Verified RealEstate™

RE REGULATORY RECORD

# RERA Document

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DIGITALLY VERIFIED RECORD

**Er. S.PRAVEEN KUMAR, M.Tech., A.M.I.E.,**
REGISTERED STRUCTURAL ENGINEER, GRADE-1,
**PS STRUCTURES**
#1105-2, Vijayaragavan Nagar, Jagir Ammapalayam, Salem - 636 302,
E-mail : structuresps@gmail.com, Mobile No.: +91 96295 68810.

**Date : 18.08.2026**

## STABILITY CERTIFICATE

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

The detailed engineering and structure design of the Proposed Construction of Residential building Stilt+8 floors in Ward-AA(27), Block No.22, New T.S.No. 1, (Old S.F.No. 435/1) Plot No. 1 to 7, at Sowripalayam Village, Coimbatore Corporation South Part, Coimbatore South Taluk, Coimbatore District has been done by me/us based on the report of geotechnical investigation (soil test) done by GLOBAL SOIL TESTING AND STRUCTURAL FORUM Report No. Global/Soil/2025/577 Dated 03.06.2025 and considering the functional requirement of the building.

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

3. I/We further certify that:

(i) The minimum grade of concrete is M35

(ii) The design and analysis has been done using the code of practice for plain and reinforced concrete as per IS 456, design loads as per IS Codes No 875 (Part 1 & 2) and design of earthquake resistant structure as per IS Code No 1893(Part-1):2016

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

STRUCTURAL CONSULTANT
PS STRUCTURES
SALEM - 636 302.

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**GST IN : 33ABJFP5953F1Z3**

GOVT. OF TAMILNADU
TOWN AND COUNTRY PLANNING DEPARTMENT

# SALEM DTCP

## THE SALEM DISTRICT TOWN AND COUNTRY PLANNING

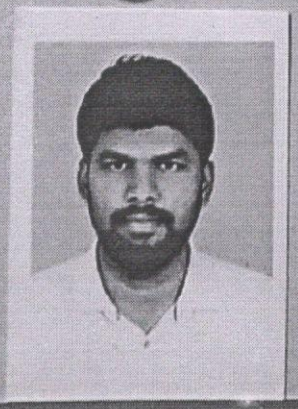
6,Sannathi St,Subramanya Nagar,Suramangalam,
Salem-636 005.
Phone: 0427-2448625.
Email: ddslmregion@gmail.com
Website: WWW.tn.gov.in/tcp

## PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that Thiru. ***S.PRAVEENKUMAR*** has enrolled as **Structural Engineer Grade-I (SE)** with Salem District Town and Country Planning **(SDTCP)** who has the qualification of ***M.TECH.STRUCTURAL ENGINEERING.,*** and experience in the relevant field for ***06*** years.

He has been given the Registration No: ***03/2022 SE-GR-I*** on ***29-11-2022.***He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(MS) No. 18, MAWS (MA1) Dept., Dated:04.02.2019.

This Registration is valid upto ***28-11-2027.***



Er. S. PRAVEEN KUMAR, B.E.,M.Tech.,
Chartered Engineer ( AM183598-2)
SDTCP / SE / Gr-1 / 03 / 2022
No: 1, Jawahar Nagar, S.A.H.S. Post
Coimbatore - 641 043.

30.11.22

ASSISTANT DIRECTOR,
SALEM DISTRICT TOWN AND COUNTRY PLANNING,
SALEM.

30/11/22

30/11/2022

SALEM DTCP

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**Date : 18.08.2026**

# HAVEN - RESIDENTIAL APARTMENT
# DESIGN CALCULATION REPORT

## 1.1 Introduction

The Proposed Construction of Residential building Stilt+8 floors in Ward-AA(27), Block No.22, New T.S.No. 1, (Old S.F.No. 435/1) Plot No. 1 to 7, at Sowripalayam Village, Coimbatore Corporation South Part, Coimbatore South Taluk, Coimbatore District. This report presents material properties, loads and load combinations, static & Dynamic analysis.

## 1.2 Building Description

The structure consists of Stilt + Eight Floors and has Irregular plan dimensions of approximately 87.64m x 26.15m on ground level.

The height of the building above ground level is 29.70m excluding lift & staircase, Head Room & Machine Room.

. The structure comprises of RC wall, column, beam & slabs. Lateral stability of the structure is mainly provided by Reinforced Concrete walls & columns.

Safe bearing capacity of the soil is taken as 27.0 t/m2 at 4.2m from existing ground level per Geo-technical Investigation report.

## 1.3 Grade of Concrete

| | | |
|---|---|---|
| Footing | : | M35 |
| Column | : | M35 |
| Wall | : | M35 |
| Beam | : | M35 |
| Slab | : | M35 |
| All other Structural components | : | M35 |

## 1.4 Codes Followed

Following codes are used for designing and detailing of members.

