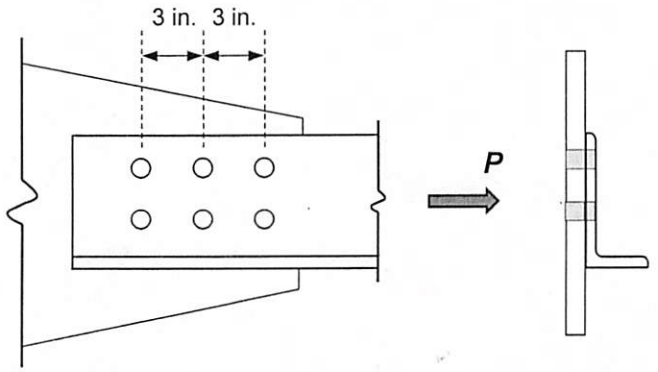
CIVL 3131 Quiz #1 S26 Name: _____

Compute the maximum acceptable tensile service load on a single angle **L6 x 4 x ½** of **A572 Grade 50** steel that is connected along both legs. The 6-in. leg contains a double-gage line of ⅝ in.-diameter bolts. The live load is two times the dead load.



FROM TABLE 2-4
$F_y = 50 ksi \quad F_u = 65 ksi$

FROM TABLE 1-7
$A_g = 4.75 in^2 \quad \bar{x} = 0.981 in$

YIELDING $\phi P_n = \phi F_y A_g = 0.90(50ksi)(4.75in^2) = \underline{213.75^k}$

RUPTURE $\phi P_n = \phi F_u A_e = \phi F_u U A_n$

$A_n = A_g - 2HOLES = 4.75in^2 - 2(5/8in + 1/8in)(1/2in)$

$= 4.00 in^2$

$U = 1 - \frac{\bar{x}}{\ell} = 1 - \frac{0.981 in}{6in} = 0.8365$

$\therefore \phi P_n = 0.75(65ksi)(0.8365)4 in^2 = \underline{163.12^k}$ *

$P_u = 1.2D + 1.6L = 1.2D + 1.6(2D) = 4.4D$

$P_u \leq \phi P_n \Rightarrow 163.12^k = 4.4D \qquad D = 37.07^k$

$L = 74.14^k$

TOTAL SERVICE LOAD $= 111.22^k$