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CIVIL AND STRUCTURAL ENGINEERING

GSTIN: 33BJEPM7723G2Z9

27-04-2024

To,
M/S UNITD LIVING SPACE
NO:496, B-13, 1 st Floor,GRAND CAG CENTRAL,
(Near TATA Motors)AVINASHI ROAD, Nava India
COIMBATORE – 641004

STRUCTURAL STABILITY CERTIFICATE

This is to certify that the Structural Design for the Proposed Residential Apartment Building havingStilt floor + 5 Typical floors with OHT and Head room at Terrace floor in Block A, Block B, Block C, Block D and Block E for M/S UNITD-49 HOUSING, S.F.No:488/1 at Chinnavedampatti Village, Coimbatore North Taluk, Coimbatore Corporation, Coimbatore District, Promoted by M/S UNITD LIVING SPACE, NO:496, B-13, 1 st Floor,GRAND CAG CENTRAL, (Near TATA Motors)AVINASHI ROAD, Nava India, COIMBATORE – 641004.The proposed building hasa Total of 190 numbers of dwelling units.

The building in the above site have been designed as per National Building Code, IS 456, IS 1893-2016 and other IS codes. The building is designed for Gravity loads and Lateral loads (Wind and Earthquake Forces) refer to Latest Seismic code Design "Criteria for Earthquake Resistant Design of Structures IS 1893-2016". I hereby certify that the proposed building is structurally safe and sound as per National Building Code.

This Certificate is issued for the purpose of RERA Registration

Name of the Structural Engineer
Signature :
Registration Number :
Date :
Place :

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph - 88259 58947

27/04/24.

STRUCTURAL DESIGN REPORT

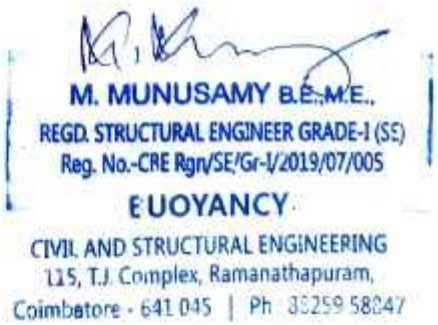
PROJECT TITLE

PLAN SHOWING THE PROPOSED STILT, FIRST, SECOND, THIRD, FOURTH & FIFTH FLOOR RESIDENTIAL APARTMENT BUILDING INS.F.NO:488/1 AT CHINNAVEDAMAPATTI VILLAGE, COIMBATORE NORTH TALUK, COIMBATORE CORPORATION.

REPORT PREPARED BY : M.MUNUSAMY

STRUCTURAL ENGINEER GRADE-I

REGD NO. CBE.Rgn/SE/Gr-I/2019/07/005



CONTENTS

1. SCOPE
2. CODE OF PRACTICE
3. REFERENCE DRAWING
4. MATERIALS
5. DRAWING
6. LOADS
    1. SELF WEIGHT
    2. DEAD LOAD (DL)
    3. IMPOSED LOAD (LL)
    4. WIND LOAD (WL)
    5. SEISMIC LOAD (SL)
    6. LOAD COMBINATION
7. GEOMETRICAL MODEL
    1. VIEWS
8. DESIGN OF STRUCTURAL MEMBERS
    1. DESIGN OF FOOTING
    2. DESIGN OF COLUMNS
    3. DESIGN OF BEAMS
    4. DESIGN OF SLABS

M. MUNUSAMY B.E.,M.E.,
FEGFI STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

1. SCOPE

This calculation report contains design of the R.C. framed structure for a Proposed Apartment Building intended for Residential purpose. The Club House building is intended for people gathering and other common purpose

The scope of this report is to show the references, construction material used, calculation and analysis criteria, loads & load combinations adopted, design checks and verification carried out for the R.C.C. structural design.

2. CODE OF PRACTICE

In accordance with design basis for civil and structural works specified in IS Codes, the following are the specific codes followed for the analysis and design.

IS456 : 2000	Code for practice for plain and Reinforced concrete .
IS 875 : 1987	Code of practice for design loads (Other than earthquake) for Building and Structures Part 3 for wind loads.
SP16: 1980	Design Aids for Reinforced Concrete to IS: 456-1978
IS1893 : 2016	Criteria for Earthquake Design of Structures (Part-1 : General Provisions and Buildings)

3. REFERENCE DRAWING

The following figure shows the input drawing based on which the design was carried out

Basement Floor Plan, Ground Floor Plan and all further Floor Plans were shown here for reference. For Details of section and Elevation refer Architectural drawings.

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 85259 58847

3.1. BLOCK A

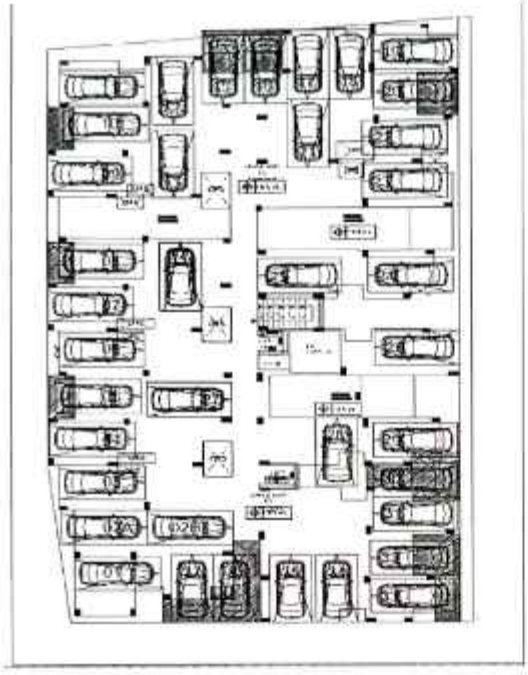


FIG. 1 BASEMENT PLAN

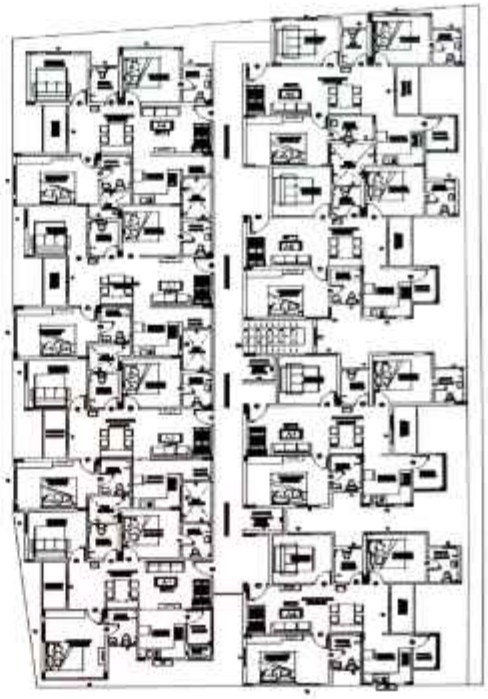


FIG. 2 FIRST FLOOR PLAN

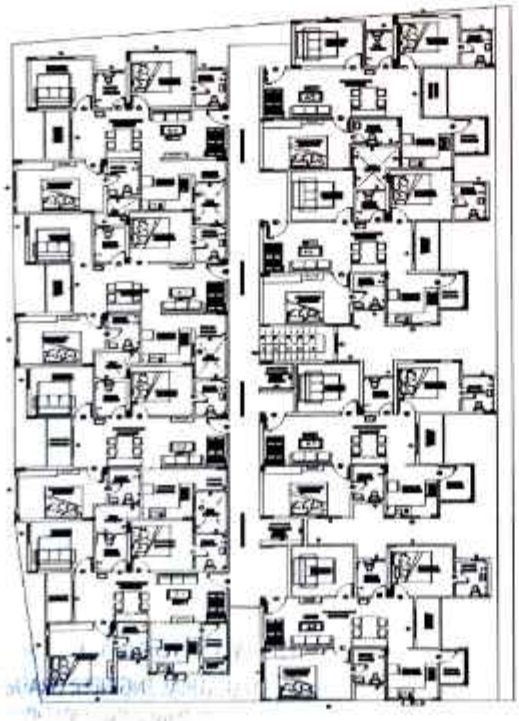


FIG. 3 SECOND FLOOR PLAN

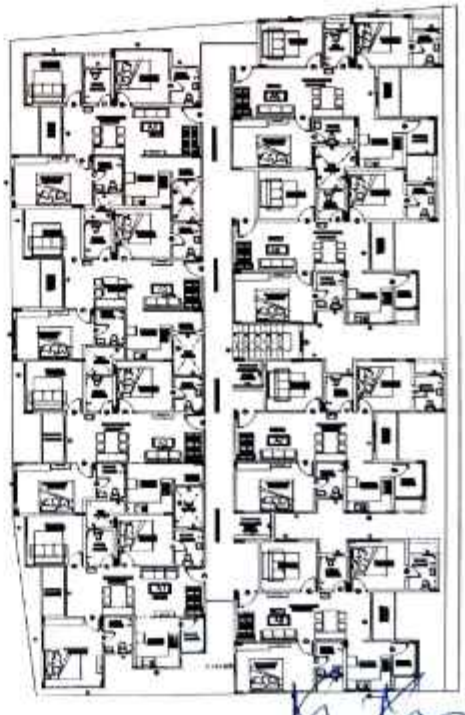


FIG. 4 THIRD AND FOURTH FLOOR PLAN

N. MUNISAMY B.E.,M.I.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 98259 58847



FIG. 5 FIFTH FLOOR PLAN

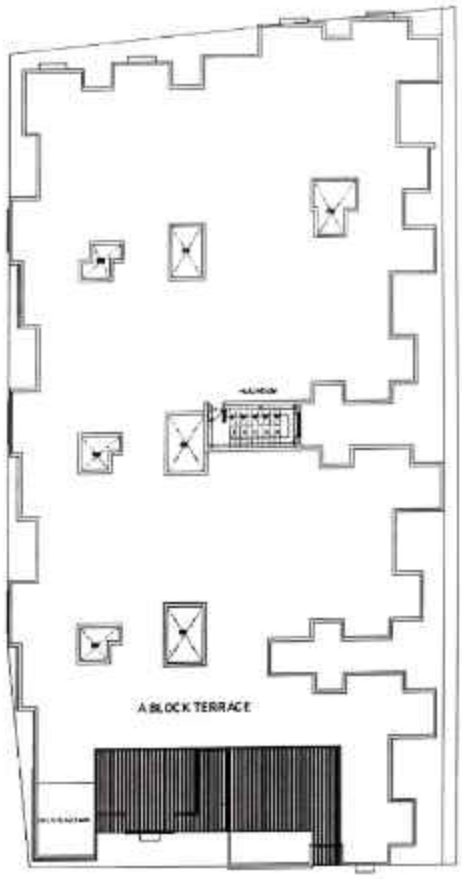


FIG. 6 TERRACE PLAN

M. MUNUSAMY B.E., M.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J Complex, Ramanathapuram,
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3.2. BLOCK B

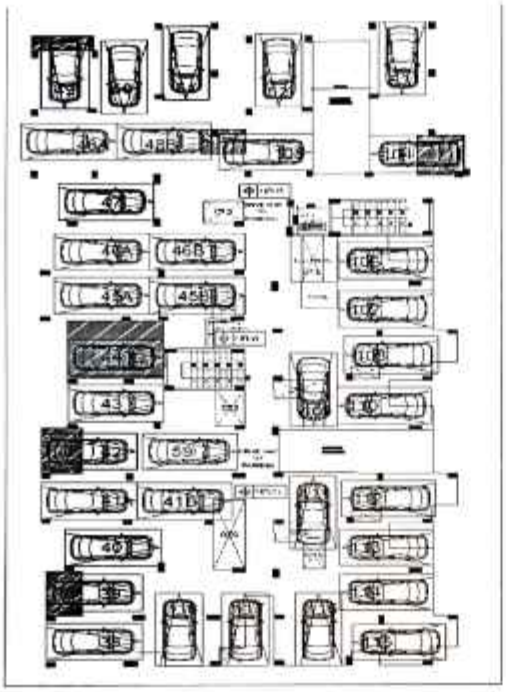


FIG. 7 BASEMENT PLAN



FIG. 8 FIRST FLOOR PLAN

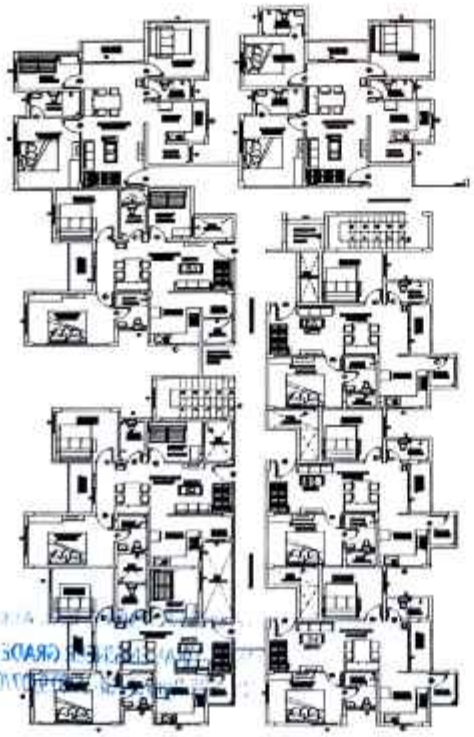


FIG. 9 SECOND FLOOR PLAN

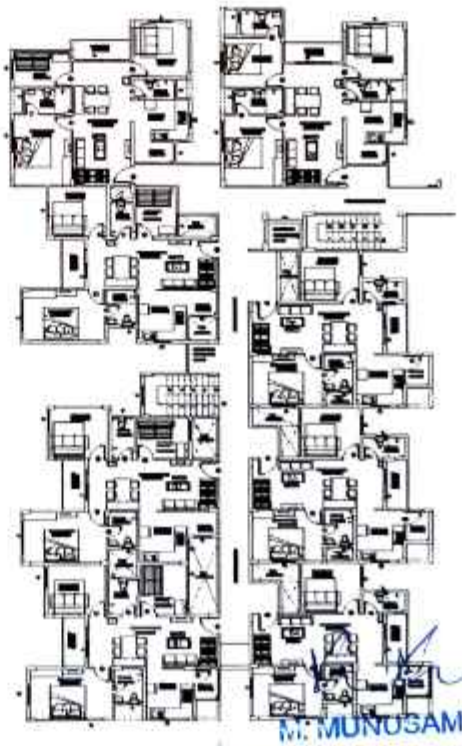


FIG. 10 THIRD AND FOURTH FLOOR PLAN

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No. C-[illegible]/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

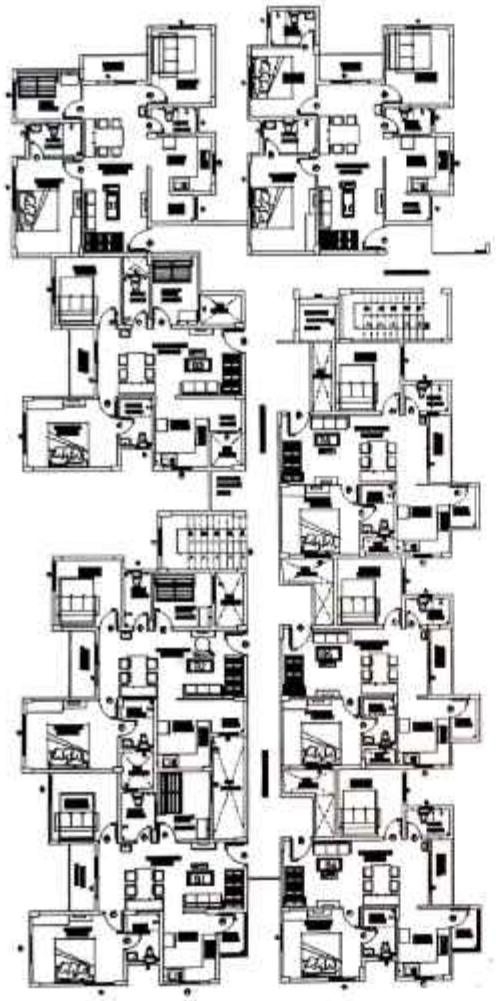


FIG. 11 FIFTH FLOOR PLAN

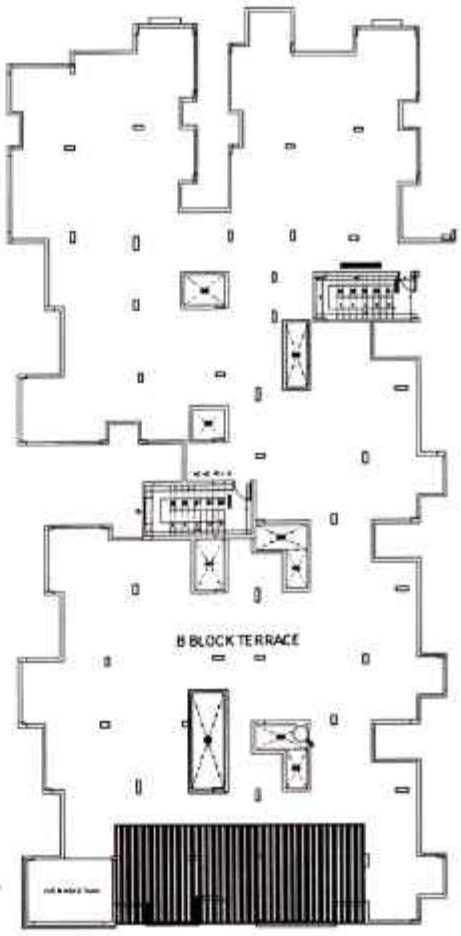


FIG. 12 TERRACE PLAN

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
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3.3. BLOCK C

