

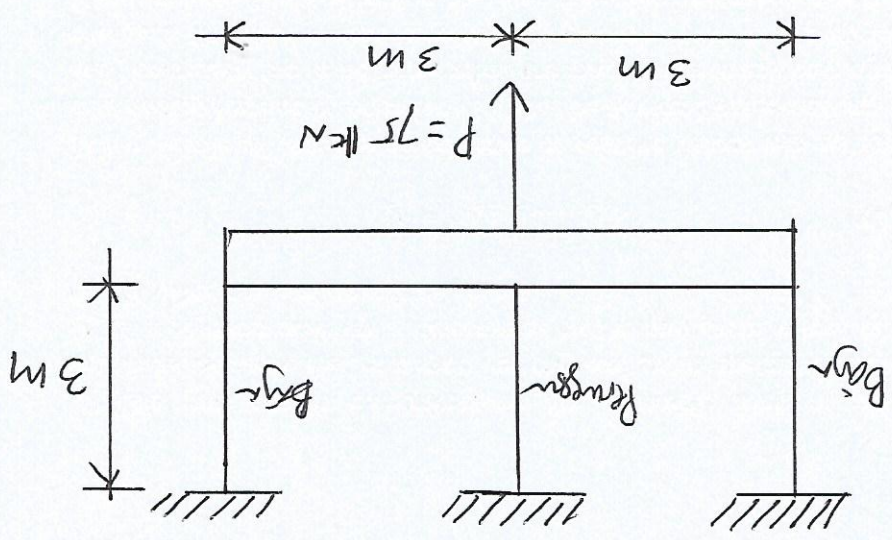
Upload Tugas Pertemuan ke 10

$$\sigma_p = \frac{A_p}{T_p} = \frac{12.664,67 \cdot 1,90}{379,94} = 63,33 \text{ MPa}$$

$$\sigma_b = \frac{A_b}{T_b} = \frac{18.397,33 \cdot 1,90}{200,96} = 126,67 \text{ MPa}$$

182710032
②

gaya: sebagai gander



Baja	Perunggu	
Diameter (mm)	16	22
E (GPa)	200	100

Ditanya: Defleksi dan tegangan pada tumpuan.

Jawab:

$$\sum V = 0 \rightarrow 2 T_b + T_p = 75 \dots (1)$$

$$A_b = \frac{1}{4} \pi (16)^2 = 200,96 \text{ mm}^2$$

$$A_p = \frac{1}{4} \pi (22)^2 = 379,94 \text{ mm}^2$$

$$\delta_b = \left(\frac{T_b L}{A E} \right)_{baja} \leftarrow$$

$$T_{baja} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{baja} = \frac{200,96 \cdot 200 \cdot 10^3 \cdot \delta}{3000} = 13.397,33 \delta$$

$$\delta_p = \left(\frac{T_p L}{A E} \right)_{perunggu} \leftarrow$$

$$T_{perunggu} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{perunggu} = \frac{379,94 \cdot 100 \cdot 10^3 \cdot \delta}{3000} = 12.664,67 \delta$$

dari persamaan (1)

$$2 T_b + T_p = 75$$

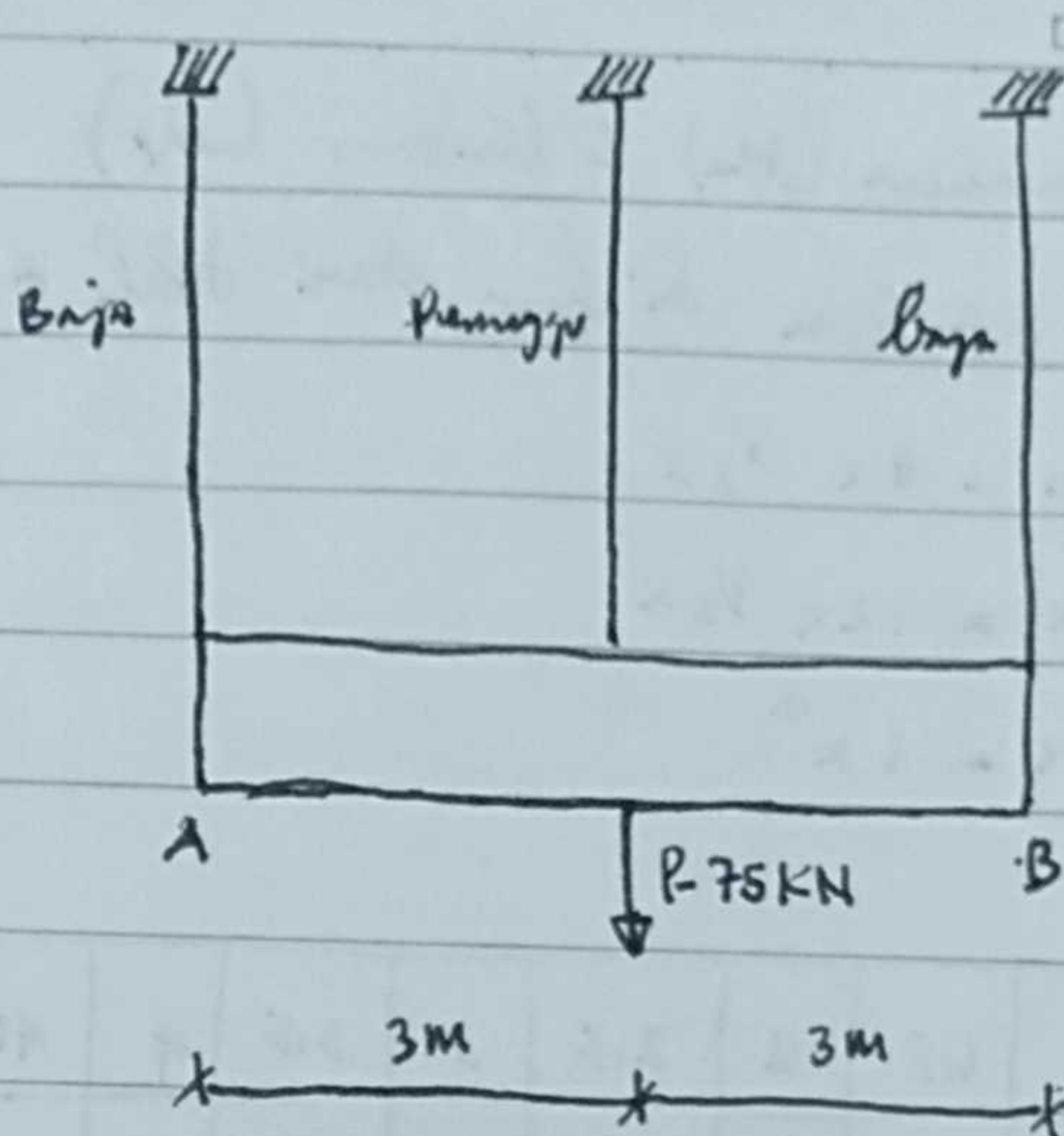
$$2 (13.397,33 \delta) + 12.664,67 \delta = 75 \rightarrow 39.459,33 \delta = 75 \times 10^3$$

