

Fiber Reinforced Concrete Slabs on Grade

Ground supported slabs may be specified with fiber reinforcement in lieu of a single layer of reinforcing or welded wire fabric. Such slabs are referred to as membrane slabs, floating slabs, or filler slabs and range in thickness from as little as 4" to 8" depending on the supported loads. In warehouses and storage facilities such slabs may be subjected to concentrated point loads from storage rack posts or forklift wheel loads.

Example Model with Sample Input

In this example, a concrete warehouse floor with joints spacing 20' o.c. a slab is subject to modular racking posts loads of 3,750 lbs each in a grid of 6' × 6'. The 6" slab is supported on soil with a subgrade modulus of 100 kcf.

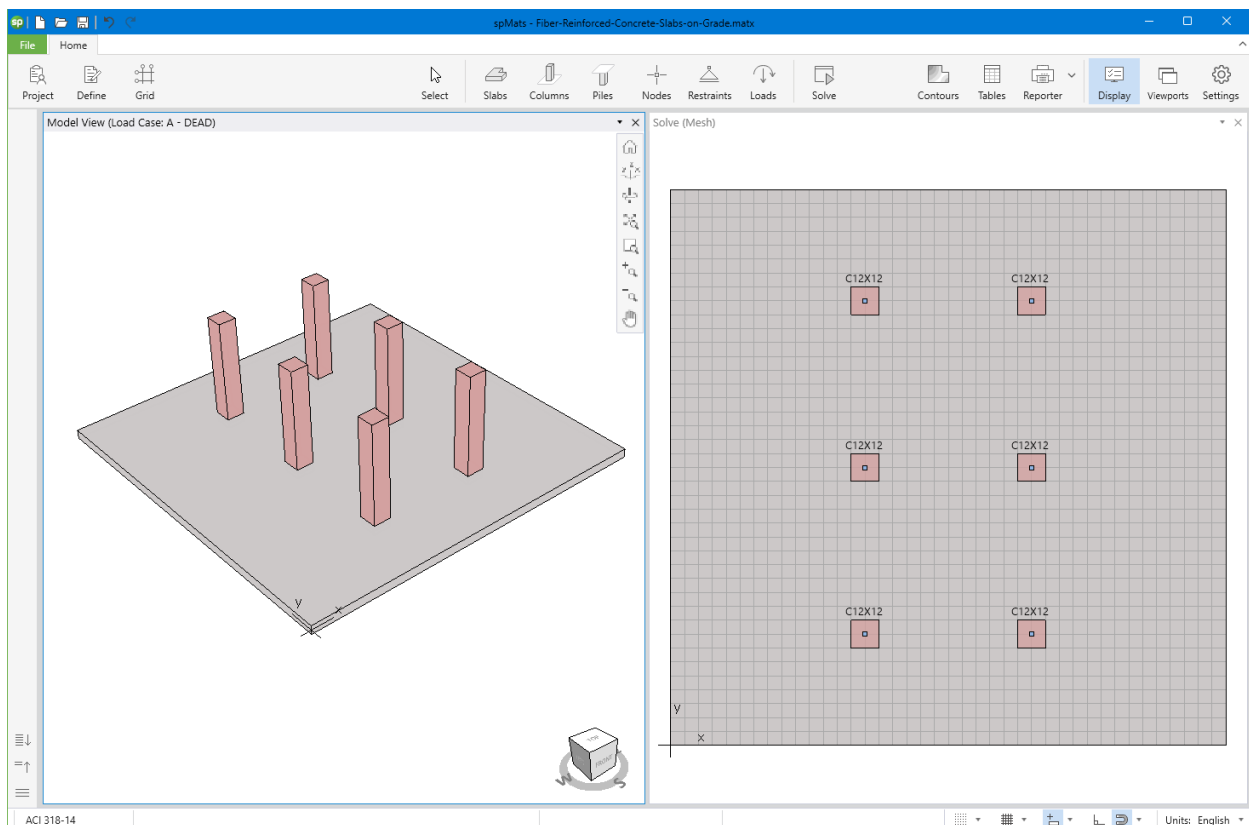




Figure 1 – 3D View and Plan View

The existing design called for a macro fiber dosage for TUF-STRAND SF as 4.9 lbs/yd³ per the table below (Courtesy of Euclid Chemical). Concrete strength is 4 ksi. In order to use the table, the reinforcement is to be of Grade 60 and placed in the top half of the slabs on grade.

