45. A rod BC is subjected to a force $F \sim N(2000, 200^2)$ lbf as shown in the figure. Rod AB with a round cross section has a yield strength of $S_y \sim N(2, 0.2^2)$ kpsi. If the maximum probability of failure is designed to be $p_f = 10^{-5}$, determine the minimum diameter of rod AB and select a preferred diameter.

Answer: $d_{min} = 0.904$ in, $d_{preferred} = 1.00$ in