

BAB VII

KESIMPULAN DAN SARAN

7.1. Kesimpulan

Berdasarkan hasil analisis balok lengkung pada portal bidang pada bab-bab sebelumnya dapat disimpulkan hal-hal pokok sebagai berikut :

1. Dalam menurunkan matriks fleksibilitas persamaan integral yang diperoleh sulit diselesaikan secara analisis sehingga dilakukan pendekatan secara numerik dengan menggunakan metode *Gauss Quadrature*.
2. Tugas akhir ini telah berhasil membuat suatu program mengenai balok lengkung pada portal bidang, dengan hasil keluaran berupa perpindahan titik kumpul, gaya ujung batang, dan reaksi tumpuan.
3. Hasil program relatif akurat karena ketepatan program ini memiliki angka koreksi maksimal terhadap perhitungan dalam buku referensi sebesar 3,122 %.
4. Pada kasus balok lengkung tak prismatis terdapat perbedaan perpindahan sebesar 31,355 % dengan hasil SAP2000 yang didapat dengan memodelkan balok lengkung menjadi segmen-segmen lurus.

7.2 Saran

Penyusunan analisis balok lengkung dapat dikembangkan lagi untuk hal-hal seperti berikut :

1. Menambah perhitungan apabila balok lengkung tak prismatis pada tinggi maupun lebarnya.

2. Menampilkan tampilan grafis hasil perhitungan berupa perpindahan dan gaya-gaya batang.
3. Balok lengkung tidak terbatas pada bentuk lingkaran.
4. Beban tidak hanya berupa beban titik kumpul.



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Input program arc frame book3ttk

```

3      6      2      1      1      1
1      0      0      10
2      0      10
3      I2
1      1      1
1      1      1
1      1      1
2      109.5445115 109.5445115
2      8      109.5445115 109.5445115 109.5445115 6      4.708497378
2      100      0
  
```

non-Prismatic Arc Frame Project
[D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book3ttk.txt]
Unit: kip - ft

Joint Displacements

Joint ID	UX	UY	RZ
1	0	0	0
2	8.324662E-05	-8.15681E-05	1.383968E-05
3	0	0	0

Frame Element Forces

Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j
1	-9.788171E-02	21.95208	-93.15279	-9.788171E-02	21.95208	126.368
2	51.69726	58.4712	126.368	51.55044	-58.60068	127.5425

Support Reactions

Joint ID	RX	RY	RZ
1	-21.95208	9.788171E-02	93.15279
3	-78.04792	-9.787933E-02	127.5425

Input program arc frame book4ttk

4	6	2	3	2	1	1
1	0	0				
2	0	10				
3	6	12.708497378				
4	12	10				
1	1	1	1			
4	1	1	1			
1	1	1	109.5445115	109.5445115	109.5445115	4.708497378
1	1	2	109.5445115	109.5445115	109.5445115	4.708497378
2	2	3	109.5445115	109.5445115	109.5445115	6
3	3	4	109.5445115	109.5445115	109.5445115	6
2	100	0				

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book4ttk.txt]
 Unit: kip - ft

Joint Displacements

Joint ID	UX	UY	RZ
1	0	0	0
2	8.324673E-05	-8.156839E-05	1.38397E-05
3	2.312029E-05	3.912153E-05	6.743132E-06
4	0	0	0

Frame Element Forces

Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j
1	-9.788206E-02	21.95211	-93.15292	-9.788206E-02	21.95211	126.3682
2	51.69766	58.47143	126.3684	78.04836	-0.0980282	-84.43723
3	78.04807	-9.785295E-02	-84.43742	51.55055	-58.60077	127.5427

Support Reactions

Joint ID	RX	RY	RZ
1	-21.95211	9.788206E-02	93.15292
4	-78.04806	-9.785042E-02	127.5427

Input program arc frame book5ttk

5	6	2	4	3	1	1
1	0	0				
2	0	10				
3	4	12.45446407				
4	8	12.45446407				
5	12	10				
1	1	1				
5	1	1				
1	1	1				
2	2	8	109.5445115	109.5445115	109.5445115	109.5445115
3	3	8	109.5445115	109.5445115	109.5445115	109.5445115
4	4	8	109.5445115	109.5445115	109.5445115	109.5445115
4	4	8	109.5445115	109.5445115	109.5445115	109.5445115
2	100	0				

4.708497378
4.708497378
4.708497378

non-Prismatic Arc Frame Project
[D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book5ttk.txt]
Unit: kip - ft

Joint Displacements

Joint ID	Ux	Uy	RZ
1	0	0	0
2	8.324529E-05	-8.157491E-05	1.383981E-05
3	2.71267E-05	1.202329E-05	1.986817E-05
4	2.254062E-05	3.902048E-05	-6.347443E-06
5	0	0	0

Frame Element Forces

Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j
1	-9.788989E-02	21.95198	-93.15214	-9.788989E-02	21.95198	126.3677
2	51.69581	58.47033	126.3673	75.59235	19.4173	-64.80503
3	75.59227	19.41693	-64.80457	75.54342	-19.60613	-64.41376
4	75.54247	-19.60579	-64.41379	51.54879	-58.59841	127.5356

Support Reactions

Joint ID	RX	RY	RZ
1	-21.95198	9.788989E-02	93.15214
5	-78.04513	-9.760761E-02	127.5356

```

Input program arc frame book6ttk      1
6 2 0 1
1 0 0 1
2 10 12469587
3 3 12.708497378
4 6 12.12469587
5 9 10
6 12 1
1 1 1
1 1 109.5445115 109.5445115
2 1 109.5445115 109.5445115 109.5445115 6
3 3 109.5445115 109.5445115 109.5445115 6
4 4 109.5445115 109.5445115 109.5445115 6
5 5 109.5445115 109.5445115 109.5445115 6
6 6 109.5445115 109.5445115 109.5445115 6
2 100 0
    
```

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book6ttk.txt]

Unit: kip - ft

Joint Displacements

```

Joint ID Ux Uy RZ
1 0 0 0
2 8.324571E-05 -8.163779E-05 1.384223E-05
3 3.454888E-05 -1.038636E-05 2.451369E-05
4 2.310714E-05 3.908461E-05 6.750546E-06
5 1.956903E-05 3.019004E-05 -1.093837E-05
6 0 0 0
    
```

Frame Element Forces

```

Frame ID Axial-i Shear-i Moment-i Axial-j Shear-j Moment-j
1 -9.796534E-02 21.95378 -93.15826 -9.796534E-02 21.95378 126.3796
2 51.69481 58.47158 126.3794 72.38705 29.17867 -39.15845
3 72.38474 29.17736 -39.15847 78.04396 -9.613975E-02 -84.43223
4 78.03802 -9.555944E-02 -84.43258 72.30735 -29.35284 -38.58719
5 72.30649 -29.35157 -38.58707 51.54543 -58.5902 127.5014
    
```

Support Reactions

```

Joint ID RX RY RZ
1 -21.95378 9.796534E-02 93.15826
6 -78.03674 -9.470189E-02 127.5014
    
```


non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book8ttk.txt]
 Unit: kip - ft

Joint Displacements		RZ	
Joint ID	UX	UY	RZ
1	0	0	0
2	8.32553E-05	-8.168729E-05	1.38433E-05
3	4.715967E-05	-3.620363E-05	2.647461E-05
4	2.711601E-05	1.19498E-05	1.988202E-05
5	2.31042E-05	3.907051E-05	6.756666E-06
6	2.252923E-05	3.899735E-05	-6.337349E-06
7	1.360256E-05	1.801989E-05	-1.283097E-05
8	0	0	0

Frame Element Forces		Moment-i		Axial-j		Shear-j		Moment-j	
Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j	Axial-j	Shear-j	Moment-j
1	-9.802474E-02	21.95594	-93.16772	-9.802474E-02	21.95594	126.3916	-9.802474E-02	21.95594	126.3916
2	51.67692	58.46254	126.3915	67.61839	38.93747	-1.140215	67.61839	38.93747	-1.140215
3	67.64245	38.95437	-1.140437	75.60006	19.43129	-64.80132	75.60006	19.43129	-64.80132
4	75.59738	19.42783	-64.8	78.05381	-8.843113E-02	-84.4514	78.05381	-8.843113E-02	-84.4514
5	78.06084	-9.356207E-02	-84.44891	75.55869	-19.6058	-64.43174	75.55869	-19.6058	-64.43174
6	75.5423	-19.6017	-64.43129	67.54119	-39.1031	-0.4224324	67.54119	-39.1031	-0.4224324
7	67.54697	-39.10422	-0.4217205	51.55608	-58.59782	127.5055	51.55608	-58.59782	127.5055

Support Reactions		RZ	
Joint ID	RX	RY	RZ
1	-21.95594	9.802474E-02	93.16772
8	-78.04951	-9.175865E-02	127.5055

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book10-tk.txt]
 Unit: kip - ft

Joint Displacements		UY	RZ	Frame Element Forces		Axial-j	Shear-j	Moment-j
Joint ID	UX			Frame ID	Axial-i			
1	0	0	0	1	-9.959761E-02	-9.959761E-02	21.9955	21.9955
2	8.329629E-05	-8.299801E-05	1.389005E-05	2	51.72694	64.61976	43.83763	126.6456
3	5.536779E-05	-5.05679E-05	2.602688E-05	3	64.46224	72.26161	29.16804	23.5112
4	3.442378E-05	-1.147974E-05	2.463917E-05	4	72.44838	76.75774	14.61455	-38.89234
5	2.485646E-05	2.030571E-05	1.706388E-05	5	76.64436	78.02919	5.080719E-03	-73.36294
6	2.289859E-05	3.843769E-05	6.909982E-06	6	77.99668	76.612	-14.63161	-84.44894
7	2.290152E-05	4.103552E-05	-3.244126E-06	7	76.72916	72.41416	-29.29279	-73.37332
8	1.944164E-05	2.998033E-05	-1.081757E-05	8	72.34837	64.52361	-43.91177	-38.85214
9	9.586479E-06	1.163532E-05	-1.218575E-05	9	64.4615	51.55532	-58.5282	23.74392
10	0	0	0					126.9931
Support Reactions		RY	RZ					
Joint ID								
1		9.959761E-02	93.30945					
10		-4.627756E-02	126.9931					

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\output arc frame book12ttk.txt]
 Unit: kip - ft

Joint Displacements		Support Reactions	
Joint ID	UX	Joint ID	RX
1	0	1	-21.94428
2	8.292052E-05	12	-77.14822
3	6.049107E-05		
4	4.104912E-05		
5	2.907259E-05		
6	2.374848E-05		
7	2.262206E-05		
8	2.274912E-05		
9	2.127997E-05		
10	1.60758E-05		
11	6.996989E-06		
12	0		

Frame Element Forces		Support Reactions	
Frame ID	Axial-i	Joint ID	RX
1	-0.100019	1	-21.94428
2	51.58932	12	-77.14822
3	62.19154		
4	69.30553		
5	74.04779		
6	76.90381		
7	77.26918		
8	76.20357		
9	73.51446		
10	68.80534		
11	61.61891		

Frame Element Forces		Support Reactions	
Frame ID	Axial-j	Joint ID	RX
1	21.94428	1	-21.94428
2	58.5266	12	-77.14822
3	46.53062		
4	34.85936		
5	23.18518		
6	11.57379		
7	-0.1156888		
8	-11.66586		
9	-23.20755		
10	-34.82644		
11	-46.42181		

Frame Element Forces		Support Reactions	
Frame ID	Moment-i	Joint ID	RZ
1	-93.04852	1	93.04852
2	126.3921	12	125.6892
3	39.87257		
4	-17.8314		
5	-55.55441		
6	-77.00547		
7	-83.9407		
8	-76.80399		
9	-55.24942		
10	-17.58863		
11	39.97123		

Frame Element Forces		Support Reactions	
Frame ID	Moment-j	Joint ID	RZ
1	21.94428	1	93.04852
2	46.82661	12	125.6892
3	34.87147		
4	23.21911		
5	11.54291		
6	-0.0927279		
7	-11.70475		
8	-23.22596		
9	-34.76601		
10	-46.3811		
11	-57.97103		

SAP2000 v7.42 File: LGK_BK_2TTK Kip-ft Units PAGE 1

JOINT DISPLACEMENTS

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0707	0.0000	8.885E-05	0.0000	6.620E-05	0.0000
3	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SAP2000 v7.42 File: LGK_BK_3TTK Kip-ft Units PAGE 1

JOINT DISPLACEMENTS

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0904	0.0000	6.616E-05	0.0000	4.839E-05	0.0000
3	LOAD1	0.0452	0.0000	0.0242	0.0000	2.406E-05	0.0000
4	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SAP2000 v7.42 File: LGK_BK_4TTK Kip-ft Units PAGE 1

JOINT DISPLACEMENTS

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0932	0.0000	6.177E-05	0.0000	4.519E-05	0.0000
3	LOAD1	0.0568	0.0000	0.0201	0.0000	2.042E-05	0.0000

4	LOAD1	0.0364	0.0000	0.0201	0.0000	2.453E-05	0.0000
5	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SAP2000 v7.42 File: LGK_BK_5TTK Kip-ft Units PAGE 1

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0940	0.0000	6.020E-05	0.0000	4.406E-05	0.0000
3	LOAD1	0.0637	0.0000	0.0166	0.0000	2.044E-05	0.0000
4	LOAD1	0.0471	0.0000	0.0221	0.0000	2.190E-05	0.0000
5	LOAD1	0.0304	0.0000	0.0166	0.0000	2.342E-05	0.0000
6	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

