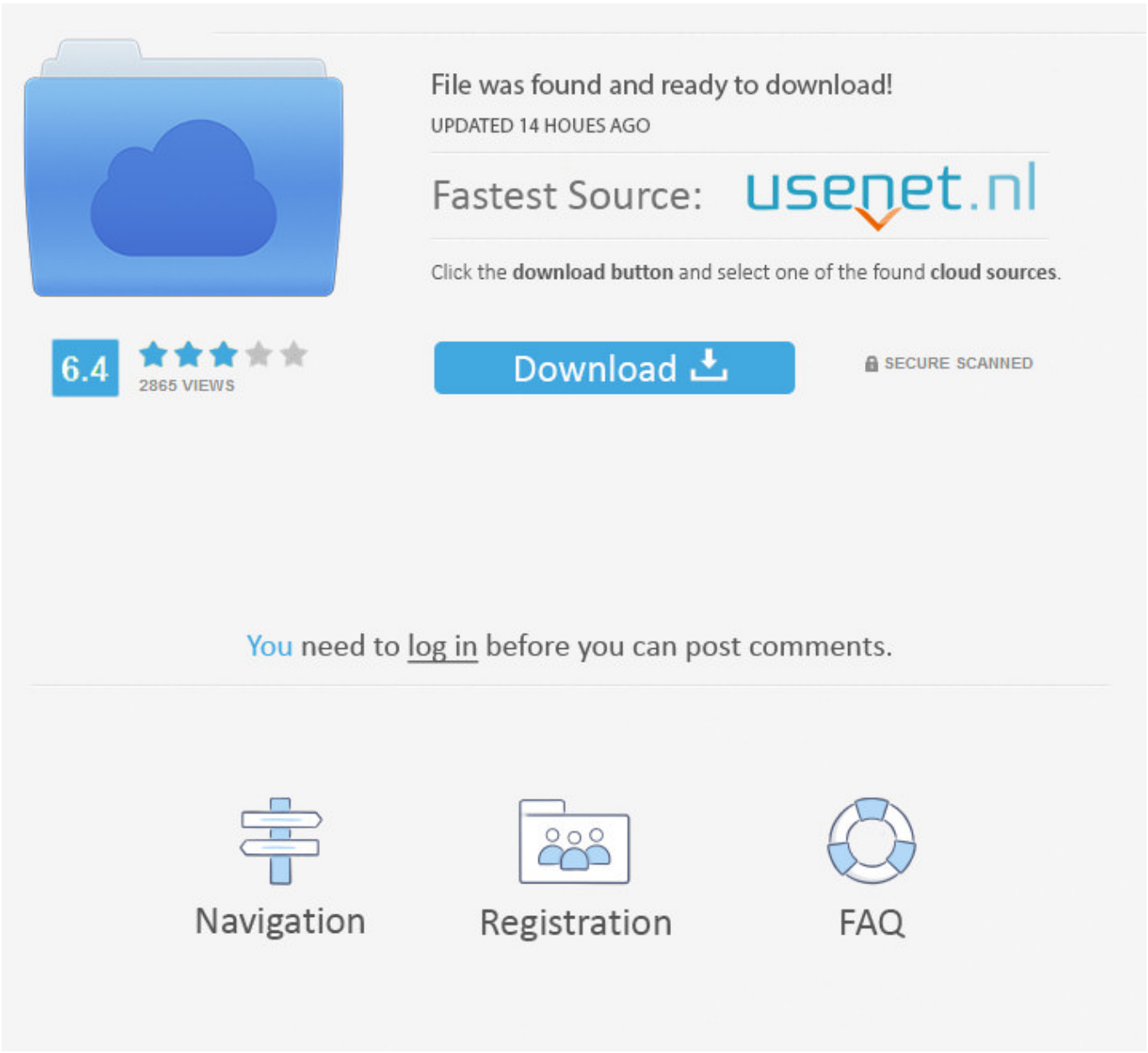
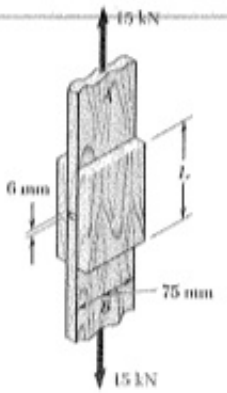


