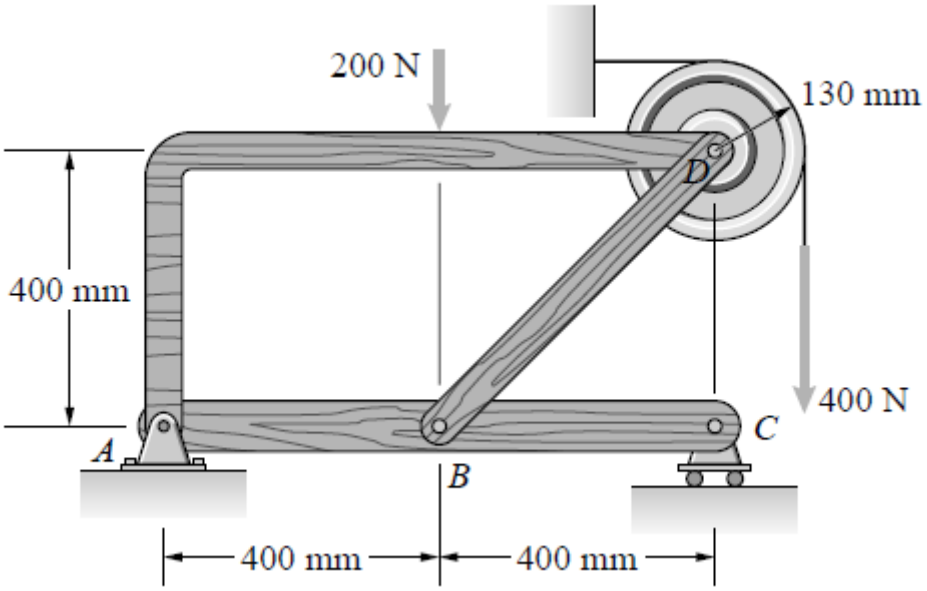
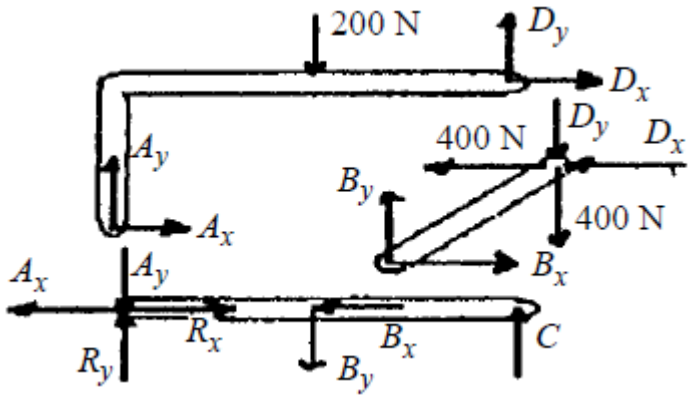
1) Determinar las fuerzas actuantes en el elemento AD





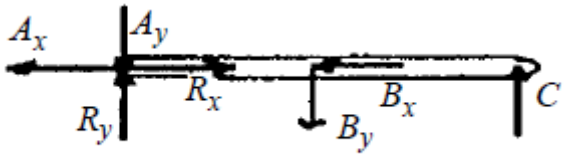
Analizando la estructura completa

$$\sum F_x = R_x - 400 = 0 \qquad R_x = 400 \text{ N}$$

$$\sum M_A = 800C - 400(930) + 400(530) - 400(200) = 0. \qquad C = 300 \text{ N}$$

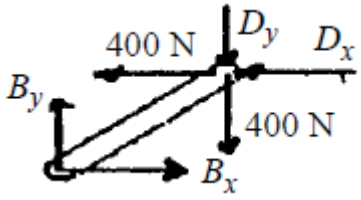
$$\sum F_y = C + R_y - 400 - 200 = 0 \qquad R_y = 300 \text{ N}$$

