Important Bearing Capacity of Non-cohesive Soil Formulas PDF

Formulas
Examples
with Units

List of 18
Important Bearing Capacity of Non-cohesive Soil Formulas

1) Bearing Capacity Factor Dependent on Surcharge for Circular Footing Formula

Evaluate Formula

Formula

$$N_q = \frac{q_{fc} - \left(0.3 \cdot \gamma \cdot d_{section} \cdot N_\gamma\right)}{\sigma_s}$$

Example with Units

$$1.8431 = \frac{127.8\,\text{kPa} - \left(0.3 \cdot 18\,\text{kN/m}^3 \cdot 5\,\text{m} \cdot 1.6\right)}{45.9\,\text{kN/m}^2}$$

2) Bearing Capacity Factor Dependent on Surcharge for Square Footing Formula

Evaluate Formula

Formula

$$N_q = \frac{q_{fc} - \left(0.4 \cdot \gamma \cdot B \cdot N_\gamma\right)}{\sigma_s}$$

Example with Units

$$2.2824 = \frac{127.8\,\text{kPa} - \left(0.4 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)}{45.9\,\text{kN/m}^2}$$

3) Bearing Capacity Factor Dependent on Surcharge for Strip Footing Formula

Evaluate Formula

Formula

$$N_q = \frac{q_{fc} - \left(0.5 \cdot \gamma \cdot B \cdot N_\gamma\right)}{\sigma_s}$$

Example with Units

$$2.1569 = \frac{127.8\,\text{kPa} - \left(0.5 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)}{45.9\,\text{kN/m}^2}$$

4) Bearing Capacity Factor Dependent on Unit Weight for Circular Footing Formula

Evaluate Formula

Formula

$$N_\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.3 \cdot \gamma \cdot d_{section}}$$

Example with Units

$$1.3163 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.3 \cdot 18\,\text{kN/m}^3 \cdot 5\,\text{m}}$$

5) Bearing Capacity Factor Dependent on Unit Weight for Square Footing Formula

Evaluate Formula

Formula

$$N_\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.4 \cdot \gamma \cdot B}$$

Example with Units

$$2.4681 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.4 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m}}$$

6) Bearing Capacity Factor Dependent on Unit Weight for Strip Footing Formula

Evaluate Formula

Formula

$$N_\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.5 \cdot \gamma \cdot B}$$

Example with Units

$$1.9745 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.5 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m}}$$

7) Bearing Capacity of Non Cohesive Soil for Circular Footing Formula

Evaluate Formula

Formula

$$q_{fc} = \left(\sigma_s \cdot N_q\right) + \left(0.3 \cdot \gamma \cdot d_{section} \cdot N_\gamma\right)$$

Example with Units

$$135.459\,\text{kPa} = \left(45.9\,\text{kN/m}^2 \cdot 2.01\right) + \left(0.3 \cdot 18\,\text{kN/m}^3 \cdot 5\,\text{m} \cdot 1.6\right)$$

8) Bearing Capacity of Non Cohesive Soil for Square Footing Formula

Evaluate Formula

Formula

$$q_{fc} = \left(\sigma_s \cdot N_q\right) + \left(0.4 \cdot \gamma \cdot B \cdot N_\gamma\right)$$

Example with Units

$$115.299\,\text{kPa} = \left(45.9\,\text{kN/m}^2 \cdot 2.01\right) + \left(0.4 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)$$

9) Bearing Capacity of Non Cohesive Soil for Strip Footing Formula

Evaluate Formula

Formula

$$q_{fc} = \left(\sigma_s \cdot N_q\right) + \left(0.5 \cdot \gamma \cdot B \cdot N_\gamma\right)$$

Example with Units

$$121.059\,\text{kPa} = \left(45.9\,\text{kN/m}^2 \cdot 2.01\right) + \left(0.5 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)$$

10) Diameter of Circular Footing given Bearing Capacity Formula

Evaluate Formula

Formula

$$d_{section} = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.3 \cdot N_\gamma \cdot \gamma}$$

Example with Units

$$4.1135\,\text{m} = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.3 \cdot 1.6 \cdot 18\,\text{kN/m}^3}$$

11) Effective Surcharge given Bearing Capacity of Non Cohesive Soil for Circular Footing Formula

