

34. A force $P \sim N(1600, 160^2)$ lbf is applied to a tube as shown in the figure. The tube has a length of $l \sim N(100, 1^2)$ in. It has an outside diameter of $d_o = 4$ in and inside diameter of $d_i = 2$ in. The modulus of elasticity and allowable transverse deflection are $E = 11$ Mpsi and $y_a = 6$ in, respectively. If P and l are independent, determine the probability of failure using the First Order Second Moment Method. The maximum deflection is given by $y_{\max} = \frac{Fl^3}{3EI}$

Answer: $p_f = 5.7769(10^{-6})$

