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RE REGULATORY RECORD

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DIGITALLY VERIFIED RECORD

**CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY**
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## PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the Thiru / Tmt. / Ms. **M.SHANKAR** has enrolled as **Registered Structural Engineer Grade-I(SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.E Structures** and experience in the relevant field for 7 years.

He/She has been given the Registration No. **SE/2024/A/0037** on **15-Apr-2024** He/She 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.19 MAWS (M1) Dept. Dated: 04.02.2019.

This Registration is valid upto **11-Apr-2029**.

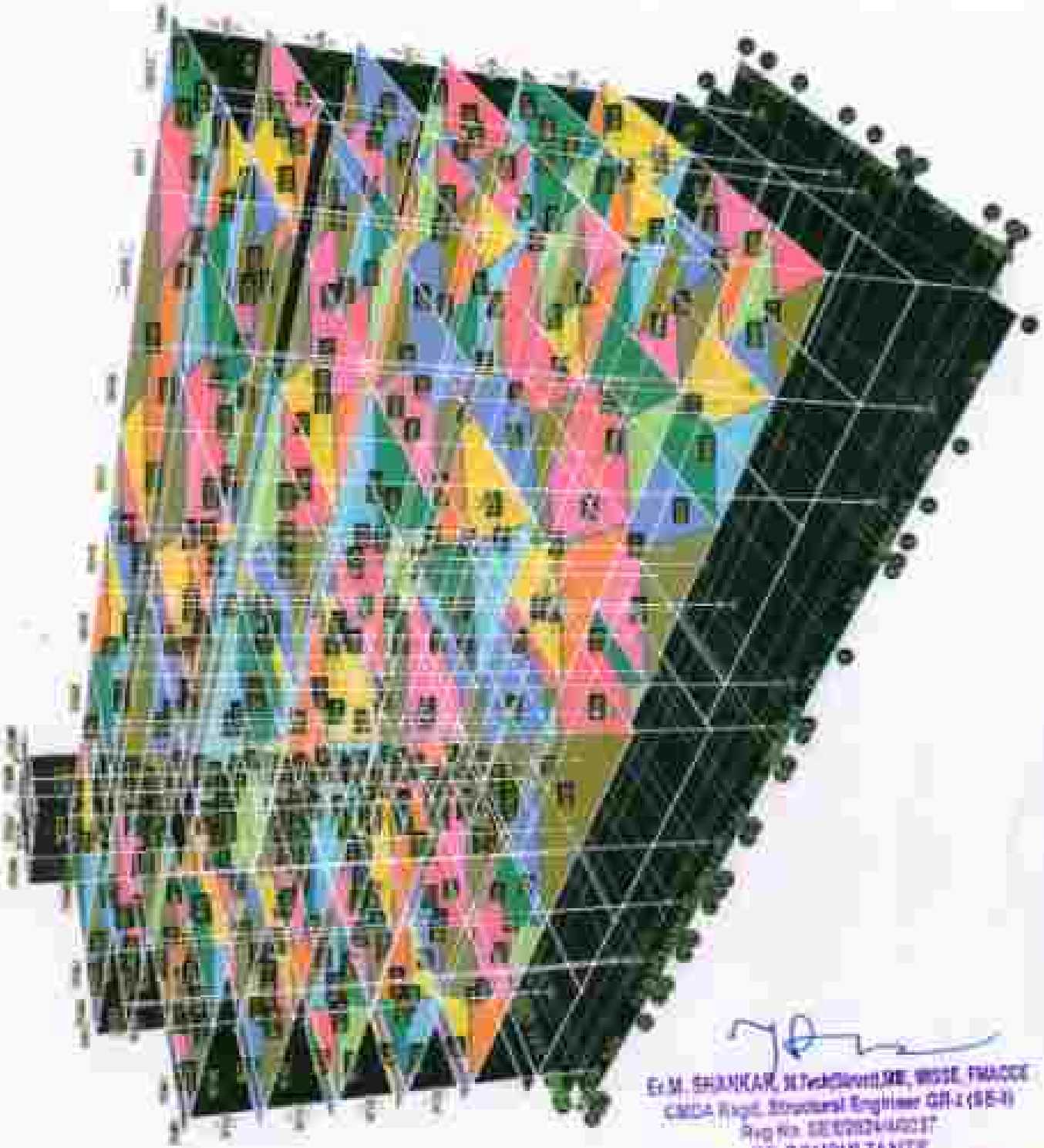
Signature valid
Name: A. Nagarathinam
Designation: Superintendent
Date: 15/04/2024 3:58:03 PM



A. Nagarathinam

Superintendent

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.16/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

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## Design Data Report :

### Footing Data:

**Soil Parameters :**

| | |
|---|---|
| SBC of soil | =320.00 kN/m² |
| SBC Increment Factor for Seismic Load | = 1.500 |
| SBC Increment Factor for Wind Load | = 1.500 |
| Angle of friction,(phi) | = 30.00 degrees |
| Cohesion | = 60.00 |
| Permissible factor of safty | = 1.400 |
| Depth From Ground | = 2000 mm |

**Material Properties :**

| | |
|---|---|
| fck | = 30.00 N/mm² |
| fy | = 500.00 N/mm² |

**Footing Parameters :**

| | |
|---|---|
| Minimum steel Percentage | = 0.12 |
| Minimum spacing between bars | = 100 mm |
| Maximum spacing between bars | = 200 mm |
| Diameters of selected bars | = 10 mm , 12 mm , |
| Bottom Cover | = 50 mm |
| End Cover | =50 mm |
| Minimum Footing Depth | = 150 mm |
| Top Offset | = 50 mm |
| Bottom PCCOffset | = 150 mm |
| Bottom PCC Depth | = 150 mm |
| Pedestal Offset | = 150 mm |
| Pedestal Depth | = 150 mm |
| Size RoundingFactor | = 25 mm |
| Depth RoundingFactor | = 25 mm |
| Number of Steps | = 1 |
| Minimum Step Depth | = 150 mm |

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## Column Data:

**Material Properties :**

| | |
|---|---|
| fck | = 25.00 N/mm$^2$ |
| fy | = 500.00 N/mm$^2$ |
| fy - Stirrups | = 500.00 N/mm$^2$ |

**Column Parameters :**

| | |
|---|---|
| Effective Length Factor (X - Axis) | = 1.00 |
| Effective Length Factor (Y - Axis) | = 1.00 |
| Minimum Eccentricity @ X-Axis | = 20 mm |
| Minimum Eccentricity @ Y-Axis | = 20 mm |
| Clear Cover | = 40 mm |

**Design Considerations :**

Design is done as per IS 456.

Detailing is done as per IS 13920.

Confinement reinforcement is provided.

Live Load reduction is considered.

Minimum steel percentage is based on provided section.

**Reinforcement Details :**

| | |
|---|---|
| Steel Ratio(AstX/AstY) | = 1.00 |
| ReinForcement Placing (on two sides or on four sides) | = 2 |
| Minimum steel Percentage | = 0.80 |
| Maximum steel Percentage | = 4.00 |
| Minimum spacing between main bars | = 25 mm |
| Maximum spacing between main bars | = 300 mm |
| Minimum spacing between Stirrups | = 150 mm |
| Diameters of selected bars | = 12 mm , 16 mm , 20 mm , 25 mm , 32 mm , |

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**Slab Data:** Use Bent-up bars for steel detailing.

**Material Properties :**

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| | |
|---|---|
| RCC Grade | = M20 |
| Main Steel Grade | = Fe550 |
| Distribution Steel Grade | = Fe550 |

**Slab Parameters :**

| | |
|---|---|
| Effective Cover | = 25 mm |
| Minimum spacing between Main bars | = 75 mm |
| Maximum spacing between Main bars | = 300 mm |
| Minimum spacing between Dist.bars | = 75 mm |
| Maximum spacing between Dist.bars | = 300 mm |
| Maximum Main/Dist. bar Diameter | = 32 mm |
| Minimum Main bar Diameter | = 8 mm |
| Minimum Dist.bar Diameter | = 8 mm |
| Maximum Dimension to be used for Trapizoidal Slab | = Average of two parellel sides |
| Maximum Dimension to be used for General Slab | = Maximum of two parellel sides |

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## Beam Data:

**Shear Design Data :**

| | |
|---|---|
| Minimum Stirrup Dia | = 8 mm |
| Stirrup Legs | = 2 |
| Minimum Stirrups Spacing | = 100 mm |
| Stirrups Steel Grade Name | = Fe500 |

Effect of Concrete in shear considered

**Beam Covers :**

| | |
|---|---|
| Tension Cover | = 33 mm |
| Compression Cover | = 33 mm |
| Side Cover | = 25 mm |

Beam sections are designed as Doubly Reinforced Section

Main Bars Detailing Straight + Curtailed

Detailing provision As per IS 13920 is followed

End Moments are calculated at c/c distance of the beam span for design

Torsion Moments are considered in beam design

Anchor bar Dia = 8 mm

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| | |
|---|---|
| Main Steel Grade | = Fe500 |
| No. of division of the beam | = 10 |
| Max. Aggregate size | = 20 |

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**Annexure – XIV**

[See rule 53 (3)]

**Form 1**

**Structural Design Basis Report**

(1) This report to accompany the application for Building Development

| Part1 | General Data | | |
|---|---|---|---|
| S.No. | Description | Information | Notes |
| 1. | Site Address | | |
| 2 | Name of Owner | | |
| 3 | Name of Registered Developer along with the Registration Number | | |
| 4 | Name of Registered Architect/Engineer along with the Registration Number | | |
| 5 | Name of Registered Structural engineer along with the Registration Number | **SE/-I2024/4/0037** | |
| 6 | Use of the building | **RESIDENTIAL** | |
| 7 | Number of stories above ground level (including storeys to be added later, if any) | **STILT+4 FLOORS+5TH FLOOR (PART)** | |
| 8 | Number of basements below ground level | **NIL** | |
| 9 | Type of structure<br>Load bearing walls<br>R.C.C. frame<br>R.C.C. frame and Shear Walls<br>Steel frame | **RC FRAME** | |
| 10 | Soil data<br>Type of soil<br>Design safe bearing capacity | **INDIVIDUAL ISOLATED FOOTING WITH SBC.** | IS:1893 Cl:6.3.5.3<br>IS: 1904<br>IS: 1892<br>IS: 2131<br>IS: 2720 |

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| | | | |
|---|---|---|---|
| | | **320KN/SQ.M** | |
| 11 | Dead loads (unit weight adopted)<br>• Earth: **18KN/CUM**<br>• Water: **10KN/CUM**<br>• Brick masonry: **19.2KN/CUM**<br>• Plain cement concrete **24KN/CUM**<br>• Reinforced cement concrete **25 KN/CUM**<br>• Floor finish **50KG/SQM**<br>• Other fill materials | | IS: 875 Part 1 |
| 12 | Imposed (live) loads<br>Floor loads<br>Roof loads | **4KN/SQM**<br>**1.5KN/SQM** | IS: 875 Part 2 |

| | | | |
|---|---|---|---|
| 13 | Cyclone/Wind<br>• Speed<br>• Design pressure intensity | **N/A** | IS: 875 Part 3 |
| 14 | Seismic zone | **III** | IS: 1893 (2002) |
| 15 | Importance factor | **1** | IS:1893(2002) Table 6 |
| 16 | Seismic zone factor (Z) | **0.16** | IS:1893 Table 2 |
| 17 | Response reduction factor | | IS:1893 Table 7 |
| 18 | Fundamental natural period – approx. | **0.255EC** | IS: 1893 Cl.7.6 |
| 19 | Design horizontal acceleration spectrum value (Sa) | | IS: 1893 Cl.6.4.2 |
| 20 | • Expansion/Separation Joints | **N/A** | |
| 21 | Building is regular/irregular | **REGULAR** | IS 1893 |

• Enclose detailed drawings drawn to scale for each floor
• In case terrace garden is provided, indicate additional fill load and live load along with the detailed drawings drawn to scale

| **Part 2** | **Load bearing masonry buildings** | | |
|---|---|---|---|
| **Sl.No.** | **Description** | **Information** | **Notes** |

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| | | | |
|---|---|---|---|
| 1 | Building category | **N/A** | IS: 4326 C1.7<br>Read with IS:1893<br>Zone: II III IV V<br>Bldg.<br>Ordinary: B C D E<br>Important: C D E E |
| 2 | Basement Provided | **N/A** | |
| 3 | Number of floors including Ground Floor (all floors including stepped floors in hill slopes) | **N/A** | |
| 4 | Type of wall masonry | **N/A** | |
| 5 | Type and mix of Mortar | **N/A** | IS: 4326 C1.8.1.2 |
| 6 | Re: size and position of openings (See note No.(i))<br>• Minimum distance (b3)<br>• Ratio $(b_1+b_2+b_3)/l_1$ or: $(b_4+b_5)/l_2$<br>• Minimum pier width between consequent opening ($b_4$)<br>• Vertical distance ($b_5$)<br>• Ratio of wall height to thickness 4<br>Ratio of wall length between cross wall to thickness | **N/A** | IS: 4326 Table 4, Fig 7 |
| 7 | Horizontal seismic band<br>• at plinth level **N/A**<br>• at window sill level **N/A**<br>• at lintel level **N/A**<br>• at ceiling level **N/A** | P IP NA<br>) \| )<br>) \| )<br>) \| )<br>) ) \| | (see note No.2)<br>(i)4326 C1 8.4.6<br>IS: 4326 C1 8.3<br>IS: 4326 C1 8.4.2<br>IS: 4326 C1 8.4.3<br>IS: 4326 C1 8.4.3 |
| | • at eave level of sloping roof **N/A**<br>• at top of gable walls **N/A**<br>• at top of ridge walls **N/A** | ) ) )<br>\| ) )<br>) \| \| | IS: 4326 C1 8.4.3<br>IS: 4326 C1 8.4.4 |

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| | | | | |
|---|---|---|---|---|
| 8 | Vertical reinforcing bar **N/A** at corners and T junctions of walls or jambs of doors and window openings **N/A** | ) | ) | IS: 4326 C1 8.4.8, IS: 4326 C1 8.4.9 |
| 9 | Integration of prefab roofing/flooring elements through reinforced concrete screed **N/A** | ) | ) | IS-4326 C1 9.1.4 |
| 10 | Horizontal bracings in pitched truss in horizontal plane at the level of ties in the slopes of pitched roofs **N/A** | ) | ) | |

Notes: (i) Information in item 6 should be given on separate A4 sheets for all walls with large number of openings

(ii) IP indicated "Information Provided"

IP indicates "Information to be provided" NA indicates "Not Applicable"

Tick mark one box

| Part 3 | Reinforced concrete framed buildings | | |
|---|---|---|---|
| Sl. No. | Description | Information | Notes |
| 1 | Type of building<br>• Regular frames<br>• Regular frames with Shear Walls<br>• Irregular frames<br>• Irregular frames with Shear Walls<br>• Soft storey | **REGULAR FRAMES** | IS: 1893 C1 7.1 |
| 2 | Number of basements | **NIL** | |
| 3 | Number of floors including ground floor | **S+4&5 TH FLOOR (PART)** | |

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| | | | |
|---|---|---|---|
| 4 | Horizontal floor system<br>• Beams and slabs<br>• Waffles<br>• Ribbed floor<br>• Flat slab with drops<br>• Flat plate without drops | **BEAM AND SLAB** | |
| | | | |
| 5 | Soil data<br>• Type of soil<br>• Recommended type of foundation<br>-Independent footings<br>-Raft<br>-Piles<br>• Recommended bearing capacity of soil | **MEDIUM SOIL WITH ISOLATED FOOTING** | IS: 1498 |
| | • Recommended type, length, diameter and load capacity of piles<br>• Depth of water table<br>• Chemical analysis of ground water<br>• Chemical analysis of soil | | |
| 6 | Foundations<br>Depth below ground level<br>Type<br>Independent<br>Interconnected<br>Raft<br>Piles | **INDIVIDUAL ISOLATED FOOTING** | |
| 7 | System of interconnecting foundations<br>Plinth beams<br>Foundation beams | **PLINTH BEAM** | IS: 1893 Cl.7.12.1 |
| 8 | Grades of concrete used in different parts of building | **M25 FOR** | |

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| | | | |
|---|---|---|---|
| | | **COLUMNS& M30 FOR REST** | |
| 9 | Method of analysis used | **FEM** | |
| 10 | Computer software used | **SCADDS NUCLEUS 2022 VERSION** | |
| 11 | Torsion included | **INCLUDED** | IS: 1893 Cl 7.9 |
| 12 | Base shear:<br>a. Based on approximate fundamental period<br>b. Based on dynamic analysis<br>c. Ratio of a/b | **BASED ON APPROXIMATE FUNDAMENTAL PERIOD** | IS: 1893 CL 7.5.3 |
| 13 | Distribution of seismic forces along the height of the building. | **REFER SEISMIC JUSTIFICATION** | IS: 1893 Cl.7.7 (Provide sketch) |
| 14 | The Column of soft ground stores specially designed. | **YES** | IS: 1893 Cl.7.10 |
| 15 | Clear minimum cover provided to<br>• **Footing 50MM**<br>• **Column 40MM**<br>• **Beams 25MM**<br>• **Slabs 20MM**<br>• **Walls** | | IS: 456 Cl. 26.4 |

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| | | | |
|---|---|---|---|
| 16 | Ductile detailing of RC frame<br>• Type of reinforcement used **Fe 500D**<br>• Minimum dimension of beams **230MM**<br>• Minimum dimension of columns **230MM**<br>• Minimum percentage of reinforcement of beams at any cross section **0.20%**<br>• Maximum percentage of reinforcement at any section of beam **4%**<br>• Spacing of transverse reinforcement in 2-d length of beams near the ends **100MM**<br>• Ratio of capacity of beams in shear to capacity of beams in flexure **<1**<br>• Maximum percentage of reinforcement in column **4%** | | IS: 456 Cl. 5.6<br>IS: 13920 Cl.6.1<br>IS: 13920 Cl.7.1.2<br>IS: 456 Cl.26.5.1(a)<br>IS: 13920 Cl.6.2.1<br>IS: 456 Cl.26.5.1.(b)<br>IS: 13920 Cl.6.2.2<br>IS: 13920 Cl.6.3.5<br>IS: 456 Cl.26.5.3.1<br>IS: 13920 Cl. 7.4 |
| | • Confining stirrups near ends of columns and in beam-column joints<br>Diameter<br>**8mm**<br>Spacing<br>**100MM**<br>• Ratio of shear capacity of columns to maximum seismic shear in the stores **<1** | | |
| 17 | Does the features require clearance by SEIAA<br>Example: High rise building<br>Prefab building<br>Building in hazard prone areas | **N/A** | |

**Foundation**

i. In case raft foundation has been adopted, indicate K value used for analysis of the raft.

ii. Incase pile foundations have been used, give full particulars of the piles, type, dia, length, capacity

iii. In case of high water table, indicate system of counteracting water

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pressure, and indicate the existing water table, and that assumed in design foundations.

