calculatoratoz.com

unitsconverters.com

Foundation Stability Analysis Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 11 Foundation Stability Analysis Formulas

Foundation Stability Analysis

1) Correction Factor for Circle and Square

Open Calculator

fx $N_q = 1 + \tan(\varphi)$

ex $2.03553 = 1 + \tan(46^\circ)$

2) Correction Factor for Rectangle

Open Calculator

fx $N_q = 1 + \left(\frac{B}{L}\right) \cdot (\tan(\varphi))$

ex $1.517765 = 1 + \left(\frac{2m}{4m}\right) \cdot (\tan(46^\circ))$

3) Correction Factor Nc for Circle and Square

Open Calculator

fx $N_c = 1 + \left(\frac{N_q}{N_c}\right)$

ex $1.63871 = 1 + \left(\frac{1.98}{3.1}\right)$

4) Correction Factor Nc for Rectangle

Open Calculator

fx $N_c = 1 + \left(\frac{B}{L}\right) \cdot \left(\frac{N_q}{N_c}\right)$

ex $1.319355 = 1 + \left(\frac{2m}{4m}\right) \cdot \left(\frac{1.98}{3.1}\right)$

5) Correction Factor Ny for Rectangle

Open Calculator

fx $$N_{\gamma} = 1 - 0.4 \cdot \left(\frac{B}{L}\right)$$

ex $$0.8 = 1 - 0.4 \cdot \left(\frac{2\text{m}}{4\text{m}}\right)$$

6) Maximum Bearing Pressure

Open Calculator

fx $$q_m = \left(\frac{P}{A}\right) \cdot \left(1 + \left(e_1 \cdot \frac{c_1}{r_1^2}\right) + \left(e_2 \cdot \frac{c_2}{r_2^2}\right)\right)$$

ex $$1.372763\text{kN/m}^2 = \left(\frac{631.99\text{kN}}{470\text{m}^2}\right) \cdot \left(1 + \left(0.478\text{m} \cdot \frac{2.05\text{m}}{(12.3\text{m})^2}\right) + \left(0.75\text{m} \cdot \frac{3\text{m}}{(12.49\text{m})^2}\right)\right)$$

7) Maximum Bearing Pressure for Eccentric Loading Conventional Case

Open Calculator

fx $$q_m = \left(\frac{C_g}{b \cdot L}\right) \cdot \left(1 + \left(\frac{6 \cdot e_{load}}{b}\right)\right)$$

ex $$1.334375\text{kN/m}^2 = \left(\frac{1000\text{m}}{0.2\text{m} \cdot 4\text{m}}\right) \cdot \left(1 + \left(\frac{6 \cdot 2.25\text{mm}}{0.2\text{m}}\right)\right)$$

8) Maximum Soil Pressure

Open Calculator

fx $$q_m = \frac{2 \cdot P}{3 \cdot L \cdot \left(\left(\frac{B}{2}\right) - e_{load}\right)}$$

ex $$105.5692\text{kN/m}^2 = \frac{2 \cdot 631.99\text{kN}}{3 \cdot 4\text{m} \cdot \left(\left(\frac{2\text{m}}{2}\right) - 2.25\text{mm}\right)}$$

9) Minimum Bearing Pressure for Eccentric Loading Conventional Case

Open Calculator

fx $$q_{min} = \left(\frac{P}{b \cdot L}\right) \cdot \left(1 - \left(\frac{6 \cdot e_{load}}{b}\right)\right)$$

ex $$736.6633\text{kN/m}^2 = \left(\frac{631.99\text{kN}}{0.2\text{m} \cdot 4\text{m}}\right) \cdot \left(1 - \left(\frac{6 \cdot 2.25\text{mm}}{0.2\text{m}}\right)\right)$$

10) Net Bearing Capacity for Undrained Loading of Cohesive Soils

Open Calculator

fx $$q_u = \alpha_f \cdot N_q \cdot C_u$$

ex $$43.758\text{kPa} = 1.3 \cdot 1.98 \cdot 17\text{kPa}$$

11) Net Bearing Capacity of Long Footing in Foundation Stability Analysis

Open Calculator

fx $$q_u = (\alpha_f \cdot C_u \cdot N_c) + (\sigma_{vo} \cdot N_q) + (\beta_f \cdot \gamma \cdot B \cdot N_\gamma)$$

ex $$113.512\text{kPa} = (1.3 \cdot 17\text{kPa} \cdot 3.1) + (0.001\text{kPa} \cdot 1.98) + (0.5 \cdot 18\text{kN/m}^3 \cdot 2\text{m} \cdot 2.5)$$

Variables Used

- **A** Area of Footing *(Square Meter)*
- **b** Breadth of Dam *(Meter)*
- **B** Width of Footing *(Meter)*
- c_1 Principal Axis 1 *(Meter)*
- c_2 Principal Axis 2 *(Meter)*
- C_g Circumference of Group in Foundation *(Meter)*
- C_u Undrained Shear Strength of Soil *(Kilopascal)*
- e_1 Loading Eccentricity 1 *(Meter)*
- e_2 Loading Eccentricity 2 *(Meter)*
- e_{load} Eccentricity of the Load on Soil *(Millimeter)*
- **L** Length of Footing *(Meter)*
- N_c Correction Factor Nc
- N_q Correction Factor Nq
- N_γ Correction Factor Ny
- N_c Bearing Capacity Factor
- N_q Bearing Capacity Factor Nq
- N_γ Value of Nγ
- **P** Axial Load on Soil *(Kilonewton)*
- q_m Maximum Soil Pressure *(Kilonewton per Square Meter)*
- q_m Maximum Bearing Pressure *(Kilonewton per Square Meter)*
- q_{min} Bearing Pressure Minimum *(Kilonewton per Square Meter)*
- q_u Net Bearing Capacity *(Kilopascal)*
- r_1 Radius of Gyration 1 *(Meter)*
- r_2 Radius of Gyration 2 *(Meter)*
- α_f Alpha Footing Factor
- β_f Beta Footing Factor
- **γ** Unit Weight of Soil *(Kilonewton per Cubic Meter)*

- σ_{vo} Effective Vertical Shear Stress in Soil *(Kilopascal)*
- φ Angle of Internal Friction *(Degree)*

Constants, Functions, Measurements used

- Function: **tan**, tan(Angle)
  The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- Measurement: **Length** in Meter (m), Millimeter (mm)
  Length Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Pressure** in Kilonewton per Square Meter (kN/m²), Kilopascal (kPa)
  Pressure Unit Conversion
- Measurement: **Force** in Kilonewton (kN)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m³)
  Specific Weight Unit Conversion

Check other formula lists

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

7/2/2024 | 8:03:04 AM UTC *Please leave your feedback here...*