$$\delta = \frac{75 \times 10^3}{39.459,33} = 1,90 \text{ mm}$$

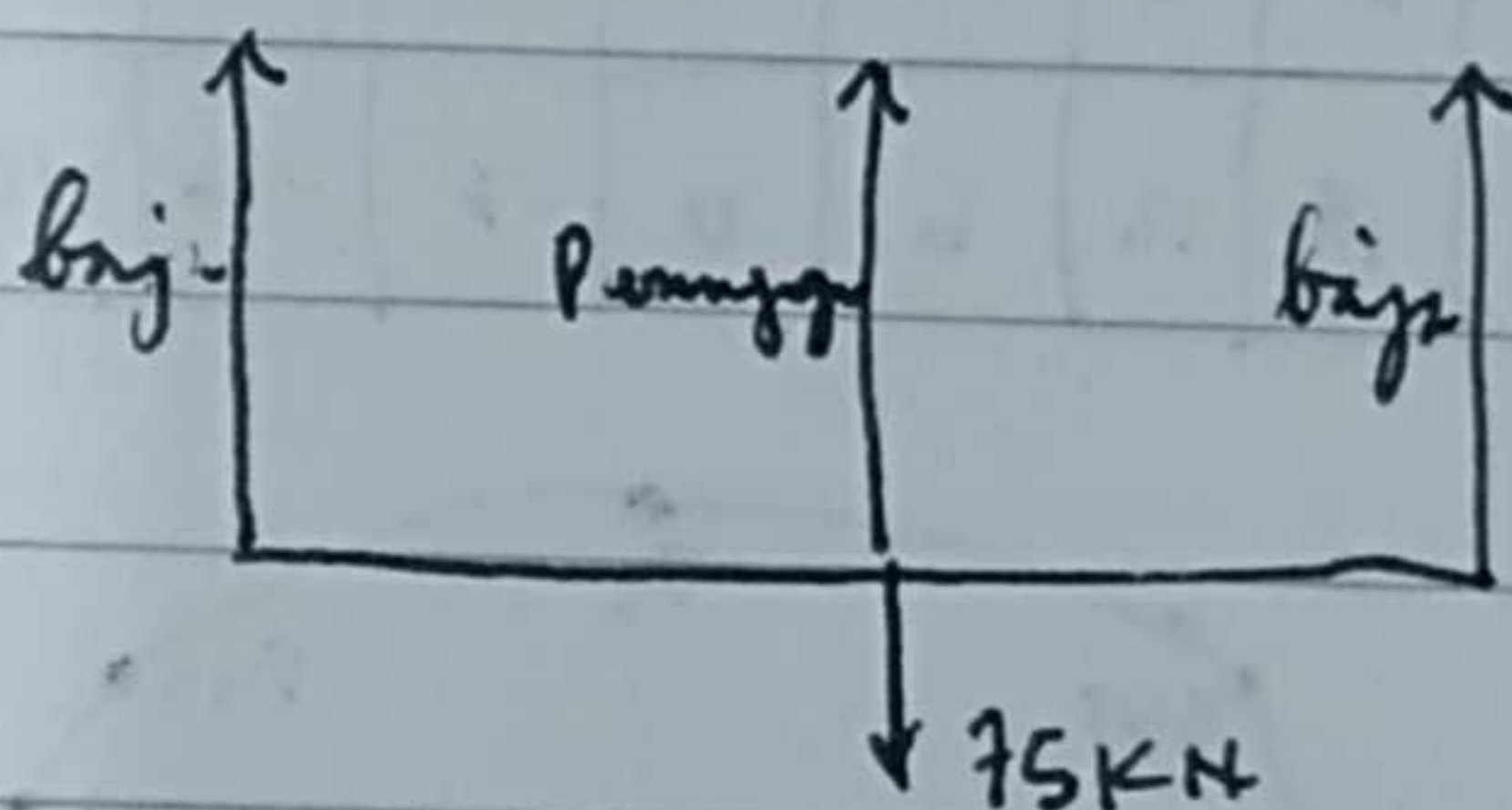
Nama : Ari Oleta Putra

Num : 162710035

Soal 10



	Baja	Perunggu
Diameter	16	22
E	200	100



$$\sum V = 0$$

$$T_{baja} + T_{perunggu} + T_{Baja} = 0$$

$$2T_B + T_P = 75$$

$$A_P = \frac{1}{4} \pi (d_P)^2 = \frac{1}{4} \pi (22)^2$$
$$= 380,13 \text{ mm}^2$$

$$A_B = \frac{1}{4} (d_B)^2 = \frac{1}{4} \pi (16)^2$$
$$= 201,06 \text{ mm}^2$$

$$\delta_B = \left(\frac{T \cdot L}{A \cdot E} \right)_{baja}$$

$$\sum M = 0, M_A = 0$$

Date.

No.

Perhitungan bidang momen (M_x) & lintang (Q_x)

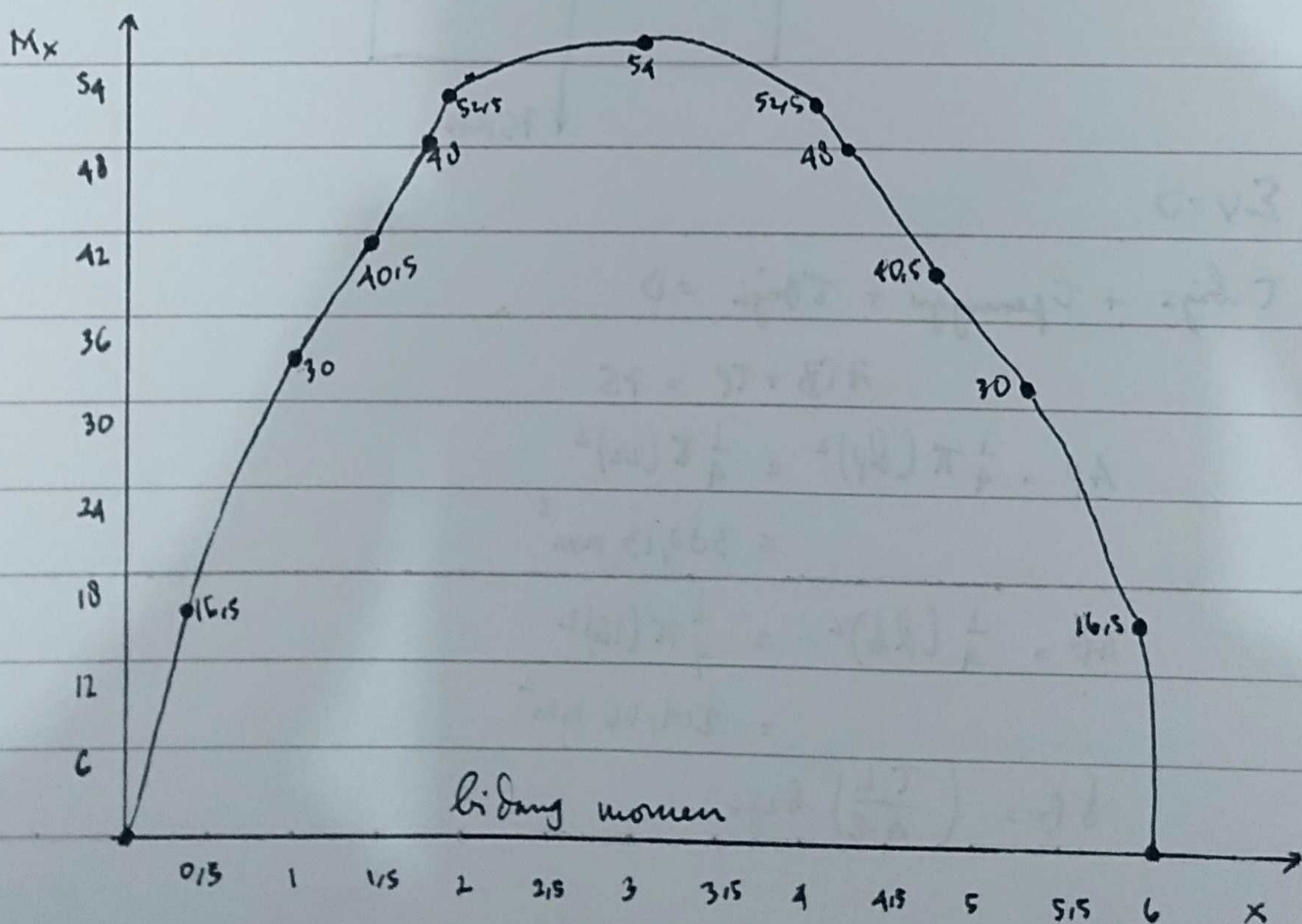
Batang AB = $0 \leq x \leq 6$ m diukur dari titik A

$$\begin{aligned} M_x &= V_A x - Q_x \cdot \frac{1}{2} x \\ &= 36x - 12x \cdot \frac{1}{2} x \\ &= 36x - 6x^2 \end{aligned}$$

