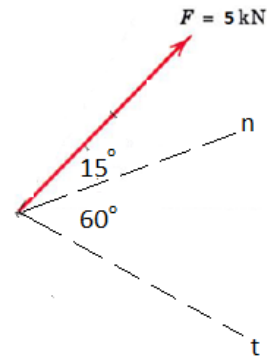
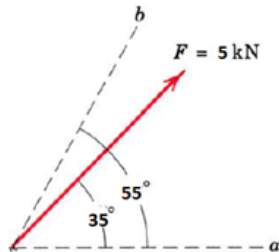


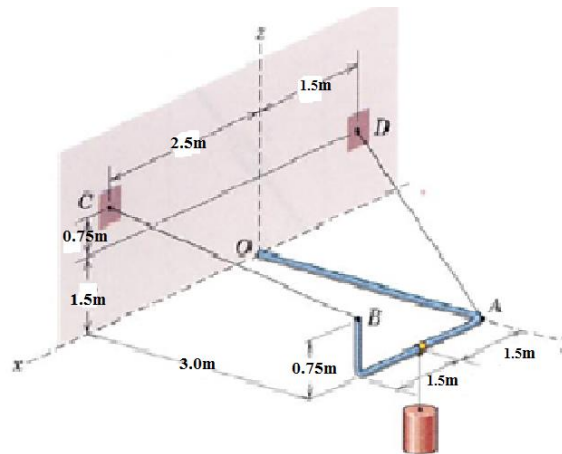
- I. Determine the component of the 5kN force along the oblique axes
 - A. a and b
 - B. n and t

Determine the projection of the force on each axes

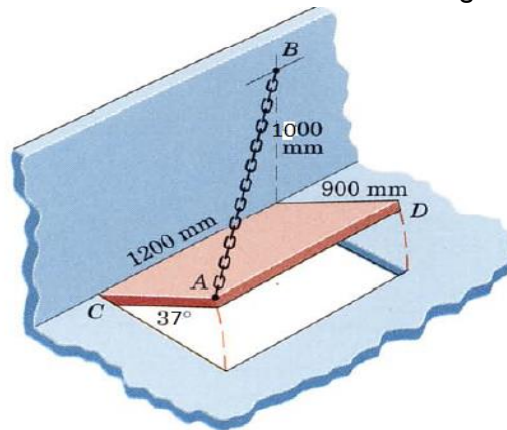


2. The tension in the supporting cable BC is 1000kN write the force which this cable exerts on the boom OAB as a vector T. Determine the angle θ_x , θ_y and θ_z which line of action of T forms with the positive x, y and z axes.

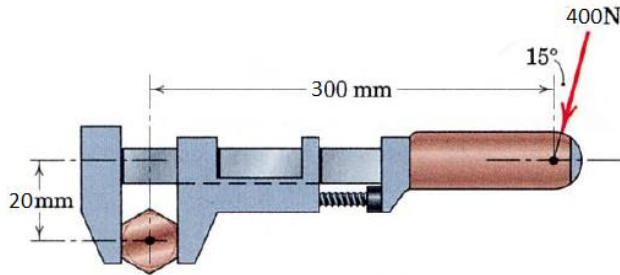
Determine also the projection of the tension force on cable BC on axis AD



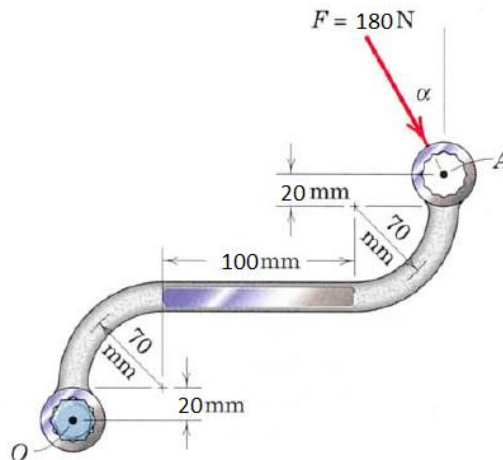
3. The access door is held in the 37° open position by the chain AB. If the tension in the chains 100N, determine the projection of the tension force onto the diagonal axis CD of the door.



4. Calculate the moment of the 400N force on the handle of the monkey wrench about the center of the bolt.
- Using moment arm method
 - Using Varignon's theorem
 - Using vector product
 - The minimum force applied at point A which produces the same moment.
 - Location of 600N force inclined at 30° from the vertical axis that produces the same moment.

