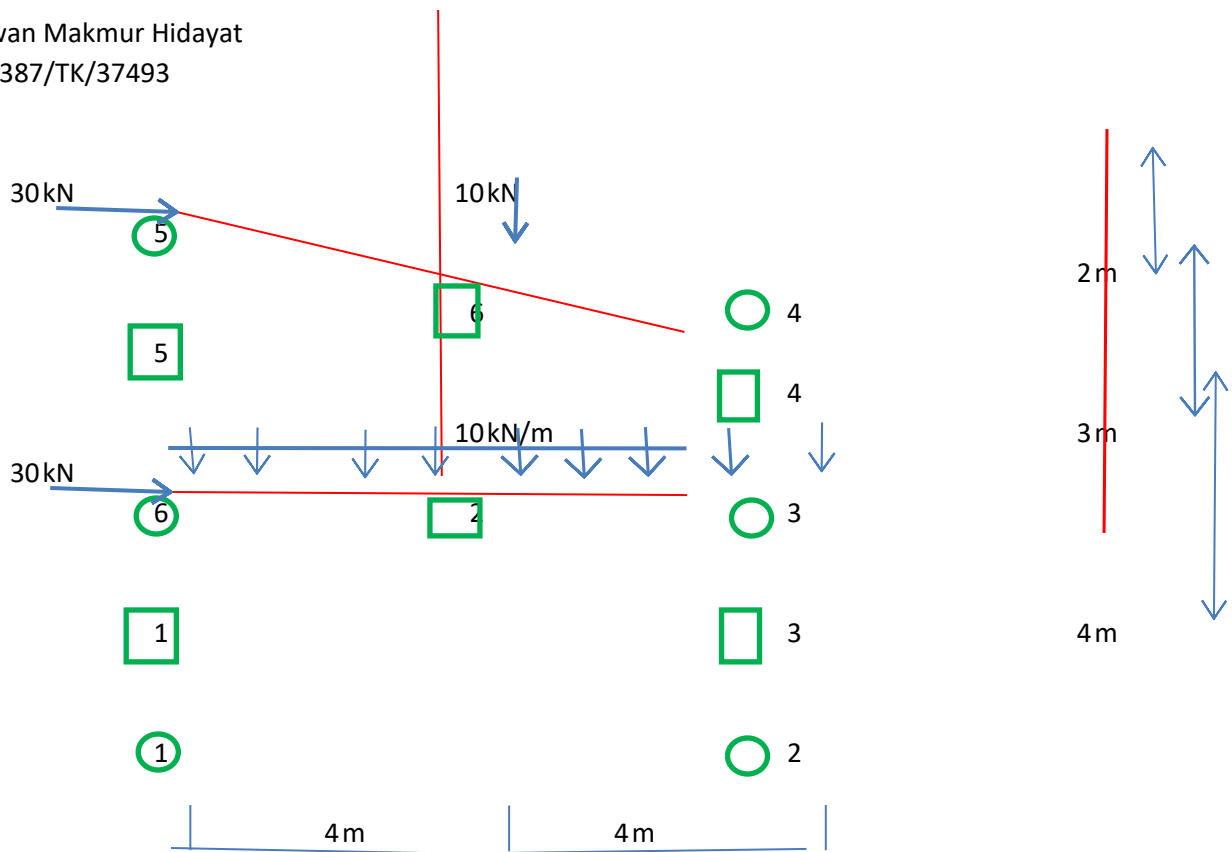
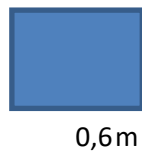


Hernawan Makmur Hidayat  
10/305387/TK/37493



kolom



0,4m

0,6m

A kolom = 0,24m<sup>2</sup>  
 $I_x = 0,0032\text{m}^4$   
 $I_y = 0,0072\text{m}^4$   
 $E = 25000000\text{kN/m}^2$

balok elemen 6



0,6m

0,4m

A balok = 0,24m<sup>2</sup>  
 $I_x = 0,0072\text{m}^4$   
 $I_y = 0,0032\text{m}^4$   
 $E = 25000000\text{kN/m}^2$

balok elemen 2



0,75m

0,4m

A balok = 0,3m<sup>2</sup>  
 $I_x = 0,01406\text{m}^4$   
 $I_y = 0,004\text{m}^4$   
 $E = 25000000\text{kN/m}^2$





















A. MATRIKS KEKAKUAN ELEMEN

KOLOM

$$\begin{aligned} \alpha &= 90 \\ \cos \alpha &= 0 \\ \sin \alpha &= 1 \end{aligned}$$

$$\begin{aligned} i &= 1 \\ j &= 6 \end{aligned}$$

k lokal

1500000
0
0
-1500000
0
0

T

0
-1
0
0
0
0

T Transpose

0
1
0
0
0
0

$$\begin{aligned} 12EI &= 2160000 \\ 6EI &= 1080000 \\ 4EI &= 720000 \\ 2EI &= 360000 \\ AE &= 6000000 \end{aligned}$$

kg

1	33750
1	0
1	-67500
6	-33750
6	0
6	-67500

$$\begin{aligned} 12EI &= 960000 \\ 6EI &= 480000 \\ 4EI &= 320000 \\ 2EI &= 160000 \\ AE &= 6000000 \end{aligned}$$

$$\begin{aligned} 12EI &= 1200000 \\ 6EI &= 600000 \\ 4EI &= 400000 \\ 2EI &= 200000 \\ AE &= 7500000 \end{aligned}$$

