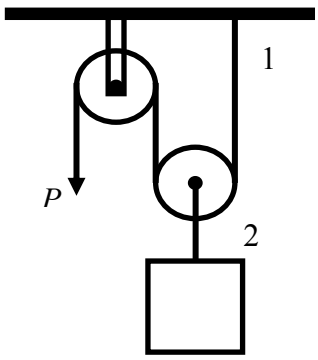
16. A frictionless pulley system, which lifts a box, is shown in the figure. The weight of the box follows a normal distribution $W \sim N(1000, 80^2)$ kN . The resistances of the two cables follow distributions $S_1 \sim N(700, 50^2)$ kN and $S_2 \sim N(1800, 200^2)$ kN . Determine the probabilities of failure of the cables. W, S_1, and S_2 are independently distributed.



Solution:

The probabilities of failure of cable 1 and cable 2 are $p_{f1} = 8.9364 \times 10^{-4}$ and $p_{f2} = 1.0204 \times 10^{-4}$.