Evaluate Formula

Formula

$$\sigma_s = \frac{q_{fc} - \left(0.3 \cdot \gamma \cdot d_{section} \cdot N_\gamma\right)}{N_q}$$

Example with Units

$$42.0896\,\text{kN/m}^2 = \frac{127.8\,\text{kPa} - \left(0.3 \cdot 18\,\text{kN/m}^3 \cdot 5\,\text{m} \cdot 1.6\right)}{2.01}$$

12) Effective Surcharge given Bearing Capacity of Non Cohesive Soil for Square Footing Formula

Evaluate Formula

Formula

$$\sigma_s = \frac{q_{fc} - \left(0.4 \cdot \gamma \cdot B \cdot N_\gamma\right)}{N_q}$$

Example with Units

$$52.1194\,\text{kN/m}^2 = \frac{127.8\,\text{kPa} - \left(0.4 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)}{2.01}$$

13) Effective Surcharge given Bearing Capacity of Non Cohesive Soil for Strip Footing Formula

Evaluate Formula

Formula

$$\sigma_s = \frac{q_{fc} - \left(0.5 \cdot \gamma \cdot B \cdot N_\gamma\right)}{N_q}$$

Example with Units

$$49.2537\,\text{kN/m}^2 = \frac{127.8\,\text{kPa} - \left(0.5 \cdot 18\,\text{kN/m}^3 \cdot 2\,\text{m} \cdot 1.6\right)}{2.01}$$

14) Unit Weight of Non Cohesive Soil given Bearing Capacity of Circular Footing Formula

Evaluate Formula

Formula

$$\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.3 \cdot N_\gamma \cdot d_{section}}$$

Example with Units

$$14.8088\,\text{kN/m}^3 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.3 \cdot 1.6 \cdot 5\,\text{m}}$$

15) Unit Weight of Non Cohesive Soil given Bearing Capacity of Square Footing Formula

Evaluate Formula

Formula

$$\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.4 \cdot N_\gamma \cdot B}$$

Example with Units

$$27.7664\,\text{kN/m}^3 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.4 \cdot 1.6 \cdot 2\,\text{m}}$$

16) Unit Weight of Non Cohesive Soil given Bearing Capacity of Strip Footing Formula

Evaluate Formula

Formula

$$\gamma = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.5 \cdot N_\gamma \cdot B}$$

Example with Units

$$22.2131\,\text{kN/m}^3 = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.5 \cdot 1.6 \cdot 2\,\text{m}}$$

17) Width of Square Footing given Bearing Capacity Formula

Evaluate Formula

Formula

$$B = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.4 \cdot N_\gamma \cdot \gamma}$$

Example with Units

$$3.0852\,\text{m} = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.4 \cdot 1.6 \cdot 18\,\text{kN/m}^3}$$

18) Width of Strip Footing given Bearing Capacity Formula

Evaluate Formula

Formula

$$B = \frac{q_{fc} - \left(\sigma_s \cdot N_q\right)}{0.5 \cdot N_\gamma \cdot \gamma}$$

Example with Units

$$2.4681\,\text{m} = \frac{127.8\,\text{kPa} - \left(45.9\,\text{kN/m}^2 \cdot 2.01\right)}{0.5 \cdot 1.6 \cdot 18\,\text{kN/m}^3}$$

Variables used in list of Bearing Capacity of Non-cohesive Soil Formulas above

- **B** Width of Footing *(Meter)*
- $d_{section}$ Diameter of Section *(Meter)*
- N_q Bearing Capacity Factor dependent on Surcharge
- N_γ Bearing Capacity Factor dependent on Unit Weight
- q_{fc} Ultimate Bearing Capacity in Soil *(Kilopascal)*
- **γ** Unit Weight of Soil *(Kilonewton per Cubic Meter)*
- σ_s Effective Surcharge in KiloPascal *(Kilonewton per Square Meter)*

Constants, Functions, Measurements used in list of Bearing Capacity of Non-cohesive Soil Formulas above

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Pressure** in Kilopascal (kPa), Kilonewton per Square Meter (kN/m²)
  Pressure Unit Conversion
- Measurement: **Specific Weight** in Kilonewton per Cubic Meter (kN/m³)
  Specific Weight Unit Conversion

Try our Unique Visual Calculators

- Percentage growth
- LCM calculator
- Divide fraction

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

7/9/2024 | 4:38:05 AM UTC