Elemento ABC



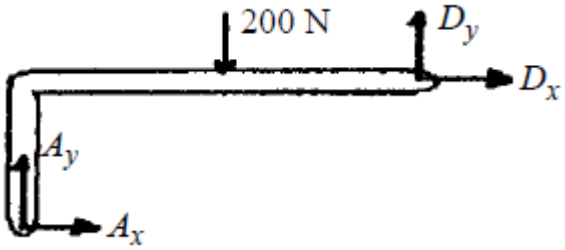
$$\sum M_A = -4B_y + 8C = 0 \qquad B_y = 600 \text{ N}$$

Elemento BD



$$\sum F_y = B_y - D_y - 400 = 0 \qquad \boxed{D_y = 200 \text{ N}}$$

Elemento AD

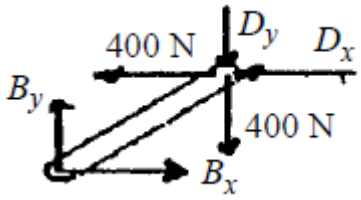


$$\sum F_y = A_y + D_y - 200 = 0 \qquad \boxed{A_y = 0}$$

$$\sum F_x = A_x + D_x = 0 \qquad \boxed{A_x = -200 \text{ N}}$$

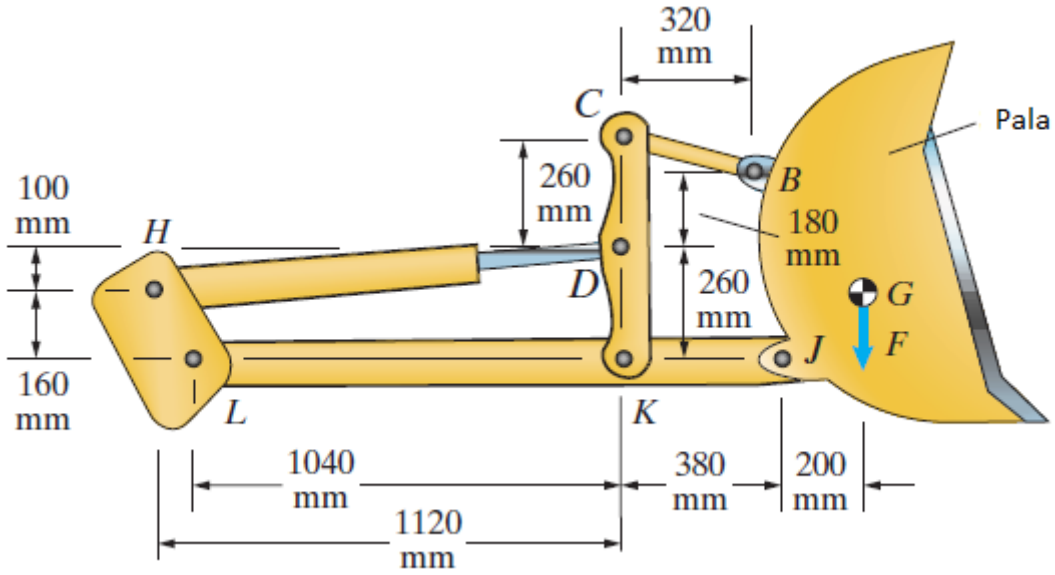
$$\sum M_A = -400(200) + 800D_y - 400D_x = 0 \qquad \boxed{D_x = 200 \text{ N}}$$

