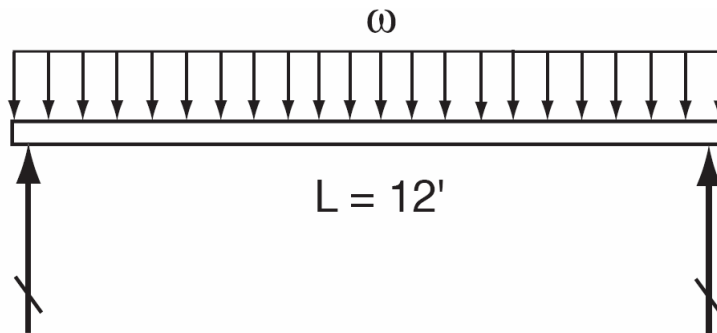


## 6 Stress Values Assignment 6

NAME: \_\_\_\_\_

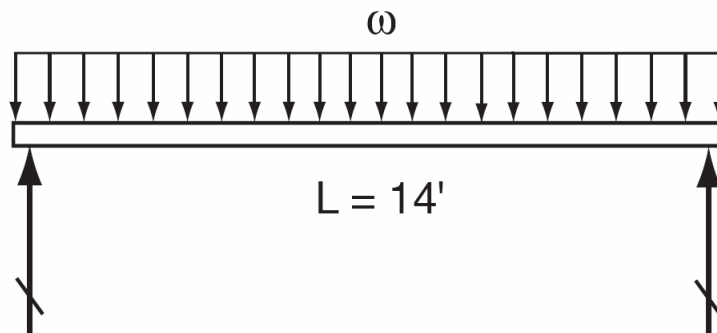
1. Check the adequacy of a 2x8 S4S joist spaced at 16" o.c. supporting a dead load of 10 psf and a live load of 40 psf. The joist material is Hem-Fir No. 2 (joist and planks).

What stress would develop if the same load is applied to a 2x8 S4S board placed flat as a plank?

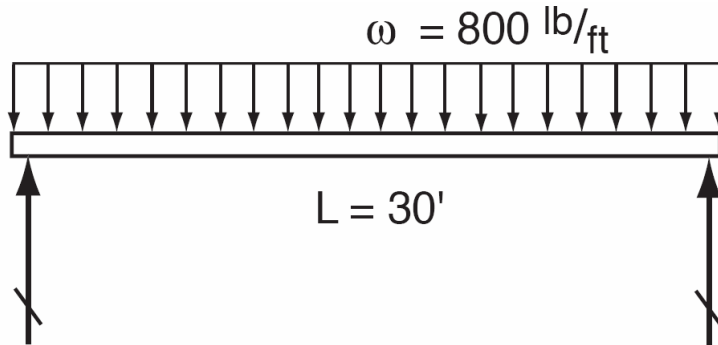


2. Timber beams, 6x12 S4S, are spaced at 8'-0" on center to support a floor load in an office building. Check the adequacy of the beam for bending if Hem-fir No.1 grade (beams and posts) stock is used. The design load is equivalent to 60 psf and the beams span 14 feet.

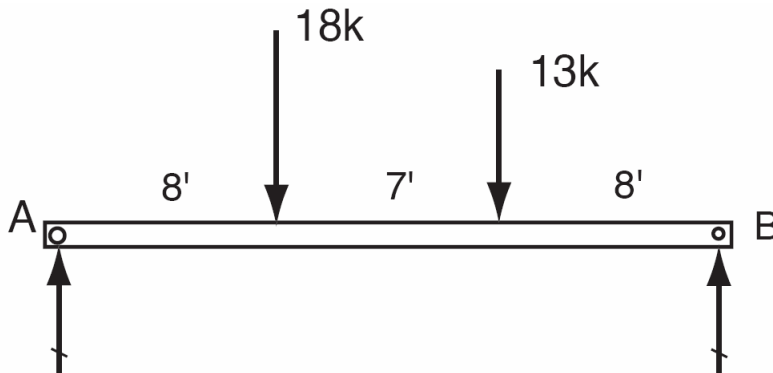
What is the resulting bending stress if a W 8x10 steel beam (A-36) is used in place of a timber section?



