Question: Hello , my question is that how can i proof the Tarzaghi equatio···

hello , my question is that how can i proof the Tarzaghi equation which is Nc = 5.7. i meant how it become Nc = 5.7?

This subject is Engineering retaining wall foundation

Expert Answer

Sanjay Sharma answered this
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Nc is 5.7 for friction angle phi =0. Terzaghi found the bearing capacity factors Nc, Nq by extending Prandtl's (1921) solution. The equation he came out with is given in the images below. Nc changes with friction angle.

$$N_c = \cot\phi\left[\frac{a^2}{2\cos^2\left(\frac{\pi}{4}+\frac{\phi}{2}\right)}-1\right] = (N_q - 1)\cot\phi$$

$$N_q = \frac{a^2}{2\cos^2\left(\frac{\pi}{4}+\frac{\phi}{2}\right)}$$

$$N_\gamma = \frac{1}{2}\tan\phi\left(\frac{K_{p\gamma}}{\cos^2\phi}-1\right)$$

$$a = \exp\left(\frac{3\pi}{4}-\frac{\phi}{2}\right)\tan\phi$$

when phi =0 degrees, only then Nc = 5.7. For other values of phi it varies accordingly, see the table below.

$\phi°$	N_c	N_q	N_r
0	5.7	1.0	0.0
5	7.3	1.6	0.5
10	9.6	2.7	1.2
15	12.9	4.4	2.5
20	17.7	7.4	5.0
25	25.1	12.7	9.7
30	37.2	22.5	19.7

also, these factors vary in local shear failure to those in general shear failure. However, Nc is 5.7 for both at phi=0 degrees.

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