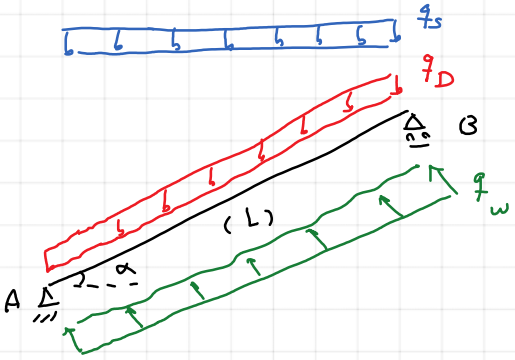
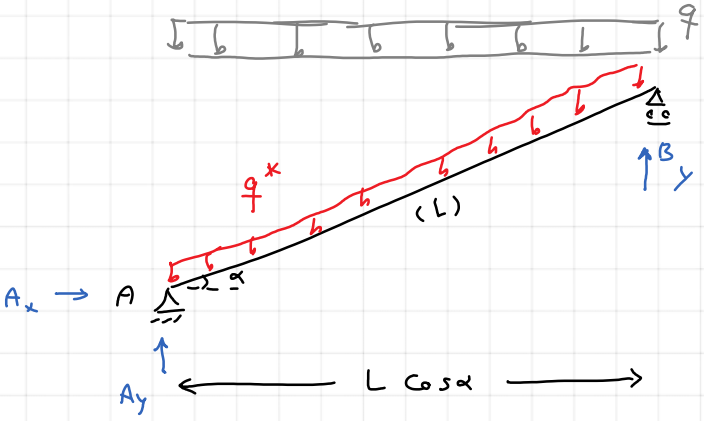
In this video, the analysis of inclined beams under different load cases is explained.





$$\rightarrow^{+} \quad \Sigma F_x = \rightarrow \quad A_x =$$

$$+\uparrow \Sigma F_y = \rightarrow \quad A_y + B_y = q\,L\cdot\cos\alpha$$

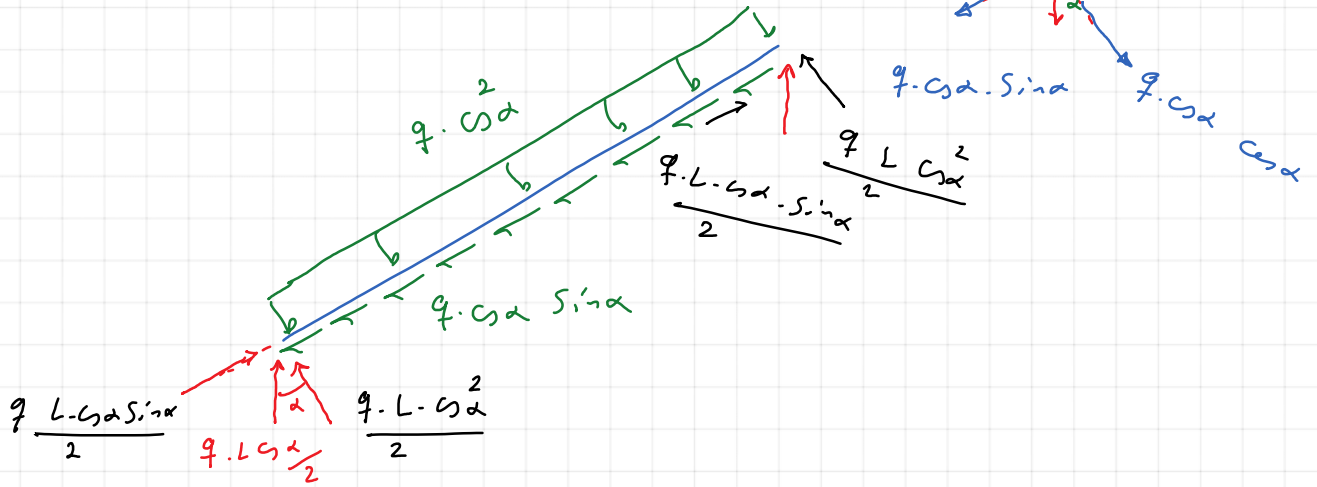
$$+\circlearrowleft \Sigma M_A = \cdot \quad -q\cdot L\cdot\cos\alpha \,\frac{L\cos\alpha}{2}$$

