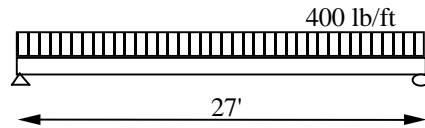


Beam Bending

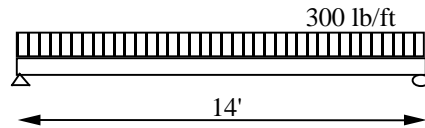
Problem No. 1

Design (for bending only) a 27' steel beam (W section), made of A36 steel ($f_b = 24,000$ psi), subject to 400 lb/ft uniform load. Include the beam's own weight



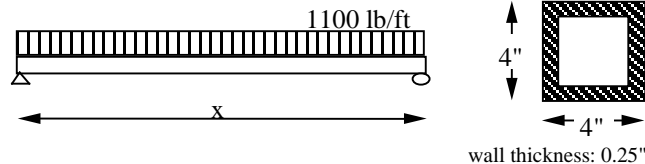
Problem No. 2

How many 2x10 southern pine pieces do you need (placed side by side) for a 14' beam subject to 300 lb/ft uniform load? The allowable stress is $f_b = 1,400$ psi. Consider bending stresses only.



Problem No. 3

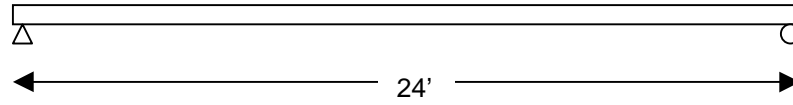
Determine the maximum length of the simply supported floor beam, made of A36 steel ($f_b = 24,000$ psi) shown below that carry the load. Consider the maximum length of the beam governed by bending stresses only and ignore the beam's own weight.



Problem No. 4

A review of multiple loading conditions

- The loading condition for the beam shown below are:
 - deadload of 200 lb/ft, uniform live load of 300 lb/ft OR
 - a single point load of 3,000 lb at the middle OR
 - three point loads at 6', 12' and 18' of 1600 lb each OR
 - a single point load of -4,000 lb (i.e. acting upwards) at 10' from the left.



Conditions: All point loads and uniform live loads are temporary loads and cannot occur simultaneously. However, there is one exception according to code: The single point load of 3,000 lb can occur simultaneously with the uniform live load but in that case both loads must be reduced by 25%

- a) Draw the shearing force and bending moment diagrams for the conditions above
- b) Draw the envelope of the maximum and minimum shearing forces and bending moments