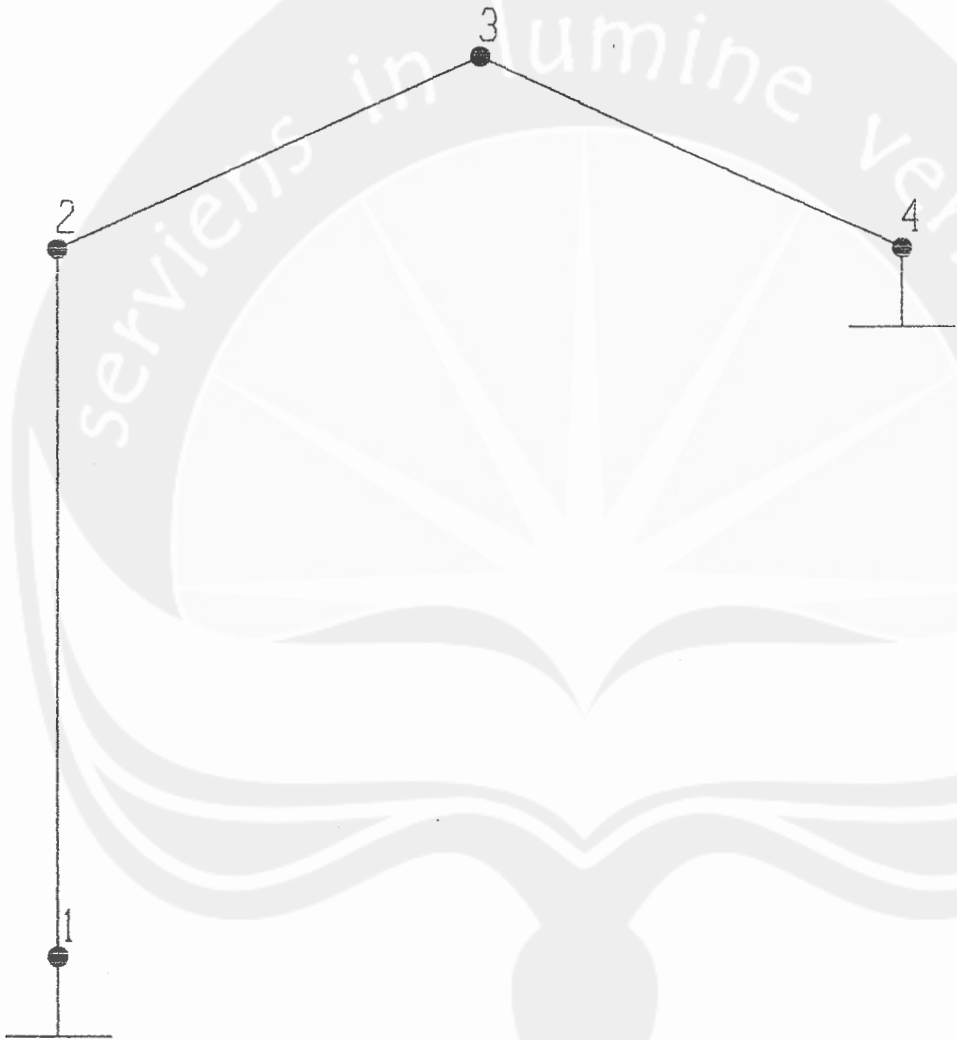
SAP2000 v7.42 File: LGK_BK_8TTK Kip-ft Units PAGE 1

J O I N T D I S P L A C E M E N T S

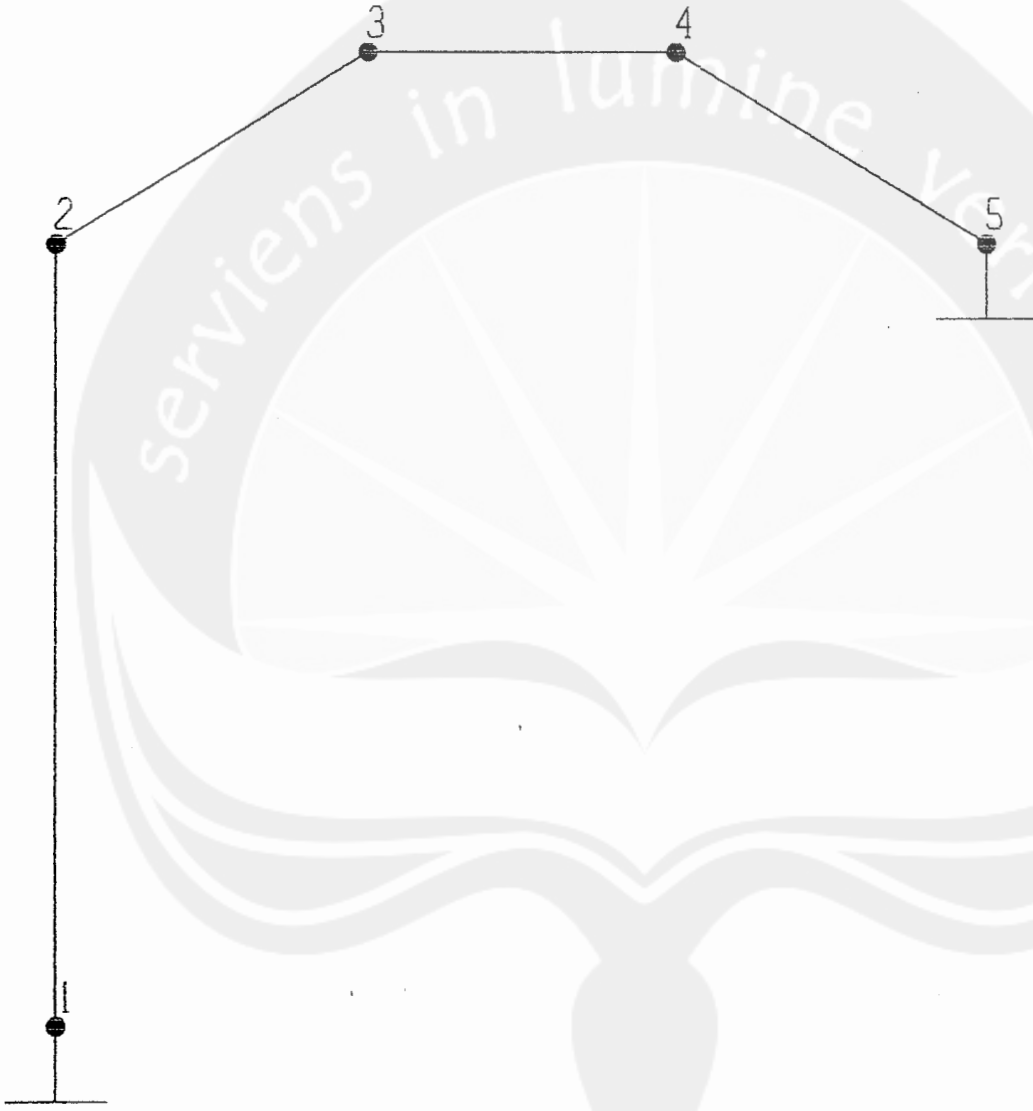
JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0947	0.0000	5.907E-05	0.0000	4.326E-05	0.0000
3	LOAD1	0.0718	0.0000	0.0121	0.0000	2.290E-05	0.0000
4	LOAD1	0.0579	0.0000	0.0193	0.0000	1.934E-05	0.0000
5	LOAD1	0.0474	0.0000	0.0217	0.0000	2.150E-05	0.0000

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	0.0950	0.0000	5.848E-05	0.0000	4.284E-05	0.0000
3	LOAD1	0.0796	0.0000	7.770E-03	0.0000	2.762E-05	0.0000
4	LOAD1	0.0688	0.0000	0.0138	0.0000	2.108E-05	0.0000
5	LOAD1	0.0605	0.0000	0.0181	0.0000	1.912E-05	0.0000
6	LOAD1	0.0537	0.0000	0.0206	0.0000	1.965E-05	0.0000
7	LOAD1	0.0475	0.0000	0.0215	0.0000	2.129E-05	0.0000
8	LOAD1	0.0414	0.0000	0.0206	0.0000	2.295E-05	0.0000
9	LOAD1	0.0346	0.0000	0.0180	0.0000	2.350E-05	0.0000
10	LOAD1	0.0263	0.0000	0.0137	0.0000	2.159E-05	0.0000
11	LOAD1	0.0154	0.0000	7.725E-03	0.0000	1.512E-05	0.0000
12	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

