8-10. A column is 5.5-meter long and is fixed at both ends. The cross-sectional area of this column is shown in the figure. If the modulus of elasticity follows $E \sim N\left(200,\, 20^2\right)$ GPa . Determine the distribution of the critical axial buckling load. If the axial load acting on the column folllows $P \sim N\left(260,\, 25^2\right)$ kN , determine the probability of failure. Assume that *E* and *P* are independent.

(**Ans.** $p_f = 1.9725 \times 10^{-6}$)