[Solucionario Mecanica De Materiales Gere Septima Edicion.11]

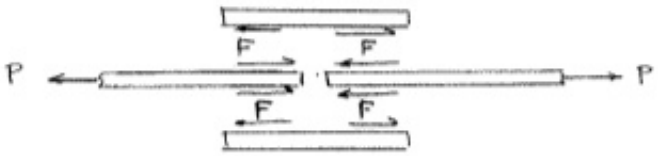
Problem 1.15

1.15 The wooden members *A* and *B* are to be joined by plywood splice plates that will be fully glued on the surfaces in contact. As part of the design of the joint, and knowing that the clearance between the ends of the members is to be 6 mm, determine the smallest allowable length *L* if the average shearing stress in the glue is not to exceed 700 kPa.



There are four separate areas that are glued. Each of these areas transmits one half the the 15 kN load. Thus

$$F = \frac{1}{2}P = \frac{1}{2}(15) = 7.5\ \text{kN} = 7500\ \text{N}$$



Let l = length of one glued area and $w = 75\ \text{mm} = 0.075\ \text{m}$ be its width.

For each glued area, $A = lw$

Average shearing stress: $\tau = \dfrac{F}{A} = \dfrac{F}{lw}$

The allowable shearing stress is $\tau = 700 \times 10^3\ \text{Pa}$

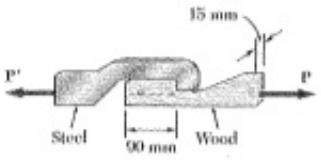
Solving for l, $l = \dfrac{F}{\tau w} = \dfrac{7500}{(700\times10^3)(0.075)} = 0.14286\ \text{m} = 142.85\ \text{mm}$

Total length L: $L = l + (\text{gap}) + l = 142.85 + 6 + 142.85$

$$L = 292\ \text{mm}$$

Problem 1.16

1.16 When the force **P** reached 8 kN, the wooden specimen shown failed in shear along the surface indicated by the dashed line. Determine the average shearing stress along that surface at the time of failure.