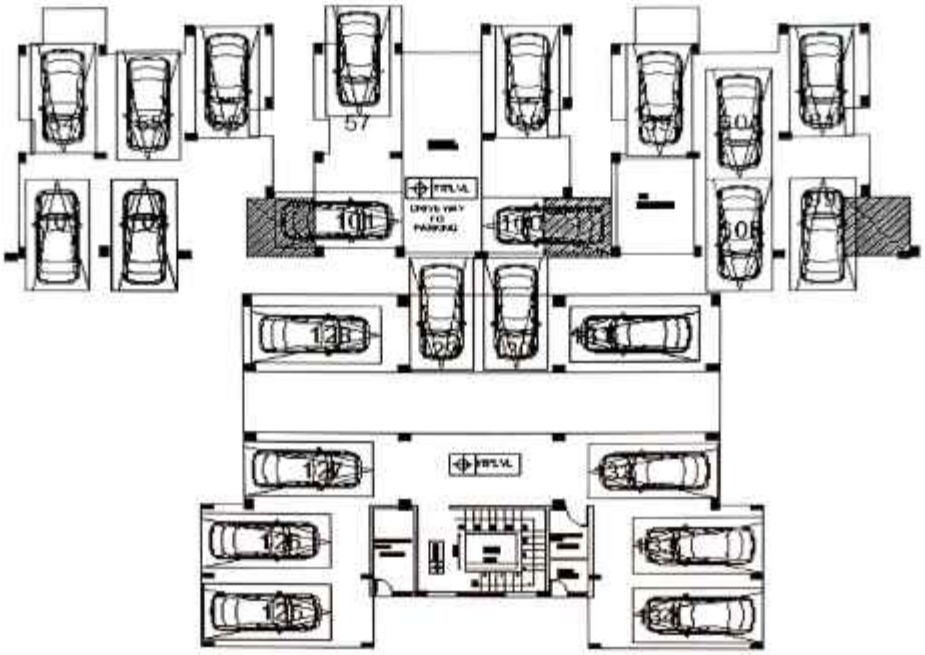


FIG. 13 BASEMENT PLAN

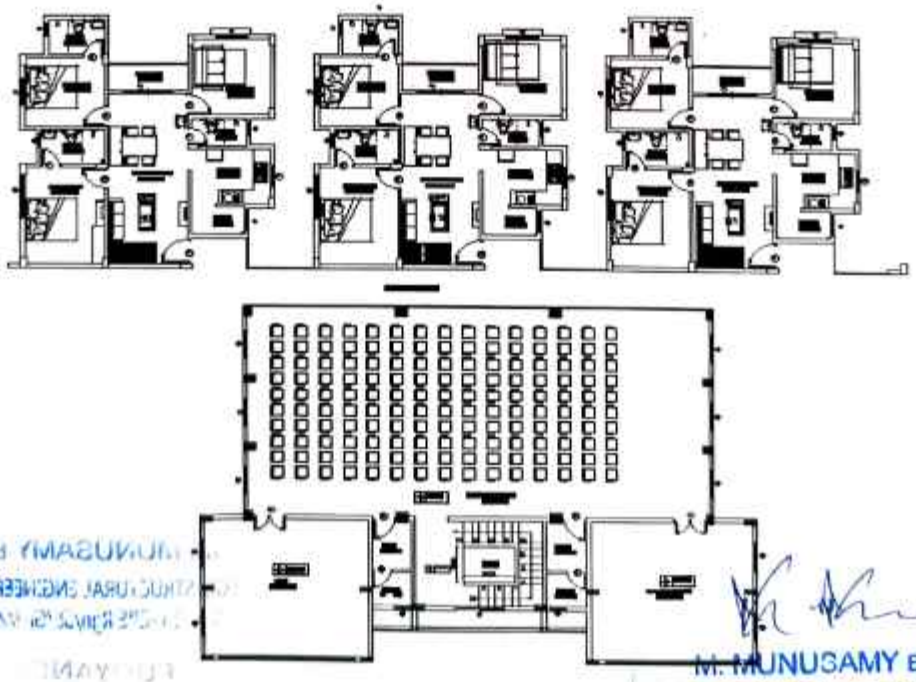


FIG. 14 FIRST FLOOR PLAN

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
...mbatore - 641 045 | Ph : 88259 58847

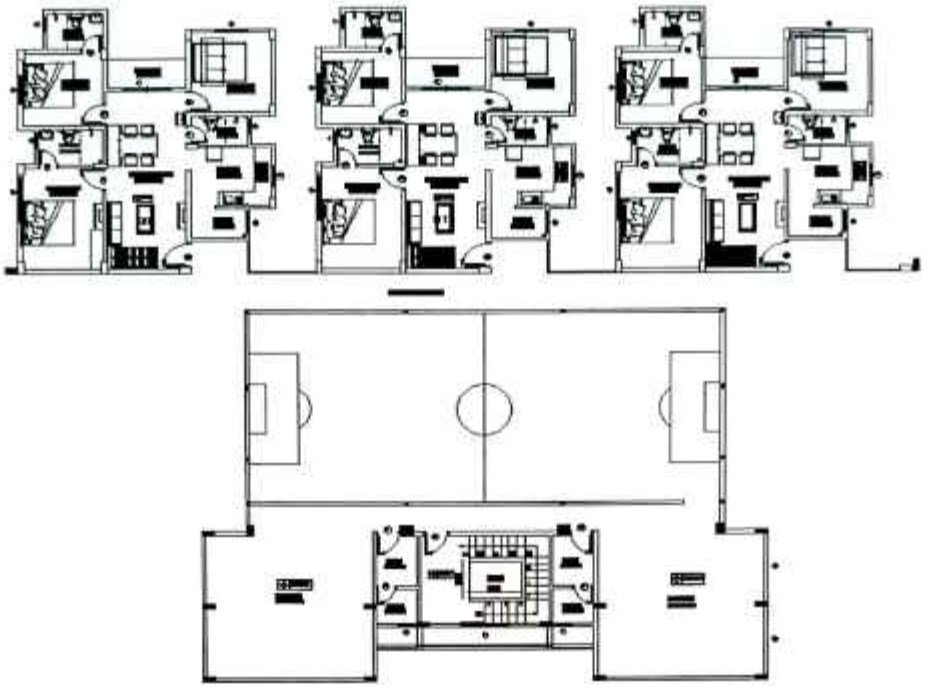


FIG. 15 SECOND FLOOR PLAN

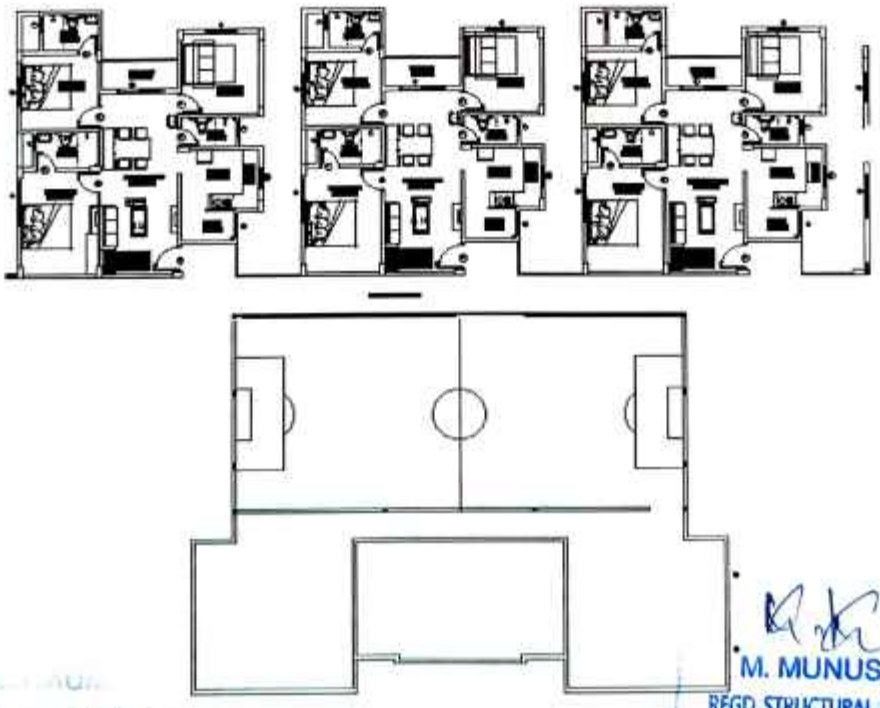


FIG. 16 THIRD AND FOUTH FLOOR PLAN

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
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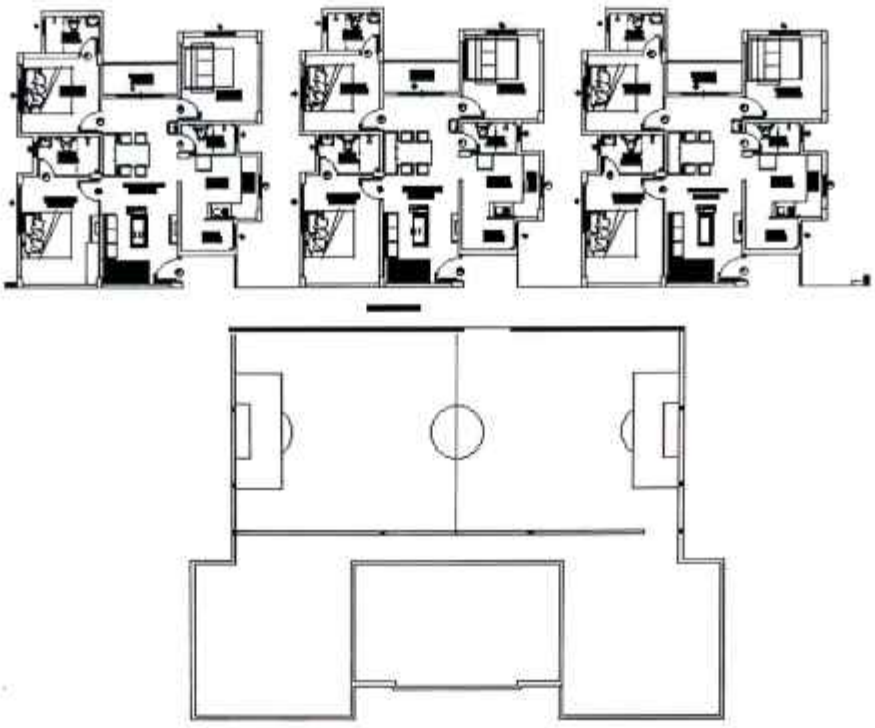


FIG. 17 FIFTH FLOOR PLAN

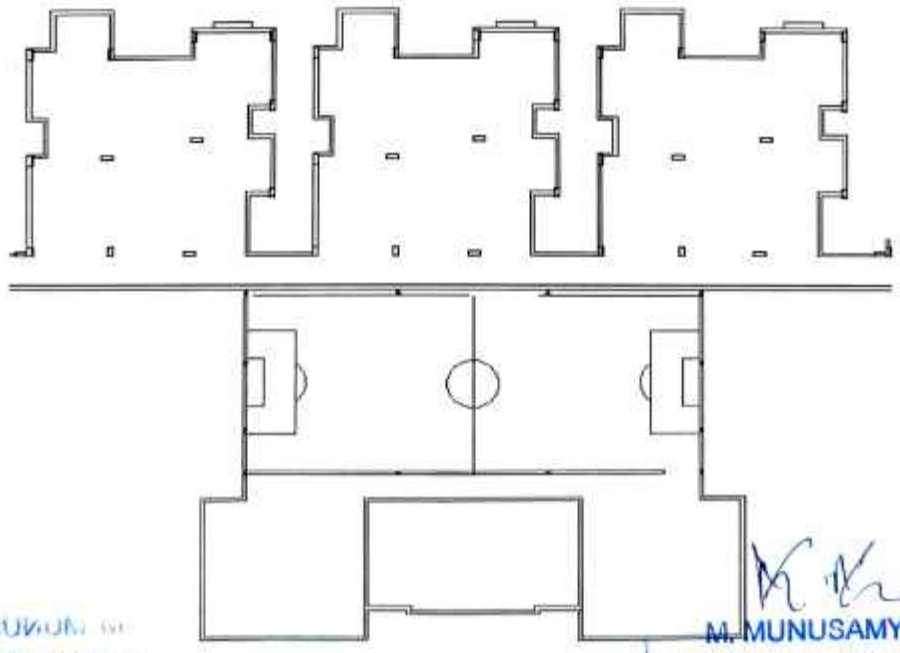


FIG. 18 TERRACE FLOOR PLAN

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
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3.4. BLOCK D

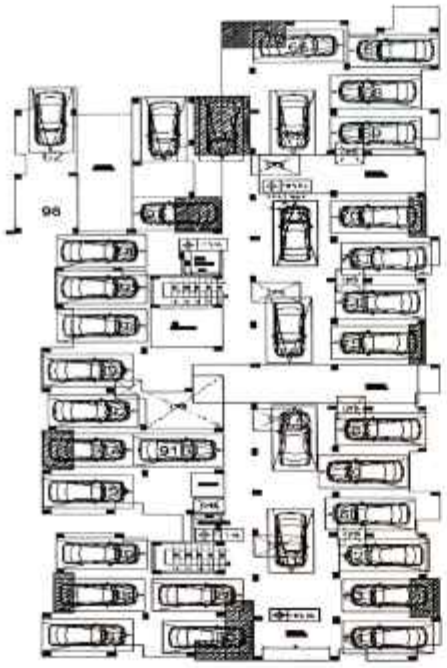


FIG. 19 BASEMENT PLAN

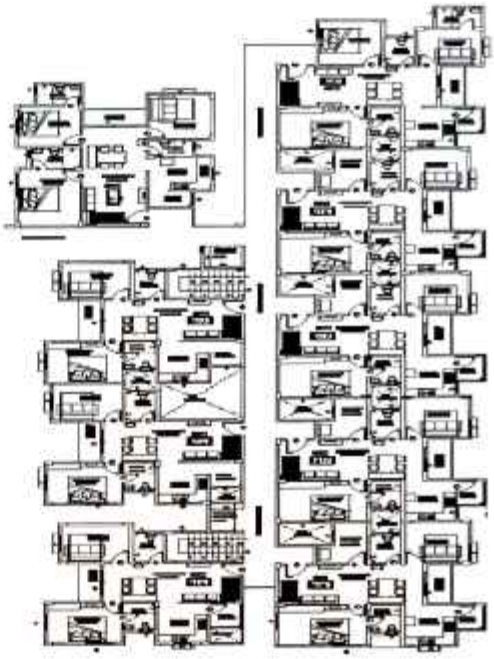


FIG. 20 FIRST FLOOR PLAN



FIG. 21 SECOND FLOOR PLAN

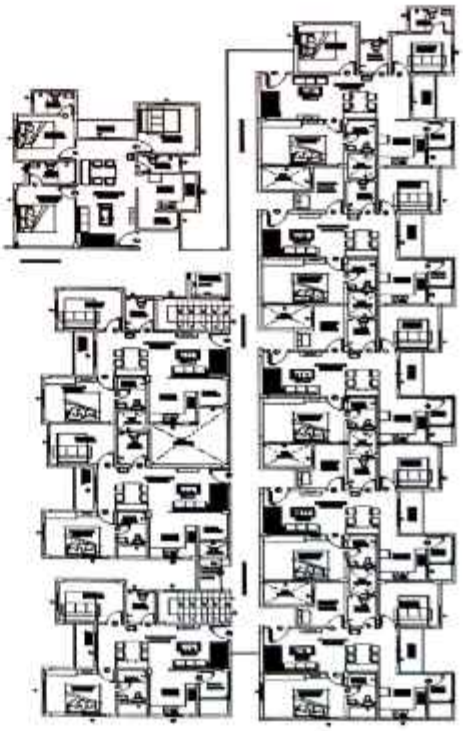


FIG. 22 THIRD AND FOURTH FLOOR PLAN

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
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FIG. 23 FIFTH FLOOR PLAN