X (cm)	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6
M_x (kN-m)	0	16,5	30	40,5	48	52,5	54	52,5	48	40,5	30	16,5	0

$$Q_x = \frac{dM_x}{dx} = 36 - 12x$$

X cm	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6
M_x (kN-m)	36	30	24	18	12	6	0	-6	-12	-18	-24	-30	-36



Batang CB : $2m \leq X_2 \leq 4m$ diambil dari titik A

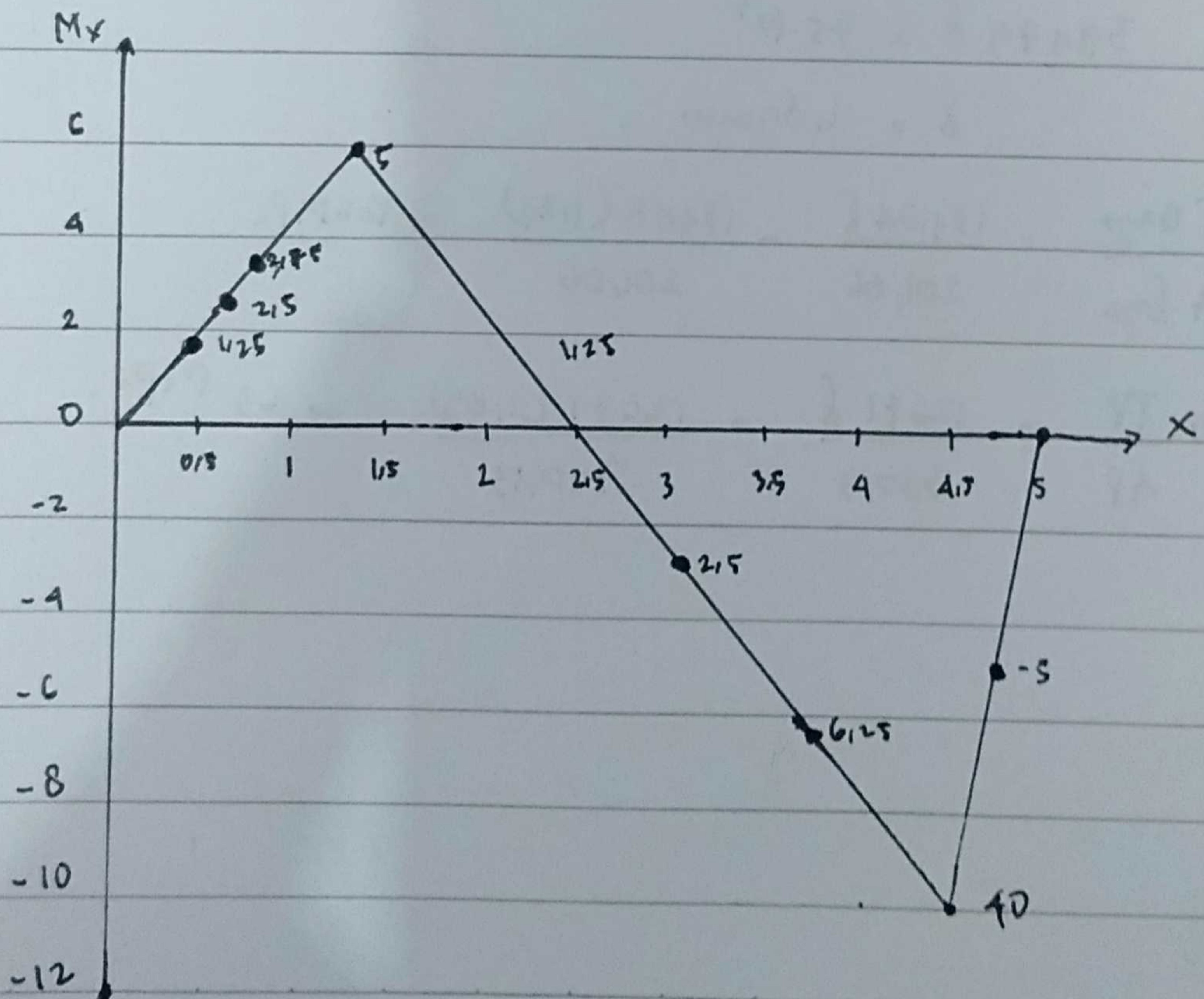
$$\begin{aligned} M_{X_2} &= V_A \cdot X_2 - P_1 (X_2 - 2) \\ &= \frac{5}{2} X_2 - 10 (X_2 - 2) \\ &= -\frac{15}{2} X_2 + 20 \end{aligned}$$

$X_2 (m)$	2	2,5	3	3,5	4
$M_{X_2} (kN \cdot m)$	5	1,25	-2,5	-6,25	-10

Batang BD : $4m \leq X_3 \leq 5m$ diambil dari titik A

$$\begin{aligned} M_X &= V_A (X_3) - P_1 (X_3 - 2) + V_B (X_3 - 4) \\ &= \frac{5}{2} (X_3) - 10 (X_3 - 2) + \frac{35}{2} (X_3 - 4) \\ &= 10X_3 - 10 \end{aligned}$$

$X_3 (m)$	4	4,5	5
$M_{X_3} (kN \cdot m)$	-10	-5	0



$$T_{Baja} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{Baja}$$

$$= \frac{201,06 (200) 10^3 \delta}{300}$$

$$= 13404 \delta$$

$$\delta_{perunggu} = \left(\frac{T \cdot L}{A \cdot E} \right)_{P}$$

$$T_{perunggu} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{perunggu}$$

$$= \frac{380,13 \cdot 100 \cdot 10^3 \cdot \delta}{3000}$$

$$= 12671 \delta$$

$$\Delta T_{Baja} + T_{perunggu} = 75$$

$$2 (13404 \delta) + (12671 \delta) = 75$$

$$26808 \delta + 12671 \delta = 75 \cdot 10^3$$

$$39479 \delta = 75 \cdot 10^3$$

$$\delta = 1,89 \text{ mm}$$

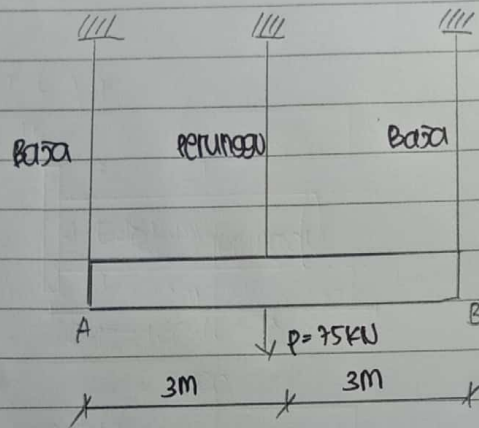
$$T_{Baja} = \frac{T_{Baja}}{A_{Baja}} = \frac{13404 \delta}{201,06} = \frac{13408 (1,89)}{201,06} = 126 \text{ MPa}$$

$$T_{perunggu} = \frac{TP}{AP} = \frac{12671 \delta}{380,13} = \frac{12671 (1,89)}{380,13} = 63 \text{ MPa}$$