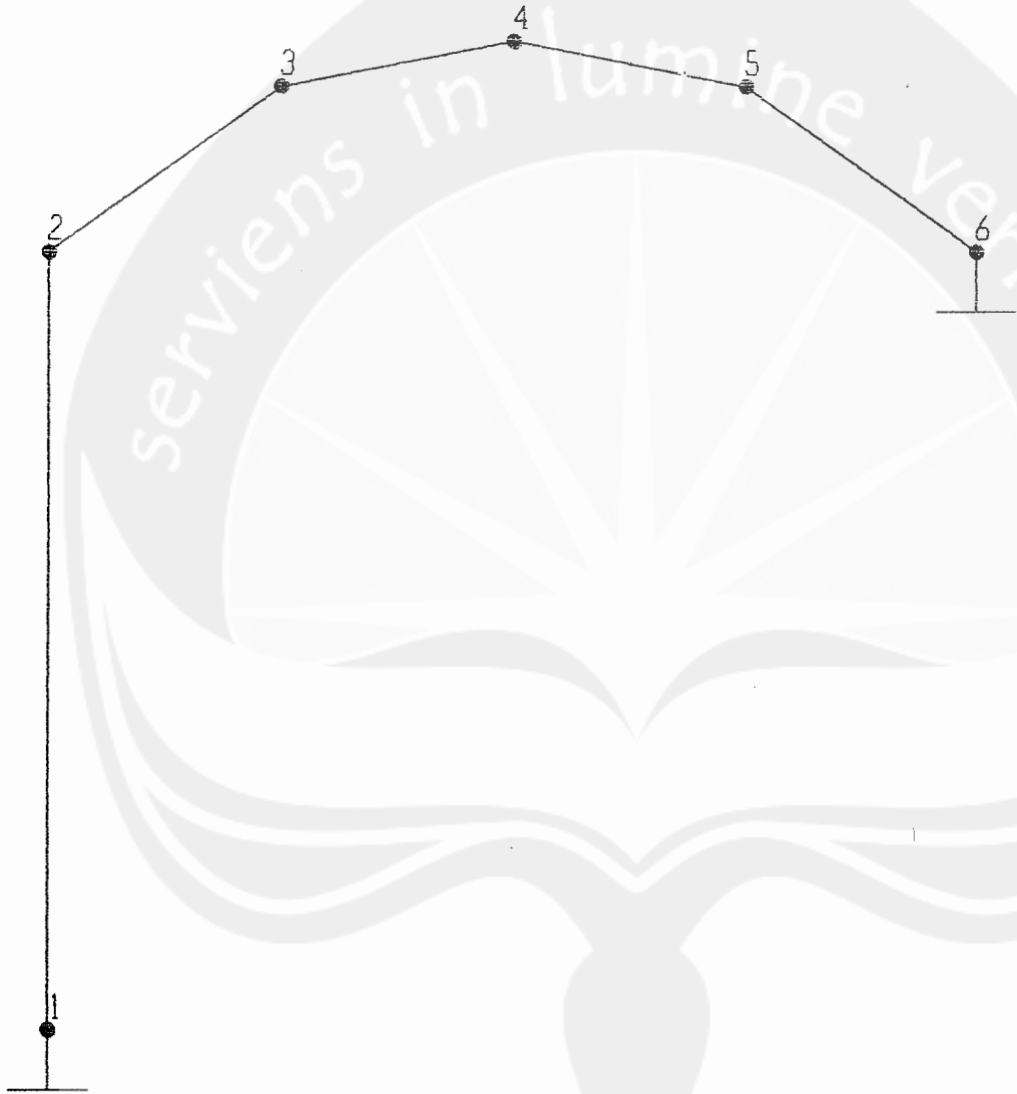


Lampiran B
69

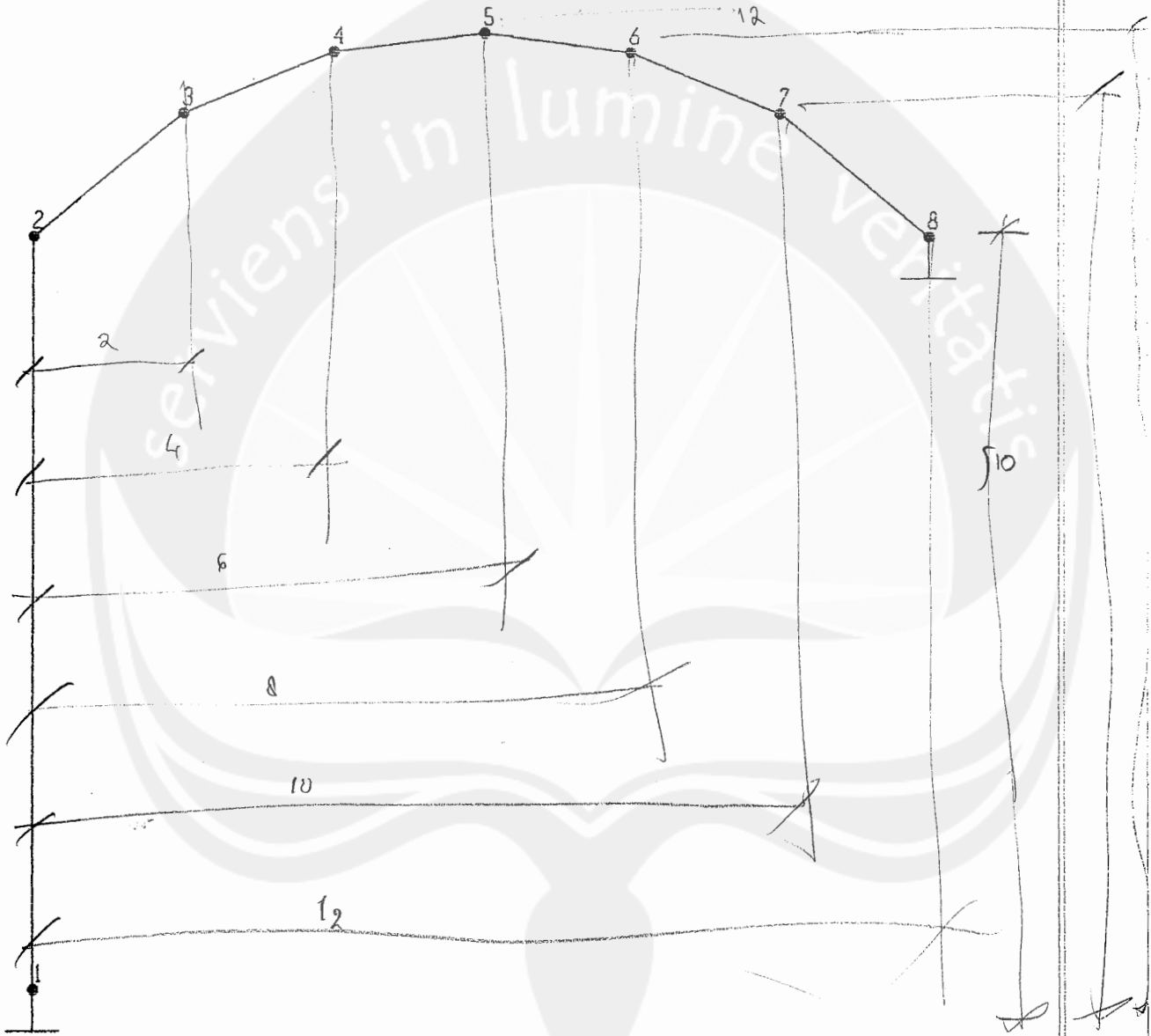


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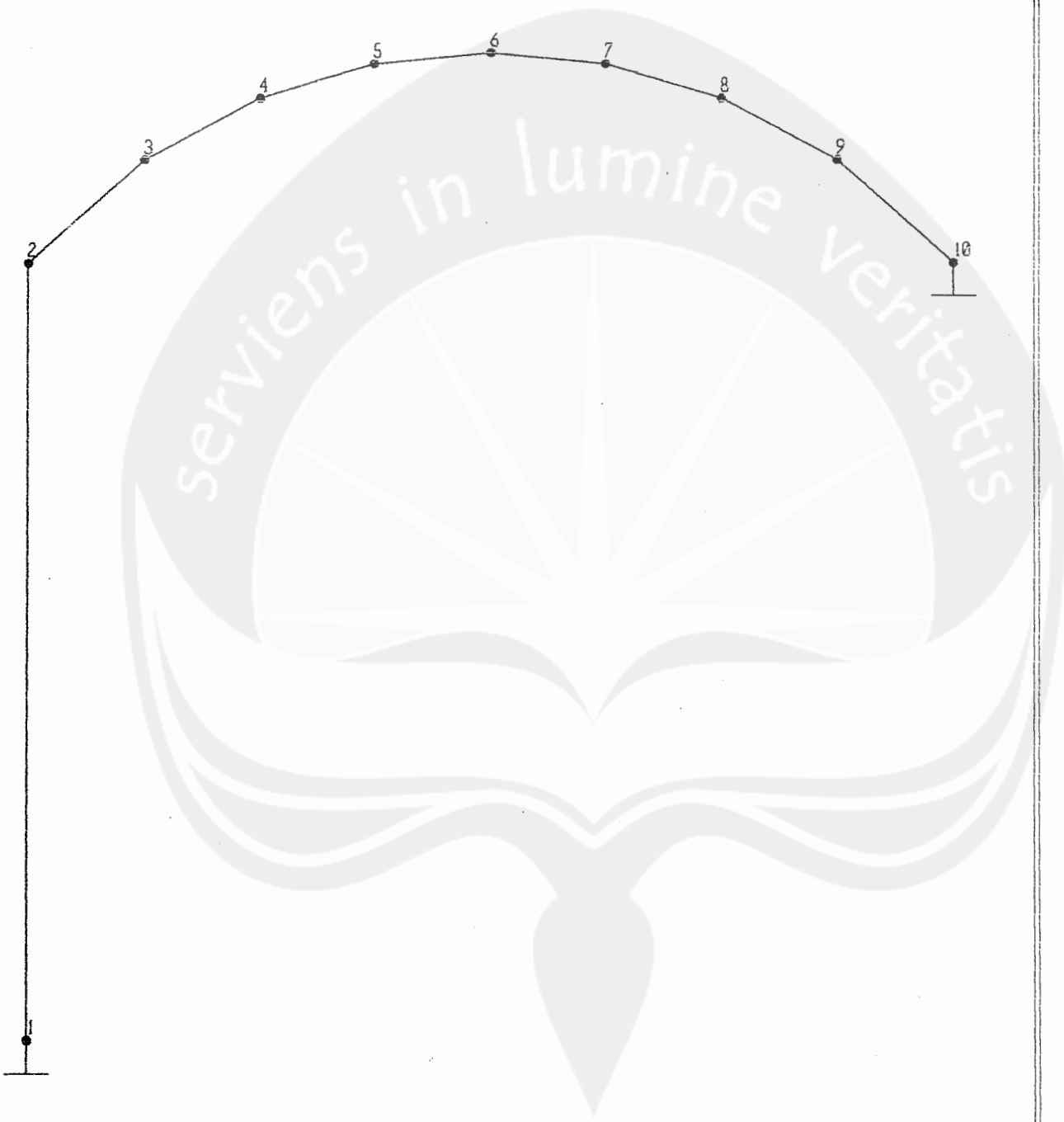
<i>Lampiran B</i>
70



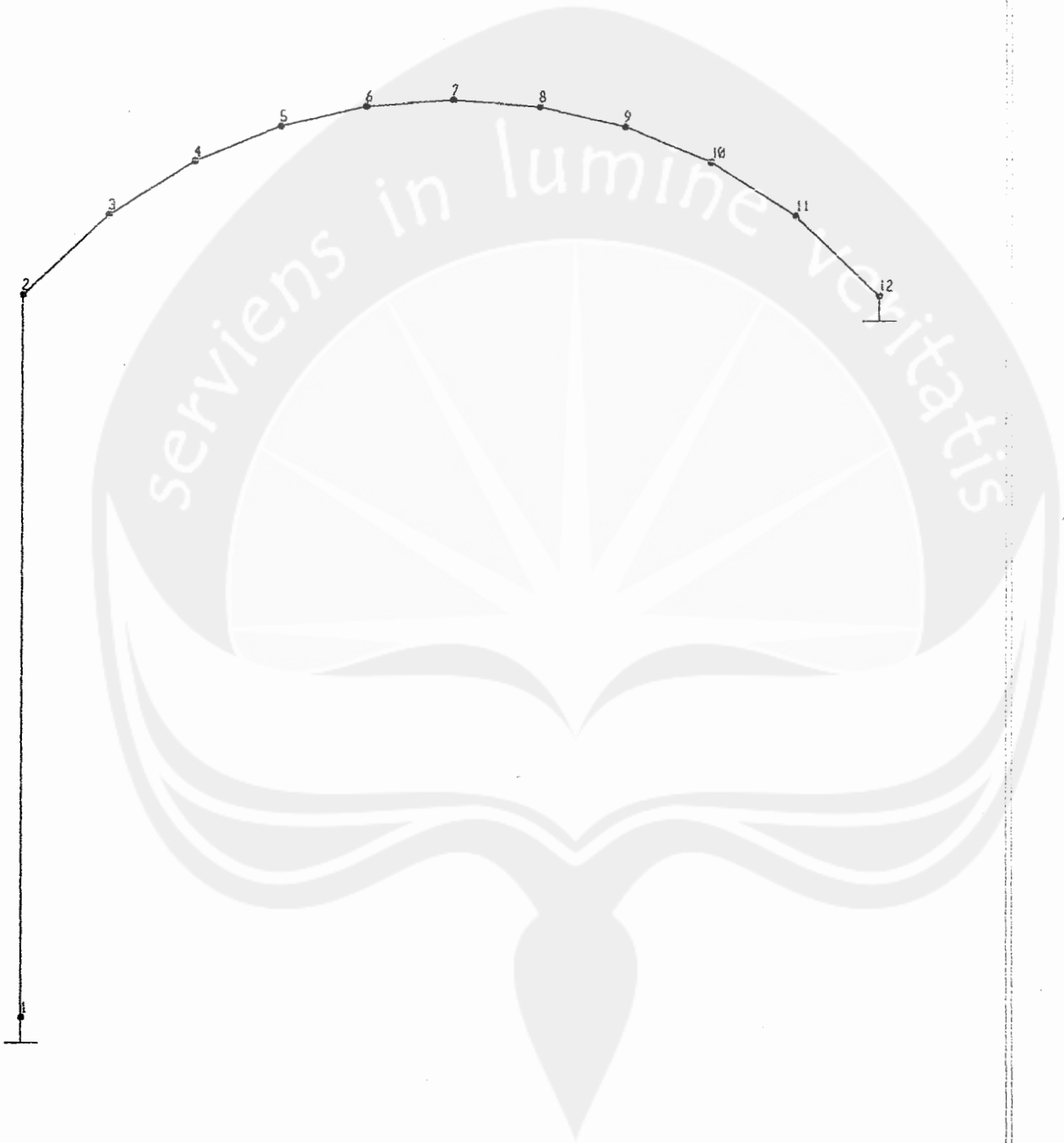
Lampiran B
71



Lampiran B
72



Lampiran B
73



Input program arc frame lgg_msa_3ttk

3	6	2	2	2e8	1
1	0	0			
2	12	12			
3	24	0			
1	1	1	1		
3	1	1	1		
1	1	2	12	0.20598	0.20598
2	2	3	12	0.20598	0.20598
2	0	0			

12 0
12 0

non-Prismatic Arc Frame Project
[D:\Input&Output Project\OUTPUT PROGRAM\out_lgg_msa_3ttk.txt]
Unit: KN-m

Joint Displacements

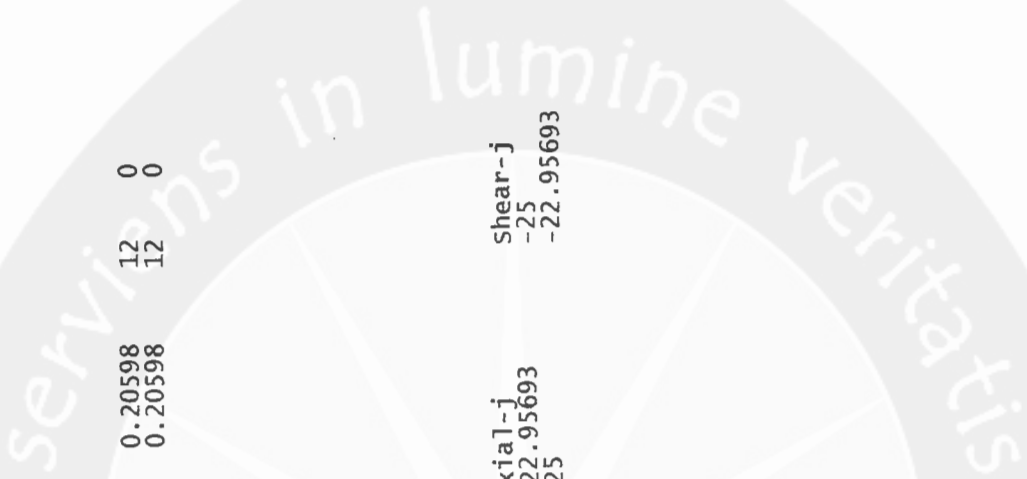
Joint ID	Ux	Uy	Rz
1	0	0	0
2	0	-3.358384E-02	0
3	0	0	0

Frame Element Forces

Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j
1	25	22.95693	66.36392	22.95693	-25	90.88083
2	22.95693	25	90.88083	25	-22.95693	66.36392

Support Reactions

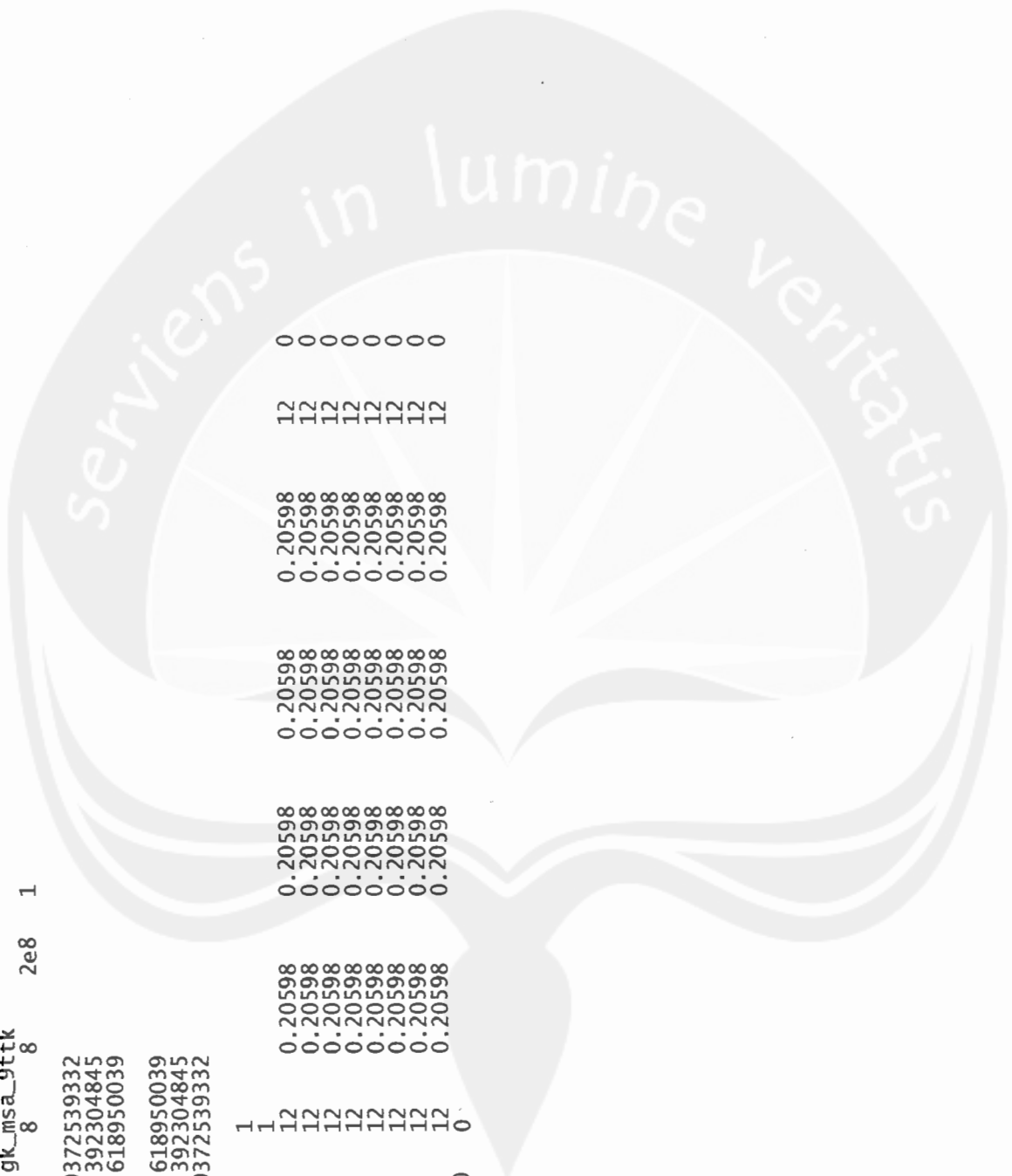
Joint ID	Rx	Ry	Rz
1	22.95693	25	-66.36392
3	-22.95693	25	66.36392




```

Input program 1gk_msa_9ttk      2e8 1
9 1 0 0 7.9372539332 12 0 0.20598 0.20598 0
1 2 0 3 10.392304845 12 1 0.20598 0.20598 0
3 6 9 9 11.618950039 12 1 0.20598 0.20598 0
4 5 12 12 11.618950039 12 1 0.20598 0.20598 0
6 15 18 21 10.392304845 12 1 0.20598 0.20598 0
7 8 24 0 7.9372539332 12 1 0.20598 0.20598 0
9 1 1 1 1 12 1 0.20598 0.20598 0
1 1 1 2 3 12 1 0.20598 0.20598 0
2 3 4 5 6 12 1 0.20598 0.20598 0
3 4 5 6 7 12 1 0.20598 0.20598 0
4 5 6 7 8 12 1 0.20598 0.20598 0
5 6 7 8 9 12 1 0.20598 0.20598 0
6 7 8 9 -50 0 0.20598 0.20598 0
8 5 0 0 0 0 0 0.20598 0.20598 0

