64. An uniform load of $w \sim N(6000, \ 600^2)$ N/m is applied to a square-cross-section beam as shown in the figure. The beam is simply-supported and has a length of $l = 3$ m. The side length of cross section is $b = 60$ mm. If the allowable bending stress is $S_a \sim N(20, \ 2^2)$ MPa, estimate the probability of failure using the First Order Second Moment Method. Assume that w and S_a are independent.

Answer: $p_f = 6.86(10^{-5})$