* 1. General Information
     1. Design Code : IS456:2000
     2. Unit System : N, mm
  2. Material
     1. : 25 MPa
     2. : 415 MPa
  3. Design Load
     1. Column 1
        + : 10.000kN
        + : 100.00kN
     2. Column 2
        + : 20.00kN
        + : 150kN
     3. Surcharge Load
        + Surface Load : 1.000kN/m²
        + Weight Density : 18.00kN/m³
        + Soil Height : 0.500m
     4. Self-weight is considered.
  4. Column (mm)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Shape** | **Section** |  |
| 1 | Rectangle | 305x305mm | 1.000m |
| 2 | Rectangle | 305x305mm | 3.048m |

* 1. Rebar
     1. Direction X
        + Cantilever(L) : P8@457
        + Column (1) : P8@457
        + Span (1-2) : P8@457
        + Column (2) : P8@457
        + Cantilever(R) : P8@457
     2. Direction Y
        + Column (1) : P8@457
        + Column (2) : P8@457
  2. Foundation
     1. Foundation Size
        + : 4.548m
        + : 1.000m
        + Depth : 300mm
        + Cover : 100mm
        + Soil Bearing Capacity : 200KPa



* 1. Check Soil Capacity
     1. Calculate actual soil stress (KPa)
        + 16.77 29.96
        + 29.96

0.150 → O.K

* + 1. Calculate factored soil stress (KPa)
       - 14.74 95.20
       - 95.20 14.74
  1. Check Shear [IS456:2000 34.2.4]
     1. Calculate one-way shear
        + 77.12kN Tc b d =125kN

0.615 → O.K

* + 1. Calculate two-way shear

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column** | **Pos.** | **(mm)** | **(kN)** | **(kN)** | **Ratio** |
| 1 | Interior | 1,918 | 580 | 87.37 | 0.201 |
| 2 | Interior | 1,918 | 580 | 137 | 0.316 |

* + - * d = 300.000mm
      * =580 kN
      * 137kN

0.316 → O.K

* 1. Check Moment Capacity
     1. Calculate moment capacity (Direction X)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | **Top/Bottom** |  |  | **Ratio** | **Mark** |
| Cantilever(L) | Bottom | 7.089 | 73.66 | 0.0962 | O.K |
| Column (1) | Bottom | 7.089 | 73.66 | 0.0962 | O.K |
| Span (1-2) | Top | -58.05 | 73.66 | 0.788 | O.K |
| Column (2) | Bottom | 5.628 | 73.66 | 0.0764 | O.K |
| Cantilever(R) | Bottom | 5.628 | 73.66 | 0.0764 | O.K |

* + 1. Calculate moment capacity (Direction Y)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Position** | **Top/Bottom** |  |  | **Ratio** | **Mark** |
| Column (1) | Bottom | 6.041 | 63.11 | 0.205 | O.K |
| Column (2) | Bottom | 9.062 | 63.11 | 0.308 | O.K |

* 1. Check Rebar
     1. Calculate minimum rebar area required **[IS456:2000 26.5.2.1]**
        + 540mm²
     2. Calculate minimum rebar space required (Direction X)  **[IS456:2000 26.3.3]**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Position** | **Top/Bottom** | **Rebar** |  |  |  | **Mark** |
| Cantilever(L) | Bottom | P8@457 | 1,115mm² | 300 | 450 | N.G |
| Column (1) | Bottom | P8@457 | 1,115mm² | 300 | 450 | N.G |
| Span (1-2) | Top | P8@457 | 1,115mm² | 300 | 450 | N.G |
| Column (2) | Bottom | P8@457 | 1,115mm² | 300 | 450 | N.G |
| Cantilever(R) | Bottom | P8@457 | 1,115mm² | 300 | 450 | N.G |

* + 1. Calculate minimum rebar space required (Direction Y)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Position** | **Top/Bottom** | **Rebar** |  |  |  | **Mark** |
| Column (1) | Bottom | P8@457 | 1,115mm² | 450 | 450 | N.G |
| Column (2) | Bottom | P8@457 | 1,115mm² | 450 | 450 | N.G |