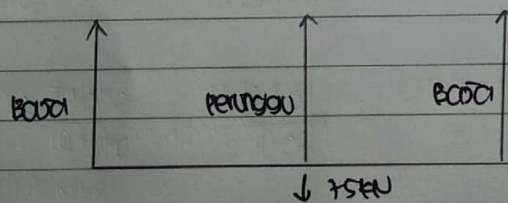
Nama : Deni Harison

NPM : 182710027

Tugas pertemuan ke 10 :



	Baja	Perunggu
diameter (mm)	16	22
E (GPa)	200	100



$$\sum V = 0$$

$$T_{Baja} + T_{Perunggu} + T_{Baja} = 0$$

$$2T_B + T_P = 75$$

$$A_P = \frac{1}{4} \pi (d_P)^2 = \frac{1}{4} \pi (22)^2 = 380,13 \text{ mm}^2$$

$$A_B = \frac{1}{4} \pi (d_B)^2 = \frac{1}{4} \pi (16)^2 = 201,06 \text{ mm}^2$$

$$\delta_B = \left(\frac{T \cdot L}{A E} \right)_{Baja}$$

$$\begin{aligned}
 T_{Baja} &= \left(\frac{A \cdot E \cdot \delta}{L} \right)_{Baja} \\
 &= \frac{201.06 (200) 10^3 \delta}{3000} \\
 &= 13404 \delta
 \end{aligned}$$

$$\delta_{perunggu} = \left(\frac{T \cdot L}{A E} \right) P$$

$$\begin{aligned}
 T_{perunggu} &= \left(\frac{A \cdot E \delta}{L} \right)_{perunggu} \\
 &= \frac{380.13 \cdot 100 \cdot 10^3 \cdot \delta}{3000} \\
 &= 12671 \delta
 \end{aligned}$$

$$2T_{Baja} + T_{perunggu} = 75$$

$$2(13404 \delta) + (12671 \delta) = 75$$

$$26808 \delta + 12671 \delta = 75 \cdot 10^3$$

$$39479 \delta = 75 \cdot 10^3$$

$$\delta = 1.89 \text{ mm}$$

$$\sigma_{Baja} = \frac{T_{Baja}}{A_{Baja}} = \frac{13404 \delta}{201.06} = \frac{13404 (1.89)}{201.06} = 126 \text{ MPa}$$

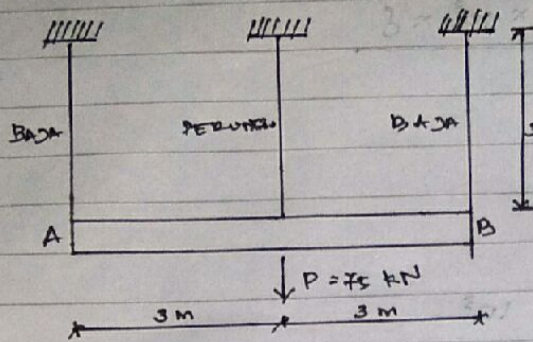
$$\sigma_{perunggu} = \frac{T_P}{A_P} = \frac{12671 \delta}{380.13} = \frac{12671 (1.89)}{380.13} = 63 \text{ MPa}$$

MAMA : DISMARITA
 NIM : 182710025

- MEKANIKA TERAPAN -

TUGAS 10 :

* SEBUAH BATANG KAYU AB DIGANTUNG PADA KAWAT VERTICAL DARI BAHAN PERUNGU DAN BAJA SEPERTI TERGAMBAR. KAWAT INI MEMIKUL BEBAN P YANG BERKERJA DI TITIK TENGAH BATANG. HITUNGLAH DEFORMASI DAN TEGANGAN PADA KAWAT TERSEBUT.



	BAJA	PERUNGU
DIAMETER (mm)	16	22
E (GPa)	200	100

$$\sum V = 0$$

$$T_{BAJA} + T_{PERUNGU} + T_{BAJA} = 0$$

$$2 T_B + T_P = 75$$

$$A_P = \frac{1}{4} \pi (d_P)^2 = \frac{1}{4} \pi (22)^2 = 380,13 \text{ mm}^2$$

$$A_B = \frac{1}{4} \pi (d_B)^2 = \frac{1}{4} \pi (16)^2 = 201,06 \text{ mm}^2$$

$$\delta_B = \left(\frac{T \cdot L}{A \cdot E} \right)_{BAJA}$$

$$T_{BAJA} = \left(\frac{\delta \cdot E \cdot A}{L} \right)_{BAJA}$$

$$= \frac{201,06 (200) 10^3 \delta}{3000}$$

$$= 13404 \delta$$

$$\delta_{\text{PERUNGGU}} = \left(\frac{F \cdot L}{A \cdot E} \right) P$$

$$\begin{aligned} T_{\text{PERUNGGU}} &= \left(\frac{A \cdot E \cdot \delta}{L} \right) \text{PERUNGGU} \\ &= \frac{380,13 \times 100 \times 10^3 \times \delta}{3000} \\ &= 12671 \delta \end{aligned}$$