Quick Reference Guide for Slab on Ground Design with TUF-STRAND macro-fibers, lbs/yd³ (kg/m³)

Slab Thickness	all 6" x 6" (150 x 150 mm)			4" x 4" (100 x 100mm)		#3 bar (3/8")		#4 bar (1/2")	
	10 gage (W1.4)	6 gage (W2.9)	4 gage (W4.0)	6 gage (W2.9)	4 gage (W4.0)	@16" (406 mm)	@12" (305 mm)	@16" (406 mm)	@12" (305 mm)
4	3.0 (1.8)	3.0 (1.8)	4.6 (2.7)	5.1 (3.0)	7.4 (4.4)	3.9 (2.3)	5.6 (3.3)	7.9 (4.7)	10.8 (6.4)
6	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	4.6 (2.7)	3.0 (1.8)	3.4 (2.0)	4.9 (2.9)	6.9 (4.1)
8	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.2 (1.9)	3.0 (1.8)	3.0 (1.8)	3.4 (2.0)	4.9 (2.9)
10	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.0 (1.8)	3.7 (2.2)





To investigate or design a slab with fiber-reinforcement, [spMats](#) requires design parameters definition to have a single layer of reinforcement input. From the table above, for a 6" slab, an equivalent single layer reinforcement to the specified macro fiber dosage is #4 @ 16 in. which is equal to 0.15 in.²/ft.

Design Parameters Input

An equivalent single layer of reinforcing design parameter input is shown below and complies with the requirements to use the table above.

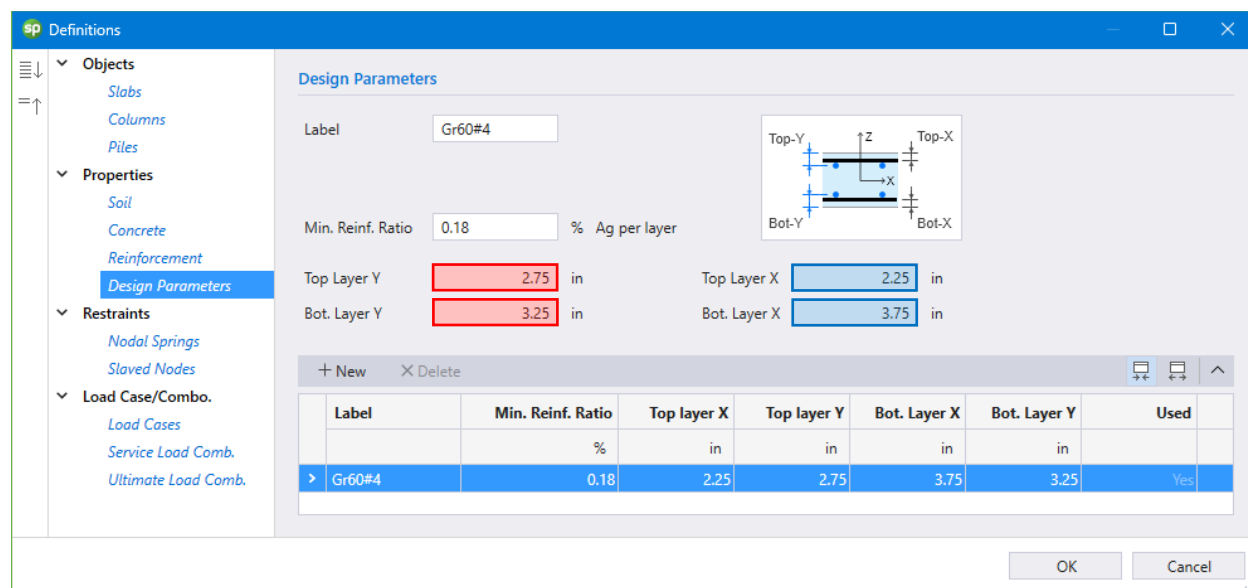
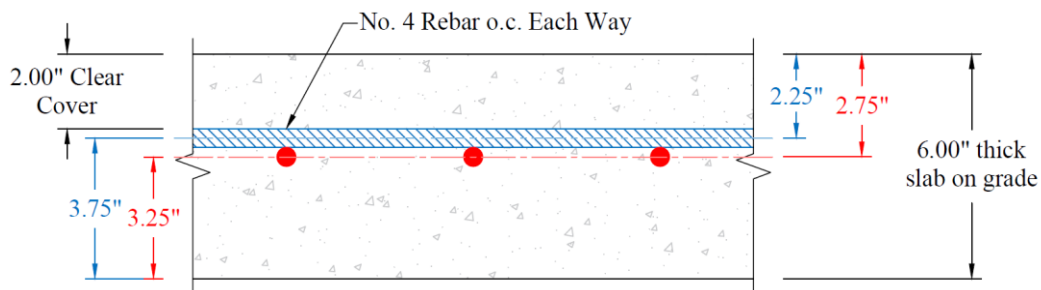


