

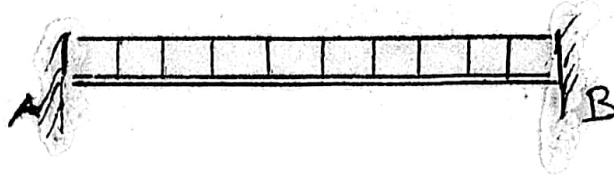
METODA CLAPAYRON

* $\text{KERJA LUAR} = \text{KERJA DALAM}$

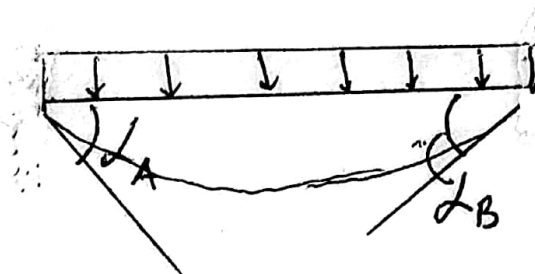
* $\text{SUDUT ROTASI AKIBAT BEBAN KERJA} = \text{SUDUT ROTASI AKIBAT MOMEN PERLAWANAN}.$

CONTOH 1 :

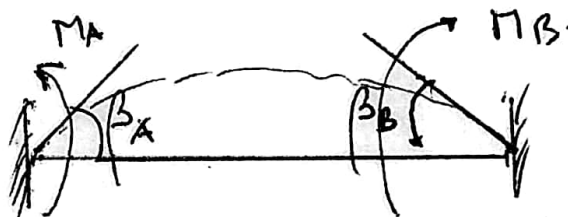
DIKETAHUI :



SUDUT ROTASI AKIBAT BEBAN KERJA :



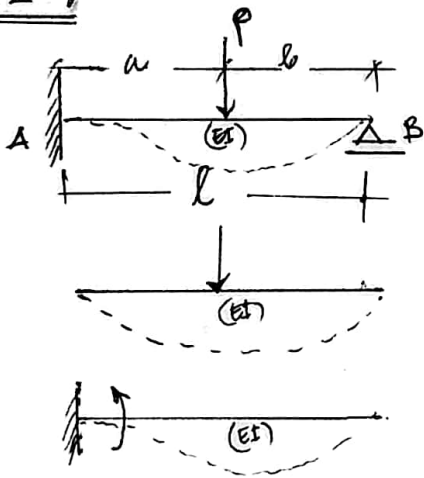
SUDUT ROTASI AKIBAT MOMEN PERLAWANAN :



$$\alpha_A = \beta_A$$

$$\alpha_B = \beta_B$$

CONTOH 2 :



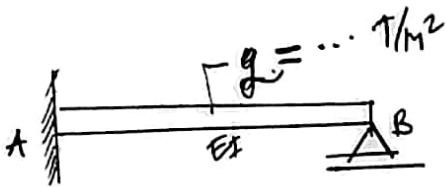
$$\Delta_A = \frac{P \cdot b (l^2 - b^2)}{6(EI) \cdot l}$$

$$\beta_A = \frac{M_A \cdot l}{3(EI)}$$

$$\Delta_A = \beta_A \Rightarrow \frac{P \cdot b (l^2 - b^2)}{6(EI) \cdot l} = \frac{M_A \cdot l}{3(EI)}$$

$$M_A = \frac{P \cdot b \cdot (l^2 - b^2)}{2 l^2}$$

CONTOH 3 :

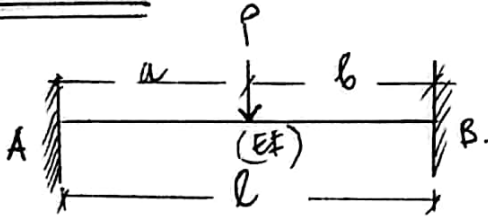


$$\alpha_A = \frac{q l^3}{24 (EI)}$$

$$\beta_A = \frac{M_A \cdot l}{3 \cdot (EI)}$$

$$\alpha_A = \beta_A \quad \leadsto \quad M_A = \frac{1}{8} \cdot q \cdot l^2$$

CONTOH 4 :



