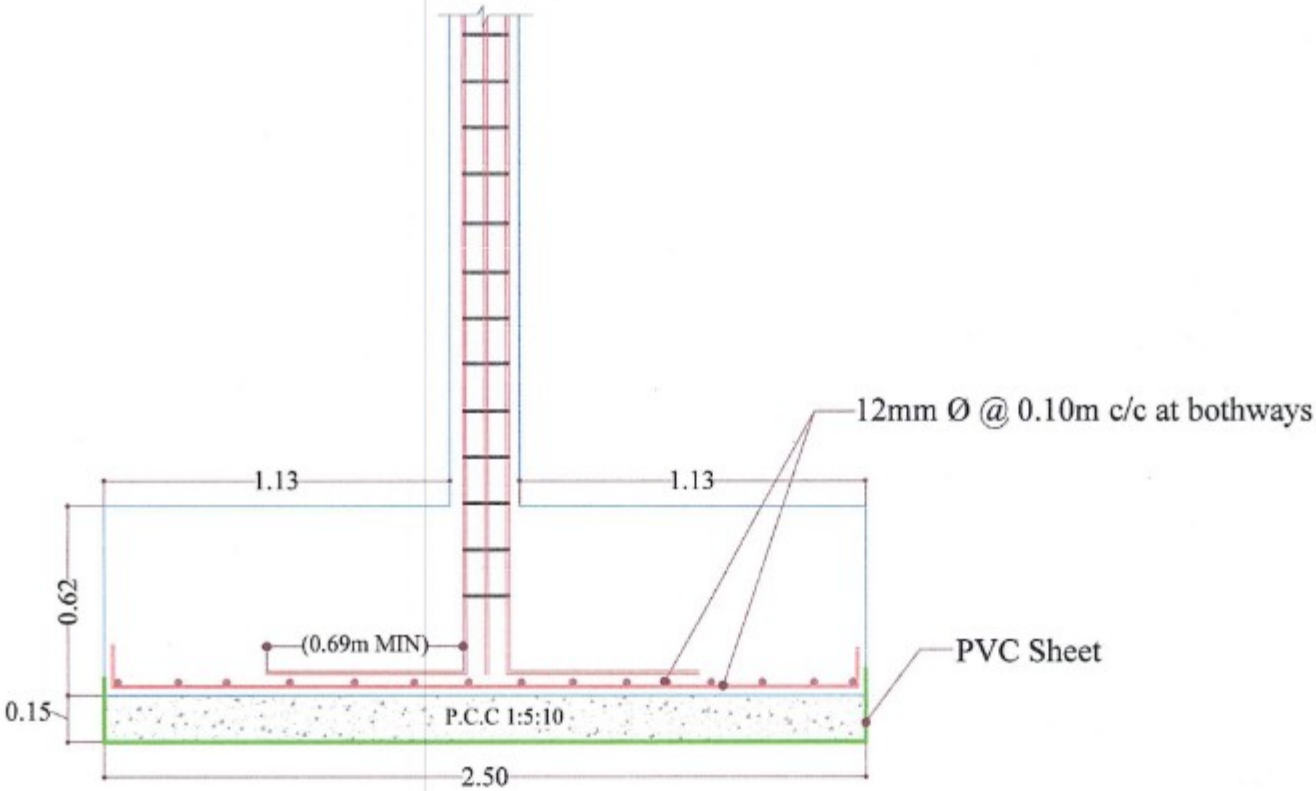


Main Reinforcements
12 Nos 16mm Ø rts
4 Legged Stirrups
8mm @ 0.15m c/c

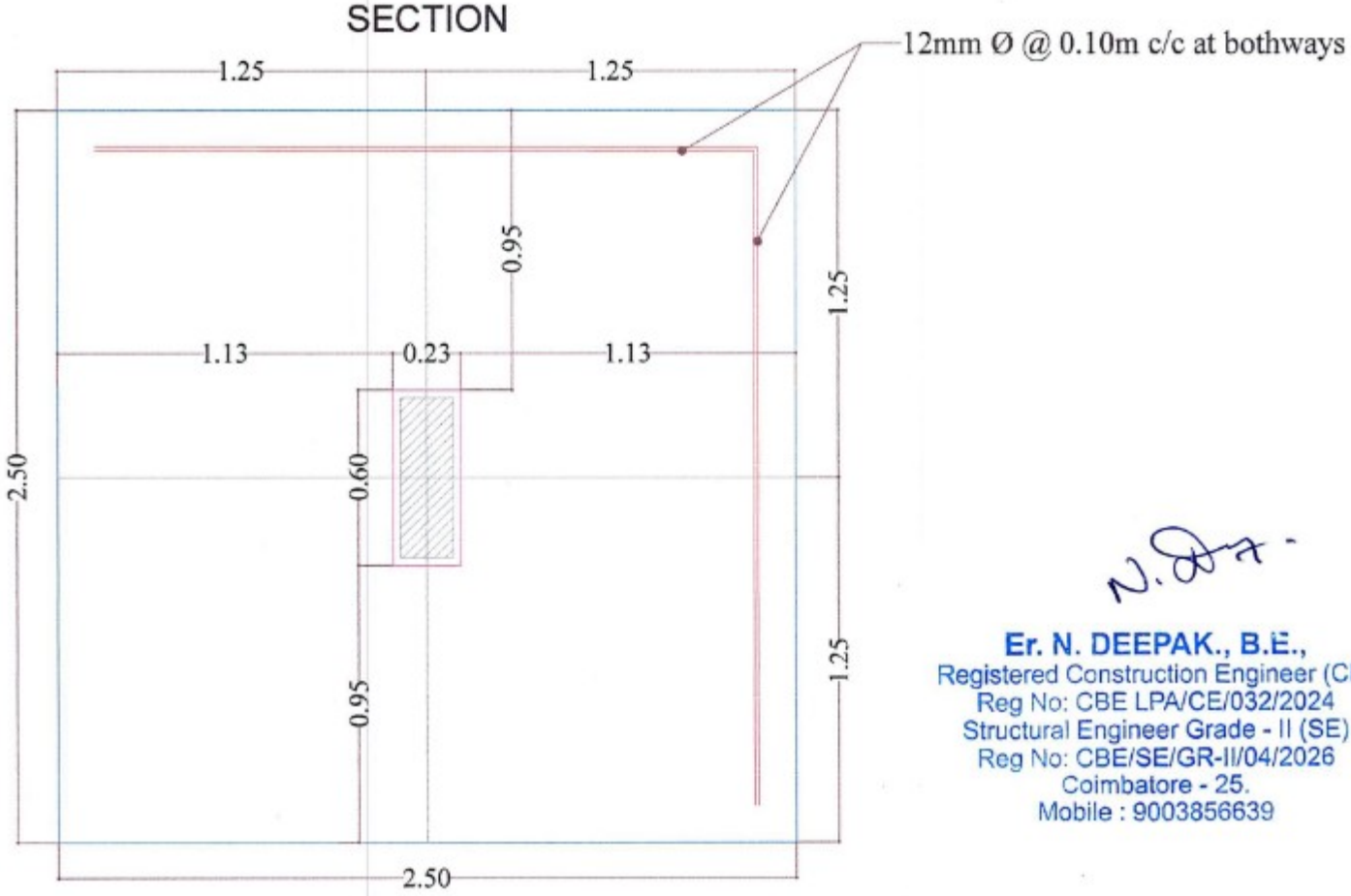
COLUMN - C1
(0.23 x 0.60)



4 Legged Stirrups
8mm @ 0.15m c/c



SECTION



PLAN

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DESIGN OF FOUNDATION

Design of Isolated footing for Intermediate column

Data :

