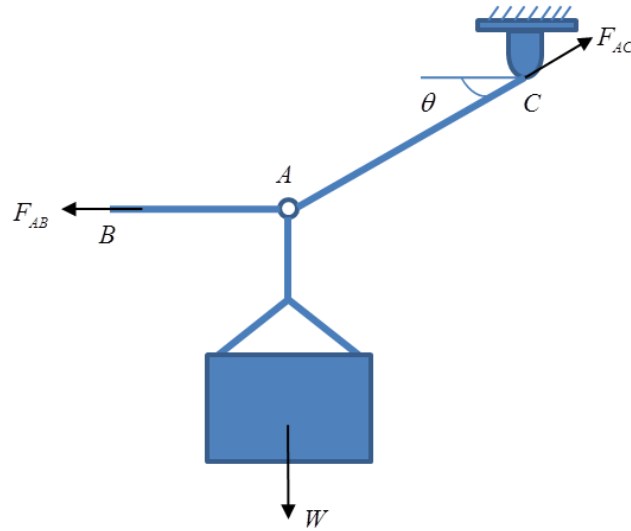6. The weight of the crate follows a normal distribution $W \sim N(1000,120^2)$ lb and the crate is hoisted using ropes AB and AC. Each rope can withstand a maximum tension $T_{max} \sim N(6000,220^2)$ lb before it breaks. If AB always remains horizontal and θ is $12°$, determine the probability that rope AB and AC will break. Note all the forces W, T_{max}, F_{AB}, and F_{AC} are independently distributed.

Solution

The probability of the break of rope AC is 0.027 and the probability of the break of rope AB is 0.016.