KOLOM

$$\begin{aligned} \alpha &= 90 \\ \cos \alpha &= 0 \end{aligned}$$

$$\sin \alpha = 1$$

$$i = 3$$

$$j = 4$$

k lokal	3000000
	0
	0
	-3000000
	0
	0

T	0
	-1
	0
	0
	0
	0

T Transpose	0
	1
	0
	0
	0
	0

kg	3
3	270000
3	0
3	-270000
4	-270000
4	0
4	-270000

## B. BEBAN NODAL EKIVALEN

### KOLOM

Pada elemen ini tidak ada beban batang y

f1*	f1
	g1
	m1

	f6
	g6
	m6
F1*	F1
	G1
	M1
	F6
	G6
	M6

**KOLOM**

Pada elemen ini tidak ada beban batang y

f4*	f6
	g6
	m6
	f5
	g5
	m5
F4*	F6
	G6
	M6
	F5
	G5
	M5

---

C. OVERALL STIFFNESS MATRIX

$$F^* + F = K U$$

F1
G1
M1
F2
G2
M2
F3
G3
M3
F4
G4
M4
F5
G5
M5
F6
G6
M6

+

	0	
	0	
	0	
	0	
	0	
	0	
	0	
	0	
	0	
	-40	
53,33333		+
	0	
	-5	
	10	
	0	

-5  
-10  
0  
-40  
-53,33333



D. REARRANGEMENT

---

E. UNKNOWN DISPLACEMENTS

---

F. UNKNOWN REACTIONS



F3  
G3  
M3  
F4  
G4  
M4                    +  
F1  
G1  
M1  
F2  
G2  
M2

---

G. MEMBER FORCES

$$f_e^* + f_e = T_e \times k_{ge} \times U_e$$

ELEMEN 1

0  
0  
0 +  
0  
0  
0  
0

**ELEMEN 3**

0  
0  
0+  
0  
0  
0  
0

**ELEMEN 5**

0  
0  
0+  
0  
0  
0  
0

ELEMEN 4

0  
0  
0+  
0  
0  
0  
0

ELEMEN 2

0  
-40  
-53,33333+  
0  
-40  
53,33333

ELEMEN 6

1,21268  
-4,85071  
10+  
1,21268  
-4,85071  
-10

**Elemen 1**

AE/L	1500000
12EI/(L^3)	33750
6EI/(L^2)	67500
4EI/L	180000
2EI/L	90000

**KOLOM**

$\alpha =$   
 $\cos \alpha =$   
 $\sin \alpha =$

i =  
j =

k lokal

T

T Transpose

kg

2  
2  
2  
3  
3  
3

0	0	-1500000	0	0
33750	67500	0	-33750	67500
67500	180000	0	-67500	90000
0	0	1500000	0	0
-33750	-67500	0	33750	-67500
67500	90000	0	-67500	180000

1	0	0	0	0
0	0	0	0	0
0	1	0	0	0
0	0	0	1	0
0	0	-1	0	0
0	0	0	0	1

-1	0	0	0	0
0	0	0	0	0
0	1	0	0	0
0	0	0	-1	0
0	0	1	0	0
0	0	0	0	1

<b>1</b>	<b>1</b>	<b>6</b>	<b>6</b>	<b>6</b>
0	-67500	-33750	0	-67500
1500000	0	0	-1500000	0
0	180000	67500	0	90000
0	67500	33750	0	67500
-1500000	0	0	1500000	0
0	90000	67500	0	180000

**ELEMEN 4**

AE/L	3000000
12EI/(L^3)	270000

**BALOK**

$\alpha =$   
 $\cos \alpha =$

$6EI/(L^2)$       270000  
 $4EI/L$          360000  
 $2EI/L$          180000

$\sin \alpha =$   
 $L =$   
 $i =$   
 $j =$

0	0	-3000000	0	0
270000	270000	0	-270000	270000
270000	360000	0	-270000	180000
0	0	3000000	0	0
-270000	-270000	0	270000	-270000
270000	180000	0	-270000	360000

k lokal

1	0	0	0	0
0	0	0	0	0
0	1	0	0	0
0	0	0	1	0
0	0	-1	0	0
0	0	0	0	1

T

-1	0	0	0	0
0	0	0	0	0
0	1	0	0	0
0	0	0	-1	0
0	0	1	0	0
0	0	0	0	1

T Transpose

3	3	4	4	4
0	-270000	-270000	0	-270000
3000000	0	0	-3000000	0
0	360000	270000	0	180000
0	270000	270000	0	270000
-3000000	0	0	3000000	0
0	180000	270000	0	360000

kg

6  
6  
6  
3  
3  
3

ELEMEN 1	
ang bekerja	
0	
0	
0	

KOLOM	ELEMEN 3
Pada elemen ini tidak ada beban batang yang bekerja	
f3*	f2      0
	g2      0
	m2      0

0  
0  
0  
  
0  
0  
0  
0  
0  
0  
0

	f3	0
	g3	0
	m3	0
F3*	F2	0
	G2	0
	M2	0
	F3	0
	G3	0
	M3	0

**ELEMEN 5**

ang bekerja

0  
0  
0  
0  
0  
0  
  
0  
0  
0  
0  
0  
0

**KOLOM**

**ELEMEN 4**

Pada elemen ini tidak ada beban batang yang bekerja

f5*	f3	0
	g3	0
	m3	0
	f4	0
	g4	0
	m4	0
F5	F3	0
	G3	0
	M3	0
	F4	0
	G4	0
	M4	0

---

			1	1	1	2
F1	1	33750	0	-67500	0	
G1	1	0	1500000	0	0	
M1	1	-67500	0	180000	0	
F2	2	0	0	0	33750	
G2	2	0	0	0	0	
M2	2	0	0	0	-67500	
F3	3	0	0	0	-33750	
G3	3	0	0	0	0	
M3	3	0	0	0	-67500	
F4	4	0	0	0	0	
G4	4	0	0	0	0	
M4	4	0	0	0	0	
F5	5	0	0	0	0	
G5	5	0	0	0	0	
M5	5	0	0	0	0	
F6	6	-33750	0	67500	0	
G6	6	0	-1500000	0	0	
M6	6	-67500	0	90000	0	