Column Size	L	=	230 mm
	B	=	600 mm
Size of footing	L	=	2.5 m
	B	=	2.5 m
Safe Bearing capacity of soil	SBC	=	450 kN/m²
Depth of footing below GL		=	2 m
Density of soil	g	=	18 kN/m³
Characteristic strength of concrete	fck	=	20 N/mm²
Characteristic strength of Steel	fy	=	500 N/mm²
Depth of footing provided	D	=	1.2m
Cover	d'	=	50mm

1. Loading on footing

Axial load on column		=	2595 kN
Self weight of footing (10%)		=	131 kN
Total load on footing		=	2726 kN
Adpot size of footing		=	2.5 x 2.5 m
		=	6.25 m²
Soil pressure	$\frac{P}{A}$	=	$\frac{2726}{6.25}$
		=	436 kN/m²
Gross safe bearing capacity		=	450 kN/m²

Hence safe & sound

2. Moment Calculation

Face of the column		=	$\frac{2.5 - 0.60}{2}$
		=	0.95 m
Design pressure		=	436 kN/m²
Moment	M	=	$\left\{ \frac{436 \times (0.95)^2}{2} \right\}$
		=	196.75 kN.m
Factored moment		=	295.12 kN.m

3. Area of Reinforcement

Effective Depth	d	=	620 mm	(or)	0.62 m
Dia of bar provided	ø	=	20 mm		

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Provided spacing = 100mm

$$\frac{Mu}{b \times d^2} = \frac{295.12 \times 10^6}{1000 \times 620 \times 620}$$

$$= 0.77$$

Percentage of tension reinforcement

$$pt = \frac{fck}{2 \times fy}\left\{1-\left[\text{SQRT}\left[1 - \frac{4 \times (Mu/b \times d2)}{0.87 \times fck}\right]\right]\right\} \times 100$$

$$= 0.51\ \%$$

Required, Ast $= \frac{0.51 \times 1000 \times 620}{100}$

$= 3162\ mm^2$

Hence safe & sound

4.Check for One way shear

Vu $= 1.5 \times 254 \times 3 \times 0.5 \times 0.30 \times 0.5 - 0.62$

$= 160$ kN

Permissible shear stress $= \frac{160 \times 1000}{1000 \times 620}$

$= 0.26\ N/mm^2$

Allowable shear stress $= 0.49\ N/mm^2$

Hence safe & sound

5.Check for punching shear

Punching force Pf $= \left(254 \times 608 - ((0.23 + 0.62) \times (0.60 + 0.62))\right) \times 1.5$

$= 2187$ kN

Punching shear stress $= \frac{2,187 \times 1000}{620 \times 2 \times (230 + 6000 + (2 \times 620))}$

$= 0.85\ N/mm^2$

Allowable shear stress $= 1.25\ N/mm^2$

Hence safe & sound

EARTH QUAKE ANALYSIS

1. Calculation of horizontal seismic Coefficient

As per IS 1893 – 2002

$$Ah = \frac{z \times 1 \times Sa}{2 \times R \times g}$$

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Zone factor	Z	=	0.16	} (As per table 7)
Importance factor	I	=	1	
Response reduction factor,	R	=	5	
	Sa / g	=	2.5	