Elemento BD

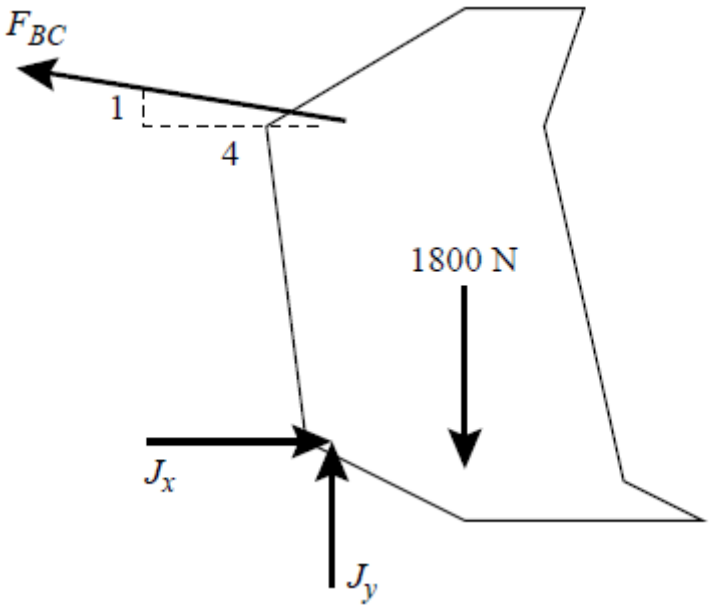


$$\sum F_x = B_x - D_x - 400 = 0 \qquad B_x = 600 \text{ N}$$

2) La estructura que se muestra en el diagrama (una de las dos estructuras idénticas que soportan la pala de la excavadora) soporta una fuerza descendente F = 1800 N en G. Los elementos BC y DH pueden tratarse como elementos de dos fuerzas. Determine las reacciones en el miembro CDK en K.



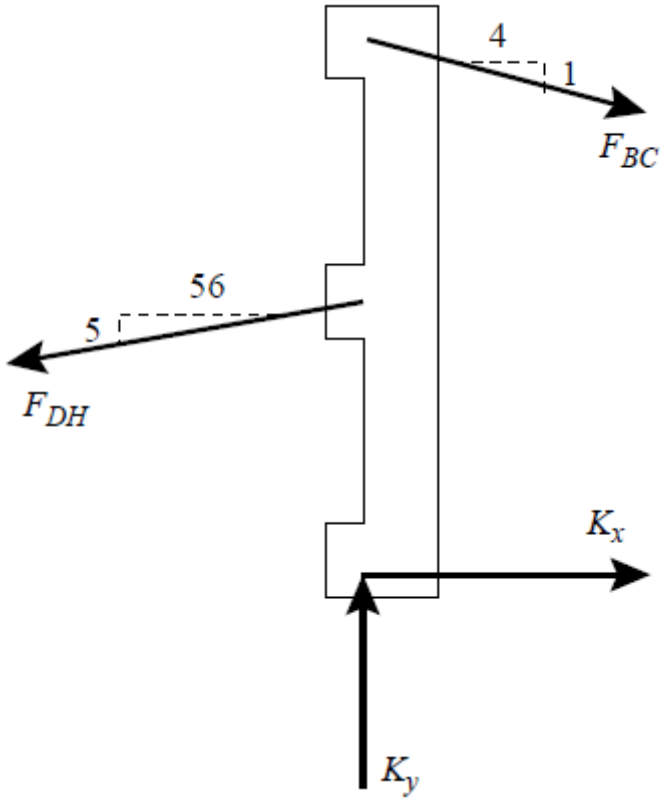
Analizando las fuerzas actuantes en la pala



$$\sum M_J : \frac{4}{\sqrt{17}} F_{BC}(0.44\ \text{m}) - \frac{1}{\sqrt{17}} F_{BC}(0.06\ \text{m}) - (1800\ \text{N})(0.2\ \text{m}) = 0$$

$$\Rightarrow F_{BC} = 873\ \text{N}$$

Ahora analizamos el elemento CDK



$$\sum M_K : \frac{56}{\sqrt{3161}} F_{DH}(0.26\ \text{m}) - \frac{4}{\sqrt{17}} F_{BC}(0.52\ \text{m}) = 0$$

$$\sum F_x : -\frac{56}{\sqrt{3161}} F_{DH} + \frac{4}{\sqrt{17}} F_{BC} + K_x = 0$$

$$\sum F_y : -\frac{5}{\sqrt{3161}} F_{DH} - \frac{1}{\sqrt{17}} F_{BC} + K_y = 0$$

Resolviendo

$$K_x = 847\ \text{N}$$
$$K_y = 363\ \text{N}$$