```



non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\out_lgk_msa_9ttk.txt]
 Unit: KN-m

Joint Displacements

Joint ID	UX	UY	RZ
1	0	0	0
2	-1.722247E-02	5.432963E-03	-1.007193E-03
3	-9.045184E-03	-5.328994E-03	-5.557127E-03
4	-1.650169E-03	-2.344625E-02	-5.670051E-03
5	-3.504798E-07	-3.358375E-02	-1.118298E-07
6	0.0016494	-2.344684E-02	5.669923E-03
7	9.04442E-03	-5.329609E-03	5.557223E-03
8	1.722206E-02	5.432772E-03	1.007312E-03
9	0	0	0

Frame Element Forces

Frame ID	Axial-j	Shear-j	Moment-j	Axial-j	Shear-j	Moment-j
1	24.99953	22.95664	66.36354	33.93404	0.6818486	-40.85057
2	33.93454	0.6822174	-40.85061	32.38139	-10.17171	-22.21286
3	32.38863	-10.17108	-22.21146	28.48532	-18.46783	24.62823
4	28.48149	-18.46644	24.62822	22.96047	-25.00043	90.88041
5	22.96293	24.99998	90.88038	28.48376	18.4654	24.63045
6	28.48314	18.4678	24.63057	32.38652	10.17163	-22.20999
7	32.38074	10.17243	-22.21116	33.93415	-0.681334	-40.85205
8	33.9323	-0.6825345	-40.85207	24.99777	-22.93601	66.3623

Support Reactions

Joint ID	RX	RY	RZ
1	22.95664	24.99953	-66.36354
9	-22.95601	24.99777	66.3623

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\out_lgk_msa_13ttk.txt]
 Unit: KN-m

Joint Displacements		UY	RZ
Joint ID	UX		
1	0	0	0
2	-1.710053E-02	5.386101E-03	1.136379E-03
3	-1.528112E-02	3.458788E-03	-2.915058E-03
4	-9.072116E-03	-5.309844E-03	-5.556512E-03
5	3.509183E-03	-1.743862E-02	-6.209108E-03
6	-5.710293E-04	-0.0285719	-4.498369E-03
7	-2.46543E-05	-3.357997E-02	-4.389174E-06
8	5.20351E-04	-2.858864E-02	4.490822E-03
9	3.455536E-03	-1.746724E-02	6.205181E-03
10	9.017188E-03	-5.341612E-03	5.557188E-03
11	1.523038E-02	3.432513E-03	2.919845E-03
12	1.706492E-02	5.372679E-03	-1.128787E-03
13	0	0	0

Frame Element Forces		Shear-i	Moment-i	Axial-i	Shear-j	Moment-j
Frame ID	Axial-i					
1	24.9543	22.94037	66.35897	33.47601	5.322964	-35.90161
2	33.46778	5.322958	-35.90215	33.72697	-3.304185	-39.01243
3	33.73155	-3.338261	-39.01292	32.33422	-10.1715	-22.24499
4	32.32433	-10.1755	-22.24593	29.92073	-15.91078	6.597263
5	29.92258	-15.93161	6.597245	26.74622	-20.82827	44.71365
6	26.80642	-20.83382	44.71563	22.95918	-25.01016	90.88247
7	22.93457	24.98977	90.8818	26.77876	20.81782	44.7516
8	26.77641	20.81495	44.75061	29.95005	15.9133	6.667006
9	29.88987	15.914	6.665515	32.29457	10.1843	-22.19097
10	32.33053	10.17504	-22.19047	33.72866	3.342477	-38.96801
11	33.73185	3.316649	-38.96661	33.47565	-5.312131	-35.8922
12	33.47075	-5.311699	-35.892	24.95614	-22.92807	66.28333

Support Reactions		RY	RZ
Joint ID	RX		
1	22.94037	24.9543	-66.35897
13	-22.92807	24.95614	66.28333

non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\out_lgk_msa_15ttk.txt]

Unit: KN-m

Joint Displacements

Joint ID	UX	UY	RZ
1	0	0	0
2	-0.012931	3.200673E-03	3.094881E-03
3	-1.701468E-02	5.354203E-03	1.118748E-03
4	-0.01516	3.396937E-03	-2.926203E-03
5	-8.941674E-03	-5.383818E-03	-5.557147E-03
6	-3.382608E-03	-1.750339E-02	-6.199713E-03
7	-4.509957E-04	-2.861067E-02	-4.48248E-03
8	9.253254E-05	-3.358411E-02	1.35947E-05
9	6.403436E-04	-2.855851E-02	4.506301E-03
10	3.581851E-03	-1.741198E-02	6.214414E-03
11	9.148143E-03	-5.275637E-03	5.558515E-03
12	1.535643E-02	3.492357E-03	2.912245E-03
13	1.716129E-02	5.407682E-03	-1.146066E-03
14	1.302412E-02	3.225119E-03	-3.124566E-03
15	0	0	0

Frame Element Forces

Frame ID	Axial-i	Shear-i	Moment-i	Axial-j	Shear-j	Moment-j
1	24.94969	22.90274	66.16223	32.02369	11.02297	-18.72576
2	31.97651	11.0317	-18.72688	33.40643	5.310945	-35.88589
3	33.43432	5.289683	-35.88501	33.68619	-3.327928	-38.90745
4	33.68279	-3.361218	-38.90961	32.28179	-10.18399	-22.09768
5	32.24722	-10.17135	-22.0997	29.84568	-15.89262	6.718824
6	29.93514	-15.90214	6.72108	26.76364	-20.8014	44.77906
7	26.78536	-20.80207	44.77991	22.9437	-24.97535	90.87972
8	22.9161	25.02409	90.87984	26.76626	20.85474	44.67791
9	26.82848	20.83508	44.67768	30.00479	15.9242	6.561915
10	29.97999	15.9239	6.562755	32.38499	10.17756	-22.29722
11	32.42634	10.18253	-22.29764	33.82397	3.330197	-39.06924
12	33.80597	3.317624	-39.06952	33.54761	-5.329911	-35.96923
13	33.55292	-5.347296	-35.96666	32.11446	-11.09294	-18.70519
14	32.11389	-11.07652	-18.70573	25.01097	-22.98787	66.52928

Support Reactions

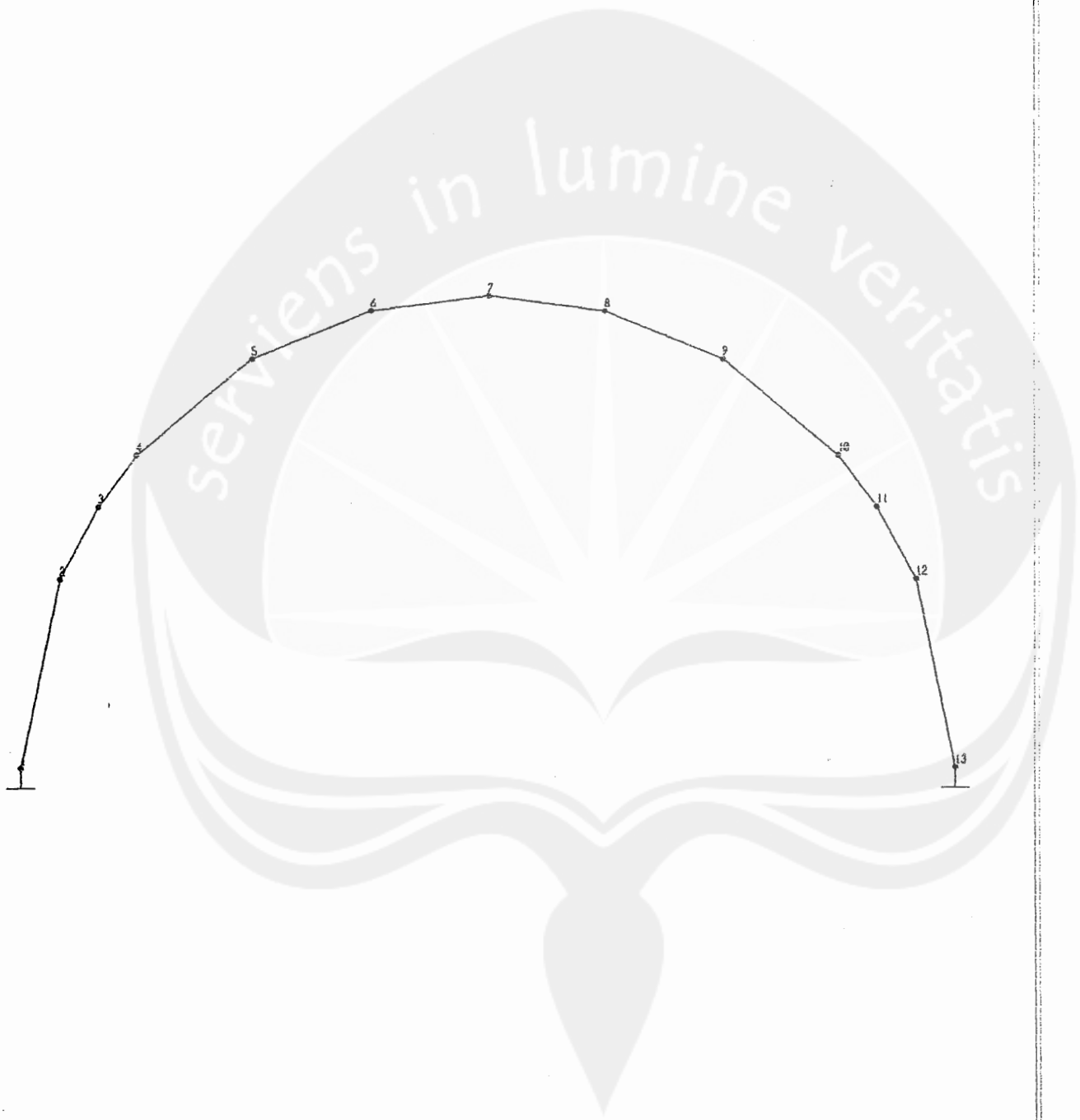
Joint ID	RX	RY	RZ
1	22.90274	24.94969	-66.16223
15	-22.98787	25.01097	66.52928

J O I N T D I S P L A C E M E N T S

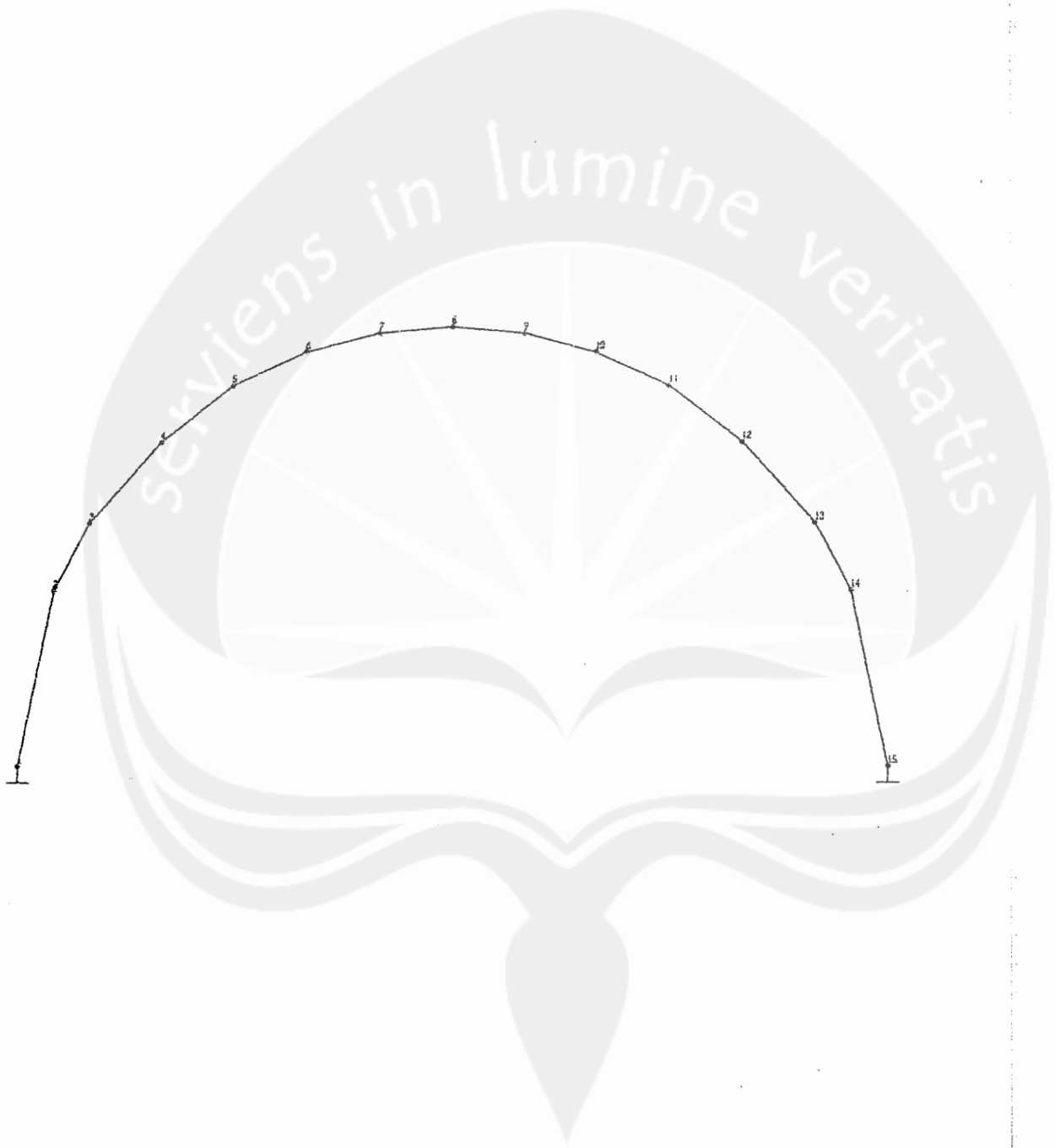
JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	-0.0133	0.0000	2.747E-03	0.0000	-3.229E-03	0.0000
3	LOAD1	-0.0174	0.0000	5.003E-03	0.0000	-1.097E-03	0.0000
4	LOAD1	-0.0174	0.0000	4.986E-03	0.0000	1.164E-03	0.0000
5	LOAD1	-8.661E-03	0.0000	-5.724E-03	0.0000	5.553E-03	0.0000
6	LOAD1	-1.280E-03	0.0000	-0.0238	0.0000	5.639E-03	0.0000
7	LOAD1	0.0000	0.0000	-0.0340	0.0000	0.0000	0.0000
8	LOAD1	1.280E-03	0.0000	-0.0238	0.0000	-5.639E-03	0.0000
9	LOAD1	8.661E-03	0.0000	-5.724E-03	0.0000	-5.553E-03	0.0000
10	LOAD1	0.0174	0.0000	4.986E-03	0.0000	-1.164E-03	0.0000
11	LOAD1	0.0174	0.0000	5.003E-03	0.0000	1.097E-03	0.0000
12	LOAD1	0.0133	0.0000	2.747E-03	0.0000	3.229E-03	0.0000
13	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	-0.0131	0.0000	2.721E-03	0.0000	-3.189E-03	0.0000
3	LOAD1	-0.0172	0.0000	4.937E-03	0.0000	-1.060E-03	0.0000
4	LOAD1	-0.0153	0.0000	3.189E-03	0.0000	2.801E-03	0.0000
5	LOAD1	-8.763E-03	0.0000	-5.279E-03	0.0000	5.447E-03	0.0000
6	LOAD1	-3.268E-03	0.0000	-0.0172	0.0000	6.133E-03	0.0000
7	LOAD1	-4.126E-04	0.0000	-0.0283	0.0000	4.455E-03	0.0000
8	LOAD1	0.0000	0.0000	-0.0333	0.0000	0.0000	0.0000
9	LOAD1	4.126E-04	0.0000	-0.0283	0.0000	-4.455E-03	0.0000
10	LOAD1	3.268E-03	0.0000	-0.0172	0.0000	-6.133E-03	0.0000
11	LOAD1	8.763E-03	0.0000	-5.279E-03	0.0000	-5.447E-03	0.0000
12	LOAD1	0.0153	0.0000	3.189E-03	0.0000	-2.801E-03	0.0000
13	LOAD1	0.0172	0.0000	4.937E-03	0.0000	1.060E-03	0.0000
14	LOAD1	0.0131	0.0000	2.721E-03	0.0000	3.189E-03	0.0000
15	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000