Natural period, Ta = $0.075\ h^{3/4}$
(Clause 7.6) h = height of the building

$= 0.075 \times 13.1^{0.75}$

$= 0.52$ sec

$$Ah = \frac{0.16 \times 1 \times 2.5}{2 \times 5}$$

$= 0.04$

2. Calculation of Base shear & seismic forces

Base shear V = $Ah \sum Wi$

$= 0.040 \times 1316$

$= 52.64$ kN

Total no of columns = 21

Shear per column = $\frac{25.64}{21}$

Seismic moment per column = $\frac{1.22 \times 3}{4}$

$= 0.92$ T-m

Column provided = 230 x 600 mm with 12 –Y16

Hence safe & sound

3. Checking for footing

SBC = $45\ T/m^2$

Soil pressure = $25.4\ T/m^2$

$$\frac{P}{A} \pm \frac{1.40 \times 6}{12}$$

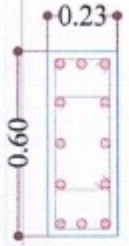
$= 25.4 \pm 0.7$

$= 26.1$

$= 24.7\ T/m^2 < 45.00\ T/m^2$

Hence safe & sound

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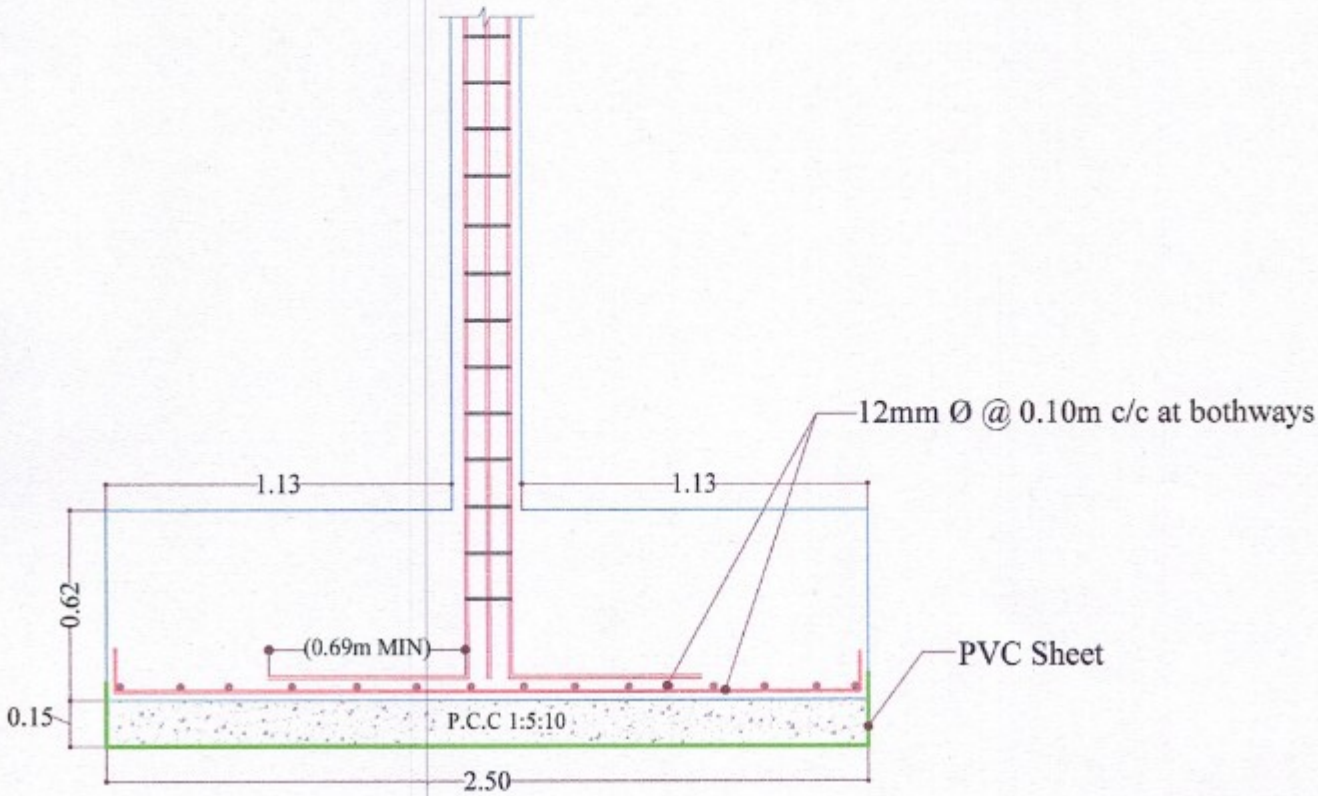


