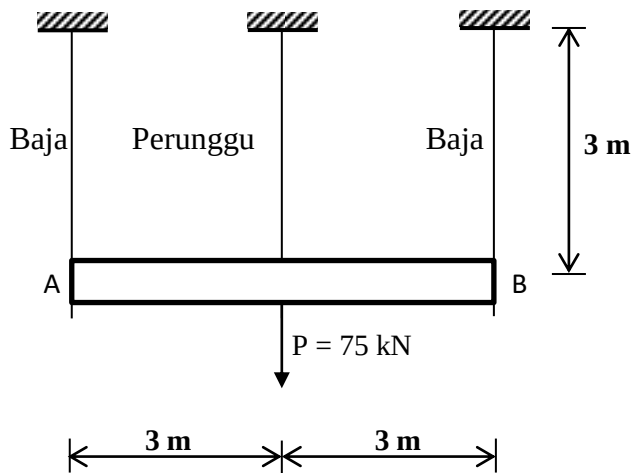


Upload Tugas

Nama : JAYAPURA
Nim : 202710010
Kelas : MT-S5 A1

TUGAS-7

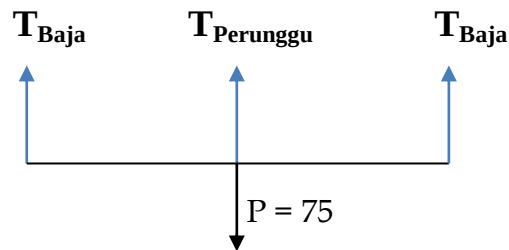
Sebuah batang kaku AB digantung pada kawat vertical dari bahan perunggu dan baja seperti tergambar. Kawat ini memikul beban P yang berkerja di titik tengah batang. Hitunglah deformasi dan tegangan pada kawat tersebut.



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

Nama : JAYAPURA
 Nim : 202710010
 Kelas : MT-S5 A1

Jawabannya



$$\sum V = 0$$

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

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

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

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

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

$$T_{baja} = \left(\frac{A \cdot E \cdot \delta}{L}\right)_{baja} = \frac{201 \text{ mm}^2 \cdot 200 \cdot 10^3 \frac{\text{N}}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 13400 \delta \frac{\text{N}}{\text{mm}}$$

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

$$T_{perunggu} = \left(\frac{A \cdot E \cdot \delta}{L}\right)_{perunggu} = \frac{380,1 \text{ mm}^2 \cdot 100 \cdot 10^3 \frac{\text{N}}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 12670 \delta \frac{\text{N}}{\text{mm}}$$

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

$$2 \cdot \left(13400 \delta \frac{\text{N}}{\text{mm}}\right) + 12670 \delta \frac{\text{N}}{\text{mm}} = 75 \cdot 10^3 \text{ N}$$

$$39470 \delta \frac{\text{N}}{\text{mm}} = 75000 \text{ N} \rightarrow \delta = \frac{75000}{39470} \text{ mm} = 1,9 \text{ mm}$$

$$\sigma_{baja} = \frac{T_{baja}}{A_{baja}} = \frac{13400 \delta \frac{\text{N}}{\text{mm}}}{201 \text{ mm}^2} = \frac{13400 \frac{\text{N}}{\text{mm}} \times 1,9 \text{ mm}}{201 \text{ mm}^2} = 126,7 \frac{\text{N}}{\text{mm}^2} = 126,7 \text{ MPa}$$