			1	1	1	2
F1	1	33750	0	-67500	0	
G1	1	0	1500000	0	0	
M1	1	-67500	0	180000	0	
F2	2	0	0	0	33750	
G2	2	0	0	0	0	
M2	2	0	0	0	-67500	
F3	3	0	0	0	-33750	
G3	3	0	0	0	0	
M3	3	0	0	0	-67500	
F4	4	0	0	0	0	
G4	4	0	0	0	0	
M4	4	0	0	0	0	
30	5	0	0	0	0	



0	5	0	0	0	0
0	5	0	0	0	0
30	6	-33750	0	67500	0
0	6	0	-1500000	0	0
0	6	-67500	0	90000	0

		1	1	1	2
F1	1	33750	0	-67500	0
G1	1	0	1500000	0	0
M1	1	-67500	0	180000	0
F2	2	0	0	0	33750
G2	2	0	0	0	0
M2	2	0	0	0	-67500
F3+0	3	0	0	0	-33750
G3-40	3	0	0	0	0
M3+53.33	3	0	0	0	-67500
F4+0	4	0	0	0	0
G4-5	4	0	0	0	0
M4+10	4	0	0	0	0
30	5	0	0	0	0
-5	5	0	0	0	0
-10	5	0	0	0	0
30	6	-33750	0	67500	0
-40	6	0	-1500000	0	0
-53	6	-67500	0	90000	0

		5	5	5	6
30	5	702187,17752	-170798,79034	41487,98382	-17280
-5	5	-170798,79034	1244411,71376	-6848,06471	0
-10	5	41487,98382	-6848,06471	182805,7	-43200
30	6	-17280	0	-43200	988530
-40	6	0	-1200000	0	0
-53,33333	6	43200	0	72000	24300
F3+0	3	0	0	0	-937500
G3-40	3	0	0	0	0
M3+53.33	3	0	0	0	0
F4+0	4	-684907,17752	170798,79034	1712,01618	0
G4-5	4	170798,79034	-44411,71376	6848,06471	0

M4+10	4	-1712,01618	-6848,06471	19402,85000	0
F1	1	0	0	0	-33750
G1	1	0	0	0	0
M1	1	0	0	0	67500
F2	2	0	0	0	0
G2	2	0	0	0	0
M2	2	0	0	0	0

---

30		702187,17752	-170798,79034	41487,98382	-17280	0
-5		-170798,79034	1244411,71376	-6848,06471	0	-1200000
-10	=	41487,98382	-6848,06471	182805,7	-43200	0
30		-17280	0	-43200	988530	0
-40		0	-1200000	0	0	2702343,75
-53,33333		43200	0	72000	24300	9375

U5		0,000002	0,0000004	-0,0000003	0,00000002	0,0000002
V5		0,0000004	0,000001	-0,000000002	0,000000008	0,0000007
5	=	-0,0000003	-0,000000002	0,000006	0,0000003	0,000000003
U6		0,00000002	0,000000008	0,0000003	0,000001	0,000000004
V6		0,0000002	0,0000007	0,000000003	0,000000004	0,0000007
6		-0,0000001	-0,00000006	-0,000001	-0,0000001	-0,00000004

U5	0,00005
V5	-0,00002
5	0,000001
U6	0,00003
V6	-0,00002
6	-0,00015

---

F3+0		0	0	0	-937500	0
G3-40		0	0	0	0	-2343,75
M3+53.33		0	0	0	0	9375
F4+0		-684907,17752	170798,79034	1712,01618	0	0
G4-5		170798,79034	-44411,71376	6848,06471	0	0
M4+10	=	-1712,01618	-6848,06471	19402,85000	0	0

F1	0	0	0	-33750,00000000009
G1	0	0	00,00000000009	-1500000
M1	0	0	0	67500,00000000004
F2	0	0	0	0
G2	0	0	0	0
M2	0	0	0	0

0		-32,73708
-40		1,46043
53,33333		-3,96627
0		-36,21170
-5		9,07331
10	=	0,07168
0		8,94878
0		34,46626
0		-11,14602
0		0
0		0
0		0

F3		-32,73708
G3		41,46043
M3		-57,29961
F4		-36,21170
G4		14,07331
M4	=	-9,92832
F1		8,94878
G1		34,46626
M1		-11,14602
F2		0
G2		0
M2		0

---

f1		0	1	0	0	0
g1		-1	0	0	0	0
m1	=	0	0	1	0	0
f6		0	0	0	0	1
g6		0	0	0	-1	0
m6		0	0	0	0	0

f1		34,46626
g1		-8,94878
m1	=	-11,14602
f6		-34,46626
g6		8,94878
m6		-24,64911

f2		0	1	0	0	0
g2		-1	0	0	0	0
m2	=	0	0	1	0	0
f3		0	0	0	0	1
g3		0	0	0	-1	0
m3		0	0	0	0	0

f2		0
g2		0
m2	=	0
f3		0
g3		0
m3		0

f6		0	1	0	0	0
g6		-1	0	0	0	0
m6	=	0	0	1	0	0
f5		0	0	0	0	1
g5		0	0	0	-1	0
m5		0	0	0	0	0

f6		-4,07331
g6		-6,21170
m6	=	-20,96709
f5		4,07331
g5		6,21170
m5		-10,09141

f3		0	1	0	0	0
g3		-1	0	0	0	0
m3	=	0	0	1	0	0
f4		0	0	0	0	1
g4		0	0	0	-1	0
m4		0	0	0	0	0

f3		0
g3		0
m3	=	0
f4		0
g4		0
m4		0

f6		1	0	0	0	0
g6		0	1	0	0	0
m6	=	0	0	1	0	0
f3		0	0	0	1	0
g3		0	0	0	0	1
m3		0	0	0	0	0

f6		32,73708
g6		38,53957
m6	=	45,61620
f3		-32,73708
g3		41,46043

m3 -57,29961

f4		0,97014	-0,24254	0	0	0
g4		0,24254	0,97014	0	0	0
m4	=	0	0	1	0	0
f5		0	0	0	0,97014	-0,24254
g5		0	0	0	0,24254	0,97014
m5		0	0	0	0	0

f4		-38,54379
g4		4,87049
m4	=	-9,92832
f5		36,11843
g5		4,83094
m5		10,09141

**ELEMEN 3**

90	AE/L	1500000
0	12EI/(L^3)	33750
1	6EI/(L^2)	67500
	4EI/L	180000
2	2EI/L	90000
3		

1500000	0	0	-1500000	0	0
0	33750	67500	0	-33750	67500
0	67500	180000	0	-67500	90000
-1500000	0	0	1500000	0	0
0	-33750	-67500	0	33750	-67500
0	67500	90000	0	-67500	180000

