

Uniform Load Design Calculation Details

Date: 5/1/2014
Name: Sample Project
Location: Buffalo Grove
Engineer: Mike McPhee

Poisson's Ratio	$\mu = 0.15$
Section Width	$b = 1 \text{ meter}$
Slab Thickness	$h = 6.50 \text{ in}$
Concrete Compressive Strength	$F_c = 4,000.00 \text{ psi}$
Modulus of Elasticity	$E = 3,602,728.70 \text{ psi}$
Concrete Flexural Strength	$F_r = 600.00 \text{ psi}$
Modulus of Subgrade Reaction	$k = 100.00 \text{ pci}$
Uniform Distributed Live Load	$q = 1,500.00 \text{ psf}$

Radius of Relative Stiffness

$$I = \left| \frac{E * h^3}{12(1 - \mu^2) * k} \right|^{0.25} \quad I = \mathbf{30.27 \text{ in}}$$

(768.85 mm)

Maximum Slab Moment - Randomly Distributed Load Pattern

$$\lambda = \left| \frac{3 * k}{E * h^3} \right|^{0.25} \quad \lambda = \mathbf{0.92}$$

$$M_{\max} = 0.168 * \frac{q}{\lambda^2} * 10^{-3} \quad M_{\max} = \mathbf{14,103.16}$$

Maximum Slab Flexural-Tensile Stress

$$f_b = 1.008 * \frac{q}{\lambda^2 * h^2} \quad f_b = \mathbf{450.25 \text{ psi}}$$

(0.00 kN/mm²)

Interior Safety Factor

$$FS = \frac{f_r}{f_b} \quad FS = \mathbf{1.33}$$

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