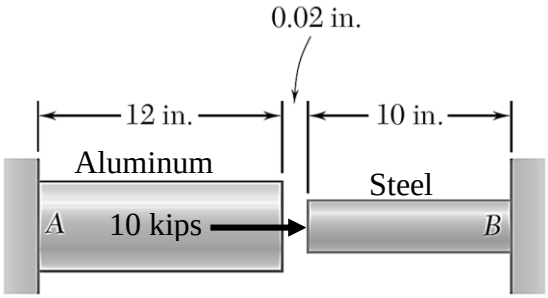
1) GIVEN: Before the 10 kip load is applied, a 0.02-in. gap exists between the ends of the rods when at room temperature (70 °F). (B9.46)



Aluminum	Steel
$A = 2.8\ in^2$	$A = 1.2\ in^2$
$E = 10.4 \times 10^6\ psi$	$E = 29.0 \times 10^6\ psi$
$\alpha = 13.3 \times 10^{-6}/°F$	$\alpha = 9.6 \times 10^{-6}/°F$

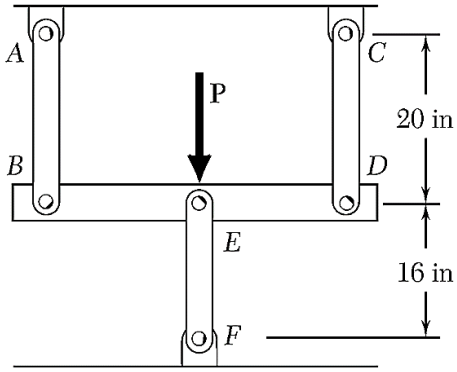
REQ'D: (a) What will be the gap once the 10 kip load is applied?

(b) At what temperature will the gap just close?

(d) What will be the maximum stress if the bars are heated to 320 °F?

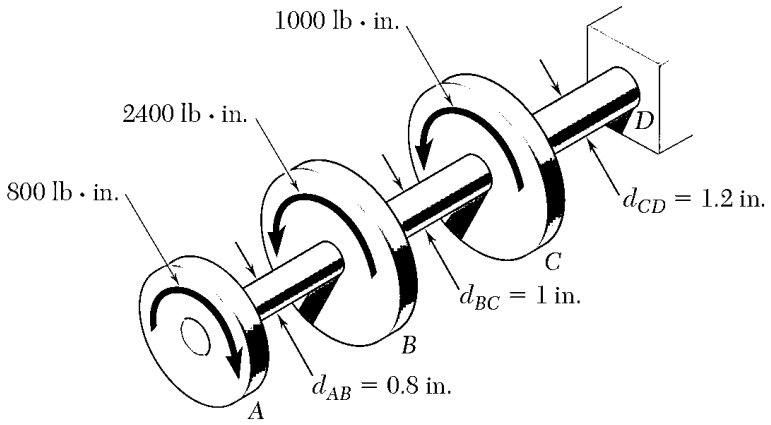
2) GIVEN: Three steel rods ($E = 29 \times 10^6$ psi) support an 8.5-kip load **P**. Each of the rods AB and CD has a 0.32-in^2 cross-sectional area and rod EF has a 1-in^2 cross-sectional area. (B9.29)

Neglect any deformation of rod BED.



REQ'D: (a) Find the change in length of rod EF
(b) Find the stress in each rod.

3) GIVEN: Solid steel shaft with pulleys spaced every 6 in and torques as shown.
Gsteel = 11.2×10^6 psi (B10.9)



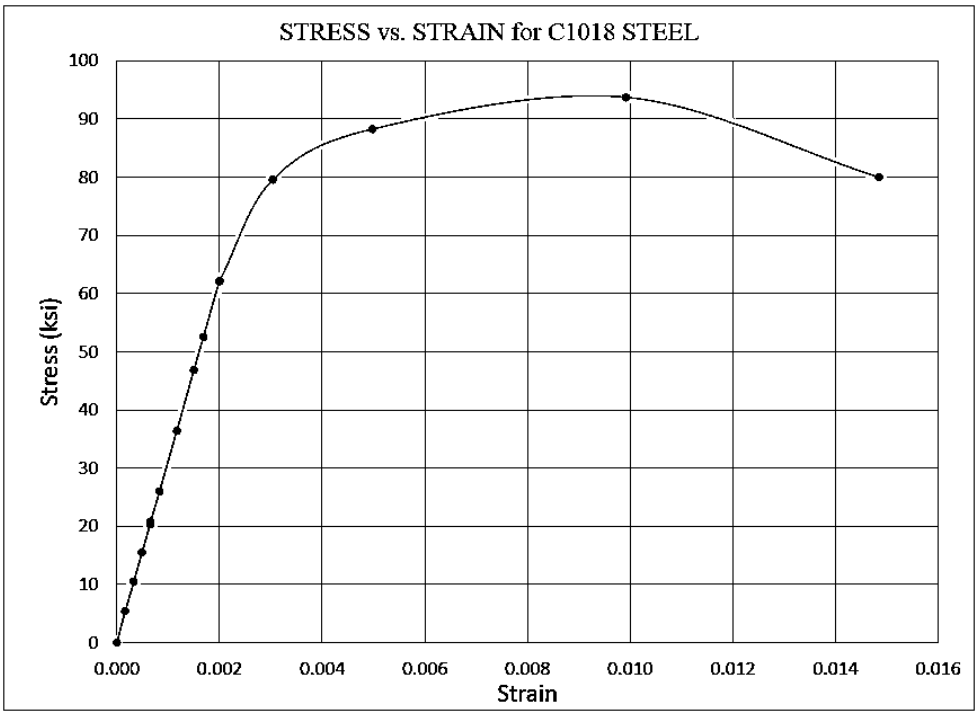
REQ'D: (a) Torque in each segment

(b) Maximum shear stress in shaft. In which segment does it occur?

(c) The angle of twist at end A of the shaft. Indicate direction of twist.

4) GIVEN: Stress strain plot.

Initial diameter = 0.514 in
Gage length = 2.00 in
Final diameter = 0.378 in
Final length = 2.36 in



REQ'D: (a) Stress at proportional limit.

(b) 0.2 % offset yield stress

(c) Modulus of elasticity.

(d) Ultimate Strength.

(e) Percent elongation and reduction in area.