Problem M14

A circular cross-section aluminum tube is simply supported at its ends and is loaded eccentrically as shown.   The external diameter of the tube is 50 mm, the wall thickness is 5 mm. The Young's modulus is 70 GPa, The allowable normal stress is 85 MPa. The length of the tube is 2.5 m.

   a) Determine the allowable load P, and the corresponding lateral central deflection. Note, you will need to calculate the axial stress due to the combined axial loading and bending moment due to the eccentricity and lateral deflection
   b) What would be the critical buckling load if the column was loaded centrally.