**Idealisation for Earthquake analysis**

i. In case of composite system of shear walls and right frames, give distribution of base shear in the two systems on the basis of analysis, and that used for design of each system

ii. Indicate the idealisation of frames and shear walls adopted in the analysis with the help of sketches.

iii. Submit framing plans of each floor

iv. In case of basements, indicate the system used to contain earth pressures.

| **Part 4** | **Buildings in structural steel** | | |
|---|---|---|---|
| 1 | Adopted method of design | a Simple<br>b Semi rigid<br>c Rigid | IS:800 Cl.3.4.4<br>IS:800 Cl.3.4.5<br>IS:800 Cl.3.5.6 |
| 2 | Design based on | a Elastic analysis<br>b Plastic analysis | IS: 800 Section 9<br>IS:6 (b) |
| 3 | Floor construction | a Composite<br>b Non composite<br>c Bonded | |
| 4 | Roof construction | a Composite<br>b Non composite<br>c Metal<br>d Any other | |
| 5 | Horizontal force resisting system adopted | Frames<br>Braced frames<br>Frames & shear walls | Note: Seismic force As per IS 1893 Would depend on system |
| 6 | Slenderness ratios maintained | Members defined in Table 3.1, IS:800 | IS 800, Cl.3.7 |
| 7 | Member deflection limited to | Beams, Rafters<br>Crane Girders, Purlins<br>Top of columns | IS:800 Cl.3.11 |
| 8 | Structural members | a Encased in concrete<br>Not encased | IS: 800 Section-10 |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 28,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| 9 | Proposed material | a. General weld-able<br>b. High strength<br>c. Cold formed<br>d. Tubular | IS: 2062<br>IS: 8500<br>IS: 801, 811<br>IS: 806 |
| 10. | Minimum metal thickness Specified for corrosion protection | a. Hot rolled sections<br>b. Cold formed sections<br>c. Tubes | IS: 800: Cl.3.8<br>Cl.3.8.1 to Cl.3.8.4<br>Cl.3.8.5 |
| 11 | Structural connections | a. Rivets<br>b. CT Bolts<br>c. S H F G Bolts<br>d. Black Bolts<br>e. Welding field<br>fship (Specify welding type proposed) Composite | IS: 800, Section-8<br>IS: 1929, 2155, 1149<br>IS 6639, 1367<br>IS 3757, 4000<br>IS: 1363, 1367<br>IS: 816, 814,1395, 7280, 3613, 6419, 6560, 813, 9595 |
| 12 | Minimum Fire rating proposed, with method | a. Rating ——— hour s<br>b. Method proposed.<br>-In tumescent painting<br>-Spraying<br>-Quilting<br>-Fire retardant boarding | IS: 1641, 1642, 1643 |

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**SCADDS/Nucleus 2022: RC-Footing Designer**
**Limit State Design of Wall Footings for**
**Axial Load & Uniaxial Bending.**
**Isolated Flat/Sloped Rectangular/Circular Footings**
**with or without Pedestals**
**for Axial Load, Uniaxial & Biaxial Bending.**
**Combined Rectangular/Trapezoidal Footings**
**with or without Pedestals**
**for Axial Load & Uniaxial Bending**
**in accordance with IS:456-2000 and IS:6403-1981**

Introduction::

This Report contains the detailed solution for the given Reinforced Concrete Footing Design problem.

The given Footing is considered for flexural design and the output contains the following portions.

1. Footing Input Data
2. Flexural Design Output for Footing
3. Flexural Design Output for Pedestal, if provided
4. One Way Shear Check Output
5. Two Way Shear Check Output
6. Development Length / Bond Design Output

While detailed design will be carried out for Flexure and Bond, only checks for stresses are made for

**Global Material Data**

| | | | |
|---|---|---|---|
| Concrete Clear Cover | = | 50 | mm. |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Strength of Main Steel | = | 500 | N/sq.mm. |
| Main Rod Size-1 | = | 10 | mm. |
| Main Rod Size-2 | | 12 | mm. |
| Yield Strength of Distribution Steel | = | 500 | N/sq.mm. |
| Distbn. Rod Size-1 | | 10 | mm. |
| Distbn. Rod Size-2 | | 12 | mm. |

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| | | | |
|---|---|---|---|
| Yield Strength of Dowel/Pedestal Steel | = | 500 | N/sq.mm. |
| Dowel/Pedestal Rod Size-1 | = | 12 | mm |
| Dowel/Pedestal Rod Size-2 | = | 16 | mm |
| Factor of Safety for Load | = | 1 | |
| Partial Safety Factor for Concrete | = | 1.5 | |
| Partial Safety Factor for Steel | = | 1.15 | |
| Max. Strain in Concrete | = | 0.0035 | mm/mm |
| Max. Strain in Steel | = | 0.0055 | mm/mm |
| Young's Modulus of Concrete | = | 25000 | N/sq.mm. |
| Young's Modulus of Steel | = | 200000 | N/sq.mm. |

**Bond / Development Length Output**

| | | | |
|---|---|---|---|
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Main Steel | = | 500 | N/sq.mm. |
| Yield Stress of Secondary Steel | = | 500 | N/sq.mm. |
| Yield Stress of Dowel/Pedestal Steel | = | 500 | N/sq.mm. |
| **As Per IS: 456-2000, Clause 26.2.1.1,** | | | |
| Design Bond Stress for Main Rods | = | 2.24 | N/sq.mm. |
| Design Bond Stress for Secondary Rods | = | 2.24 | N/sq.mm. |
| Design Bond Stress for Dowel/Pedestal Rods | = | 2.24 | N/sq.mm. |
| **Rods in Tension:-** | | | |
| Main Rod Diameter-1 | = | 10 | mm. |
| Corresponding Development Length | = | 485.491 | mm. |
| Main Rod Diameter-2 | = | 12 | mm. |
| Corresponding Development Length | = | 582.589 | mm. |
| Secondary Rod Diameter-1 | = | 10 | mm. |
| Corresponding Development Length | = | 485.491 | mm. |
| Secondary Rod Diameter-2 | = | 12 | mm. |
| Corresponding Development Length | = | 582.589 | mm. |
| **Rods in Compression:-** | | | |
| Dowel/Pedestal Rod Diameter-1 | = | 12 | mm. |
| Corresponding Development Length | = | 582.589 | mm. |
| Dowel/Pedestal Rod Diameter-2 | = | 16 | mm. |
| Corresponding Development Length | = | 776.786 | mm. |

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| F01 : Global Input Data (LC No. : 9) | | | |
|---|---|---|---|
| The footing is to be designed as an Isolated Footing | | | |
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |
| The footing is subjected to Axial Load & Biaxial | | | |
| Working Axial Load | = | 1145.476 | KN |
| Working Moment about ZZ-axis | = | 6.883 | KN m |
| Working Moment about XX-axis | = | 1.934 | KN m |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m. |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

| F01 : Flexure Output (LC No. : 9) | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 1145.476 | KN |
| Factored Axial Load on Footing | = | 1145.476 | KN |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 114.548 | KN |
| Total Factored Axial Load on Footing | = | 1260.023 | KN |
| Working Moment about ZZ-axis | = | 6.883 | KN m |
| Factored Moment about ZZ-axis | = | 6.883 | KN m |
| Working Moment about XX-axis | = | 1.934 | KN m |
| Factored Moment about XX-axis | = | 1.934 | KN m |
| Ultimate Bearing Capacity of Soil | = | 495 | KN/sq.m. |
| From Vertical Load and Bending considerations, | | | |
| Area of Footing Required | = | | sq.m. |

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Equal Projections were initially assumed from the
to arrive at the Footing Size.

| | | | |
|---|---|---|---|
| Width of Footing Required | = | 1.44 | m |
| Length of Footing Required | = | 1.81 | m |

| | | | |
|---|---|---|---|
| Width of Footing Provided | = | 1.45 | m |
| Length of Footing Provided | = | 1.825 | m |
| Actual Bearing Area Provided | = | 2.646 | sq.m |
| Max. Bearing Pressure at the Base | = | 467.73 | KN/sq.m |
| Min. Bearing Pressure at the Base | = | 464.573 | KN/sq.m |

**Bending about ZZ-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in touch

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 444.443 | KN/sq.m |
| Net Bearing Pressure at the Base - Left End | = | 427.34 | KN/sq.m |
| Net Bearing Pressure at the Column Face | = | 438.703 | KN/sq.m |
| Net Bearing Pressure - 'd' from Face | = | 442.864 | KN/sq.m |

**As Per IS:456-2000, Clause**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 612.5 | mm |
| Design Bending Moment | = | 120.383 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 500 | mm |
| Modified Depth of Footing at the End | = | 350 | mm |
| Effective Depth Required | = | 286.041 | mm |
| Effective Depth Provided | = | 444 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.099 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided

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| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 772.56 | sq.mm |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 147.41 | mm |
| Max. Spacing allowed (Rounded off) | = | 100 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 212.27 | mm |
| Max. Spacing allowed (Rounded off) | = | 200 | mm |

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 444.443 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 438.395 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 441.899 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 443.75 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 610 | mm |
| Design Bending Moment | = | 150.619 | KN.m. |
| Modified Depth of Footing at the Face of Wall | = | 500 | mm |
| Modified Depth of Footing at the End | = | 350 | mm |
| Effective Depth Required | = | 235.996 | mm |
| Effective Depth Provided | = | 432 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.104 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | | |

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| | | | |
|---|---|---|---|
| Area of Steel Provided | = | 946.08 | sq mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 151.504 | mm |
| Max. Spacing allowed (Rounded off) | = | 150 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 218.166 | mm |
| Max. Spacing allowed (Rounded off) | = | 200 | mm |

*Note (1) - The required Spacing of Main Rods will 300 mm. or 3d (300 mm. or 5d for Dist. Rods) If the required spacing exceeds this limit, the least*

*will be automatically provided. This is done in IS 456-2000 Clause 26.3.3*

*Note (2) - The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**F01 : Dowel Bars Output (LC No. : 9)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 1145.476 | KN |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm. |
| Depth of Column Section | = | 600 | mm. |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.45 | m. |
| Length of Footing | = | 1.825 | m. |
| Area of Footing | = | | |

**As Per IS:456-2000, Clause 34.4,**


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| | | | |
|---|---|---|---|
| Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 8.301 | N/sq.mm. |

**As Per IS:456-2000, Clause 34.4.2,**
Reinforcement is NOT required. However,

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 880 | sq.mm. |
| Dowel Rod Size-1 | = | 12 | mm |
| No. of Rods to be Provided | = | 6 | Nos. |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 16 | mm |
| No. of Rods to be Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |

*Note :- Calculation for Dowel Rods is only*
*However, Dowel Rods may not be required in all*

**F01 : One Way Shear Output (LC No. : 9)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance
the Effective Depth of the Footing, from the Face

| | | | |
|---|---|---|---|
| Design Shear Force about Length | = | 108.396 | KN. |
| Modified Depth of Footing at the Face of Wall | = | 500 | mm. |
| Modified Depth of Footing at the End | = | 350 | mm. |
| Depth of Footing at Critical Section | = | 335.265 | mm |
| Projection of Footing from Critical Section | = | 168.5 | mm. |

**As Per IS:456-2000, Clause 40.1,**

| | | | |
|---|---|---|---|
| Actual Shear Stress | = | 0.223 | N/sq.mm. |

**As Per IS:456-2000, Table 19,**

| | | | |
|---|---|---|---|
| Design Shear Strength of Concrete | = | 0.251 | N/sq.mm. |

**As Per IS:456-2000, Table 20,**

| | | | |
|---|---|---|---|
| Max. Permissible Shear Stress | = | 2.124 | N/sq.mm. |

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**The section is SAFE in Shear, about ZZ-axis.**

| | | | |
|---|---|---|---|
| Design Shear Force about Width | = | 134.539 | KN |
| Depth of Footing at Critical Section | = | 322.82 | mm |
| Projection of Footing from Critical Section | = | 166 | mm |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.228 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.264 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |

**The section is SAFE in Shear, about XX-axis.**

**Fdt : Punching Shear Output (LC No. : 9)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from

the Column.

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 1.032 | m. |
| Width of Footing at Critical Section | = | 0.662 | m. |
| Ratio of Width to Length at Critical Section | = | 0.641 | |
| Modified Depth of Footing at the Face of Wall | = | 500 | mm |
| Modified Depth of Footing at the End | = | 350 | mm |
| Depth of Footing at Critical Section | = | 383.633 | mm |
| Design Shear Force | = | 640.886 | KN. |
| **As Per IS:456-2000, Clause 31.6.2.1,** Actual Shear Stress | = | 0.647 | N/sq.mm. |
| **As Per IS:456-2000, Clause 31.6.3.1,** Coefficient, ks | = | 1 | |
| Max. Permissible Shear Stress | = | | |

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The section is SAFE in Shear.

**F01 : Global Input Data (LC No. : 10)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm. |
| Length of Column | = | 600 | mm. |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm. |
| Initial Depth at the End | = | 150 | mm. |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 742.869 | KN. |
| Working Moment about ZZ-axis | = | 0.884 | KN m. |
| Working Moment about XX-axis | = | 50.357 | KN m. |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m. |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 10)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 742.869 | KN. |
| Factored Axial Load on Footing | = | 742.869 | KN. |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 74.287 | KN. |
| Total Factored Axial Load on Footing | = | 816.935 | KN. |
| Working Moment about ZZ-axis | = | 0.884 | KN m. |
| Factored Moment about ZZ-axis | = | 0.884 | KN m. |
| Working Moment about XX-axis | = | 50.357 | KN m. |
| Factored Moment about XX-axis | = | 50.357 | KN m. |
| Ultimate Bearing Capacity of Soil | = | 495 | KN/sq.m. |

From Vertical Load and Bending considerations,

| | | | |
|---|---|---|---|
| Area of Footing Required | = | 2.131 | sq.m. |

Equal Projections were initially assumed from the to arrive at the Footing Size.

| | | | |
|---|---|---|---|
| Width of Footing Required | = | 1.267 | m. |
| Length of Footing Required | = | 1.667 | m. |
| Width of Footing Provided | = | | |

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| | | | |
|---|---|---|---|
| Length of Footing Provided | = | 1.675 | m. |
| Actual Bearing Area Provided | = | 2.177 | sq.m |
| Max. Bearing Pressure at the Base | = | 483.361 | KN/sq.m. |
| Min. Bearing Pressure at the Base | = | 256.981 | KN/sq.m. |

Bending about ZZ-axis :-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 449.255 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 449.348 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 448.321 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 449.006 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 537.5 | mm |
| Design Bending Moment | = | 84.307 | KN m |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Effective Depth Required | = | 246.788 | mm |
| Effective Depth Provided | = | 394 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.096 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 614.64 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 16 | mm |
| Required Spacing of Rods | = | 166.116 | mm |
| Max. Spacing allowed (Rounded off) | = | 150 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 299.218 | mm |
| Max. Spacing allowed (Rounded off) | = | 250 | mm |

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**Bending about XX-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 449.255 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 238.784 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 361.403 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 426.101 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 535 | mm |
| Design Bending Moment | = | 100.873 | KN-m |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Effective Depth Required | = | 196.113 | mm |
| Effective Depth Provided | = | 362 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.097 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 787.82 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 171.335 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 249.722 | mm |
| Max. Spacing allowed (Rounded off) | = | 250 | mm |

*Note (1):- The required Spacing of Main Rods will 300 mm, or 3d (300 mm, or 5d for Dist. Rods) if the required spacing exceeds this limit, the least will be automatically provided. This is done in IS: 456-2000 Clause 26.3.3.*

*Note (2):- The required minimum area of*

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as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. The minimum area is 360.0 sq.mm. for

Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations

Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

**F01 : Dowel Bars Output (LC No. : 10)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 742.669 | KN |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Reqestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm |
| Depth of Column Section | = | 600 | mm |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.3 | m. |
| Length of Footing | = | 1.675 | m. |
| Area of Footing | = | 2.177 | sq.m. |
| **As Per IS:456-2000, Clause 34.4,** | | | |
| Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 5.382 | N/sq.mm. |
| **As Per IS:456-2000, Clause 34.4.3,** | | | |
| Reinforcement is NOT required. However, | | | |
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 690 | sq.mm. |
| Dowel Rod Size-1 | = | 12 | mm |
| No. of Rods to be Provided | = | 6 | Nos. |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 16 | mm |
| No. of Rods to be Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |

Note :- Calculation for Dowel Rods is only However, Dowel Rods may not be required in all

**F01 : One Way Shear Output (LC No. : 10)**

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**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Effective Depth of the Footing, from the Face

| | | | |
|---|---|---|---|
| Design Shear Force about Length | = | 83.785 | KN |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Depth of Footing at Critical Section | = | 284.047 | mm |
| Projection of Footing from Critical Section | = | 143.5 | mm |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.227 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.276 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |

**The section is SAFE in Shear, about ZZ-axis.**

| | | | |
|---|---|---|---|
| Design Shear Force about Width | = | 103.365 | KN |
| Depth of Footing at Critical Section | = | 271.533 | mm |
| Projection of Footing from Critical Section | = | 141 | mm |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.227 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.261 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |

**The section is SAFE in Shear, about XX-axis.**

**F01 : Punching Shear Output (LC No. : 10)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from the Column

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 0.982 | m |
| Width of Footing at Critical Section | = | 0.612 | m |
| Ratio of Width to Length at Critical Section | = | [illegible] | |