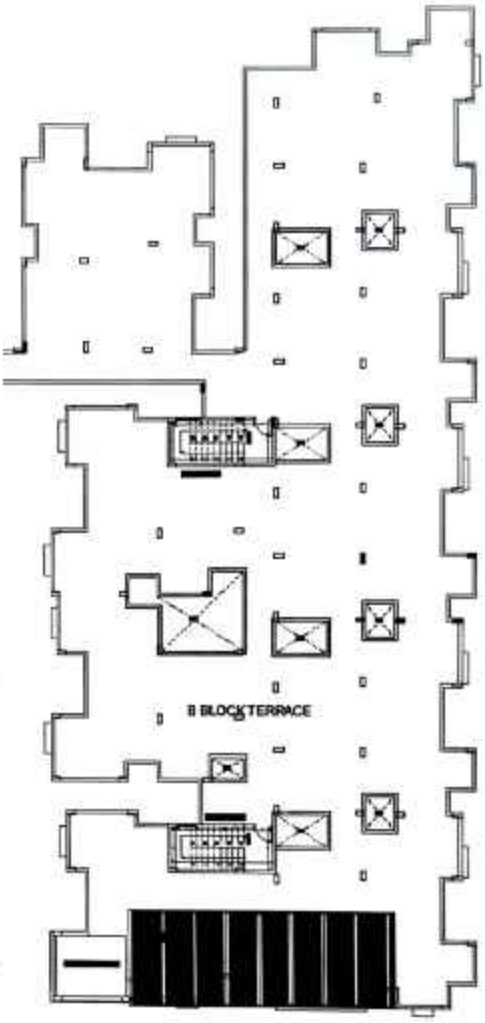


FIG. 24 TERRACE PLAN

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

3.5. BLOCK E

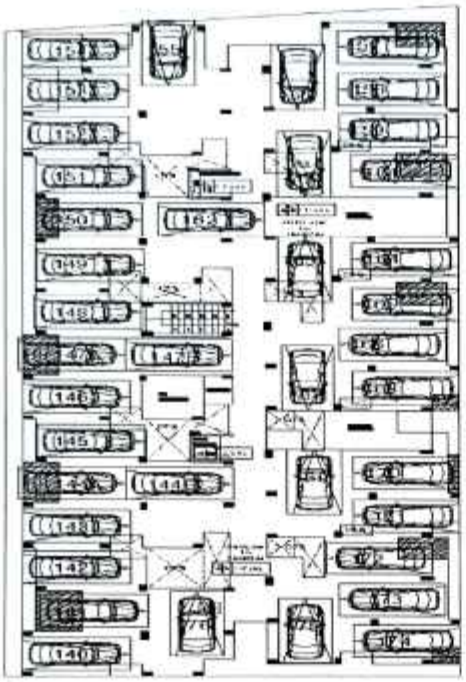


FIG. 25 BASEMENT PLAN

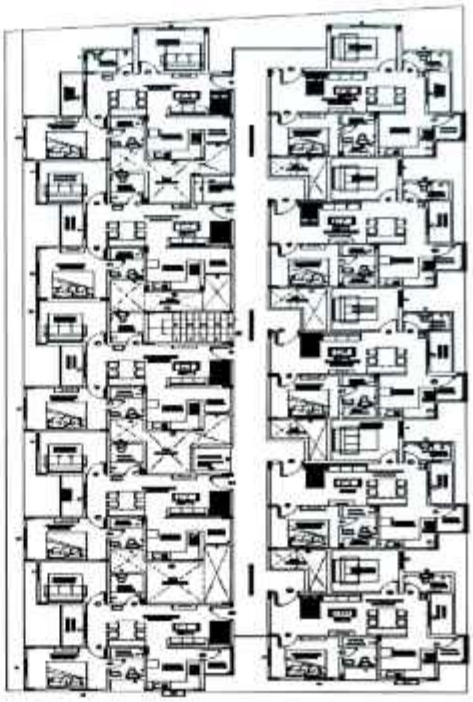


FIG. 26 FIRST FLOOR PLAN

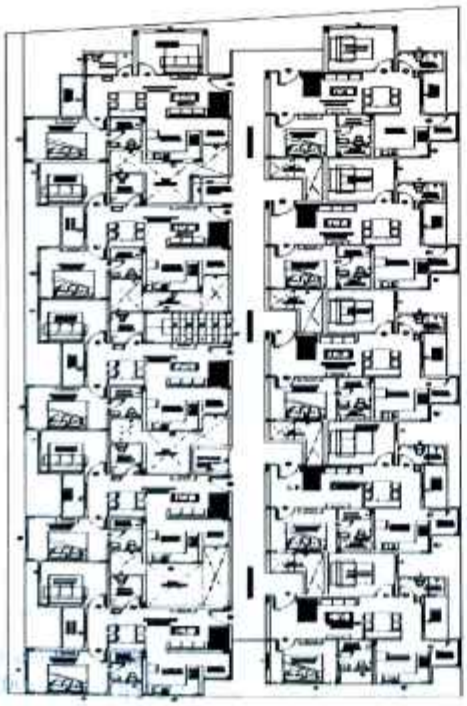


FIG. 27 SECOND FLOOR PLAN

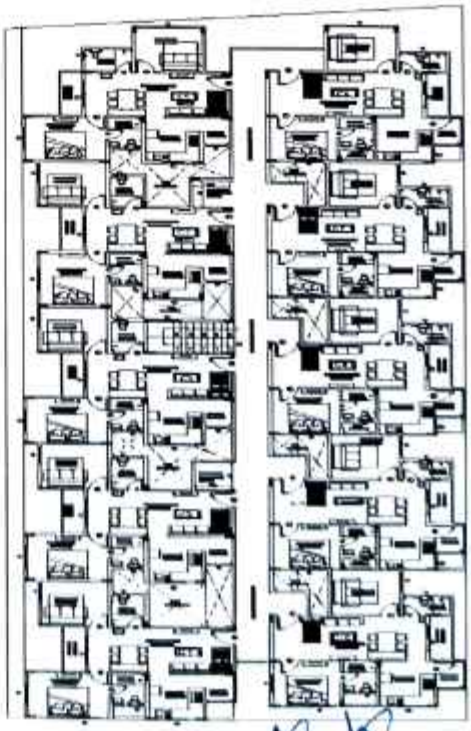


FIG. 28 THIRD AND FOURTH FLOOR PLAN

B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

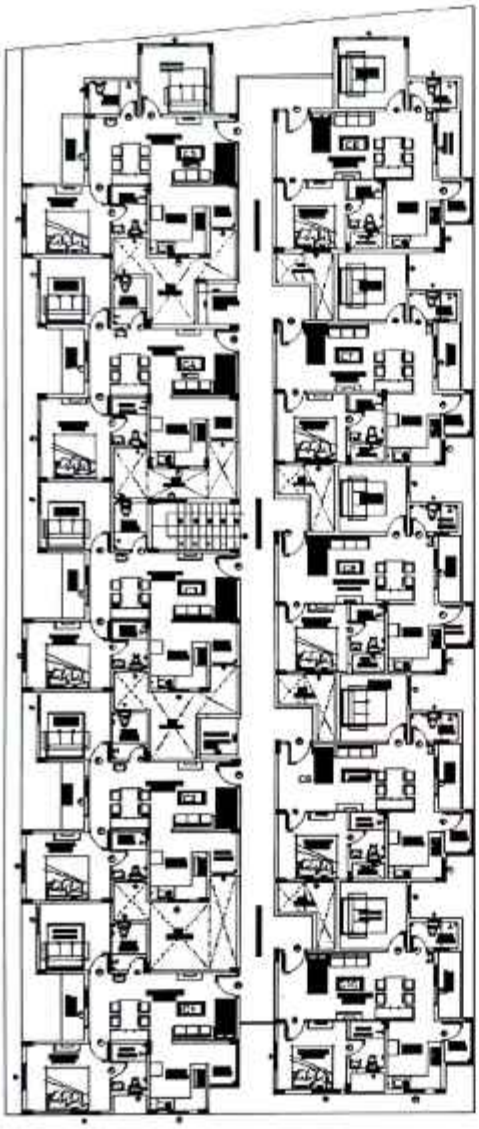


FIG. 29 FIFTH FLOOR PLAN

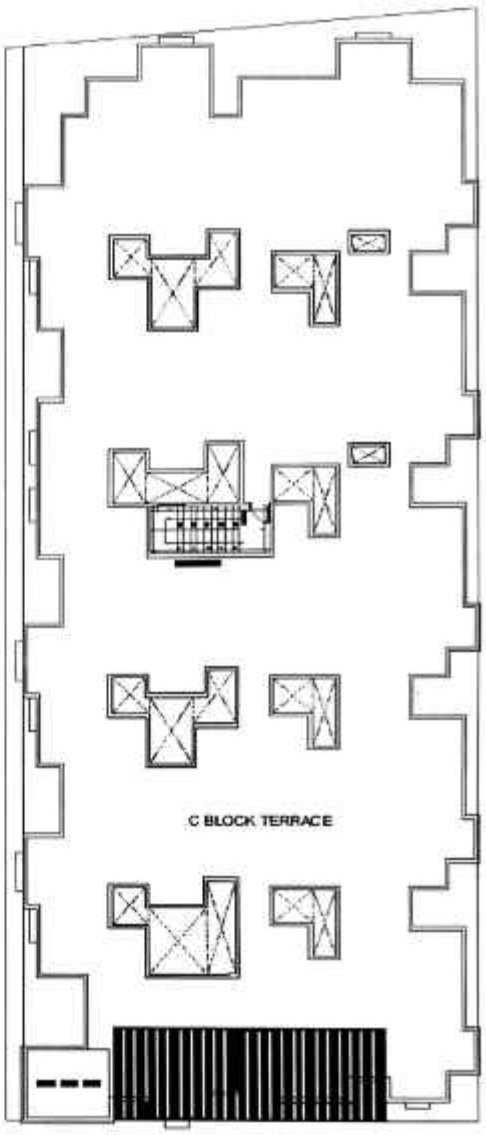


FIG. 30 TERRACE PLAN

M. MUNUSAMY B.E.,M.E.
REGN. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.J. Complex, Ramanathapuram,
641 045 | Ph : 88259 58847

4. MATERIAL

Plain Cement Concrete	- M10
Reinforced Cement Concrete	- M35 (for All Columns from Footing to Second Floor roof)
	- M25 (for all other concreting)
	- M20 (for footing)
Reinforcement Steel	- Fe 550 (TMT)

5. DRAWING

Structural design results were plotted in the form of structural drawings and Refer Structural Details for more Information

6. LOADS

For the design and verification for the concrete structure, STAAD Pro software had been employed. The following are the loads considered in the software. The loads which have been applied to the structure according to the design criteria and the arrangement of input data are listed below.

6.1. SELF WEIGHT (DL)

Self-weight of all modelled structural elements is generated automatically by the software

6.2. DEAD LOAD (DL)

The following unit weight of materials will be considered for calculation of dead load.

Reinforced cement concrete	: 25.0 kN/m³
Floor finish	: 18.0 kN/m³
Steel rebars	: 78.5kN/m³
Soil	: 18.0kN/m³

Weight of block wall for Typ floor Ht = 0.2 tk x 3.0m ht x 1m (b) x 6.5

= 3.9kN/m (applied on Structural Beam)

M. MUNUSAMY B.E., M.E.
EGI, STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
6, Jothi Nagar, Ramanathapuram,
Coimbatore - 641 045 | Ph : 83259 58847

Parapet wall = 3 kN/m

Weight of slab = 0.125 m (tk) x 1 x 1 x 25

= 3.125 kN/m^2

Floor finish = 2 kN/m^2

6.3. IMPOSED LOAD (LL)

Imposed Load on Floors = 2 kN/m^2

Imposed Load on Floors (Community Hall) = 4 kN/m^2

Imposed Load on Corridors = 3 kN/m^2

Accessible Roof (Open Terrace) = 1.5 kN/m^2

6.4. WIND LOADS (WL)

Wind loading will be in accordance with IS:875 Part-3 for a basic wind speed of 39 m/s for the Entire height of the building above mean ground level. Terrain Category-2 will be considered for this building. Risk Co-efficient (k1) will be considered as 1.06

Basic wind speed Vb (m/s)	39
Risk Co efficient K1	1.06
Terrain category k2	1.02
Topography factor K3	1

Design wind speed at any height $Vz = Vb\ k1\ k2\ k3$

Design wind speed at any height $pz = 0.6\ Vz^2$

Wind pressure for a height 10m = $0.6\ (1.06x1.02x1x39)^2$ =1.06kN/m^2

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
...5, T.J. Complex, Ramanathapuram,
...im' ator... - 641 045 | Ph : 88259 58847

6.5. SEISMIC LOAD (SL)

The lateral forces due to seismic will be considered in accordance with the stipulation of IS: 1893- 2016. The site is located in Zone-III as per the seismic map indicated in IS: 1893. Importance factor of 1.5 will be considered. Static method will be used for seismic analysis as per IS: 1893-2002

Seismic Parameters Considered:

Zone factor Z	-	0.16 for Zone III
Importance factor	-	1.2
Response Reduction factor (R)	-	3 (for Ordinary Moment Resisting Frame)
Rock and Soil Site factor (Ss)	-	1
Damping Ratio	-	0.05
Sub soil classification	-	Rock

Seismic Weight Applied on the structure

The seismic wt due to the self wt of the structure is calculated by the software. The seismic weights due to the summation of Dead Load as well as the appropriate % of Imposed loads are distributed among the nodes in the respective levels.

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 83259 58847

7. GEOMETRIC MODEL

7.1. BLOCK A

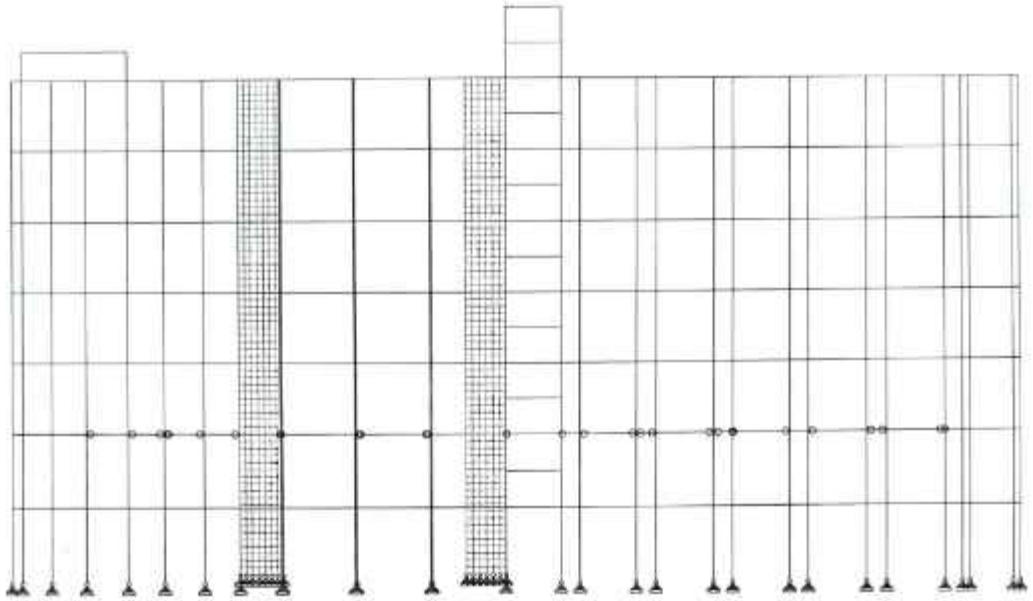


FIG. 31 ELEVATIONAL VIEW

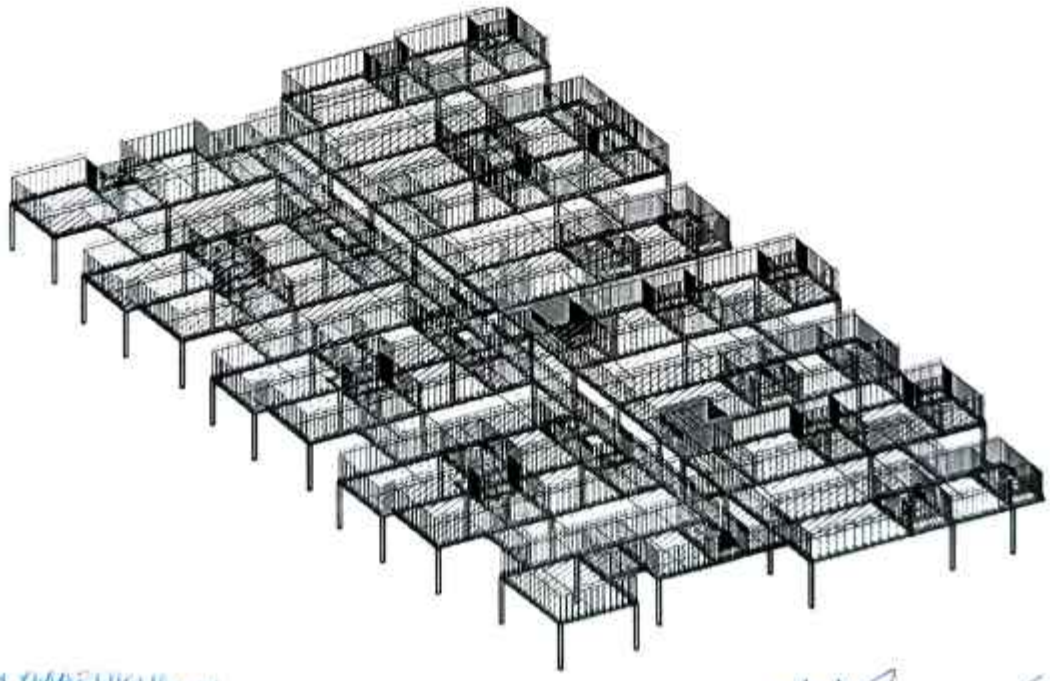


FIG. 32 DEAD LOADS ON BEAMS

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CAE Rgn/SE/Gr-I/2015/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

