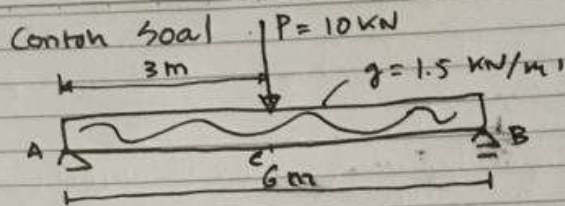


①



Soal

- Hitung Reaksi perletakan (V_A) dan (V_B)
- Gambar bidang Momen dan Lintang

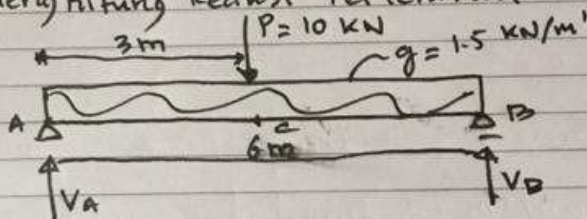
Jawab

- Tentukan derajat kebebasan (ST atau stt)

$$ST = n - 3 \rightarrow n = 3 \text{ (Sendi dan roll)}$$

$$= 3 - 3 = 0 \dots \text{(statis tertentu)}$$

- Menghitung Reaksi Perletakan



$$\sum M_B = 0$$

$$+V_A(6) - g(6)(3) - P(3) = 0$$

$$+6V_A - 1.5(6)(3) - 10(3) = 0$$

$$V_A = \frac{27 + 30}{6} = +9.5 \text{ kN } (\uparrow)$$

$$\sum M_A = 0$$

$$-V_B(6) + g(6)(3) + P(3) = 0$$

$$-6V_B + 1.5(6)(3) + 10(3) = 0$$

$$V_B = \frac{27 + 30}{6} = +9.5 \text{ kN } (\uparrow)$$



(2)

Check

$$\sum V = 0$$

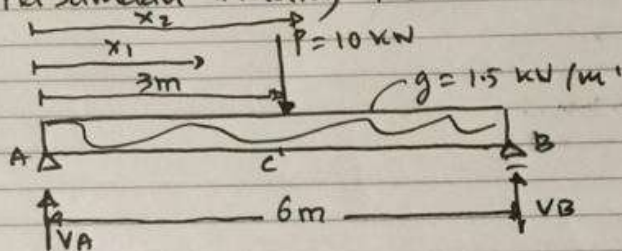
$$+V_A - g(6) - P + V_B = 0$$

$$+9.5 - 1.5(6) - 10 + 9.5 = 0$$

$$+19 - 19 = 0$$

$$0 = 0 \dots \text{OK}$$

* Persamaan Bidang Momen dan Lintang



Bentang AC

$$0 \leq x_1 \leq 3\text{m}$$

$$M_{x_1} = +V_A(x_1) - \frac{1}{2}g(x_1)^2$$

$$= +9.5(x_1) - \frac{1}{2}(1.5)(x_1)^2$$

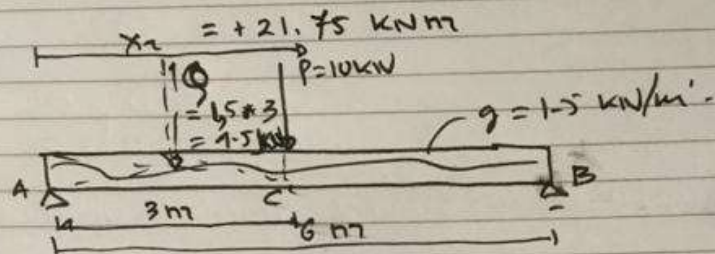
$$x_1 = 0 \rightarrow M = +9.5(0) - \frac{1}{2}(1.5)(0)^2 = 0$$

$$\begin{aligned} x_1 = 1 \rightarrow M &= +9.5(1) - \frac{1}{2}(1.5)(1)^2 \\ &= 9.5 - 0.75 \\ &= +8.75 \text{ kNm} \end{aligned}$$

$$\begin{aligned} x_1 = 2 \rightarrow M &= +9.5(2) - \frac{1}{2}(1.5)(2)^2 \\ &= +19 - 3 = +16 \text{ kNm} \end{aligned}$$

