

Check shear at notch in joist 2x4 x 4x4 L @ 12" from end

* Notch is deeper than $D/6$ as allowed by IRC Fig R502.B
Notch is longer than $D/3$ " " " " " "

$$L = 12' \quad 2 \times 10 \text{ joist}$$

$$w = 40(1.33) L \quad 3.2 \text{ plf } D \quad w = 56.5 \text{ plf}$$

$$\text{Shear @ } 1' = 56.5 \left(\frac{12}{2} - 1 \right) = 282.5 \text{ lbs}$$

$$f_v = \text{Shear stress} = \frac{V}{A} = \frac{282.5}{1.5(9.25 - 2.25)} = 26.9 \text{ psi}$$

$$F_v = \text{Allowable shear} = 115 \text{ psi}$$

$$\frac{f_v}{F_v} = \frac{26.9}{115} = .23 \quad \underline{\underline{OK}}$$

Recommendation: Add 2x8 #2 (DF, SPF) at least half the span length, sistered to side of existing joist.

Fasten with (2) 16d nails at 12" OC min.

To further increase shear and bending capacity at notch.