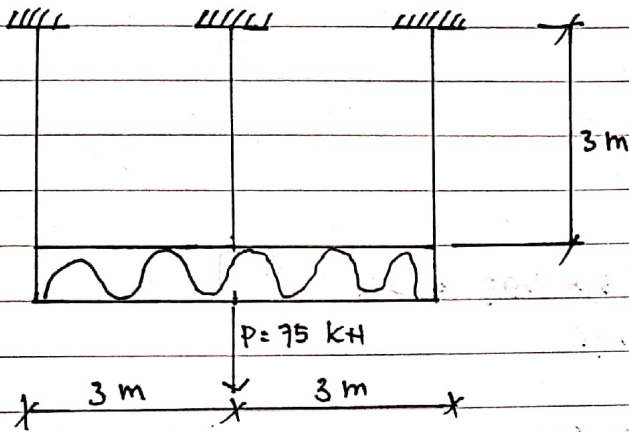
Nama : JAYAPURA
Nim : 202710010
Kelas : MT-S5 A1

$$\begin{aligned}\sigma_{perunggu} &= \frac{T_{perunggu}}{A_{perunggu}} = \frac{12670 \delta \frac{N}{mm}}{380,1 mm^2} = \frac{12670 \frac{N}{mm} \times 1,9 mm}{380,1 mm^2} = 63,3 \frac{N}{mm^2} \\ &= 63,3 MPa\end{aligned}$$

Nama : M. Batara

Mk : Tugas 6. Mekanika Terapan

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

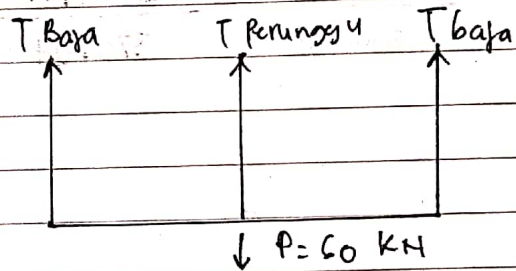


	Baja	Perunggu
Diameter (mm)	16	22
E (GPa)	200	100

Jawab :

$$\sum V = 0$$

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



$$A_{\text{perunggu}} = \frac{1}{4} \pi (d_{\text{perunggu}})^2 = \frac{1}{4} \cdot 3,14 (22)^2 = 379,94 \text{ mm}^2$$

$$A_{\text{baja}} = \frac{1}{4} \pi (d_{\text{baja}})^2 = \frac{1}{4} \cdot 3,14 (16)^2 = 200,96 \text{ mm}^2$$

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

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

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

$$T_{\text{perunggu}} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{\text{perunggu}} = \frac{379,94 \times 100 \cdot 10^3 \cdot \delta}{3000} = 12.664,66 \delta$$

Nama : M. Batara

Mk : Tugas 6 Mekanika Terapan

$$2 T_{\text{batu}} + T_{\text{perunggu}} = 75$$

$$2 (13.397,33 f) + 12.664,66 f = 75 \cdot 10^3$$

$$26.794,66 f + 12.664,66 f = 75 \cdot 10^3$$

$$39.459,33 f = 75 \cdot 10^3$$

$$f = \frac{75 \cdot 10^3}{39.459,33}$$

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

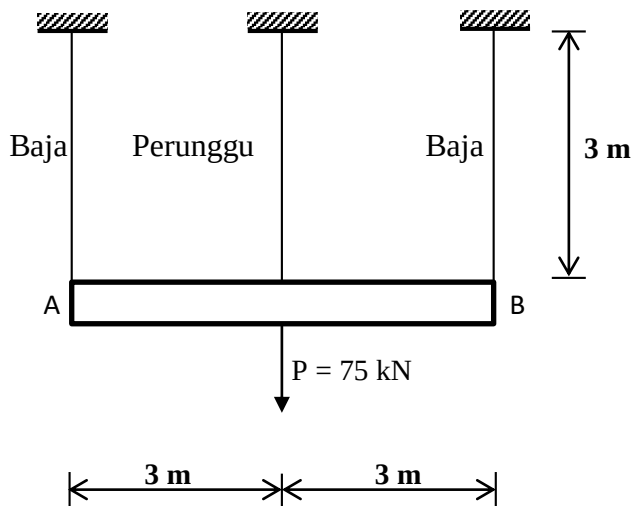
$$\sigma_{\text{batu}} = \frac{T_{\text{batu}}}{A_{\text{batu}}} = \frac{13.397,33 f}{200,96} = \frac{13.397,33 \times 1,90}{200,96} = 126,71 \text{ MPa}$$

$$\sigma_{\text{perunggu}} = \frac{T_{\text{perunggu}}}{A_{\text{perunggu}}} = \frac{12.664,66 f}{379,94} = \frac{12.664,66 \times 1,90}{379,94} = 63,35 \text{ MPa}$$