Lampiran D
84



Input program 1gk2_msa_4ttk 2e8 1
 4 8 3 3 3
 1 0 0
 2 12.5 6.708438
 3 25 0
 4 50 0
 1 1 1
 3 1 1 1
 4 1 1 1
 1 2 3 15
 2 2 3 15
 3 3 4 15
 2 0 -180 0

0.2213 0.2213 0.2213
 0.2213 0.2213 0.2213
 0.2213 0.2213 0.2213
 12.5 -8.29156
 12.5 -8.29156
 37.5 -8.29156

Non-Prismatic Arc Frame Project
 [D:\Input&Output Project\OUTPUT PROGRAM\out_put_2\gk.txt]
 Unit: KN-m

Joint Displacements
 Joint ID UX Uy RZ
 1 0 0 0
 2 7.502623E-03 -0.0474922 1.627822E-03
 3 0 0 -7.729186E-03
 4 0 0 0

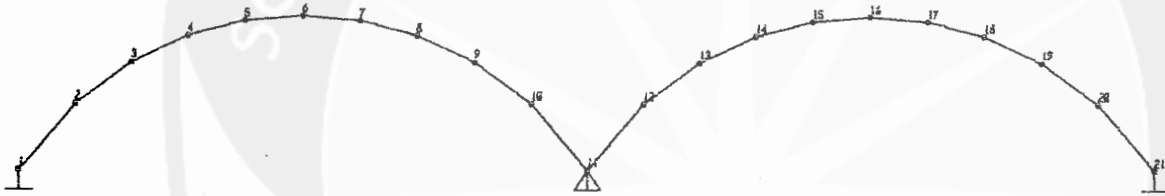
Frame Element Forces
 Frame ID Axial-i Axial-j Shear-i Shear-j Moment-i Moment-j
 1 153.2455 144.8407 72.15726 -87.81816 141.6209 -267.6932
 2 144.8407 156.8819 92.18186 -69.74513 267.6932 -87.07468
 3 4.384967 8.021385 10.5577 8.145576 87.0747 32.52843

Support Reactions
 Joint ID RX RY RZ
 1 144.8407 87.81817 -141.6209
 3 -133.6187 90.00002 0
 4 -11.22197 2.181852 32.52843

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	-8.918E-03	0.0000	7.634E-03	0.0000	-2.977E-03	0.0000
3	LOAD1	-8.688E-03	0.0000	7.227E-03	0.0000	3.818E-03	0.0000
4	LOAD1	-7.279E-04	0.0000	-0.0102	0.0000	9.451E-03	0.0000
5	LOAD1	5.633E-03	0.0000	-0.0349	0.0000	8.918E-03	0.0000
6	LOAD1	6.584E-03	0.0000	-0.0467	0.0000	-1.517E-03	0.0000
7	LOAD1	8.149E-03	0.0000	-0.0275	0.0000	-0.0116	0.0000
8	LOAD1	0.0160	0.0000	2.869E-03	0.0000	-0.0112	0.0000
9	LOAD1	0.0250	0.0000	0.0226	0.0000	-3.813E-03	0.0000
10	LOAD1	0.0229	0.0000	0.0197	0.0000	5.716E-03	0.0000
11	LOAD1	0.0000	0.0000	0.0000	0.0000	7.090E-03	0.0000
12	LOAD1	0.0111	0.0000	-9.643E-03	0.0000	1.175E-03	0.0000
13	LOAD1	0.0107	0.0000	-9.013E-03	0.0000	-1.374E-03	0.0000
14	LOAD1	8.469E-03	0.0000	-4.219E-03	0.0000	-2.266E-03	0.0000
15	LOAD1	6.983E-03	0.0000	1.504E-03	0.0000	-2.186E-03	0.0000
16	LOAD1	6.584E-03	0.0000	6.229E-03	0.0000	-1.517E-03	0.0000
17	LOAD1	6.800E-03	0.0000	8.830E-03	0.0000	-5.319E-04	0.0000

18	LOAD1	6.793E-03	0.0000	8.814E-03	0.0000	5.287E-04	0.0000
19	LOAD1	5.647E-03	0.0000	6.334E-03	0.0000	1.379E-03	0.0000
20	LOAD1	2.824E-03	0.0000	2.440E-03	0.0000	1.564E-03	0.0000
21	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000



```

Input program book3ttksoal
3      2      1      1      1
1      0      0      10
2      0      10
3      1      1      10
1      1      1      10
1      1      2      10
2      3      6      10
2      2      0      10
100    0

```

non-Prismatic Arc Frame Project
[D:\Input&Output Project\OUTPUT PROGRAM\output book3ttksoal.txt]
Unit: KN-m

```

Joint Displacements
Joint ID  UX      UY      RZ
1         0      0      0
2      4.354392  3.835347E-03  -3.24183E-03
3         0      0      0

```

```

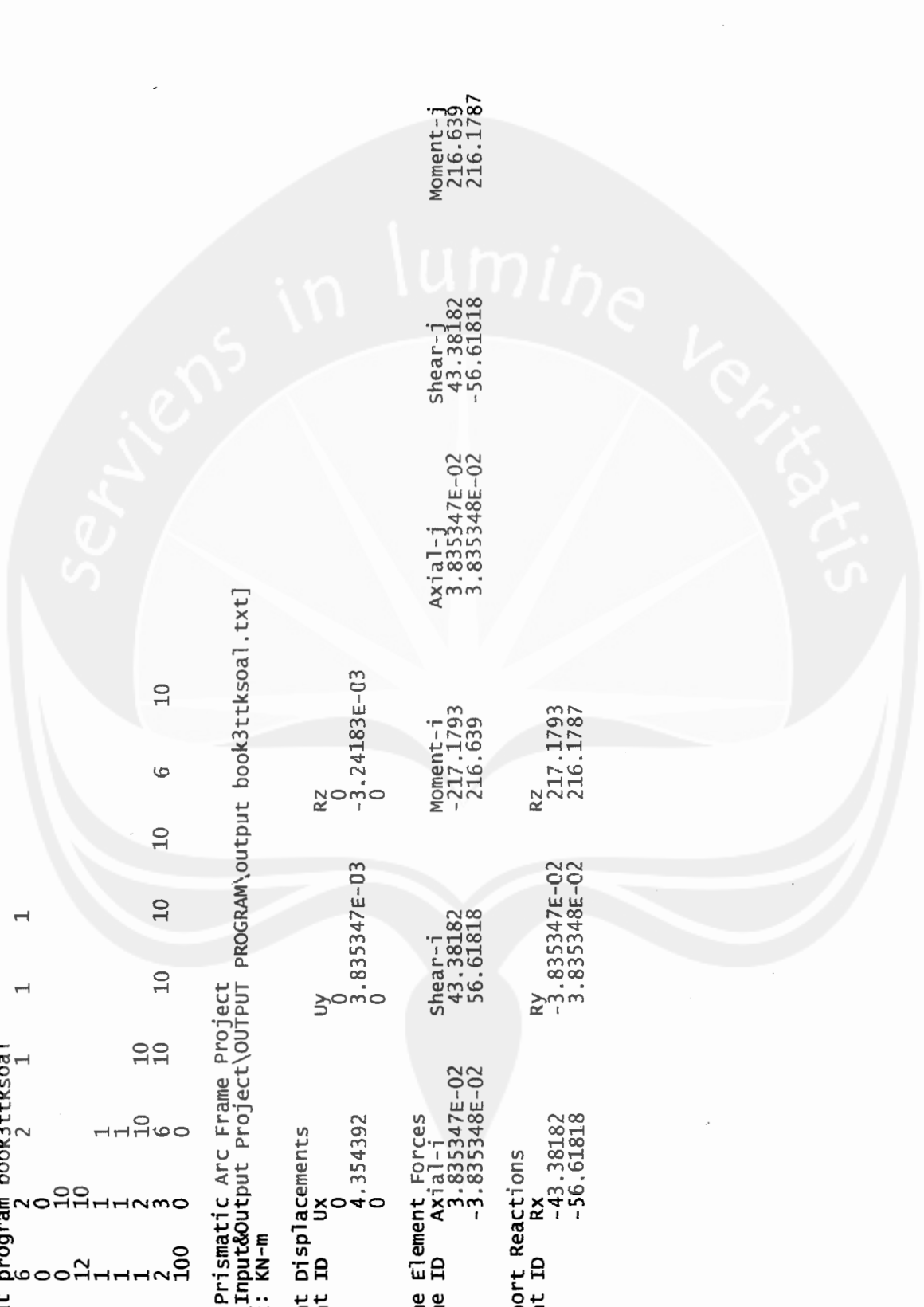
Frame Element Forces
Frame ID  Axial-i  Shear-i  Moment-i  Axial-j  Shear-j  Moment-j
1         3.835347E-02  43.38182  -217.1793  3.835347E-02  43.38182  216.639
2      -3.835348E-02  56.61818  216.639    3.835348E-02  -56.61818  216.1787

```

```

Support Reactions
Joint ID  RX      RY      RZ
1      -43.38182  -3.835347E-02  217.1793
3      -56.61818  3.835348E-02  216.1787

```



```

Input program 1gk_non_prsm4ttk
4 6 0 0 2 1e8 2
1 0 0 10
2 0 10
3 12 10
4 12 0
1 1 1
1 1 1
1 0.6 0.6
1 0.6 0.6
3 4 0.6 0.6
2 10 0.6 0.6
2 100 0
3 0 -100 0

```

non-Prismatic Arc Frame Project
[D:\Input&Output Project\OUTPUT PROGRAM\output 1gk_non_prsm4ttk.txt]

Unit: KN-m

Joint Displacements

```

Joint ID Ux Uy RZ
1 0 0 0
2 3.830746E-03 4.017307E-06 -3.134571E-04
3 3.566732E-03 -1.79062E-05 -3.94434E-04
4 0 0 0

```

Frame Element Forces

```

Frame ID Axial-j Shear-j Moment-j Axial-j Shear-j Moment-j
1 28.92461 58.66891 -361.0513 28.92461 58.66891 225.6378
2 15.71008 47.93833 225.6378 50.41962 -1.658949 -121.4576
3 -128.9246 41.33105 -121.4575 -128.9246 41.33105 291.853

```

Support Reactions

```

Joint ID RX RY RZ
1 -58.66891 -28.92461 361.0513
4 -41.33105 128.9246 291.853

```


SAP2000 v7.42 File: LGK_NON_PRISM4TTK KN-m Units PAGE 1
7/13/04 17:53:13

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	4.273E-03	0.0000	3.468E-06	0.0000	4.263E-04	0.0000
3	LOAD1	4.262E-03	0.0000	-1.736E-05	0.0000	5.012E-04	0.0000
4	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SAP2000 v7.42 File: LGK_NON_PRISM5TTK KN-m Units PAGE 1
7/13/04 18:01:55

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	4.324E-03	0.0000	3.449E-06	0.0000	3.947E-04	0.0000
3	LOAD1	4.292E-03	0.0000	8.718E-05	0.0000	-2.256E-04	0.0000
4	LOAD1	4.250E-03	0.0000	-1.734E-05	0.0000	5.405E-04	0.0000
5	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SAP2000 v7.42 File: LGK_NON_PRISM9TTK KN-m Units PAGE 1
7/12/04 0:13:19

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	4.466E-03	0.0000	3.335E-06	0.0000	4.103E-04	0.0000
3	LOAD1	4.723E-03	0.0000	-4.393E-04	0.0000	5.514E-05	0.0000
4	LOAD1	4.683E-03	0.0000	-3.162E-04	0.0000	-1.550E-04	0.0000
5	LOAD1	4.640E-03	0.0000	9.639E-05	0.0000	-2.318E-04	0.0000
6	LOAD1	4.680E-03	0.0000	5.178E-04	0.0000	-1.598E-04	0.0000
7	LOAD1	4.710E-03	0.0000	6.169E-04	0.0000	9.455E-05	0.0000
8	LOAD1	4.337E-03	0.0000	-1.722E-05	0.0000	5.707E-04	0.0000
9	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