IS 875-1987 (Part 1) Dead loads

IS 875-1987 (Part 2) Live loads

IS 875-2015 (Part 3) Wind loads

IS 875-1987 (Part 5) Special Loads and combinations

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**Date : 18.08.2026**

IS 1893-2016 (Part 1) Earthquake loads

IS 13920-2016 - Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces

### 1.4 Wall Load :

230mm thick RC wall load calculation = 0.23x8x3.0= 5.5 kN/m

115mm thick RC wall load calculation (Partition Wall) = 0.115x8x3.0= 2.76kN/m

### 1.5 Floor Finish :

| Floor | Intensity in kN/m$^2$ of plan area |
|---|---|
| Hall, Bedroom,Kitchen, Dining, Sitout, corridor, Lobby, Power rooms, Balcony | 1.0 ( 15mm Tile + 20 mm cement mortar + 12.5mm ceiling Plaster )<br>( 0.015x20+0.020x20.4+0.0125x20.4 )=1.00 (Approximately) |
| Toilet | 3.4 (300mm AAC Light weight Broken blocks with mortar at 8 kN/m$^2$ + 15mm Tile + 20 mm cement mortar +12.5mm ceiling Plaster ) |
| Solar Panel Terrace | 2.2 (75mm thick Lime & Surkhi with mortar & weathering Tile + 12.5mm ceiling Plaster + Solar Panel ) |
| Staircase, Swimming Pool, Podium | 1.5 ( 15mm Tile + 20 mm cement mortar + 12.5mm ceiling Plaster )+0.5<br>( 0.015x20+0.020x20.4+0.0125x20.4 )+0.5 =1.50 (Approximately) |

### 1.6 Live Loads

These loads are considered for the analysis in addition to dead loads as follows,

| | | |
|---|---|---|
| Hall, Kitchen, Dining, Bedroom | = | 2.0 kN/m$^2$ |
| WC & Toilet | = | 2.0 kN/m$^2$ |
| Lobby, Corridor, Staircase | = | 3.0 kN/m$^2$ |
| Services, Sunken Seater | = | 3.0 kN/m$^2$ or as per actuals |
| Lift Machine rooms | = | 10.0 kN/m$^2$ or as per actuals |
| Live Load on Terrace | = | 1.5 kN/m$^2$ |
| Solar Panel Load on Roof | = | 0.3 kN/m$^2$ (Max. 30 kg/m$^2$) |

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## 1.7 Seismic Load Parameters

The building comes under the seismic zone III and the seismic parameters considered for analysis are as follows:

| | | |
|---|---|---|
| Height of the Building, H | = | 29.70 m |
| Seismic Zone | = | III |
| Seismic Zone Factor, Z | = | 0.16 |
| Importance Factor, I | = | 1.2 |
| Response Reduction Factor, R | = | 5 (SMRF) |

(SMRF- Special Moment Resisting Frame, Designed & detailed as per IS 456 & SP34 )

| | | |
|---|---|---|
| Percentage Damping | = | 5% |
| Soil Type | = | I (Hard) |
| Average response acc. coefft. Sa/g | = | As per IS: 1893 : 2016 |

## 1.8 Wind Load Parameters

The building located in Coimbatore region and the wind parameters are considered as per IS 875 part : 3 (2015).

| | | |
|---|---|---|
| Wind Speed | = | 39 m/s |
| Terrain Category | = | 3 |
| Importance factor | = | 1.0 |
| Risk Coefficient, K1 | = | 1.0 |
| Topography, K3 | = | 1 |

Cp values are arrived based on the codal provisions.

## 1.9 Analysis of Structure

The analysis of the structure is carried out by mathematical modelling of the structure in ETABS and performing an analysis run.

The proposed Building is modeled and analyzed using ETABS. The physical structure of a building is transformed into a mathematical model for structural analysis using 3D frame & Shell elements.

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**Date : 18.08.2026**

The entire structure is composed of an integrated three-dimensional structure of RC columns, beams and slabs, forming a building with a ductile frame system to act as one unit responding to the loading on the structure.

Staircase waist slab and terrace tank slabs are modelled with respect to architectural drawing.

## 2.1 Design of Structure

Limit State design using IS: 456-2000 is carried out for RC Footings, walls/Columns and beams using the forces obtained from the critical combination of loads from the analysis results in E-TABS software.

Components like Roof Slabs and staircases designed using simplified provisions as per applicable codes with the help of spread sheets developed in-house.