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| | | | |
|---|---|---|---|
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Depth of Footing at Critical Section | = | 333.023 | mm |
| Design Shear Force | = | 631.121 | KN |
| **As Per IS:456-2000, Clause 31.6.2.1,** Actual Shear Stress | = | 0.5 | N/sq.mm |
| **As Per IS:456-2000, Clause 31.6.3.1,** Coefficient, ks | = | 1 | |
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 11)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 1297.18 | KN |
| Working Moment about ZZ-axis | = | 8.751 | KN m |
| Working Moment about XX-axis | = | 54.841 | KN m |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m. |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 1297.18 | KN |
| Factored Axial Load on Footing | = | 1297.18 | KN |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 129.718 | KN |
| Total Factored Axial Load on Footing | = | 1426.898 | KN |
| Working Moment about ZZ-axis | = | 8.751 | KN m |
| Factored Moment about ZZ-axis | = | 13.127 | KN m |

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| | | | |
|---|---|---|---|
| Working Moment about XX-axis | = | 54.641 | KN.m |
| Factored Moment about XX-axis | = | 54.641 | KN.m |
| Ultimate Bearing Capacity of Soil | = | 495 | KN/sq.m |
| From Vertical Load and Bending considerations. Area of Footing Required | = | 3.338 | sq.m |
| Equal Projections were initially assumed from the to arrive at the Footing Size. | | | |
| Width of Footing Required | = | 1.661 | m. |
| Length of Footing Required | = | 2.021 | m. |
| Width of Footing Provided | = | 1.675 | m. |
| Length of Footing Provided | = | 2.025 | m. |
| Actual Bearing Area Provided | = | 3.392 | sq.m |
| Max. Bearing Pressure at the Base | = | 488.242 | KN/sq.m |
| Min. Bearing Pressure at the Base | = | 355.12 | KN/sq.m |

**Bending about ZZ-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 447.599 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 432.71 | KN/sq.m |
| Net Bearing Pressure at the Column Face | = | 442.619 | KN/sq.m |
| Net Bearing Pressure - 'd' from Face | = | 445.349 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 712.5 | mm |
| Design Bending Moment | = | 189.71 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm |
| Modified Depth of Footing at the End | = | 400 | mm |
| Effective Depth Required | = | 344.196 | mm |
| Effective Depth Provided | = | 494 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.109 | |

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**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 852.94 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Requirrd Spacing of Rods | = | 132.49 | mm. |
| Max. Spacing allowed (Rounded off) | = | 125 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm. |
| Required Spacing of Rods | = | 190.785 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |

**Bending about XX-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 447.999 | KN/sq.m |
| Net Bearing Pressure at the Base - Left End | = | 332.165 | KN/sq.m |

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Column Face | = | 398.035 | KN/sq.m |
| Net Bearing Pressure - at from Face | = | 432.197 | KN/sq.m |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 722.5 | mm |
| Design Bending Moment | = | 227.979 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm |
| Modified Depth of Footing at the End | = | 400 | mm |
| Effective Depth Required | = | 284.321 | mm |
| Effective Depth Provided | = | 462 | mm |

**Hence SAFE.**

Percentage of Steel Required = 0.112 %

**As Per IS:456-2000, Clause 26.5.2.1,**

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the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 1171.26 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 135.798 | mm |
| Max. Spacing allowed (Rounded off) | = | 125 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 195.535 | mm |
| Max. Spacing allowed (Rounded off) | = | 200 | mm |

*Note (1) - The required Spacing of Main Rods with 300 mm. or 3d (300 mm. or 5d for Dist. Rods) if the required spacing exceeds this limit, the least will be automatically provided. This is done as IS 456-2000 Clause 26.3.3*

*Note (2) - The required minimum area of as per IS 456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**#01 : Dowel Bars Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 1297.16 | KN. |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm |
| Depth of Column Section | = | 600 | mm |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.675 | m |
| Length of Footing | = | [illegible] | |

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| | | | |
|---|---|---|---|
| Area of Footing | = | 3.392 | sq.m. |
| **As Per IS:456-2000, Clause 34.4,** | | | |
| Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 9.4 | N/sq.mm. |
| **As Per IS:456-2000, Clause 34.4.3,** Reinforcement is NOT required. However, | | | |
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 680 | sq.mm. |
| Dowel Rod Size-1 | = | 12 | mm. |
| No. of Rods to be Provided | = | 6 | Nos. |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 10 | mm. |
| No. of Rods to be Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |

*Note :- Calculation for Dowel Rods is only. However, Dowel Rods may not be required in all*

**F01 : One Way Shear Output (LC No. : 11)**

**As Per IS:456-2000, Clause 34.2.4,** the critical section for Shear Force is at a distance the Effective Depth of the Footing, from the Face

| | | | |
|---|---|---|---|
| Design Shear Force about Length | = | 153.66 | KN |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm. |
| Modified Depth of Footing at the End | = | 400 | mm. |
| Depth of Footing at Critical Section | = | 390 | mm. |
| Projection of Footing from Critical Section | = | 216.5 | mm. |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.251 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.37 | N/sq.mm. |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| **The section is SAFE in Shear, about ZZ-axis.** | | | |
| Design Shear Force about Width | = | 203.639 | KN. |
| Depth of Footing at Critical Section | = | 379.439 | mm. |
| Projection of Footing from Critical Section | = | 228.5 | mm. |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.265 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.273 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| **The section is SAFE in Shear, about XX-axis.** | | | |

**FD1 : Punching Shear Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause 24.2.4,** the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from the Column. | | | |
| Length of Footing at Critical Section | = | 1.082 | m. |
| Width of Footing at Critical Section | = | 0.712 | m. |
| Ratio of Width to Length at Critical Section | = | 0.658 | |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm. |
| Modified Depth of Footing at the End | = | 400 | mm. |
| Depth of Footing at Critical Section | = | 436 | mm. |
| Design Shear Force | = | 994.268 | KN. |
| **As Per IS:456-2000, Clause 31.6.2.1,** Actual Shear Stress | = | | |
| **As Per IS:456-2000, Clause 31.6.3.1,** Coefficient, ks | = | | |


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| | | | |
|---|---|---|---|
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm. |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 12)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 1394.464 | KN |
| Working Moment about ZZ-axis | = | 103.598 | KN m |
| Working Moment about XX-axis | = | 1.485 | KN m |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 1394.464 | KN |
| Factored Axial Load on Footing | = | 1394.464 | KN |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 139.446 | KN |
| Total Factored Axial Load on Footing | = | 1533.91 | KN |
| Working Moment about ZZ-axis | = | 103.598 | KN m |
| Factored Moment about ZZ-axis | = | 103.598 | KN m |
| Working Moment about XX-axis | = | 1.485 | KN m |
| Factored Moment about XX-axis | = | 1.485 | KN m |

| | | |
|---|---|---|
| Ultimate Bearing Capacity of Soil | = | |

From Vertical Load and Bending considerations.

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| | | | |
|---|---|---|---|
| Area of Footing Required | = | 3.702 | sq.m |

Equal Projections were initially assumed from the
to arrive at the Footing Size

| | | | |
|---|---|---|---|
| Width of Footing Required | = | 1.748 | m. |
| Length of Footing Required | = | 2.118 | m. |
| Width of Footing Provided | = | 1.75 | m |
| Length of Footing Provided | = | 2.125 | m |
| Actual Bearing Area Provided | = | 3.719 | sq.m. |
| Max. Bearing Pressure at the Base | = | 492.508 | KN/sq.m |
| Min. Bearing Pressure at the Base | = | 332.452 | KN/sq.m |

**Bending about ZZ-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 455.009 | KN/sq.m |
| Net Bearing Pressure at the Base - Left End | = | 297.892 | KN/sq.m |
| Net Bearing Pressure at the Column Face | = | 388.98 | KN/sq.m |
| Net Bearing Pressure - 'd' from Face | = | 438.833 | KN/sq.m |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 762.5 | mm |
| Design Bending Moment | = | 221.805 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 600 | mm |
| Modified Depth of Footing at the End | = | 450 | mm |
| Effective Depth Required | = | 367.312 | mm |
| Effective Depth Provided | = | 544 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.101 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the

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to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 1142.4 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 120.512 | mm |
| Max. Spacing allowed (Rounded off) | = | 125 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 173.25 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |

**Bending about XX-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 455.009 | KN/sq.m |
| Net Bearing Pressure at the Base - Left End | = | 452.272 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 453.821 | KN/sq.m |
| Net Bearing Pressure - 'd' from Face | = | 454.572 | KN/sq.m |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 760 | mm |
| Design Bending Moment | = | 278.996 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 600 | mm |
| Modified Depth of Footing at the End | = | 450 | mm |
| Effective Depth Required | = | 311.35 | mm |
| Effective Depth Provided | = | 532 | mm |

**Hence SAFE.**

Percentage of Steel Required =

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

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| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 1356.6 | sq.mm. |

| | | | |
|---|---|---|---|
| Dia. of Rod-1 in Central Band | = | 10 | mm. |
| Required Spacing of Rods | = | 123.026 | mm. |
| Max. Spacing allowed (Rounded off) | = | 125 | mm. |
| Dia. of Rod-2 in Central Band | = | 12 | mm. |
| Required Spacing of Rods | = | 177.157 | mm. |
| Max. Spacing allowed (Rounded off) | = | 175 | mm. |

*Note (1) - The required Spacing of Main Rods will 200 mm. or 3d (300 mm. or 5d for Dist. Rods) If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS 456-2000 Clause 26.3.3*

*Note (2) - The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**FC1 : Dowel Bars Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 1394.464 | KN |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm. |
| Depth of Column Section | = | 600 | mm. |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.75 | m. |
| Length of Footing | = | 2.185 | m. |
| Area of Footing | = | 3.718 | Sq.m. |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause 34.4,** | | | |
| Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 10.105 | N/sq.mm. |
| **As Per IS:456-2000, Clause 34.4.3,** | | | |
| Reinforcement is NOT required. However, | | | |
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 690 | sq.mm. |
| Dowel Rod Size-1 | = | 12 | mm |
| No. of Rods to be Provided | = | 6 | Nos. |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 16 | mm |
| No. of Rods to be Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |
| *Note :- Calculation for Dowel Rods is only* | | | |
| *However, Dowel Rods may not be required in all* | | | |

**F01 : One Way Shear Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause 34.2.4,** | | | |
| the critical section for Shear Force is at a distance | | | |
| the Effective Depth of the Footing, from the Face | | | |
| Design Shear Force about Length | = | 170.892 | KN |
| Modified Depth of Footing at the Face of Wall | = | 600 | mm |
| Modified Depth of Footing at the End | = | 450 | mm. |
| Depth of Footing at Critical Section | = | 436.984 | mm |
| Projection of Footing from Critical Section | = | 218.5 | mm |
| **As Per IS:456-2000, Clause 40.1,** | | | |
| Actual Shear Stress | = | 0.223 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.259 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 2.124 | N/sq.mm. |

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**The section is SAFE in Shear, about ZZ-axis.**

| | | | |
|---|---|---|---|
| Design Shear Force about Width | = | 208.772 | KN |
| Depth of Footing at Critical Section | = | 424.632 | mm |
| Projection of Footing from Critical Section | = | 216 | mm |
| **As Per IS:456-2000, Clause** Actual Shear Stress | = | 0.231 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.261 | N/sq.mm. |

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |

**The section is SAFE in Shear, about XX-axis.**

**F01 : Punching Shear Output (LC No. : 12)**

**As Per IS:456-2000, Clause** the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from the Column.

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 1.132 | m. |
| Width of Footing at Critical Section | = | 0.762 | m. |
| Ratio of Width to Length at Critical Section | = | 0.673 | |
| Modified Depth of Footing at the Face of Wall | = | 600 | mm |
| Modified Depth of Footing at the End | = | 450 | mm |
| Depth of Footing at Critical Section | = | 484.482 | mm |
| Design Shear Force | = | 1062.434 | KN |
| **As Per IS:456-2000, Clause** Actual Shear Stress | = | 0.579 | N/sq.mm. |
| **As Per IS:456-2000, Clause** Coefficient, ks | = | | |
| Max. Permissible Shear Stress | | | N/sq.mm. |

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The section is SAFE in Shear.

**F01 : Global Input Data (LC No. : 13)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 645.384 | KN |
| Working Moment about ZZ-axis | = | 93.963 | KN m |
| Working Moment about XX-axis | = | 3 | KN m |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq m |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 13)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 645.384 | KN |
| Factored Axial Load on Footing | = | 645.384 | KN |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 64.538 | KN |
| Total Factored Axial Load on Footing | = | 709.923 | KN |
| Working Moment about ZZ-axis | = | 93.963 | KN m |
| Factored Moment about ZZ-axis | = | 93.963 | KN m |
| Working Moment about XX-axis | = | 3 | KN m |
| Factored Moment about XX-axis | = | 3 | KN m |
| Ultimate Bearing Capacity of Soil | = | 495 | KN/sq m |
| From Vertical Load and Bending considerations, Area of Footing Required | = | 2.448 | Sq m |

Equal Projections were initially assumed from the

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to arrive at the Footing Size:

| | | | |
|---|---|---|---|
| Width of Footing Required | = | 1.282 | m. |
| Length of Footing Required | = | 1.662 | m. |
| Width of Footing Provided | = | 1.3 | m. |
| Length of Footing Provided | = | 1.675 | m. |
| Actual Bearing Area Provided | = | 2.177 | sq.m. |
| Max. Bearing Pressure at the Base | = | 486.959 | KN/sq.m. |
| Min. Bearing Pressure at the Base | = | 165.095 | KN/sq.m. |

**Bending about ZZ-axis):**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 457.32 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 348.173 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 368.116 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 430.835 | KN/sq.m. |

**As Per IS:456-2000, Clause**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 537.5 | mm |
| Design Bending Moment | = | 79.67 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Effective Depth Required | = | 239.906 | mm |
| Effective Depth Provided | = | 394 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.093 | % |

**As Per IS:456-2000, Clause**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 1584 | sq.mm. |
| Dia. of Rod-1 in Central Band | | 16 | mm |
| Required Spacing of Rods | | 196.119 | c/c mm |

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| | | | |
|---|---|---|---|
| Max. Spacing allowed (Rounded off) | = | 155 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 239.208 | mm |
| Max. Spacing allowed (Rounded off) | = | 225 | mm |

**Bending about XX-axis :-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 457.32 | KN/sq.m |
| Net Bearing Pressure at the Base - Left End | = | 444.603 | KN/sq.m |
| Net Bearing Pressure at the Column Face | = | 452.086 | KN/sq.m |
| Net Bearing Pressure - 'd' from Face | = | 455.94 | KN/sq.m |

**As Per IS:456-2000, Clause**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 535 | mm |
| Design Bending Moment | = | 109.258 | KN.m |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm |
| Modified Depth of Footing at the End | = | 300 | mm |
| Effective Depth Required | = | 204.257 | mm |
| Effective Depth Provided | = | 382 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.105 | % |

**As Per IS:456-2000, Clause**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 767.82 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 171.335 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 246.722 | mm |
| Max. Spacing allowed (Rounded off) | = | 250 | mm |

*Note (1):- The required Spacing of Main Rods will*

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*300 mm. or 3d (300 mm. or 5d for Dist. Rods)*
*If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS 456-2000 Clause 26.3.3*

*Note (2) - The required minimum area of as per IS 456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**F01 : Dowel Bars Output (LC No. : 13)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 645.384 | KN |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm. |
| Depth of Column Section | = | 600 | mm. |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.3 | m. |
| Length of Footing | = | 1.675 | m. |
| Area of Footing | = | 2.177 | sq.m. |
| **As Per IS:456-2000, Clause 34.4,** | | | |
| Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 4.677 | N/sq.mm. |
| **As Per IS:456-2000, Clause 34.4.3,** Reinforcement is NOT required. However, | | | |
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 690. | sq.mm. |
| Dowel Rod Size-1 | = | 12 | mm |
| No. of Rods to be Provided | = | 6 | Nos |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 16 | mm |
| No. of Rods to be Provided | = | 4 | Nos |

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| | | | |
|---|---|---|---|
| Corresponding Steel Area | = | 604.248 | sq.mm. |

*Note :- Calculation for Dowel Rods is only*
*However, Dowel Rods may not be required in all*

**F01 : One Way Shear Output (LC No. : 13)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Effective Depth of the Footing, from the Face

| | | | |
|---|---|---|---|
| Design Shear Force about Length | = | 82.843 | KN. |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm. |
| Modified Depth of Footing at the End | = | 300 | mm. |
| Depth of Footing at Critical Section | = | 284.047 | mm. |
| Projection of Footing from Critical Section | = | 143.5 | mm. |

**As Per IS:456-2000, Clause 40.1,**

| | | | |
|---|---|---|---|
| Actual Shear Stress | = | 0.224 | N/sq.mm. |

**As Per IS:456-2000, Table 19,**

| | | | |
|---|---|---|---|
| Design Shear Strength of Concrete | = | 0.275 | N/sq.mm. |

**As Per IS:456-2000, Table 20,**

| | | | |
|---|---|---|---|
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |

**The section is SAFE in Shear, about ZZ-axis.**

| | | | |
|---|---|---|---|
| Design Shear Force about Width | = | 107.845 | KN. |
| Depth of Footing at Critical Section | = | 271.533 | mm. |
| Projection of Footing from Critical Section | = | 141 | mm. |

**As Per IS:456-2000, Clause 40.1,**

| | | | |
|---|---|---|---|
| Actual Shear Stress | = | 0.237 | N/sq.mm. |

**As Per IS:456-2000, Table 19,**

| | | | |
|---|---|---|---|
| Design Shear Strength of Concrete | = | 0.281 | N/sq.mm. |

**As Per IS:456-2000, Table 20,**

| | | | |
|---|---|---|---|
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |

