



Design of Two Way Slab System and Footing Formulas

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List of 12 Design of Two Way Slab System and Footing Formulas



Design of Two Way Slab System 🕑

1) Concrete Shear Strength at Critical Sections 🖸

fx
$$\mathrm{V} = \left(2 \cdot (\mathrm{f_c})^{rac{1}{2}}
ight) \cdot \mathrm{d'} \cdot \mathrm{b_o}$$

2) Equation for Punching Shear Design 🕑

fx
$$\left | \phi \mathrm{V_n} = \phi \cdot (\mathrm{V_c} + \mathrm{V_s})
ight |$$

$$| 161.5 \text{MPa} = 0.85 \cdot (90 \text{MPa} + 100 \text{MPa}) |$$

3) Maximum Slab thickness 🖸

fx
$$\mathbf{h} = \left(\frac{\mathbf{l}_{n}}{36}\right) \cdot \left(0.8 + \frac{\mathbf{fy}_{\text{steel}}}{200000}\right)$$

ex $3509.189 \text{mm} = \left(\frac{101 \text{mm}}{36}\right) \cdot \left(0.8 + \frac{250 \text{MPa}}{200000}\right)$



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Footing 🕑

4) Maximum Moment for Symmetrical Concrete Wall Footing 🚰

$$fx M'max = \left(\frac{P}{8}\right) \cdot (b - t)^{2}$$

$$fx M'max = \left(\frac{11.76855Pa}{8}\right) \cdot (0.2m - 7.83m)^{2}$$

$$fx B = \left(6 \cdot \frac{M}{D^{2}}\right)$$

$$fx B = \left(6 \cdot \frac{M}{D^{2}}\right)$$

$$fx B = \left(6 \cdot \frac{M}{D^{2}}\right)$$

$$fx D = \left(6 \cdot \frac{500.5N}{(15.2m)^{2}}\right)$$

$$fx P = \frac{8 \cdot M'max}{(b - t)^{2}}$$

$$fx Open Calculator C Ope$$



Partial Safety Factors for Loads 🕑

7) Basic Load Effect given Ultimate Strength for Applied Wind Loads

fx
$$\mathrm{DL} = rac{\mathrm{U} - (1.3 \cdot \mathrm{W})}{0.9}$$

$$12.11111 \text{kN/m}^2 = \frac{20 \text{kN/m}^2 - (1.3 \cdot 7 \text{kN/m}^2)}{0.9}$$

8) Basic Load Effect given Ultimate Strength for Unapplied Wind and Earthquake Loads

fx
$$DL = rac{U - (1.7 \cdot LL)}{1.4}$$

ex
$$8.214286 \text{kN/m}^2 = \frac{20 \text{kN/m}^2 - (1.7 \cdot 5 \text{kN/m}^2)}{1.4}$$

9) Live Load Effect given Ultimate Strength for Unapplied Wind and Earthquake Loads

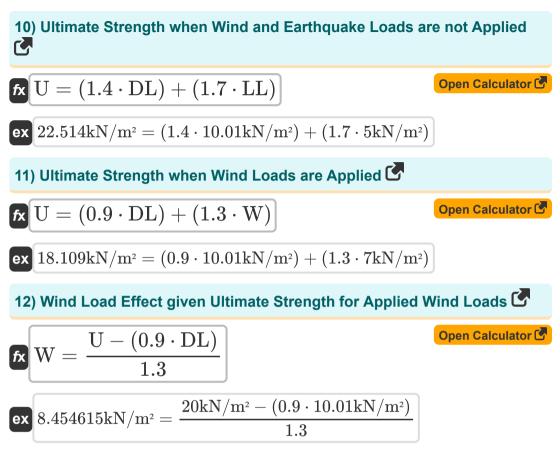
fx
$$\mathrm{LL}=rac{\mathrm{U}-(1.4\cdot\mathrm{DL})}{1.7}$$
 ex $3.521176\mathrm{kN/m^2}=rac{20\mathrm{kN/m^2}-(1.4\cdot10.01\mathrm{kN/m^2})}{1.7}$

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Variables Used

- **b** Width of Footing (*Meter*)
- B Tensile Bending Stress (Newton Millimeter)
- **b**_o Perimeter of Critical Section (Meter)
- d' Distance from Compression to Centroid Reinforcment (Millimeter)
- D Depth of Footing (Meter)
- DL Dead Load (Kilonewton per Square Meter)
- **f**_c 28 Day Compressive Strength of Concrete (Megapascal)
- fysteel Yield Strength of Steel (Megapascal)
- h Maximum Slab Thickness (Millimeter)
- In Length of Clear Span in Long Direction (Millimeter)
- LL Live Load (Kilonewton per Square Meter)
- M Factored Moment (Newton)
- M'max Maximum Moment (Newton Meter)
- P Uniform Pressure on Soil (Pascal)
- t Wall Thickness (Meter)
- U Ultimate Strength (Kilonewton per Square Meter)
- V Shear Strength of Concrete at Critical Section (Pascal)
- V_c Nominal Shear Strength of Concrete (Megapascal)
- V_s Nominal Shear Strength by Reinforcement (*Megapascal*)
- W Wind Load (Kilonewton per Square Meter)
- φ Capacity Reduction Factor
- **φV**_n Punching Shear (Megapascal)



Constants, Functions, Measurements used

- Measurement: Length in Millimeter (mm), Meter (m) Length Unit Conversion
- Measurement: Pressure in Pascal (Pa), Megapascal (MPa), Kilonewton per Square Meter (kN/m²)
 Pressure Unit Conversion C
- Measurement: Force in Newton (N) Force Unit Conversion
- Measurement: Moment of Force in Newton Meter (N*m)
 Moment of Force Unit Conversion
- Measurement: Bending Moment in Newton Millimeter (N*mm) Bending Moment Unit Conversion
- Measurement: Stress in Megapascal (MPa) Stress Unit Conversion





Check other formula lists

- Properties of Basic Material of Concrete Structures Formulas
- Design for Beams and Ultimate Strength for Rectangular Beams with Tension Reinforcement Formulas
- Design of Compression Members
 Formulas
- Design of Retaining Walls
 Formulas
- Design of Two Way Slab System and Footing Formulas

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