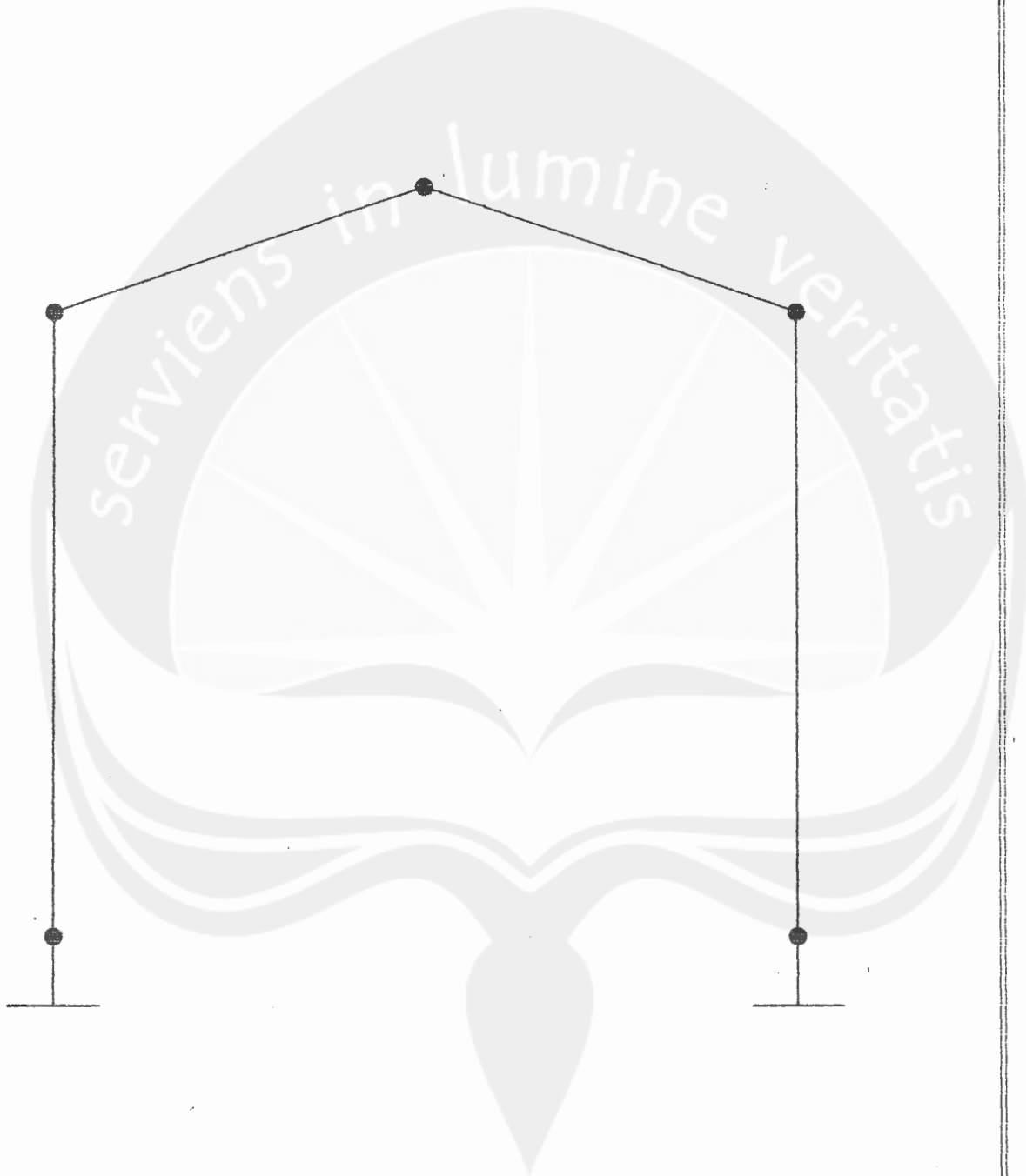
SAP2000 v7.42 File: LGK_NON_PRISM15TTK KN-m Units PAGE 1
7/13/04 17:29:29

J O I N T D I S P L A C E M E N T S

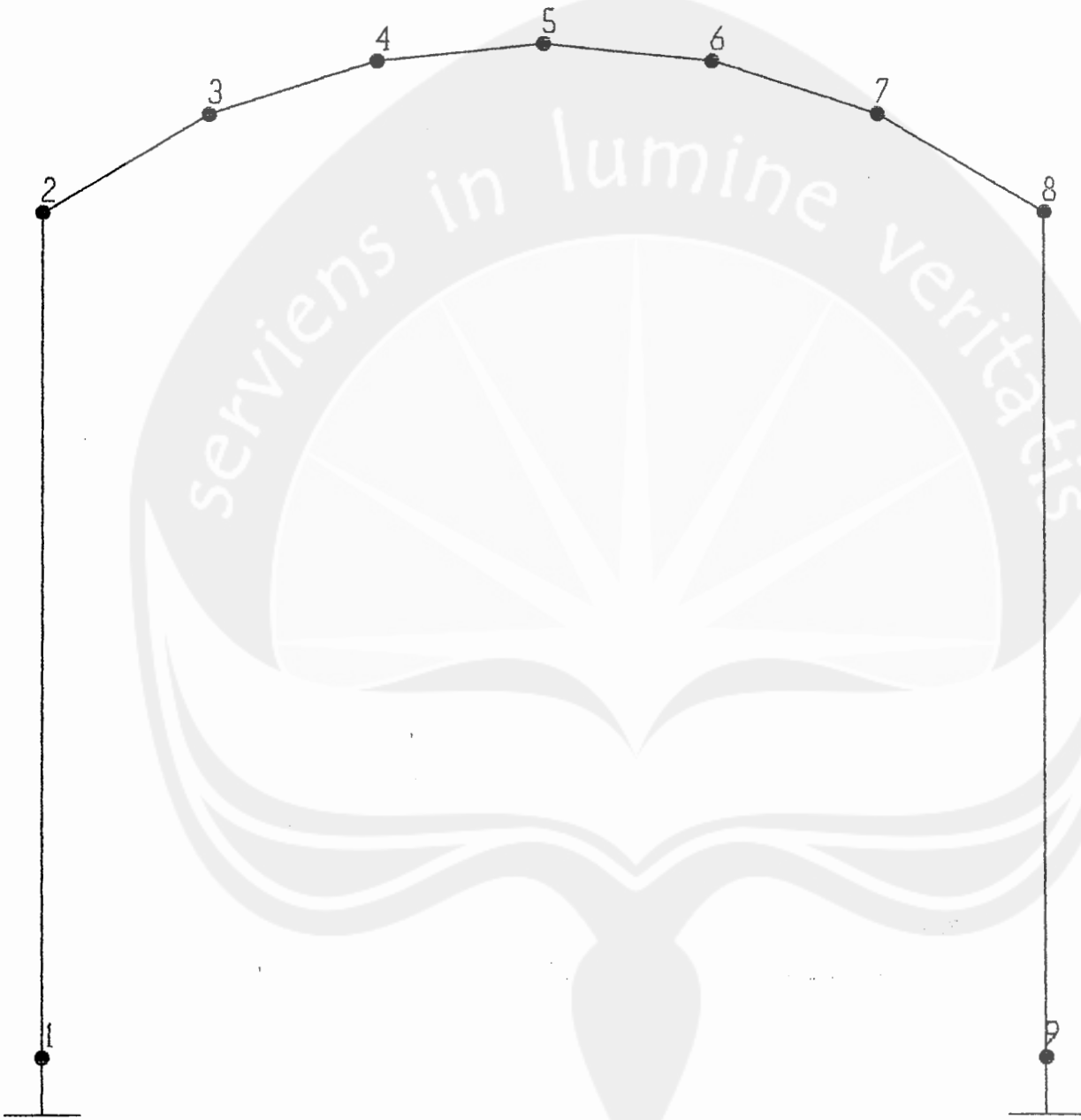
JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	LOAD1	4.483E-03	0.0000	3.319E-06	0.0000	4.127E-04	0.0000
3	LOAD1	4.687E-03	0.0000	-3.061E-04	0.0000	2.146E-04	0.0000

4	LOAD1	4.753E-03	0.0000	-4.380E-04	0.0000	5.737E-05	0.0000
5	LOAD1	4.750E-03	0.0000	-4.303E-04	0.0000	-6.454E-05	0.0000
6	LOAD1	4.720E-03	0.0000	-3.173E-04	0.0000	-1.533E-04	0.0000
7	LOAD1	4.691E-03	0.0000	-1.317E-04	0.0000	-2.092E-04	0.0000
8	LOAD1	4.679E-03	0.0000	9.273E-05	0.0000	-2.309E-04	0.0000
9	LOAD1	4.690E-03	0.0000	3.206E-04	0.0000	-2.156E-04	0.0000
10	LOAD1	4.718E-03	0.0000	5.130E-04	0.0000	-1.596E-04	0.0000
11	LOAD1	4.746E-03	0.0000	6.268E-04	0.0000	-5.800E-05	0.0000
12	LOAD1	4.740E-03	0.0000	6.134E-04	0.0000	9.490E-05	0.0000
13	LOAD1	4.640E-03	0.0000	4.185E-04	0.0000	3.047E-04	0.0000
14	LOAD1	4.351E-03	0.0000	-1.721E-05	0.0000	5.746E-04	0.0000
15	LOAD1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

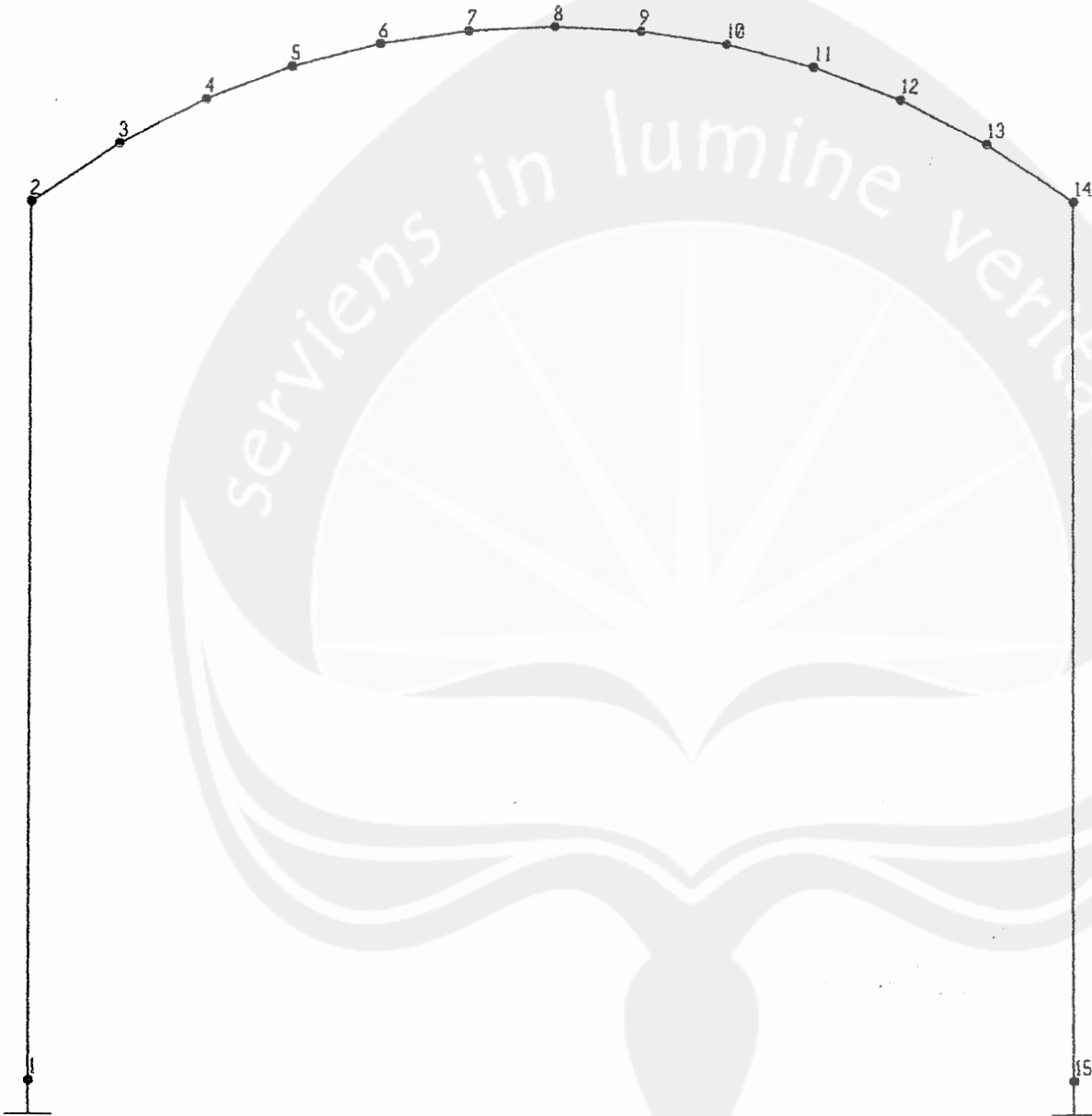
Lampiran I
94



Lampiran I
95



Lampiran I
96



Listing Program**Form Judul**

```
Private Sub Label1_Click()  
Form1.Show  
FormPicture.Hide  
End Sub
```

```
Private Sub Label2_Click()  
Form1.Show  
FormPicture.Hide  
End Sub
```

```
Private Sub Label3_Click()  
Form1.Show  
FormPicture.Hide  
End Sub
```

```
Private Sub Label4_Click()  
Form1.Show  
FormPicture.Hide  
End Sub
```

```
Private Sub Picture1_Click()  
Form1.Show  
FormPicture.Hide  
End Sub
```

