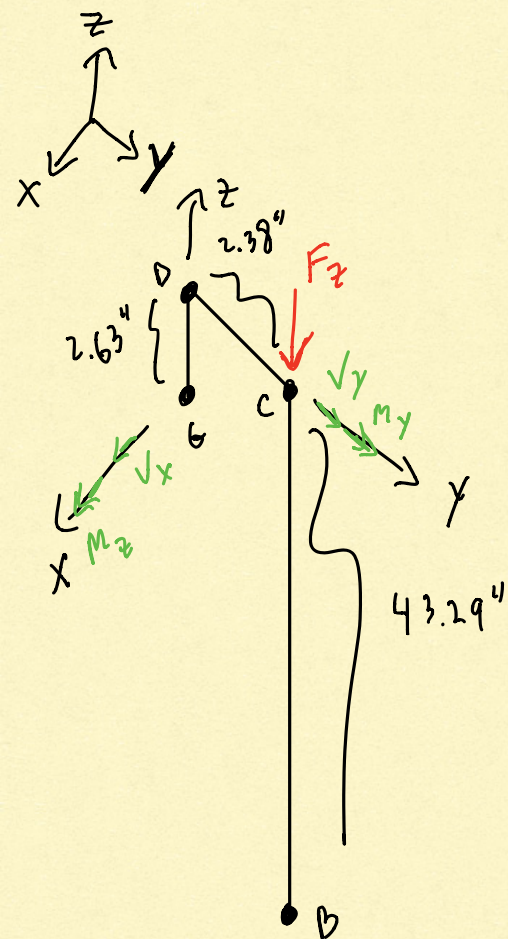


Analysis



Length of PR valve Section:

$$L_{PR} = 1.69" + 1.10" + 0.50" + 2.00" = 5.29"$$

Length of Pressure Sensor Section:

$$L_{PS} = 1.65" + 0.50" + 1.00" + 1.20" + 1.02" = 5.37"$$

$$M_{PR} = 0.38 \text{ lb}$$

$$M_{PS} = 0.745 \text{ lb}$$

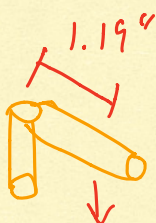
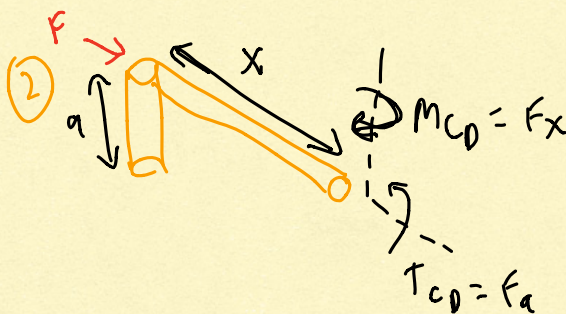
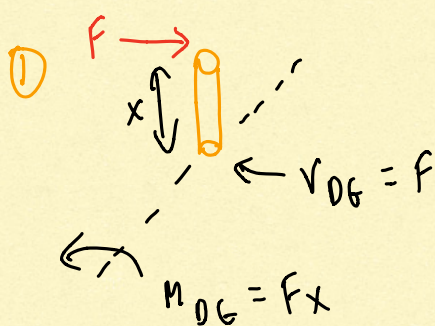
$$F_1 = (0.38 \text{ lb})(5.29") = 2.0102 \text{ lb.in}$$

$$F_2 = (0.745 \text{ lb})(5.37") = 4.0 \text{ lb.in}$$

$$F_z = 0;$$

$$F_2 = F_1 + F_2 = \boxed{6.01085 \text{ lb.in}}$$

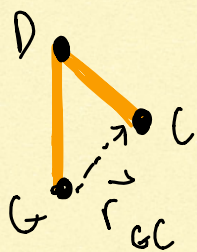
$$T_x = (2.63") (6.01085 \text{ lb.in}) = \underline{15.8095 \text{ lb.in}^2}$$



$$M = (0.40375 \text{ lb})(1.19")$$

$$= \underline{0.48046 \text{ lb.in}}$$

Continued...



$$\begin{aligned}\vec{r}_{GC} &= C(0, 2.38, 2.63) \\ &\quad - G(0, 0, 0) \\ &= (2.38\hat{j} + 2.63\hat{k})\end{aligned}$$

$$\vec{F} = \frac{0\hat{i} + 0\hat{j} - 6.01085\hat{k}}{\sqrt{6.01085^2}} = -1\hat{k}$$

$$M_G = r_{GC} \times F = \begin{bmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 2.38 & 2.63 \\ 0 & 0 & -1 \end{bmatrix}$$

$$= \underline{\underline{[-2.38\hat{i} + 0\hat{j} + 0\hat{k}] \text{ lb}\cdot\text{in}}}$$