# PIERWALL DESIGN - PIERWALL (230x1220) GRID E17

## ETABS Shear Wall Design

### IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| STILT | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

STRUCTURAL CONSULTANT PS STRUCTURES SALEM - 636 302

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**Date : 18.08.2026**

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4195 | 0.015 | 0.0034 | UDConS29 | 3256 | 138.9895 | -323.8415 | 280600 |
| Bottom | 7655 | 0.0273 | 0.0034 | UDConS29 | 3300 | 140.6838 | 883.8074 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 575 | UDConS29 | 2045 | 268.0817 | 280 | 109 | 311 |
| Bottom | Leg 1 | 575 | UDConS29 | 2089 | 883.8074 | 280 | 109 | 311 |

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 345 | UDConS19 | 3340 | -283.0831 | 16.87 | 7 |
| Top–Right | Leg 1 | 345 | UDConS19 | 3256 | 268.0817 | 16.3 | 7 |
| Bottom–Left | Leg 1 | 460 | UDConS29 | 3300 | -791.6123 | 25.64 | 7 |
| Botttom–Right | Leg 1 | 460 | UDConS29 | 3384 | 826.7896 | 26.55 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 1 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 2836 | 0.0101 | 0.0034 | UDConS29 | 3112 | 78.1901 | 588.4081 | 280600 |
| Bottom | 1429 | 0.0051 | 0.0034 | UDConS29 | 3145 | 78.9394 | -316.7579 | 280600 |

STRUCTURAL CONSULTANT PS STRUCTURES SALEM - 636 302

**GST IN : 33ABJFP5953F1Z3**

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**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 575 | UDConS29 | 1966 | 588.4081 | -270 | 133 | 336 |
| Bottom | Leg 1 | 575 | UDConS29 | 1999 | 299.9163 | -270 | 125 | 328 |

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 345 | UDConS19 | 3198 | -284.7235 | 16.39 | 7 |
| Top–Right | Leg 1 | 460 | UDConS19 | 3112 | 588.4081 | 21.4 | 7 |
| Bottom–Left | Leg 1 | 345 | UDConS29 | 3145 | -316.7579 | 16.76 | 7 |
| Botttom–Right | Leg 1 | 345 | UDConS29 | 3232 | 277.8616 | 16.39 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 2 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 5157 | 0.0184 | 0.0034 | UDConS29 | 2766 | 73.7983 | -945.5024 | 280600 |
| Bottom | 7570 | 0.027 | 0.0034 | UDConS19 | 2871 | 64.1891 | 1258.1983 | 280600 |

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**Date : 18.08.2026**

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1450.76 | UDConS19 | 2836 | -877.6258 | 642 | 131 | 642 |
| Bottom | Leg 1 | 1450.76 | UDConS19 | 2871 | 1258.1983 | 642 | 131 | 642 |

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 460 | UDConS19 | 2836 | -877.6258 | 25.49 | 7 |
| Top–Right | Leg 1 | 460 | UDConS19 | 2766 | 895.5425 | 25.55 | 7 |
| Bottom–Left | Leg 1 | 460 | UDConS29 | 2800 | -1010.7369 | 27.69 | 7 |
| Botttom–Right | Leg 1 | 575 | UDConS29 | 2871 | 1258.1983 | 32.28 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 3 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4381 | 0.0156 | 0.0034 | UDConS19 | 2390 | -58.8581 | -956.6319 | 280600 |
| Bottom | 5485 | 0.0195 | 0.0034 | UDConS19 | 2425 | 59.6614 | 1093.6638 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1377.18 | UDConS19 | 2390 | -956.6319 | 616 | 131 | 616 |
| Bottom | Leg 1 | 1377.18 | UDConS19 | 2425 | 1093.6638 | 616 | 131 | 616 |

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**Date : 18.08.2026**

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 460 | UDConS19 | 2390 | -956.6319 | 25.29 | 7 |
| Top–Right | Leg 1 | 345 | UDConS19 | 2368 | 861.504 | 23.54 | 7 |
| Bottom–Left | Leg 1 | 345 | UDConS29 | 2402 | -837.3625 | 23.24 | 7 |
| Botttom–Right | Leg 1 | 460 | UDConS29 | 2425 | 1093.6638 | 27.81 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 4 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4325 | 0.0154 | 0.0034 | UDConS19 | 1979 | -49.2172 | -1008.9674 | 280600 |
| Bottom | 4712 | 0.0168 | 0.0034 | UDConS19 | 2014 | 50.0204 | 1052.0347 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1389.79 | UDConS19 | 1979 | -1008.9674 | 620 | 131 | 620 |
| Bottom | Leg 1 | 1389.79 | UDConS19 | 2014 | 1052.0347 | 620 | 131 | 620 |

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**Date : 18.08.2026**

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 345 | UDConS29 | 2009 | -920.3851 | 23.29 | 7 |
| Top–Right | Leg 1 | 345 | UDConS29 | 2009 | 854.9672 | 22.14 | 7 |
| Bottom–Left | Leg 1 | 345 | UDConS29 | 2044 | -810.4231 | 21.49 | 7 |
| Botttom–Right | Leg 1 | 460 | UDConS29 | 2014 | 1052.0347 | 25.61 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 5 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.6 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4382 | 0.0156 | 0.0034 | UDConS19 | 1569 | -39.3332 | -1044.4022 | 280600 |
| Bottom | 4084 | 0.0146 | 0.0034 | UDConS19 | 1604 | 40.1364 | 1007.1321 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1386.09 | UDConS19 | 1569 | -1044.4022 | 619 | 131 | 619 |
| Bottom | Leg 1 | 1386.09 | UDConS19 | 1604 | 1007.1321 | 619 | 131 | 619 |