$$+ B_y \cdot L\cos\alpha =$$

$$B_y = \frac{q\cdot L\cos\alpha}{2}$$

$$\rightarrow A_y = \frac{q\cdot L\cos\alpha}{2}$$

$$q\cdot L\cdot\cos\alpha = q^*\,L \rightarrow \boxed{q^* = q\cdot\cos\alpha}$$



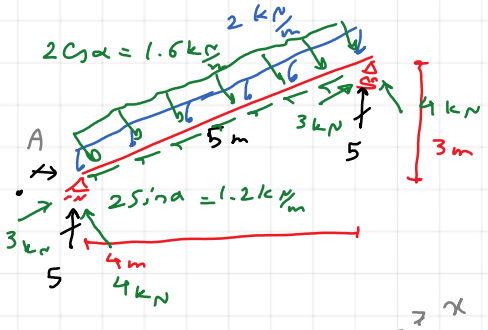
$$\begin{cases} L = 5\,m \\ \alpha = 36.87^\circ \\ L\cos\alpha = 4\,m \\ L\sin\alpha = 3\,m \end{cases}$$

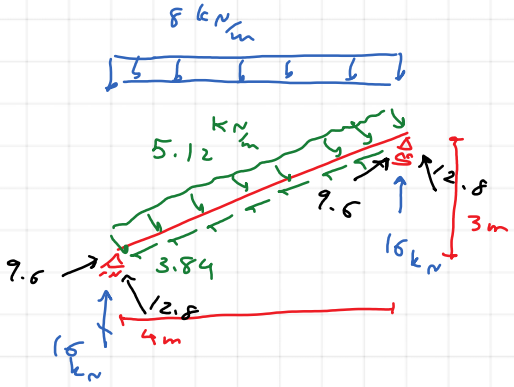
$q_D = 2\ kN/m$

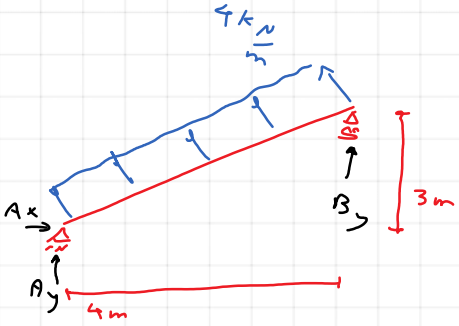
$q_S = 8\ kN/m$

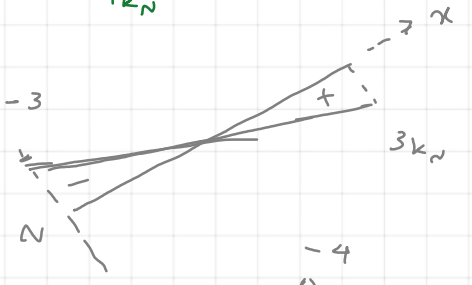
$q_W = 4\ kN/m$ (suction)

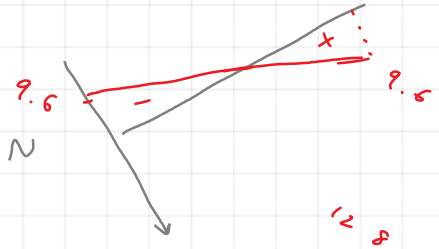
$$\begin{cases} \cos\alpha = 0.8 \\ \sin\alpha = 0.6 \end{cases}$$

