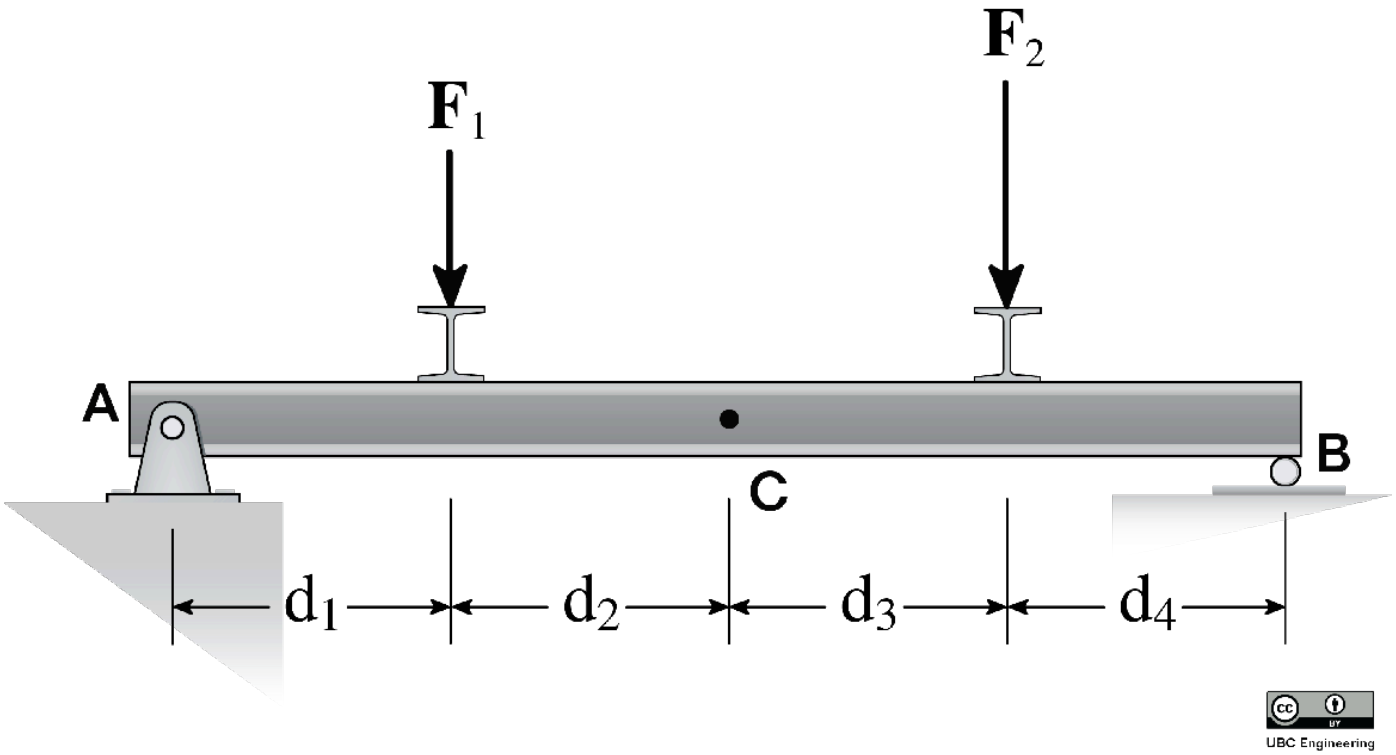

Two forces F_1 and F_2 are exerted on the beam AB perpendicular to the axis. Find the internal forces in the beam at point C. The beam is supported by a pin at A and a roller at B. Ignore the mass of the beam. Assume $d_1 = d_2 = d_3 = d_4$.

Find the reaction forces at A and B.

$+ \rightarrow \Sigma F_x = 0$

$\Rightarrow A_x = 0$

$\Sigma M_A = 0 \rightarrow 4d_1 \cdot N_B - d_1 \cdot F_1 - 3d_1 \cdot F_2 = 0$

$\Rightarrow N_B = \frac{F_1 + 3F_2}{4}$

$+ \uparrow \Sigma F_y = 0 \rightarrow A_y + N_B - F_1 - F_2 = 0$

$\Rightarrow A_y = \frac{3F_1 + F_2}{4}$

Find the magnitude of the internal forces in the beam at point C.

Using section AC:

$$+ \rightarrow F_x = 0$$
$$\Rightarrow N_C = 0$$

$$+ \uparrow \Sigma F_y = 0 \rightarrow A_y - F_1 - V_C = 0$$
$$\Rightarrow V_C = \frac{F_2 - F_1}{4}$$

$$\Sigma M_C = 0 \rightarrow M_C + d_1 \cdot F_1 - 2d_2 \cdot A_y = 0 \rightarrow M_C = d_1(2A_y - F_1)$$
$$\Rightarrow M_C = d_1 \frac{F_1 + F_2}{2}$$