Joint A : $\Delta_A = \frac{P \cdot b (l^2 - b^2)}{6 \cdot (EI) \cdot l}$

$$\beta_A = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

$$\Delta_A = \beta_A \rightarrow \frac{P \cdot b (l^2 - b^2)}{6 \cdot (EI) \cdot l} = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

$$M_A = \frac{P \cdot a \cdot b^2}{l^2} \quad ; \quad M_B = \frac{P \cdot b \cdot a^2}{l^2}$$

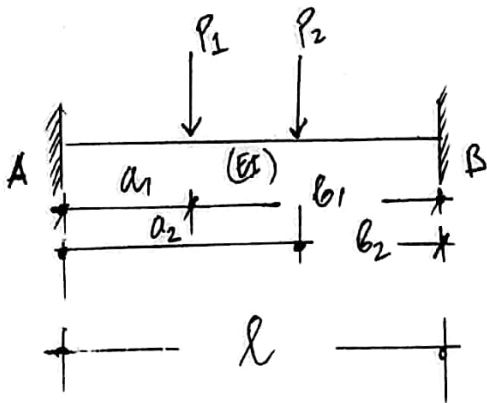
Joint B : $\Delta_B = \frac{P \cdot a (l^2 - a^2)}{6 \cdot (EI) \cdot l}$

$$\beta_B = \frac{M_A \cdot l}{6 \cdot (EI)} + \frac{M_B \cdot l}{3 \cdot (EI)}$$

$$\Delta_B = \beta_B \rightarrow \frac{P \cdot a (l^2 - a^2)}{6 \cdot (EI) \cdot l} = \frac{M_A \cdot l}{6 \cdot (EI)} + \frac{M_B \cdot l}{3 \cdot (EI)}$$

$$M_A = \frac{P \cdot a \cdot b^2}{l^2} \quad ; \quad M_B = \frac{P \cdot b \cdot a^2}{l^2}$$

CONTOH 5 :



Joint A :

$$\Delta_A = \frac{P_1 \cdot b_1 (l^2 - b_1^2)}{6 \cdot (EI) \cdot l} + \frac{P_2 \cdot b_2 (l^2 - b_2^2)}{6 \cdot (EI) \cdot l}$$

$$\beta_A = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

$$\Delta_A = \beta_A$$

$$\frac{P_1 \cdot b_1 (l^2 - b_1^2)}{6 \cdot (EI) \cdot l} + \frac{P_2 \cdot b_2 (l^2 - b_2^2)}{6 \cdot (EI) \cdot l} = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

Joint B :

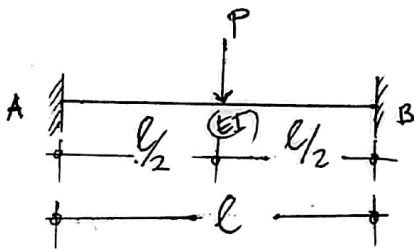
$$\Delta_B = \frac{P_1 \cdot a_1 (l^2 - a_1^2)}{6 \cdot (EI) \cdot l} + \frac{P_2 \cdot a_2 (l^2 - a_2^2)}{6 \cdot (EI) \cdot l}$$

$$\beta_B = \frac{M_B \cdot l}{3 \cdot (EI)} + \frac{M_A \cdot l}{6 \cdot (EI)}$$

$$\Delta_B = \beta_B$$

$$\frac{P_1 \cdot a_1 (l^2 - a_1^2)}{6 \cdot (EI) \cdot l} + \frac{P_2 \cdot a_2 (l^2 - a_2^2)}{6 \cdot (EI) \cdot l} = \frac{M_B \cdot l}{3 \cdot (EI)} + \frac{M_A \cdot l}{6 \cdot (EI)}$$

CONTOH 6 :



