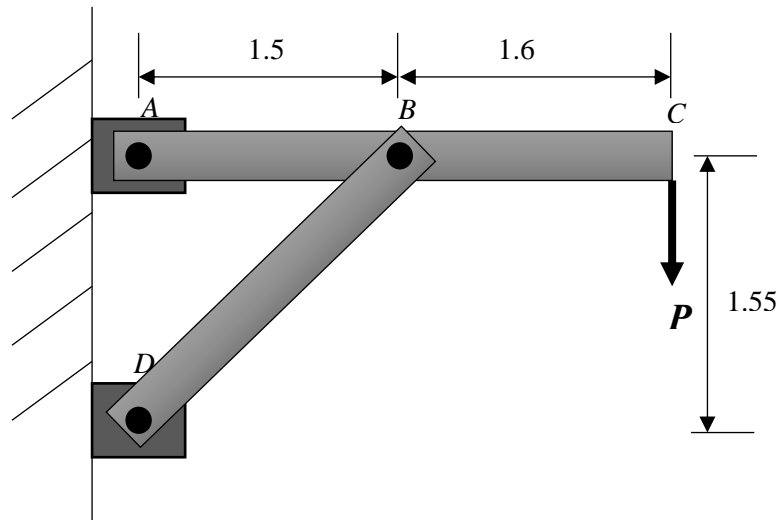1-16. Rigid beam AC is subjected to a normally distributed force $P \sim N(3.5, 0.4^2)$ kN as shown. The beam is supported by support beam BD which has a cross sectional area $A = 10000$ mm², a modulus of elasticity $E = 200$ GPa, and an allowable axial deformation $\delta_{max} = 2$ mm. What is the strain distribution? What is the probability of failure? Neglect the weight of the beam.

(**Ans.** $p_f = 4.1848(10^{-4})$)

Note - This is <u>not</u> to be solved using $\delta = \dfrac{FL}{AE}$ but with stress strain relations.