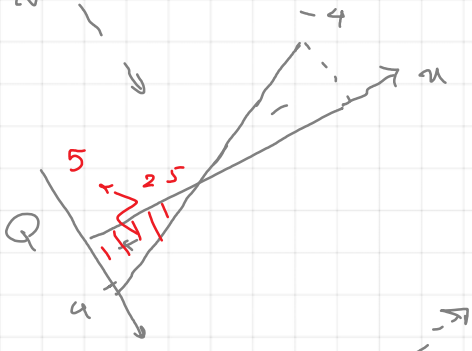


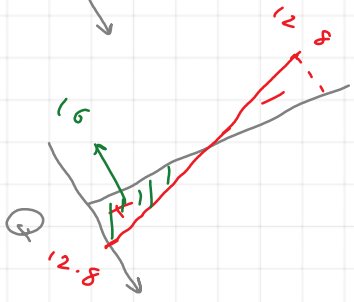


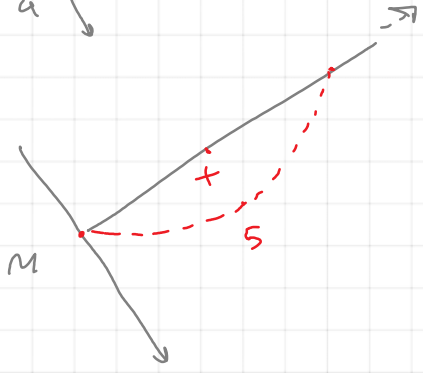


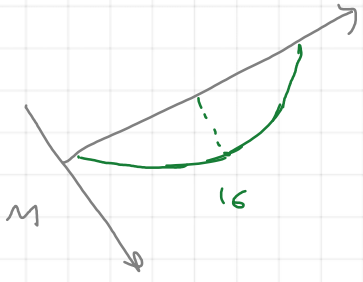






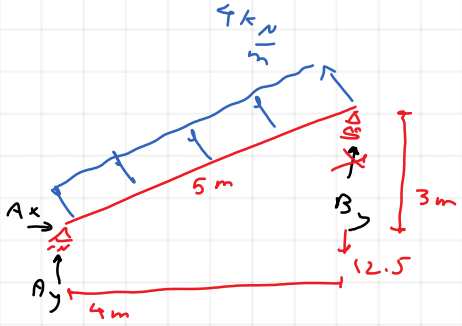






$M_D^+ = 5\ kN\,m$

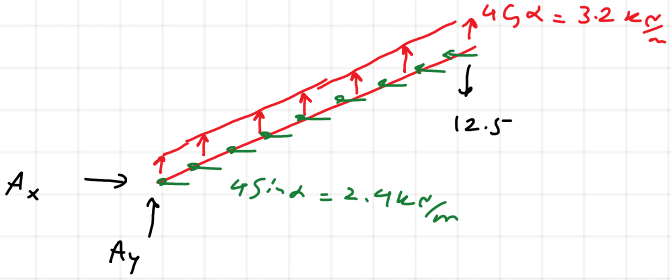
$M_S^+ = 16\ kN\,m$

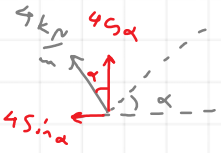


$$+\circlearrowleft \Sigma M_A = 0$$

$$4\ \tfrac{kN}{m} \times 5\,m \times \tfrac{5\,m}{2} + B_y \times 4\,m = 0$$

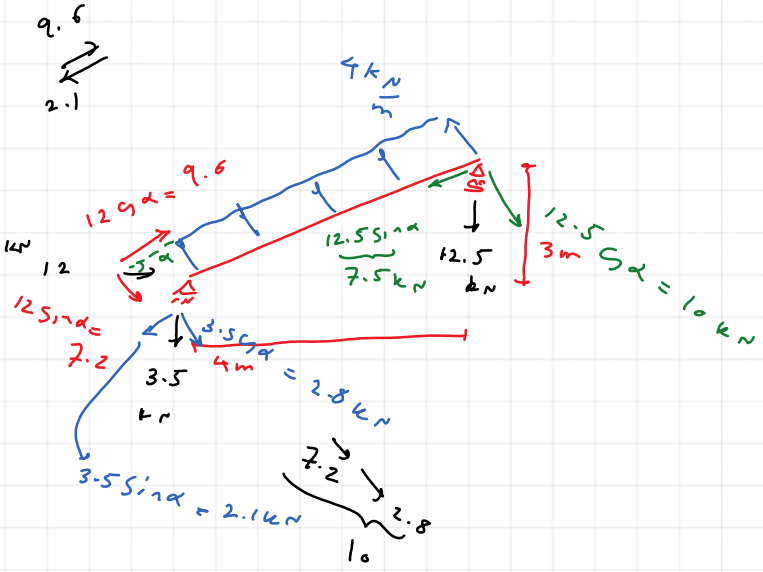
$$\boxed{B_y = -12.5\ kN}$$

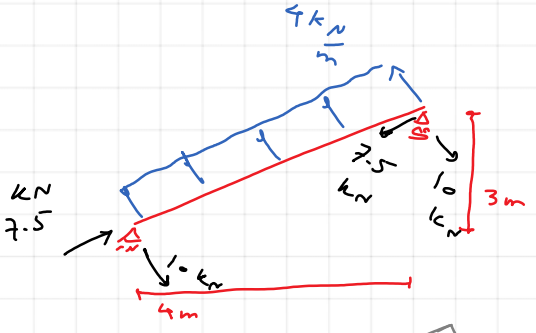


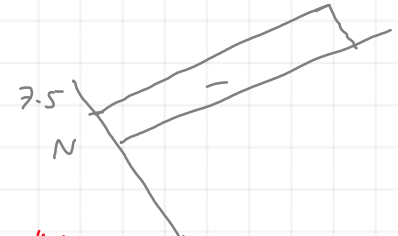


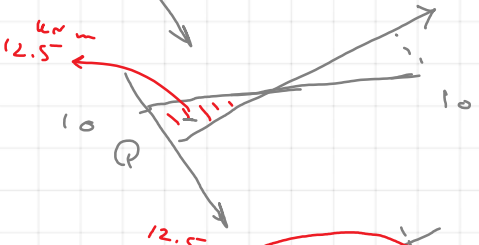
