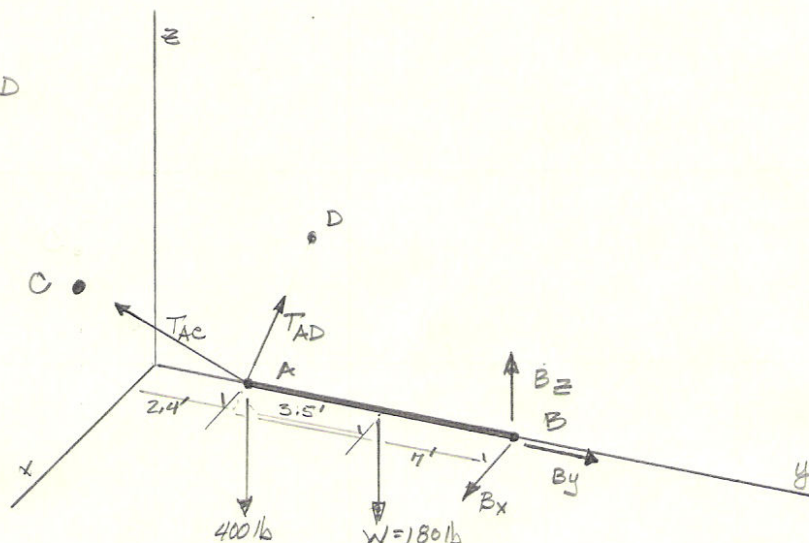


PROBLEM 5.2

STEP ONE: FBD



STEP TWO: EQUATIONS OF EQUILIBRIUM

$$\textcircled{1} \sum F_x = 0 \quad B_x + T_{AC} \left[\frac{2}{\sqrt{2^2 + 4^2 + 2.4^2} \approx 5.0754} \right] - T_{AD} \left[\frac{4}{\sqrt{4^2 + 4^2 + 2.4^2} \approx 6.1449} \right] = 0$$

$$B_x + 0.3941 T_{AC} - 0.6509 T_{AD} = 0$$

$$\textcircled{2} \sum F_y = 0 \quad B_y - T_{AC} \left(\frac{2.4}{5.0754} \right) - T_{AD} \left(\frac{2.4}{6.1449} \right) = 0 \Rightarrow B_y - 0.4729 T_{AC} - 0.3906 T_{AD} = 0$$

$$\textcircled{3} \sum F_z = 0 \quad B_z + T_{AC} \left(\frac{4}{5.0754} \right) + T_{AD} \left(\frac{4}{6.1449} \right) - 400 - 180 = 0 \Rightarrow B_z + 0.7881 T_{AC} + 0.6509 T_{AD} = 580$$

$$\textcircled{4} \sum M_x = 0 \quad B_z(9.4) + T_{AC} \left(\frac{4}{5.0754} \right) (2.4) + T_{AD} \left(\frac{4}{6.1449} \right) (2.4) - 400(2.4) - 180(5.9) = 0$$

$$9.4 B_z + 1.8914 T_{AC} + 1.5622 T_{AD} = 2022$$

$$\textcircled{5} \sum M_z = 0 \quad -B_x(9.4) - T_{AC} \left(\frac{2}{5.0754} \right) (2.4) + T_{AD} \left(\frac{4}{6.1449} \right) (2.4) = 0$$

$$-9.4 B_x - 0.9458 T_{AC} + 1.5622 T_{AD} = 0$$

STEP THREE: PLACE DATA INTO MATRIX

	B_x	B_y	B_z	T_{AC}	T_{AD}	= NUMBERS
①	1	0	0	0.3941	-0.6509	0
②	0	1	0	-0.4729	-0.3906	0
③	0	0	1	0.7881	0.6509	580
④	0	0	9.4	1.8914	1.5622	2022
⑤	-9.4	0	0	-0.9458	1.5622	0

STEP FOUR: PLACE IN XL SPREADSHEET AND PERFORM MATRIX MATH.

[illegible]