24. A steel thin-wall tube is 60 in long and has a square cross section with side length $b = 3$ in and wall thickness $t = 0.3$ in. It is subjected to a torque $T \sim N(50,000\ \ 5,000^2)$ lbf·in. The shear modulus of the tube is $G = 11.5(10^6)$ psi. If the allowable shear stress is $\tau_a \sim N(25,\ 3^2)$ kpsi, and T and τ_a are independent, determine the probability of failure using the First Order Second Moment Method.

Answer: $p_f = 1.19(10^{-5})$