0	1	0	0	0	0
-1	0	0	0	0	0
0	0	1	0	0	0
0	0	0	0	1	0
0	0	0	-1	0	0
0	0	0	0	0	1

0	-1	0	0	0	0
1	0	0	0	0	0
0	0	1	0	0	0
0	0	0	0	-1	0
0	0	0	1	0	0
0	0	0	0	0	1

<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>
33750	0	-67500	-33750	0	-67500
0	1500000	0	0	-1500000	0
-67500	0	180000	67500	0	90000
-33750	0	67500	33750	0	67500
0	-1500000	0	0	1500000	0
-67500	0	90000	67500	0	180000

**ELEMEN 2**

0	AE/L	937500
1	12EI/(L^3)	2343,75

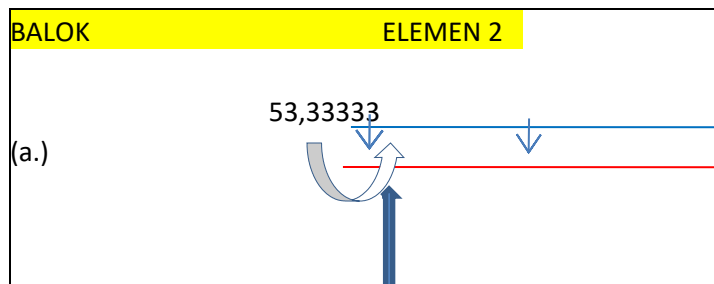
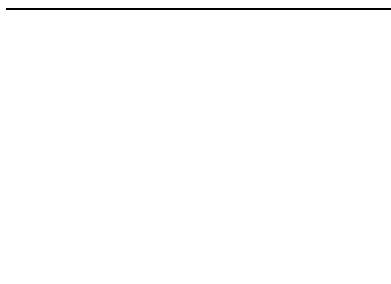
0	$6EI/(L^2)$	9375
8	$4EI/L$	50000
6	$2EI/L$	25000
3		

937500	0	0	-937500	0	0
0	2343,75	9375	0	-2343,75	9375
0	9375	50000	0	-9375	25000
-937500	0	0	937500	0	0
0	-2343,75	-9375	0	2343,75	-9375
0	9375	25000	0	-9375	50000

1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	0	0	0
0	0	0	1	0	0
0	0	0	0	1	0
0	0	0	0	0	1

1	0	0	0	0	0
0	1	0	0	0	0
0	0	1	0	0	0
0	0	0	1	0	0
0	0	0	0	1	0
0	0	0	0	0	1

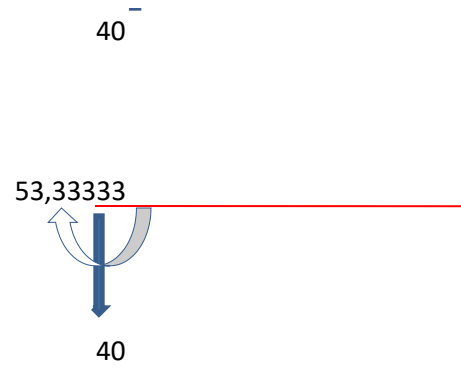
<b>6</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>3</b>	<b>3</b>
937500	0	0	-937500	0	0
0	2343,75	9375	0	-2343,75	9375
0	9375	50000	0	-9375	25000
-937500	0	0	937500	0	0
0	-2343,75	-9375	0	2343,75	-9375
0	9375	25000	0	-9375	50000



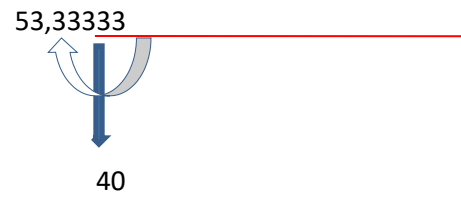




(b.)



(c.)



f2*	f6	0
	g6	-40
	m6	-53,33333
	f3	0
	g3	-40
	m3	53,33333
F2*	F6	0
	G6	-40
	M6	-53,33333
	F3	0
	G3	-40
	M3	53,33333

---

	2	2	3	3	3	4	4
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	-67500	-33750	0	-67500	0	0
1500000	0	0	0	-1500000	0	0	0
	0	180000	67500	0	90000	0	0
	0	67500	1241250	0	-202500	-270000	0
-1500000	0	0	0	4502343,75	-9375,0	0	-3000000
	0	90000	-202500	-9375,0	590000	270000	0
	0	0	-270000	0	270000	4907,17752	-170798,79034
	0	0	0	-3000000	0	0798,79034	3044411,71376
	0	0	-270000	0	180000	1712,01618	6848,06471
	0	0	0	0	0	4907,17752	170798,79034
	0	0	0	0	0	0798,79034	-44411,71376
	0	0	0	0	0	01712,01618	6848,06471
	0	0	-937500	0	0	0	0
	0	0	0	-2343,75	9375	0	0
	0	0	0	-9375	25000	0	0