**The section is SAFE in Shear, about XX-axis.**

**F01 : Punching Shear Output (LC No. : 13)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from

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the Column

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 0.982 | m. |
| Width of Footing at Critical Section | = | 0.812 | m. |
| Ratio of Width to Length at Critical Section | = | 0.823 | |
| Modified Depth of Footing at the Face of Wall | = | 450 | mm. |
| Modified Depth of Footing at the End | = | 300 | mm. |
| Depth of Footing at Critical Section | = | 333.023 | mm. |
| Design Shear Force | = | 461.548 | KN. |
| **As Per IS:456-2000, Clause 31.6.2.1,** Actual Shear Stress | = | 0.435 | N/sq.mm. |
| **As Per IS:456-2000, Clause 31.6.3.1,** Coefficient, ks | = | 1 | |
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm. |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 14)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm. |
| Length of Column | = | 600 | mm. |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm. |
| Initial Depth at the End | = | 150 | mm. |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 694.576 | KN. |
| Working Moment about ZZ-axis | = | 2.36 | KN.m. |
| Working Moment about XX-axis | = | 40.532 | KN.m. |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m. |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 14)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 694.576 | KN. |
| Factored Axial Load on Footing | = | 694.576 | KN. |
| Percentage Factor for Self Weight of Footing | = | | |

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| | | | |
|---|---|---|---|
| Factored Self Weight of Footing | = | 69.458 | KN |
| Total Factored Axial Load on Footing | = | 184.034 | KN |
| Working Moment about ZZ-axis | = | 2.36 | KN m |
| Factored Moment about ZZ-axis | = | 2.36 | KN m |
| Working Moment about XX-axis | = | 40.532 | KN m |
| Factored Moment about XX-axis | = | 40.532 | KN m |
| Ultimate Bearing Capacity of Soil | = | 495 | KN/sq.m. |
| From Vertical Load and Bending considerations, Area of Footing Required | = | 1.992 | sq.m. |
| Equal Projections were initially assumed from the to arrive at the Footing Size. | | | |
| Width of Footing Required | = | 1.226 | m. |
| Length of Footing Required | = | 1.598 | m. |
| Width of Footing Provided | = | 1.25 | m |
| Length of Footing Provided | = | 1.6 | m. |
| Actual Bearing Area Provided | = | 2 | sq.m. |
| Max. Bearing Pressure at the Base | = | 483.719 | KN/sq.m. |
| Min. Bearing Pressure at the Base | = | 280.315 | KN/sq.m. |

**Bending about ZZ-axis:-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 448.99 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 440.141 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 446.225 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 446.255 | KN/sq.m. |

**As Per IS 456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 500 | mm |
| Design Bending Moment | = | 70.011 | KN m |
| Modified Depth of Footing at the Face of Wall | = | 425 | mm |
| Modified Depth of Footing at the End | = | 275 | mm |
| Effective Depth Required | = | | |

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| | | | |
|---|---|---|---|
| Effective Depth Provided | = | 368 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.099 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 553.5 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 177.371 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 255.414 | mm |
| Max. Spacing allowed (Rounded off) | = | 250 | mm |

**Bending about XX-axis :-**

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 448.99 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 254.435 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 369.812 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 427.044 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column.

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 510 | mm |
| Design Bending Moment | = | 87.92 | KN m |
| Modified Depth of Footing at the Face of Wall | = | 425 | mm |
| Modified Depth of Footing at the End | = | 275 | mm |
| Effective Depth Required | = | 184.811 | mm |
| Effective Depth Provided | = | 367 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.101 | |

**As Per IS:456-2000, Clause 26.5.2.1,**

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the required percentage of Steel is less than the to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 565.44 | sq.mm |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 193.393 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 283.999 | mm |
| Max. Spacing allowed (Rounded off) | = | 250 | mm |

*Note (1) - The required Spacing of Main Rods will 300 mm, or 3d (300 mm, or 5d for Dist. Rods).*

*If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS:456-2000 Clause 26.3.3.*

*Note (2) - The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. The minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**F01 : Dowel Bars Output (LC No. : 14)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 894.576 | KN |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm |
| Width of Column Section | = | 230 | mm |
| Depth of Column Section | = | 600 | mm |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.25 | m. |
| Length of Footing | = | 1.6 | m. |
| Area of Footing | = | 2 | sq.m. |
| **As Per IS:456-2000, Clause 34.4,** Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause 40.1,** | | | |
| Actual Shear Stress | = | 0.249 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.289 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |

**The section is SAFE in Shear, about XX-axis.**

**F01 : Punching Shear Output (LC No. : 14)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance

the Half the Effective Depth of the Footing, from the Column.

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 0.957 | m |
| Width of Footing at Critical Section | = | 0.687 | m |
| Ratio of Width to Length at Critical Section | = | 0.613 | |
| Modified Depth of Footing at the Face of Wall | = | 425 | mm |
| Modified Depth of Footing at the End | = | 275 | mm |
| Depth of Footing at Critical Section | = | 327.65 | mm |
| Design Shear Force | = | 492.999 | KN |
| **As Per IS:456-2000, Clause 31.6.2.1,** | | | |
| Actual Shear Stress | = | 0.519 | N/sq.mm |
| **As Per IS:456-2000, Clause 31.6.3.1,** | | | |
| Coefficient, ks | = | 1 | |
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 15)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |

The footing is subjected to Axial Load & Biaxial



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| | | | |
|---|---|---|---|
| Actual Shear Stress | = | 0.597 | N/sq.mm |
| **As Per IS:456-2000, Clause 31.6.3.1,** | | | |
| Coefficient, ks | = | 1 | |
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 16)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Length of Column | = | 600 | mm |

| | | | |
|---|---|---|---|
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm |
| Initial Depth at the End | = | 150 | mm |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 1216.012 | KN |
| Working Moment about ZZ-axis | = | 84.531 | KN.m |
| Working Moment about XX-axis | = | 0.941 | KN.m |
| Safe Bearing Capacity of Soil | = | 330 | KN/sq.m |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

**F01 : Flexure Output (LC No. : 16)**

| | | | |
|---|---|---|---|
| Working Axial Load on Footing | = | 1216.012 | KN |
| Factored Axial Load on Footing | = | 1216.012 | KN |
| Percentage Factor for Self Weight of Footing | = | 10 | % |
| Factored Self Weight of Footing | = | 121.601 | KN |
| Total Factored Axial Load on Footing | = | 1337.613 | KN |
| Working Moment about ZZ-axis | = | 84.531 | KN.m |
| Factored Moment about ZZ-axis | = | 84.531 | KN.m |
| Working Moment about XX-axis | = | 0.941 | KN.m |
| Factored Moment about XX-axis | = | 0.941 | KN.m |


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| | | | |
|---|---|---|---|
| Ultimate Bearing Capacity of Soil | = | 485 | KN/sq.m. |
| From Vertical Load and Bending considerations. | | | |
| Area of Footing Required | = | 3.224 | sq.m. |
| Equal Projections were initially assumed from the to arrive at the Footing Size. | | | |
| Width of Footing Required | = | 1.62 | m. |
| Length of Footing Required | = | 1.99 | m. |
| Width of Footing Provided | = | 1.625 | m. |
| Length of Footing Provided | = | 2 | m. |
| Actual Bearing Area Provided | = | 3.25 | sq.m. |
| Max. Bearing Pressure at the Base | = | 490.671 | KN/sq.m. |
| Min. Bearing Pressure at the Base | = | 332.476 | KN/sq.m. |

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 453.255 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 297.198 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 396.635 | KN/sq.m. |
| Net Bearing Pressure - 'd' from Face | = | 437.181 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 700 | mm |
| Design Bending Moment | = | 173.394 | KN.m. |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm |
| Modified Depth of Footing at the End | = | 400 | mm |
| Effective Depth Required | = | 331.865 | mm |
| Effective Depth Provided | = | 454 | mm |

**Hence SAFE.**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.103 | |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

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| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 963.3 | sq.mm. |
| Dia. of Rod-1 in Central Band | = | 10 | mm |
| Required Spacing of Rods | = | 132.49 | mm |
| Max. Spacing allowed (Rounded off) | = | 125 | mm |
| Dia. of Rod-2 in Central Band | = | 12 | mm |
| Required Spacing of Rods | = | 190.785 | mm |
| Max. Spacing allowed (Rounded off) | = | 175 | mm |

Bending about XX-axis :

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

| | | | |
|---|---|---|---|
| Net Bearing Pressure at the Base - Right End | = | 453.255 | KN/sq.m. |
| Net Bearing Pressure at the Base - Left End | = | 451.117 | KN/sq.m. |
| Net Bearing Pressure at the Column Face | = | 452.338 | KN/sq.m. |
| Net Bearing Pressure - at from Face | = | 452.887 | KN/sq.m. |

**As Per IS:456-2000, Clause 34.2.3,**
the critical section for Bending Moment is at the
of the Column

| | | | |
|---|---|---|---|
| Projection of Footing from Critical Section | = | 897.5 | mm |
| Design Bending Moment | = | 220.383 | KN m |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm |
| Modified Depth of Footing at the End | = | 400 | mm |
| Effective Depth Required | = | 280.253 | mm |
| Effective Depth Provided | = | 462 | mm |

**Hence SAFE**

| | | | |
|---|---|---|---|
| Percentage of Steel Required | = | 0.112 | % |

**As Per IS:456-2000, Clause 26.5.2.1,**
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

| | | | |
|---|---|---|---|
| Percentage of Main Steel Provided | = | 0.12 | % |
| Area of Steel Provided | = | 1155.6 | |
| Dia. of Rod-1 in Central Band | = | 10 | |
| Required Spacing of Rods | = | 135.785 | |

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| | | | |
|---|---|---|---|
| Max. Spacing allowed (Rounded off) | = | 125 | mm |
| Dia. of Rod 2 in Central Band | = | 12 | mm. |
| Required Spacing of Rods | = | 196.535 | mm |
| Max. Spacing allowed (Rounded off) | = | 200 | mm |

*Note (1) - The required Spacing of Main Rods will 300 mm. or 3d (300 mm. or 5d for Dist. Rods) If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS:456-2000 Clause 26.3.3*

*Note (2) - The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. The minimum area is 360.0 sq.mm. for*

*Note (3) - The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.*

*Note (4) - Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**F01 : Dowel Bars Output (LC No. : 16)**

| | | | |
|---|---|---|---|
| Factored Axial Load on Column | = | 1216.012 | KN. |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Yield Stress of Pedestal Steel | = | 500 | N/sq.mm. |
| Width of Column Section | = | 230 | mm. |
| Depth of Column Section | = | 600 | mm. |
| Area of Column Section | = | 138000 | sq.mm. |
| Width of Footing | = | 1.625 | m |
| Length of Footing | = | 2 | m |
| Area of Footing | = | 3.25 | sq.m. |
| **As Per IS:456-2000, Clause 34.4,** Basic Permissible Bearing Stress | = | 11.25 | N/sq.mm. |
| Max. Bearing Stress based on Area Ratio | = | 22.5 | N/sq.mm. |
| Actual Bearing Stress | = | 8.812 | N/sq.mm. |
| **As Per IS:456-2000, Clause 34.4.3,** Reinforcement is NOT required. However, | | | |
| Percentage of Steel Required | = | 0.5 | % |
| Area of Steel Provided | = | 690 | sq.mm. |

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| | | | |
|---|---|---|---|
| Dowel Rod Size-1 | = | 12 | mm |
| No. of Rods to be Provided | = | 6 | Nos |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Dowel Rod Size-2 | = | 16 | mm |
| No. of Rods to be Provided | = | 4 | Nos |
| Corresponding Steel Area | = | 804.248 | sq.mm. |

*Note :- Calculation for Dowel Rods is only*
*However Dowel Rods may not be required in all*

**F01 : One Way Shear Output (LC No. : 16)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Effective Depth of the Footing, from the Face

| | | | |
|---|---|---|---|
| Design Shear Force about Length | = | 145.037 | KN |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm |
| Modified Depth of Footing at the End | = | 400 | mm |
| Depth of Footing at Critical Section | = | 388.143 | mm |
| Projection of Footing from Critical Section | = | 206 | mm |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.236 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.27 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |

**The section is SAFE in Shear, about ZZ-axis.**

| | | | |
|---|---|---|---|
| Design Shear Force about Width | = | 164.42 | KN |
| Depth of Footing at Critical Section | = | 375.783 | mm |
| Projection of Footing from Critical Section | = | 203.5 | mm |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.246 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | [illegible] | |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | [illegible] |

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**The section is SAFE in Shear, about XX-axis.**

**F01 : Punching Shear Output (LC No. : 16)**

**As Per IS:456-2000, Clause 34.2.4,**
the critical section for Shear Force is at a distance the Half the Effective Depth of the Footing, from the Column.

| | | | |
|---|---|---|---|
| Length of Footing at Critical Section | = | 1.082 | m. |
| Width of Footing at Critical Section | = | 0.712 | m. |
| Ratio of Width to Length at Critical Section | = | 0.658 | |
| Modified Depth of Footing at the Face of Wall | = | 550 | mm. |
| Modified Depth of Footing at the End | = | 400 | mm. |
| Depth of Footing at Critical Section | = | 435.671 | mm. |
| Design Shear Force | = | 919.858 | KN. |

**As Per IS:456-2000, Clause 31.6.2.1,**

| | | | |
|---|---|---|---|
| Actual Shear Stress | = | 0.589 | N/sq.mm. |

**As Per IS:456-2000, Clause 31.6.3.1,**

| | | | |
|---|---|---|---|
| Coefficient ks | = | 1 | |
| Max. Permissible Shear Stress | = | 1.25 | N/sq.mm. |

**The section is SAFE in Shear.**

**F01 : Global Input Data (LC No. : 17)**

The footing is to be designed as an Isolated

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm. |
| Length of Column | = | 600 | mm. |
| Footing Shape | = | Rectangular | |
| Initial Depth at the Face of Wall/Column | = | 300 | mm. |
| Initial Depth at the End | = | 150 | mm. |

The footing is subjected to Axial Load & Biaxial

| | | | |
|---|---|---|---|
| Working Axial Load | = | 616.749 | KN. |
| Working Moment about ZZ-axis | = | 73.518 | KN.m. |
| Working Moment about XX-axis | = | 2.162 | KN.m. |
| Safe Bearing Capacity of Soil | = | 300 | KN/sq.m. |
| Factor of Safety for Safe Bearing Capacity | = | 1.5 | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLIJER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

**SCADDS/RC-Column Designer 2022 [ Release: 4.01.3010 ]**

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**SCADDS/Nucleus 2022: RC-Column Designer**
**Limit State Design of Braced/Unbraced Short/Long**
**Rectangular/Circular Cracked/Uncracked Column Sections**
**Subjected to Axial Load/Uni-axial & Bi-axial Bending**
**as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)**

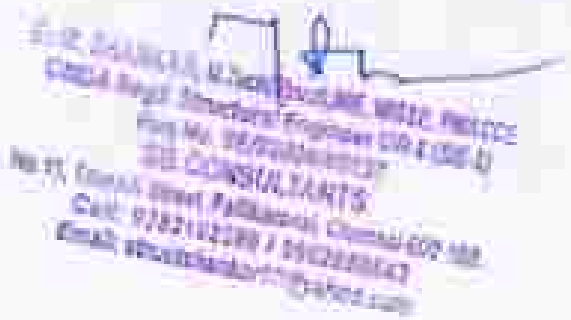
Introduction:-

This Report contains the detailed solution for the Reinforced Concrete Column Design problem

The given Column Section is considered for Design and the output contains the following

1. Global Input Data
2. Development Length Output
3. Slenderness & Eccentricity Output
4. Flexural Design Output
5. Tie Design Output

While detailed design will be carried out for design for Axial Tension and Shear is not



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| Global Material Data | | | |
|---|---|---|---|
| Concrete Clear Cover | = | 40 | mm. |
| Char. Comp. Strength of Concrete | = | 30 | N/sq.mm. |
| Yield Strength of Main Steel | = | 500 | N/sq.mm. |
| Main Rod Size-1 | = | 25 | mm. |
| Yield Strength of Tie Steel | = | 415 | N/sq.mm. |
| Tie Rod Size-1 | = | 8 | mm. |
| Tie Rod Size-2 | = | 10 | mm. |
| Factor of Safety for Load | = | 1 | |
| Partial Safety Factor for Concrete | = | 1.5 | |
| Partial Safety Factor for Steel | = | 1.15 | |
| Max. Strain in Concrete | = | 0.0035 | mm./mm. |
| Max. Strain in Steel | = | 0.0065 | mm./mm. |
| Young's Modulus of Concrete | = | 27386.128 | N/sq.mm. |
| Young's Modulus of Steel | = | 200000 | N/sq.mm. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| Bond / Development Length Output | | | |
|---|---|---|---|
| Char. Comp. Strength of Concrete | = | 30 | N/sq mm |
| Yield Stress of Main Steel | = | 500 | N/sq mm |
| **As Per IS:456-2000, Clause** | | | |
| Design Bond Stress for Main Rods | = | 3 | N/sq mm |
| **Rods in Compression:-** | | | |
| Main Rod Diameter-1 | = | 25 | mm |
| Corresponding Development Length | = | 908.25 | mm |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

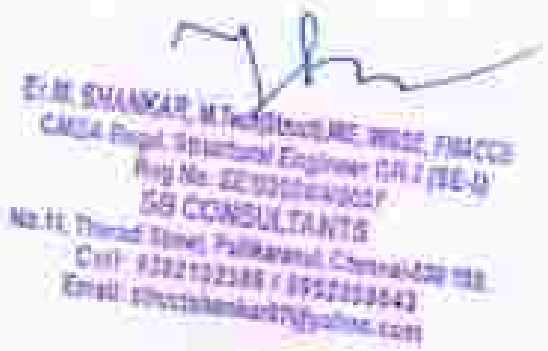
| C1 : Global Input Data (LC No. : 9) | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm. |
| Depth of Column | = | 600 | mm. |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 1.5 | m. |
| Unsupported Length-YY of Column | = | 1.5 | m. |
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Working Axial Load on Column | = | 1145.476 | KN. |
| Working Moment about ZZ-axis at Top | = | -6.683 | KN m. |
| Working Moment about YY-axis at Top | = | -1.934 | KN m. |
| Working Moment about ZZ-axis at Bottom | = | -7.703 | KN m. |
| Working Moment about YY-axis at Bottom | = | -3.879 | KN m. |

| C1 : Slenderness & Eccentricity Output (LC No. : 9) | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Slenderness Ratio about ZZ-axis<br>The Column is Short about the ZZ-axis. | = | 4.559 | |
| Slenderness Ratio about YY-axis<br>The Column is Short about the YY-axis. | = | 1.958 | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm. |
| Lo/500 + b/30 | = | 10.667 | mm. |
| Lo/500 + D/30 | = | 23 | mm. |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm. |
| Actual Minimum Eccentricity about YY | = | 20 | mm. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| As Per IS:456-2000, 39.5, | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| | | | |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 5.724 | mm |



