

47. A round Euler column is subjected to an axial force  $F \sim N(8000, 400^2)$  lbf. The column has a length of  $l \sim N(4, 0.01^2)$  in and its ends are pinned as shown in the figure. The modulus of elasticity is  $E = 400$  kpsi. If the maximum probability of failure is designed to be  $p_f = 10^{-5}$ , determine the minimum diameter of the column using the First Order Second Moment Method. Note that  $F$  and  $l$  are independent.

**Answer:**  $d_{min} = 0.946$  in,  $t_{preferred} = 1.00$  in

