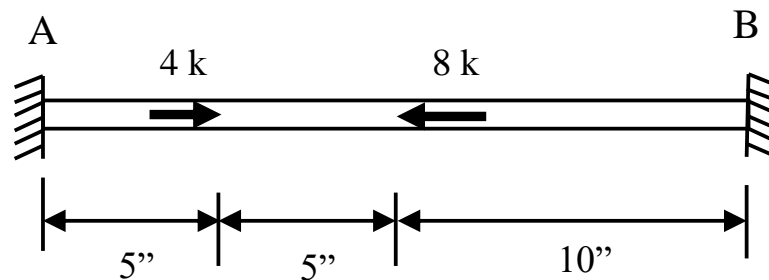


1. What is superposition and when can you use it?
2. When is a member statically indeterminate?
3. Using words, equations, and/or drawings, explain all the relationships between loads, stress, strain, and deformation in axial members. For example, if given stress, how can you find deformation in the member, if given deformation, how do you know how much load was applied, etc.
4. Refer to the figure below for the following problems. The member is a 2014-T6 aluminum rod ($E = 10600$ ksi) with a 1 inch diameter.



- a. If the member above fits snugly between the fixed walls before it is loaded, determine the reactions at the walls when it is subjected to the given load.
- b. If there is a gap of 0.1 inches between the member and the fixed wall at B before it is loaded, determine the reactions at the walls when it is subjected to the given load.
- c. If an A992 steel tube ($E = 29000$ ksi, outside diameter of 1.5 inches) is bonded to the left ten inches of the member, determine the support reactions when it is subjected to the given load.
- d. Given these three different scenarios, what is the largest average normal stress developed in the aluminum rod?
- e. If the allowable stress is 15 ksi, what is the minimum diameter needed for the aluminum rod to support the given load.
- f. How does adding a steel tube to the left ten inches impact the minimum diameter found in part e?