

68. A welded thin-wall steel tube is subjected to a torque $T \sim N(500, 50^2)$ N·m as shown in the figure. The thickness of tube is $t = 5$ mm and the length is $l \sim N(200, 0.1^2)$ mm. The tube has a round section with a diameter of $d = 40$ mm. The shear modulus is $G = 80$ GPa. If the allowable angle of twist is $\theta_a = 0.01$, estimate probability of failure using the FOSM. Note that T and θ_a are independent.

Answer: $p_f = 2.61(10^{-4})$