Nama : SELAMAT
Nim : 202710025
Kelas : MT-S5 A1

TUGAS-7

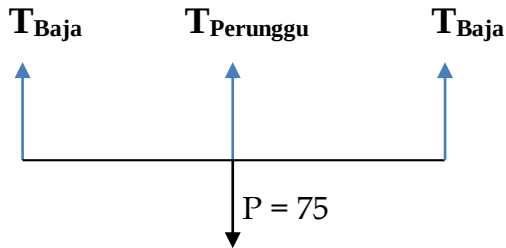
Sebuah batang kaku AB digantung pada kawat vertical dari bahan perunggu dan baja seperti tergambar. Kawat ini memikul beban P yang berkerja di titik tengah batang. Hitunglah deformasi dan tegangan pada kawat tersebut.



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

Nama : SELAMAT
 Nim : 202710025
 Kelas : MT-S5 A1

Jawabannya



$$\sum V = 0$$

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

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

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

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

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

$$T_{baja} = \left(\frac{A \cdot E \cdot \delta}{L}\right)_{baja} = \frac{201 \text{ mm}^2 \cdot 200 \cdot 10^3 \frac{\text{N}}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 13400 \delta \frac{\text{N}}{\text{mm}}$$

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

$$T_{perunggu} = \left(\frac{A \cdot E \cdot \delta}{L}\right)_{perunggu} = \frac{380,1 \text{ mm}^2 \cdot 100 \cdot 10^3 \frac{\text{N}}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 12670 \delta \frac{\text{N}}{\text{mm}}$$

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

$$2 \cdot \left(13400 \delta \frac{\text{N}}{\text{mm}}\right) + 12670 \delta \frac{\text{N}}{\text{mm}} = 75 \cdot 10^3 \text{ N}$$

$$39470 \delta \frac{\text{N}}{\text{mm}} = 75000 \text{ N} \rightarrow \delta = \frac{75000}{39470} \text{ mm} = 1,9 \text{ mm}$$

$$\sigma_{baja} = \frac{T_{baja}}{A_{baja}} = \frac{13400 \delta \frac{\text{N}}{\text{mm}}}{201 \text{ mm}^2} = \frac{13400 \frac{\text{N}}{\text{mm}} \times 1,9 \text{ mm}}{201 \text{ mm}^2} = 126,7 \frac{\text{N}}{\text{mm}^2} = 126,7 \text{ MPa}$$

Nama : SELAMAT
Nim : 202710025
Kelas : MT-S5 A1

$$\begin{aligned}\sigma_{perunggu} &= \frac{T_{perunggu}}{A_{perunggu}} = \frac{12670 \delta \frac{N}{mm}}{380,1 mm^2} = \frac{12670 \frac{N}{mm} \times 1,9 mm}{380,1 mm^2} = 63,3 \frac{N}{mm^2} \\ &= 63,3 MPa\end{aligned}$$