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Actual Eccentricity about YY due to Moment-YY | = | 3.387 | mm |
| Design Eccentricity about ZZ due to Moment ZZ | = | 23 | mm |
| Design Eccentricity about YY due to Moment-YY | = | 20 | mm |
| **As Per IS:456-2000, 39.3,** Design Eccentricity about ZZ is not more than the Hence, the Column carries only Axial Load about | | | |
| *Design Eccentricity about YY is more than the Hence, the Column has Axial Load & Bending* | | | |
| Revised Design Bending Moment about YY | = | 22.91 | KN m |

**C1 : Flexural Design Output (LC No. : 9)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | 1145.476 | KN |
| Factored Axial Load | = | 1145.476 | KN |
| Revised Design Moment about YY axis | = | 22.91 | KN m |
| The Column is subjected to Axial Load & Uni-axial | | | |
| Main Reinforcement is provided along all the | | | |
| Characteristic Comp. Strength of Concrete | = | 30 | N/sq.mm |
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Depth of Neutral Axis | = | 6 | mm |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| Gross Sectional Area | = | 138000 | sq.mm |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm |
| Main Rod Size-1 | = | [illegible] | mm |
| No. of Rods Required | = | [illegible] | Nos |
| No. of Rods Provided | = | 4 | Nos |

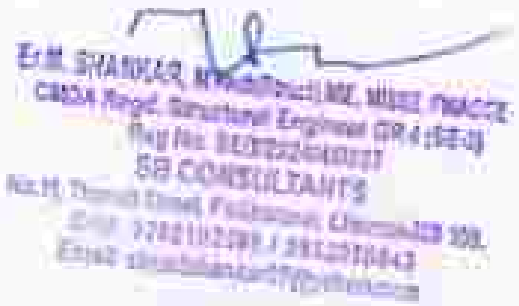
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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Corresponding Steel Area | = | 1963.495 | sq.mm |

*Note :- Please note that the minimum number of will be always FOUR for Rectangular Columns. Columns. as per IS:456-2000 Clause 26.5.3.1.(c)*

**C1 : Tie Pitch Output (LC No. : 9)**



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm. |
| Tie Rod Size-2 | = | 10 | mm. |
| Main Rod Size-1 | = | 25 | mm. |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm. |
| Minimum of the above values for 25# Rods | = | 225 | mm |
| *Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum* | | | |

**C1 : Global Input Data (LC No. : 10)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm. |
| Depth of Column | = | 900 | mm. |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 1.5 | m. |
| Unsupported Length-YY of Column | = | 1.5 | m. |
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Working Axial Load on Column | = | 742.609 | KN |
| Working Moment about ZZ-axis at Top | = | -0.884 | KN m. |
| Working Moment about YY-axis at Top | = | 90.357 | KN m. |
| Working Moment about ZZ-axis at Bottom | = | -7.144 | KN m. |
| Working Moment about YY-axis at Bottom | = | 33.315 | KN m. |

**C1 : Slenderness & Eccentricity Output (LC No. : 10)**

| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,1T TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | |
|---|---|---|
| Slenderness Ratio about ZZ-axis<br>The Column is Short about the ZZ-axis | = | 4.559 |
| Slenderness Ratio about YY-axis<br>The Column is Short about the YY-axis | = | 1.958 |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm. |
| Lo/500 + b/30 | = | 10.667 | mm. |
| Lo/500 + D/30 | = | 23 | mm. |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm. |
| Actual Minimum Eccentricity about YY | = | 20 | mm. |
| **As Per IS:456-2000, 39.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 9.619 | mm. |
| Actual Eccentricity about YY due to Moment-YY | = | 67.805 | mm. |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 23 | mm. |
| Design Eccentricity about YY due to Moment-YY | = | 67.805 | mm. |
| **As Per IS:456-2000, 39.3,** | | | |
| Design Eccentricity about ZZ is not more than the | | | |
| Hence, the Column carries only Axial Load about | | | |
| *Design Eccentricity about YY is more than the* | | | |
| *Hence, the Column has Axial Load & Bending* | | | |
| Revised Design Bending Moment about YY | = | 50.357 | KN.m. |

**C1 : Flexural Design Output (LC No. : 10)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | 742.669 | KN. |
| Factored Axial Load | = | 742.669 | KN. |
| Revised Design Moment about YY axis | = | 50.357 | KN.m. |
| The Column is subjected to Axial Load & Uni-axial | | | |
| Main Reinforcement is provided along all the | | | |
| Characteristic Comp. Strength of Concrete | = | 35 | N/sq.mm. |
| Yield Stress of Main Steel | = | 500 | N/sq.mm. |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Depth of Neutral Axis | = | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| Gross Sectional Area | = | 138000 | sq.mm |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm |
| Main Rod Size-1 | = | 25 | mm |
| No. of Rods Required | = | 2.249 | Nos |
| No. of Rods Provided | = | 4 | Nos |
| Corresponding Steel Area | = | 1963.495 | sq.mm |

*Note :- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1 (c)*

**C1 : Tie Pitch Output (LC No. : 10)**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm |
| Main Rod Size-1 | = | 25 | mm |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm |
| Minimum of the above values for 25# Rods | = | 225 | mm |

*Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**C1 : Global Input Data (LC No. : 11)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 3.5 | m |
| Unsupported Length-YY of Column | = | 1.5 | m |


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| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m |
| Effective Length-YY of Column | = | 1.049 | m |
| | | | |
| Working Axial Load on Column | = | 1297.18 | KN |
| Working Moment about ZZ-axis at Top | = | -8.751 | KN m |
| Working Moment about YY-axis at Top | = | -54.841 | KN m |
| Working Moment about ZZ-axis at Bottom | = | -5.397 | KN m |


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| | | | |
|---|---|---|---|
| Working Moment about YY-axis at Bottom | = | -42.413 | KN m |

**C1 : Slenderness & Eccentricity Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m |
| Effective Length-YY of Column | = | 1.049 | m |
| Slenderness Ratio about ZZ-axis | = | 4.559 | |
| The Column is Short about the ZZ-axis | | | |
| Slenderness Ratio about YY-axis | = | 1.956 | |
| The Column is Short about the YY-axis | | | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm |
| Lo/500 + b/30 | = | 10.667 | mm |
| Lo/500 + D/30 | = | 23 | mm |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm |
| Actual Minimum Eccentricity about YY | = | 20 | mm |
| **As Per IS:456-2000, 39.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 6.746 | mm |
| Actual Eccentricity about YY due to Moment-YY | = | 42.277 | mm |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 23 | mm |
| Design Eccentricity about YY due to Moment-YY | = | 42.277 | mm |
| **As Per IS:456-2000, 39.3,** | | | |
| Design Eccentricity about ZZ is not more than the | | | |
| Hence, the Column carries only Axial Load about | | | |
| *Design Eccentricity about YY is more than the* | | | |
| *Hence, the Column has Axial Load & Bending* | | | |
| Revised Design Bending Moment about YY | = | 54.841 | KN m |

**C1 : Flexural Design Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | [illegible] | KN |
| Factored Axial Load | = | [illegible] | KN |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Revised Design Moment about YY axis | = | 54.841 | KN m |
| The Column is subjected to Axial Load & | | | |
| Main Reinforcement is provided along all the | | | |
| Characteristic Comp. Strength of Concrete | = | 30 | N/sq mm |

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| | | | |
|---|---|---|---|
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Depth of Neutral Axis | = | 6 | mm |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| Gross Sectional Area | = | 138000 | sq.mm |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm |
| Main Rod Size-1 | = | 25 | mm |
| No. of Rods Required | = | 2.249 | Nos. |
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 1963.495 | sq.mm |

*Note :- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS: 456-2000 Clause 26.5.3.1 (c)*

**C1 : Tie Pitch Output (LC No. : 11)**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm |
| Main Rod Size-1 | = | 25 | mm |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm |
| Minimum of the above values for 25# Rods | = | 225 | mm |

*Spacing of Rods are also controlled by Values, User-defined Minimum and Maximum*

**C1 : Global Input Data (LC No. : 11)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Width of Column | = | 230 | mm. |
| Depth of Column | = | 600 | mm. |

The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D


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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 1.5 | m. |
| Unsupported Length-YY of Column | = | 1.5 | m. |
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Working Axial Load on Column | = | 1304.404 | KN |
| Working Moment about ZZ-axis at Top | = | -103.598 | KN m |
| Working Moment about YY-axis at Top | = | -1.455 | KN m |
| Working Moment about ZZ-axis at Bottom | = | -27.345 | KN m |
| Working Moment about YY-axis at Bottom | = | -4.017 | KN m |

**C1 : Slenderness & Eccentricity Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Slenderness Ratio about ZZ-axis | = | 4.559 | |
| The Column is Short about the ZZ-axis | | | |
| Slenderness Ratio about YY-axis | = | 1.958 | |
| The Column is Short about the YY-axis | | | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm |
| Lo/500 + b/30 | = | 10.667 | mm |
| Lo/500 + D/30 | = | 23 | mm |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm |
| Actual Minimum Eccentricity about YY | = | 20 | mm |
| **As Per IS:456-2000, 38.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 74.293 | mm |
| Actual Eccentricity about YY due to Moment-YY | = | 2.68 | mm |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 74.293 | mm |
| Design Eccentricity about YY due to Moment-YY | = | 23 | mm |
| **As Per IS:456-2000, 39.3,** | | | |


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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Design Eccentricity about ZZ is more than the
Hence, the Column has Axial Load & Bending

Revised Design Bending Moment about ZZ = 103.598 KN.m

Design Eccentricity about YY is more than the
Hence, the Column has Axial Load & Bending

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| | | | |
|---|---|---|---|
| Revised Design Bending Moment about YY | = | 27.889 | KN m |

**C1 : Flexural Design Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | 1394.464 | KN |
| Factored Axial Load | = | 1394.464 | KN |
| Revised Design Moment about ZZ axis | = | 103.588 | KN m |
| Revised Design Moment about YY axis | = | 27.889 | KN m |

The Column is subjected to Axial Load & Bi-axial

Main Reinforcement is provided along all the

| | | | |
|---|---|---|---|
| Characteristic Comp. Strength of Concrete | = | 30 | N/sq.mm |
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Percentage of Reinforcement Required | = | 0.441 | % |

**As Per IS:456-2000,**
the required percentage of Reinforcement is less the Minimum value to be provided. Therefore, Reinforcement will be provided

| | | | |
|---|---|---|---|
| Depth of Neutral Axis about ZZ-axis | = | 509.4 | mm |
| Depth of Neutral Axis about YY-axis | = | 505.8 | mm |
| Ultimate Axial Load, Puz | = | 2093.002 | KN |
| Ratio of Pu/Puz | = | 0.666 | |
| Value of Coefficient, Alpha-n | = | 1.782 | |
| Ultimate Moment Capacity about ZZ-axis | = | 135.482 | KN m |
| Ultimate Moment Capacity about YY-axis | = | 48.156 | KN m |
| Ratio of Actual to Ultimate Moment, Muz/Muz1 | = | 0.765 | |
| Ratio of Actual to Ultimate Moment, Muy/Muy1 | = | 0.579 | |
| Sum of above Ratios, applied with Alpha-n | = | 0.[illegible] | |
| Width of Column | = | 230 mm | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Depth of Column | = | 600 | mm. |
| Gross Sectional Area | = | 136000 | sq.mm |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm |

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| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 25 | mm |
| No. of Rods Required | = | 2.249 | Nos |
| No. of Rods Provided | = | 4 | Nos |
| Corresponding Steel Area | = | 1963.495 | sq mm |

*Note : Please note that the minimum number of will be always FOUR for Rectangular Columns Columns as per IS:456-2000 Clause 26.5.3.1.(c)*

**C1 : Tie Pitch Output (LC No. : 12)**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm |
| Main Rod Size-1 | = | 25 | mm |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm |
| Minimum of the above values for 25# Rods | = | 225 | mm |

*Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

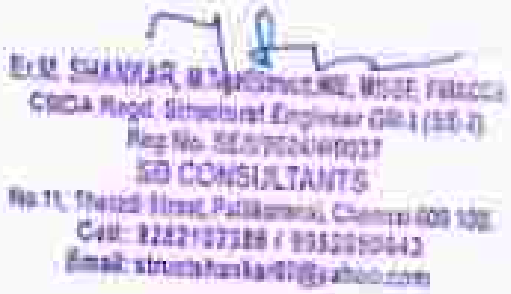
**C1 : Global Input Data (LC No. : 13)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | | |
| Unsupported Length-YY of Column | = | | |
| Effective Length-ZZ of Column | = | | |
| Effective Length-YY of Column | = | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Working Axial Load on Column | = | 645.384 | KN. |
| Working Moment about ZZ-axis at Top | = | 93.963 | KN m. |
| Working Moment about YY-axis at Top | = | -3 | KN m. |
| Working Moment about ZZ-axis at Bottom | = | 14.804 | KN m. |
| Working Moment about YY-axis at Bottom | = | -5.081 | KN m. |



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 23,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| C1 : Slenderness & Eccentricity Output (LC No. : 13) | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m |
| Effective Length-YY of Column | = | 1.048 | m |
| Slenderness Ratio about ZZ-axis<br>The Column is Short about the ZZ-axis. | = | 4.559 | |
| Slenderness Ratio about YY-axis<br>The Column is Short about the YY-axis. | = | 1.958 | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm. |
| La/500 + b/30 | = | 10.667 | mm. |
| La/500 + D/30 | = | 23 | mm. |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm. |
| Actual Minimum Eccentricity about YY | = | 20 | mm. |
| **As Per IS:456-2000, 39.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm. |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm. |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 145.592 | mm. |
| Actual Eccentricity about YY due to Moment-YY | = | 7.872 | mm. |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 145.592 | mm. |
| Design Eccentricity about YY due to Moment-YY | = | 20 | mm. |
| **As Per IS:456-2000, 39.3,**<br>Design Eccentricity about ZZ is more than the<br>Hence, the Column has Axial Load & Bending | | | |
| Revised Design Bending Moment about ZZ | = | 93.963 | KN.m. |
| *Design Eccentricity about YY is more than the*<br>*Hence, the Column has Axial Load & Bending* | | | |
| Revised Design Bending Moment about YY | = | 12.908 | KN.m. |

| C1 : Flexural Design Output (LC No. : 13) | | | |
|---|---|---|---|
| Axial Load on Column | = | [illegible] | KN |
| Factored Axial Load | = | 645.384 | KN |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 25 | mm |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm |
| Minimum of the above values for 25# Rods | = | 225 | mm |
| *Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum* | | | |

**C1 : Global Input Data (LC No. : 14)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.765 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 1.5 | m. |
| Unsupported Length-YY of Column | = | 1.5 | m. |
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Working Axial Load on Column | = | 694.570 | KN |
| Working Moment about ZZ-axis at Top | = | -2.36 | KN m. |
| Working Moment about YY-axis at Top | = | 40.532 | KN m |
| Working Moment about ZZ-axis at Bottom | = | -6.861 | KN m |
| Working Moment about YY-axis at Bottom | = | 27.168 | KN m |

**C1 : Slenderness & Eccentricity Output (LC No. : 14)**

| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Slenderness Ratio about ZZ-axis | = | Er.M. S[illegible] | |
| The Column is Short about the ZZ-axis | | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Slenderness Ratio about YY-axis | = | 1.958 | |
| The Column is Short about the YY-axis. | | | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm |
| Lo/500 + b/30 | = | 10.867 | mm |

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| | | | |
|---|---|---|---|
| Lo/500 + D/30 | = | 23 | mm |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm |
| Actual Minimum Eccentricity about YY | = | 20 | mm |
| **As Per IS:456-2000, 39.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 8.678 | mm |
| Actual Eccentricity about YY due to Moment-YY | = | 58.355 | mm |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 23 | mm |
| Design Eccentricity about YY due to Moment-YY | = | 58.355 | mm |
| **As Per IS:456-2000, 39.5,** | | | |
| Design Eccentricity about ZZ is not more than the | | | |
| Hence, the Column carries only Axial Load about | | | |
| Design Eccentricity about YY is more than the | | | |
| Hence, the Column has Axial Load & Bending | | | |
| Revised Design Bending Moment about YY | = | 40.532 | KN.m |

**C1 : Flexural Design Output (LC No. : 14)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | 694.576 | KN |
| Factored Axial Load | = | 694.576 | KN |
| Revised Design Moment about YY axis | = | 40.532 | KN.m |
| The Column is subjected to Axial Load & Uni-axial | | | |
| Main Reinforcement is provided along all the | | | |
| Characteristic Comp. Strength of Concrete | = | 30 | N/sq.mm |
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Depth of Neutral Axis | = | 0 | mm |
| Width of Column | = | | |
| Depth of Column | = | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 25 | mm. |
| No. of Rods Required | = | 2.249 | Nos. |
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 1963.495 | sq.mm |

*Note :- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1 (c)*

**C1 : Tie Pitch Output (LC No. : 14)**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm. |
| Main Rod Size-1 | = | 25 | mm. |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm. |
| 16 times dia. of Main Rod | = | 400 | mm. |
| Maximum allowable value as per Code | = | 300 | mm. |
| Minimum of the above values for 25# Rods | = | 225 | mm. |

*Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**C1 : Global Input Data (LC No. : 15)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm. |
| Depth of Column | = | 600 | mm. |
| The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D | | | |
| Effective Length Coeff. about ZZ axis | = | 0.783 | |
| Effective Length Coeff. about YY axis | = | 0.699 | |
| Unsupported Length-ZZ of Column | = | 1.5 | m. |
| Unsupported Length-YY of Column | = | 1.5 | m. |
| Effective Length-ZZ of Column | = | 1.175 | m. |
| Effective Length-YY of Column | = | 1.048 | m. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLIJER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Working Axial Load on Column | = | 1138.185 | KN |
| Working Moment about ZZ-axis at Top | = | -8.653 | KN m |
| Working Moment about YY-axis at Top | = | -43.626 | KN m |
| Working Moment about ZZ-axis at Bottom | = | -5.463 | KN m |
| Working Moment about YY-axis at Bottom | = | -33.395 | KN m |

**C1 : Slenderness & Eccentricity Output (LC No. : 18)**

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| | | | |
|---|---|---|---|
| Effective Length-ZZ of Column | = | 3.175 | m. |
| Effective Length-YY of Column | = | 1.049 | m. |
| Slenderness Ratio about ZZ-axis | = | 4.559 | |
| The Column is Short about the ZZ-axis | | | |
| Slenderness Ratio about YY-axis | = | 1.958 | |
| The Column is Short about the YY-axis | | | |
| **As Per IS:456-2000, 25.4,** | | | |
| Minimum Eccentricity | = | 20 | mm |
| Lo/500 + b/30 | = | 10.667 | mm |
| Lo/500 + D/30 | = | 23 | mm |
| Actual Minimum Eccentricity about ZZ | = | 23 | mm |
| Actual Minimum Eccentricity about YY | = | 20 | mm |
| **As Per IS:456-2000, 39.3,** | | | |
| 0.05 times D (Limiting Value about ZZ) | = | 30 | mm |
| 0.05 times b (Limiting Value about YY) | = | 11.5 | mm |
| Actual Eccentricity about ZZ due to Moment-ZZ | = | 7.003 | mm |
| Actual Eccentricity about YY due to Moment-YY | = | 38.33 | mm |
| Design Eccentricity about ZZ due to Moment-ZZ | = | 23 | mm |
| Design Eccentricity about YY due to Moment-YY | = | 38.33 | mm |
| **As Per IS:456-2000, 39.3,** | | | |
| Design Eccentricity about ZZ is not more than the | | | |
| Hence, the Column carries only Axial Load about | | | |
| *Design Eccentricity about YY is more than the* | | | |
| *Hence, the Column has Axial Load & Bending* | | | |
| Revised Design Bending Moment about YY | = | 43.628 | KN m |

**C1 : Flexural Design Output (LC No. : 15)**

| | | | |
|---|---|---|---|
| Axial Load on Column | = | 1138.185 | KN |
| Factored Axial Load | = | 1138.185 | KN |
| Revised Design Moment about YY axis | = | 43.628 | KN m |
| The Column is subjected to Axial Load & | | | |

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Main Reinforcement is provided along all the

| | | | |
|---|---|---|---|
| Characteristic Comp. Strength of Concrete | = | 20 | N/sq.mm |
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| Min. Percentage of Reinforcement Required | = | 0.8 | % |

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| | | | |
|---|---|---|---|
| Max. Percentage of Reinforcement Allowed | = | 6 | % |
| Depth of Neutral Axis | = | 6 | mm |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |
| Gross Sectional Area | = | 138000 | sq.mm. |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm. |
| Main Rod Size-1 | = | 25 | mm |
| No. of Rods Required | = | 2.249 | Nos. |
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 1963.495 | sq.mm. |

*Note :- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns. as per IS:456-2000 Clause 26.5.3.1 (c)*

**C1 : Tie Pitch Output (LC No. : 15)**

| | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm |
| Main Rod Size-1 | = | 25 | mm |
| **As Per IS:456-2000,** | | | |
| Least Lateral Dimension | = | 230 | mm |
| 16 times dia. of Main Rod | = | 400 | mm |
| Maximum allowable value as per Code | = | 300 | mm |
| Minimum of the above values for 25# Rods | = | 225 | mm |

*Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

**C1 : Global Input Data (LC No. : 16)**

| | | | |
|---|---|---|---|
| Column Section | = | Rectangular | |
| Width of Column | = | 230 | mm |
| Depth of Column | = | 600 | mm |

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The Effective Lengths about ZZ and YY axes
based on actual framing conditions from the 3D

| | | |
|---|---|---|
| Effective Length Coeff. about ZZ axis | = | 0.783 |
| Effective Length Coeff. about YY axis | = | 0.699 |

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| C1 : Tie Pitch Output (LC No. : 17) | | | |
|---|---|---|---|
| Tie Rod Size-1 | = | 8 | mm |
| Tie Rod Size-2 | = | 10 | mm |
| Main Rod Size-1 | = | 25 | mm |

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| | | | |
|---|---|---|---|
| As Per IS:456-2000, | | | |
| Least Lateral Dimension | = | 230 | mm. |
| 16 times dia. of Main Rod | = | 400 | mm. |
| Maximum allowable value as per Code | = | 300 | mm. |
| Minimum of the above values for 25# Rods | = | 225 | mm. |

*Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum*

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**SCADDS/RC-Beam Desioner 2022 [ Release: 4.01.3010 ]**

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**SCADDS/Nucleus 2022: RC-Beam Designer**
**Limit State Design of Singly/Doubly Reinforced**
**Rectangular/Tee/El Beam Sections**
**subjected to Moment/Torsion/Shear**
**as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)**

Introduction:-

This Report contains the detailed solution for the Reinforced Concrete Beam Design problem.

The given Beam Section is considered for design and the output contains the following

1. Global Input Data
2. Development Length Output
3. Flexural Design Output
4. Shear Design Output
5. Side Face Steel Output
6. Deflection Check Output
7. Slender Beam Check Output
8. Deep Beam Check Output

While detailed design will be carried out for and Side Face Steel, only checks are made for

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| Global Material Data | | | |
|---|---|---|---|
| Concrete Clear Cover | = | 25 | mm. |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm |
| Yield Strength of Main Steel | = | 500 | N/sq.mm |
| Main Rod Size-1 | = | 12 | mm. |
| Main Rod Size-2 | = | 16 | mm |
| Yield Strength of Tie Steel | = | 500 | N/sq.mm |
| Stirrup Rod Size-1 | = | 8 | mm |
| Stirrup Rod Size-2 | = | 10 | mm. |
| Factor of Safety for Load | = | 1 | |
| Partial Safety Factor for Concrete | = | 1.5 | |
| Partial Safety Factor for Steel | = | 1.15 | |
| Max. Strain in Concrete | = | 0.0035 | mm./mm. |
| Max. Strain in Steel | = | 0.0055 | mm./mm. |
| Young's Modulus of Concrete | = | 25000 | N/sq.mm |
| Young's Modulus of Steel | = | 200000 | N/sq.mm |

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| Bond / Development Length Output: | | | |
|---|---|---|---|
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm |
| Yield Stress of Main Steel | = | 500 | N/sq.mm |
| **As Per IS:456-2000, Clause** | | | |
| Design Bond Stress for Main Rods | = | 2.24 | N/sq.mm |
| Rods in Tension:- | | | |
| Main Rod Diameter-1 | = | 12 | mm |
| Corresponding Development Length | = | 582.589 | mm |
| Main Rod Diameter-2 | = | 16 | mm |
| Corresponding Development Length | = | 776.786 | mm |
| Rods in Compression:- | | | |
| Main Rod Diameter-1 | = | 12 | mm |
| Corresponding Development Length | = | 466.071 | mm |
| Main Rod Diameter-2 | = | 16 | mm |
| Corresponding Development Length | = | 621.429 | mm |

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| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Required | = | 5.198 | Nos. |
| No. of Rods Provided | = | 5 | Nos. |
| Corresponding Steel Area | = | 565.487 | sq.mm |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Required | = | 2.918 | Nos. |
| No. of Rods Provided | = | 3 | Nos. |
| Corresponding Steel Area | = | 603.186 | sq.mm |

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm |

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |

*Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing*

**B91 : End-1 Min - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 76.757 | KN. |
| Factored Shear | = | 76.757 | KN. |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.63 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.474 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | | |

Stirrups have to be Designed for Shear.

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| B81 : Global Input Data | | | |
|---|---|---|---|
| Effective Span | = | 4.12 | m |
| Section Type | = | Rectangular | |
| Width of Web | = | 230 | mm |
| Overall Depth | = | 600 | mm |
| Effective Cover at Top | = | 70 | mm |
| Effective Cover at Bottom | = | 70 | mm |
| Number of Stirrup Legs | = | 2 | Nos. |
| Max. Bending Moment at End-1 | = | 146.046 | KN m |
| Min. Bending Moment at End-1 | = | -122.186 | KN m |
| Max. Bending Moment at End-2 | = | 136.853 | KN m |
| Min. Bending Moment at End-2 | = | -127.12 | KN m |
| Max. Bending Moment at Middle | = | 71.54 | KN m |
| Min. Bending Moment at Middle | = | -66.959 | KN m |
| Max. Shear Force at Left | = | 76.757 | KN |
| Max. Shear Force at Right | = | 73.326 | KN |
| Max. Torsional Moment | = | 0 | KN m |
| Torsion, as per Analysis Results, is partially | | | |
| Ignore Torsion Limit | = | 10 | % |
| If Torsion is less than the above % of the Max. it will be ignored. Otherwise, the Beam is | | | |

| B81 : End-1 Max - Flexure Output | | | |
|---|---|---|---|
| Bending Moment | = | 146.046 | KN m |
| Factored Moment | = | 146.046 | KN m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | | |

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| | | | |
|---|---|---|---|
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | KN.m |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Total Design Moment | = | 146.046 | KN.m. |
| Depth of Neutral Axis | = | 151.012 | mm. |
| Tensile Reinforcement Required | = | 0.59 | % |
| Compression Reinforcement is NOT Necessary. | | | |
| **As Per IS:456-2000, Clause** Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause** Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 718.609 | sq.mm. |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Required | = | 6.354 | Nos. |
| No. of Rods Provided | = | 7 | Nos. |
| Corresponding Steel Area | = | 791.681 | sq.mm. |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Required | = | 3.574 | Nos. |
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |

*Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.*

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**B81 : End-1 Max - Shear Output**

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.16/11&16/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Shear Force | = | 78.757 | KN |
| Factored Shear | = | 78.757 | KN |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.83 | N/sq.mm |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| As Per IS:456-2000, Table 19, Design Shear Strength of Concrete | = | 0.543 | N/sq.mm |
| As Per IS:456-2000, Table 20, Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |
| Stirrups have to be Designed for Shear | | | |
| Shear for which Stirrups are Provided | = | 10.544 | KN |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

*As per IS 456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm, whichever is less, the value will be provided as the Spacing of Stirrups*

**B81 : End-1 Min - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 122.186 | KN.m |
| Factored Moment | = | 122.186 | KN.m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.458 | |
| Total Limiting Moment | = | 214.682 | KN.m |
| Total Design Moment | = | 122.186 | KN.m |
| Depth of Neutral Axis | = | 123.298 | mm |
| Tensile Reinforcement Required | = | 0.481 | % |

Compression Reinforcement is NOT Necessary

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| | | | |
|---|---|---|---|
| As Per IS:456-2000, Clause<br>Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| As Per IS:456-2000, Clause<br>Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 586.726 | sq.mm. |


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| | | | |
|---|---|---|---|
| Gross Sectional Area | = | 138000 | sq.mm. |
| Percentage of Reinforcement to be Provided | = | 0.8 | % |
| Area of Longitudinal Reinforcement Required | = | 1104 | sq.mm |

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| | | | |
|---|---|---|---|
| Shear for which Stirrups are Provided | = | 18.959 | KN |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm. |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-f | = | 8 | mm. |
| Spacing of Stirrups Required | = | 300 | mm. |

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| | | | |
|---|---|---|---|
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

*As per IS:456-2000 Clause 26.5.1.5, If the stirrup exceeds 0.75d or 300 mm , whichever is less, the value will be provided as the Spacing of Stirrups*

**B81 : End-2 Max - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 136.853 | KN m |
| Factored Moment | = | 136.853 | KN m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | KN m |
| Total Design Moment | = | 136.853 | KN m |
| Depth of Neutral Axis | = | 140.151 | mm |
| Tensile Reinforcement Required | = | 0.547 | % |

Compression Reinforcement is NOT Necessary

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause** Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause** Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 868.827 | sq.mm. |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 5.897 | Nos |
| No. of Rods Provided | = | 6 | Nos |
| Corresponding Steel Area | = | 678.584 | sq.mm. |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | 3.317 | Nos |

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| | | | |
|---|---|---|---|
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 804.248 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm. |

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| | | | |
|---|---|---|---|
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm |
| *Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.* | | | |

**B81 : End-2 Max - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 72.328 | KN |
| Factored Shear | = | 72.328 | KN |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.602 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.511 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |
| Stirrups have to be Designed for Shear. | | | |
| Shear for which Stirrups are Provided | = | 11.077 | KN |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| *As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm , whichever is less, the value will be provided as the Spacing of Stirrups.* | | | |

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| B81 : End-2 Min - Flexure Output | | | |
|---|---|---|---|
| Bending Moment | = | 127.12 | KN m |
| Factored Moment | = | 127.12 | KN m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |




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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | KN m |
| Total Design Moment | = | 127.12 | KN m |
| Depth of Neutral Axis | = | 128.906 | mm |
| Tensile Reinforcement Required | = | 0.583 | % |
| Compression Reinforcement is NOT Necessary. | | | |
| **As Per IS:456-2000, Clause** Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause** Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 613.409 | sq.mm |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 5.424 | Nos. |
| No. of Rods Provided | = | 6 | Nos. |
| Corresponding Steel Area | = | 678.584 | sq.mm |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | 3.051 | Nos. |
| No. of Rods Provided | = | 3 | Nos. |
| Corresponding Steel Area | = | 603.186 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 10 | mm |
| No. of Rods Provided | = | 2 | Nos. |

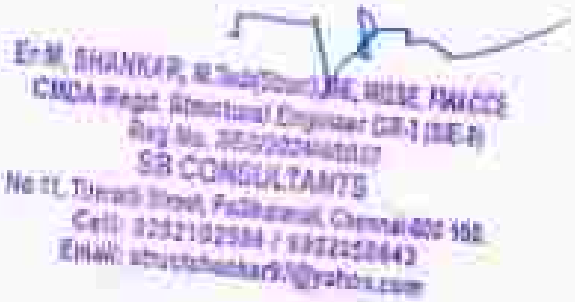

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.16/11&16/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Corresponding Steel Area | = | 402.124 | sq.mm |

*Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing*

**B81 : End-2 Min - Shear Output**



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Shear Force | = | 73.328 | KN |
| Factored Shear | = | 73.328 | KN |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.602 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.511 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| Stirrups have to be Designed for Shear. | | | |
| Shear for which Stirrups are Provided | = | 11.077 | KN |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm. |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

*As per IS:456-2000 Clause 26.5.1.5, If the stirrup exceeds 0.75d or 300 mm , whichever is less, the value will be provided as the Spacing of Stirrups.*

**Sb1 : Mid. Max - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 71.54 | KN m |
| Factored Moment | = | 71.54 | KN m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.682 | KN m |
| Total Design Moment | = | 71.54 | KN m |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause** | | | |
| Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause** | | | |
| Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 328.037 | sq.mm. |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Required | = | 2.9 | Nos |
| No. of Rods Provided | = | 3 | Nos. |
| Corresponding Steel Area | = | 339.292 | sq.mm. |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Required | = | 1.632 | Nos |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | 402.124 | sq.mm |
| *Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing* | | | |

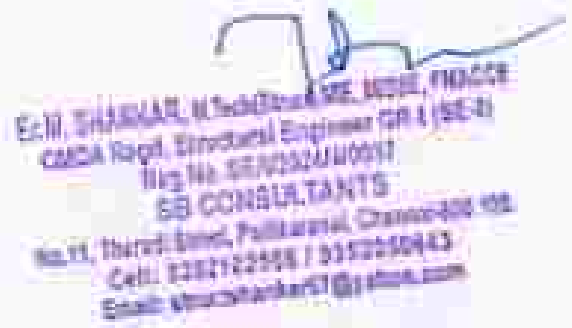
**BR1 : Mid. Max - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 71.662 | KN. |
| Factored Shear | = | 71.662 | KN. |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.588 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** | | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 2.706 | Nos. |
| No. of Rods Provided | = | 3 | Nos. |
| Corresponding Steel Area | = | 339.292 | sq mm. |
| | | | |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | 1.522 | Nos. |



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |
| *Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing* | | | |

**B81 : Mid. Min - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 71.682 | KN. |
| Factored Shear | = | 71.682 | KN. |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.568 | N/sq.mm. |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.382 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| Stirrups have to be Designed for Shear. | | | |
| Shear for which Stirrups are Provided | = | 25.082 | KN. |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm. |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm. |
| Spacing of Stirrups Required | = | 300 | mm. |

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| B81 : Side Face Steel Output | | | |
|---|---|---|---|
| Overall Depth of Section | = | 600 | mm |
| **As Per IS:456-2000, Clauses 26.5.1.3,** Side Face Reinforcement is NOT Required | | | |

| B81 : Deflection Check Output | | | |
|---|---|---|---|
| Type of Beam | = | Ends | Fixed or Continuous |
| Effective Span of Beam | = | 4.12 | m |
| Effective Depth of Beam | = | 530 | mm |
| Actual Span to Depth Ratio | = | 7.774 | |
| **As Per IS:456-2000, Clause** Factor Alpha | = | 26 | |
| **As Per IS:456-2000, Clause** Factor Zigma | = | 1 | |
| **As Per IS:456-2000, Clause** Factor Gamma | = | 1.232 | |
| **As Per IS:456-2000, Clause** Factor Delta | = | 1 | |
| **As Per IS:456-2000, Clause** Factor Lamda | = | 1 | |
| Allowable Span to Depth Ratio | = | 32.033 | |
| **Deflection Requirements are O.K.** | | | |

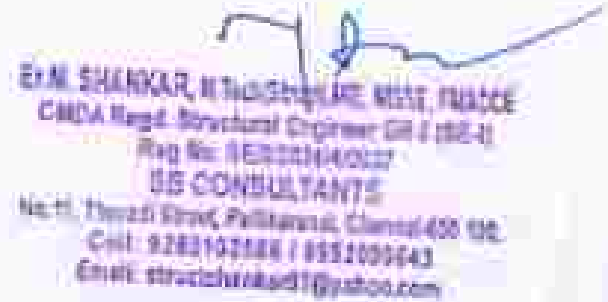
| B81 : Deep Beam Check Output | | | |
|---|---|---|---|
| Effective Span of Beam | = | 4.12 | m |
| Overall Depth | = | 600 | mm |
| Effective Span to Depth Ratio | = | 6.867 | |
| Minimum Value for the above | = | 2.5 | |
| **As Per IS:456-2000, Clause 29.1,** this Beam is NOT a Deep Beam. | | | |

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| B81 : Slender Beam Check Output | | | |
|---|---|---|---|
| Clear Distance between Lateral Restraints | = | 4.12 | m |
| Allowable Value for the above | = | 13.8 | m |

As Per IS:456-2000, Clause 23.3,



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

this Beam is NOT a Slender Beam.

