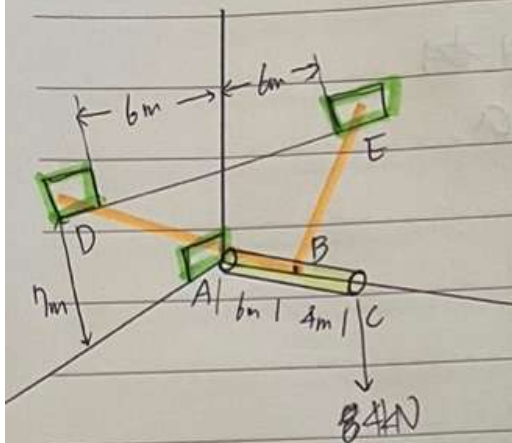
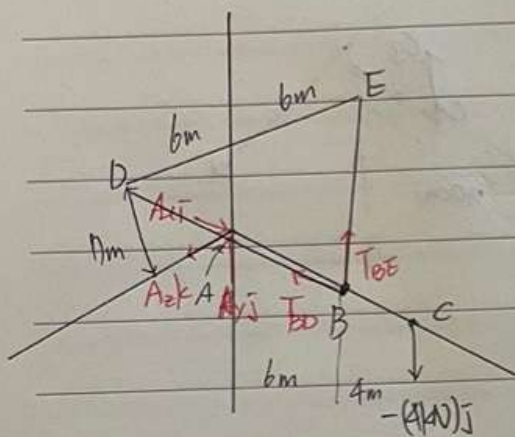


< 예제 4.105 >



각 케이블의 장력
A에서 작용하는 힘



$$\vec{BD} = (-6\text{m})\vec{i} + (7\text{m})\vec{j} + (6\text{m})\vec{k}, \quad BD = 11\text{m}$$

$$\vec{BE} = (-6\text{m})\vec{i} + (7\text{m})\vec{j} - (6\text{m})\vec{k}, \quad BE = 11\text{m}$$

$$T_{BD} = T_{BD} \frac{\vec{BD}}{BD} = \frac{T_{BD}}{11} (-6\vec{i} + 7\vec{j} + 6\vec{k})$$

$$T_{BE} = T_{BE} \frac{\vec{BE}}{BE} = \frac{T_{BE}}{11} (-6\vec{i} + 7\vec{j} - 6\vec{k})$$

$$\sum M_A = 0: r_{BA} \times T_{BD} + r_{BA} \times T_{BE} + r_{CA} \times (-4\vec{j}) = 0$$

$$6\vec{i} \times \frac{T_{BD}}{11} (-6\vec{i} + 7\vec{j} + 6\vec{k}) + 6\vec{i} \times \frac{T_{BE}}{11} (-6\vec{i} + 7\vec{j} - 6\vec{k}) + 10\vec{i} \times (-4\vec{j}) = 0$$

$$\frac{42}{11} T_{BD} \vec{k} - \frac{36}{11} T_{BD} \vec{j} + \frac{42}{11} T_{BE} \vec{k} + \frac{36}{11} T_{BE} \vec{j} - 40\vec{k} = 0$$

$$\vec{j}: -\frac{36}{11} T_{BD} + \frac{36}{11} T_{BE} = 0 \quad \therefore T_{BE} = T_{BD}$$

$$\vec{k}: \frac{42}{11} T_{BD} + \frac{42}{11} T_{BD} - 40 = 0$$

$$2 \cdot \left(\frac{42}{11} T_{BD} \right) = 40$$

$$\therefore T_{BD} = T_{BE} = 5.24\text{kN}$$

$$\sum F_x = 0: A_x - \frac{6}{11} (5.24\text{kN}) - \frac{6}{11} (5.24\text{kN}) = 0 \quad \therefore A_x = 5.72\text{kN}$$

$$\sum F_y = 0: A_y + \frac{7}{11} (5.24\text{kN}) + \frac{7}{11} (5.24\text{kN}) - 4\text{kN} = 0 \quad \therefore A_y = -2.67\text{kN}$$

$$\sum F_z = 0: A_z + \frac{6}{11} (5.24\text{kN}) - \frac{6}{11} (5.24\text{kN}) = 0 \quad \therefore A_z = 0$$

$$\underline{A = (5.72\text{kN})\vec{i} - (2.67\text{kN})\vec{j}}$$