

## Answer #1

Results from python-based calculator illustrate very precise output data and can be used for foundation design for all sorts of cases mentioned in the lecture. Please kindly use the following URL for an online calculator.

[C:\Users\nazar\OneDrive\Desktop\bearing\\_capacity\\_calculator.m\Ashraf\\_calculator.html](C:\Users\nazar\OneDrive\Desktop\bearing_capacity_calculator.m\Ashraf_calculator.html)



Ashraf\_calculator.html

### Bearing Capacity Calculator

Width of Footing (B) [m]:	<input type="text" value="1.5"/>
Length of Footing (L) [m]:	<input type="text" value="2"/>
Depth of Embedment (D) [m]:	<input type="text" value="0.6"/>
Friction Angle ( $\phi$ ) [degrees]:	<input type="text" value="38"/>
Unit Weight ( $\gamma$ ) [kN/m <sup>3</sup> ]:	<input type="text" value="15"/>
Saturated Unit Weight ( $\gamma_{sat}$ ) [kN/m <sup>3</sup> ]:	<input type="text" value="20"/>
Water Table Depth ( $z_w$ ) [m]:	<input type="text" value="0.6"/>
Safety Factor (FS):	<input type="text" value="25"/>

Calculate

**Results:**  
Effective Unit Weight ( $\gamma_b$ ): 10.20 kN/m<sup>3</sup>  
Effective Stress ( $q_0$ ): 9.00 kN/m<sup>2</sup>  
Bearing Capacity Factor ( $N_q$ ): 48.93  
Bearing Capacity Factor ( $N_y$ ): 56.17  
Shape Factor ( $S_q$ ): 2.19  
Shape Factor ( $S_r$ ): 1.19  
Depth Factor ( $D_q$ ): 1.68  
Depth Factor ( $D_r$ ): 1.00  
Net Ultimate Capacity ( $q_{net}$ ): 2116.55 kPa  
Design Load ( $Q_{design}$ ): 253.99 kN

## Answer #2 MATLAB based calculator:

The MATLAB based calculator results are not very accurate. Shown in MATLAB attached file.

**Answer # 3 Excel spreadsheet.** Kindly see the attached file