---

	2	2	3	3	3	4	4
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	-67500	-33750	0	-67500	0	0
1500000	0	0	0	-1500000	0	0	0
	0	180000	67500	0	90000	0	0
	0	67500	1241250	0	-202500	-270000	0
-1500000	0	0	0	4502343,75	-9375,0	0	-3000000
	0	90000	-202500	-9375,0	590000	270000	0
	0	0	-270000	0	270000	4907,17752	-170798,79034
	0	0	0	-3000000	0	0798,79034	3044411,71376
	0	0	-270000	0	180000	1712,01618	6848,06471
	0	0	0	0	0	4907,17752	170798,79034

0	0	0	0	00798,79034	-44411,71376
0	0	0	0	01712,01618	6848,06471
0	0	-937500	0	0	0
0	0	0	-2343,75	9375	0
0	0	0	-9375	25000	0

---

2	2	3	3	3	4	4
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	-67500	-33750	0	-67500	0	0
1500000	0	0	-1500000	0	0	0
0	180000	67500	0	90000	0	0
0	67500	1241250	0	-202500	-270000	0
-1500000	0	0	4502343,75	-9375,0	0	-3000000
0	90000	-202500	-9375,0	590000	270000	0
0	0	-270000	0	270000	4907,17752	-170798,79034
0	0	0	-3000000	00798,79034	3044411,71376	
0	0	-270000	0	180000	1712,01618	6848,06471
0	0	0	0	04907,17752	170798,79034	
0	0	0	0	00798,79034	-44411,71376	
0	0	0	0	01712,01618	6848,06471	
0	0	-937500	0	0	0	0
0	0	0	-2343,75	9375	0	0
0	0	0	-9375	25000	0	0

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6	6	3	3	3	4	4
0	43200	0	0	04907,17752	170798,79034	
-1200000	0	0	0	00798,79034	-44411,71376	
0	72000	0	0	01712,01618	6848,06471	
0	24300	-937500	0	0	0	0
2702343,75	9375	0	-2343,75	9375	0	0
9375	374000	0	-9375	25000	0	0
0	0	1241250	0	-202500	-270000	0
-2343,75	-9375	0	4502343,75	-9375,0	0	-3000000
9375	25000	-202500	-9375,0	590000	270000	0
0	0	-270000	0	270000	4907,17752	-170798,79034
0	0	0	-3000000	00798,79034	3044411,71376	

0	0	-270000	0	1800001712,01618	6848,06471
0	-67500	0	0	0	0
-1500000	0	0	0	0	0
0	90000	0	0	0	0
0	0	-33750	0	-67500	0
0	0	0	-1500000	0	0
0	0	67500	0	90000	0

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43200		U5
0		V5
72000	X	5
24300		U6
9375		V6
374000		6

-0,0000001		30
-0,00000006		-5
-0,000001	X	-10
-0,0000001		30
-0,00000004		-40
0,000003		-53,33333

---

0		0,00005
-9375		-0,00002
25000		0,000001
0	X	0,00003
0		-0,00002
0		-0,00015

-67500

,000000000004

90000

0

0

0



0	33750,00000000009	-67500	-33750-0,00000000009
0	0,00000000009	1500000,000000000004)000000009	-1500000
0	-6750000000000004	180000	67500,000000000004
0	-33750,00000000009	67500	33750 0,00000000009
0	-0,00000000009	-1500000,000000000004)000000009	1500000
1	-6750000000000004	90000	67500,000000000004

0	33750,00000000009	-67500	-33750-0,00000000009
0	0,00000000009	1500000,000000000004)000000009	-1500000
0	-6750000000000004	180000	67500,000000000004
0	-33750,00000000009	67500	33750 0,00000000009
0	-0,00000000009	-1500000,000000000004)000000009	1500000
1	-6750000000000004	90000	67500,000000000004

0	17280,00000000007	-43200	-17280-0,00000000007
0	0,00000000007	1200000,000000000003)000000007	-1200000
0	-4320000000000003	144000	43200,000000000003
0	-17280,00000000007	43200	17280 0,00000000007
0	-0,00000000007	-1200000,000000000003)000000007	1200000
1	-4320000000000003	72000	43200,000000000003

0	270000	0,0000000002	-270000	-270000	-0,0000000002
0	0,0000000002	3000000	0,0000000002	0,0000000002	-3000000
0	-270000	0,0000000002	360000	270000	-0,0000000002
0	-270000	-0,0000000002	270000	270000	0,0000000002
0	-0,0000000002	-3000000	-0,0000000002	0,0000000002	3000000
1	-270000	0,0000000002	180000	270000	-0,0000000002

0	937500	0	0	-937500	0
0	0	2343,75	9375	0	-2343,75
0	0	9375	50000	0	-9375
0	-937500	0	0	937500	0
0	0	-2343,75	-9375	0	2343,75
1	0	9375	25000	0	-9375

0	684907,17752-170798,79034	1712,016184907,17752	170798,79034
0	-170798,79034 44411,71376	6848,064710798,79034	-44411,71376
0	1712,01618 6848,06471	38805,71712,01618	-6848,06471
0	-684907,17752 170798,79034	-1712,016184907,17752	-170798,79034
0	170798,79034 -44411,71376	-6848,064710798,79034	44411,71376
1	1712,01618 6848,06471	19402,850001712,01618	-6848,06471



**KOLOM** **ELEMEN 5**

$\alpha = 90$        $AE/L$       1200000  
 $\cos \alpha = 0$        $12EI/(L^3)$       17280  
 $\sin \alpha = 1$        $6EI/(L^2)$       43200  
                           $4EI/L$       144000  
*i* = 6       $2EI/L$       72000  
*j* = 5

k lokal

1200000	0	0	-1200000	0	0
0	17280	43200	0	-17280	43200
0	43200	144000	0	-43200	72000
-1200000	0	0	1200000	0	0
0	-17280	-43200	0	17280	-43200
0	43200	72000	0	-43200	144000