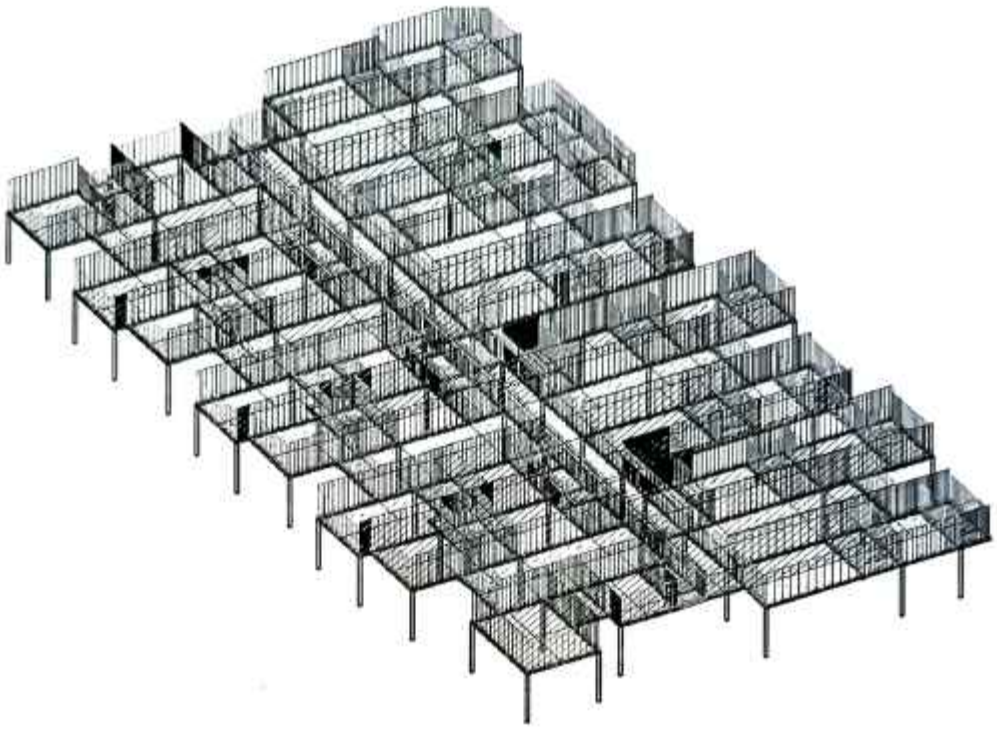


FIG. 33 DEAD LOADS ON SLAB

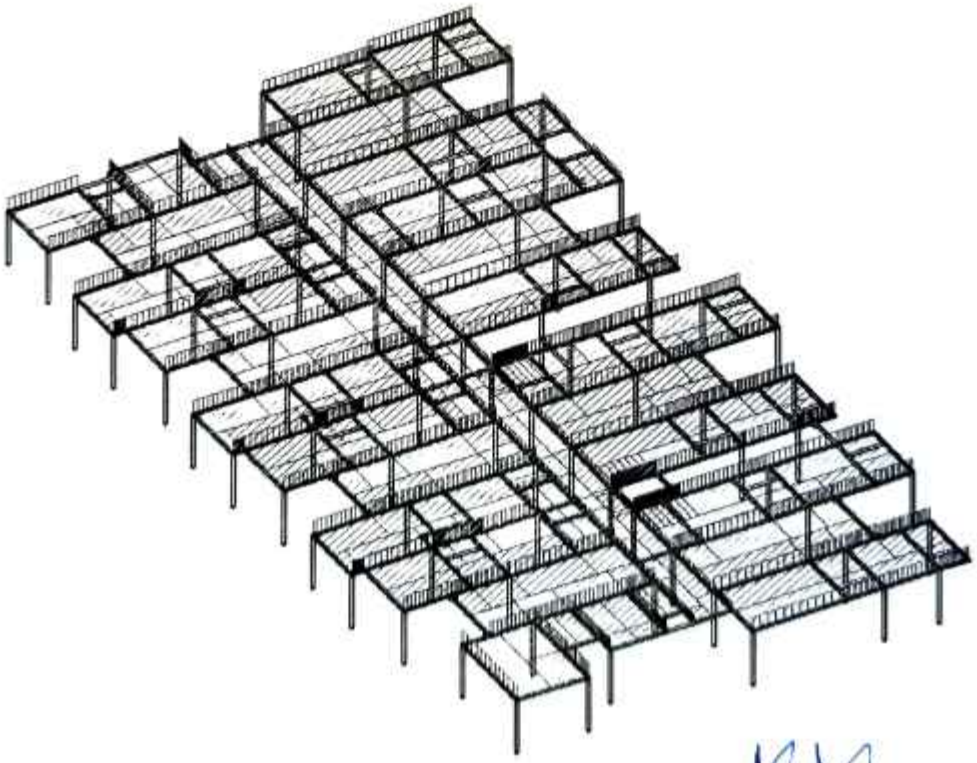


FIG. 34 LIVE LOADS ON SLAB

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
135, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

7.2. BLOCK B

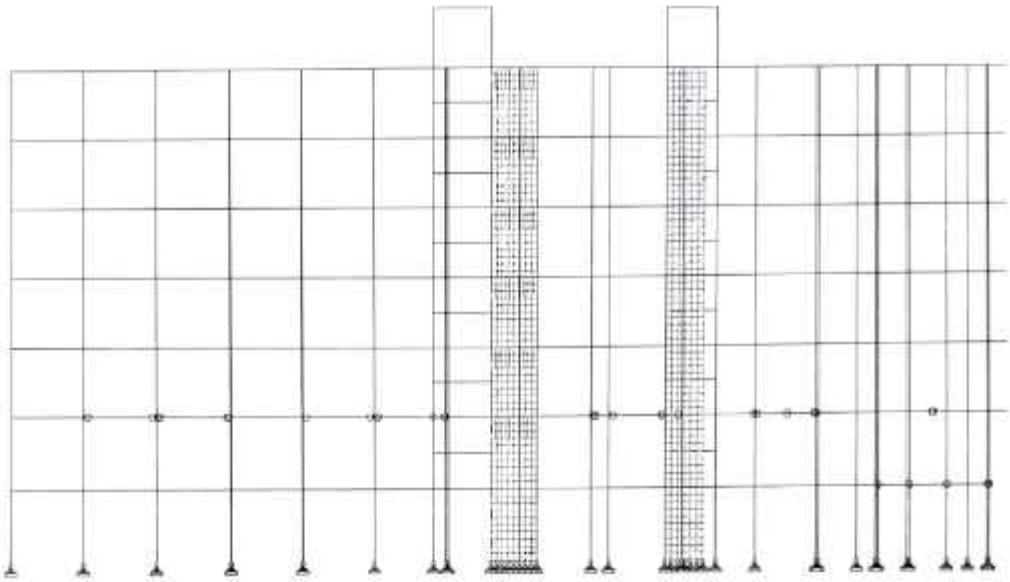


FIG.35 ELEVATIONAL VIEW

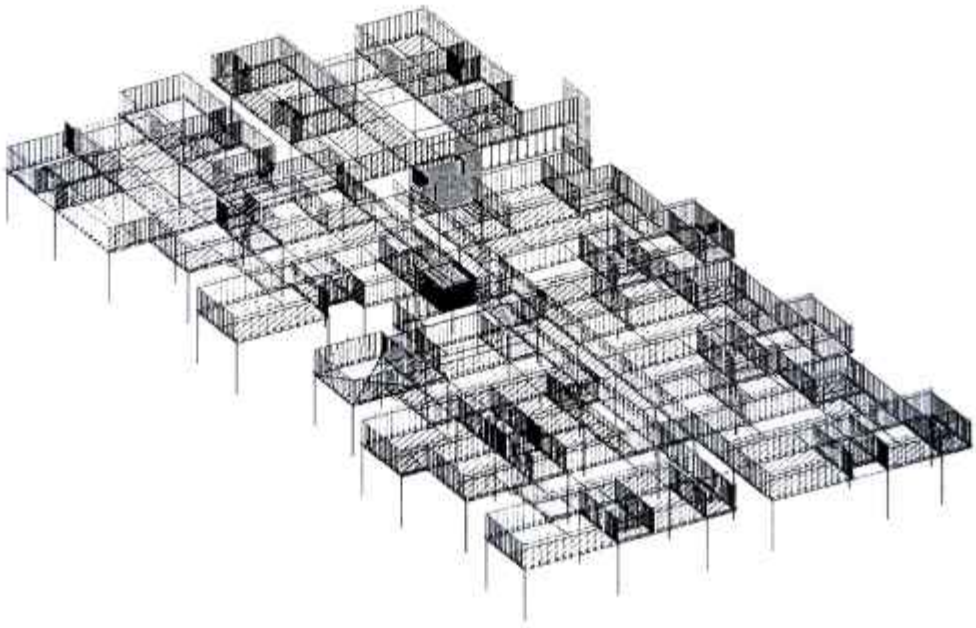


FIG. 36 DEAD LOADS ON BEAMS

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER, GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
641 045 | Ph: 4259 58847

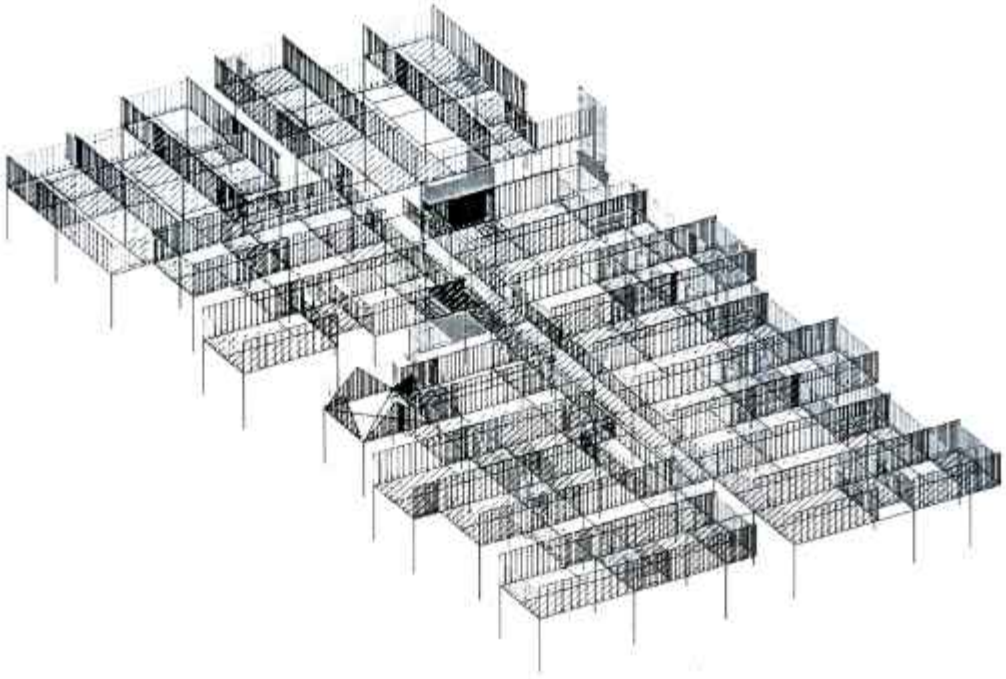


FIG. 37 DEAD LOADS ON SLAB

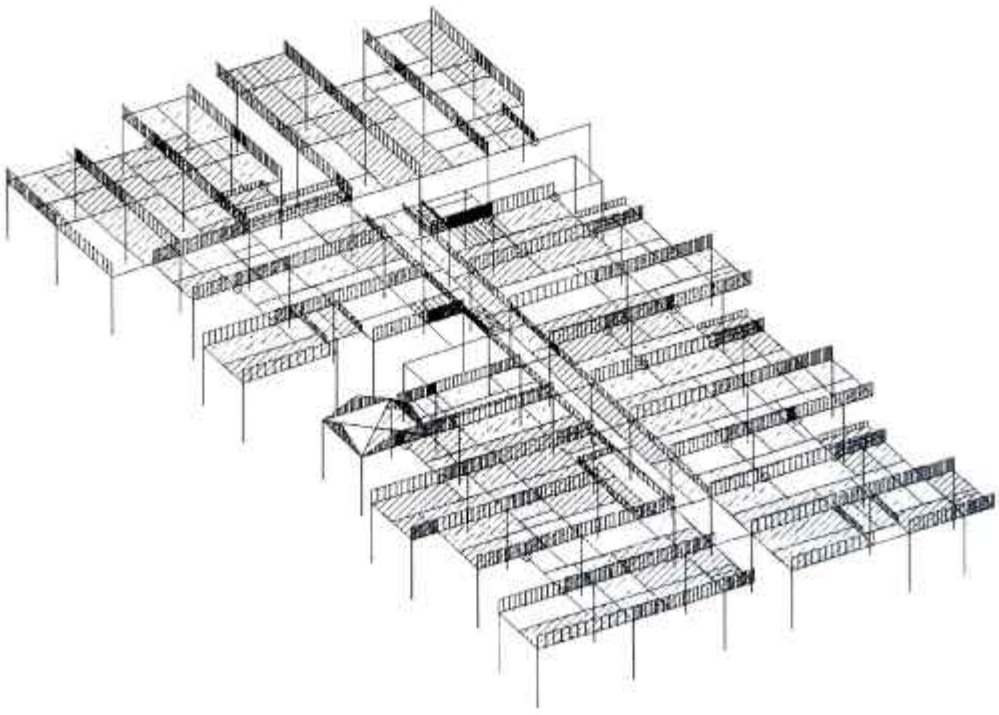


FIG. 38 LIVE LOADS ON SLAB

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER. GRADE-I (SE)
Reg. No.-CRE Rgn/SE-I/2019/07/005

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7.3. BLOCK C

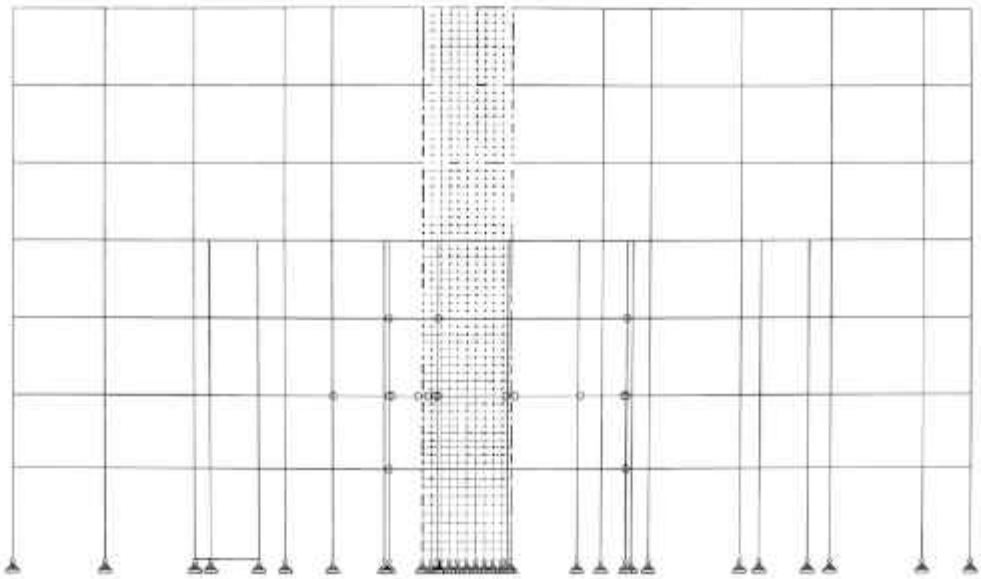


FIG.39 ELEVATIONAL VIEW

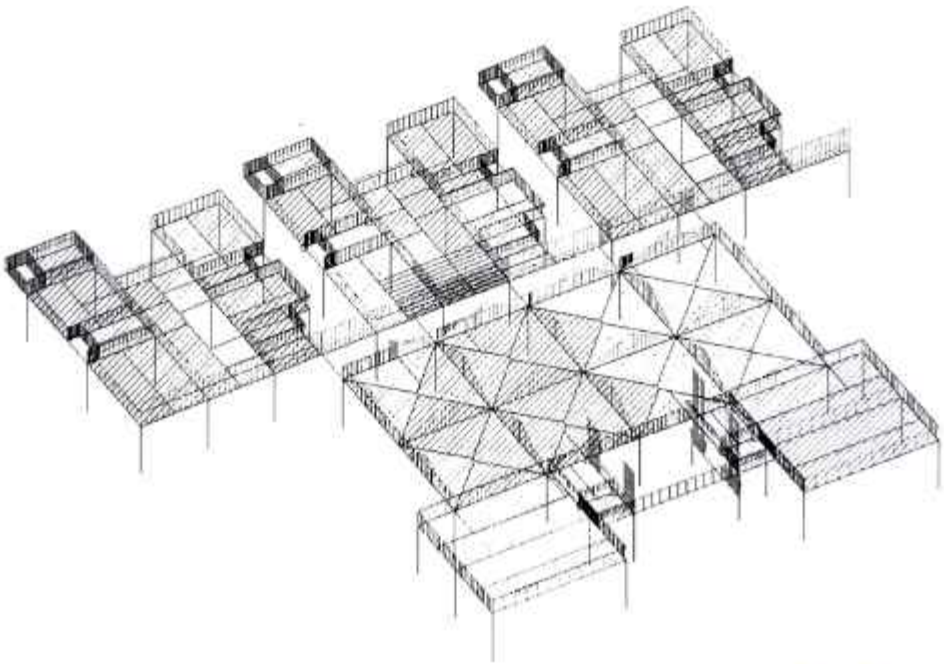


FIG. 40 DEAD LOADS ON BEAMS

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER, GRADE-I (SE)
Reg. No.-CAE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

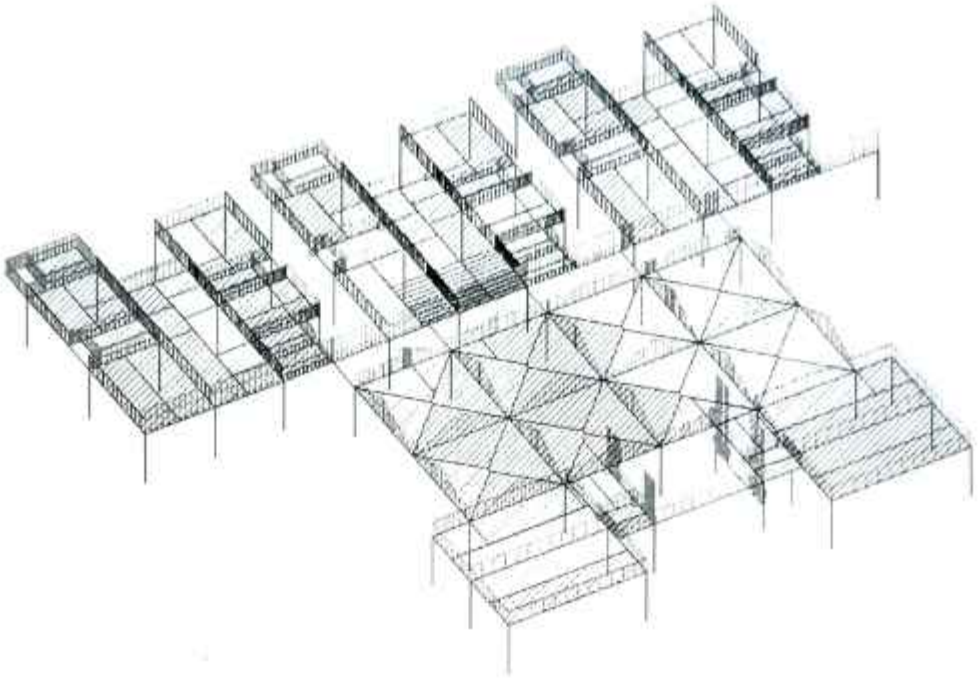


FIG. 41 DEAD LOADS ON SLAB

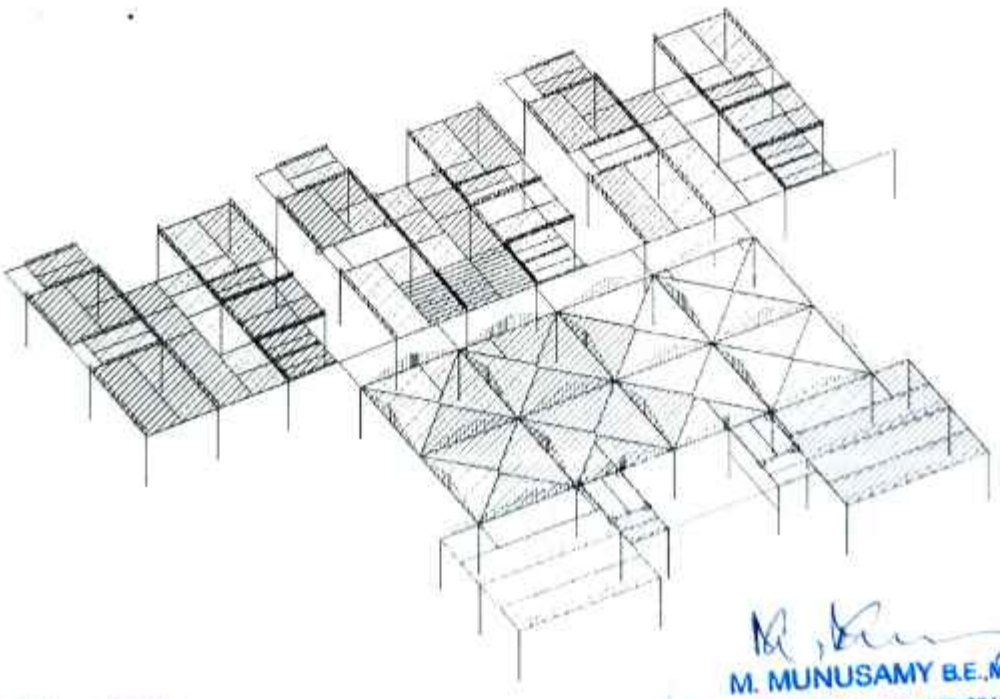


FIG. 42 DEAD LOADS ON SLAB

M. MUNUSAMY B.E., M.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
PUOYANC
CIVIL AND STRUCTURAL ENGINEERING
135, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 80259 58847