Form Input data

```
Dim nomorfile As Integer
```

```
Private Sub Form_Load()  
back.Enabled = False  
Mnew.Enabled = False  
SSTab1.Tab = 0
```

```
With CboUnit  
    .AddItem "lb - in"  
    .AddItem "lb - ft"  
    .AddItem "kip - in"  
    .AddItem "kip - ft"  
    .AddItem "kN - mm"  
    .AddItem "kN - cm"  
    .AddItem "kN - m"  
    .AddItem "N - mm"  
    .AddItem "N - cm"  
    .AddItem "N - m"  
    .AddItem "kgf - mm"  
    .AddItem "kgf - cm"  
    .AddItem "kgf - m"  
    .AddItem "T - mm"  
    .AddItem "T - cm"  
    .AddItem "T - m"  
End With
```

```
With MSFlexGrid1  
    .ColAlignment(-1) = flexAlignCenterCenter  
    .ColWidth(0) = 1100  
    .TextMatrix(0, 0) = "Joint ID"  
    .TextMatrix(0, 1) = "X"  
    .TextMatrix(0, 2) = "Y"  
End With
```

```
With MSFlexGrid2
.ColAlignment(-1) = flexAlignCenterCenter
.ColWidth(0) = 1000
.ColWidth(1) = 800
.ColWidth(2) = 800
.ColWidth(3) = 800
.TextMatrix(0, 0) = "Joint ID"
.TextMatrix(0, 1) = "R-Ux"
.TextMatrix(0, 2) = "R-Uy"
.TextMatrix(0, 3) = "R-Rz"
End With
With MSFlexGrid3
.ColAlignment(-1) = flexAlignCenterCenter
.ColWidth(0) = 1300
.ColWidth(1) = 1300
.ColWidth(2) = 1300
.ColWidth(3) = 1000
.ColWidth(4) = 1000
.TextMatrix(0, 0) = "Frame ID"
.TextMatrix(0, 1) = "Start Joint"
.TextMatrix(0, 2) = "End Joint"
.TextMatrix(0, 3) = "B"
.TextMatrix(0, 4) = "H"
End With
With MSFlexGrid4
.ColAlignment(-1) = flexAlignCenterCenter
.ColWidth(0) = 1200
.ColWidth(1) = 1400
.ColWidth(2) = 1400
.TextMatrix(0, 0) = "Frame ID"
.TextMatrix(0, 1) = "Start Joint"
.TextMatrix(0, 2) = "End Joint"
.TextMatrix(0, 3) = "X Center"
.TextMatrix(0, 4) = "Y Center"
.TextMatrix(0, 5) = "R"
End With
With MSFlexGrid6
.ColAlignment(-1) = flexAlignCenterCenter
.ColWidth(0) = 1200
.ColWidth(1) = 1400
.ColWidth(2) = 1400
.TextMatrix(0, 0) = "Frame ID"
.TextMatrix(0, 1) = "B"
.TextMatrix(0, 2) = "H1"
.TextMatrix(0, 3) = "H2"
.TextMatrix(0, 4) = "H3"
End With
With MSFlexGrid5
.ColAlignment(-1) = flexAlignCenterCenter
.ColWidth(0) = 1100
.ColWidth(1) = 1000
.ColWidth(2) = 1000
.ColWidth(3) = 1000
.TextMatrix(0, 0) = "Joint ID"
.TextMatrix(0, 1) = "PX"
.TextMatrix(0, 2) = "PY"
.TextMatrix(0, 3) = "MZ"
End With
End Sub

Private Sub exit_Click()
End
End Sub
```



```
Sub simpan()
NJ = Text1.Text
NR = Text2.Text
NRJ = Text3.Text
M = Text4.Text
MAR = Text5.Text
E1 = Text6.Text
NLJ = Text7.Text
Print #1, NJ; Tab(9); NR; Tab(18); NRJ; Tab(27); M; Tab(36); MAR;
Tab(45); E1; Tab(54); NLJ
For K = 1 To NJ
  j = (Form1.MSFlexGrid1.TextMatrix(K, 0))
  xa = (Form1.MSFlexGrid1.TextMatrix(K, 1))
  xb = (Form1.MSFlexGrid1.TextMatrix(K, 2))
  Print #1, j; Tab(9); xa; Tab(18); xb
Next K
For j = 1 To NRJ
  K = (Form1.MSFlexGrid2.TextMatrix(j, 0))
  xa = (Form1.MSFlexGrid2.TextMatrix(j, 1))
  xb = (Form1.MSFlexGrid2.TextMatrix(j, 2))
  xc = (Form1.MSFlexGrid2.TextMatrix(j, 3))
  Print #1, K; Tab(9); xa; Tab(18); xb; Tab(27); xc
Next j
o = M - MAR
For j = 1 To o
  i = (Form1.MSFlexGrid3.TextMatrix(j, 0))
  xa = (Form1.MSFlexGrid3.TextMatrix(j, 1))
  xb = (Form1.MSFlexGrid3.TextMatrix(j, 2))
  xc = (Form1.MSFlexGrid3.TextMatrix(j, 3))
  xd = (Form1.MSFlexGrid3.TextMatrix(j, 4))
  Print #1, i; Tab(9); xa; Tab(18); xb; Tab(27); xc; Tab(36); xd
Next j
For j = 1 To MAR
  i = (Form1.MSFlexGrid4.TextMatrix(j, 0))
  i = (Form1.MSFlexGrid6.TextMatrix(j, 0))
  xa = (Form1.MSFlexGrid4.TextMatrix(j, 1))
  xb = (Form1.MSFlexGrid4.TextMatrix(j, 2))
  xh = (Form1.MSFlexGrid4.TextMatrix(j, 3))
  xi = (Form1.MSFlexGrid4.TextMatrix(j, 4))
  xc = (Form1.MSFlexGrid4.TextMatrix(j, 5))

  xd = (Form1.MSFlexGrid6.TextMatrix(j, 1))
  xe = (Form1.MSFlexGrid6.TextMatrix(j, 2))
  xf = (Form1.MSFlexGrid6.TextMatrix(j, 3))
  xg = (Form1.MSFlexGrid6.TextMatrix(j, 4))
  Print #1, i; Tab(12); xa; Tab(24); xb; Tab(36); xc; Tab(48); xd;
  Tab(60); xe; Tab(72); xf; Tab(84); xg; Tab(96); xh; Tab(108); xi
Next j
For K = 1 To NLJ
  j = (Form1.MSFlexGrid5.TextMatrix(K, 0))
  xa = (Form1.MSFlexGrid5.TextMatrix(K, 1))
  xb = (Form1.MSFlexGrid5.TextMatrix(K, 2))
  xc = (Form1.MSFlexGrid5.TextMatrix(K, 3))
  Print #1, j; Tab(9); xa; Tab(18); xb; Tab(27); xc
Next K
End Sub

Sub sdata()
Input #nomorfile, NJ, NR, NRJ, M, MAR, E1, NLJ
Text1.Text = NJ
Text2.Text = NR
Text3.Text = NRJ
```

```

Text4.Text = M
Text5.Text = MAR
Text6.Text = E1
Text7.Text = NLJ
ReDim MM(M)
MSFlexGrid1.Rows = NJ + 1
For K = 1 To NJ
    Input #nomorfile, j, xa, xb
    With MSFlexGrid1
        .TextMatrix(K, 0) = j
        .TextMatrix(K, 1) = xa
        .TextMatrix(K, 2) = xb
        .Rows = NJ + 1
        .Cols = 3
        .ColWidth(0) = 1200
        If NJ <= 8 Then
            .ColWidth(1) = 1200
            .Width = .ColWidth(0) + 2 * .ColWidth(1) + 100
            .Height = (NJ + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 1200
            .Width = .ColWidth(0) + 2 * .ColWidth(1) + 350
            .Height = 8 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
    End With
Next K
MSFlexGrid2.Rows = NRJ + 1
For j = 1 To NRJ
    Input #nomorfile, K, xa, xb, xc
    With MSFlexGrid2
        .TextMatrix(j, 0) = K
        .TextMatrix(j, 1) = xa
        .TextMatrix(j, 2) = xb
        .TextMatrix(j, 3) = xc
        .Rows = NRJ + 1
        .Cols = 4
        .ColWidth(0) = 1000
        If NRJ <= 5 Then
            .ColWidth(1) = 900
            .Width = .ColWidth(0) + 3 * .ColWidth(1) + 100
            .Height = (NRJ + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 900
            .Width = .ColWidth(0) + 3 * .ColWidth(1) + 350
            .Height = 5 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
        .ColWidth(3) = .ColWidth(1)
    End With
Next j

o = M - MAR
MSFlexGrid3.Rows = o + 1
For j = 1 To o
    Input #nomorfile, i, xa, xb, xc, xd

    With MSFlexGrid3
        .TextMatrix(j, 0) = i
        .TextMatrix(j, 1) = xa
        .TextMatrix(j, 2) = xb
        .TextMatrix(j, 3) = xc
        .TextMatrix(j, 4) = xd
    End With
Next j

```

```
.Rows = o + 1
.Cols = 5
.ColWidth(0) = 1200
If o <= 8 Then
    .ColWidth(1) = 1400
    .Width = .ColWidth(0) + 4 * .ColWidth(1) + 100
    .Height = (o + 1) * .RowHeight(0) + 90
Else
    .ColWidth(1) = 1400
    .Width = .ColWidth(0) + 4 * .ColWidth(1) + 350
    .Height = 8 * .RowHeight(0) + 90
End If
.ColWidth(2) = .ColWidth(1)
.ColWidth(3) = .ColWidth(1)
.ColWidth(4) = .ColWidth(1)
End With
Next j
MSFlexGrid4.Rows = MAR + 1
For j = 1 To MAR
    Input #nomorfile, i, xa, xb, xc, xd, xe, xf, xg, xh, xi
    With MSFlexGrid4
        .TextMatrix(j, 0) = i
        .TextMatrix(j, 1) = xa
        .TextMatrix(j, 2) = xb
        .TextMatrix(j, 3) = xh
        .TextMatrix(j, 4) = xi
        .TextMatrix(j, 5) = xc
        .Rows = MAR + 1
        .Cols = 6
        .ColWidth(0) = 1000
        If MAR <= 8 Then
            .ColWidth(1) = 1300
            .Width = .ColWidth(0) + 5 * .ColWidth(1) + 100
            .Height = (MAR + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 1200
            .Width = .ColWidth(0) + 5 * .ColWidth(1) + 250
            .Height = 8 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
        .ColWidth(3) = .ColWidth(1)
        .ColWidth(4) = .ColWidth(1)
        .ColWidth(5) = .ColWidth(1)
    End With
With MSFlexGrid6
    .TextMatrix(j, 0) = i
    .TextMatrix(j, 1) = xd
    .TextMatrix(j, 2) = xe
    .TextMatrix(j, 3) = xf
    .TextMatrix(j, 4) = xg
    .Rows = MAR + 1
    .Cols = 5
    .ColWidth(0) = 1000
    If MAR <= 8 Then
        .ColWidth(1) = 1200
        .Width = .ColWidth(0) + 4 * .ColWidth(1) + 100
        .Height = (MAR + 1) * .RowHeight(0) + 90
    Else
        .ColWidth(1) = 1200
        .Width = .ColWidth(0) + 4 * .ColWidth(1) + 250
        .Height = 8 * .RowHeight(0) + 90
    End If
    .ColWidth(2) = .ColWidth(1)
```

```

        .ColWidth(3) = .ColWidth(1)
        .ColWidth(4) = .ColWidth(1)
    End With
Next j
MSFlexGrid5.Rows = NLJ + 1
For j = 1 To NLJ
    Input #nomorfile, i, xa, xb, xc
    With MSFlexGrid5
        .TextMatrix(j, 0) = i
        .TextMatrix(j, 1) = xa
        .TextMatrix(j, 2) = xb
        .TextMatrix(j, 3) = xc
        .Rows = NLJ + 1
        .Cols = 4
        .ColWidth(0) = 1100
        If NLJ <= 5 Then
            .ColWidth(1) = 1000
            .Width = .ColWidth(0) + 3 * .ColWidth(3) + 100
            .Height = (NLJ + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 1000
            .Width = .ColWidth(0) + 3 * .ColWidth(3) + 350
            .Height = 5 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
        .ColWidth(3) = .ColWidth(1)
    End With
Next j
End Sub
Sub bukafile()
    On Error GoTo other1
    dlgfile.Filter = "Text Document (*.txt)| *.txt"
    dlgfile.DialogTitle = "Open File..."
    dlgfile.ShowOpen
    nomorfile = FreeFile
    Open dlgfile.FileName For Input As nomorfile
    sdata
    Close nomorfile
    Form1.Caption = "non-Prismatic Arc Frame Project " + dlgfile.FileName
other1:
    Form1.Show
End Sub

Private Sub Mnew_Click()
    Form1.Show
    Form1.Text1.Text = ""
    Form1.Text2.Text = ""
    Form1.Text3.Text = ""
    Form1.Text4.Text = ""
    Form1.Text5.Text = ""
    Form1.Text6.Text = ""
    Form1.Text7.Text = ""
    Form1.MSFlexGrid1.Rows = 2
    For j = 0 To 2
        Form1.MSFlexGrid1.TextMatrix(1, j) = ""
    Next j
    Form1.MSFlexGrid2.Rows = 2
    For j = 0 To 3
        Form1.MSFlexGrid2.TextMatrix(1, j) = ""
    Next j
    Form1.MSFlexGrid3.Rows = 2
    For j = 0 To 4
        Form1.MSFlexGrid3.TextMatrix(1, j) = ""
    
```

```
Next j
    Form1.MSFlexGrid4.Rows = 2
For j = 0 To 5
    Form1.MSFlexGrid4.TextMatrix(1, j) = ""
Next j
    Form1.MSFlexGrid6.Rows = 2
For j = 0 To 4
    Form1.MSFlexGrid6.TextMatrix(1, j) = ""
Next j
    Form1.MSFlexGrid5.Rows = 2
For j = 0 To 3
    Form1.MSFlexGrid5.TextMatrix(1, j) = ""
Next j
End Sub

Private Sub next_Click()
Form2.Show
Form1.Hide
End Sub

Private Sub open_Click()
bukafile
Mnew.Enabled = True
End Sub

Private Sub Form_Activate()
Text1.SetFocus
End Sub

Private Sub Save_Click()
On Error GoTo debug1
dlgfile.Filter = "Text Document (*.txt)|*.txt"
dlgfile.DialogTitle = "Save Input File..."
dlgfile.DefaultExt = ".txt"
dlgfile.ShowSave
nomorfile = FreeFile
Open dlgfile.FileName For Output As #nomorfile
simpan
Close #nomorfile
Exit Sub
debug1:
Close #nomorfile
Form1.Show
End Sub

Private Sub Text1_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then
    NJ = Val(Text1.Text)
    MSFlexGrid1.Rows = NJ + 1
    judul = "Input Joint Coordinate"
    For K = 1 To NJ
        promp = "INPUT ABSCISSA X OF JOINT (" + Str(K) + ")"
        x = Val(InputBox(promp, judul))

        promp = "INPUT ORDINATE Y OF JOINT (" + Str(K) + ")"
        y = Val(InputBox(promp, judul))
        With MSFlexGrid1
            .TextMatrix(K, 0) = K
            .TextMatrix(K, 1) = x
            .TextMatrix(K, 2) = y
            .Rows = NJ + 1
            .Cols = 3
            .ColWidth(0) = 1200
        End With
    Next K
End If
End Sub
```

```

If NJ <= 8 Then
  .ColWidth(1) = 1200
  .Width = .ColWidth(0) + 2 * .ColWidth(1) + 100
  .Height = (NJ + 1) * .RowHeight(0) + 90
  Else
  .ColWidth(1) = 1200
  .Width = .ColWidth(0) + 2 * .ColWidth(1) + 350
  .Height = 8 * .RowHeight(0) + 90
  End If
  .ColWidth(2) = .ColWidth(1)
End With
Next K
Text2.SetFocus
End If
End Sub

Private Sub Text2_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then Text3.SetFocus
End Sub

Private Sub Text3_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then
  NRJ = Val(Text3.Text)
  MSFlexGrid2.Rows = NRJ + 1
  judul = "Input Joint Restraints"
  For j = 1 To NRJ
    promp = "INPUT RESTRAINED-JOINT ID"
    K = Val(InputBox(promp, judul))

    promp = "TRANSLATION X OF JOINT (" + Str(K) + ")"
    xa = Val(InputBox(promp, judul))

    promp = "TRANSLATION Y OF JOINT (" + Str(K) + ")"
    xb = Val(InputBox(promp, judul))

    promp = "ROTATION Z OF JOINT (" + Str(K) + ")"
    xc = Val(InputBox(promp, judul))
    With MSFlexGrid2
      .TextMatrix(j, 0) = K
      .TextMatrix(j, 1) = xa
      .TextMatrix(j, 2) = xb
      .TextMatrix(j, 3) = xc
      .Rows = NRJ + 1
      .Cols = 4
      .ColWidth(0) = 1000
      If NRJ <= 5 Then
        .ColWidth(1) = 900
        .Width = .ColWidth(0) + 3 * .ColWidth(1) + 100
        .Height = (NRJ + 1) * .RowHeight(0) + 90
      Else
        .ColWidth(1) = 900
        .Width = .ColWidth(0) + 3 * .ColWidth(1) + 350
        .Height = 5 * .RowHeight(0) + 90
      End If
      .ColWidth(2) = .ColWidth(1)
      .ColWidth(3) = .ColWidth(1)
    End With
  Next j
  Text4.SetFocus
End If
End Sub

Private Sub Text4_KeyDown(KeyCode As Integer, Shift As Integer)