$$2 T_{\text{BADA}} + T_{\text{PERUNGGU}} = 75$$

$$2 (13.404 \delta) + (12.671 \delta) = 75$$

$$26.808 \delta + 12.671 \delta = 75 \cdot 10^3$$

$$39.479 \delta = 75 \cdot 10^3$$

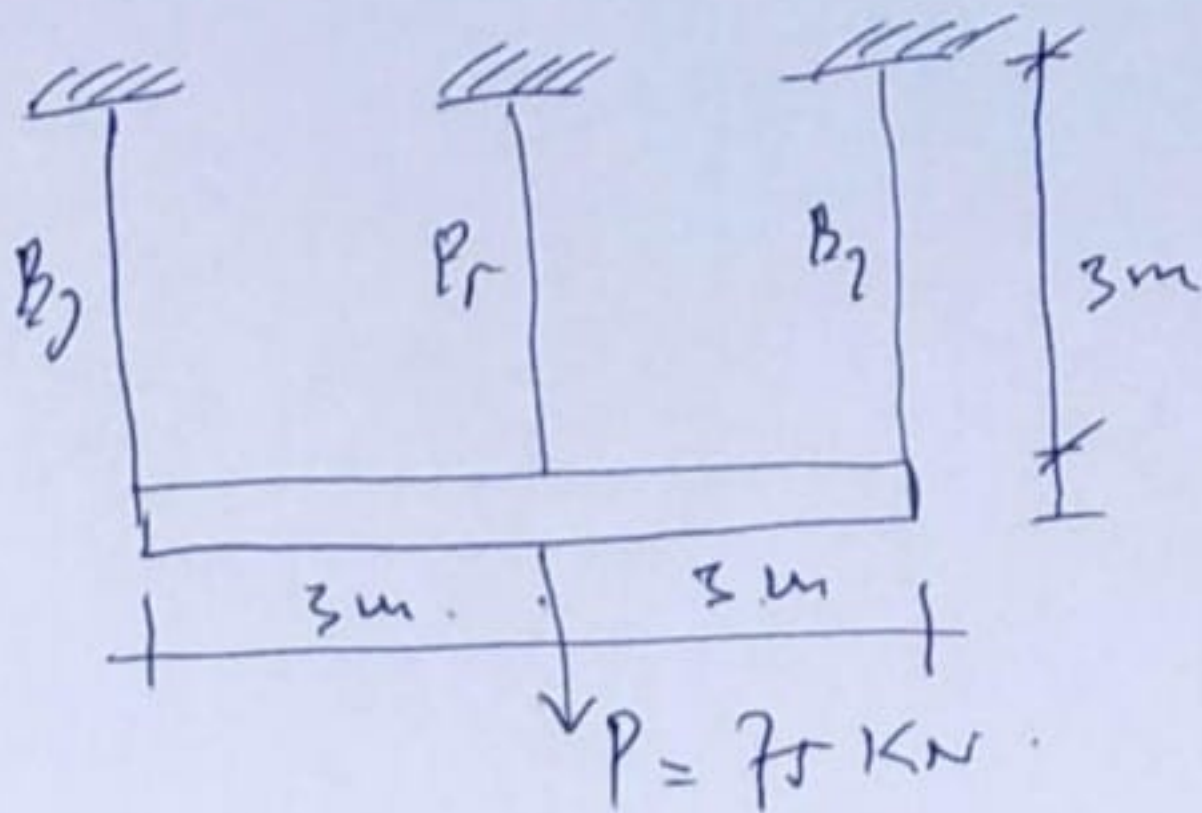
$$\delta = 1,89 \text{ mm}$$

$$\sigma_{\text{BADA}} = \frac{T_{\text{BADA}}}{A_{\text{BADA}}} = \frac{13404 \delta}{201,06} = \frac{13404 (1,89)}{201,06} = 126 \text{ MPa}$$

$$\sigma_{\text{PERUNGGU}} = \frac{T_P}{A_P} = \frac{12671 \delta}{380,13} = \frac{12671 (1,89)}{380,13} = 63 \text{ MPa}$$

Tugas Pertemuan 10.

Nama: Idwan Rozanova.
NIM: 182170028.



$$\begin{aligned} \sum V &= 0 \\ &= T_B + T_P + T_B - 75 = 0 \\ &= 2T_B + T_P = 75 \quad (1) \end{aligned}$$

$$\begin{aligned} T_B &= \frac{P \cdot A \cdot \delta}{E \cdot A} \\ T_B &= \frac{E \cdot A \cdot \delta}{L} \\ &= \frac{200200,49 \cdot \delta}{3000} \\ &= 13,366 \delta \quad (2) \end{aligned}$$

$$\begin{aligned} T_P &= \frac{E_p \cdot A_p \cdot \delta}{L} \\ &= \frac{100 \cdot 379,94 \cdot \delta}{3000} \\ &= 12,665 \delta \quad (3) \end{aligned}$$

	Bj	Pr
A	200,496	379,94
E	200	100
L	3000	3000
δ	1,904	1,904
T	25,392	24,114
σ	126,35 N/mm ²	265,47 N/mm ²

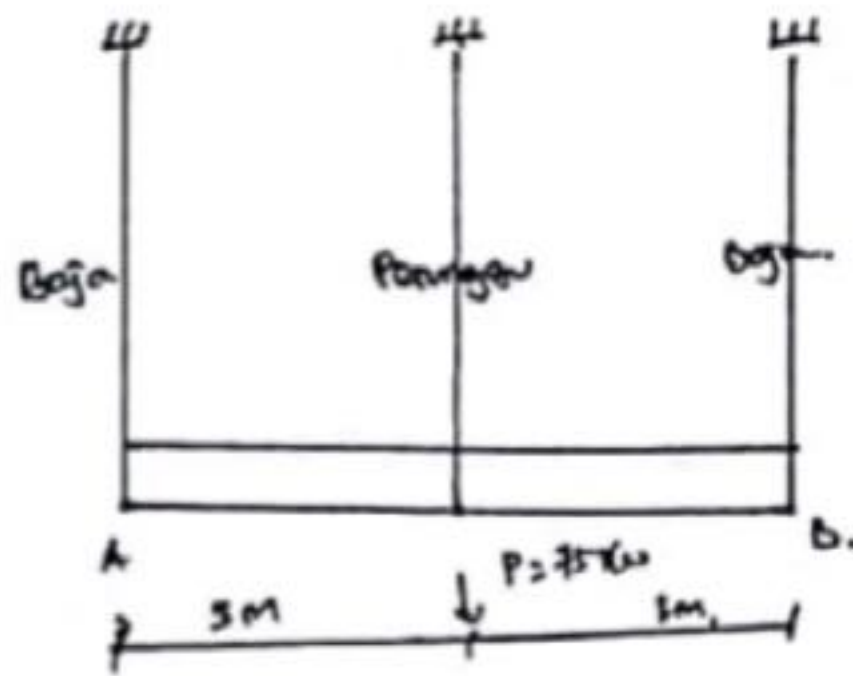
Dari Pers. (1) didapat = δ

$$2 \cdot (13,366 \delta) + 12,665 \delta = 75$$

$$39,397 \delta = 75$$

$$\delta = \underline{\underline{1,904 \text{ mm}}}$$

Tugas 10



	Baja	Perngus
D.	16	22
E	200	100

$$\sum V = 0$$

$$T_{\text{Baja}} + T_{\text{Perngus}} + T_{\text{Baja}} = 0$$

$$2 T_b + T_p = 75$$

$$A_p = \frac{1}{4} \pi (d_p)^2 = \frac{1}{4} \pi (22)^2 = 380,13 \text{ mm}^2$$

$$A_b = \frac{1}{4} \pi (d_b)^2 = \frac{1}{4} \pi (16)^2 = 201,06 \text{ mm}^2$$

$$\sigma_b = \left(\frac{T \cdot L}{A \cdot b} \right)_{\text{Baja}}$$

$$T_{\text{Baja}} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{Baja}}$$

$$= \frac{201,06 (200) 10^3 \cdot \delta}{3000}$$

$$= 13404 \delta$$

①

$$\begin{aligned} \delta_{\text{Perngus}} &= \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{Perngus}} \\ &= \frac{380,13 \cdot 200 \cdot 10^3 \cdot \delta}{3000} \\ &= 12671 \delta \end{aligned}$$

$$2 T_{\text{Baja}} + T_{\text{Perngus}} = 75$$

$$2 (13404 \delta) + (12671 \delta) = 75$$

$$26808 \delta + 12671 \delta = 75 \cdot 10^3$$

$$39479 \delta = 75 \cdot 10^3$$

$$\delta = \underline{1,89 \text{ mm}}$$

$$\sigma_{\text{Baja}} = \frac{T_{\text{Baja}}}{A_{\text{Baja}}} = \frac{13404 \delta}{201,06} = \frac{13404 (1,89)}{201,06} = 126 \text{ MPa}$$

$$\sigma_{\text{Perngus}} = \frac{T_p}{A_p} = \frac{12671 \delta}{380,13} = \frac{12671 (1,89)}{380,13} = 63 \text{ MPa}$$

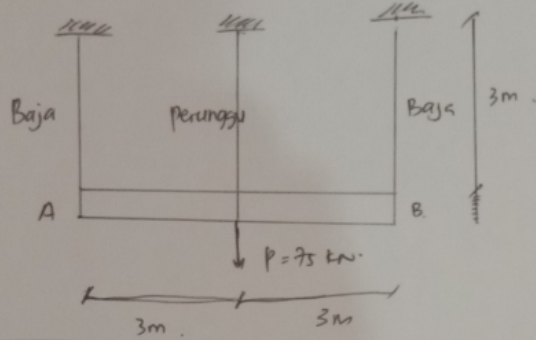
Nama : Muhammad Reza Niscaya

Tugas 10

Nim : 182 710037

Soal :

Sebuah batang torsi AB digantung pada kawat vertical dari bahan perunggu dan baja seperti tergambar. kawat ini memiliki beban P yang bekerja di titik tengah batang. Hitunglah deformasi dan tegangan pada kawat tersebut.