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**Date : 18.08.2026**

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 345 | UDConS29 | 1653 | -910.2094 | 21.84 | 7 |
| Top–Right | Leg 1 | 345 | UDConS29 | 1653 | 836.2549 | 20.55 | 7 |
| Bottom–Left | Leg 1 | 345 | UDConS29 | 1687 | -780.1225 | 19.69 | 7 |
| Botttom–Right | Leg 1 | 345 | UDConS29 | 1687 | 876.1659 | 21.37 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 6 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.7 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4054 | 0.0144 | 0.0034 | UDConS24 | 541 | 14.4558 | 930.6103 | 280600 |
| Bottom | 3325 | 0.0119 | 0.0034 | UDConS23 | 776 | 20.2452 | 859.1918 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1207.73 | UDConS19 | 1187 | -968.0095 | 556 | 131 | 556 |
| Bottom | Leg 1 | 1207.73 | UDConS19 | 1221 | 872.0002 | 556 | 131 | 556 |

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**Date : 18.08.2026**

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 345 | UDConS29 | 1304 | -829.2254 | 19.18 | 7 |
| Top–Right | Leg 1 | 345 | UDConS29 | 1304 | 782.4764 | 18.36 | 7 |
| Bottom–Left | Leg 1 | 230 | UDConS29 | 1338 | -712.5545 | 17.26 | 7 |
| Botttom–Right | Leg 1 | 345 | UDConS29 | 1338 | 776.5964 | 18.38 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 7 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.8 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 4392 | 0.0157 | 0.0034 | UDConS23 | 513 | -13.5465 | -969.1631 | 280600 |
| Bottom | 3210 | 0.0114 | 0.0034 | UDConS31 | 332 | 16.9741 | 733.6314 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1165.77 | UDConS19 | 830 | -982.8057 | 541 | 131 | 541 |
| Bottom | Leg 1 | 1165.77 | UDConS19 | 865 | 802.9803 | 541 | 131 | 541 |

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**Date : 18.08.2026**

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 230 | UDConS29 | 956 | -861.4382 | 18.51 | 7 |
| Top–Right | Leg 1 | 230 | UDConS29 | 956 | 793.2255 | 17.31 | 7 |
| Bottom–Left | Leg 1 | 230 | UDConS29 | 991 | -676.6535 | 15.39 | 7 |
| Botttom–Right | Leg 1 | 230 | UDConS29 | 991 | 747.8759 | 16.64 | 7 |

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

**Pier Details**

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| 8 | P30 | 26900 | 11058.8 | 1220 | 230 | 0.9 |

**Design Code Parameters**

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

**Pier Leg Location, Length and Thickness**

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

**Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$**

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 2872 | 0.0102 | 0.0034 | UDConS23 | 304 | -8.1149 | -686.8621 | 280600 |
| Bottom | 2232 | 0.008 | 0.0034 | UDConS31 | 220 | 13.9845 | 538.7384 | 280600 |

**Shear Design**

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 721.97 | UDConS23 | 304 | -686.8621 | 378 | 124 | 378 |
| Bottom | Leg 1 | 760.2 | UDConS23 | 324 | 558.3373 | 378 | 110 | 378 |

**Boundary Element Check**

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 230 | UDConS29 | 610 | -608.6828 | 12.84 | 7 |
| Top–Right | Leg 1 | 230 | UDConS29 | 610 | 579.1454 | 12.33 | 7 |
| Bottom–Left | Leg 1 | 230 | UDConS29 | 645 | -510.4944 | 11.25 | 7 |
| Botttom–Right | Leg 1 | 230 | UDConS29 | 645 | 545.7994 | 11.86 | 7 |

STRUCTURAL CONSULTANT PS STRUCTURES SALEM - 636 302

**GST IN : 33ABJFP5953F1Z3**

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**Date : 18.08.2026**

# ETABS Shear Wall Design

## IS 456:2000 Pier Design

### Pier Details

| Story ID | Pier ID | Centroid X (mm) | Centroid Y (mm) | Length (mm) | Thickness (mm) | LLRF |
|---|---|---|---|---|---|---|
| TERRACE | P30 | 26900 | 11058.8 | 1220 | 230 | 1 |

### Material Properties

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

### Design Code Parameters

| $\Gamma_S$ | $\Gamma_C$ | $IP_{MAX}$ | $IP_{MIN}$ | $P_{MAX}$ | MinEcc Major | MinEcc Minor |
|---|---|---|---|---|---|---|
| 1.15 | 1.5 | 0.04 | 0.0025 | 0.8 | Yes | Yes |

### Pier Leg Location, Length and Thickness

| Station Location | ID | Left $X_1$ mm | Left $Y_1$ mm | Right $X_2$ mm | Right $Y_2$ mm | Length mm | Thickness mm |
|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |
| Bottom | Leg 1 | 26290 | 11058.8 | 27510 | 11058.8 | 1220 | 230 |