*Note :-*
*Actually, the clear distance between lateral taken as against the effective span. But, the taken for simplifying the calculations. In fact, it's to consider the effective span rather than the*

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| B145 : Global Input Data | | | |
|---|---|---|---|
| Effective Span | = | 6.95 | m. |
| Section Type | = | Rectangular | |
| Width of Web | = | 230 | mm. |
| Overall Depth | = | 600 | mm. |
| Effective Cover at Top | = | 70 | mm. |
| Effective Cover at Bottom | = | 70 | mm. |
| Number of Stirrup Legs | = | 2 | Nos. |
| Max. Bending Moment at End-1 | = | 86.826 | KN m. |
| Min. Bending Moment at End-1 | = | -42.386 | KN m. |
| Max. Bending Moment at End-2 | = | 48.903 | KN m. |
| Min. Bending Moment at End-2 | = | -38.678 | KN m. |
| Max. Bending Moment at Middle | = | 29.39 | KN m. |
| Min. Bending Moment at Middle | = | -40.172 | KN m. |
| Max. Shear Force at Left | = | 35.694 | KN. |
| Max. Shear Force at Right | = | 30.606 | KN. |
| Max. Torsional Moment | = | 0 | KN m. |
| Torsion, as per Analysis Results, is partially | | | |
| Ignore Torsion Limit | = | 10 | % |
| If Torsion is less than the above % of the Max it will be ignored. Otherwise, the Beam is | | | |

| B145 : End-1 Max - Flexure Output | | | |
|---|---|---|---|
| Bending Moment | = | 86.826 | KN m. |
| Factored Moment | = | 86.826 | KN m. |
| Overall Depth of Section | = | 600 | mm. |
| Bottom Effective Cover | = | 70 | mm. |
| Effective Depth | = | 530 | mm. |

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| | | | |
|---|---|---|---|
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | KN m |

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| | | | |
|---|---|---|---|
| Total Design Moment | = | 66.826 | KN m |
| Depth of Neutral Axis | = | 84.779 | mm |
| Tensile Reinforcement Required | = | 0.331 | % |
| Compression Reinforcement is NOT Necessary. | | | |
| As Per IS:456-2000, Clause<br>Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| As Per IS:456-2000, Clause<br>Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 403.431 | sq.mm |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 3.567 | Nos. |
| No. of Rods Provided | = | 4 | Nos. |
| Corresponding Steel Area | = | 452.389 | sq.mm |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | 2.007 | Nos. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm |

*Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.*

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**B145 : End-1 Max - Shear Output**

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Shear Force | = | 35.694 | KN |
| Factored Shear | = | 35.694 | KN |
| | | | |
| As Per IS:456-2000, Clause | | | |
| Actual Shear Stress | = | 0.293 | N/sq.mm |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.432 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |
| Minimum Shear Reinforcement is provided | | | |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| *As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm, whichever is less, the value will be provided as the Spacing of Stirrups* | | | |

**B145 : End-1 Min - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 42.386 | KN.m |
| Factored Moment | = | 42.386 | KN.m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.852 | KN.m |
| Total Design Moment | = | 42.386 | KN.m |
| Depth of Neutral Axis | = | 39.852 | mm |
| Tensile Reinforcement Required | = | 0.17 | % |
| Compression Reinforcement is NOT Necessary | | | |
| **As Per IS:456-2000, Clause** Min. Tensile Reinforcement Percentage | = | 0.17 | % |

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| | | | |
|---|---|---|---|
| No. of Rods Required | = | 1.833 | Nos. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| | | | |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Required | = | 1.031 | Nos. |
| No. of Rods Provided | = | 1 | Nos. |
| Corresponding Steel Area | = | 201.062 | sq.mm. |
| | | | |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| | | | |
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| | | | |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| | | | |
| Main Rod Size-2 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |
| | | | |
| *Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing* | | | |

**B145 : End-1 Min - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 35.694 | KN |
| Factored Shear | = | 35.694 | KN |
| | | | |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.293 | N/sq.mm. |
| | | | |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.32 | N/sq.mm. |
| | | | |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| | | | |
| Minimum Shear Reinforcement is provided. | | | |
| | | | |
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm. |
| No. of Stirrup Legs | = | 2 | Nos. |

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| | | | |
|---|---|---|---|
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| | | | |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

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*As per IS:456-2000 Clause 26.5.1.5, If the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups*

**B145 : End-2 Max - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 49.903 | KN m |
| Factored Moment | = | 49.903 | KN m |
| Overall Depth of Section | = | 600 | mm |
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | KN m |
| Total Design Moment | = | 49.903 | KN m |
| Depth of Neutral Axis | = | 47.236 | mm |
| Tensile Reinforcement Required | = | 0.184 | % |

Compression Reinforcement is NOT Necessary.

| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Clause** Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause** Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 224.779 | sq.mm. |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 1.987 | Nos. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | [illegible] | |
| No. of Rods Provided | = | [illegible] | |
| Corresponding Steel Area | = | 201.062 | sq.mm. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

Compression Steel is NOT required. However, 2
are provided, irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |

Compression Steel is NOT required. However, 2

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.16/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

are provided, irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | 402.124 | sq.mm |

*Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing*

**B145 : End-2 Max - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 30.606 | KN |
| Factored Shear | = | 30.606 | KN |
| **As Per IS:456-2000, Clause** | | | |
| Actual Shear Stress | = | 0.251 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.32 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq.mm |

Minimum Shear Reinforcement is provided

| | | | |
|---|---|---|---|
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm |
| No. of Stirrup Legs | = | 2 | Nos |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

*As per IS 456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm, whichever is less, the value will be provided as the Spacing of Stirrups*

**B145 : End-2 Min - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | [illegible] | [illegible] |
| Factored Moment | = | [illegible] | [illegible] |
| Overall Depth of Section | = | 600 | mm |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Bottom Effective Cover | = | 70 | mm |
| Effective Depth | = | 530 | mm |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.882 | kN.m |

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| | | | |
|---|---|---|---|
| Total Design Moment | = | 38.675 | KN m |
| Depth of Neutral Axis | = | 38.287 | mm |
| Tensile Reinforcement Required | = | 0.17 | % |
| Compression Reinforcement is NOT Necessary | | | |
| As Per IS:456-2000, Clause<br>Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| As Per IS:456-2000, Clause<br>Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 207.23 | sq.mm |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Required | = | 1.832 | Nos |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | 226.195 | sq.mm |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Required | = | 1.031 | Nos |
| No. of Rods Provided | = | 1 | Nos |
| Corresponding Steel Area | = | 201.062 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-1 | = | 12 | mm |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | 226.195 | sq.mm |
| Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding | | | |
| Main Rod Size-2 | = | 16 | mm |
| No. of Rods Provided | = | 2 | Nos |
| Corresponding Steel Area | = | | |

*Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing*

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| B145 : End-2 Min - Shear Output | | | |
|---|---|---|---|
| Shear Force | = | 30.606 | KN |
| Factored Shear | = | 30.606 | KN |
| As Per IS:456-2000, Clause | | | |
| Actual Shear Stress | = | 0.251 | N/sq.mm |

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| | | | |
|---|---|---|---|
| **As Per IS:456-2000, Table 19,** | | | |
| Design Shear Strength of Concrete | = | 0.32 | N/sq mm |
| **As Per IS:456-2000, Table 20,** | | | |
| Max. Permissible Shear Stress | = | 3.124 | N/sq mm |
| Minimum Shear Reinforcement is provided. | | | |
| Stirrup Steel Yield Strength | = | 500 | N/sq mm |
| No. of Stirrup Legs | = | 2 | Nos. |
| Stirrup Rod Diameter-1 | = | 8 | mm. |
| Spacing of Stirrups Required | = | 300 | mm. |
| Stirrup Rod Diameter-2 | = | 10 | mm. |
| Spacing of Stirrups Required | = | 300 | mm. |
| *As per IS 456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.* | | | |

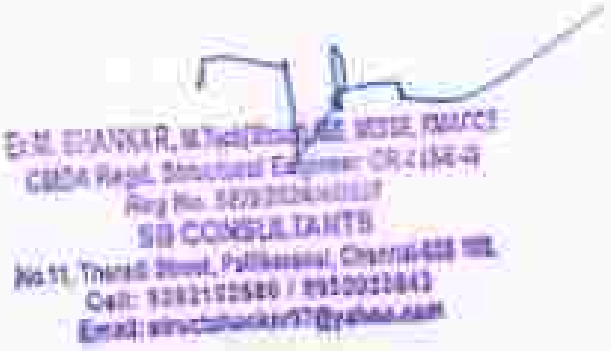
**B145 : Mid. Max - Flexure Output**

| | | | |
|---|---|---|---|
| Bending Moment | = | 40.172 | KN m |
| Factored Moment | = | 40.172 | KN m |
| Overall Depth of Section | = | 600 | mm. |
| Bottom Effective Cover | = | 70 | mm. |
| Effective Depth | = | 530 | mm. |
| Maximum N.A. Ratio | = | 0.456 | |
| Total Limiting Moment | = | 214.862 | KN m |
| Total Design Moment | = | 40.172 | KN m |
| Depth of Neutral Axis | = | 37.733 | mm. |
| Tensile Reinforcement Required | = | 0.17 | % |
| Compression Reinforcement is NOT Necessary | | | |
| **As Per IS:456-2000, Clause** | | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Min. Tensile Reinforcement Percentage | = | 0.17 | % |
| **As Per IS:456-2000, Clause**<br>Max. Reinforcement Percentage | = | 4 | % |
| Area of Tensile Reinforcement | = | 227.23 | sq.mm. |



**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.**

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Required | = | 1.832 | Nos. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |
| Main Rod Size-3 | = | 16 | mm. |
| No. of Rods Required | = | 1.031 | Nos. |
| No. of Rods Provided | = | 1 | Nos. |
| Corresponding Steel Area | = | 201.062 | sq.mm. |

Compression Steel is NOT required. However, 2 are provided. Irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-1 | = | 12 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 226.195 | sq.mm. |

Compression Steel is NOT required. However, 2 are provided. Irrespective of the size, for holding

| | | | |
|---|---|---|---|
| Main Rod Size-3 | = | 16 | mm. |
| No. of Rods Provided | = | 2 | Nos. |
| Corresponding Steel Area | = | 402.124 | sq.mm. |

*Note :- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing*

**B145 : Mid. Max - Shear Output**

| | | | |
|---|---|---|---|
| Shear Force | = | 26.288 | KN |
| Factored Shear | = | 26.288 | KN |
| **As Per IS:456-2000, Clause** Actual Shear Stress | = | 0.218 | N/sq.mm |
| **As Per IS:456-2000, Table 19,** Design Shear Strength of Concrete | = | 0.32 | N/sq.mm |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 1.174 | N/sq.mm |

Minimum Shear Reinforcement is provided.

| | | | |
|---|---|---|---|
| Stirrup Steel Yield Strength | = | 500 | N/sq.mm |

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| | | | |
|---|---|---|---|
| No. of Stirrup Legs | = | 2 | Nos |
| Stirrup Rod Diameter-1 | = | 8 | mm |
| Spacing of Stirrups Required | = | 300 | mm |
| Stirrup Rod Diameter-2 | = | 10 | mm |
| Spacing of Stirrups Required | = | 300 | mm |

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**SCADDS/RC-Slab Designer 2022 [ Release: 4.01.3010 ]**

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**SCADDS/Nucleus 2022: RC-Slab Designer**
**Limit State Design of R.C.C. One Way/Two Way**
**Rectangular/Square Slabs & Trapezoidal/Triangular Slabs**
**and Circular/Hexagonal/Octagonal Slabs**
**with Simple/Fixed/Continuous/Cantilever Supports**
**as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)**
**and IS:875-1987(Part-2)**

INTRODUCTION

This Report contains detailed design solutions for

The R.C.C. Slabs are considered for Flexural Design.
the output contains the following portions

1. Global Input Data
2. Flexural Design Output
3. Shear Check Output
4. Deflection Check Output
5. Development Length / Bond Design Output

While detailed design is carried out for Flexure,
only checks are made for items 3 and 4.

**GLOBAL MATERIAL DATA**

| | | | |
|---|---|---|---|
| Concrete Clear Cover | = | 20 | mm. |
| Char. Comp. Strength of Concrete | = | 25 | N/sq.mm. |
| Density of Concrete | = | 24.517 | kN/cu.m. |
| Yield Strength of Main Steel | = | 500.000 | N/sq.mm. |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Main Rod Diameter-2 | = | 10 | mm |
| Corresponding Development Length | = | 534.04 | mm |
| Secondary Rod Diameter-1 | = | 8 | mm |
| Corresponding Development Length | = | 427.232 | mm |
| Secondary Rod Diameter-2 | = | 10 | mm |
| Corresponding Development Length | = | 534.04 | mm |

**S001 - PANEL INPUT**

| | | | |
|---|---|---|---|
| Slab Number | = | S001 | |
| Slab Shape | = | Rectangular | |
| Centre to Centre Short Span | = | 1.32 | m |
| Centre to Centre Long Span | = | 4.75 | m |

| | | | |
|---|---|---|---|
| Effective Short Span | = | 1.1 | m |

**Support Type : Continuous Supports**
**It is a One way Slab.**

| | | | |
|---|---|---|---|
| Initial Thickness of Slab | = | 125 | mm |

**Type of Building is "Residential Building"**
**Type of Floor is "All Rooms and Kitchens"**

| | | | |
|---|---|---|---|
| Live Load | = | | |
| Floor Finish Load | = | | |
| Partition Load | = | | |

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Miscellaneous Load | = | NIL | |

**S001 - FLEXURE OUTPUT**

| | | | |
|---|---|---|---|
| **Slab Identification Number** | = | **S001** | |
| Effective Short Span | = | 1.1 | m. |
| Effective Long Span | = | 4.595 | m |
| Long Span to Short Span Ratio | = | 4.177 | |
| **It is a One way Slab.** | | | |
| **Thickness of Slab Provided** | = | **125** | **mm.** |
| Concrete Clear Cover | = | 20 | mm. |
| Density of Reinforced Concrete | = | 24.517 | KN/cu.m. |
| **Dead Weight of Slab** | = | **2.819** | **KN/sq.m.** |
| **Loads on the Slab Panel** | | | |
| Live Load | = | 2 | KN/sq.m. |
| Floor Finish Load | = | 1 | KN/sq.m. |
| Partition Load | = | 1 | KN/sq.m. |
| Miscellaneous Load | = | NIL | |
| **Total Dead Load on Slab Panel** | = | **4.819** | **KN/sq.m.** |
| **Total Load on Slab Panel** | = | **6.819** | **KN/sq.m.** |
| Safety Factor for Load | = | 1.5 | |
| **Total Factored Load on Slab Panel** | = | **10.229** | **KN/sq.m.** |
| Effective Depth Required | = | 20.078 | mm |
| Effective Depth Provided | = | 90 | mm |
| **Hence SAFE.** | | | |

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**Short Span Reinforcement over Centre Portion**

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| | | | |
|---|---|---|---|
| Short Span Positive Moment | = | 1 092 | KN m. |
| **Short Span Positive Steel** | = | **106** | **sq.mm.** |
| Dia. of Rod-1 along Short Span | = | 8 | mm. |
| Required Spacing along Short Span (+) | = | 465.421 | mm. |
| **Max. Spacing allowed (Rounded off) (+)** | = | **275** | **mm.** |
| Dia. of Rod-2 along Short Span | = | 10 | mm. |
| Required Spacing along Short Span (+) | = | 727.221 | mm. |
| **Max. Spacing allowed (Rounded off) (+)** | = | **275** | **mm.** |

Short Span Reinforcement over Support Portion

| | | | |
|---|---|---|---|
| Short Span Negative Moment | = | 1 278 | KN m. |
| **Short Span Negative Steel** | = | **100** | **sq.mm.** |
| Dia. of Rod-1 along Short Span | = | 8 | mm. |
| Required Spacing along Short Span (-) | = | 465.421 | mm. |
| **Max. Spacing allowed (Rounded off) (-)** | = | **275** | **mm.** |
| Dia. of Rod-2 along Short Span | = | 10 | mm. |
| Required Spacing along Short Span (-) | = | 727.221 | mm. |
| **Max. Spacing allowed (Rounded off) (-)** | = | **275** | **mm.** |

Distribution Reinforcement

| | | | |
|---|---|---|---|
| Distribution Steel Percentage | = | 0.12 | % |
| **Long Span Distribution Steel** | = | **138** | **sq.mm.** |
| Spacing of Rod-1 along Long Span (+) | = | 364.243 | mm. |
| **Max. Spacing allowed (Rounded off) (+)** | = | **300** | **mm.** |
| Spacing of Rod-2 along Long Span (+) | = | 369.129 | mm. |
| **Max. Spacing allowed (Rounded off) (+)** | = | **300** | **mm.** |

*Note:- The required Spacing of Main Rods will be compared 300 mm. (11.811") or 3d whichever is less. If the required this limit, the least value will be automatically provided. This is done in accordance with IS:456-2000 Clause 26.3.3.*

*Similarly, the required Spacing of Dist. Rods will be 300 mm. (11.811") or 5d whichever is less. If the required this limit, the least value will be automatically provided. This is done in accordance with IS:456-2000 Clause 26.3.3.*

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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&18/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