Joint A :

$$\Delta_A = \frac{P \cdot \frac{l}{2} (l^2 - \frac{l^2}{2})}{6 \cdot (EI) \cdot l} = \frac{1}{16} \cdot \frac{Pl^2}{(EI)}$$

$$\beta_A = \frac{M_A \cdot l}{3(EI)} + \frac{M_B \cdot l}{6(EI)}$$

$$\Delta_A = \beta_A \rightsquigarrow \frac{1}{16} \frac{Pl^2}{(EI)} = \frac{M_A \cdot l}{3(EI)} + \frac{M_B \cdot l}{6(EI)}$$

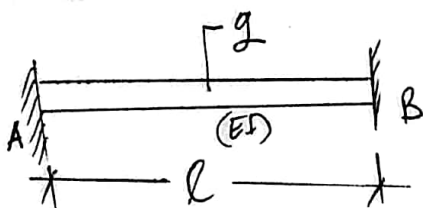
Joint B :

$$\Delta_B = \frac{P \cdot \frac{l}{2} (l^2 - \frac{l^2}{2})}{6 \cdot (EI) \cdot l} = \frac{1}{16} \cdot \frac{Pl^2}{(EI)}$$

$$\beta_B = \frac{M_A \cdot l}{3(EI)} + \frac{M_B \cdot l}{6(EI)}$$

$$\Delta_B = \beta_B \rightsquigarrow \frac{1}{16} \cdot \frac{Pl^2}{(EI)} = \frac{M_A \cdot l}{3(EI)} + \frac{M_B \cdot l}{6(EI)}$$

UNTUK 7:



Joint A:

$$\Delta_A = \frac{1}{24} \frac{q \cdot l^3}{(EI)}$$

$$\beta_A = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

$$\Delta_A = \beta_A \approx \frac{1}{24} \frac{q \cdot l^3}{(EI)} = \frac{M_A \cdot l}{3 \cdot (EI)} + \frac{M_B \cdot l}{6 \cdot (EI)}$$

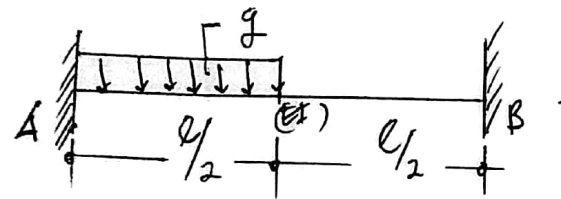
Joint B

$$\Delta_B = \frac{1}{24} \frac{q \cdot l^3}{(EI)}$$

$$\beta_B = \frac{M_B \cdot l}{3 \cdot (EI)} + \frac{M_A \cdot l}{6 \cdot (EI)}$$

$$\Delta_B = \beta_B \approx \frac{1}{24} \frac{q \cdot l^3}{(EI)} = \frac{M_B \cdot l}{3 \cdot (EI)} + \frac{M_A \cdot l}{6 \cdot (EI)}$$

Contoh 8 :



Joint B :

$$\Delta_B = \frac{7}{384} \cdot \frac{q l^3}{EI}$$

$$\beta_B = \frac{M_B \cdot l}{3 \cdot (EI)} + \frac{M_A \cdot l}{6 \cdot (EI)}$$

$$\Delta_B = \beta_B \Rightarrow \frac{7}{384} \cdot \frac{q l^3}{EI} = \frac{M_B \cdot l}{3 (EI)} + \frac{M_A \cdot l}{6 (EI)}$$

Joint A :

$$\Delta_A = \frac{q}{384} \cdot \frac{l^3}{EI}$$

$$\beta_A = \frac{M_A \cdot l}{3 (EI)} + \frac{M_B \cdot l}{6 (EI)}$$

$$\Delta_A = \beta_A$$

$$\frac{q}{384} \cdot \frac{l^3}{EI} = \frac{M_A \cdot l}{3 (EI)} + \frac{M_B \cdot l}{6 (EI)}$$