TUGAS MATA KULIAH
MEKANIKA TERAPAN

Dosen : Dr. Firdaus, ST., M.T



NAMA : S U J O N O

NIM : 202710020

MAGISTER TEKNIK SIPIL PROGRAM PASCA SARJANA
UNIVERSITAS BINA DARMA PALEMBANG

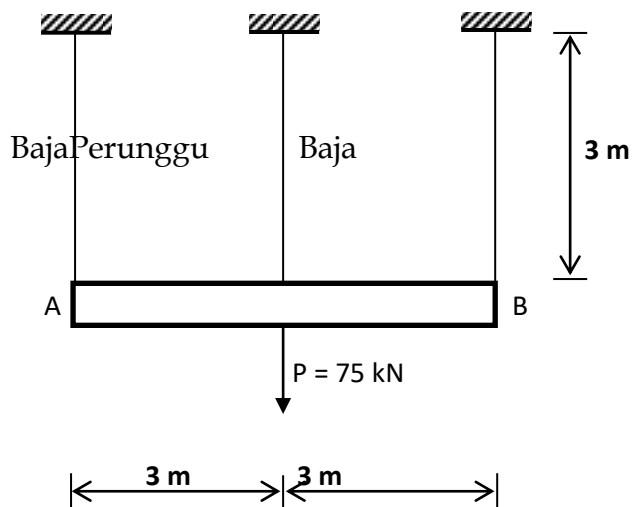
Tugas-6

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

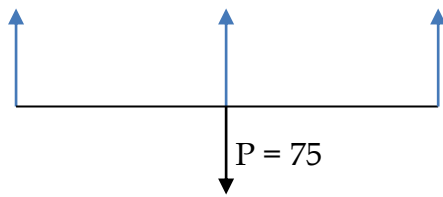
dan tegangan pada kawat tersebut.



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

Jawab :

$T_{Baja} T_{Perunggu} T_{Baja}$



$$\sum V = 0$$

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

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

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

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

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

$$T_{baja} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{baja} = \frac{201 \text{ mm}^2 \cdot 200 \cdot 10^3 \frac{N}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 13400 \delta \frac{N}{\text{mm}}$$

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

$$T_{perunggu} = \left(\frac{A \cdot E \cdot \delta}{L} \right)_{perunggu} = \frac{380,1 \text{ mm}^2 \cdot 100 \cdot 10^3 \frac{N}{\text{mm}^2} \cdot \delta}{3000 \text{ mm}} = 12670 \delta \frac{N}{\text{mm}}$$

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

$$2 \cdot \left(13400 \delta \frac{N}{\text{mm}} \right) + 12670 \delta \frac{N}{\text{mm}} = 75 \cdot 10^3 \text{ N}$$

$$39470 \delta \frac{N}{\text{mm}} = 75000 \text{ N} \rightarrow \delta = \frac{75000}{39470} \text{ mm} = 1,9 \text{ mm}$$