	Baja	perunggu
Diameter	16	22
E	200	100

Jawab :

$$\sum V = 0$$

$$T_{\text{perunggu}} + 2T_{\text{baja}} = P$$

$$2T_{\text{baja}} + T_{\text{perunggu}} = 75 \text{ kN}$$

$$A_{\text{perunggu}} = \frac{1}{4} \pi (d_{\text{perunggu}})^2 = \frac{1}{4} \pi (22)^2 = 379,94$$

$$A_{\text{baja}} = \frac{1}{4} \pi (d_{\text{baja}})^2 = \frac{1}{4} \pi (16)^2 = 200,96$$

$$\delta_{\text{baja}} = \left(\frac{T \cdot L}{A \cdot E} \right)_{\text{baja}} \rightarrow T_{\text{baja}} = \frac{A \cdot E \cdot \delta}{L} = \frac{200,96 \cdot (200 \times 10^3) \delta}{3000} = 13,397 \delta$$

$$\delta_{\text{perunggu}} = \left(\frac{T \cdot L}{A \cdot E} \right)_{\text{perunggu}} \rightarrow T_{\text{perunggu}} = \frac{A \cdot E \cdot \delta}{L} = \frac{379,94 (100 \times 10^3) \delta}{3000} = 12,664 \delta$$

$$2T_{\text{baja}} + T_{\text{perunggu}} = 75 \cdot 10^3 \text{ N}$$

$$2(13,397 \delta) + (12,664 \delta) = 75 \cdot 10^3$$

$$\delta = \frac{75 \cdot 10^3}{39,458}$$

$$\delta = 1,9 \text{ mm}$$

$$\sigma_{\text{baja}} = \frac{T_{\text{baja}}}{A_{\text{baja}}} = \frac{13,397 (1,9)}{200,96} = 126,67 \text{ MPa}$$

$$\sigma_{\text{perunggu}} = \frac{T_{\text{perunggu}}}{A_{\text{perunggu}}} = \frac{12,664 (1,9)}{379,94} = 63,33 \text{ MPa}$$

$$\delta_{\text{Perunggu}} = \left(\frac{A \cdot E \cdot d}{L} \right) \text{Perunggu.}$$

$$= \frac{380,13 \cdot 100 \cdot 10^3 \cdot \delta}{3000}$$

$$= 12671 \delta.$$

$$2T_{\text{Baja}} + T_{\text{Perunggu}} = 75.$$

$$2(13404 \delta) + (12671 \delta) = 75$$

$$26808 \delta + 12671 \delta = 75 \cdot 10^3$$

$$39479 \delta = 75 \cdot 10^3$$

$$\delta = \frac{1,89 \text{ mm.}}{2}$$

$$\sigma_{\text{Baja}} = \frac{T_{\text{Baja}}}{A_{\text{Baja}}} = \frac{13404 \delta}{201,06} = \frac{13404 (1,89)}{201,06} = 126 \text{ Mpa.}$$

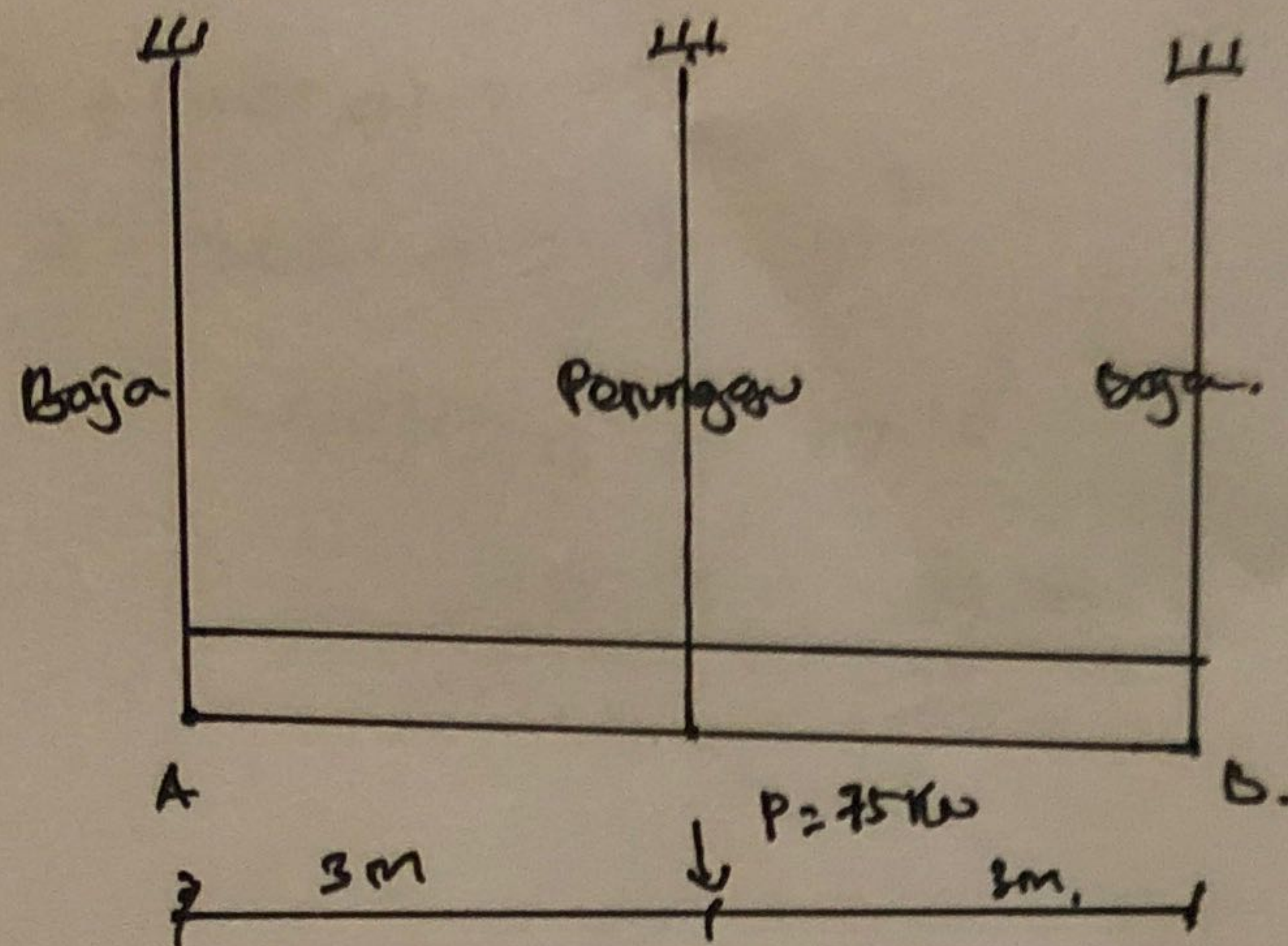
$$\sigma_{\text{Perunggu}} = \frac{T_{\text{P}}}{A_{\text{P}}} = \frac{12671 \delta}{380,13} = \frac{12671 (1,89)}{380,13} = 63 \text{ Mpa.}$$

NAMA: RICO ANDRO BELLI

NIM: 182710043

M.kul: MATEMATIKA TERAPAN.

Tugas. 10.



