

Pertemuan 12

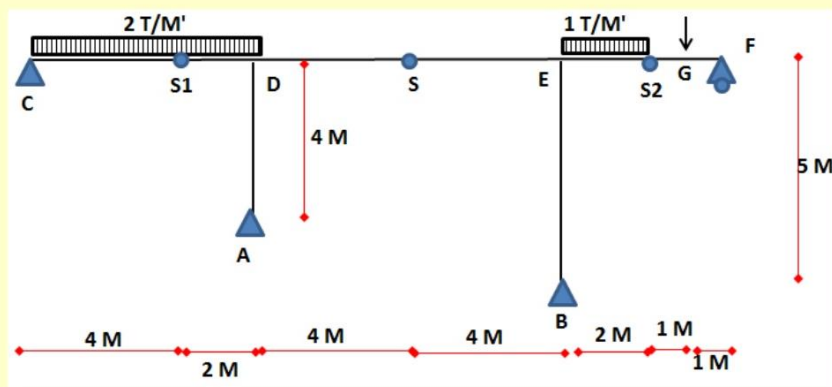
Makul : ANALISA STRUKTUR

Hari/ tgl. : Kamis, 3 Desember 2020

Jam : 20.00-21.15

Materi : Portal 3 sendi tidak simetris gabungan

KLAS : 3 c (MALAM)



**STUDI KASUS PORTAL 3 SENDI DI A, S & B DAN
BALOK GERBER DI S1 DAN S2**

- 1. ANALISA DAN GAMBAR DIAGRAM GAYA GAYA
DALAM,**
- 2. HITUNG GAYA DALAM MAKSIMUM**
- 3. GAMBAR GARIS PENGARUH M1**

1. Analisa Balok Anak

$$\sum M_c = 0 \rightarrow V_{c1} \cdot 0 - V_{s1} \cdot 4 + q \cdot 4 \cdot \frac{1}{2} \cdot 4 = 0$$
$$\rightarrow V_{s1} = \frac{2 \cdot 4 \cdot 1/2 \cdot 4}{4} = +4 \uparrow$$
$$\sum M_{s1} = 0 \rightarrow V_{c1} \cdot 4 - V_{s1} \cdot 0 - q \cdot 4 \cdot \frac{1}{2} \cdot 4 = 0$$
$$\rightarrow V_{c1} = \frac{2 \cdot 4 \cdot 1/2 \cdot 4}{4} = +4 \uparrow$$
$$\sum V = 0 \rightarrow V_{c1} + V_{s1} - q \cdot 4 = 0$$
$$\rightarrow 4 + 4 - 2 \cdot 4 = 0 \text{ OK}$$

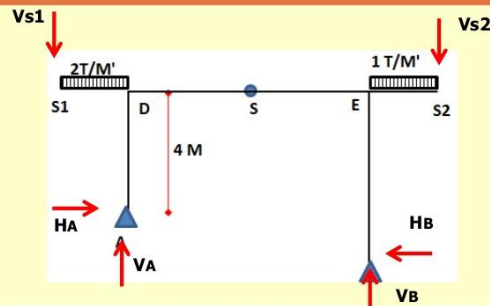
$$\sum M_{s2} = 0 \rightarrow V_{s2} \cdot 0 - V_F \cdot 2 + P \cdot 1 = 0$$
$$\rightarrow V_F = \frac{4}{2} = +2 \uparrow$$
$$\sum M_F = 0 \rightarrow V_{s2} \cdot 2 - V_F \cdot 0 - P \cdot 1 = 0$$
$$\rightarrow V_{s2} = \frac{4}{2} = +2 \uparrow$$
$$\sum V = 0 \rightarrow V_{s2} + V_F - P = 0$$
$$\rightarrow 2 + 2 - 4 = 0 \text{ OK}$$

Gaya Dalam	Persamaan	x1	0	2	4
D	$V_A - q \cdot x_1$		4	0	-4
DIAGRAM D					
M	$V_A \cdot x_1 - q \cdot x_1 \cdot 1/2 \cdot x_1$		0	4	0
DIAGRAM M					
N			0		
DIAGRAM N					

Gaya Dalam	Persamaan	x1	0	1	2
Dx2	V_{s2}		2	2	
Dx3	$V_{s2} - P$		-2	-2	
DIAGRAM D					
Mx2	$V_{s2} \cdot x_2$		0	2	
Mx3	$V_{s2} \cdot x_2 - P \cdot (x_2 - 1)$		2	0	
DIAGRAM M					
N			0		
DIAGRAM N					

2. Analisa Balok Induk

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substitusi (1) dan (4)

$-4 V_B + 5 H_B = -22$	1x
$-8 V_B + 1 H_B = -26$	5x
$36 V_B = 108$	
$V_B = 3 \uparrow$	
$H_B = -2 \rightarrow$	

substitusi (2) dan (3)

