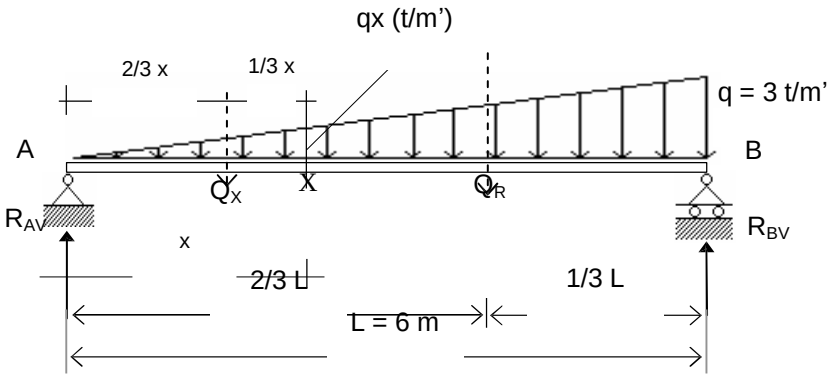
3. **Balok Diatas Dua Perletakan Memikul Muatan Segi Tiga**.



Penyelesaian :

a. Reaksi Perletakan.

$Q_R = q \cdot ½ L = (3 \text{ t/m'}) \times ½ \times (6 \text{ m}) = 9 \text{ ton}.$

$\Sigma M_B = 0,$

$R_{AV} \cdot L - Q_R \cdot 1/3 L = 0$

$R_{AV} = + 1/3 Q_R = + 1/3 q \cdot ½L$

$R_{AV} = 1/6 q L$

$= 1/6 \times (3 \text{ t/m'})/(6 \text{ m})$

$R_{AV} = + 3 \text{ ton } (\uparrow)$

$\Sigma M_B = 0,$

$- R_{BV} \cdot L + Q_R \cdot 2/3 L = 0$

$R_{BV} = + 2/3 Q_R = + 2/3 q \cdot ½L$

$R_{BV} = 1/3 q L$

$= 1/3 \times (3 \text{ t/m'})/(6 \text{ m})$

$R_{BV} = + 6 \text{ ton } (\uparrow)$

Kontrol :

$\Sigma V = 0,$

$R_{AV} + R_{BV} - Q_R = 0$

$3 \text{ ton} + 6 \text{ ton} - 9 \text{ ton} = 0$ ……(memenuhi)

b. Gaya lintang.

$D_{A-B} = + R_{AV} = + 1/6 q L = + 3 \text{ ton}.$

$D_{B-A} = + R_{AV} - Q_R = 1/6 q L - ½ q L = - 1/3 q L = - R_{BV} = - 6 \text{ ton}.$

c. Tinjau tampang X.

Tampang X terletak sejauh x dari perletakan A, momen pada tampang X, dihitung dari kanan kekiri,

$q_x = q \cdot x/L$

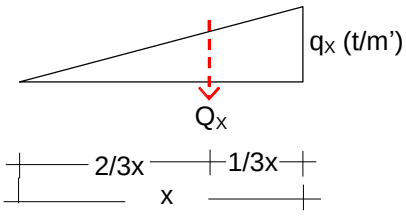
$Q_X = q_x \cdot ½ x = (q \cdot x/L) \cdot ½ x$

$= ½ q x^2/L$

$Mx = R_{AV} \cdot x - Q_X \cdot 1/3 x$

$= (1/6 q L) \cdot x - (½ q x^2/L) \cdot 1/3 x$

$Mx = 1/6 q L x - 1/6 q x^3/L$ …..(1)



Momen maksimum terjadi apabila gaya lintang sama dengan nol,

$Dx = d(Mx)/dx = 0$

$= d(1/6\ q\ L\ x - 1/6\ q\ x^3/L)/dx$

$Dx = 1/6\ q\ L - ½\ q\ x^2/L$ .....(2)

$1/6\ q\ L - ½\ q\ x^2/L = 0$

$x^2 = 1/6\ q\ L\ .\ 2\ L\ /q$

$x = \sqrt{(1/3\ L^2)}$

$x = 1/3\ L\sqrt{3}$ .....(3)

$= 1/3\ .\ (6\ m)\ .\sqrt{3}$

$x = 3{,}464$ m (dari perletakan A).

Substitusikan pers.(3) kedalam (1), maka diperoleh momen maksimum,

$M_{maks} = 1/6\ q\ L\ .\ (1/3\ L\sqrt{3}) - 1/6\ q\ (1/3\ L\sqrt{3})^3/L$

$= 1/6\ q\ L^2\ \{1/3\sqrt{3} - 1/9\sqrt{3}\}$

$M_{maks} = 1/27\ q\ L^2\ \sqrt{3}$ .....(4)

$M_{maks} = 1/27\ x\ 3\ x\ 6^2\ x\ \sqrt{3} = 6{,}9282$ t.m'.

Tabel nilai momen dan gaya lintang

X	Dx	Mx
m	ton	ton.m'.
0	3.000	0.0000
0.5	2.938	1.4896
1.0	2.750	2.9167
1.5	2.438	4.2188
2.0	2.000	5.3333
2.5	1.438	6.1979
3.0	0.750	6.7500
3.5	-0.063	6.9271
4.0	-1.000	6.6667
4.5	-2.063	5.9063
5.0	-3.250	4.5833
5.5	-4.563	2.6354
6.0	-6.000	0.0000