

37. A bar is subjected to a torque $T \sim N(2000, 200^2)$ N·m. The bar has a round cross section with a diameter of $d \sim N(100, 0.1^2)$ mm. If the allowable shear stress is $\tau_a \sim N(18, 2^2)$ MPa, determine the probability of failure using the First Order Second Moment Method. Note that T , d and τ_a are independent.

Answer: $p_f = 2.50(10^{-5})$

