1-15. Rigid beam AC is subjected to a normally distributed force $P \sim N(5000, 550^2)$ lb as shown. The beam is supported by wire BD which has a diameter $d = 1$ in, a modulus of elasticity $E = 29000$ ksi, and an allowable strain $\varepsilon_a \sim N(1, 0.1^2)(10^{-3})$. What is the probability of failure? Assume P and ε_a are independent and neglect the weight of the beam.

(**Ans.** $p_f = 3.4528(10^{-4})$)