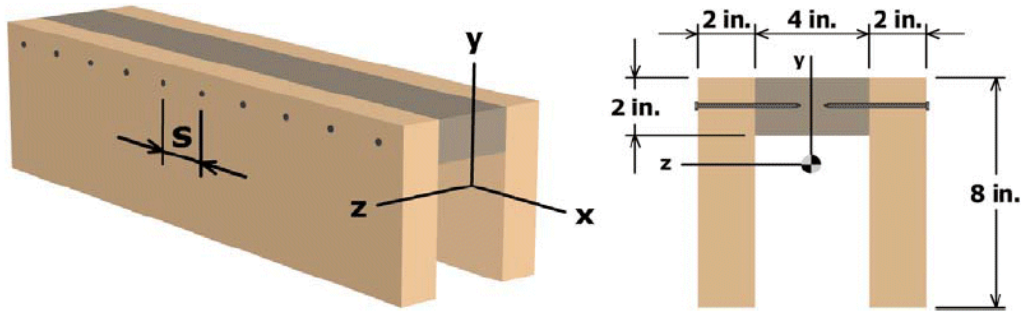
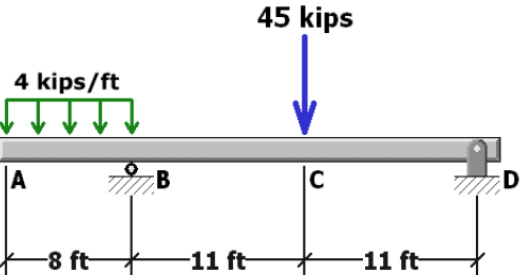


A wooden beam is fabricated by nailing together three pieces of dimension lumber as shown. The cross-sectional dimensions of the beam are shown. The beam must support an internal shear force of $V = 600$ lb.

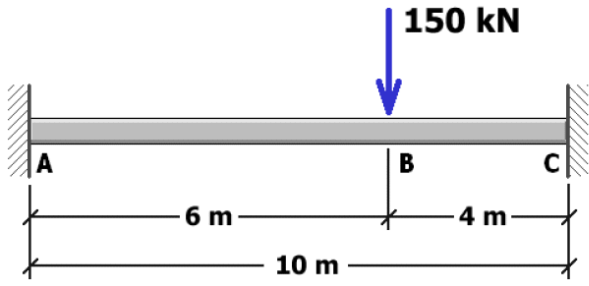
- (a) Determine the maximum horizontal shear stress in the cross section for $V = 600$ lb.
- (b) If each nail can provide 120 lb of horizontal resistance, determine the maximum spacing s for the nails.



The simply supported beam shown consists of a W 21×44 structural steel wide flange shape [$E = 29,000 \text{ ksi}$; $I = 843 \text{ in.}^4$]. For the loading shown, determine: the beam deflection at point A .



A W 530×92 structural steel wide flange shape [$E = 200 \text{ GPa}$; $I = 554 \times 10^6 \text{ mm}^4$] is loaded and supported as shown. Determine the force and moment reactions at supports A and C.



Consider a point in a structural member that is subjected to plane stress. Normal and shear stresses acting on horizontal and vertical planes at the point are shown.

- a. Determine the principal stresses and the maximum in-plane shear stress acting at the point.
- c. Show these stresses on an appropriate sketch
- c. Compute the absolute maximum shear stress at the point.