*If the User has fixed Minimum and Maximum Spacing practical considerations, those values will be used as and implemented in the Drawings and Quantity*

| S001 – SHEAR CHECK | | | |
|---|---|---|---|
| Effective Short Span | = | 1.1 | m. |
| Effective Long Span | = | 4.595 | m. |
| **Total Factored Load per Unit Length** | = | **16.229** | **KN/m.** |
| Shear Coeff. for Continuous Edge-X | = | 0.6 | |
| Corresponding Design Shear | = | 6.751 | KN. |
| Shear Coeff. for Discontinuous Edge-X | = | 0 | |
| Corresponding Design Shear | = | 0 | KN. |
| Shear Coeff. for Continuous Edge-Y | = | 0.6 | |
| Corresponding Design Shear | = | 6.751 | KN. |
| Shear Coeff. for Discontinuous Edge-Y | = | 0 | |
| Corresponding Design Shear | = | 0 | KN. |
| **Maximum Design Shear** | = | **6.751** | **KN.** |
| **As Per IS:456-2000, Clause 40.1,** Actual Shear Stress | = | 0.075 | N/sq.mm. |
| **As Per IS:456-2000, Clause 40.2.1.1 & Table 19,** Design Shear Strength of Concrete | = | 0.342 | N/sq.mm. |
| **As Per IS:456-2000, Table 20,** Max. Permissible Shear Stress | = | 3.124 | N/sq.mm. |
| **It can be seen that 0.075 < 0.342 and 0.075 < 3.124. The Slab Panel is SAFE in Shear.** | | | |

| S001 - DEFLECTION CHECK |
|---|

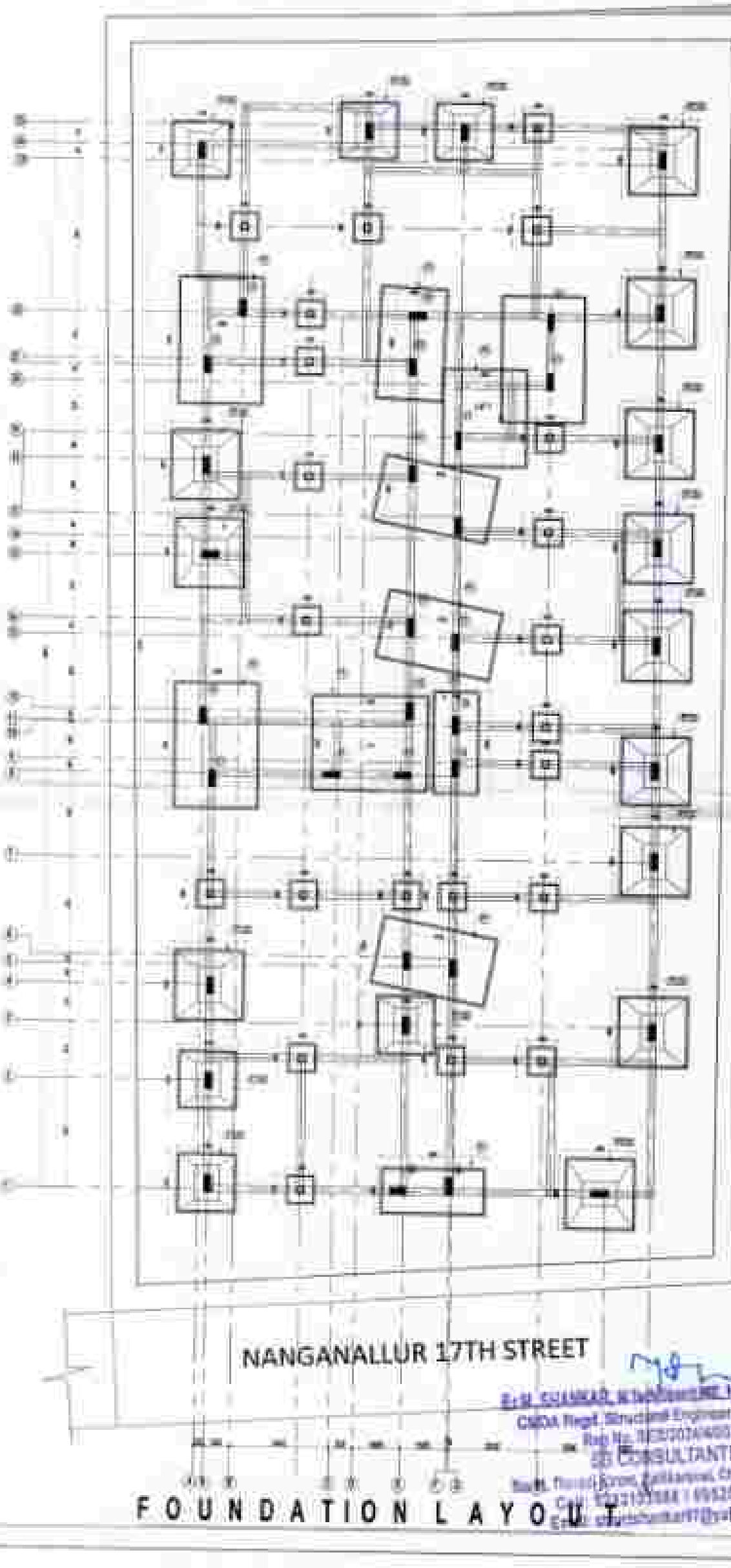
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CMDA Regd. Structural Engineer Gr-I (SE-I)
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**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OD STILT FLOOR +4 FLOORS +5 TH FLOOR (PART) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS AVAILING PREMIUM FSI WITH TOD BENIFITAT PLOT NO. 29,17 TH CROSS STREET,NCBS COLONY,NANGANALLUR,CHENNAI-600061 AND COMPRISED IN OLD S.NO.19/3 (PART)4 (PART),20/1 (PART),3 (PART) AS PER PATTA NEW TS NO.18/11&16/2,BLOCK NO. 31,WARD -B OF NANAGANALLUER VILLAGE,ALANDUR TALUK WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

| | | | |
|---|---|---|---|
| Effective Short Span | = | 1.1 | m. |
| Effective Depth of Slab | = | 90 | mm. |
| Actual Span to Depth Ratio | = | 12.222 | |
| As Per IS:456-2000, Clause 23.2.1.a, Factor Alpha | = | 26 | |
| As Per IS:456-2000, Clause 23.2.1.b, Factor Zigma | = | 1 | |
| As Per IS:456-2000, Clause 23.2.1.c, Factor Gamma | = | 1.478 | |
| Allowable Span to Depth Ratio | = | 38.424 | > 12.222 |

**Deflection Requirements are O.K.**

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FOUNDATION LAYOUT

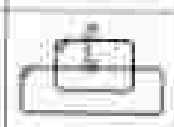
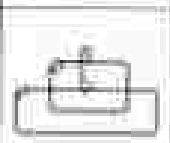
# FOUNDATION LAYOUT

AANIRUDH FOUNDATION PVT LTD

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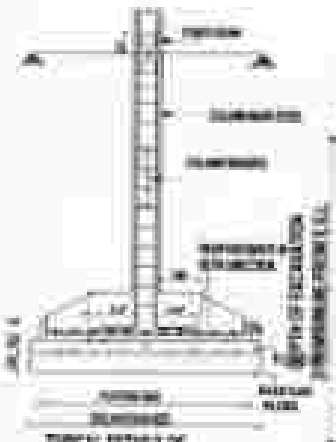
SB CONSULTANTS

## COLUMN SCHEDULE

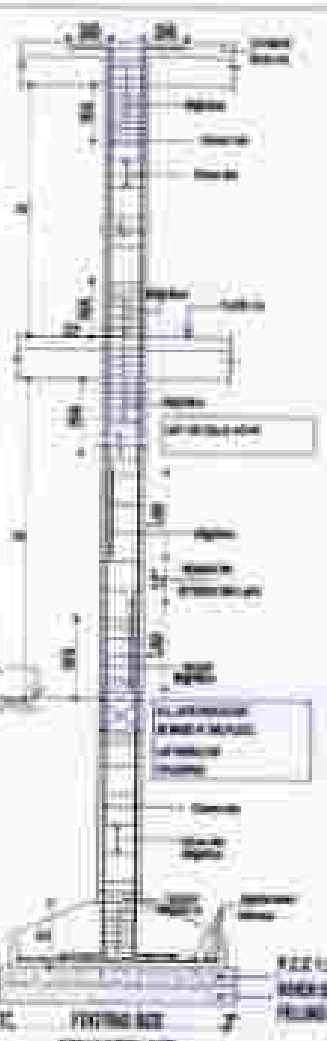
| MARK | COLUMN REFERENCE | SIZE | COLUMN SHAPE | REINFORCEMENT | MARKING | DIAGRAM | TIE DETAILS |
|---|---|---|---|---|---|---|---|
| C1 | C1 | [illegible] |  | [illegible] | [illegible] | [illegible] |  |
| C2 | C2 | [illegible] |  | [illegible] | [illegible] | [illegible] |  |
| C3 | C3 | [illegible] |  | [illegible] | [illegible] | [illegible] |  |

## FOOTING SCHEDULE

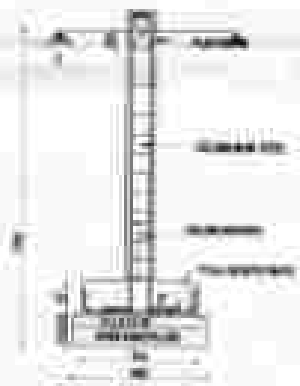
| MARK | FOOTING REFERENCE | SIZE | FOOTING SIZE | A | B | DEPTH | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | F1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2 | F2 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 3 | F3 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 4 | F4 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 5 | F5 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 6 | F6 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 7 | F7 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 8 | F8 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 9 | F9 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |



TYPICAL DETAILS OF SQUARE SLOPED FOOTING



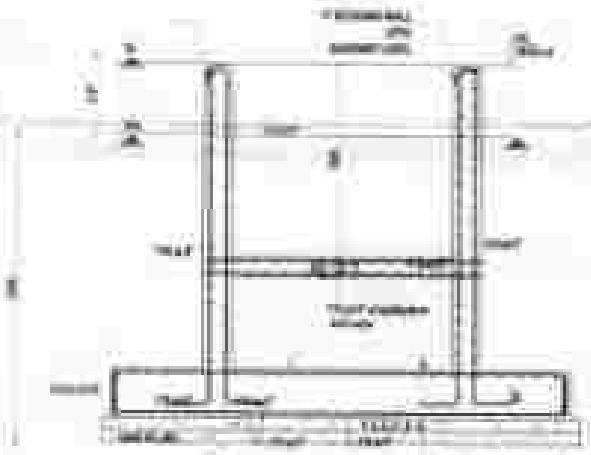
TYPICAL SECTION THROUGH



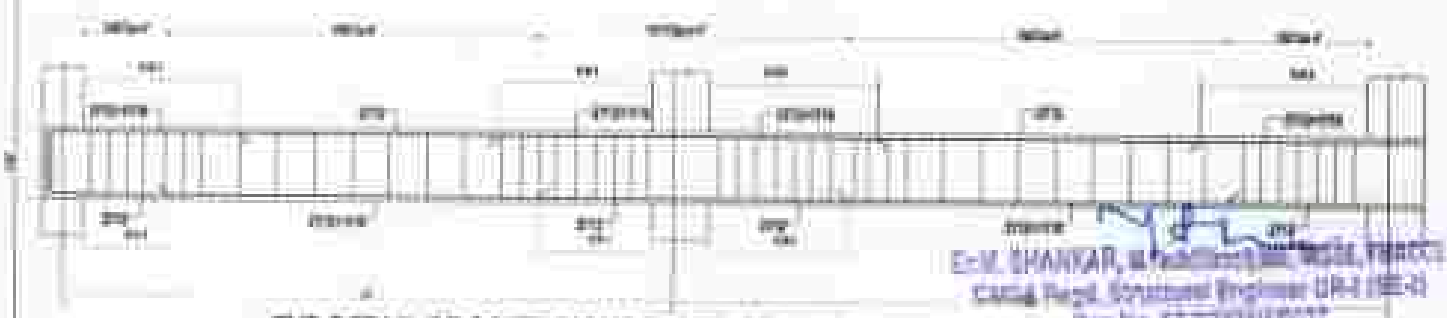
TYPICAL DETAILS OF [illegible] COLUMN FOOTING



C.S OF PB



TYPICAL LIFT RETAINING WALL DETAILS P2



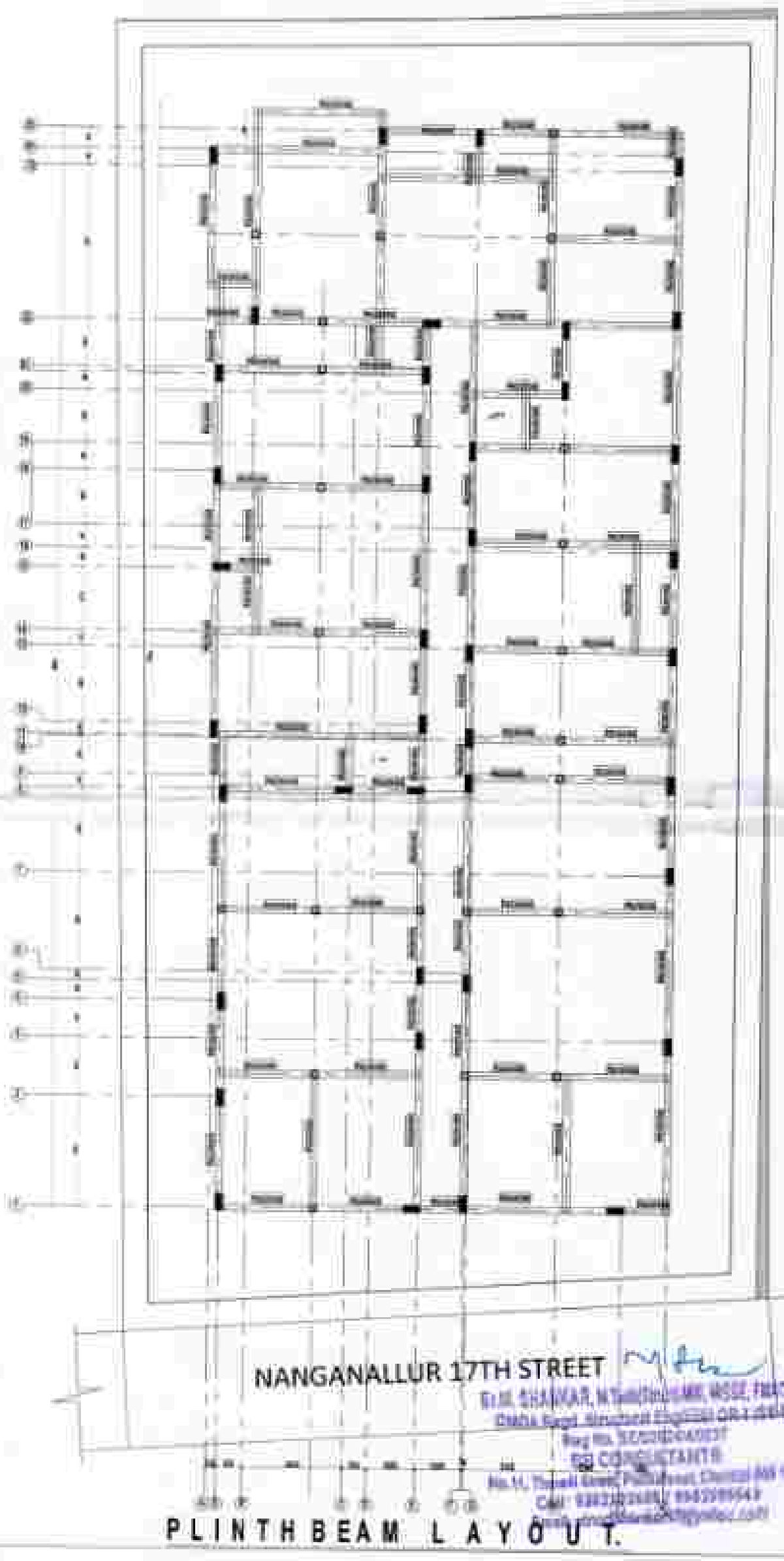
TYP.DETAIL OF CONTINUOUS PLINTH BEAM PB

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FOUNDATION LAYOUT

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PLINTH BEAM LAYOUT.

PROJECT:

PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 4 FLOORS + SU FLOOR (Part) RESIDENTIAL BUILDING WITH 37 DWELLING UNITS AVAILING PREMIUM FSI WITH TDR BENEFIT AT PLOT NO. 28, 17TH STREET, MODEL COLONY, NANGANALLUR, CHENNAI - 600061 AND COMPRISED IN OLD SURVEY NO. 19/1 (Part), 4(Part), 19/1 (Part), 3 (Part) AS PER PATTA BOOK T.S. NO. 191 & 192, BLOCK NO. 31, WARD-K OF NANGANALLUR VILLAGE, ALAMBAKKAM TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

NOTES:

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| NO. | REVISION | DATE | SIGN |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

PROJECT NO.

DRG TITLE: **PLINTH BEAM LAYOUT**

STRUCTURAL DRAWING

DRG NO. : SK-01 (R1)

SCALE : 1:100 @ A1

DATE : 11.12.2024

REVISED NO. : R1

DRAWN BY : S.Das

LAY OUT & STRUCTURAL DESIGN OF RCC STRUCTURE AS PER IS CODES

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THE LANDLENS SUITE

# Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

### LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
**/landlens/one**

### Verify My Land
Every record check run on one property and returned as a single report.
**/landlens/verify-my-land**

### Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
**/landlens**

### One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
**/landlens/one/map**

### PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
**/landlens/pricemap**

### Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
**/landlens/build-scope**

### Property Tracker
Watch a property and hear about it when something new is registered against it.
**/landlens/property-tracker**

### Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
**/landlens/deal-room**

FREE TOOLS · NO ACCOUNT NEEDED

# Twenty-four checks you can run yourself, at no cost.

## Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

## Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

## Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

## Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

**Every free tool**
/tools

**Services we run for you**
/services

**The LandLens suite**
/landlens/one

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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Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.