T

0	1	0	0	0	0
-1	0	0	0	0	0
0	0	1	0	0	0
0	0	0	0	1	0
0	0	0	-1	0	0
0	0	0	0	0	1

T Transpose

0	-1	0	0	0	0
1	0	0	0	0	0
0	0	1	0	0	0
0	0	0	0	-1	0
0	0	0	1	0	0
0	0	0	0	0	1

kg

	6	6	6	5	5	5
6	17280	0	-43200	-17280	0	-43200
6	0	1200000	0	0	-1200000	0
6	-43200	0	144000	43200	0	72000
5	-17280	0	43200	17280	0	43200
5	0	-1200000	0	0	1200000	0
5	-43200	0	72000	43200	0	144000

**BALOK** **ELEMEN 6**

$\alpha = -14,036$        $AE/L$       727606,87511  
 $\cos \alpha = 0,9701$        $12EI/(L^3)$       1712,01618

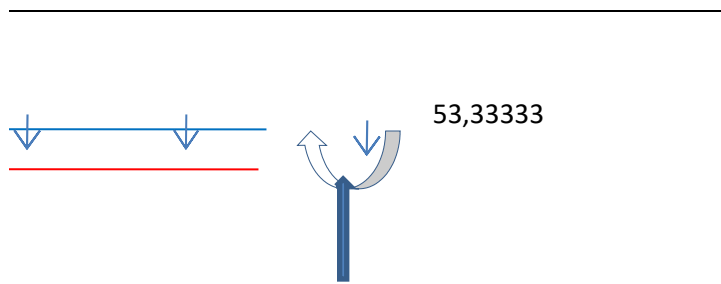
$\sin \alpha = -0,2425$        $6EI/(L^2)$       7058,82353  
 $L = 8,246$        $4EI/L$       38805,7  
 $i = 4$        $2EI/L$       19402,85000  
 $j = 5$

k lokal	727606,87511	0	0	-727606,87511	0	0
	0	1712,01618	7058,82353	0	-1712,01618	7058,82353
	0	7058,82353	38805,7	0	-7058,82353	19402,85000
	-727606,87511	0	0	727606,87511	0	0
	0	-1712,01618	-7058,82353	0	1712,01618	-7058,82353
	0	7058,82353	19402,85000	0	-7058,82353	38805,7

T	0,9701	-0,2425	0	0	0	0
	0,2425	0,9701	0	0	0	0
	0	0	1	0	0	0
	0	0	0	0,9701	-0,2425	0
	0	0	0	0,2425	0,9701	0
	0	0	0	0	0	1

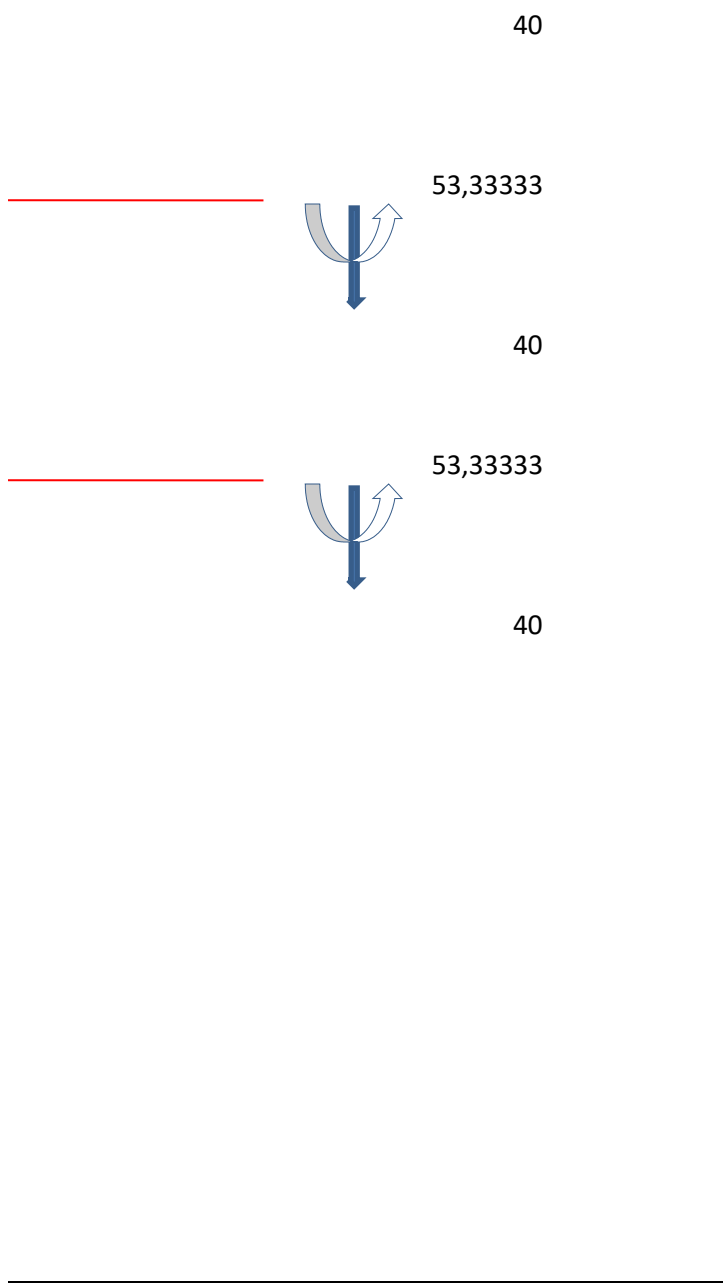
T Transpose	0,97014	0,24254	0	0	0	0
	-0,24254	0,97014	0	0	0	0
	0	0	1	0	0	0
	0	0	0	0,97014	0,24254	0
	0	0	0	-0,24254	0,97014	0
	0	0	0	0	0	1

kg		4	4	4	5	5	5
4	684907,17752	-170798,79034	1712,01618	-684907,17752	170798,79034	1712,01618	
4	170798,79034	44411,71376	6848,06471	170798,79034	-44411,71376	6848,06471	
4	1712,01618	6848,06471	38805,7	-1712,01618	-6848,06471	19402,85000	
5	684907,17752	170798,79034	-1712,01618	684907,17752	-170798,79034	-1712,01618	
5	170798,79034	-44411,71376	-6848,06471	-170798,79034	44411,71376	-6848,06471	
5	1712,01618	6848,06471	19402,85000	-1712,01618	-6848,06471	38805,7	



BALOK

beban tegak lurus bat  
 beban sejajar batang  
 Panjang bentang (L)



(a.)