	Baja	Perunggu
D.	16	22
E	200	100

$$\sum v = 0$$

$$T_{\text{Baja}} + T_{\text{Perunggu}} + T_{\text{Baja}} = 0$$

$$2 T_B + T_P = 75$$

$$A_P = \frac{1}{4} \pi (d_p)^2 = \frac{1}{4} \pi (22)^2 \\ = 380,13 \text{ mm}^2$$

$$A_B = \frac{1}{4} \pi (d_b)^2 = \frac{1}{4} \pi (16)^2 \\ = 201,06 \text{ mm}^2$$

$$\sigma_B = \left(\frac{T \cdot L}{A \cdot E} \right)_{\text{Baja}}$$

$$T_{\text{Baja}} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{Baja}}$$

$$= \frac{201,06 (200) 10^3 \cdot \delta}{3000}$$

$$= 13404 \sigma$$

Tugas 10.

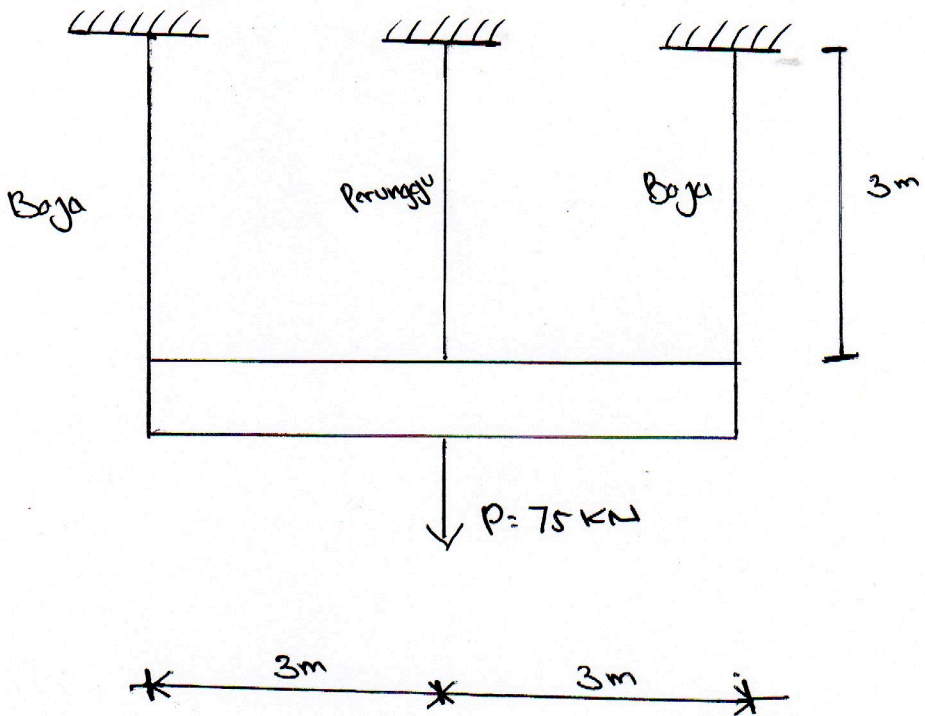
1.

Nama : Wahid Sapta

Mata Kuliah : Mekanika Terapan

NIM : 182710033

Dosen : Dr. Firdaus, MT



	Baja	Perunggu
Diameter (mm)	16	22
E (GPa)	200	100

Ditanya: Deformasi dan tegangan pada kawat.

Jawab :

$$\sum v = 0$$

$$T_p + T_b + T_b = 75 \rightarrow 2T_b + T_p = 75 \dots (1)$$

$$A_b = \frac{1}{4} \pi (16)^2 = 200,96 \text{ mm}^2$$

$$A_p = \frac{1}{4} \pi (22)^2 = 379,94 \text{ mm}^2$$

$$\delta_b = \left(\frac{T \cdot L}{A \cdot E} \right)_{\text{baja}} \rightarrow T_{\text{baja}} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{baja}} = \frac{200,96 \cdot 200 \cdot 10^3 \cdot \delta_b}{3000} = 13.397,33 \delta$$

$$\sigma_p = \left(\frac{T \cdot L}{A \cdot E} \right)_{\text{perunggu}} \rightarrow T_{\text{perunggu}} = \left(\frac{A \cdot E \cdot \sigma}{L} \right)_{\text{perunggu}} = \frac{379,94 \cdot 100 \cdot 10^3 \cdot \sigma}{3000} \quad (2)$$

$$= 12.664,67 \sigma$$

dari persamaan (1)

$$2T_b + T_p = 75$$

$$2(13.397,33 \sigma) + 12.664,67 \sigma = 75 \rightarrow 39.459,33 \sigma = 75 \times 10^3$$

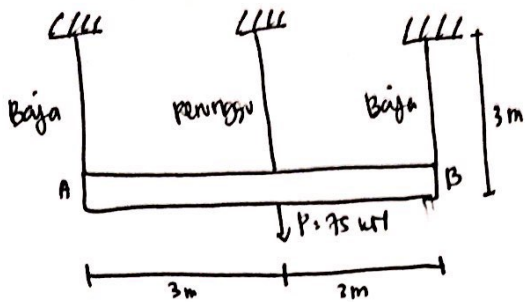
$$\sigma = \frac{75 \times 10^3}{39.459,33} = 1,90 \text{ mm}$$

$$\sigma_b = \frac{T_b}{A_b} = \frac{13.397,33 \cdot 1,90}{200196} = 126,6 \text{ Mpa}$$

$$\sigma_p = \frac{T_p}{A_p} = \frac{12.667,67 \cdot 1,90}{379,94} = 63,33 \text{ Mpa.}$$

Tugas 10.

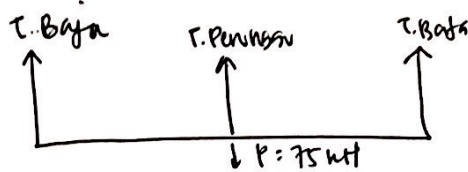
Diket: Batang AB memiliki beban P digantung pada kawat vertical



	Baja	Perngsu.
Diameter cmm	16	22
E (GPa)	200	100

Tanya: Hit. deformasi dan Teg. pada kawat tsb.

Jawab:



$$\sum V = 0$$

$$T_{\text{baja}} + T_{\text{perngsu}} + T_{\text{baja}} = P$$

$$2T_{\text{baja}} + T_{\text{perngsu}} = 75 \text{ kN}$$

$$A_{\text{baja}} : \frac{1}{4} \pi d_{\text{baja}}^2 = \frac{1}{4} \pi \cdot 16^2 = 200,96 \text{ mm}^2$$

$$A_{\text{perngsu}} : \frac{1}{4} \pi d_{\text{perngsu}}^2 = \frac{1}{4} \pi \cdot 22^2 = 379,94 \text{ mm}^2$$

$$\delta_{\text{baja}} : \frac{T \cdot L}{A \cdot E}$$

$$T_{\text{baja}} : \frac{A \cdot E \cdot \delta_{\text{baja}}}{L} = \frac{200,96 \times 200 \cdot 10^3 \cdot \delta_{\text{baja}}}{3000} = 13397 \delta_{\text{baja}}$$

$$\delta_{\text{perngsu}} : \frac{T \cdot L}{A \cdot E}$$

$$T : \frac{A \cdot E \cdot \delta_{\text{perngsu}}}{L} = \frac{379,94 \times 100 \cdot 10^3 \cdot \delta_{\text{perngsu}}}{3000} = 12663,3 \delta_{\text{perngsu}}$$