### Flexural Design for $P_u$, $M_{u2}$ and $M_{u3}$

| Station Location | Required Rebar Area (mm²) | Required Reinf Ratio | Current Reinf Ratio | Flexural Combo | $P_u$ kN | $M_{u2}$ kN-m | $M_{u3}$ kN-m | Pier $A_g$ mm² |
|---|---|---|---|---|---|---|---|---|
| Top | 5000 | 0.0178 | 0.0034 | UDConS23 | 126 | 3.5047 | -982.3177 | 280600 |
| Bottom | 3208 | 0.0114 | 0.0034 | UDConS31 | 108 | 10.7125 | 671.1873 | 280600 |

### Shear Design

| Station Location | ID | Rebar mm²/m | Shear Combo | $P_u$ kN | $M_u$ kN-m | $V_u$ kN | $V_c$ kN | $V_c + V_s$ kN |
|---|---|---|---|---|---|---|---|---|
| Top | Leg 1 | 1078.25 | UDConS19 | 215 | -997.2105 | 510 | 131 | 510 |
| Bottom | Leg 1 | 1088.73 | UDConS19 | 250 | 677.7577 | 510 | 127 | 510 |

### Boundary Element Check

| Station Location | ID | Edge Length (mm) | Governing Combo | $P_u$ kN | $M_u$ kN-m | Stress Comp MPa | Stress Limit MPa |
|---|---|---|---|---|---|---|---|
| Top–Left | Leg 1 | 230 | UDConS29 | 271 | -957.5653 | 17.75 | 7 |
| Top–Right | Leg 1 | 230 | UDConS29 | 271 | 883.1011 | 16.44 | 7 |
| Bottom–Left | Leg 1 | 230 | UDConS29 | 305 | -639.3382 | 12.29 | 7 |
| Botttom–Right | Leg 1 | 230 | UDConS29 | 305 | 679.1496 | 12.99 | 7 |

**PROVIDED :**

MAIN REINFORCEMENT : 16-Y25 (FOUNDATION TO SECOND FLOOR LEVEL)
: 16-Y20 (SECOND TO TERRACE FLOOR)

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**GST IN : 33ABJFP5953F1Z3**

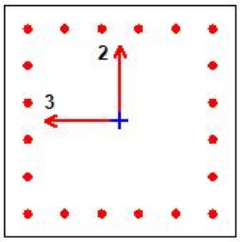
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**Date : 18.08.2026**

# COLUMN DESIGN - COLUMN C2 (600x600) GRID F2

## ETABS Concrete Frame Design

**IS 456:2000 + IS 13920:2016 Column Section Design**




**Column Element Details Type: Ductile Frame (Summary)**

| Level | Element | Unique Name | Section ID | Combo ID | Station Loc | Length (mm) | LLRF |
|---|---|---|---|---|---|---|---|
| STILT | C13 | 2263 | C600x600 | UDConS31 | 3600 | 4200 | 0.9 |

**Section Properties**

| b (mm) | h (mm) | dc (mm) | Cover (Torsion) (mm) |
|---|---|---|---|
| 600 | 600 | 60 | 30 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\gamma_c$ | $\gamma_s$ |
|---|---|
| 1.5 | 1.15 |

**Axial Force and Biaxial Moment Design For $P_u$ , $M_{u2}$ , $M_{u3}$**

| Design $P_u$ kN | Design $M_{u2}$ kN-m | Design $M_{u3}$ kN-m | Minimum $M_2$ kN-m | Minimum $M_3$ kN-m | Rebar Area mm² | Rebar % % |
|---|---|---|---|---|---|---|
| 446 | 249.6454 | 109.3 | 12.1221 | 12.1221 | 2880 | 0.8 |

**Axial Force and Biaxial Moment Factors**

| | K Factor Unitless | Length mm | Initial Moment kN-m | Additional Moment kN-m | Minimum Moment kN-m |
|---|---|---|---|---|---|
| Major Bend(M3) | 1 | 3600 | -74.359 | 0 | 12.1221 |
| Minor Bend(M2) | 1 | 3600 | -45.1192 | 0 | 12.1221 |

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**Date : 18.08.2026**

**Shear Design for $V_{u2}$ , $V_{u3}$**

| | Shear $V_u$ kN | Shear $V_c$ kN | Shear $V_s$ kN | Shear $V_p$ kN | Rebar $A_{sv}$ /s mm²/m |
|---|---|---|---|---|---|
| Major, $V_{u2}$ | 109 | 169 | 130 | 109 | 665.06 |
| Minor, $V_{u3}$ | 135 | 169 | 130 | 135 | 665.06 |

**Joint Shear Check/Design**

| | Joint Shear Force kN | Shear $V_{Top}$ kN | Shear $V_{u,Tot}$ kN | Shear $V_c$ kN | Joint Area cm² | Shear Ratio Unitless |
|---|---|---|---|---|---|---|
| Major Shear, $V_{u2}$ | 0 | 78 | 477 | 2130 | 3600 | 0.224 |
| Minor Shear, $V_{u3}$ | 0 | 96 | 571 | 2130 | 3600 | 0.268 |