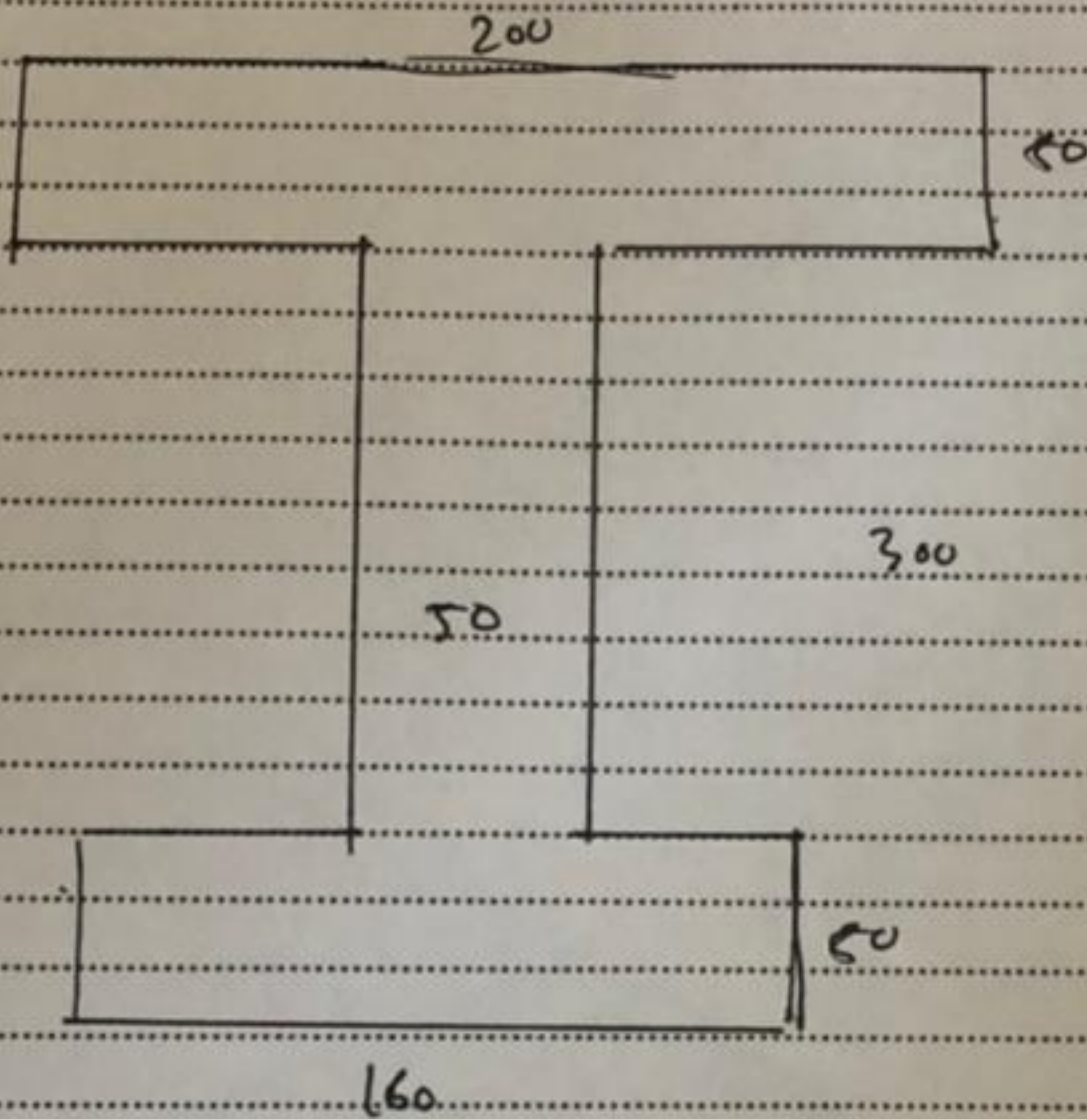
$$\sigma_{baja} = \frac{T_{baja}}{A_{baja}} = \frac{13400 \delta \frac{N}{\text{mm}}}{201 \text{ mm}^2} = \frac{13400 \frac{N}{\text{mm}} \times 1,9 \text{ mm}}{201 \text{ mm}^2} = 126,7 \frac{N}{\text{mm}^2} = 126,7 \text{ MPa}$$

$$\sigma_{perunggu} = \frac{T_{perunggu}}{A_{perunggu}} = \frac{12670 \delta \frac{N}{\text{mm}}}{380,1 \text{ mm}^2} = \frac{12670 \frac{N}{\text{mm}} \times 1,9 \text{ mm}}{380,1 \text{ mm}^2} = 63,3 \frac{N}{\text{mm}^2} = 63,3 \text{ MPa}$$

NAMA MAHASISWA : ZARDI OKASUSTEJA
 NIM : 202710021
 PROGRAM STUDI : TEKNIK SIPIL
 FAKULTAS : PROGRAM PASCA SARJANA
 MATA KULIAH : Mekanika Terapan

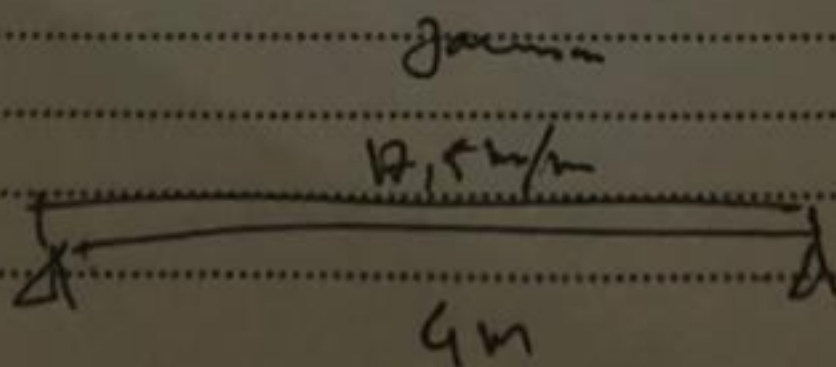
UTS

Kayaku Sed di bawah ini :



