Determining Punching Capacity V_c

Unreinforced

Least of:

$V_c = 4\lambda_s \lambda \sqrt{f'_c}$

$V_c = \left(2 + \frac{4}{\beta}\right)\lambda_s \lambda \sqrt{f'_c}$

$V_c = \left(\frac{\alpha_s d}{b_o} + 2\right)\lambda_s \lambda \sqrt{f'_c}$

where:

λ = LW conc

λ_s = size = $\sqrt{\frac{2}{1+d/10}} \leq 1.0$

β = Clong / Cshort

Condition	Formula for Nominal Shear Strength (v_c)
A. Limit on b_o/d	$v_c = 4\lambda_s \lambda \sqrt{f'_c}$
B. Limit on β	$v_c = (2 + \frac{4}{\beta})\lambda_s \lambda \sqrt{f'_c}$
C. Limit on α_s	$v_c = (\frac{\alpha_s d}{b_o} + 2)\lambda_s \lambda \sqrt{f'_c}$

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Reinforced

Inner Limit

$\phi V_n = \phi(V_c + V_s)$

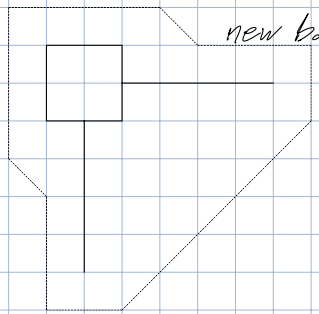
$V_c = 2\lambda \sqrt{f'_c}$ *capped, cracked

V_s = given by manufacturer

Absolute limit

$V_n \leq 8\lambda \sqrt{f'_c}$ if $V_u >$ increase slab depth

Outer Limit



Critical Section

Conservative

$\phi V_c = 2\lambda \sqrt{f'_c}$

$\phi V_c = 0.75 V_c$