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8mm @ 0.15m c/c

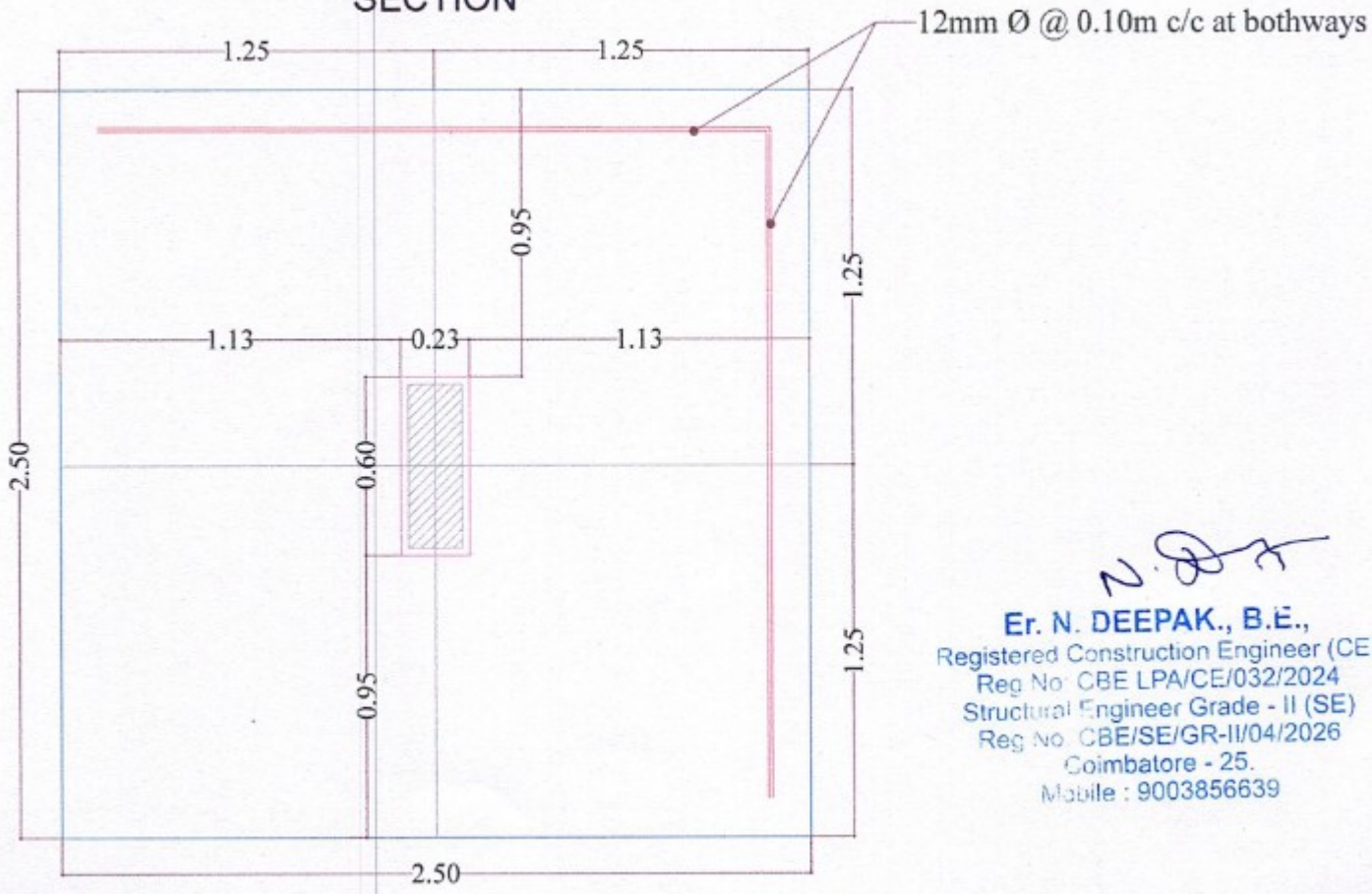
COLUMN - C1
(0.23 x 0.60)



4 Legged Stirrups
8mm @ 0.15m c/c



SECTION



PLAN

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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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