59. A strut with a square cross section is subjected to an eccentric force $F \sim N(600, \ 60^2)$ lbf shown in the figure. The yield strength of the strut is $S_y \sim N(5000, \ 500^2)$ psi. If the maximum probability of failure is designed to be $p_f = 10^{-5}$, determine the minimum side length of the square cross section. Assume that F and S_y are independent.

Answer: $b = 0.77$ in, $b_{preferred} = 0.80$ in

F

$e = 0.20$ in

F