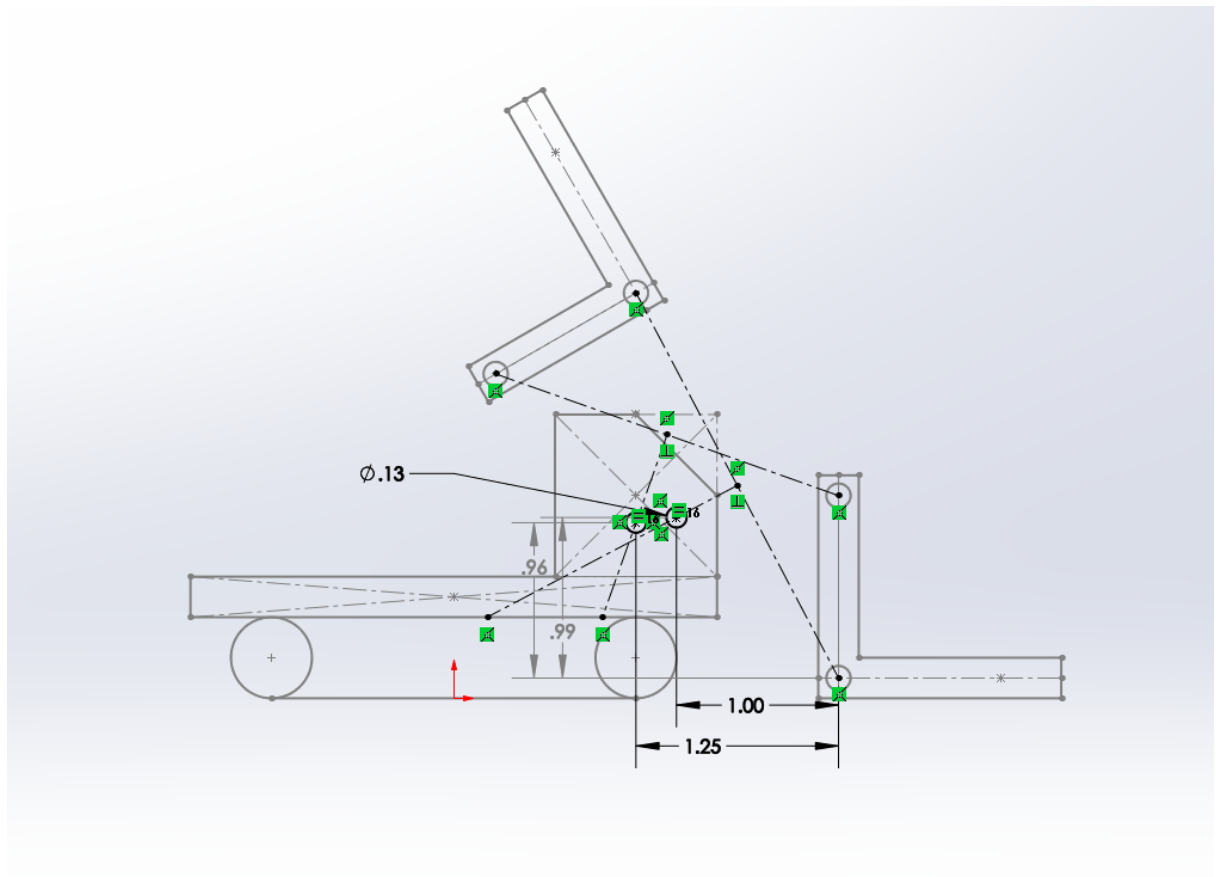
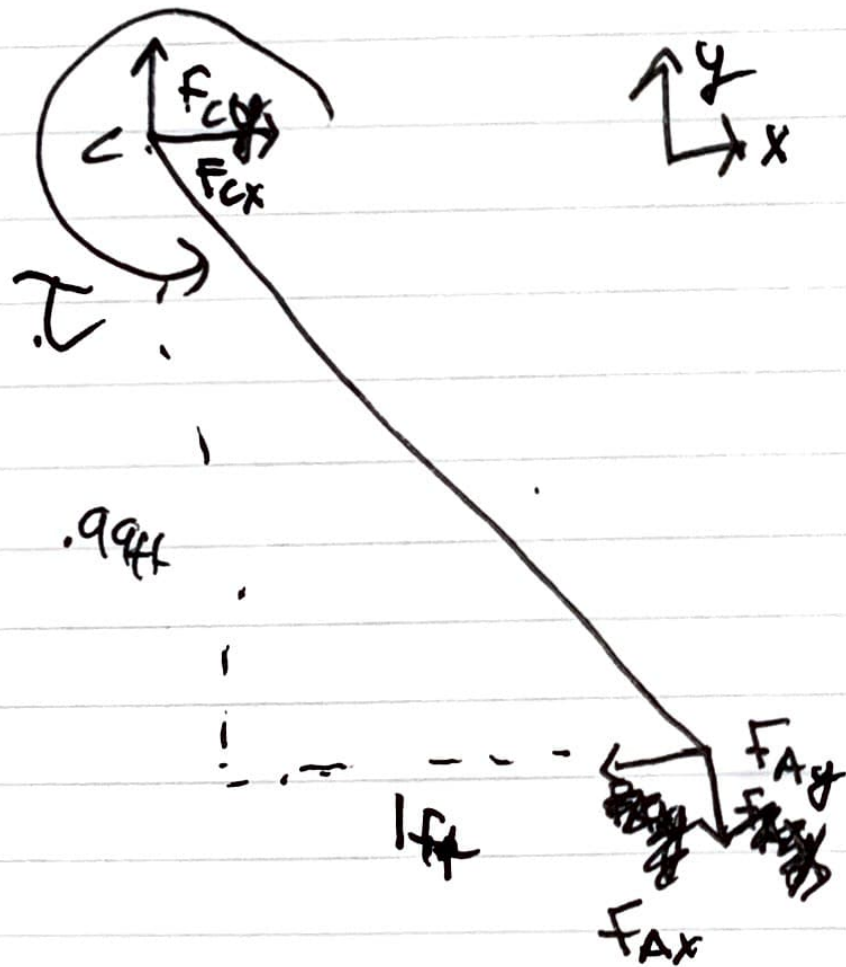