7.4. BLOCK D

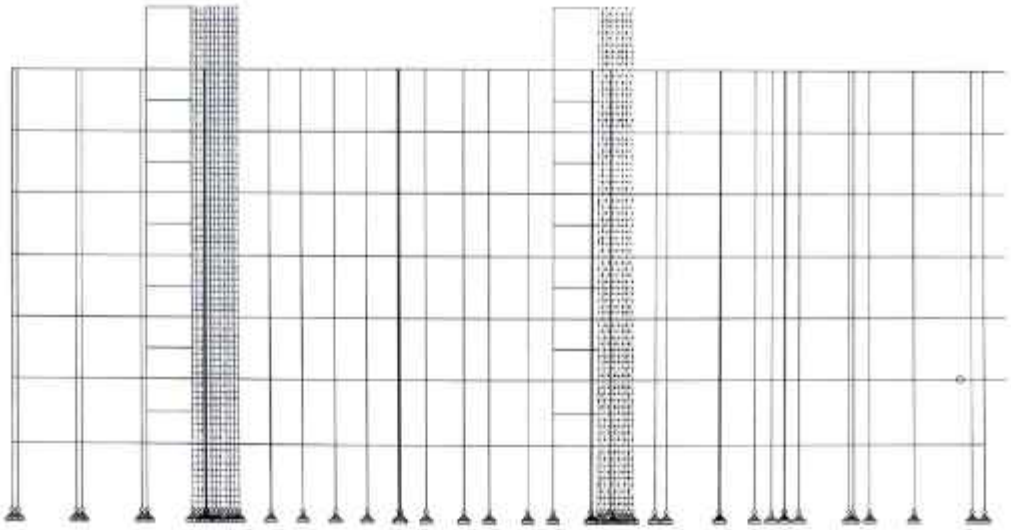


FIG.43 ELEVATIONAL VIEW

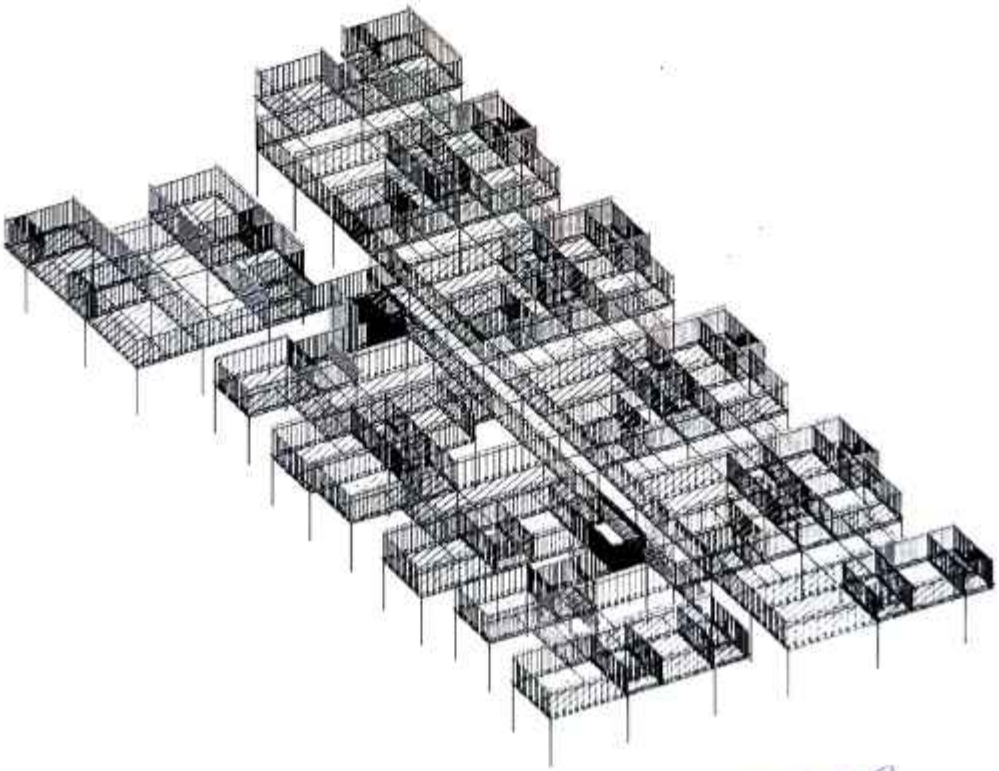


FIG. 44 DEAD LOADS ON BEAMS

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SS)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 98259 58847

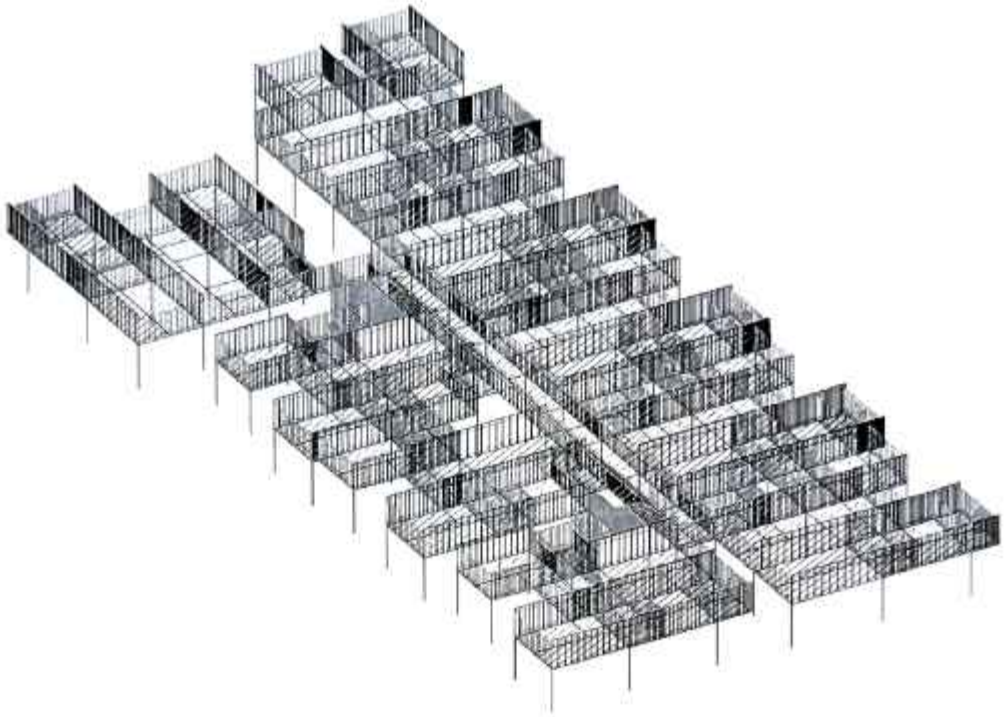


FIG. 45 DEAD LOADS ON SLAB

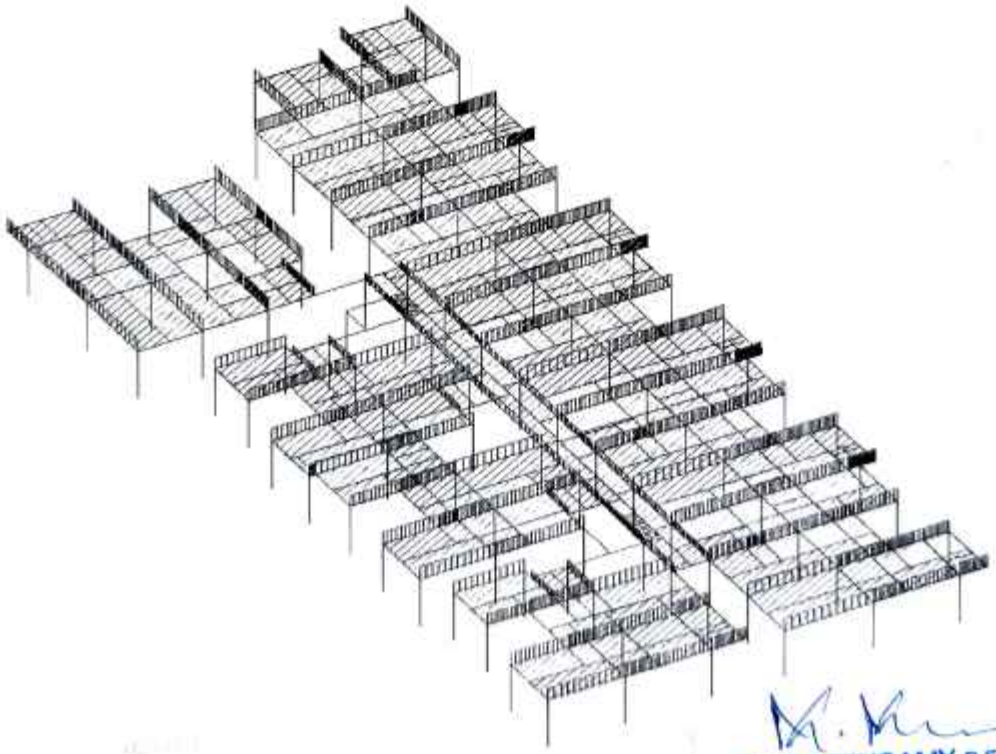


FIG. 46 LIVE LOADS ON SLAB

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
L-5, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 89259 58847

7.5. BLOCK E

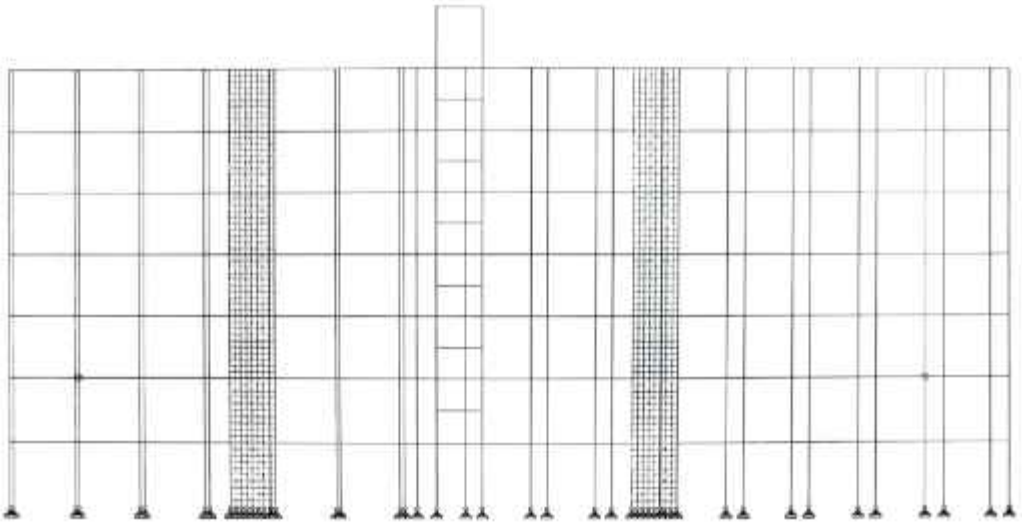


FIG.47 ELEVATIONAL VIEW

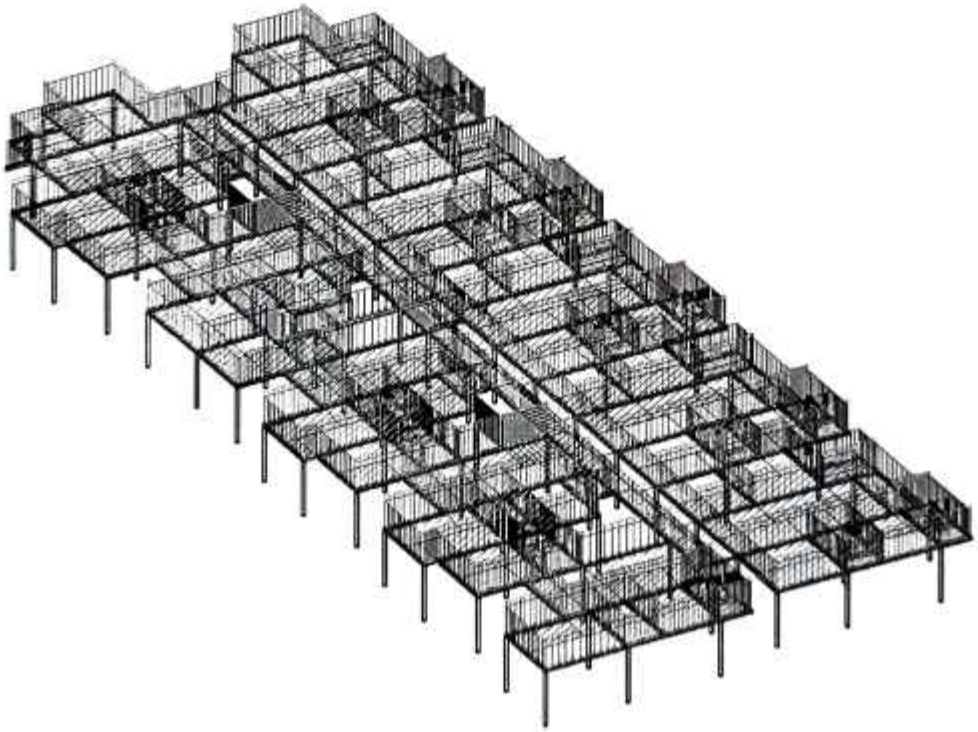


FIG. 48 DEAD LOADS ON BEAMS

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CRE Rgn/SE/Gr-I/2015/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
S, T.J. Complex, Ramanathapuram,
mbatore - 641 045 | Ph : 95259 58847