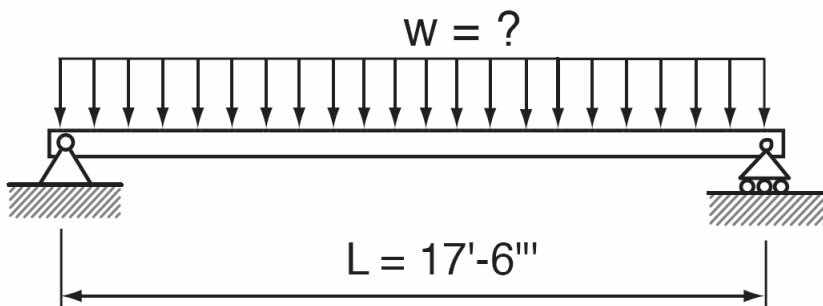
3. Determine the adequacy of a W16x14 (A-36) steel beam that supports a uniform load of 800 pounds/foot over a span of 30 feet.



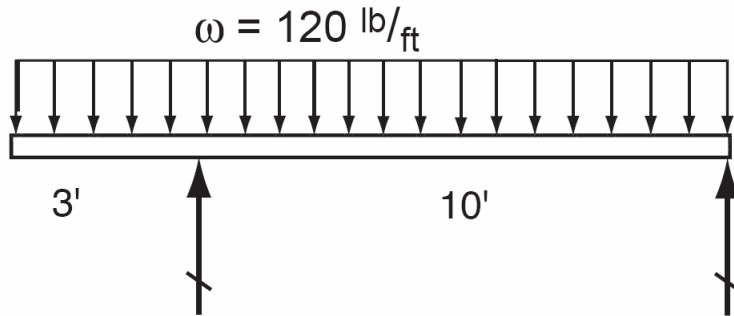
4. A W12x45 steel beam (A572,  $F_y=50$  ksi) spans 23 feet and supports 2 concentrated loads as shown.
- Construct V and M diagrams (on back)
  - Determine the maximum bending stress in the beam.
  - Is the beam adequate?



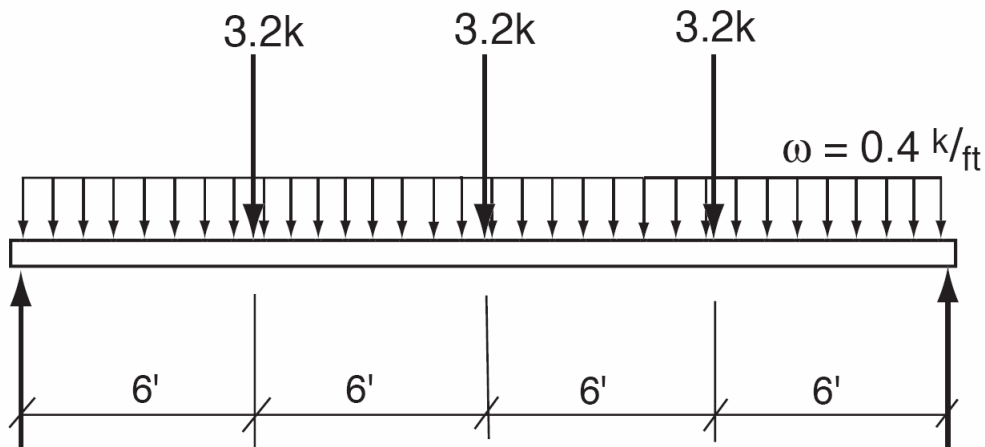
5. Douglas Fir-Larch No 2 floor joists are to be used in supporting the floor of an office building. Determine the maximum joist spacing permitted. Assume the joists are 2x12 S4S. Show computations based on the bending stress condition. DL=10 psf, LL=50 psf.
- 12" o.c.
  - 16" o.c.
  - 24" o.c.



