

A rod is made up of segments (1) and (2), where the same material, having a modulus of elasticity E , is used for each segment. Segments (1) and (2) have circular cross-sections of diameters $2d$ and d , respectively, and lengths of $2L$ and L , respectively. The segments are joined by a rigid connector at C, and second rigid connector is located at D, with the weights of the connectors at C and D being $2W$ and W , respectively. A vertical load of $P = 2W$ is applied to connector D. The weights of segments (1) and (2) are to be considered to be negligible.

- Draw individual free body diagrams (FBDs) of connectors C and D.
- Write down the equilibrium equations for the connectors from the FBDs above, and from these, determine the load carried by each of the two segments of the rod.
- Write down the force/elongation equations for segments (1) and (2).
- Determine the displacements of connectors C and D.

Leave your answers in terms of the given parameters of, at most: E , d , W and L . Verify that your answers have appropriate units.