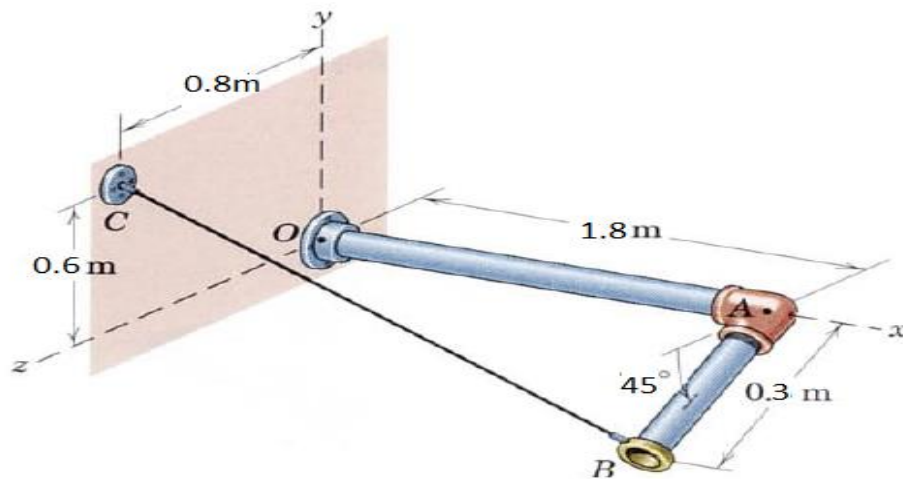


5. The 180N force is applied as shown to one end the curved wrench. If $\alpha=40^\circ$, calculate the moment of F about the center of the bolt. Determine the value of α which would maximize the moment about O: state the value of its maximum moment.

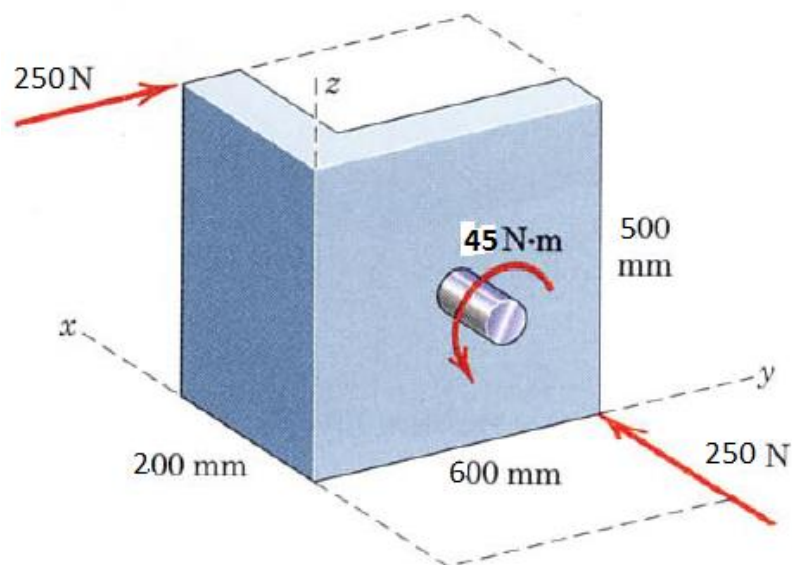


6. For question number 3, determine the moment at point C and D. similarly calculate the moment produced about axis CD. Find the perpendicular between the force acting in the chain and axis CD. (hint: use dot or scalar product)

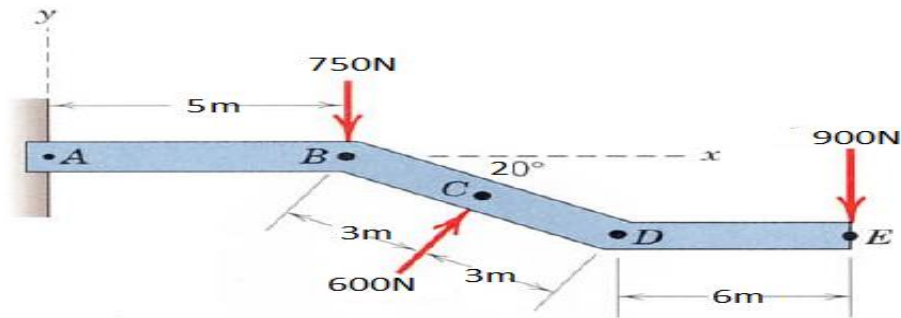
7. The right-angle pipe OAB is supported by cable BC. The cable BC carries a tension of 600. Replace the 600-N tensile force which the cable exerts on point B by a Force-couple system at point O.



8. The resultant of the two forces and couple may be represented by a wrench. Determine the vector expression for the moment M of the wrench and find the coordinates of the point p in the x - z plane through which the resultant force of the wrench passes.



9. Replace the three forces which act on the bent bar by a force-couple system at the support point A. then determine the x-intercepts of the line of action of the stand-alone resultant force.



10. Determine the X - and Y- coordinates of a point through which the resultant of the parallel forces passes.