Figure 2 – Design Parameters Input

Interpretation of Reinforcement Output

spMats displays the required area of reinforcement as a contour view as well as a text output for each element. The contour views of required reinforcement envelopes in the X-Direction and Y-Direction are shown below. The governing required reinforcement amount is $0.141 \text{ in.}^2/\text{ft}$ which is less than $0.15 \text{ in.}^2/\text{ft}$. Therefore, the specified macro fiber dosage for TUF-STRAND SF as $4.9 \text{ lbs}/\text{yd}^3$ provides the required replacement for this existing slab on grade.

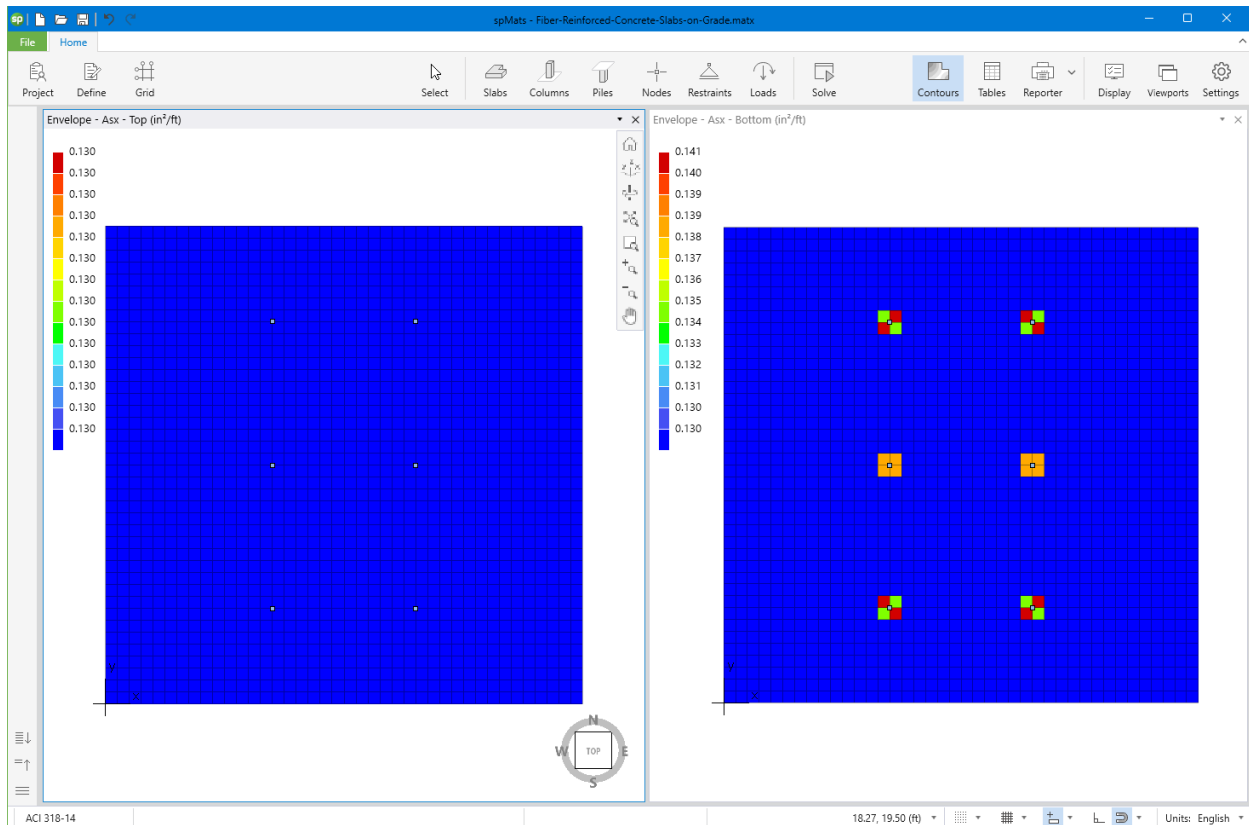


Figure 3 – Required Reinforcement Contours along X-Direction (Top and Bottom) (spMats)

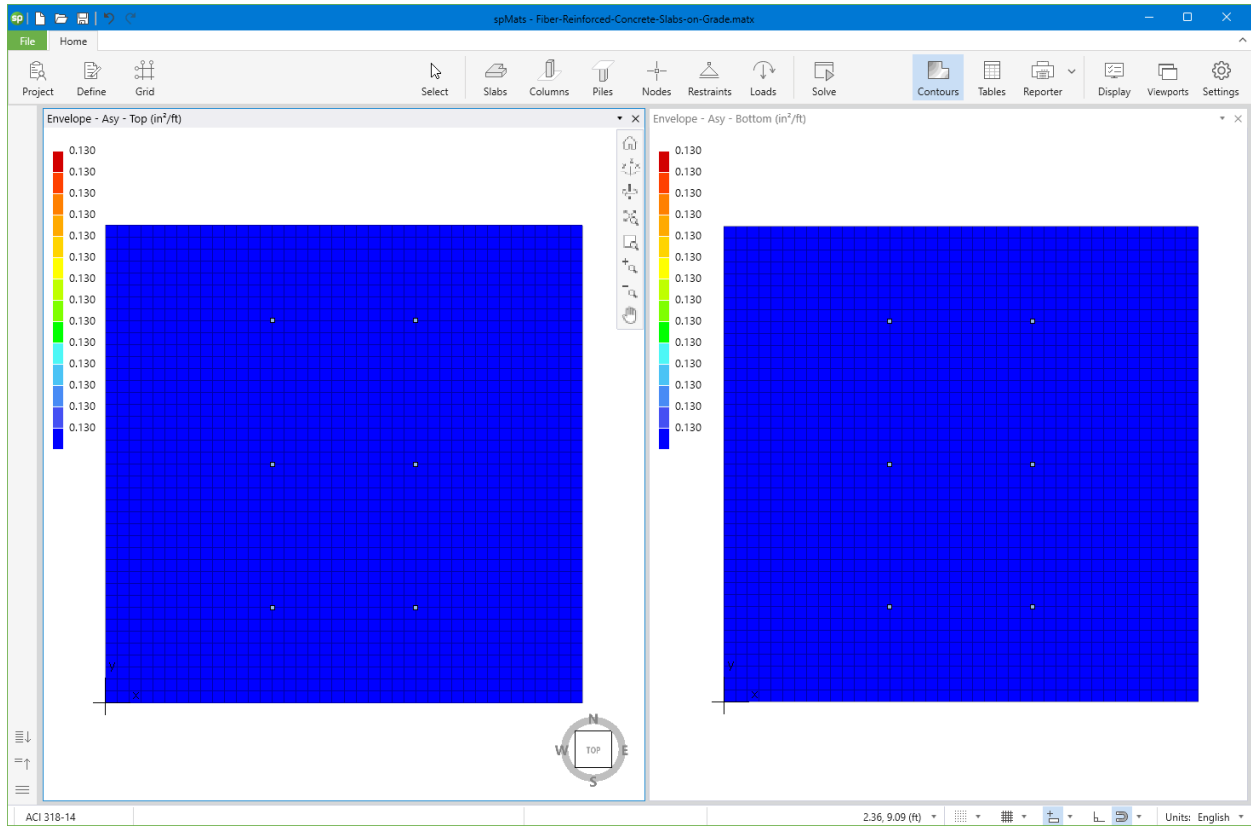


Figure 4 – Required Reinforcement Contours along Y-Direction (Top and Bottom) (spMats)