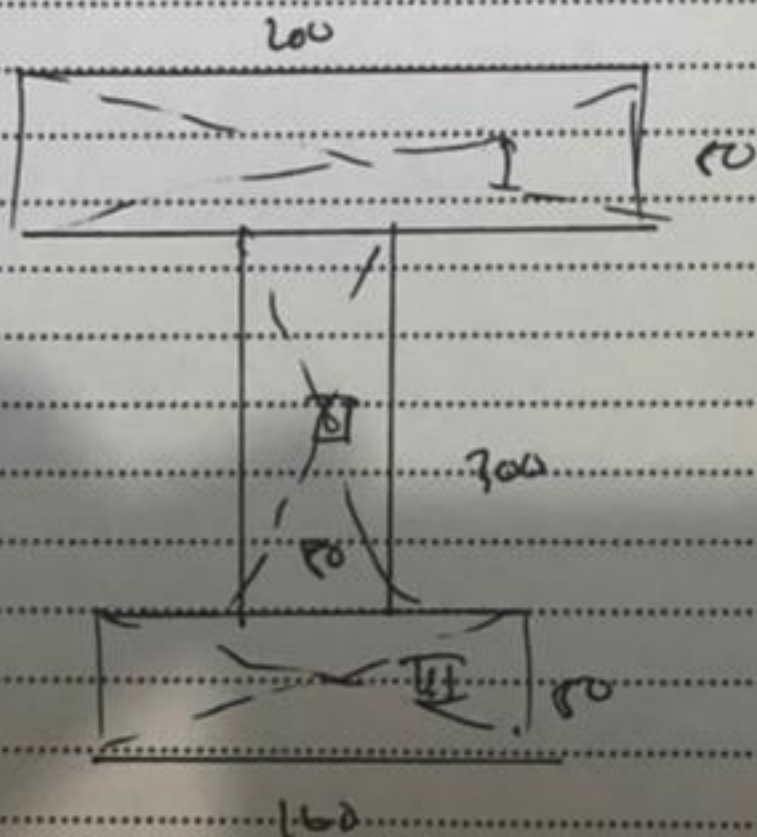
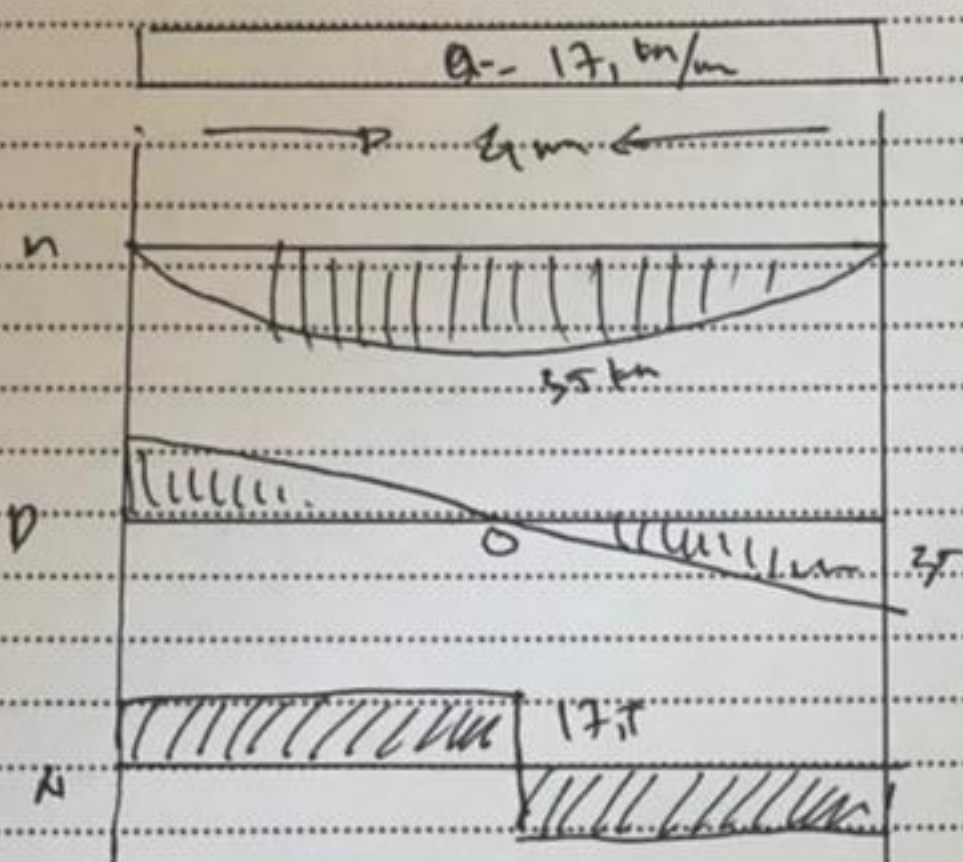
Sebuah balok kayu penampang seperti tersebut diatas
 diletakkan sebagai bentang 4.0 metera beban (kawat besi) 17,5 kN/m

