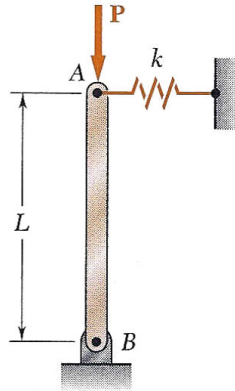


Stability and Buckling (Example Problems)

Stability Example 1:



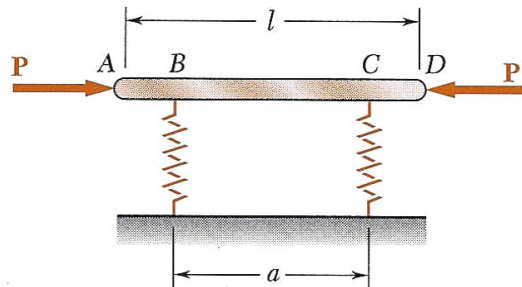
Specifications:

1. Spring constant = k .
2. Bar AB is rigid.
3. Spring exerts zero force when the bar is vertical.

Determine:

1. The critical load P_{cr} when the bar is perfectly vertical.
2. The critical load P_{cr} when a small horizontal force acts at the top of the bar and is directed to the left.

Stability Example 2:

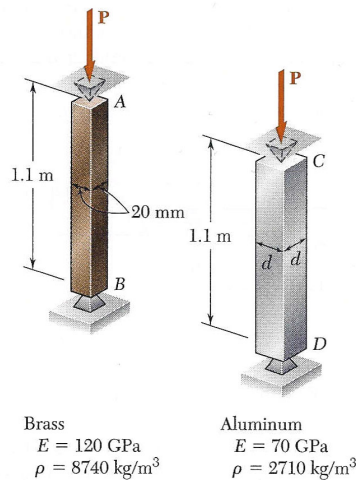


Specifications:

1. Both springs have a spring constant of k .
2. Bar AD is rigid.
3. Spring exerts zero force when the bar is horizontal.
4. P and P' are equal and opposite and remain horizontal.

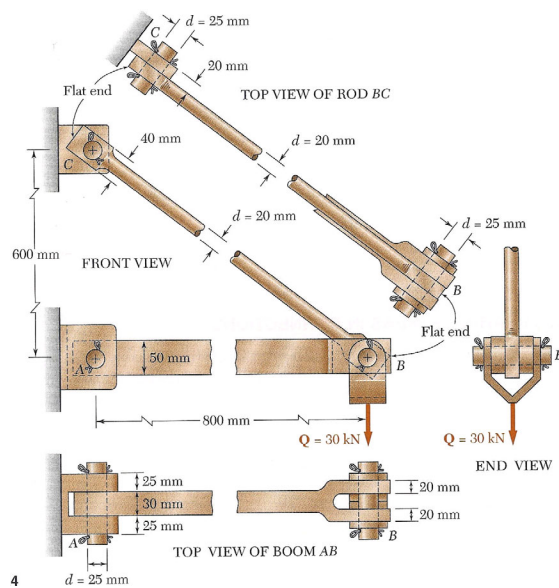
Determine:

1. The critical load P_{cr} .

Buckling Example 3:

Determine:

1. The critical load P_{cr} for the brass column.
2. The dimension “d” for which the aluminum column will have the same critical load.
3. The weight of the aluminum column as a percent of the weight of the brass column.

Buckling Example 4:

$$F_{BC} = 50 \text{ kN} = 11,240 \text{ lb}_f \text{ (Tension)}$$

$$F_{AB} = 40 \text{ kN} = 8992 \text{ lb}_f \text{ (Compression)}$$