$$+\rightarrow \Sigma F_x = 0 \rightarrow A_x - 2.4\ \tfrac{kN}{m} \times 5\,m = 0 \rightarrow A_x = 12\ kN$$

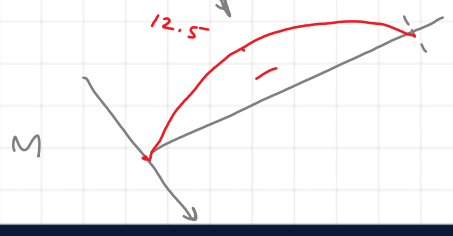
$$+\uparrow \Sigma F_y = 0 \rightarrow A_y + 3.2\ \tfrac{kN}{m} \times 5\,m - 12.5\ kN = 0 \rightarrow A_y = -3.5\ kN$$











$$M_{wind} = 12.5\ kN\,m\ (-)$$

$$\begin{cases} M_D = 5 \text{ kN m} \\ M_S = 16 \text{ kN m} \\ M_W = -12.5 \text{ kN m} \end{cases}$$

(Unf) → Max + Bending moment

$$M^{+}_{max} = 1.15 \times 5 \text{kN m} + 1.5 \times 16 \text{kN m} = 29.75 \text{ kN.m}$$

(fa) → Max − Bending moment

$$M^{(-)}_{max} = 0.9 \times 5 \text{ kN m} + 1.5 \underbrace{(-12.5}_{\text{kN.m}}) = -19.25 \text{ kN.m}$$