$8 V_A + 1 H_A = 70$	4x
$4 V_A + -4 H_A = 44$	1x
$36 V_A = 324$	
$V_A = 9 \uparrow$	
$H_A = -2 \leftarrow$	

$$\sum M_A = 0$$

$$\rightarrow V_A \cdot 0 + H_A \cdot 0 - V_B \cdot 8 + H_B \cdot 1 - 2.2 \cdot \frac{1}{2} \cdot 2 + 2.1 \cdot (\frac{1}{2} \cdot 2 + 8) - V_{s1} \cdot 2 + V_{s2} \cdot (8+2) = 0$$

$$\rightarrow -V_B \cdot 8 + H_B \cdot 1 = 2.2 \cdot 1 - 2.1 \cdot 9 + 4.2 - 2 \cdot 10$$

$$\rightarrow -V_B \cdot 8 + H_B \cdot 1 = -26 \dots \dots \dots (\text{pers 1})$$

$$\sum M_B = 0$$

$$\rightarrow V_A \cdot 8 + H_A \cdot 1 - V_B \cdot 0 + H_B \cdot 0 - 2.2 \cdot (\frac{1}{2} \cdot 2 + 8) + 2.1 \cdot \frac{1}{2} \cdot 2 - V_{s1} \cdot (2+8) + V_{s2} \cdot 2 = 0$$

$$\rightarrow V_A \cdot 8 + H_A \cdot 1 = 2.2 \cdot 9 - 2.1 \cdot 1 + 4 \cdot 10 - 2 \cdot 2$$

$$\rightarrow V_A \cdot 8 + H_A \cdot 1 = 70 \dots \dots \dots (\text{pers 2})$$

$$\sum M_S (\text{pot AS}) = 0$$

$$\rightarrow V_A \cdot 4 - H_A \cdot 4 - 2.2 \cdot (\frac{1}{2} \cdot 2 + 4) - V_{s1} \cdot (2+4) = 0$$

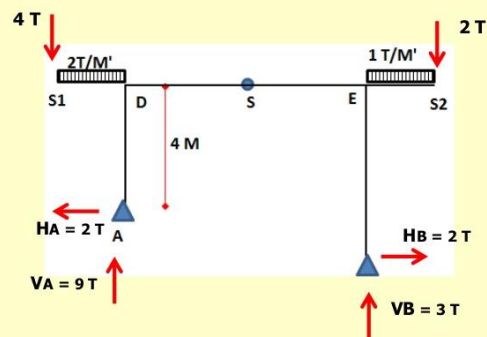
$$\sum M_S (\text{pot SB}) = 0$$

$$\rightarrow -V_B \cdot 4 + H_B \cdot 5 + 2.1 \cdot (\frac{1}{2} \cdot 2 + 4) + V_{s2} \cdot (2+4) = 0$$

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Kontrol Keseimbangan Luar

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$$\sum V = 0$$

$$\rightarrow V_A + V_B - V_{s1} + V_{s2} - q \cdot 1.2 - q \cdot 2.2 = 0$$

$$\rightarrow 9 + 3 - 4 - 2 - 2.2 - 1.2 = 0$$

$$\rightarrow 12 - 12 = 0 \dots \dots \dots (\text{OK})$$

$$\sum H = 0$$

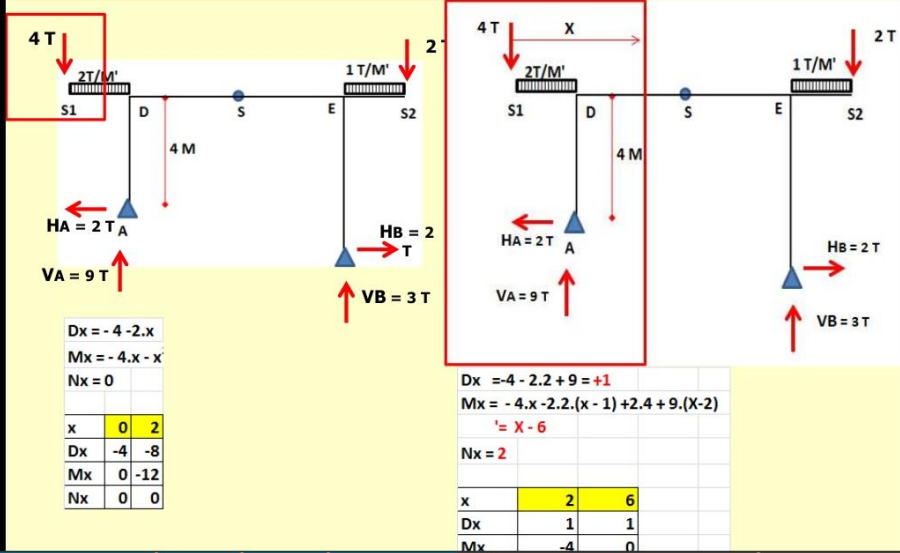
$$\rightarrow -H_A + H_B = 0$$

$$\rightarrow -2 + 2 = 0 \dots \dots \dots (\text{OK})$$

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Analisa Keseimbangan Dalam Balok Induk

