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RE REGULATORY RECORD

# RERA Document

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DIGITALLY VERIFIED RECORD

# Square Ball Apartment Design Data Report :

## Footing Data:

### Soil Parameters :

| | |
|---|---|
| SBC of soil | = 190.00 kN/m² |
| SBC Increment Factor for Seismic Load | = 1.250 |
| SBC Increment Factor for Wind Load | = 1.250 |
| Angle of friction,(phi) | = 30.00 degrees |
| Cohesion | = 60.00 |
| Permissible factor of safety | = 1.400 |
| Depth From Ground | = 2.50 m |

### Material Properties :

| | |
|---|---|
| fck | = 20.00 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 |
| Bottom PCC Depth | = 150 mm |
| Pedestal Offset | = 150 mm |
| Pedestal Depth | = 150 mm |
| Size Rounding Factor | = 25 mm |
| Depth Rounding Factor | = 25 mm |
| Number of Steps | = 2 |
| Minimum Step Depth | = 150 mm |

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## Column Data:

### Material Properties :

| | |
|---|---|
| fck | = 20.00 N/mm² |
| fy | = 500.00 N/mm² |
| fy - Stirrups | = 500.00 N/mm² |

### 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 |

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**Design Considerations :**

Design is done as per IS 456.

IS 13920 provisions are not considered for detailing.

Live Load reduction is not 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) | = 4 |
| Minimum steel Percentage | = 0.80 |
| Maximum steel Percentage | = 6.00 |
| Minimum spacing between main bars | = 25 mm |
| Maximum spacing between main bars | = 300 mm |
| Minimum spacing between Stirrups | = 125 mm |
| Diameters of selected bars | = 12 mm , 16 mm , 20 mm, 32 mm . |

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

**Material Properties :**

| | |
|---|---|
| RCC Grade | = M20 |
| Main Steel Grade | = Fe500 |
| Distribution Steel Grade | = Fe500 |

**Slab Parameters :**

| | |
|---|---|
| Effective Cover | = 20 mm |
| Minimum spacing between Main bars | = 75 mm |
| Maximum spacing between Main bars | = 200 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 | = 10 mm |
| Minimum Dist.bar Diameter | = 8 mm |
| Maximum Dimension to be used for Trapezoidal Slab | = Average of two parallel sides |
| Maximum Dimension to be used for General Slab | = Maximum of two parallel sides |

---

## Beam Data:

**Shear Design Data :**

| | |
|---|---|
| Minimun Stirrup Dia | = 8 mm |
| Stirrup Legs | = 2 |
| Minimum Stirrups Spacing | = 100 mm |
| Stirrups Steel Grade Name | = Fe500 |
| Effect of Concrete in shear considered | |

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**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 not 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 = 10 mm
Main Steel Grade = Fe500
No. of division of the beam = 10
Max. Aggregate size = 20

## EARTHQUAKE LOAD REPORT : As per IS:1893(Part 1) - 2002

## Earthquake Load Generation Method : Column Reaction Method
## Wall Load Transfer Type : Full Wall Load is transferred on floor

## Earthquake Load Parameters:

| Parameters | Values |
|---|---|
| Seismic zone factor,Z | 0.16 |
| Importance factor,I | 1.20 |
| Response reduction factor,R | 3.00 |
| Percentage damping | 5 % |
| Fundamental time period,$T_x$ | 0.53 |
| Fundamental time period,$T_y$ | 0.58 |
| Soil type | Medium Soil |
| Average response acc. coeff.,($S_{ax}$/g) | 2.50 |
| Average response acc. coeff.,($S_{ay}$/g) | 2.36 |
| Total Load W | Total Dead Load + Total Effective Live Load |
| | 16837.78 + 464.45 |
| W | 17302.23 kN |

### $A_h$ Calculation

$A_{hx}$ = (z/2).(I/R).($S_{ax}$/g)
= (0.16 / 2).(1.20 / 3.00).(2.50)
= 0.08
= 0.08

Base shear in X Direction $V_{bx}$ = $A_{hx}$ x W
$V_{bx}$ = 0.08 x 17302.23
$V_{bx}$ = 1384.18 kN

$A_{hy}$ = (z/2).(I/R).($S_{ay}$/g)
= (0.16 / 2).(1.20 / 3.00).(2.36)
= 0.08
= 0.08

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Base shear in Y Direction $V_{by}$ = $A_{hy}$ x W

$V_{by}$ = 0.08 x 17302.23

$V_{by}$ = 1308.08 kN

**SQUARE BALL APARTMENT Design of Beam Group : RB3**

Beam : RB3

**Material Properties :**

fck = 20.000 N/mm2

fy = 500.000 N/mm2

**1.Design Data :**

1.1)Dimensions:

Beam Type = 'Rectangular Beam'

Width (b) = 230 mm

Total depth (D) = 460 mm

Effective Tension Cover = 33mm

Effective Compression Cover = 33mm

Clear side Cover = 25mm

Effective depth (d) = 427mm

Span = 6.705m

Clear Span (L) = 6.705m

**1.2)Loading on the Beam :**

1.2.1)Self wt. of beam : -3.450 kN/m

1.2.3)Wall Load

UDL in kN/m

St.Pt 0.000 m L = 6.705 m Max. Value = -24.535 kN/m

**2.Computation of Area of steel :**

2.1) Flexural Steel at Top and Bottom

2.1.1)Computation of theoretical steel

| At length | 0.000L | 0.100L | 0.200L | 0.300L | 0.400L | 0.500L | 0.600L | 0.700L | 0.800L | 0.900L | 1.000L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B.M. Hog in kN-m | 163.218 | 75.373 | 6.401 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 52.007 | 134.011 |
| B.M. Sag in kN-m | 0.000 | 0.000 | 0.000 | 43.700 | 74.929 | 87.286 | 80.770 | 55.383 | 11.124 | 0.000 | 0.000 |
| Torsion in kN-m | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 | 0.234 |
| Eq.B.M.Hog in kN-m | 163.566 | 75.721 | 6.749 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 52.355 | 134.359 |
| Eq.B.M.Sag in kN-m | 0.000 | 0.000 | 0.000 | 44.048 | 75.277 | 87.634 | 81.118 | 55.731 | 11.472 | 0.000 | 0.000 |
| Top $A_{st_req}$ in mmB | 958.236 | 397.776 | 33.219 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 268.636 | 755.659 |
| Bot $A_{st_req}$ in mmB | 0.000 | 0.000 | 0.000 | 224.219 | 395.259 | 466.238 | 428.560 | 286.901 | 56.699 | 0.000 | 0.000 |

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Max.Area of steel req. at Top = 958.236 mm2 at 0.000L
Max.Area of steel req. at Bottom = 466.238 mm2 at 0.500L
2.1.2)Minimum and Maximum Steel Checks :
a)Minimum Steel Check as per IS 456:2000 Clause 26.5.1.1(a)

$A_{st}$ = (0.85 x b x d) / $f_y$
= 197.973 mm2

b)Maximum Steel Check as per IS 456:2000 Clause 26.5.1.1(b)

$A_{st}$ = 0.04 x b x D
= 5520.000 mm2

2.1.3)Provided Steel
2.1.3.1)Provided Bottom Steel :

| | |
|---|---|
| Straight bars | = 2 - #16 |
| Curtail Bars | = --- +2 - #16 |
| Total Area of Steel at bottom at 0.500L | = 804.00 mm2>$A_{st_req.}$ (O.K.) |

2.1.3.2)Provided Top Steel :

| | |
|---|---|
| Straight bars | = 2 - #16 |
| Extra bars at Left | = +4 - #16 1.562,1.676 +1 - #12 1.562,1.676 |
| Extra bars at Right | = +4 - #16 1.676,0.000 +2 - #10 1.676,0.000 |
| Total Area of Steel at Top | |
| At Left Support | = 1206.00 mm2 |
| At Right Support | = 1206.00 mm2 |

2.2)Computation of Shear Reinforcement(Stirrups) :

$\tau_{auc}$ = 0.526 N/mm2
$S_{vmin}$ = 320 mm

Note :
Design Shear = (Equivalent S.F.)-($V_{uc}$)
$V_{usT}$ = ( $T_u/b_1$ + $V_u/2.5$)($d/d_1$)
Where,
$T_u$ = Torsional moment,
$V_u$ = Ultimate shear force
$b_1$ = Center to center distance between corner bars in the direction of width
$d_1$ = Center to center distance between corner bars in the direction of depth
(As per Clause 41.4.3 of IS 456:2000)
If Design Shear < $V_{usT}$ then Design Shear = $V_{usT}$
$V_{usT}$ = Minimum shear for torsional transverse Reinforcement
2.2.1) Computation of Steel