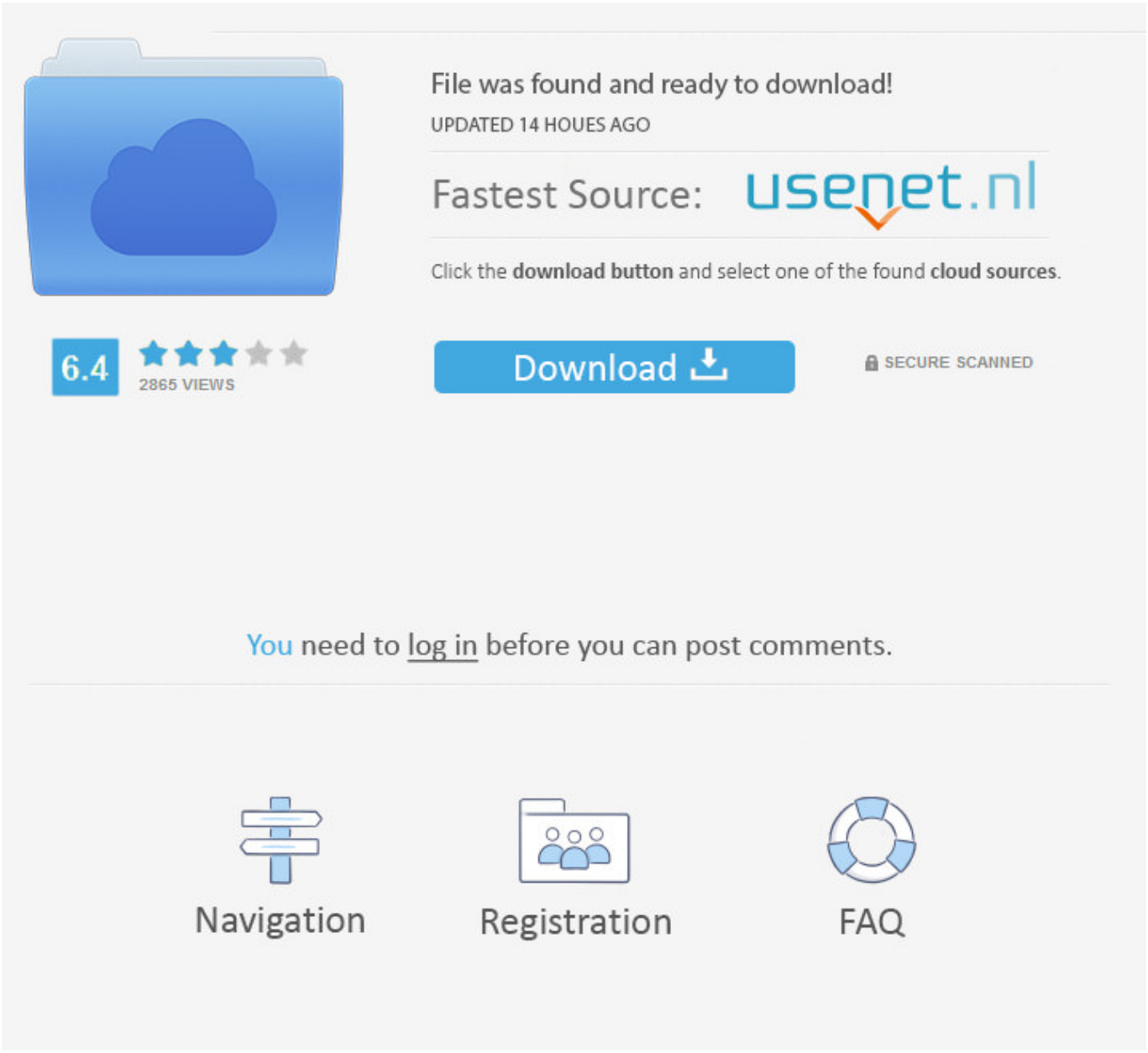
Area being sheared

$$A = 90\ \text{mm} \times 15\ \text{mm} = 1350\ \text{mm}^2 = 1350 \times 10^{-6}\ \text{m}^2$$

Force $P = 8 \times 10^3\ \text{N}$

Shearing stress $\tau = \dfrac{P}{A} = \dfrac{8\times10^3}{1350\times10^{-6}} = 5.93\times10^3\ \text{Pa} = 5.93\ \text{MPa}$

[Solucionario Mecanica De Materiales Gere Septima Edicion.11]



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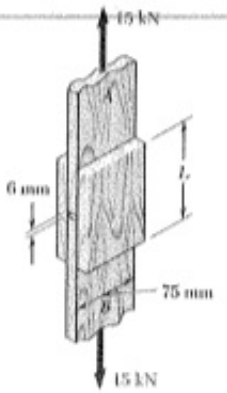

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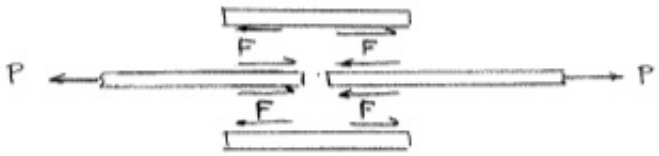

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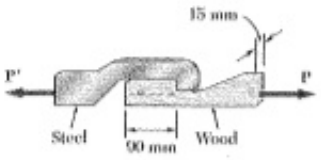

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