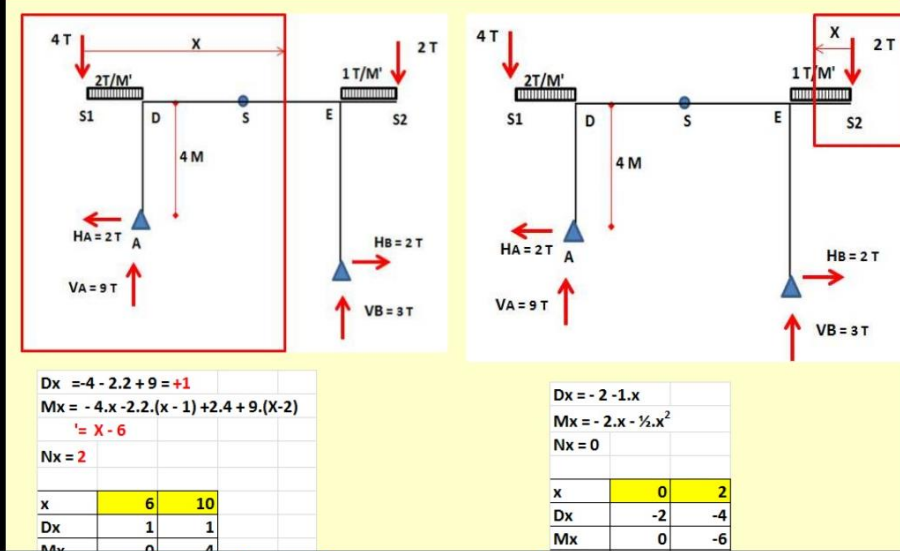
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Analisa Keseimbangan Dalam Balok Induk

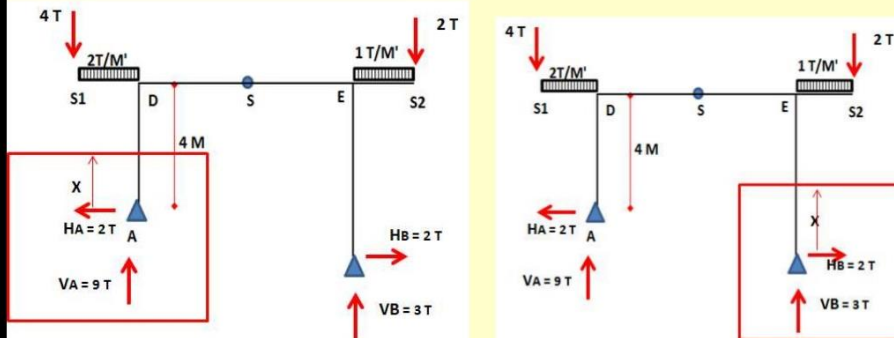
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Analisa Keseimbangan Dalam Balok Induk

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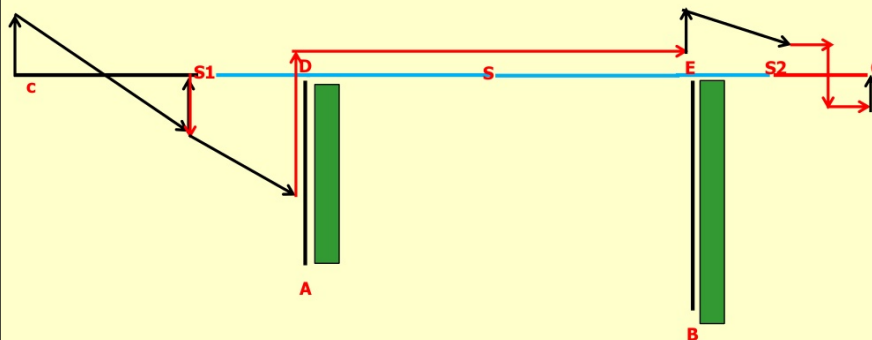
$Dx = 2$		
$Mx = 2.X$		
$Nx = -9$		
x	0	4
Dx	2	2
Mx	0	8
Nx	-9	-9

$Dx = -2$		
$Mx = 2.X$		
$Nx = -3$		
x	0	5
Dx	-2	-2
Mx	0	10

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Diagram Gaya Dalam Lintang (D)

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Diagram Gaya Dalam Normal (N)

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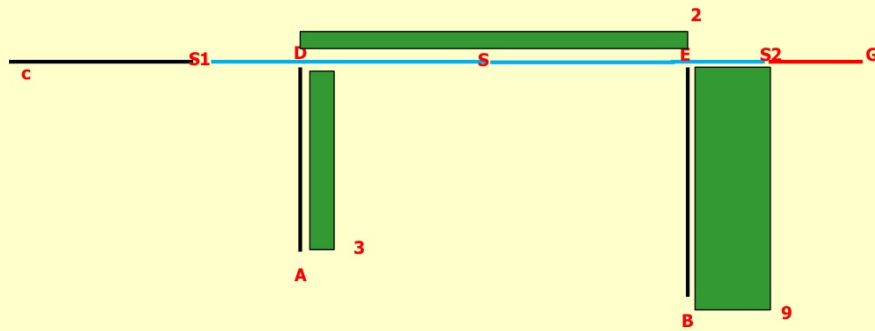


Diagram Gaya Dalam Momen (M)

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