I used solid works to find hole placements that are valid on the robot



Assumptions

Motor is at hole the hole that is 1 foot away from the base joint



Crank

$$\Sigma F_x = F_{Cx} = F_{Ax} = 8.9 \text{ lb}$$

$$\Sigma F_y = F_{Cy} - F_{Ay} = 0$$

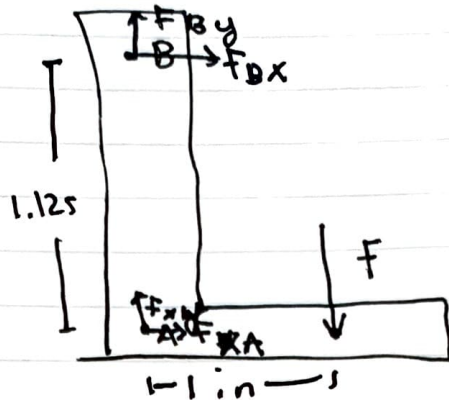
$$\Sigma M_c = T - F_{Ax} \cdot .99 - F_{Ay} \cdot 1 = 0$$

$$F_{Cy} = F_{Ay}$$

$$F_{Ax} = F_{Cx} = 8.9 \text{ lb}$$

$$T = -8.8 \text{ lb} \cdot \text{ft} - F_{Ay} \text{ ft}$$

~~Fork Lift Link~~ →
Coupler



$$F = 10 \text{ lb}$$

$$\sum F_x = F_{Ax} + F_{Bx} = 0$$

$$\sum F_y = F_{Ay} + F_{By} - F = 0$$

$$\sum M_A = F_{Bx} \cdot 1.125 + F \cdot 1 = 0$$

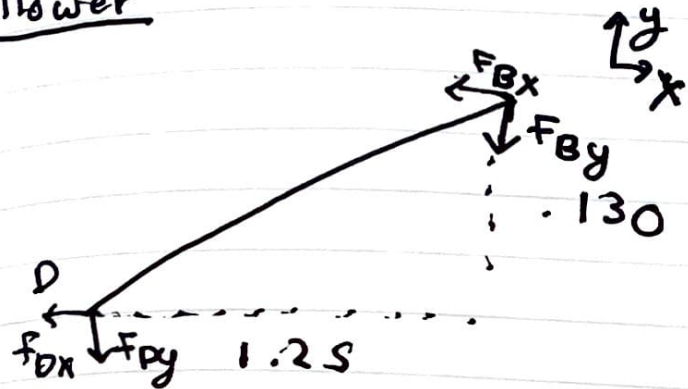
$$F_{Bx} \cdot 1.125 = -F$$

$$F_{Bx} = -\frac{F}{1.125}$$

$$F_{Bx} = -8.9 \text{ lb}$$

$$F_{Ax} = -F_{Bx} = 8.9 \text{ lb}$$

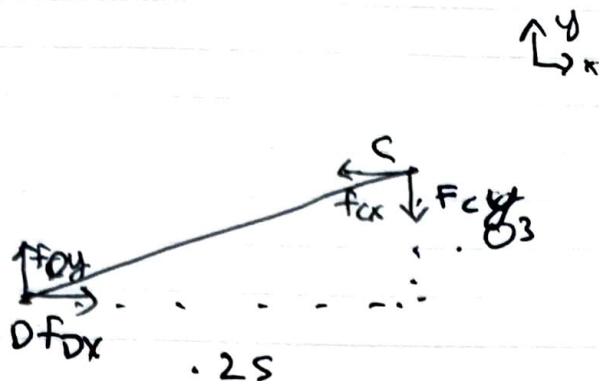
Follower



$$\Sigma F_x = F_{Bx} + F_{Dx} = 0$$

$$\Sigma F_y = F_{Dy} + F_{By} = 0$$

$$\Sigma M_B = -.13 \cdot F_{Dx} + 1.25 \cdot F_{Dy}$$



$$\sum F_x = F_{Dx} - F_{Cx} = 0$$

$$\sum F_y = F_{Dy} - F_{Cy} = 0$$

$$\sum M_D = .03 \cdot F_{Cx} - .25 F_{Cy} = 0$$



Tying it All together

$$F_{Cx} = \frac{.03}{.25} F_{Cy}$$

$$F_{Ax} = F_{Cx} = F_{Dx} = -F_{Bx} = 8.9$$

$$F_{Cy} = F_{Ay} = \frac{.03}{.25} F_{Cx} = \frac{.03}{.25} F_{Ax}$$

$$T = F_{Ax} \cdot .99 - F_{Ay}$$

$$T = F_{Ax} \cdot .99 - \frac{.03}{.25} F_{Ax}$$

$$T = 8.9 \cdot .99 - \frac{.03}{.25} \cdot 8.9$$

$$T = 8.811 - 1.068$$

$$T = \cancel{7.743} \quad 7.743 \text{ ft}\cdot\text{lb}$$