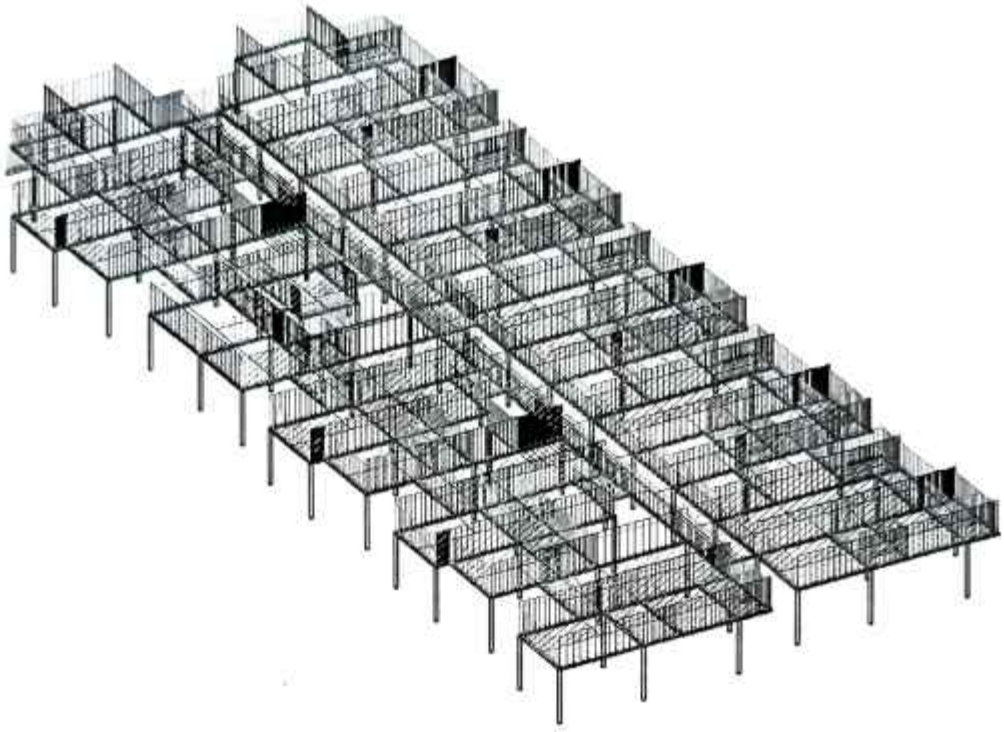


FIG. 49 DEAD LOADS ON SLAB

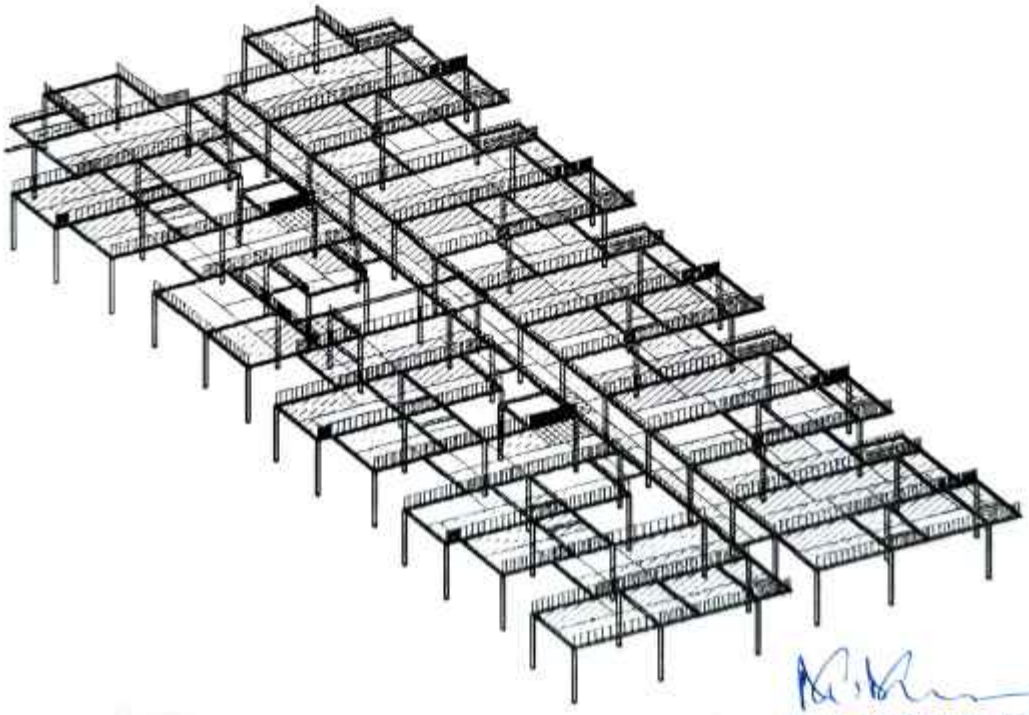


FIG. 50 LIVE LOADS ON SLAB

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER. GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 93259 58847

8. DESIGN OF STRUCTURAL MEMBERS

8.1. DESIGN OF FOOTING

FOOTING – TYPE T1 – BLOCK A

Input details		F1
Load, Pu	kN	*2200*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.61*
	Hori, d m	*0.3*
Area reqd	m^2	4.61
L (Hori)	m	2.286
B (Ver)	m	2.286
Area provided		5.23
Direct Pressure	kN/m^2	420.99
Pmax xy	kN/m^2	420.99
Pmin xy	kN/m^2	420.99
		SAFE
Depth of footing		
Moment Mu	kNm	207.6
or	kNm	147.8
d reqd	mm	274.23
or	mm	231.42
D provided	mm	*680*
Therefore Eff d	mm	630
Projection for BM	m	0.993
	m	0.838
Proj-one way SF	m	0.363
Proj-Two way SF	m	0.93
	m	1.24

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.S, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b		13.1588	301455
	c		2.08E+08	1.48E+08
Ast	X & Y	mm^2	710.558	501.32
Dia of rod	X & Y	mm	12	12
Sp reqd	X & Y	mm	159.09	225.48
Sp prod	X & Y	mm	150	150
Ast prod	X & Y	mm^2	753.60	753.6
% Ast			0.12	0.12

One way shear

	Vu	kN	152.8	
Tou v		N/mm^2	0.243	
Tc		N/mm^2	0.280	
Two way shear			*SAFE*	
Vu		kN	1714.52	
Tou v		N/mm^2	0.63	
Bc			0.49	
ks			0.99	1.0
Tou c= ks x 0.25 x sqrt(fck)			1.11	
	N/mm^2		*SAFE*	

Results

Size of footing	in m	2.286	2.286
Depth of footing	in mm	680	
Ast		12 Tor 150 C/C	
		12 Tor 150 C/C	

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-C^RE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

FOOTING – TYPE T2 – BLOCK A

Input details		F1
Load, Pu	kN	*2165*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.61*
	Hori, d m	*0.3*
Area reqd	m^2	4.54
L (Hori)	m	2.1336
B (Ver)	m	2.1336
Area provided		4.55
Direct Pressure	kN/m^2	475.59
Pmax xy	kN/m^2	475.59
Pmin xy	kN/m^2	475.59
		SAFE
Depth of footing		
Moment Mu	kNm	199.9
or	kNm	138.0
d reqd	mm	269.10
or	mm	223.61
D provided	mm	*680*
Therefore Eff d	mm	630
Projection for BM	m	0.9168
	m	0.7618
Proj-one way SF	m	0.2868
Proj-Two way SF	m	0.93
	m	1.24

M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CPE Ram/2[illegible]
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
5, T.J. Complex, Ramanathapuram,
[illegible]batore - 641 045 | Ph: 98259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b	10.8750	274050
	c	2E+08	1.38E+08
Ast	X & Y mm^2	751.751	514.05
Dia of rod	X & Y mm	12	12
Sp reqd	X & Y mm	150.37	219.90
Sp prod	X & Y mm	150	150
Ast prod	X & Y mm^2	753.60	753.6
% Ast		0.12	0.12

One way shear

	Vu kN	136.4	
Tou v	N/mm^2	0.217	
Tc	N/mm^2	0.280	
Two way shear		*SAFE*	
Vu	kN	1616.55	
Tou v	N/mm^2	0.59	
Bc		0.49	
ks		0.99	1.0
Tou c= ks x 0.25 x sqrt(fck)		1.11	
	N/mm^2	*SAFE*	

Results

Size of footing	in m	2.1336	2.1336
Depth of footing	in mm	680	
Ast		12 Tor 150 C/C	
		12 Tor 150 C/C	

M. MUNUSAMY B.E.,(M.E.)
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

I UOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

FOOTING – TYPE 3 – BLOCK B

Input details		F1
Load, Pu	kN	*2130*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.61*
	Hori, d m	*0.3*
Area reqd	m^2	4.46
L (Hori)	m	2.286
B (Ver)	m	2.286
Area provided		5.23
Direct Pressure	kN/m^2	407.59
Pmax xy	kN/m^2	407.59
Pmin xy	kN/m^2	407.59
		SAFE
Depth of footing		
Moment Mu	kNm	201.0
or	kNm	143.1
d reqd	mm	269.83
or	mm	227.71
D provided	mm	*680*
Therefore Eff d	mm	630
Projection for BM	m	0.993
	m	0.838
Proj-one way SF	m	0.363
Proj-Two way SF	m	0.93
	m	1.24

M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b	13.1588	301455
	c	2.01E+08	1.43E+08
Ast	X & Y mm^2	687.228	485.02
Dia of rod	X & Y mm	12	12
Sp reqd	X & Y mm	164.49	233.06
Sp prod	X & Y mm	150	150
Ast prod	X & Y mm^2	753.60	753.6
% Ast		0.12	0.12

One way shear

	Vu kN	148.0	
Tou v	N/mm^2	0.235	
Tc	N/mm^2	0.280	
Two way shear		*SAFE*	
Vu	kN	1659.96	
Tou v	N/mm^2	0.61	
Bc		0.49	
ks		0.99	1.0
Tou c= ks x 0.25 x sqrt(fck)		1.11	
	N/mm^2	*SAFE*	

Results

Size of footing	in m	2.286	2.286
Depth of footing	in mm	680	
Ast		12 Tor 150 C/C	
		12 Tor 150 C/C	

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 83259 58847

FOOTING – TYPE 4 – BLOCK B

Input details			F1
Load, Pu		kN	*1860*
Muy		kNm	
Muz		kNm	
fck		N/mm^2	*20*
fy		N/mm^2	*550*
SBC		kN/m^2	*350*
Column size		Ver, b m	*0.3*
		Hori, d m	*0.46*
Area reqd		m^2	3.90
L (Hori)		m	2.1336
B (Ver)		m	1.9812
Area provided			4.23
Direct Pressure		kN/m^2	440.02
Pmax xy		kN/m^2	440.02
Pmin xy		kN/m^2	440.02
			SAFE
Depth of footing			
Moment Mu		kNm	154.1
	or	kNm	155.5
d reqd		mm	236.26
	or	mm	237.33
D provided		mm	*600*
Therefore Eff d		mm	550
Projection for BM		m	0.8368
		m	0.8406
Proj-one way SF		m	0.2868
Proj-Two way SF		m	1.01
		m	0.85

M. MUNUSAMY B.E.,M.E.
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CPE Rgn/SE/Gr-I/20

EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 95259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b	13.1588	263175
	c	1.54E+08	1.55E+08
Ast	X & Y mm^2	603.600	609.27
Dia of rod	X & Y mm	12	12
Sp reqd	X & Y mm	130.05	128.84
Sp prod	X & Y mm	150	150
Ast prod	X & Y mm^2	753.60	753.60
% Ast		0.12	0.12

One way shear

	Vu kN	126.2	
Tou v	N/mm^2	0.229	
Tc	N/mm^2	0.280	
Two way shear		*SAFE*	
Vu	kN	1482.24	
Tou v	N/mm^2	0.72	
Bc		1.53	
ks		2.03	1.0
Tou c= ks x 0.25 x sqrt(fck)		1.12	
	N/mm^2	*SAFE*	

Results

Size of footing	in m	2.1336	1.9812
Depth of footing	in mm	600	
Ast		10 Tor 150 C/C	
		10 Tor 150 C/C	

M. MUNUSAMY B.E.,M.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

FOOTING – TYPE 8 – BLOCK C

Input details		F1
Load, Pu	kN	*1355*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.46*
	Hori, d m	*0.46*
Area reqd	m^2	2.84
L (Hori)	m	1.83
B (Ver)	m	1.83
Area provided		3.35
Direct Pressure	kN/m^2	404.61
Pmax xy	kN/m^2	404.61
Pmin xy	kN/m^2	404.61
		SAFE

Depth of footing			
Moment Mu		kNm	94.9
	or	kNm	94.9
d reqd		mm	185.46
	or	mm	185.46
D provided		mm	*530*
Therefore Eff d		mm	480
Projection for BM		m	0.685
		m	0.685
Proj-one way SF		m	0.205
Proj-Two way SF		m	0.94
		m	0.94

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CRE Rgn/SE/Gr-I/2003/[illegible]

EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
[illegible], T.J. Complex, Ramanathapuram,
[illegible]store - 641 045 | Ph : 93259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b	13.1588	229680
	c	94926674	94926674
Ast	X & Y mm^2	423.579	423.58
Dia of rod	X & Y mm	10	10
Sp reqd	X & Y mm	185.33	185.33
Sp prod	X & Y mm	150	150
Ast prod	X & Y mm^2	523.33	523.3
% Ast		0.11	0.11

One way shear

	Vu kN	82.9	
Tou v	N/mm^2	0.173	
Tc	N/mm^2	0.285	
Two way shear		*SAFE*	
Vu	kN	997.49	
Tou v	N/mm^2	0.55	
Bc		1.00	
ks		1.50	1.0
Tou c= ks x 0.25 x sqrt(fck)		1.12	
	N/mm^2	*SAFE*	

Results

Size of footing	in m	1.83	1.83
Depth of footing	in mm	530	
Ast		10 Tor 150 C/C	
		10 Tor 150 C/C	

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REGD. STRUCTURAL ENGINEER GRADE-I (SE)
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FOOTING – TYPE 9 – BLOCK C

Input details		F1
Load, Pu	kN	*620*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.2*
	Hori, d m	*0.2*
Area reqd	m^2	1.30
L (Hori)	m	1.524
B (Ver)	m	1.524
Area provided		2.32
Direct Pressure	kN/m^2	266.94
Pmax xy	kN/m^2	266.94
Pmin xy	kN/m^2	266.94
		SAFE
Depth of footing		
Moment Mu	kNm	58.5
or	kNm	58.5
d reqd	mm	145.58
or	mm	145.58
D provided	mm	*380*
Therefore Eff d	mm	330
Projection for		
BM	m	0.662
	m	0.662
Proj-one way SF	m	0.332
Proj-Two way SF	m	0.53
	m	0.53

M. MUNUSAMY B.E., M.I.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

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Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b		13.1588	157905
	c		58493518	58493518
Ast	X & Y	mm^2	382.636	382.64
Dia of rod	X & Y	mm	10	10
Sp reqd	X & Y	mm	205.16	205.16
Sp prod	X & Y	mm	150	150
Ast prod	X & Y	mm^2	523.33	523.3
% Ast			0.16	0.16

One way shear

	Vu	kN	88.6	
Tou v		N/mm^2	0.269	
Tc		N/mm^2	0.285	
Two way shear			*SAFE*	
Vu		kN	545.02	
Tou v		N/mm^2	0.78	
Bc			1.00	
ks			1.50	1.0
Tou c= ks x 0.25 x sqrt(fck)			1.12	
	N/mm^2		*SAFE*	

Results

Size of footing	in m	1.524	1.524
Depth of footing	in mm	380	
Ast		10 Tor 150 C/C	
		10 Tor 150 C/C	

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
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FOOTING – TYPE 5 – BLOCK D

Input details		F1
Load, Pu	kN	*1630*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.46*
	Hori, d m	*0.3*
Area reqd	m^2	3.42
L (Hori)	m	1.8288
B (Ver)	m	1.9812
Area provided		3.62
Direct Pressure	kN/m^2	449.88
Pmax xy	kN/m^2	449.88
Pmin xy	kN/m^2	449.88
		SAFE
Depth of footing		
Moment Mu	kNm	131.4
or	kNm	130.1
d reqd	mm	218.22
or	mm	217.14
D provided	mm	*530*
Therefore Eff d	mm	480
Projection for BM	m	0.7644
	m	0.7606
Proj-one way SF	m	0.2844
Proj-Two way SF	m	0.78
	m	0.94

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REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CME Rgn/SE/Gr-I/2019/07/005

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Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b	13.1588	229680
	c	1.31E+08	1.3E+08
Ast	X & Y mm^2	592.346	586.26
Dia of rod	X & Y mm	10	10
Sp reqd	X & Y mm	132.52	133.90
Sp prod	X & Y mm	125	125
Ast prod	X & Y mm^2	628.00	628.0
% Ast		0.13	0.13

One way shear

	Vu kN	127.9	
Tou v	N/mm^2	0.267	
Tc	N/mm^2	0.280	
Two way shear		*SAFE*	
Vu	kN	1300.15	
Tou v	N/mm^2	0.79	
Bc		0.65	
ks		1.15	1.0
Tou c= ks x 0.25 x sqrt(fck)		1.12	
	N/mm^2	*SAFE*	

Results

Size of footing	in m	1.8288	1.9812
Depth of footing	in mm	530	
Ast		10 Tor 125 C/C	
		10 Tor 125 C/C	

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
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FOOTING – TYPE T6 – BLOCK D

Input details		F1
Load, Pu	kN	*1700*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.46*
	Hori, d m	*0.3*
Area reqd	m^2	3.56
L (Hori)	m	1.8288
B (Ver)	m	1.9812
Area provided		3.62
Direct Pressure	kN/m^2	469.20
Pmax xy	kN/m^2	469.20
Pmin xy	kN/m^2	469.20
		SAFE
Depth of footing		
Moment Mu	kNm	137.1
or	kNm	135.7
d reqd	mm	222.86
or	mm	221.75
D provided	mm	*530*
Therefore Eff d	mm	480
Projection for BM	m	0.7644
	m	0.7606
Proj-one way SF	m	0.2844
Proj-Two way SF	m	0.78
	m	0.94

M. MUNUSAMY B.E.,M.I.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 95259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b		13.1588	229680
	c		1.37E+08	1.36E+08
Ast	X & Y	mm^2	618.753	612.39
Dia of rod	X & Y	mm	10	10
Sp reqd	X & Y	mm	126.87	128.19
Sp prod	X & Y	mm	125	125
Ast prod	X & Y	mm^2	628.00	628.0
% Ast			0.13	0.13

One way shear

	Vu	kN	133.4	
Tou v		N/mm^2	0.278	
Tc		N/mm^2	0.280	
Two way shear			*SAFE*	
Vu		kN	1355.99	
Tou v		N/mm^2	0.82	
Bc			0.65	
ks			1.15	1.0
Tou c= ks x 0.25 x sqrt(fck)			1.12	
	N/mm^2		*SAFE*	

Results

Size of footing	in m	1.8288	1.9812
Depth of footing	in mm	530	
Ast		10 Tor 125 C/C	
		10 Tor 125 C/C	

M. MUNUSAMY B.E.,M.I.S.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
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115, TJ Complex, Ramanathapuram,
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FOOTING – TYPE T6 – BLOCK E

Input details		F1
Load. Pu	kN	*1700*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.46*
	Hori, d m	*0.3*
Area reqd	m^2	3.56
L (Hori)	m	1.8288
B (Ver)	m	1.9812
Area provided		3.62
Direct Pressure	kN/m^2	469.20
Pmax xy	kN/m^2	469.20
Pmin xy	kN/m^2	469.20
		SAFE

Depth of footing			
Moment Mu		kNm	137.1
	or	kNm	135.7
d reqd		mm	222.86
	or	mm	221.75
D provided		mm	*530*
Therefore Eff d		mm	480
Projection for BM		m	0.7644
		m	0.7606
Proj-one way SF		m	0.2844
Proj-Two way SF		m	0.78
		m	0.94

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REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CRE Rgn/EE/Gr-I/[illegible]
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph: 88259 58847