- hitung tegangan lentur maksimum dengan menggunakan cara kapal manan dan
- periksa hasil hitungan (a) dengan menggunakan rumus belah
- hitung beratnya jika belah belah
- hitung momen tahanan dengan menggunakan cara kapal manan dalam apabila tegangan $120 = 110 \text{ MPa}$



a) $\sum m_b = 20$
 $R_A = R_B = \frac{q \cdot L}{2}$
 $= \frac{17,5 \text{ kn/m} \cdot 4}{2}$
 $= 35 \text{ kn}$

$H_C = R_A = R_B$
 $= 17,5 \text{ kn/m} \cdot 4 \text{ m} - (2 \cdot x \cdot \frac{1}{2} \cdot x)$
 $= 70 \text{ kn} - (\frac{1}{2} \cdot 17,5 \cdot 2^2)$
 $= 70 \text{ kn} - 35 \text{ kn}$
 $= 35 \text{ kn}$



	A	x	y	x _c	Ay
I	200	200	22,5	40.000	4500
II	160	200	200	32.000	32000
III	160	200	22,5	32.000	3600
	520			102000	38100

$\bar{x} = \frac{102000}{520} = 200 \text{ cm}$

$\bar{y} = \frac{38100}{520} = 74,70$

	A	x ₀	y ₀	tx ₀ ²	ty ₀ ²
I	200	0	125	0	6125.000
II	100	0	0	0	
III	200	0	125	0	6125.000

$$I_x = \frac{1}{12} (200) (50)^3 + 6125.000 + \frac{1}{12} 100 (300)^3 + 0 + \frac{1}{12} (160) (50)^3 + 6125.000$$

$$I_y = 2.083.333,33 + 6125.000 + 112.500.000 + 1666.666,67 + 6125.000$$

$$= 128.499.999,99$$

$$I_y = \frac{1}{12} (50) (200)^3 + 0 + \frac{1}{12} (300) (50)^3 + \frac{1}{12} (50) (160)^3 + 0$$

$$= 33.333.333,33 + 0 + 3125.000 + 17.066.666,67$$

$$= 53.524.999,99$$

tesanya lantur

$$x \text{ Jc Serat alas} = J_c = \frac{m_c}{I_x} \cdot y_n = \frac{35.000}{128.499.999,99} (200) =$$

$$x \text{ Jc Serat bambu} = J_c = \frac{m_c}{I_y} \cdot y_n = \frac{35.000}{53.524.999,99} (200) =$$