22. A force $P \sim N(700, 70^2)$ lbf is applied to a crank shown in the figure. The shaft AB fixed at A has a diameter of $d = 1$ in and a length of $l_{AB} = 6$ in. The arm BC has a length of $l_{BC} = 5$ in. If the yield strength of the shaft AB is $S_y \sim N(100, 10^2)$ kpsi, and P and S_y are independent, determine the probability of failure using the First Order Second Moment Method. Use the distortion-energy theroy.

Answer: $p_f = 1.47(10^{-5})$