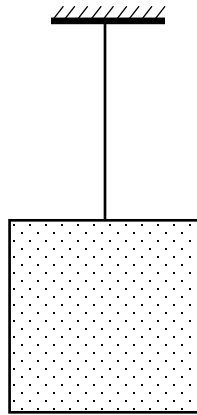


Due to the manufacturing impression, the weight of the block in the figure is random, following a normal distribution $W \sim N(1,000, 10^2)$ N. If the allowable tension of the cable is 1,030 N, what is the probability that the cable will break?



Solution

When the weight is greater than the allowable tension of the cable, the cable will break. Then the probability that the cable will break is given by

$$\begin{aligned} P(W > 1,030) &= 1 - P(W \leq 1,030) = 1 - \Phi\left(\frac{W - \mu_W}{\sigma_W}\right) \\ &= 1 - \Phi\left(\frac{1,030 - 1,000}{10}\right) = 1 - \Phi(3) = 1 - 0.9987 \\ &= 0.0013 \end{aligned}$$