

Problem 3-19 McCormac.

- 3-19. Compute the effective net area of the built-up section shown in Fig. P3-19 if the holes are punched for $\frac{3}{4}$ -in $\varnothing$ bolts. Assume $U = 0.90$. (Ans. 20.18 in^2)

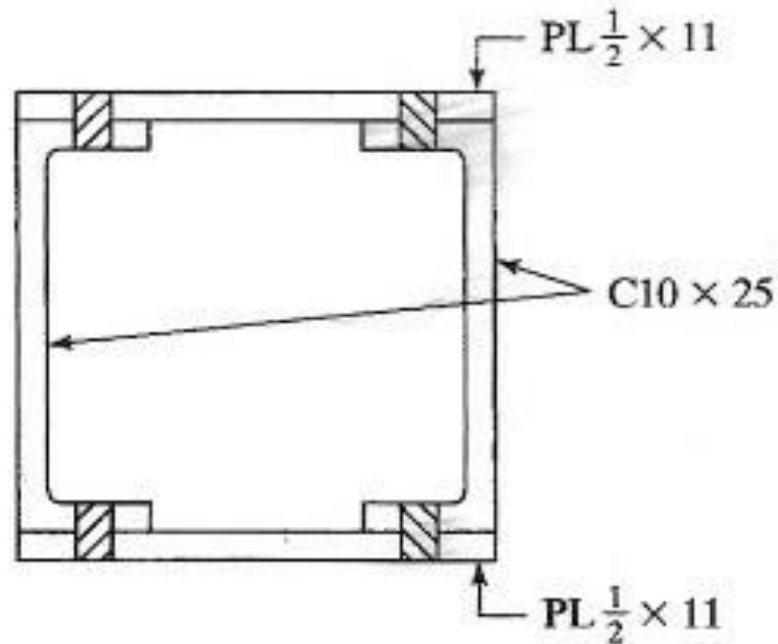


FIGURE P3-19

Solution We will estimate the gross area of the built-up section as the sum of the elements

① PL $\frac{1}{2}'' \times 11''$ ③ C10 x 25

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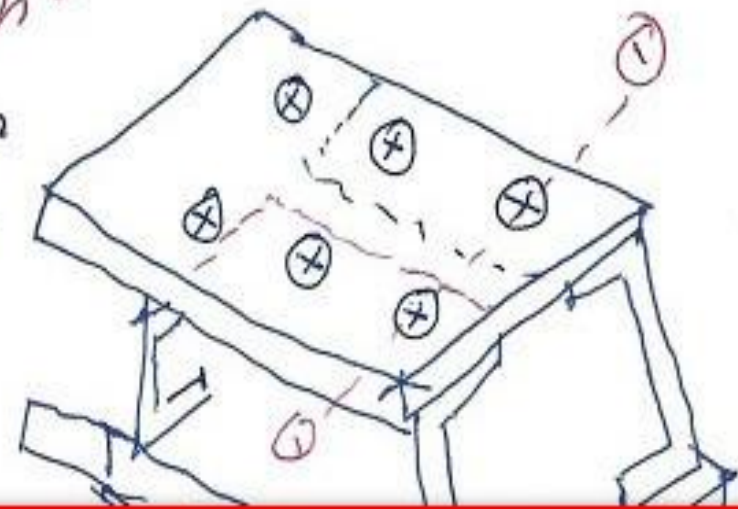
Or the sum of 2 PL $\frac{1}{2}'' \times 11'' + 2$ C10 x 25

Area of plates = $2(\frac{1}{2}'' \times 11'') = 11 \text{ inch}^2$

from table area of 1-C10 x 25 = 7.35 inch^2

Area of Two channels = $2 \times 7.35 = 14.70 \text{ inch}^2$

given bolts $d_b = \frac{3}{4}'' \rightarrow d_h = \frac{1}{8}'' + \frac{3}{4}'' = \frac{7}{8}''$



From section 1-1

$$\begin{aligned} \text{Anet plates} &= A_g - n d_h t_p = 11 - 4 \left(\frac{7}{8} \right) \left(\frac{1}{2} \right) \\ \text{Two} &= 11 - \frac{14}{8} = 9.25 \text{ inch}^2 \end{aligned}$$

Anet channels

$$\text{Two channel} = A_g - n d_h t_f = 14.70 - 4 \left(\frac{7}{8} \right) (0.436)$$

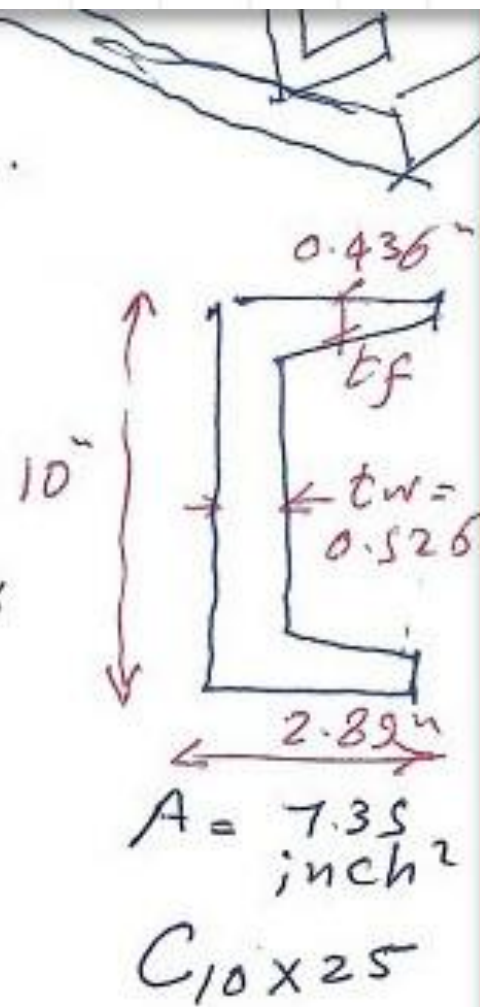
$$\text{Anet} = 13.174 \text{ inch}^2$$

There is no connection at web for both channels

U is given as = 0.90

$$A_e = A_{n_1} \cdot U + A_{n_2} \cdot U$$

$$= 13.174 (0.90) + 9.25 (0.90) = 20.18 \text{ inch}^2$$



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