

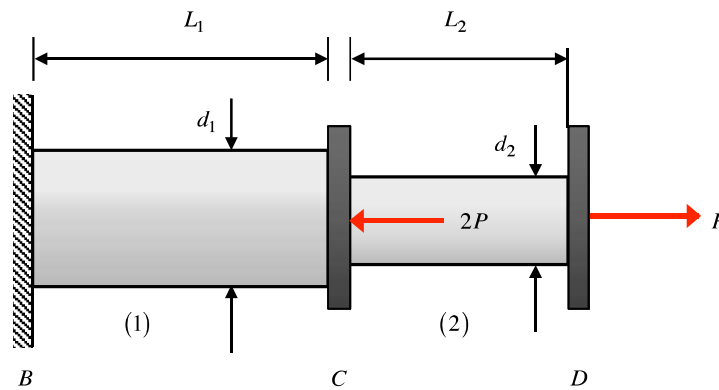
### Homework H31.A

**Given:** A rod is made up of members (1) and (2) with these members having diameters of  $d_1$  and  $d_2$ , respectively, and are made of a material having a Young's modulus of  $E$ . The members are connected by the rigid connector C. Both members are made of a material having a Young's modulus of  $E$  and a yield strength of  $\sigma_{YP}$ .

**Find:** For this problem:

- Determine the stress in each member of the rod.
- Has the material in either member failed? If not, what is the factor of safety for the rod for this loading?

For this problem, use the following parameters:  $d_1 = 1$  in,  $d_2 = 2$  in,  $P = 10$  kips,  $E = 15 \times 10^3$  ksi and  $\sigma_{YP} = 36$  ksi.



### Homework H31.B

**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:

- Determine the stress in rod AH.
- 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:  $P = 30 \text{ kN}$ ,  $L = 1.5 \text{ m}$  and  $A = 100 \text{ mm}^2$ .

