Homework Problem H10.A
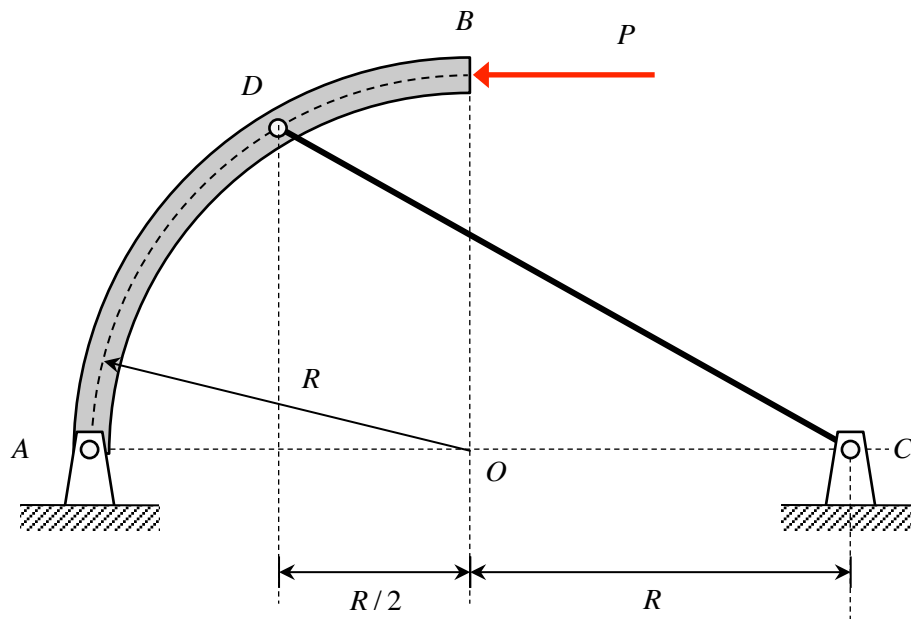
Given: Curved structural member AB is pinned to ground at end A. A cable having a cross-sectional area of A connects D on the structural member to ground at C.

Find: For this problem:

a) Determine the tension in the cable.

b) Determine the axial stress and strain in the cable.

For this problem, use the following parameters: $R = 0.5$ m, $A = 1.5$ in^2, $P = 10$ kN and $E = 30 \times 10^6$ psi.
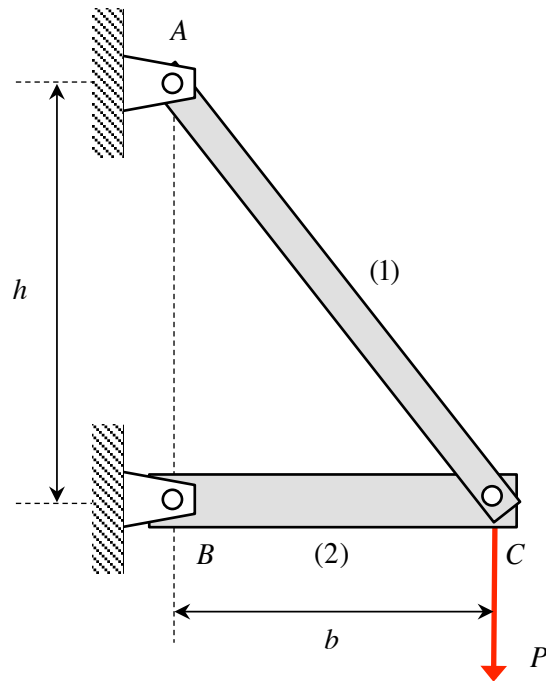
Homework Problem H10.B

Given: The truss shown below is made up of members BC and AC, with the members having cross-sectional areas of A_1 and A_2.

Find: Determine the stress in each rod.

