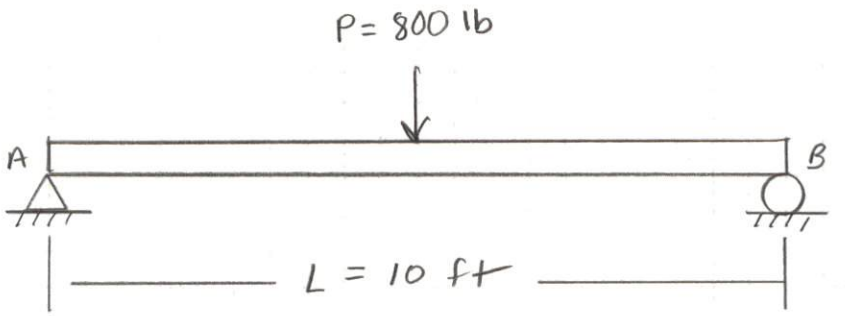
14-1

A timber beam has a 10-ft simple span and a full rectangular section 4 in. wide and 6 in. deep. Determine the maximum flexural stress in the beam due to a concentrated load of 800 lb applied at the midspan.

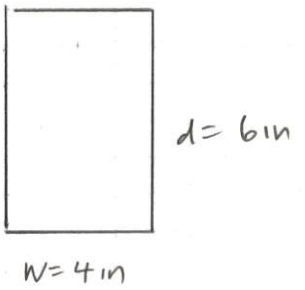
Solution.



From Table 13-1, Case 1

$$M_{MAX} = \frac{PL}{4} = \frac{800\,lb\,(10\,ft)}{4} = 2000\ lb \cdot ft$$

Full size



$$S = \frac{bh^2}{6} = \frac{4in\,(6in)^2}{6} = 24\ in^3$$

$$\sigma_{MAX} = \frac{M_{AX}}{S} = \frac{2000\ lb \cdot ft\ \left(\frac{12\,in}{ft}\right)}{24\ in^3}$$

$$= 1000\ psi$$