(b.)

(c.)



4	5	5	5	6	6	6
0	0	0	0	-33750	0	-67500
0	0	0	0	0	-1500000	0
0	0	0	0	67500	0	90000
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
-270000	0	0	0	-937500	0	0
0	0	0	0	0	-2343,75	-9375
180000	0	0	0	0	9375	25000
271712,01618	684907,17752	170798,79034	1712,01618	0	0	0
6848,06471	170798,79034	-44411,71376	6848,06471	0	0	0
398805,7	-1712,01618	-6848,06471	19402,85000	0	0	0
-1712,01618	702187,17752	-170798,79034	41487,98382	-17280	0	43200
-6848,06471	170798,79034	1244411,71376	-6848,06471	0	-1200000	0
19402,85000	41487,98382	-6848,06471	182805,7	-43200	0	72000
0	-17280	0	-43200	988530	0	24300
0	0	-1200000	0	0	2702343,75	9375
0	43200	0	72000	24300	9375	374000

4	5	5	5	6	6	6
0	0	0	0	-33750-0,00000000009		-67500
0	0	0	0	0-0,00000000009	-1500000),000000000004	
0	0	0	0	67500),000000000004		90000
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
-270000	0	0	0	-937500	0	0
0	0	0	0	0	-2343,75	-9375
180000	0	0	0	0	9375	25000
271712,01618	684907,17752	170798,79034	1712,01618	0	0	0
6848,06471	170798,79034	-44411,71376	6848,06471	0	0	0
398805,7	-1712,01618	-6848,06471	19402,85000	0	0	0
-1712,01618	702187,17752	-170798,79034	41487,98382	-17280-0,00000000007		43200

-6848,06471	170798,79034	1244411,71376	-6848,06471	-0,00000000007	-1200000),000000000003	
19402,85000	41487,98382	-6848,06471	182805,7	-43200),000000000003	72000	
0	-17280-0,00000000007		-43200	988530	0,00000000002	24300
0,00000000007		-1200000	0000000000003	0,00000000002	2702343,75	9375
0	43200),000000000003		72000	24300	9375	374000

	4	5	5	5	6	6	6
	0	0	0	0	-33750	0	-67500
	0	0	0	0	0	-1500000	0
	0	0	0	0	67500	0	90000
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
	0	0	0	0	0	0	0
-270000	0	0	0	0	-937500	0	0
0	0	0	0	0	0	-2343,75	-9375
180000	0	0	0	0	0	9375	25000
271712,01618	684907,17752	170798,79034	1712,01618	0	0	0	0
6848,06471	170798,79034	-44411,71376	6848,06471	0	0	0	0
398805,7	-1712,01618	-6848,06471	19402,85000	0	0	0	0
-1712,01618	702187,17752	-170798,79034	41487,98382	-17280	0	0	43200
-6848,06471	170798,79034	1244411,71376	-6848,06471	0	-1200000	0	0
19402,85000	41487,98382	-6848,06471	182805,7	-43200	0	0	72000
0	-17280	0	-43200	988530	0	0	24300
0	0	-1200000	0	0	2702343,75	0	9375
0	43200	0	72000	24300	9375	0	374000

	4	1	1	1	2	2	2
-1712,01618		0	0	0	0	0	0
-6848,06471		0	0	0	0	0	0
19402,85000		0	0	0	0	0	0
0	-33750	0	67500	0	0	0	0
0	0	-1500000	0	0	0	0	0
0	-67500	0	90000	0	0	0	0
-270000	0	0	0	-33750	0	0	67500
0	0	0	0	0	-1500000	0	0
180000	0	0	0	-67500	0	0	90000
271712,01618	0	0	0	0	0	0	0
6848,06471	0	0	0	0	0	0	0

398805,7	0	0	0	0	0	0	0
0	33750	0	-67500	0	0	0	0
0	0	1500000	0	0	0	0	0
0	-67500	0	180000	0	0	0	0
0	0	0	0	33750	0	0	-67500
0	0	0	0	0	1500000	0	0
0	0	0	0	-67500	0	0	180000

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-67500	0
00000000004	0
90000	0
67500	0,00003
00000000004	-0,00002
180000	-0,00015

-67500	0
00000000004	0
90000	0
67500	0
00000000004	0
180000	0

-43200	0,00003
00000000003	-0,00002
72000	-0,00015
43200	0,00005
00000000003	-0,00002
144000	0,00001



-270000	0
00000000002	0
180000	0
270000	0
00000000002	0
360000	0

0	0,00003
9375	-0,00002
25000	-0,00015
0	0
-9375	0
50000	0

1712,01618	0
6848,06471	0
19402,85000	0
-1712,01618	0,00005
-6848,06471	-0,00002
38805,7	0,000001