For this problem, use the following parameters: P = 10 kips, h = 1.6 ft, b = 1.2 ft, A_1 = 3 in^2 and A_2 = 6 in^2.
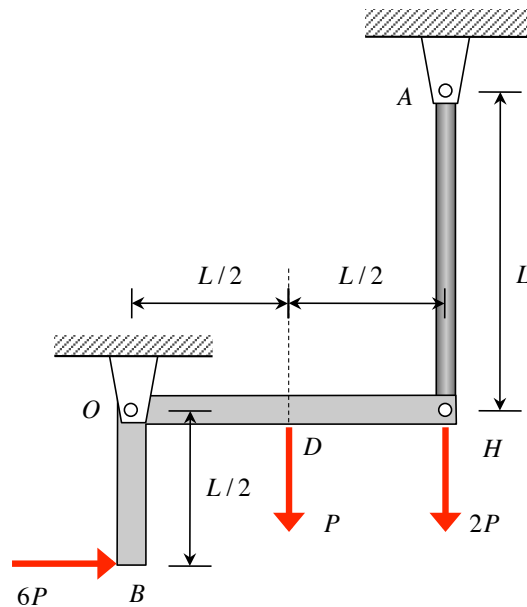
Homework Problem H10.C

Given: The frame shown below is made up of the L-shaped member BH that is pinned to ground at O. AB is also supported by the rod AH that has a cross-sectional area of A. Member BH carries loads at locations B, D and H, as shown. Rod AH is made up of an aluminum alloy 6061-T6.

Find: For this problem:

a) Determine the stress in rod AH.

b) Has the material in rod AH failed due to yielding? If not, what is the factor of safety for this loading against yielding?

For this problem, use the following parameters: P = 30 kN, L = 1.5 m and A = 100 mm².

Homework Problem H10.D

Given: The L-shaped stand is pinned to ground at B. A person having a weight of W is positioned near end A of the stand. The person is supporting herself and the stand through a cable-pulley system as shown. Consider the weight of the stand to be negligible compared to the weight of the person, and consider the pulleys to be ideal. The cable has a diameter of d.

Find: Determine the stress in the cable.

For this problem, use the following parameters: W = 140 lb, h = 6 ft, a = 4 ft, c = 1 ft, e = 0.5 ft and d = 0.75 in.
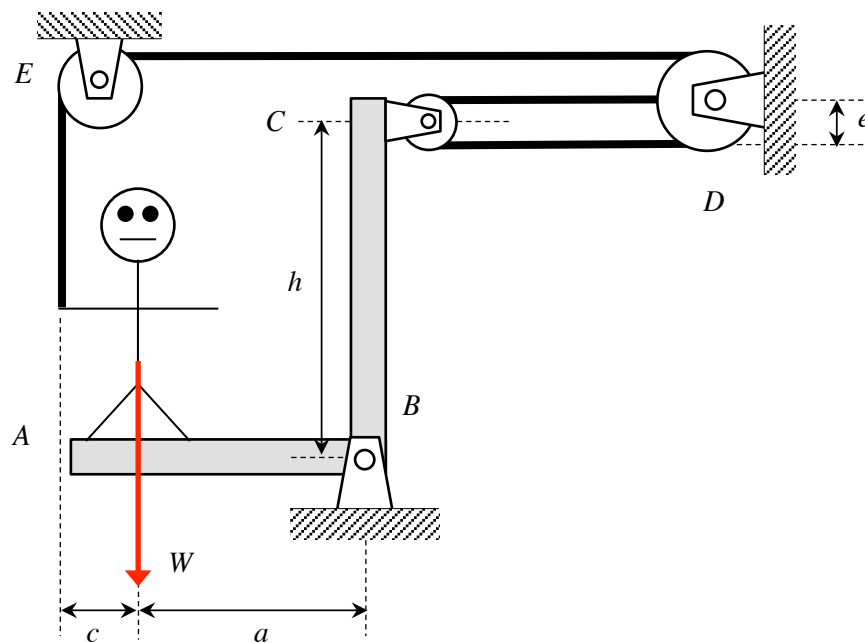
Homework Problem H10.E

Given: A rod is made up of members (1), (2) and (3), with these members having outer diameters of d_2, d_2 and d_3, respectively. Member (1) has a tubular cross section with an inner diameter of d_1. Loads are applied at rigid connectors C, D and H, as shown.

Find: Determine the stress in each member of the rod.

For this problem, use the following parameters: d_1 = 2.5 in, d_2 = 3 in, d_3 = 2.5 in and P = 40 kips.