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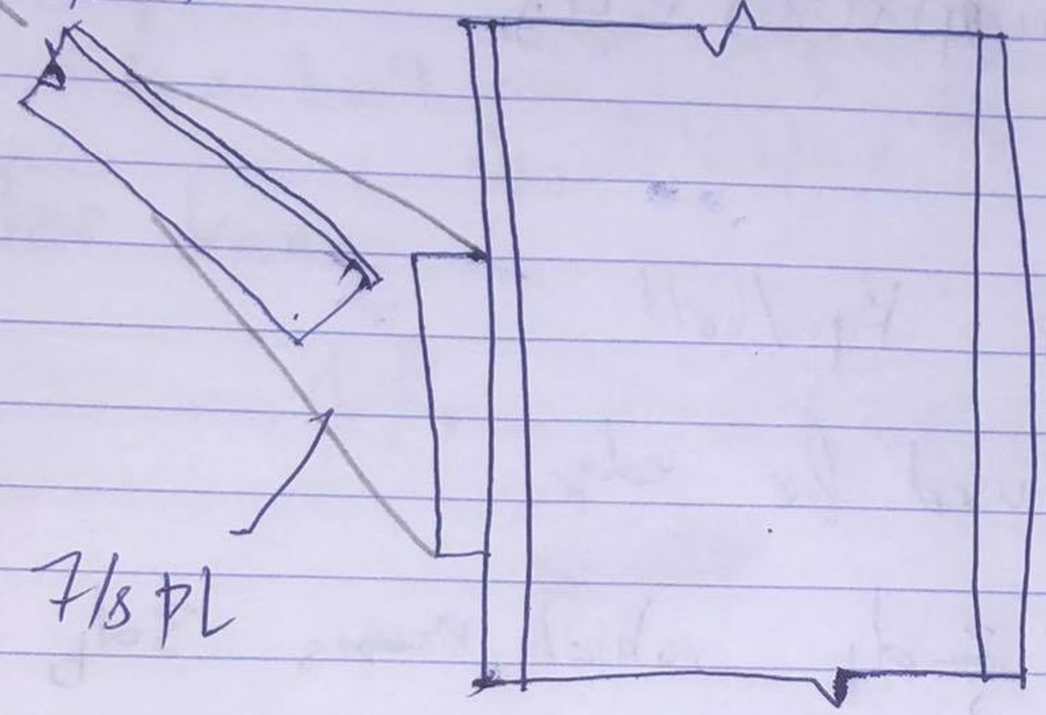
Question 3

$D_s = 35^k$

$L_s = 105^k$



$d = \frac{3}{4}''$

Member not to scale

A 325

First $P_u = 1.2(35) + 1.6(105)$

$= 42 + 168$

$= 210$ kips

For $A_b = \frac{\pi}{4}\left(\frac{3}{4}\right)^2 = 0.4417 \simeq 0.44\ in^2$

For from table 7.1 assuming threaded

$= 48$

Since N is given, we're checking the shear in this equation

$\phi R_n = N_x \phi F_n$

$(0.8)(0.75)(F_{nv})(A_b)$

7

ok For ϕR_n / bolt

A_b → one bolt

$= 0.75 \times (0.4418) \times (2) \times 48$ → f_{nv}

number of shear fc

$= 32$ kips / bolt

→ minimum spacing used for edge

$S_{min} = \frac{2}{3} d_b$ which means $3 d_b \rightarrow S = 2.5$ inch

$h = d_b + \frac{1}{16} \rightarrow \frac{3}{4} + \frac{1}{16} = 0.8125$ in

$L_{c\,edge}$ = edge distance $- \left(d_b + \frac{1}{16}\right)/2$

$l_c = 1.09$ in

$l_c = S - \left(d_b + \frac{1}{16}\right)$

$= 1.68$ in

okay for 1 6H

$d = \frac{3}{4}$"

$F_u = 58$

$l_c = 1.09$ inch

$F_y = 36$

For bearing

~~$\phi R_n = 0.75 (2.4 d_b t F_u)$~~

for $R_n = 2.4 (d)(t)(F_u)$

$= 91.44$

$\phi R_n = (0.75)(91.44) = 68.58$

This controls since it's bigger

Tear out

$R_n = (1.2)(L_c)(t)(F_u)$

$(1.2)(1.09)(\frac{7}{8})(58)$

$= 66.381$

$\phi R_n = (66.381)(0.75)$

49.78

(4)

For other

Also bearing = 91.4 kips

Yet for Tear out = $1.2(l_c)(t)(f_u)$

$= (1.2)(1.69)(58)(l_c)$

$= 103$

$(0.75)(91.4) = 68.5$ kips/bolt

$(0.75)(103) = 77.25$ kips/bolt

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for the depth

$t = 1/2$

for the edg

bearing $R_n = 1.2 l_c + f_u$

$= 39$

tear out $\Rightarrow R_n = 2.4 \times d \times t \times F_y$

$= 53$

$(2)(0.75)(39)$

58.5 kip/bolt

since it's double

Block shear

$t = 1/2$

$$A_{nt} = \frac{1}{2}\left(1.5 - \left(\frac{3}{4} + \frac{1}{8}\right)\cdot(0.5)\right)$$

$$= 0.53$$

$$A_{gv} = (1.5 + (6))(2.5)(0.5)$$

$$= 16.5 \times 0.5$$

$$= 8.25$$

$$A_{nv} = 8.25 - 0.5\left((6.5)\left(\frac{3}{4} + \frac{1}{8}\right)\right)$$

$$= 5.4$$

$$R_n = 0.6 F_u A_{nv} + U_{bs} F_u A_{nt}$$

$$\leq 0.6 F_y A_{gv} + U_{bc} F_y A_{nt}$$

plugging in the number

it would be

198

double so multiply by 2

$(198)(2)$

$= 316 \rightarrow \phi_4$ ✓

b) Adequacy

$\phi P_n = 0.75 A_g F_y$

multiply double the number by 2 since it's

ched if it's bigger than 2

$\phi P_n = (0.75)(36)(3.75)$

$= 101.3$

multiply by the 101.3 by 2