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

	a & b		13.1588	229680
	c		1.37E+08	1.36E+08
Ast	X & Y	mm^2	618.753	612.39
Dia of rod	X & Y	mm	10	10
Sp reqd	X & Y	mm	126.87	128.19
Sp prod	X & Y	mm	125	125
Ast prod	X & Y	mm^2	628.00	628.0
% Ast			0.13	0.13

One way shear

	Vu	kN	133.4	
Tou v		N/mm^2	0.278	
Tc		N/mm^2	0.285	
Two way shear			*SAFE*	
Vu		kN	1355.99	
Tou v		N/mm^2	0.82	
Bc			0.65	
ks			1.15	1.0
Tou c= ks x 0.25 x sqrt(fck)			1.12	
	N/mm^2		*SAFE*	

Results

Size of footing	in m	1.8288	1.9812
Depth of footing	in mm	530	
Ast		10 Tor 125 C/C	
		10 Tor 125 C/C	

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REGD. STRUCTURAL ENGINEER GRADE-I (SE)
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FOOTING – TYPE T7 – BLOCK E

Input details		F1
Load, Pu	kN	*1290*
Muy	kNm	
Muz	kNm	
fck	N/mm^2	*20*
fy	N/mm^2	*550*
SBC	kN/m^2	*350*
Column size	Ver, b m	*0.46*
	Hori, d m	*0.3*
Area reqd	m^2	2.70
L (Hori)	m	1.524
B (Ver)	m	1.6764
Area provided		2.55
Direct Pressure	kN/m^2	504.93
Pmax xy	kN/m^2	504.93
Pmin xy	kN/m^2	504.93
		SAFE

Depth of footing			
Moment Mu		kNm	94.6
	or	kNm	93.4
d reqd		mm	185.10
	or	mm	183.95
D provided		mm	*460*
Therefore Eff d		mm	410
Projection for BM		m	0.612
		m	0.6082
Proj-one way SF		m	0.202
Proj-Two way SF		m	0.71
		m	0.87

Ast reqd

Mu = 0.87 fy Ast d (1 - (fy Ast)/(fck b d))

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CPE
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	a & b	10.8750		178350
	c	94558362		93387753
Ast	X & Y mm^2	498.66		492.28
Dia of rod	X & Y mm	10		10
Sp reqd	X & Y mm	157.11		159.97
Sp prod	X & Y mm	150		150
Ast prod	X & Y mm^2	523.33		523.3
% Ast		0.13		0.13
One way shear				
	Vu kN	102.0		
Tou v	N/mm^2	0.249		
Tc	N/mm^2	0.285		
Two way shear		*SAFE*		
Vu	kN	978.11		
Tou v	N/mm^2	0.75		
Bc		0.65		
ks		1.15	1.0	
Tou c= ks x 0.25 x sqrt(fck)		1.12		
	N/mm^2	*SAFE*		
Results				
Size of footing	in m	1.524		1.6764
Depth of footing	in mm	460		
Ast		10 Tor 150 C/C		
		10 Tor 150 C/C		

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REGD. STRUCTURAL ENGINEER GRADE-I (SE)
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8.2. DESIGN OF COLUMNS

COLUMN – T1 – BLOCK A (UPTO SF ROOF)

COLUMN NO. 1127 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 14 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	1568.49	
		About Z	**About Y**
INITIAL MOMENTS	:	119.99	0.56
MOMENTS DUE TO MINIMUM ECC.	:	40.98	31.37
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	32.93
MOMENT REDUCTION FACTORS	:	1.00	0.60
ADDITION MOMENTS (Maz and May)	:	0.00	19.82
TOTAL DESIGN MOMENTS	:	**119.99**	**51.19**

REQD. STEEL AREA : 2411.52 Sq.mm.

REQD. CONCRETE AREA : 119588.48 Sq.mm.

MAIN REINFORCEMENT : Provide 12 - 16 dia. (1.98%, 2412.74 Sq.mm.)
(Equally distributed about Y axis)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2878.27 Muz1 : 213.05 Muy1 : 72.24

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 14

Puz : 2878.76 Muz : 222.25 Muy : 70.59 IR: 0.98

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M. MUNUSAMY B.E.,M.E.
REGD. STRUCTURAL ENGINEER GRADE-I
Reg. No.-CAE Barv

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COLUMN – T1 - BLOCK A (ABOVE SF ROOF)

COLUMN NO. 1999 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 15 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 543.39

		About Z	About Y
INITIAL MOMENTS	:	101.60	3.70
MOMENTS DUE TO MINIMUM ECC.	:	14.20	10.87
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	11.41
MOMENT REDUCTION FACTORS	:	1.00	0.99
ADDITION MOMENTS (Maz and May)	:	0.00	11.32
TOTAL DESIGN MOMENTS	**:**	**101.60**	**22.19**

REQD. STEEL AREA : 1052.66 Sq.mm.

REQD. CONCRETE AREA : 120947.34 Sq.mm.

MAIN REINFORCEMENT : Provide 10 - 12 dia. (0.93%, 1130.97 Sq.mm.)
(Equally distributed about Y axis)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1794.88 Muz1 : 152.03 Muy1 : 51.76

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 12

Puz : 1826.30 Muz : 162.12 Muy : 50.42 IR: 0.95

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
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COLUMN – T2 – BLOCK A (UPTO SF ROOF)

COLUMN NO. 1094 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 1641.45

		About Z	About Y
INITIAL MOMENTS	:	4.24	5.99
MOMENTS DUE TO MINIMUM ECC.	:	42.89	32.83
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	34.46
MOMENT REDUCTION FACTORS	:	1.00	0.52
ADDITION MOMENTS (Maz and May)	:	0.00	17.85
TOTAL DESIGN MOMENTS	:	**42.89**	**50.68**

REQD. STEEL AREA : 1766.58 Sq.mm.

REQD. CONCRETE AREA : 120233.41 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 20 dia. (2.06%, 2513.27 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2622.39 Muz1 : 202.83 Muy1 : 53.26

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 2918.64 Muz : 262.88 Muy : 62.04 IR: 0.81

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CME Rgn/SE/Gr-I/2013/07/005

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COLUMN – T2 – BLOCK A (ABOVE SF ROOF)

COLUMN NO. 1966 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 12 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	787.48	
		About Z	**About Y**
INITIAL MOMENTS	:	5.44	18.86
MOMENTS DUE TO MINIMUM ECC.	:	20.58	15.75
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	16.53
MOMENT REDUCTION FACTORS	:	1.00	0.82
ADDITION MOMENTS (Maz and May)	:	0.00	3.57
TOTAL DESIGN MOMENTS	:	**20.58**	**47.14**

REQD. STEEL AREA : 1582.03 Sq.mm.

REQD. CONCRETE AREA : 120417.97 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.32%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2007.29 Muz1 : 209.90 Muy1 : 49.40

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 12

Puz : 2017.91 Muz : 219.19 Muy : 49.47 IR: 0.98

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M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

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115, T.J. Complex, Ramanathapuram,
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COLUMN – T3 – BLOCK B (UPTO SF ROOF)

COLUMN NO. 6872 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 12 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	1100.62	
		About Z	**About Y**
INITIAL MOMENTS	:	130.04	3.64
MOMENTS DUE TO MINIMUM ECC.	:	28.76	22.01
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	23.11
MOMENT REDUCTION FACTORS	:	1.00	0.79
ADDITION MOMENTS (Maz and May)	:	0.00	18.25
TOTAL DESIGN MOMENTS	:	**130.04**	**40.26**

REQD. STEEL AREA : 1522.96 Sq.mm.

REQD. CONCRETE AREA : 120477.04 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.32%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2468.62 Muz1 : 235.54 Muy1 : 61.20

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 12

Puz : 2499.35 Muz : 246.86 Muy : 62.09 IR: 0.98

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M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I(2)
Reg. No. CRS/SE/G-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
Coimbatore - 641 045. | Ph: 95259 58847

COLUMN – T3 – BLOCK B (ABOVE SF ROOF)

COLUMN NO. 6870 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 610.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 12 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 724.68

		About Z	About Y
INITIAL MOMENTS	:	110.55	3.98
MOMENTS DUE TO MINIMUM ECC.	:	18.94	14.49
SLENDERNESS RATIOS	:	4.75	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	15.22
MOMENT REDUCTION FACTORS	:	1.00	0.85
ADDITION MOMENTS (Maz and May)	:	0.00	12.93
TOTAL DESIGN MOMENTS	**:**	**110.55**	**27.42**

REQD. STEEL AREA : 1247.89 Sq.mm.

REQD. CONCRETE AREA : 120752.12 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.32%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1826.42 Muz1 : 185.46 Muy1 : 46.54

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 12

Puz : 1957.59 Muz : 217.78 Muy : 50.12 IR: 0.90

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SS)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
CUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 89259 58847

COLUMN – T4 – BLOCK B (UPTO SF ROOF)

COLUMN NO. 1024 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	1352.75	
		About Z	**About Y**
INITIAL MOMENTS	:	3.41	5.80
MOMENTS DUE TO MINIMUM ECC.	:	28.58	27.06
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	28.40
MOMENT REDUCTION FACTORS	:	1.00	0.49
ADDITION MOMENTS (Maz and May)	:	0.00	44.00
TOTAL DESIGN MOMENTS	:	**28.58**	**41.06**

REQD. STEEL AREA : 1941.17 Sq.mm.

REQD. CONCRETE AREA : 90058.84 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 20 dia. (2.73%, 2513.27 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2146.37 Muz1 : 124.89 Muy1 : 43.72

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 2351.89 Muz : 155.38 Muy : 50.27 IR: 0.84

M. MUNUSAMY B.E., M.I.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CPE Regn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

COLUMN – T4 – BLOCK B (ABOVE SF ROOF)

COLUMN NO. 1840 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 763.20

		About Z	About Y
INITIAL MOMENTS	:	3.81	6.51
MOMENTS DUE TO MINIMUM ECC.	:	16.13	15.26
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	16.02
MOMENT REDUCTION FACTORS	:	1.00	0.57
ADDITION MOMENTS (Maz and May)	:	0.00	9.17
TOTAL DESIGN MOMENTS	:	**16.13**	**24.43**

REQD. STEEL AREA : 547.59 Sq.mm.

REQD. CONCRETE AREA : 91452.41 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.98%, 904.78 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1234.19 Muz1 : 68.61 Muy1 : 26.72

INTERACTION RATIO: 0.94 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 13

Puz : 1364.11 Muz : 98.31 Muy : 34.37 IR: 0.86

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 89259 58847

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COLUMN – T8 – BLOCK C

COLUMN NO. 1388 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2590.8 mm CROSS SECTION: 460.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 14 END JOINT: 809 SHORT COLUMN

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	334.17	
		About Z	**About Y**
INITIAL MOMENTS	:	392.39	3.05
MOMENTS DUE TO MINIMUM ECC.	:	6.86	6.86
SLENDERNESS RATIOS	:	-	-
MOMENTS DUE TO SLENDERNESS EFFECT	:	-	-
MOMENT REDUCTION FACTORS	:	-	-
ADDITION MOMENTS (Maz and May)	:	-	-
TOTAL DESIGN MOMENTS	:	**392.39**	**6.86**

REQD. STEEL AREA : 3917.56 Sq.mm.

REQD. CONCRETE AREA : 207682.47 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 25 dia. (1.86%, 3926.99 Sq.mm.)
(Equally distributed about Z axis)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 300 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 4886.99 Muz1 : 403.63 Muy1 : 293.44

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 14

END JOINT: 809 Puz : 4890.73 Muz : 396.08 Muy : 325.83 IR: 1.02

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph: +2515847

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COLUMN – T9 – BLOCK C

COLUMN NO. 1393 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2590.8 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 10 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

		About Z	About Y
DESIGN AXIAL FORCE (Pu)	:	162.10	
INITIAL MOMENTS	:	108.40	1.88
MOMENTS DUE TO MINIMUM ECC.	:	3.33	3.24
SLENDERNESS RATIOS	:	5.63	12.95
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	2.72
MOMENT REDUCTION FACTORS	:	1.00	1.00
ADDITION MOMENTS (Maz and May)	:	0.00	2.72
TOTAL DESIGN MOMENTS	**:**	**108.40**	**5.96**

REQD. STEEL AREA : 1216.55 Sq.mm.

REQD. CONCRETE AREA : 90783.45 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.75%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1931.67 Muz1 : 125.73 Muy1 : 44.08

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 10

Puz : 2087.17 Muz : 157.30 Muy : 50.37 IR: 0.81

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
1.5, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

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COLUMN – T4 – BLOCK D (UPTO SF ROOF)

COLUMN NO. 1228 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	1334.39	
		About Z	**About Y**
INITIAL MOMENTS	:	2.79	5.30
MOMENTS DUE TO MINIMUM ECC.	:	28.19	26.69
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	28.02
MOMENT REDUCTION FACTORS	:	1.00	0.49
ADDITION MOMENTS (Maz and May)	:	0.00	13.86
TOTAL DESIGN MOMENTS	:	**28.19**	**40.55**

REQD. STEEL AREA : 1846.43 Sq.mm.

REQD. CONCRETE AREA : 90153.58 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 20 dia. (2.73%, 2513.27 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2112.33 Muz1 : 122.13 Muy1 : 43.07

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 2351.89 Muz : 157.22 Muy : 50.76 IR: 0.82

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M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005

EUOYANCY

CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

COLUMN – T4 – BLOCK D (ABOVE SF ROOF)

COLUMN NO. 2158 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 14 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	628.54	
		About Z	**About Y**
INITIAL MOMENTS	:	2.61	14.55
MOMENTS DUE TO MINIMUM ECC.	:	13.28	12.57
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	13.20
MOMENT REDUCTION FACTORS	:	1.00	0.79
ADDITION MOMENTS (Maz and May)	:	0.00	10.43
TOTAL DESIGN MOMENTS	:	**13.28**	**36.37**

REQD. STEEL AREA : 1307.82 Sq.mm.

REQD. CONCRETE AREA : 90692.19 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.75%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1510.72 Muz1 : 114.57 Muy1 : 38.31

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 14

Puz : 1620.09 Muz : 132.92 Muy : 41.48 IR: 0.92

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M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CAE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

COLUMN – T6 – BLOCK D (UPTO SF ROOF)

COLUMN NO. 1157 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 12 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 1151.46

		About Z	About Y
INITIAL MOMENTS	:	53.40	1.68
MOMENTS DUE TO MINIMUM ECC.	:	24.33	23.03
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	24.18
MOMENT REDUCTION FACTORS	:	1.00	0.59
ADDITION MOMENTS (Maz and May)	:	0.00	14.14
TOTAL DESIGN MOMENTS	:	**53.40**	**37.17**

REQD. STEEL AREA : 1534.30 Sq.mm.

REQD. CONCRETE AREA : 90465.71 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.75%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2000.20 Muz1 : 124.63 Muy1 : 44.46

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 12

Puz : 2026.85 Muz : 130.29 Muy : 45.37 IR: 1.01

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M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CPE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, TJ Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 99259 58847

COLUMN – T6 – BLOCK D (ABOVE SF ROOF)

COLUMN NO. 2087 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 13 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	585.79	
		About Z	**About Y**
INITIAL MOMENTS	:	1.04	12.89
MOMENTS DUE TO MINIMUM ECC.	:	12.38	11.72
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	12.30
MOMENT REDUCTION FACTORS	:	1.00	0.81
ADDITION MOMENTS (Maz and May)	:	0.00	9.93
TOTAL DESIGN MOMENTS	**:**	**12.38**	**32.22**

REQD. STEEL AREA : 840.59 Sq.mm.

REQD. CONCRETE AREA : 91159.41 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.98%, 904.78 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1340.77 Muz1 : 94.47 Muy1 : 33.73

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 13

Puz : 1364.11 Muz : 99.89 Muy : 34.70 IR: 0.99

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M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
L15, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 98259 58847

COLUMN – T4 – BLOCK E (UPTO SF ROOF)

COLUMN NO. 762 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 1268.11

		About Z	About Y
INITIAL MOMENTS	:	64.54	1.99
MOMENTS DUE TO MINIMUM ECC.	:	26.79	25.36
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	26.63
MOMENT REDUCTION FACTORS	:	1.00	0.57
ADDITION MOMENTS (Maz and May)	:	0.00	15.20
TOTAL DESIGN MOMENTS	:	**64.54**	**40.56**

REQD. STEEL AREA : 2014.67 Sq.mm.

REQD. CONCRETE AREA : 89985.34 Sq.mm.

MAIN REINFORCEMENT : Provide 18 - 12 dia. (2.21%, 2035.75 Sq.mm.)
(Equally distributed about Y axis)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 2248.32 Muz1 : 118.25 Muy1 : 55.74

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 2256.68 Muz : 119.68 Muy : 55.85 IR: 0.97

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M. MUNUSAMY B.E., M.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CPE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

COLUMN – T4 – BLOCK E (ABOVE SF ROOF)

COLUMN NO. 1626 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 14 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu) : 660.28

		About Z	About Y
INITIAL MOMENTS	:	66.99	0.63
MOMENTS DUE TO MINIMUM ECC.	:	13.95	13.21
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	13.86
MOMENT REDUCTION FACTORS	:	1.00	0.78
ADDITION MOMENTS (Maz and May)	:	0.00	10.86
TOTAL DESIGN MOMENTS	**:**	**66.99**	**24.06**

REQD. STEEL AREA : 1515.98 Sq.mm.

REQD. CONCRETE AREA : 90484.02 Sq.mm.

MAIN REINFORCEMENT : Provide 14 - 12 dia. (1.72%, 1583.36 Sq.mm.)
(Equally distributed about Y axis)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1643.29 Muz1 : 100.49 Muy1 : 47.45

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 14

Puz : 1670.32 Muz : 105.67 Muy : 47.63 IR: 0.95

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M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

COLUMN – T6 – BLOCK E (UPTO SF ROOF)

COLUMN NO. 775 DESIGN RESULTS

M35 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

		About Z	About Y
DESIGN AXIAL FORCE (Pu)	:	1225.14	
INITIAL MOMENTS	:	7.74	2.08
MOMENTS DUE TO MINIMUM ECC.	:	25.89	24.50
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	25.72
MOMENT REDUCTION FACTORS	:	1.00	0.53
ADDITION MOMENTS (Maz and May)	:	0.00	13.57
TOTAL DESIGN MOMENTS	:	25.89	38.07

REQD. STEEL AREA : 1318.53 Sq.mm.