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**ELEMEN 6**

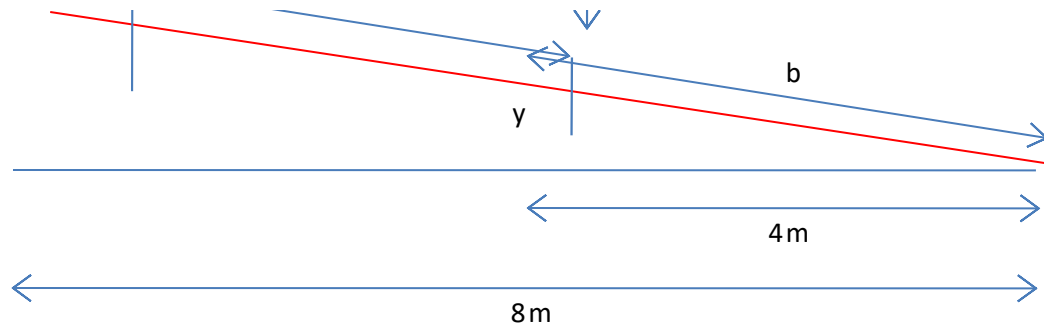
ang

9,70143 kN  
-2,42536 kN  
8,24621 m

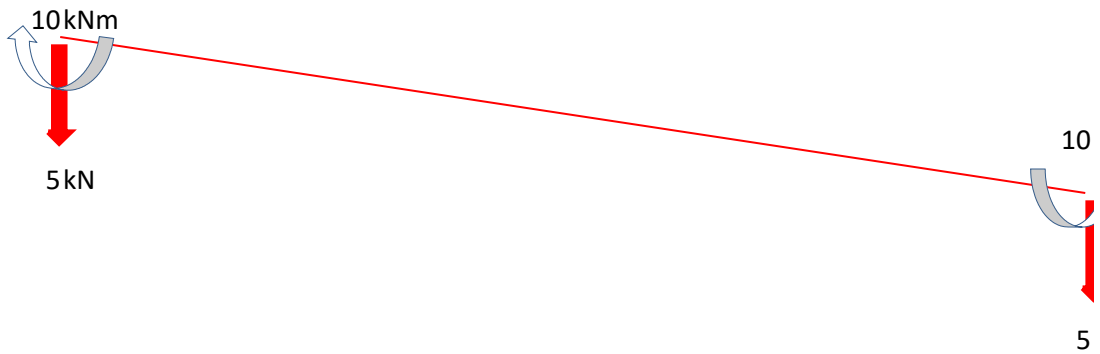
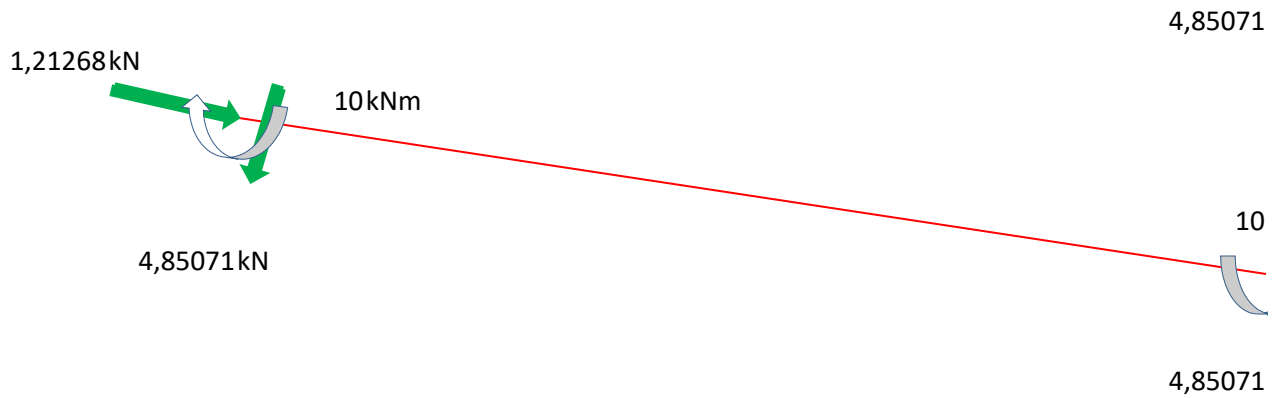
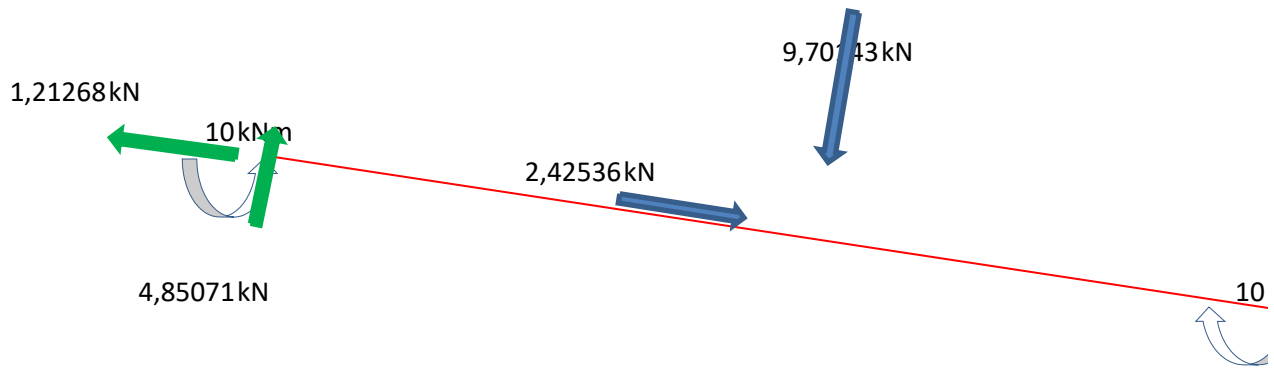


reaksi vertikal di nodal 4  
reaksi vertikal di nodal 5

4,85071  
4,85071



$y = \frac{1}{4,12311}$   
 $b = 4,12311$       momen di nodal 5      10  
 $a = 4,123106$       momen di nodal 4      10



f6*	f4	1,21268	F6*	F4	0
	g4	-4,85071		G4	-5





0
0
0
0
0
0
0
0

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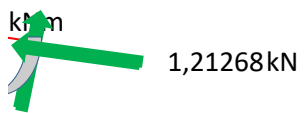
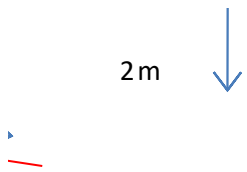


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reaksi horizontal di nodal 4	-1,21268
reaksi horizontal di nodal 5	-1,21268





kN



kN



kN

