Design of Shear Friction as per ACI 318-11 Chapter 11
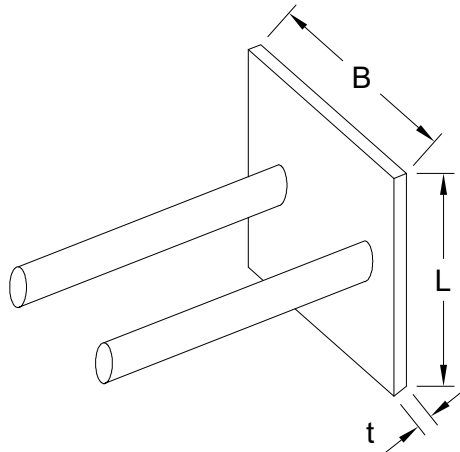
System

Width of Steel Plate, B=		2.00 in
Length of Steel Plate, L=		4.00 in
Thickness of Steel Plate, t=		0.25 in
Identification of, Bar=	SEL("ACI/Bar" ;Bar;) =	No.3
Diameter of Bars, d_b=	TAB("ACI/Bar" ;Dia ;Bar=Bar) =	0.38 in
Number of Bars, n=		2

Load

Ultimate Shear Force, V_u=	3570 lb

Material Properties

Concrete Strength, f'_c=		4000 psi
Yield Strength of Reinforcement, f_y=		60000 psi
Shear Strength Reduction Factor (According to Cl.9.3.2 of ACI318), Φ=		0.75
Modification Factor for Lightweight Concrete, λ=		0.75
Friction Factor (According to Cl.11.6.4.3 of ACI318), μ= 0.7 * λ	=	0.525

Calculation of Required Reinforcement Area

Area of Shear Friction Reinforcement (According to Eq.11-25 of ACI318),

$$A_{vf}= \frac{V_u}{\Phi * fy * \mu} = 0.151 \text{ in}^2$$

$$\text{Provided Area, } A_{act}= n * \frac{\pi * d_b^2}{4} = 0.23 \text{ in}^2$$

$$\text{Check Validity} = IF(A_{act} > A_{vf;} \text{ "Valid" ; "Invalid")} = \text{Valid}$$

Design Summary

Provided Area of Reinforcement, A_{act}= A_{act}	=	0.23 in^2