(3)

$$x_1 = 3 \rightarrow M = +9.5(3) - \frac{1}{2}(1.5)(3)^2$$
$$= +28.5 - 6.75$$



Bentangy CB

$$3 \leq x_2 \leq 6$$

$$Mx = +P_A V(x_2) - q(x_2 - 1.5) - \frac{1}{2} q(x_2 - 3)^2 - P(x_2 - 3)$$

$$= +9.5(x_2) - (1.5)(3)(x_2 - 1.5) - \frac{1}{2}(1.5)(x_2 - 3)^2 - 10(x_2 - 3)$$

$$= +9.5(x_2) - 4.5(x_2 - 1.5) - 0.75(x_2 - 3)^2 - 10(x_2 - 3)$$

$$x_2 = 3 \rightarrow M = +9.5(3) - 4.5(3 - 1.5) - 0.75(3 - 3)^2 - 10(3 - 3)$$

$$= +28.5 - 6.75 - 0 - 0$$

$$= +21.75 \text{ kNm}$$

$$x_2 = 4 \rightarrow M = +9.5(4) - 4.5(4 - 1.5) - 0.75(4 - 3)^2 - 10(4 - 3)$$

$$= +38 - 11.25 - 0.75 - 10$$

$$= +16 \text{ kNm}$$

$$x = 5 \rightarrow M = +9.5(5) - 4.5(5 - 1.5) - 0.75(5 - 3)^2 - 10(5 - 3)$$

$$= +47.5 - 15.75 - 3 - 20$$

$$= +8.75 \text{ kNm}$$

$$x = 6 \rightarrow M = +9.5(6) - 4.5(6 - 1.5) - 0.75(6 - 3)^2 - 10(6 - 3)$$

$$= +57 - 20.25 - 6.75 - 30$$

$$= 0$$



4

NAMA : _____
NIM : _____ SMT : _____
JURUSAN : _____
TANGGAL : _____
TD. TANGAN : _____

Peramaan Bici Lintang
 $0 \leq x_1 \leq 3$

$$L_{x_1} = \frac{dm_{x_1}}{dx} = +VA - q x_1 \\ = +9.5 - 1.5(x_1)$$

$$x_1 = 0 \rightarrow L = +9.5 - 1.5(0) = +9.5 \text{ kN}$$

$$x_1 = 1 \rightarrow L = +9.5 - 1.5(1) \\ = +9.5 - 1.5 = +8 \text{ kN}$$

$$x_1 = 2 \rightarrow L = +9.5 - 1.5(2) \\ = +9.5 - 3 = +6.5 \text{ kN}$$

$$x_1 = 3 \rightarrow L = +9.5 - 1.5(3) \\ = +9.5 - 4.5 = +5 \text{ kN}$$

Peramaan Bidang Lintang
 $3 \leq x_2 \leq 6$

$$L_{x_2} = \frac{dm_{x_2}}{dx_2}$$

$$= +RAV - Q - q(x_2 - 3) - P$$

$$= +9.5 - (1.5 \cdot 3) - 1.5(x_2 - 3) - 10$$

$$= +9.5 - 4.5 - 1.5(x_2 - 3) - 10$$

$$= -5 - 1.5(x_2 - 3)$$

$$x = 3 \rightarrow L = -5 - 1.5(3 - 3) = -5 \text{ kN}$$

$$x = 4 \rightarrow L = -5 - 1.5(4 - 3) = -6.5 \text{ kN}$$

5

NIM _____ SMT _____
JURUSAN _____
TANGGAL _____
TD. TANGAN _____

$$x=5 \rightarrow L = -5 - 1,5(5-3) = -8,5 \text{ kW}$$

$$x=6 \rightarrow L = -5 - 1,5(6-3) = -9,5 \text{ kW}$$

Gambar Bidang Momen dan Lintang