**(1.4) Beam/Column Capacity Ratio**

| Major Ratio | Minor Ratio |
|---|---|
| 0.516 | 0.639 |

**Additional Moment Reduction Factor k (IS 39.7.1.1)**

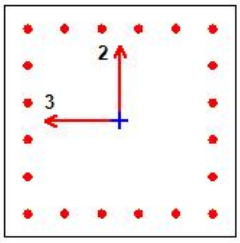
| $A_g$ cm² | $A_{sc}$ cm² | $P_{uz}$ kN | $P_b$ kN | $P_u$ kN | k Unitless |
|---|---|---|---|---|---|
| 3600 | 28.8 | 6750 | 2569 | 446 | 1 |

**Additional Moment (IS 39.7.1)**

| | Consider $M_a$ | Length Factor | Section Depth (mm) | KL/Depth Ratio | KL/Depth Limit | KL/Depth Exceeded | $M_a$ Moment (kN-m) |
|---|---|---|---|---|---|---|---|
| Major Bending ($M_3$ ) | Yes | 0.857 | 600 | 6 | 12 | No | 0 |
| Minor Bending ($M_2$ ) | Yes | 0.857 | 600 | 6 | 12 | No | 0 |

# ETABS Concrete Frame Design

**IS 456:2000 + IS 13920:2016 Column Section Design**




**Column Element Details Type: Ductile Frame (Summary)**

| Level | Element | Unique Name | Section ID | Combo ID | Station Loc | Length (mm) | LLRF |
|---|---|---|---|---|---|---|---|
| 1 | C13 | 511 | C600x600 | UDConS29 | 2600 | 3200 | 1 |

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**Date : 18.08.2026**

**Section Properties**

| b (mm) | h (mm) | dc (mm) | Cover (Torsion) (mm) |
|---|---|---|---|
| 600 | 600 | 60 | 30 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\gamma_c$ | $\gamma_s$ |
|---|---|
| 1.5 | 1.15 |

**Axial Force and Biaxial Moment Design For $P_u$ , $M_{u2}$ , $M_{u3}$**

| Design $P_u$ kN | Design $M_{u2}$ kN-m | Design $M_{u3}$ kN-m | Minimum $M_2$ kN-m | Minimum $M_3$ kN-m | Rebar Area mm² | Rebar % % |
|---|---|---|---|---|---|---|
| 503 | 498.4549 | 394.5186 | 12.6698 | 12.6698 | 6365 | 1.77 |

**Axial Force and Biaxial Moment Factors**

| | K Factor Unitless | Length mm | Initial Moment kN-m | Additional Moment kN-m | Minimum Moment kN-m |
|---|---|---|---|---|---|
| Major Bend(M3) | 1 | 2600 | 157.8074 | 0 | 12.6698 |
| Minor Bend(M2) | 0.86378 | 2600 | 116.1952 | 0 | 12.6698 |

**Shear Design for $V_{u2}$ , $V_{u3}$**

| | Shear $V_u$ kN | Shear $V_c$ kN | Shear $V_s$ kN | Shear $V_p$ kN | Rebar $A_{sv}$ /s mm²/m |
|---|---|---|---|---|---|
| Major, $V_{u2}$ | 304 | 241 | 130 | 304 | 665.06 |
| Minor, $V_{u3}$ | 312 | 241 | 130 | 312 | 665.06 |

**Joint Shear Check/Design**

| | Joint Shear Force kN | Shear $V_{Top}$ kN | Shear $V_{u,Tot}$ kN | Shear $V_c$ kN | Joint Area cm² | Shear Ratio Unitless |
|---|---|---|---|---|---|---|
| Major Shear, $V_{u2}$ | 0 | 0 | 651 | 1881 | 3180 | 0.346 |
| Minor Shear, $V_{u3}$ | 0 | 0 | 655 | 2556 | 3600 | 0.256 |

**(1.4) Beam/Column Capacity Ratio**

| Major Ratio | Minor Ratio |
|---|---|
| 0.676 | 0.692 |

**Additional Moment Reduction Factor k (IS 39.7.1.1)**

| $A_g$ cm² | $A_{sc}$ cm² | $P_{uz}$ kN | $P_b$ kN | $P_u$ kN | k Unitless |
|---|---|---|---|---|---|
| 3600 | 63.7 | 8057 | 2727 | 503 | 1 |

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**Additional Moment (IS 39.7.1)**

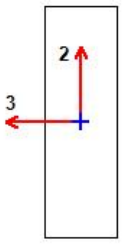
| | Consider $M_a$ | Length Factor | Section Depth (mm) | KL/Depth Ratio | KL/Depth Limit | KL/Depth Exceeded | $M_a$ Moment (kN-m) |
|---|---|---|---|---|---|---|---|
| Major Bending ($M_3$ ) | Yes | 0.813 | 600 | 4.333 | 12 | No | 0 |
| Minor Bending ($M_2$ ) | Yes | 0.813 | 600 | 3.743 | 12 | No | 0 |

