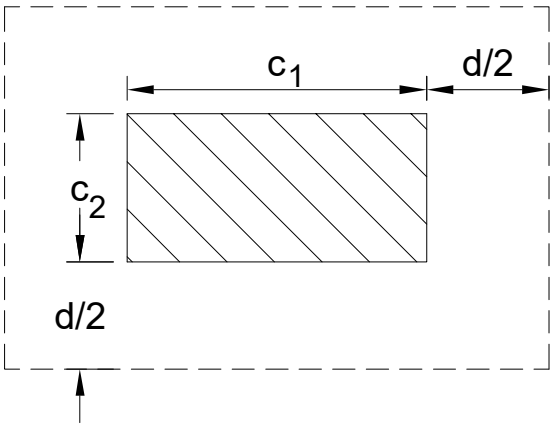
Shear Strength of Slab at Column Support as per ACI 318-11 Chapter 11



System

Width of Column, c_1=			48.0 in
Length of Column, c_2=			8.0 in
Thickness of Slab, t=			10.0 in
Concrete Cover, co=			3.5 in
Effective Depth of Slab, d=	t - co	=	6.5 in

Load

Ultimate Shear Force, V_u=			20 kips

Material Properties

Concrete Strength, f'_c=			4000 psi
Shear Strength Reduction Factor (According to Cl.9.3.2 of ACI318), Φ=			0.75
Modification Factor for Lightweight Concrete, λ=			1.00

Check Slab Thickness

Perimeter of Critical Section for Two-Way Shear, b_0=	$2*(c_1+d)+2*(c_2+d)$	=	138 in
Column Type=	SEL("ACI/Alfa S";Type;)	=	Interior
Alfa Constant, α_s=	TAB("ACI/AlfaS"; Alfa; Type=Type)	=	40.00
Ratio of Long to Short Column Dimensions, β= MAX(c_1;c_2)/MIN(c_1;c_2)		=	6.00
Concrete Shear Strength (According to Eq. 11-31 of ACI318),			
V_{c1}=	$(2+4/\beta)*\lambda*\sqrt{f'_c}*b_0*d/1000$	=	151.3 kips
Concrete Shear Strength (According to Eq. 11-32 of ACI318),			
V_{c2}=	$(\alpha_s*d/b_0+2)*\lambda*\sqrt{f'c}*b_0*d/1000$	=	220.3 kips
Concrete Shear Strength (According to Eq. 11-33 of ACI318),			
V_{c3}=	$4*\lambda*\sqrt{f'_c}*b_0*d/1000$	=	226.9 kips
Nominal Concrete Shear Strength, ΦV_c= Φ * MIN(V_{c1}; V_{c2}; V_{c3})		=	113.5 kips
Validation =	IF($\Phi V_c > V_u$; "O.K."; "Increase Depth")	=	O.K.

Calculation Summary

Thickness of Slab, t=	t	=	10 in