

31. A torsion-bar is subjected to a torque $T \sim N(6000, 600^2)$ N·m. The bar has a circular cross section with a diameter $d \sim N(100, 1^2)$ mm. The allowable shear stress is $\tau_a \sim N(50, 5^2)$ MPa, If T , d and τ_a are independent, determine the probability of failure using the First Order Second Moment Method.

Answer: $p_f = 5.2271(10^{-4})$