**PROVIDED :**
MAIN REINFORCEMENT : 16-Y25 (FOUNDATION TO FIRST FLOOR LEVEL)

# BEAM DESIGN - BEAM B7 (230x750) GRID B17-E17

## ETABS Concrete Frame Design

**IS 456:2000 + IS 13920:2016 Beam Section Design**




**Beam Element Details Type: Ductile Frame (Summary)**

| Level | Element | Unique Name | Section ID | Combo ID | Station Loc | Length (mm) | LLRF |
|---|---|---|---|---|---|---|---|
| 2 | B126 | 1383 | B230x750 | UDConS21 | 4950 | 4950 | 1 |

**Section Properties**

| b (mm) | h (mm) | $b_f$ (mm) | $d_s$ (mm) | $d_{ct}$ (mm) | $d_{cb}$ (mm) |
|---|---|---|---|---|---|
| 230 | 750 | 230 | 0 | 40 | 40 |

**Material Properties**

| $E_c$ (MPa) | $f_{ck}$ (MPa) | Lt.Wt Factor (Unitless) | $f_y$ (MPa) | $f_{ys}$ (MPa) |
|---|---|---|---|---|
| 29580.4 | 35 | 1 | 500 | 500 |

**Design Code Parameters**

| $\gamma_c$ | $\gamma_s$ |
|---|---|
| 1.5 | 1.15 |

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**Date : 18.08.2026**

**Factored Forces and Moments**

| Factored $M_{u3}$ kN-m | Factored $T_u$ kN-m | Factored $V_{u2}$ kN | Factored $P_u$ kN |
|---|---|---|---|
| -356.5829 | 5.0765 | 269 | 0 |

**Design Moments, $M_{u3}$ & $M_t$**

| Factored Moment kN-m | Factored $M_t$ kN-m | Positive Moment kN-m | Negative Moment kN-m |
|---|---|---|---|
| -356.5829 | 12.7237 | 0 | -369.3066 |

**Design Moment and Flexural Reinforcement for Moment, $M_{u3}$ & $T_u$**

| | Design -Moment kN-m | Design +Moment kN-m | -Moment Rebar mm² | +Moment Rebar mm² | Minimum Rebar mm² | Required Rebar mm² |
|---|---|---|---|---|---|---|
| Top (+2 Axis) | -369.3066 | | 1361 | 0 | 1361 | 464 |
| Bottom (-2 Axis) | | 0 | 680 | 0 | 0 | 680 |

**Shear Force and Reinforcement for Shear, $V_{u2}$ & $T_u$**

| Shear $V_e$ kN | Shear $V_c$ kN | Shear $V_s$ kN | Shear $V_p$ kN | Rebar $A_{sv}$ /s mm²/m |
|---|---|---|---|---|
| 392 | 0 | 427 | 149 | 1666.15 |

**Torsion Force and Torsion Reinforcement for Torsion, $T_u$ & $V_{U2}$**

| $T_u$ kN-m | $V_u$ kN | Core $b_1$ mm | Core $d_1$ mm | Rebar $A_{svt}$ /s mm²/m |
|---|---|---|---|---|
| 5.0765 | 269 | 170 | 690 | 795.21 |

**PROVIDED**

| | LEFT SUPPORT | MIDDLE | RIGHT SUPPORT |
|---|---|---|---|
| TOP REINFORCEMENT | 2-Y20+3-Y20 | 2-Y20 | 2-Y20+3-Y20 |
| BOTTOM REINFORCEMENT | 2-Y20 | 2-Y20+2-Y20 | 2-Y20 |
| SHEAR REINFORCEMENT | 2L-Y8@100c/c | 2L-Y8@150c/c | 2L-Y8@100c/c |

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**Date : 18.08.2026**

# SLAB DESIGN

## Design of Slab S3 (FIRST FLOOR)

### Size of the slab

| | | |
|---|---|---|
| Breadth of the slab | = | 4.88 m |
| Length of the slab | = | 4.88 m |
| Assumed thickness of the slab | = | 150 mm |
| Grade of Concrete | = | 35 N/sq.mm |
| Grade of Steel | = | 550 N/sq.mm |
| Slab Condition discontinuous | = | One short edges |

### Load Considerations

| | | |
|---|---|---|
| Self Weight of the slab | = | 4.75 kN/sq.mm |
| Floor finish loads on slab | = | 1.0 kN/sq.mm |
| Live Load on slab | = | 2.00 kN/sq.mm |
| Factored Load on slab | = | 10.125 kN/sq.mm |

### Coefficients

***Shorter Direction***

| | | |
|---|---|---|
| (-)ve Moment coeff at Continuous Edge | = | 0.039 |
| (+)ve Moment coeff at Midspan | = | 0.029 |
| (-)ve Moment at Dis-Continuous Edge | = | 0.042 |

***Longer Direction***

| | | |
|---|---|---|
| (-)ve Moment coeff at Continuous Edge | = | 0.037 |
| (+)ve Moment at Midspan | = | 0.028 |
| (-)ve Moment at Dis-Continuous Edge | = | 0.042 |

