

CE 203 STRUCTURAL MECHANICS I

First Semester 2012 / 2013 (121)

HOMEWORK NO. 5

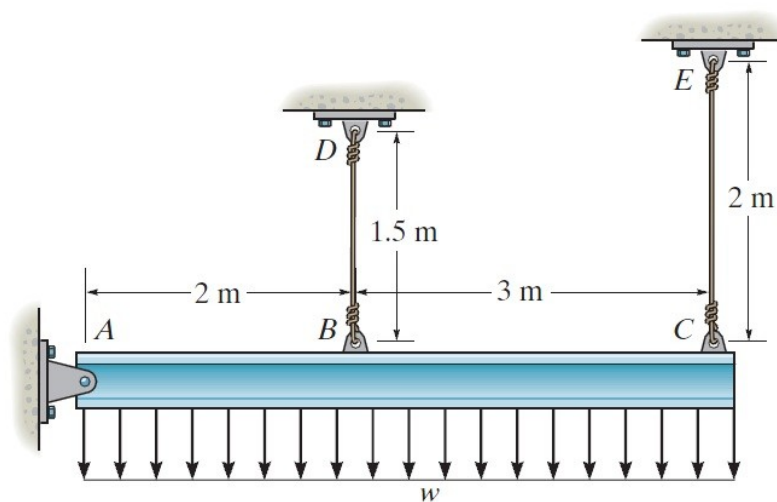
- **Textbook Sections Covered: 4.4 – 4.6 , Axial Rods , Thermal Effects**
- **DUE DATE: Monday, 8 October 2012**

1- Solve problem 4.39 in the textbook (page 146) using the given revised data: **the cross section of the concrete is a 500X200 mm rectangle.**

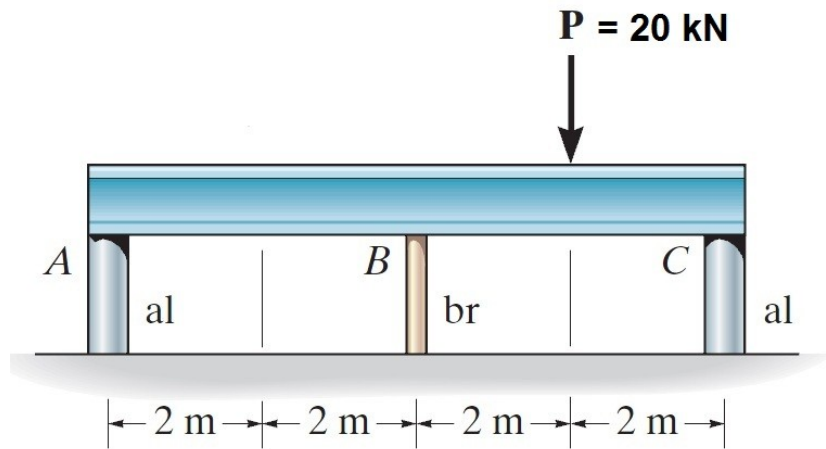
2- Solve problem 4.64 in the textbook (page 150) using the given revised data: **the central rod B is made of steel with $E= 200 \text{ GPa}$.**

3- The rigid beam AC is supported by a pin at A and wires BD and CE. The 2 wires are made of Steel ($G= 200 \text{ GPa}$) and each has a radius of 15 mm. Determine the vertical displacement of point C.

Use $w= 2 \text{ kN/m}$.



4- The rigid beam is supported by the three posts A, B, and C, of equal length. Posts A and C have a diameter of 60mm and are made of aluminum, for which $E = 80 \text{ GPa}$, and Post B has a diameter of 30 mm and is made of brass, for which $E = 120 \text{ GPa}$. Determine the stress in each of the three rods.



5- The A36 steel tube AB is capped with a rigid plate E. The gap between E and end C of the 6061-T6 aluminum alloy solid circular rod CD is 0.2 mm *before the application of the load*.

- Determine the normal stress developed in the tube and the rod due to the load.
- Determine the normal stress developed in the tube and the rod if *in addition to the load*, the temperature of both rods increases by 10° C .

Neglect the thickness of the rigid cap.