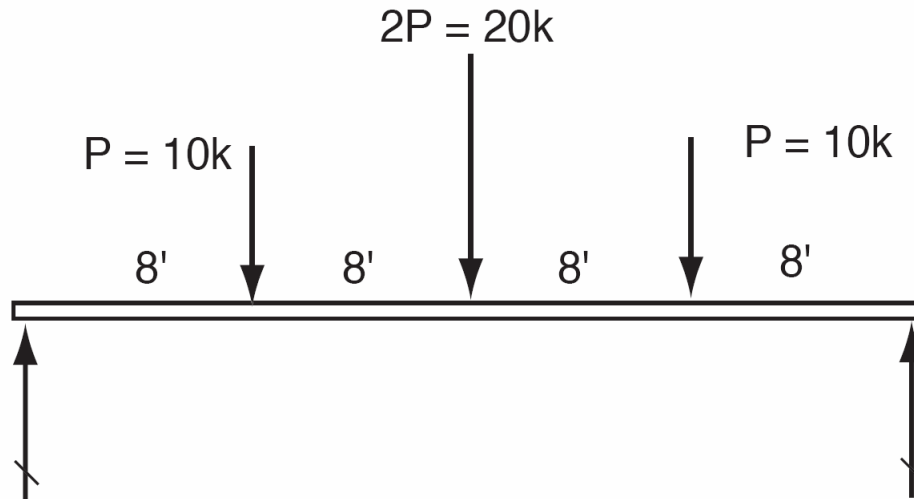
6. An outdoor deck in a mountainous region is supported by Western Red Cedar No.2 grade joists ( $F_b=900$  psi). The joists are cantilevered 3' at one end. If the snow load on each joist is 120 lb./ft. (including the joist weight), determine the required size for the joist based on bending and shear.



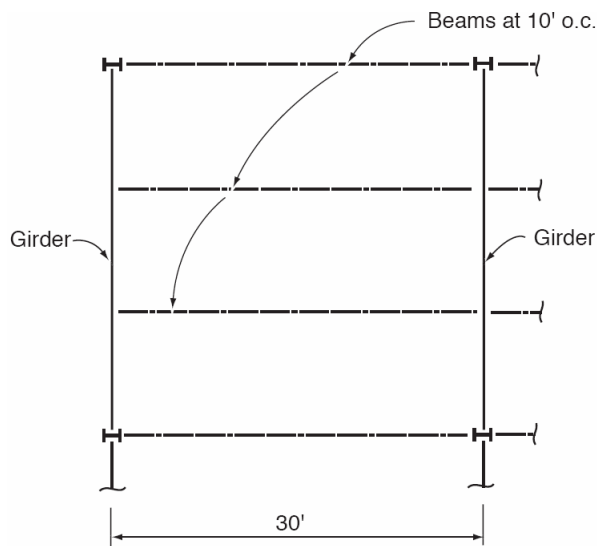
7. A 24' long steel girder (A572,  $F_y=50$  ksi) supports a uniform load plus three concentrated reactions from three beams at quarter points.
- Construct the V and M diagrams (use back)
  - Design the most economical (lightest) wide flange section.
  - What is the lightest W 12x\_\_ size that would work?
  - As an alternate, select an adequate glu-lam section



8. A steel girder spanning 32' supports three concentrated beam reactions as shown. Design the lightest W14x\_\_ section for this girder assuming A572, grade 50 steel. Check shear and deflection. You may neglect the weight of the girder.



9. The typical interior bay of a building is 30'x30' in plan and is framed with A572 (grade 50) beams and girders as shown. The floor live load is 100 psf and the dead load is 100 psf. Design the most economical (lightest) 'W' section for the beam. There is no depth restriction and the beam weight may be neglected



Partial Floor Framing Plan

10. Glue laminated floor beams are used in supporting the floor load in an office building (DL=10 psf, LL=50 psf). The floor beams are spaced at 6'-0" o.c. Design an appropriate beam based on bending, shear and deflection.