### Bending Moment

***Shorter Direction***

| | | |
|---|---|---|
| (-)ve Moment at continuous Edge | = | 9.4 kNm |
| (+)ve Moment at Midspan | = | 7.0 kNm |
| (-)ve Moment at Dis-continuous Edge | = | 10.0 kNm |

***Longer Direction***

| | | |
|---|---|---|
| (-)ve Moment at continuous Edge | = | 8.8 kNm |
| (+)ve Moment at Midspan | = | 6.6 kNm |
| (-)ve Moment at Dis-continuous Edge | = | 10.0 kNm |

### Reinforcement Required

*Shorter Direction & Longer Direction*

| | | |
|---|---|---|
| (-)ve Moment at Continuous Edge | = | 8Y @ 300mm c/c/ 8Y @ 300mm c/c |
| (+)ve Moment at Mid span | = | 8Y @ 300mm c/c /8Y @ 300mm c/c |
| (-)ve Moment at Dis-Continuous Edge | = | 8Y @ 300mm c/c/ 8Y @ 300mm c/c |

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**Reinforcement Provided**
*Shorter Direction*

| | | |
|---|---|---|
| (-)ve Moment at Continuous Edge | = | 8Y @ 150mm c/c |
| (+)ve Moment at Mid span | = | 8Y @ 150mm c/c |
| (-)ve Moment at Dis-Continuous Edge | = | 8Y @ 150mm c/c |

**Reinforcement Provided**
*Longer Direction*

| | | |
|---|---|---|
| (-)ve Moment at Continuous Edge | = | 8Y @ 150mm c/c |
| (+)ve Moment at Mid span | = | 8Y @ 150mm c/c |
| (-)ve Moment at Dis-Continuous Edge | = | 8Y @ 150mm c/c |

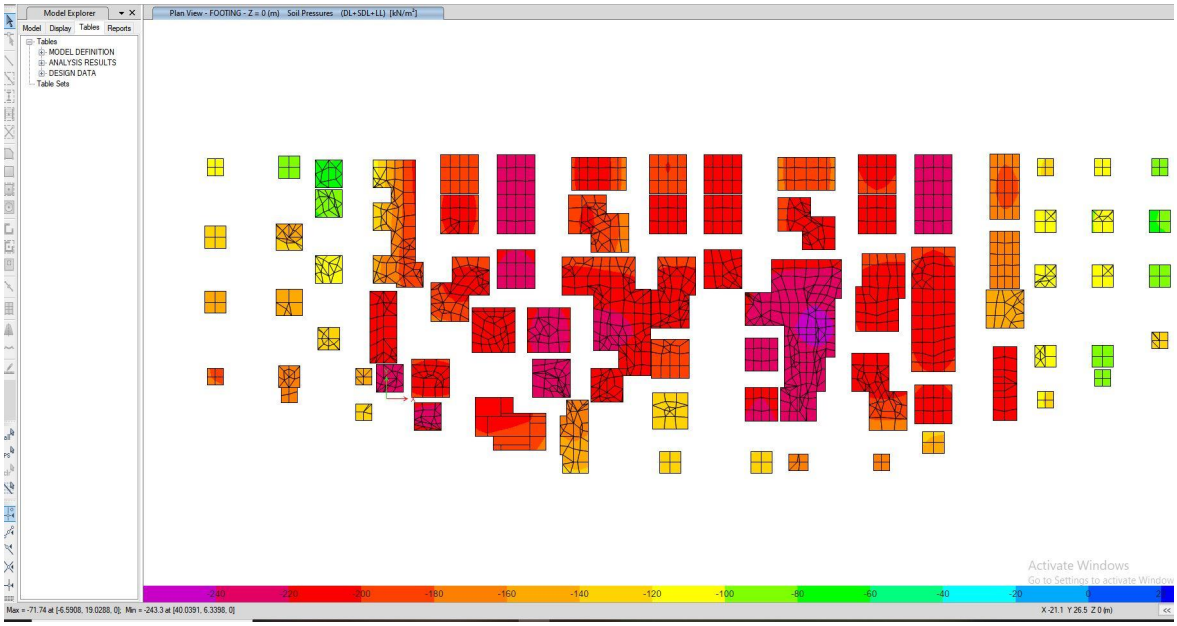
**Check for Under reinforced section**

| | | |
|---|---|---|
| Limiting Moment of Resistance Mu lim | = | $0.133fckbd^2$ |
| | = | 78.7 kNm > 10.0kNm |
| | | (Under reinforced section) |
| Depth required for Flexure | = | 45.6 mm < 130 mm |
| | | (Depth is sufficient) |

**Check for Deflection**

| | | |
|---|---|---|
| Diameter of the reinforcement used | = | Y8 mm |
| Percentage of steel | = | 0.26% |
| MF due to effect of tension steel | = | 2.45 |
| Depth required for deflection | = | 77 mm < 130 mm |
| | | (Slab safe for deflection) |

# FOOTING DESIGN




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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.
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# 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**
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**The LandLens suite**
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Verified RealEstate™

# 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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