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| At length | 0.000L | 0.100L | 0.200L | 0.300L | 0.400L | 0.500L | 0.600L | 0.700L | 0.800L | 0.900L | 1.000L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S.F.in kN | 145.087 | 116.941 | 88.795 | 60.649 | 32.502 | 4.356 | -23.790 | -51.936 | -80.082 | -108.228 | -136.375 |
| $T_u$ in kN-m | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 | -0.234 |
| Eq. S.F. in kN | 146.333 | 118.186 | 90.040 | 61.894 | 33.748 | 5.602 | 25.036 | 53.182 | 81.328 | 109.474 | 137.620 |
| $V_{usT}$ in kN | 68.212 | 55.219 | 42.226 | 29.233 | 16.240 | 3.247 | 12.218 | 25.211 | 38.204 | 51.197 | 64.190 |
| Vuc in kN | 77.561 | 77.561 | 77.561 | 57.236 | 57.236 | 57.236 | 57.236 | 57.236 | 67.347 | 67.347 | 67.347 |
| Design Shear in kN | 68.771 | 55.219 | 42.226 | 29.233 | 16.240 | 3.247 | 12.218 | 25.211 | 38.204 | 51.197 | 70.273 |
| Spacing req. in mm for 8 Dia | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |

2.2.2)Provided Shear Steel (Stirrups) :

Nominal Zone :#8 @ 150 mm c/c from 0.000 to 6.600 .

Note : Nominal zone is where No Shear Reinforcement is needed.
Hence provide minimum Shear Reinforcement of 0.75 d
(As per Clause 26.5.1.5 of IS 456:2000)

## Square Ball Apartment Design of Roof Slab

Slab Name : S1
Slab Type : Two Way Slab
Grade of Concrete :M20
Grade of Steel : Fe500
Dimensions : Lx = 5.258 m ,Ly = 4.115 m ,Thickness= 150 mm
Span Ratio : Longer/Shorter = 1.278
Boundary Condition : One long edge discontinuous

### Loading on Slab :(Table 1)

Total DL = (1) + (2) + (3)

| Self Weight (1) kN/m² | Floor Finish (2) kN/m² | Sunk Load (3) kN/m² | Total DL (4) kN/m² | Live Load (5) kN/m² | Total LL (6) kN/m² | Total Design Load 1.5 x [(4)+(6)] kN/m² |
|---|---|---|---|---|---|---|
| 3.750 | 1.500 | 0.000 | 5.250 | 5.000 | 5.000 | 15.375 |

### Deflection Check :(Table 2)

As per clause 23.2.1 of IS 456:2000:

| (Span/Depth) Ratio | Modification Factor (a) | Basic Factor (b) | Permissible Ratio (a x b) | Status |
|---|---|---|---|---|
| 32.920 | 1.343 | 26.000 | 34.925 | OK |

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## Moment And Steel Calculations :

Coefficients ($\alpha_x$ and $\alpha_y$) are computed as per clause D-1.1 of IS 456:2000:

$M_x = \alpha_x \times W \times L_x \times L_x$:

$M_y = \alpha_y \times W \times L_x \times L_x$:

where

$M_x$,$M_y$ = moments on strips of unit width spanning $L_x$ and $L_y$ respectively,

W = Total Design Load = 15.375 kN/$m^2$

$L_x$ = Shorter span = 4.115 m

| Position | Moment Coeff.$\alpha_x$ or $\alpha_y$ | Moment kN-m | $A_{st_rqd}$ per metre $mm^2$ | Steel Detail dia @ spc mm c/c | $A_{st_prv}$ per metre $mm^2$ | Remark |
|---|---|---|---|---|---|---|
| MidShort | 0.043 | 11.166 | 193.254 | #10 @ 150 | 523.35 | Main |
| MidLong | 0.028 | 7.290 | 124.610 | #10 @ 150 | 523.35 | Other |
| SuppDown | 0.000 | 0.000 | 0.000 | #10 @ 300 | 262.00 | Extra at Top |
| SuppTop | 0.056 | 14.550 | 254.683 | #10 @ 150 | 523.35 | Extra at Top |
| SuppLeft | 0.037 | 9.633 | 165.895 | #10 @ 150 | 523.35 | Extra at Top |
| SuppRight | 0.037 | 9.633 | 165.895 | #10 @ 150 | 523.35 | Extra at Top |

## Minimum Steel Check :

As per clause 26.5.2.1 of IS 456:2000:

Minimum area of steel For Main Steel = 0.12 x C/S Area

= 180.000 $mm^2$

## Notes :

Extra steel at Top support is computed considering
the bent-ups, if any, coming from the adjoining span.
It is the maximum of the extra steel required
for each slab at that common support.

**********END OF THE DESIGNREPORT**********

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THE LANDLENS SUITE

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Ask anything about a property and get an answer grounded in live government records, with the sources shown.
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### Verify My Land
Every record check run on one property and returned as a single report.
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### 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.
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### PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
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What you are allowed to build here: floor space, height, coverage and setbacks.
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- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

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

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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
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# Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

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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.