REQD. CONCRETE AREA : 90681.48 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 16 dia. (1.75%, 1608.50 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 200 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1972.13 Muz1 : 112.10 Muy1 : 40.57

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 2087.17 Muz : 129.32 Muy : 44.42 IR: 0.87

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M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.J. Complex, Ramanathapuram,
Coimbatore - 641 035 | Ph : 98259 58847

COLUMN – T6 – BLOCK E (ABOVE SF ROOF)

COLUMN NO. 1639 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2898.0 mm CROSS SECTION: 200.0 mm X 460.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 11 SHORT(Z) /BRACED LONG(Y)

DESIGN FORCES (KNS-MET)

DESIGN AXIAL FORCE (Pu)	:	697.60	
		About Z	**About Y**
INITIAL MOMENTS	:	7.05	2.36
MOMENTS DUE TO MINIMUM ECC.	:	14.74	13.95
SLENDERNESS RATIOS	:	6.30	14.49
MOMENTS DUE TO SLENDERNESS EFFECT	:	0.00	14.65
MOMENT REDUCTION FACTORS	:	1.00	0.65
ADDITION MOMENTS (Maz and May)	:	0.00	9.57
TOTAL DESIGN MOMENTS	:	**14.74**	**23.52**

REQD. STEEL AREA : 500.52 Sq.mm.

REQD. CONCRETE AREA : 91499.48 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.98%, 904.78 Sq.mm.)
(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 1235.83 Muz1 : 73.16 Muy1 : 28.22

INTERACTION RATIO: 0.82 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 11

Puz : 1398.04 Muz : 95.34 Muy : 33.35 IR: 0.68

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M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SS)
Reg. No. CHE/SE/GR-I/2019/007/005

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115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph: 88259 58847

8.3. DESIGN OF BEAMS

BEAM – TYPE B1 – BLOCK A

BEAM NO. 307 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2540.0 mm SIZE: 200.0 mm X 610.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	635.0 mm	1270.0 mm	1905.0 mm	2540.0 mm
TOP REINF.	0.00 (Sq. mm)	179.27 (Sq. mm)	329.29 (Sq. mm)	739.94 (Sq. mm)	1252.13 (Sq. mm)
BOTTOM REINF.	372.59 (Sq. mm)	336.71 (Sq. mm)	396.26 (Sq. mm)	452.01 (Sq. mm)	486.97 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	635.0 mm	1270.0 mm	1905.0 mm	2540.0 mm
TOP REINF.	2-16í 1 layer(s)	5-16í 1 layer(s)	5-16í 1 layer(s)	5-16í 1 layer(s)	8-16í 2 layer(s)
BOTTOM REINF.	6-10í 1 layer(s)	6-10í 1 layer(s)	7-10í 2 layer(s)	7-10í 2 layer(s)	8-10í 2 layer(s)
SHEAR REINF.	2 legged 8í @ 155 mm c/c	2 legged 8í @ 155 mm c/c	2 legged 8í @ 155 mm c/c	2 legged 8í @ 155 mm c/c	2 legged 8í @ 155 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 868.3 mm AWAY FROM END SUPPORT

VY = -82.75 MX = -11.99 LD= 14

Provide 2 Legged 8í @ 155 mm c/c

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 98259 58847

BEAM – TYPE B2 – BLOCK A

BEAM NO. 290 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 1676.4 mm SIZE: 200.0 mm X 610.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	419.1 mm	838.2 mm	1257.3 mm	1676.4 mm
TOP REINF.	916.87 (Sq. mm)	576.88 (Sq. mm)	360.84 (Sq. mm)	200.62 (Sq. mm)	0.00 (Sq. mm)
BOTTOM REINF.	0.00 (Sq. mm)	0.00 (Sq. mm)	179.27 (Sq. mm)	354.37 (Sq. mm)	350.70 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	419.1 mm	838.2 mm	1257.3 mm	1676.4 mm
TOP REINF.	6-16ί 2 layer(s)	5-16ί 1 layer(s)	5-16ί 1 layer(s)	5-16ί 1 layer(s)	2-16ί 1 layer(s)
BOTTOM REINF.	3-10ί 1 layer(s)	3-10ί 1 layer(s)	6-10ί 1 layer(s)	6-10ί 1 layer(s)	6-10ί 1 layer(s)
SHEAR REINF.	2 legged 8ί @ 155 mm c/c	2 legged 8ί @ 115 mm c/c	2 legged 8ί @ 115 mm c/c	2 legged 8ί @ 120 mm c/c	2 legged 8ί @ 155 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 720.6 mm AWAY FROM START SUPPORT

VY = 107.40 MX = 21.67 LD= 15

Provide 2 Legged 8ί @ 115 mm c/c

M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

BEAM – B3 – BLOCK B

BEAM NO. 82 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 1625.6 mm SIZE: 200.0 mm X 460.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	406.4 mm	812.8 mm	1219.2 mm	1625.6 mm
TOP REINF.	0.00 (Sq. mm)	241.41 (Sq. mm)	541.57 (Sq. mm)	904.97 (Sq. mm)	1256.79 (Sq. mm)
BOTTOM REINF.	338.22 (Sq. mm)	175.57 (Sq. mm)	0.00 (Sq. mm)	106.23 (Sq. mm)	489.14 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	406.4 mm	812.8 mm	1219.2 mm	1625.6 mm
TOP REINF.	2-16ί 1 layer(s)	2-16ί 1 layer(s)	3-16ί 1 layer(s)	5-16ί 2 layer(s)	7-16ί 2 layer(s)
BOTTOM REINF.	5-10ί 1 layer(s)	3-10ί 1 layer(s)	2-10ί 1 layer(s)	2-10ί 1 layer(s)	7-10ί 2 layer(s)
SHEAR REINF.	2 legged 8ί @ 140 mm c/c	2 legged 8ί @ 125 mm c/c	2 legged 8ί @ 115 mm c/c	2 legged 8ί @ 105 mm c/c	2 legged 8ί @ 140 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 718.3 mm AWAY FROM END SUPPORT

VY = -88.08 MX = -12.32 LD= 15

Provide 2 Legged 8ί @ 110 mm c/c

M. MUNUSAMY B.E.(M)
REGD. STRUCTURAL ENGINEER, GRADE-I
Reg. No.-CRE Regn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

BEAM – B4 – BLOCK B

BEAM NO. 113 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 1676.4 mm SIZE: 200.0 mm X 460.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	419.1 mm	838.2 mm	1257.3 mm	1676.4 mm
TOP REINF.	0.00 (Sq. mm)	145.18 (Sq. mm)	320.16 (Sq. mm)	626.89 (Sq. mm)	1001.68 (Sq. mm)
BOTTOM REINF.	397.01 (Sq. mm)	193.36 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	215.32 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	419.1 mm	838.2 mm	1257.3 mm	1676.4 mm
TOP REINF.	2-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)	4-16ί 1 layer(s)	5-16ί 2 layer(s)
BOTTOM REINF.	2-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)
SHEAR REINF.	2 legged 8ί @ 140 mm c/c	2 legged 8ί @ 105 mm c/c	2 legged 8ί @ 95 mm c/c	2 legged 8ί @ 100 mm c/c	2 legged 8ί @ 140 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 570.6 mm AWAY FROM END SUPPORT

VY = -101.07 MX = -13.41 LD= 15

Provide 2 Legged 8ί @ 95 mm c/c

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

BEAM – B11 – BLOCK C

BEAM NO. 490 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 4601.8 mm SIZE: 300.0 mm X 610.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1150.4 mm	2300.9 mm	3451.3 mm	4601.8 mm
TOP REINF.	182.25 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	504.63 (Sq. mm)	1782.23 (Sq. mm)
BOTTOM REINF.	1599.00 (Sq. mm)	1118.62 (Sq. mm)	441.19 (Sq. mm)	0.00 (Sq. mm)	379.85 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1150.4 mm	2300.9 mm	3451.3 mm	4601.8 mm
TOP REINF.	7-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	7-16i 1 layer(s)	10-16i 2 layer(s)
BOTTOM REINF.	9-16i 2 layer(s)	7-16i 1 layer(s)	7-16i 1 layer(s)	2-16i 1 layer(s)	7-16i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 205 mm c/c	2 legged 8i @ 205 mm c/c	2 legged 8i @ 205 mm c/c	2 legged 8i @ 200 mm c/c	2 legged 8i @ 205 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 796.3 mm AWAY FROM END SUPPORT

VY = -242.04 MX = -1.12 LD= 10

Provide 2 Legged 8i @ 190 mm c/c

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph: 98259 58347

BEAM – TYPE B4 – BLOCK D

BEAM NO. 5 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 2717.8 mm SIZE: 200.0 mm X 460.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	679.4 mm	1358.9 mm	2038.3 mm	2717.8 mm
TOP REINF.	1078.30 (Sq. mm)	547.27 (Sq. mm)	145.86 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)
BOTTOM REINF.	302.18 (Sq. mm)	184.07 (Sq. mm)	348.75 (Sq. mm)	534.87 (Sq. mm)	650.22 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	679.4 mm	1358.9 mm	2038.3 mm	2717.8 mm
TOP REINF.	6-16ί 2 layer(s)	3-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)	2-16ί 1 layer(s)
BOTTOM REINF.	3-12ί 1 layer(s)	2-12ί 1 layer(s)	4-12ί 1 layer(s)	5-12ί 2 layer(s)	6-12ί 2 layer(s)
SHEAR REINF.	2 legged 8ί @ 140 mm c/c	2 legged 8ί @ 125 mm c/c	2 legged 8ί @ 140 mm c/c	2 legged 8ί @ 140 mm c/c	2 legged 8ί @ 140 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 646.3 mm AWAY FROM START SUPPORT

VY = 85.35 MX = 10.67 LD= 13

Provide 2 Legged 8ί @ 125 mm c/c

M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
15, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

BEAM – TYPE B4 – BLOCK E

BEAM NO. 236 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 1168.4 mm SIZE: 200.0 mm X 460.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	292.1 mm	584.2 mm	876.3 mm	1168.4 mm
TOP REINF.	139.85 (Sq. mm)	314.52 (Sq. mm)	525.38 (Sq. mm)	764.53 (Sq. mm)	977.65 (Sq. mm)
BOTTOM REINF.	132.91 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	54.77 (Sq. mm)	289.74 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	292.1 mm	584.2 mm	876.3 mm	1168.4 mm
TOP REINF.	5-16í 1 layer(s)	5-16í 1 layer(s)	5-16í 1 layer(s)	5-16í 1 layer(s)	6-16í 2 layer(s)
BOTTOM REINF.	6-10í 1 layer(s)	2-10í 1 layer(s)	2-10í 1 layer(s)	6-10í 1 layer(s)	6-10í 1 layer(s)
SHEAR REINF.	2 legged 8í @ 140 mm c/c	2 legged 8í @ 140 mm c/c	2 legged 8í @ 140 mm c/c	2 legged 8í @ 140 mm c/c	2 legged 8í @ 140 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 650.6 mm AWAY FROM END SUPPORT

VY = -116.44 MX = -9.08 LD= 13

Provide 2 Legged 8í @ 140 mm c/c

M. MUNUSAMY B.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (S)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
T.J. Complex, Ramanathapuram,
641 045 | Ph: 95259 58847

BEAM – TYPE B9 – BLOCK E

BEAM NO. 224 DESIGN RESULTS

M25 Fe550 (Main) Fe550 (Sec.)

LENGTH: 3759.2 mm SIZE: 200.0 mm X 300.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	939.8 mm	1879.6 mm	2819.4 mm	3759.2 mm
TOP REINF.	408.74 (Sq. mm)	83.45 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	327.38 (Sq. mm)
BOTTOM REINF.	0.00 (Sq. mm)	83.45 (Sq. mm)	169.77 (Sq. mm)	114.62 (Sq. mm)	0.00 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	939.8 mm	1879.6 mm	2819.4 mm	3759.2 mm
TOP REINF.	7-10i 2 layer(s)	6-10i 1 layer(s)	2-10i 1 layer(s)	2-10i 1 layer(s)	6-10i 1 layer(s)
BOTTOM REINF.	2-10i 1 layer(s)	6-10i 1 layer(s)	6-10i 1 layer(s)	6-10i 1 layer(s)	2-10i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 100 mm c/c	2 legged 8i @ 100 mm c/c	2 legged 8i @ 100 mm c/c	2 legged 8i @ 100 mm c/c	2 legged 8i @ 100 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 415.8 mm AWAY FROM START SUPPORT

VY = 45.81 MX = -0.71 LD= 11

Provide 2 Legged 8i @ 100 mm c/c

SHEAR DESIGN RESULTS AT 420.0 mm AWAY FROM END SUPPORT

VY = -40.98 MX = -0.71 LD= 11

Provide 2 Legged 8i @ 100 mm c/c

M. MUNUSAMY B.E.
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
5, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

8.4. DESIGN OF SLABS

SLAB – S1 – BLOCK A

fck		25	
fy		550	
ly/lx m	7.26	3.05	2.38
slab thickness		125	mm
Floor finish / w.c		2.00	kN/m²
Live load		2.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		7.1	
Factored Load		10.7	kN/m²

Considering Simply Supported ends

actual δ = 5/384 wl^4/EI

= 1.97 mm

Permissible δ = span / 350 = 8.71 mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.125	12.411	276.2	10	284.52	175
x	0.125	12.411	276.2	10	284.52	175
-y	0.12*b*d	-	150.0	8	335.24	230
y	0.12*b*d	-	150.0	8	335.24	230

M. MUNUSAMY B.E.,M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CBE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 83259 58847

SLAB – S1 – BLOCK B

fck		25	
fy		550	
ly/lx m	7.60	3.00	2.54
slab thickness		125	mm
Floor finish / w.c		2.00	kN/m²
Live load		2.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		7.1	
Factored Load		10.7	kN/m²

Considering Simply Suported ends

actual δ = $5/384\ wl^4/EI$

= 1.84 mm

Permissible δ = span / 350 = 8.56 mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.125	11.999	266.4	10	294.96	175
x	0.125	11.999	266.4	10	294.96	175
-y	0.12*b*d		150.0	8	335.24	230
y	0.12*b*d		150.0	8	335.24	230

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SS)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

SLAB – S1 – BLOCK C

fck		25	
fy		550	
ly/lx m	7.42	3.00	2.48
slab thickness		125	mm
Floor finish / w.c		2.00	kN/m²
Live load		2.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		7.1	
Factored Load		10.7	kN/m²

Considering Simply Suported ends

actual δ = $5/384\ wl^4/EI$

=1.84 mm

Permissible δ = span / 350 = 8.56 mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.125	11.999	266.4	10	294.96	175
x	0.125	11.999	266.4	10	294.96	175
-y	0.12*b*d	-	150.0	8	335.24	230
y	0.12*b*d	-	150.0	8	335.24	230

M. MUNUSAMY B.E., M.E.,
REGD. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

SLAB – S2 – BLOCK C

fck		25	
fy		550	
ly/lx m	4.60	4.40	1.05
slab thickness		150	mm
Floor finish / w.c		2.00	kN/m²
Live load		4.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		9.8	
Factored Load		14.6	kN/m²

Considering Simply Suported ends

actual δ = $5/384\ wl^4/EI$
=6.77 mm

Permissible δ = span / 350 = 12.57 mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.06	16.988	299.9	10	262.03	150
x	0.06	16.988	299.9	10	262.03	150
-y	0.056	15.856	278.8	8	180.38	175
y	0.056	15.856	278.8	8	180.38	175

M. MUNUSAMY B.E.
REGD. STRUCTURAL ENGINEER GRADE-I (...)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
BUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

SLAB – S1 – BLOCK D

fck		25	
fy		550	
ly/lx m	7.42	3.00	2.47
slab thickness		125	mm
Floor finish / w.c		2.00	kN/m²
Live load		2.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		7.1	
Factored Load		10.7	kN/m²

Considering Simply Suported ends

actual δ = 5/384 wl^4/EI

=1.84 mm

Permissible

δ = span / 350 = 8.56 mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.125	11.999	266.4	10	294.96	175
x	0.125	11.999	266.4	10	294.96	175
-y	0.12*b*d	-	150.0	8	335.24	230
y	0.12*b*d	-	150.0	8	335.24	230

M. MUNUSAMY B.E.,
REGN. STRUCTURAL ENGINEER GRADE-I (SE)
Reg. No.-CRE Rgn/SE/Gr-I/2019/07/005
EUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847

SLAB – S1 – BLOCK E

fck		25	
fy		550	
ly/lx m	6.88	3.00	2.30
slab thickness		125	mm
Floor finish / w.c		2.00	kN/m²
Live load		2.00	kN/m²
Filling load		0.00	kN/m²
Others		0.00	kN/m²
Total Load		7.1	
Factored Load		10.7	kN/m²

Considering Simply Suported ends

actual $\delta = 5/384\ wl^4/EI$

1.84 mm

Permissible $\delta = \frac{\text{span}}{350} = 8.56$ mm

HENCE SAFE

dir	alpha	Moment	Ast	dia	spacing reqd	spacing Provd
-x	0.125	11.999	266.4	10	294.96	175
x	0.125	11.999	266.4	10	294.96	175
-y	0.12*b*d	-	150.0	8	335.24	230
y	0.12*b*d	-	150.0	8	335.24	230

M. MUNUSAMY B.E.
REGD. STRUCTURAL ENGINEER GRADE - (SE)
Reg. No.-CRE Regn/SE/Gr-1/2019/07/005
LUOYANCY
CIVIL AND STRUCTURAL ENGINEERING
115, T.J. Complex, Ramanathapuram,
Coimbatore - 641 045 | Ph : 88259 58847



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3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996
www.verified.realestate