$$2T_{\text{baja}} + T_{\text{perngsu}} = 75 \text{ kN}$$

$$2(13397 \delta) + 12663,3 \delta = 75 \text{ kN} (75 \cdot 10^3)$$

$$26794 \delta + 12663,3 \delta = 75 \cdot 10^3$$

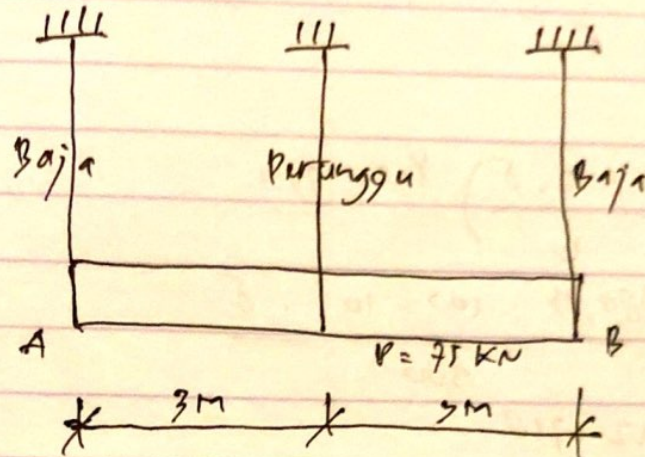
$$39457,3 \delta = 75 \cdot 10^3$$

$$\delta = 1,90 \text{ mm}$$

$$\text{Jadi } \sigma_{\text{baja}} : \frac{T_{\text{baja}}}{A_{\text{baja}}} = \frac{13397 \delta}{200,96} = \frac{13397 \cdot 1,90}{200,96} = 126 \text{ mpa}$$

$$\sigma_{\text{per}} : \frac{T_{\text{per}}}{A_{\text{per}}} = \frac{12663,3 \delta}{379,94} = 633 \text{ mpa}$$

Nama : Akhirudin
 NIM : 182710045
 M. Kuliah : Matematika Terapan



	Baja	Perunggu
P	16	22
E	200	100

$$\sum V = 0$$

$$T_{\text{Baja}} + T_{\text{Perunggu}} + T_{\text{Baja}} = 0$$

$$I T_B + T_P = 75$$

$$A_P = \frac{1}{4} \pi (d_P)^2 = \frac{1}{4} \pi (22)^2$$

$$= 380,13 \text{ mm}^2$$

$$A_B = \frac{1}{4} \pi (d_B)^2 = \frac{1}{4} \pi (16)^2$$

$$= 201,06 \text{ mm}^2$$

$$\delta_B = \left(\frac{T L}{A E} \right)_{\text{Baja}}$$

$$\begin{aligned}
 T_{\text{Baja}} &= \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{Baja}} \\
 &= \frac{201,06 (200) 10^3 \cdot \delta}{3000} \\
 &= 13404 \delta
 \end{aligned}$$

$$\begin{aligned}
 \sigma_{\text{Perunggu}} &= \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{Perunggu}} \\
 &= \frac{380,13 \cdot 100 \cdot 10^3 \cdot \delta}{300} \\
 &= 12671 \delta
 \end{aligned}$$

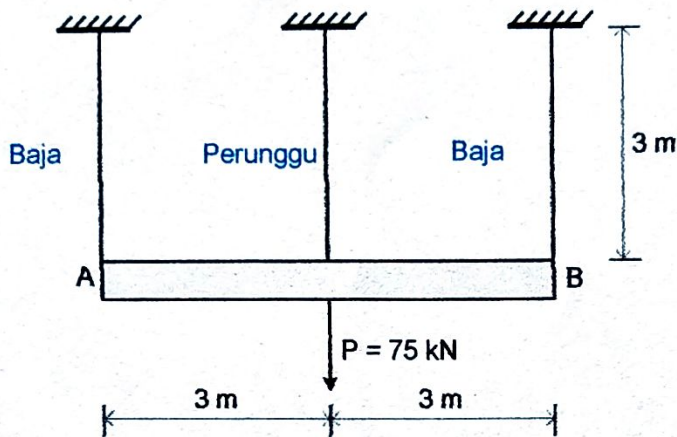
$$\sigma_{\text{Baja}} = \frac{T_{\text{Baja}}}{A_{\text{Baja}}} = \frac{13404 \delta}{201,06} = \frac{13404 (1,89)}{201,06} = 126 \text{ MPa}$$

$$\sigma_{\text{Perunggu}} = \frac{T_{\text{P}}}{A_{\text{P}}} = \frac{12571 \delta}{380,13} = \frac{12671 (1,89)}{380,13} = 63,17 \text{ MPa}$$

NAMA : ALDAFI
 NIM : 102710040
 MK : MEKANIKA TERAPAN
 DOSEN : DR. FIRDAUS, MT

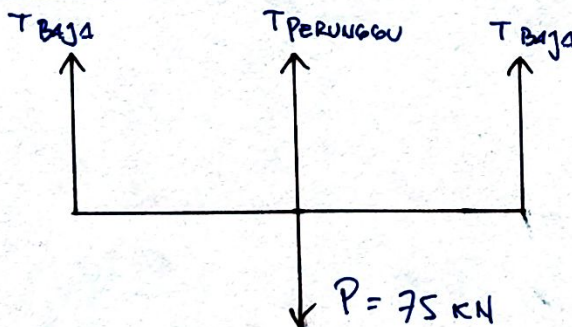
Soal

Sebuah batang kaku AB digantung pada kawat vertical dari bahan perunggu dan baja seperti tergambar. Kawat ini memikul beban P yang berkerja di titik tengah batang. Hitunglah deformasi dan tegangan pada kawat tersebut.



	Baja	Perunggu
Diameter (mm)	16	22
E (GPa)	200	100

PENYELESAIAN



$$\sum Y = 0$$

$$T_{\text{Baja}} + T_{\text{Perunggu}} + T_{\text{Baja}} = P$$

$$2T_{\text{Baja}} + T_{\text{Perunggu}} = 75$$

$$A_{\text{Baja}} = \frac{1}{4} \pi (d_{\text{Baja}})^2 = \frac{1}{4} \pi (16)^2 = 201 \text{ mm}^2$$

$$A_{\text{Perunggu}} = \frac{1}{4} \pi (d_{\text{Perunggu}})^2 = \frac{1}{4} \pi (22)^2 = 380 \text{ mm}^2$$

$$\sigma_{\text{PERUNGGU}} = \left[\frac{T \cdot L}{A \cdot E} \right]_{\text{PERUNGGU}}$$

$$T_{\text{PERUNGGU}} = \left[\frac{A \cdot E \cdot \delta}{L} \right]_{\text{PERUNGGU}} = \frac{380 \times 100 \cdot 10^3 \times \delta}{2000} = 19000 \delta$$

$$\sigma_{\text{BAJA}} = \left[\frac{T \cdot L}{A \cdot E} \right]_{\text{BAJA}}$$

$$T_{\text{BAJA}} = \left[\frac{A \cdot E \cdot \delta}{L} \right]_{\text{BAJA}} = \frac{201 \times 200 \cdot 10^3 \times \delta}{2000} = 20100 \delta$$

$$2T_{\text{BAJA}} + T_{\text{PERUNGGU}} = 75$$

$$2(20100\delta) + 19000\delta = 75 \cdot 10^3$$

$$\delta = 1,27 \text{ mm}$$

$$\sigma_{\text{PERUNGGU}} = \frac{T_{\text{PERUNGGU}}}{A_{\text{PERUNGGU}}} = \frac{19000 \delta}{380} = \frac{19000 \times 1,27}{380} = 63,5 \text{ Mpa}$$

$$\sigma_{\text{BAJA}} = \frac{T_{\text{BAJA}}}{A_{\text{BAJA}}} = \frac{20 \cdot 100 \delta}{201} = \frac{20 \cdot 100 \times 1,27}{201} = 127 \text{ Mpa}$$