```

```

If KeyCode = 13 Then
M = Val(Text4.Text)
Text5.SetFocus
End If
End Sub

Private Sub Text5_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then
Dim o As Integer
M = Val(Text4.Text)
MAR = Val(Text5.Text)
o = M - MAR
If MAR = 0 Then
MSFlexGrid3.Rows = o + 1
For i = 1 To o
    prompt = "INPUT FRAME ID OF FRAME "
    K = Val(InputBox(prompt, judul))

    prompt = "INPUT START-JOINT OF FRAME " + Str(K)
    xa = Val(InputBox(prompt, judul))

    prompt = "INPUT END-JOINT OF FRAME " + Str(K)
    xb = Val(InputBox(prompt, judul))

    prompt = "INPUT WIDTH OF FRAME " + Str(K)
    xc = Val(InputBox(prompt, judul))

    prompt = "INPUT HEIGHT OF FRAME " + Str(K)
    xd = Val(InputBox(prompt, judul))
    With MSFlexGrid3
        .TextMatrix(i, 0) = K
        .TextMatrix(i, 1) = xa
        .TextMatrix(i, 2) = xb
        .TextMatrix(i, 3) = xc
        .TextMatrix(i, 4) = xd
        .Rows = o + 1
        .Cols = 5
        .ColWidth(0) = 1200
        If o <= 8 Then
            .ColWidth(1) = 1200
            .Width = .ColWidth(0) + 4 * .ColWidth(1) + 100
            .Height = (o + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 1100
            .Width = .ColWidth(0) + 4 * .ColWidth(1) + 350
            .Height = 8 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
        .ColWidth(3) = .ColWidth(1)
        .ColWidth(4) = .ColWidth(1)
    End With
Next i
Text6.SetFocus
Else
MSFlexGrid4.Rows = MAR + 1
For j = 1 To MAR
    prompt = "INPUT FRAME ID OF ARC FRAME "
    K = Val(InputBox(prompt, judul))

    prompt = "INPUT START-JOINT OF ARC FRAME " + Str(K)
    xa = Val(InputBox(prompt, judul))

    prompt = "INPUT END-JOINT OF ARC FRAME " + Str(K)

```

```

xb = Val(InputBox(promp, judul))

promp = "INPUT RADIUS OF ARC FRAME " + Str(K)
xc = Val(InputBox(promp, judul))

promp = "INPUT WIDTH OF ARC FRAME " + Str(K)
xd = Val(InputBox(promp, judul))

promp = "INPUT HEIGHT 1 OF ARC FRAME " + Str(K)
xe = Val(InputBox(promp, judul))

promp = "INPUT HEIGHT 2 OF ARC FRAME " + Str(K)
xf = Val(InputBox(promp, judul))

promp = "INPUT HEIGHT 3 OF ARC FRAME " + Str(K)
xg = Val(InputBox(promp, judul))

promp = "INPUT ABSICA CENTER OF ARC FRAME " + Str(K)
xh = Val(InputBox(promp, judul))

promp = "INPUT ORDINAT CENTER OF ARC FRAME " + Str(K)
xi = Val(InputBox(promp, judul))
With MSFlexGrid4
.TextMatrix(j, 0) = K
.TextMatrix(j, 1) = xa
.TextMatrix(j, 2) = xb
.TextMatrix(j, 3) = xh
.TextMatrix(j, 4) = xi
.TextMatrix(j, 5) = xc
.Rows = MAR + 1
.Cols = 6
.ColWidth(0) = 1000
If MAR <= 8 Then
.ColWidth(1) = 1300
.Width = .ColWidth(0) + 5 * .ColWidth(1) + 100
.Height = (MAR + 1) * .RowHeight(0) + 90
Else
.ColWidth(1) = 1200
.Width = .ColWidth(0) + 5 * .ColWidth(1) + 250
.Height = 8 * .RowHeight(0) + 90
End If
.ColWidth(2) = .ColWidth(1)
.ColWidth(3) = .ColWidth(1)
.ColWidth(4) = .ColWidth(1)
.ColWidth(5) = .ColWidth(1)
End With
With MSFlexGrid6
.TextMatrix(j, 0) = i ' no btg
.TextMatrix(j, 1) = xd ' B
.TextMatrix(j, 2) = xe ' H1
.TextMatrix(j, 3) = xf ' H2
.TextMatrix(j, 4) = xg ' H3
.Rows = MAR + 1
.Cols = 5
.ColWidth(0) = 1000
If MAR <= 8 Then
.ColWidth(1) = 1200
.Width = .ColWidth(0) + 4 * .ColWidth(1) + 100
.Height = (MAR + 1) * .RowHeight(0) + 90
Else
.ColWidth(1) = 1200
.Width = .ColWidth(0) + 4 * .ColWidth(1) + 250
.Height = 8 * .RowHeight(0) + 90

```



```

End If
.ColWidth(2) = .ColWidth(1)
.ColWidth(3) = .ColWidth(1)
.ColWidth(4) = .ColWidth(1)
End With
o = M - MAR
MSFlexGrid3.Rows = o + 1
For i = 1 To o
  promp = "INPUT FRAME ID OF FRAME "
  K = Val(InputBox(promp, judul))

  promp = "INPUT START-JOINT OF FRAME " + Str(K)
  xa = Val(InputBox(promp, judul))

  promp = "INPUT END-JOINT OF FRAME " + Str(K)
  xb = Val(InputBox(promp, judul))

  promp = "INPUT WIDTH OF FRAME " + Str(K)
  xc = Val(InputBox(promp, judul))

  promp = "INPUT HEIGHT OF FRAME " + Str(K)
  xd = Val(InputBox(promp, judul))
  With MSFlexGrid3
    .TextMatrix(i, 0) = K
    .TextMatrix(i, 1) = xa
    .TextMatrix(i, 2) = xb
    .TextMatrix(i, 3) = xc
    .TextMatrix(i, 4) = xd
    .Rows = o + 1
    .Cols = 5
    .ColWidth(0) = 1200
    If o <= 8 Then
      .ColWidth(1) = 1200
      .Width = .ColWidth(0) + 4 * .ColWidth(1) + 100
      .Height = (o + 1) * .RowHeight(0) + 90
    Else
      .ColWidth(1) = 1100
      .Width = .ColWidth(0) + 4 * .ColWidth(1) + 350
      .Height = 8 * .RowHeight(0) + 90
    End If
    .ColWidth(2) = .ColWidth(1)
    .ColWidth(3) = .ColWidth(1)
    .ColWidth(4) = .ColWidth(1)
  End With
Next i
Next j
Text6.SetFocus
End If
End If
End Sub

Private Sub Text6_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then
El = Val(Text6.Text)
Text7.SetFocus
End If
End Sub

Private Sub Text7_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode = 13 Then
  NLJ = Val(Text7.Text)
  MSFlexGrid5.Rows = NLJ + 1
  judul = "Input Loads on Joint"

```

```

ReDim AJ(ND) As Double
For i = 1 To NLJ
  promp = "INPUT JOINT ID"
  K = Val(InputBox(promp, judul))

  promp = "INPUT POINT LOAD X ON JOINT (" + Str(i) + ")"
  xa = Val(InputBox(promp, judul))

  promp = "INPUT POINT LOAD Y ON JOINT (" + Str(i) + ")"
  xb = Val(InputBox(promp, judul))

  promp = "INPUT MOMENT Z ON JOINT (" + Str(i) + ")"
  xc = Val(InputBox(promp, judul))
  With MSFlexGrid5
    .TextMatrix(i, 0) = K
    .TextMatrix(i, 1) = xa
    .TextMatrix(i, 2) = xb
    .TextMatrix(i, 3) = xc
    .Rows = NLJ + 1
    .Cols = 4
    .ColWidth(0) = 1000
  If NLJ <= 5 Then
    .ColWidth(1) = 1000
    .Width = .ColWidth(0) + 3 * .ColWidth(3) + 100
    .Height = (NLJ + 1) * .RowHeight(0) + 90
  Else
    .ColWidth(1) = 1000
    .Width = .ColWidth(0) + 3 * .ColWidth(3) + 350
    .Height = 5 * .RowHeight(0) + 90
  End If
    .ColWidth(2) = .ColWidth(1)
    .ColWidth(3) = .ColWidth(1)
  End With
Next i
End If
End Sub

```

Form Gambar Portal

```

Dim NJ As Integer, NR As Integer, NRJ As Integer, M As Integer, MAR As
Integer, NLJ As Integer
Dim BL() As Double, HL1() As Double, HL2() As Double, HL3() As Double,
R() As Double
Dim phi() As Double, LL() As Double, dz() As Double, jj() As Single, jk()
As Single
Dim xP() As Double, yP() As Double, r1() As Double, r2() As Double, x33()
As Single, y33() As Single
Dim MM() As Integer
Dim xa As Single, xb As Single, xc As Single, xd As Single, xe As Single,
xf As Single, xg As Single, xh As Single, xi As Single
Dim XCL() As Double, YCL() As Double
Dim CYL() As Single, CXL() As Single, yy() As Double
Const PEMBEDA As Integer = 1
Public baris
Dim pengali As Single
Dim maxy As Long
Dim magnify As Integer
Dim x1 As Single
Dim x2 As Single
Dim y1 As Single
Dim y2 As Single
Dim x As Single
Dim y As Single

```

```
Dim sudut1 As Single, sudut2 As Single, ee() As Single, ff() As Single,
we() As Single
Dim i, j
Dim jumlah_batang As String
Dim jumlah_btg_lgk As String
Dim jumlah_btg_lrs As String
Dim jumlah_joint As String
Dim b, c, d, p, q, jumlah, u, E, az, f, g, h, w, radius, tt1 As Single,
tt2 As Single, v, pusatX, pusatY As Single
Dim a(), el, er(), z(25, 25), disp(25, 25), K(), titik1, titik2, titik3,
titik4, kumpul()
```

```
Private Sub back_Click()
Form1.Show
Form2.Hide
End Sub
```

```
Private Sub Check1_Click()
DrawAll
Plot
End Sub
```

```
Private Sub Check2_Click()
DrawAll
Plot
End Sub
```

```
Private Sub joint_Click()
Check1.Value = 1
Plot
End Sub
```

```
Private Sub Mnew_Click()
Form1.Show
Form1.Text1.Text = ""
Form1.Text2.Text = ""
Form1.Text3.Text = ""
Form1.Text4.Text = ""
Form1.Text5.Text = ""
Form1.Text6.Text = ""
Form1.Text7.Text = ""
Form1.Text8.Text = ""
Form1.MSFlexGrid1.Clear
Form1.MSFlexGrid2.Clear
Form1.MSFlexGrid3.Clear
Form1.MSFlexGrid4.Clear
Form1.MSFlexGrid5.Clear
Form1.MSFlexGrid6.Clear
Form1.Text1.SetFocus
End Sub
```

```
Private Sub mnuex_Click()
End
End Sub
```

```
Private Sub Mrun_Click()
Form3.Show
End Sub
```

```
Private Sub MSFrame_Click()
Check2.Value = 1
```

```
Plot
End Sub
```

```
Private Sub mShowI_Click()
Form1.Show
End Sub
```

```
Private Sub run_Click(Index As Integer)
FormPicture.Show
Form3.Show
End Sub
```

```
Private Sub DrawAll()
Picture1.Cls
E = 0
f = 0
g = 0
h = 0
jumlah_joint = (Form1.Text1.Text)
ReDim a(jumlah_joint, jumlah_joint)
For i = 1 To jumlah_joint
  For j = 1 To 2
    a(i, j) = Form1.MSFlexGrid1.TextMatrix(i, j)
  Next j
Next i
Jumlah = (Form1.Text3.Text) ' NRJ
ReDim K(jumlah, 5)
For i = 1 To jumlah
  For j = 1 To 3
    K(i, j) = Form1.MSFlexGrid2.TextMatrix(i, j)
  Next j
  ReDim kumpul(jumlah)
  kumpul(i) = Form1.MSFlexGrid2.TextMatrix(i, 0)
  p = a(kumpul(i), 1) + 4
  q = a(kumpul(i), 2) + 4
  If K(i, 1) = 1 And K(i, 2) = 1 And K(i, 3) = 1 Then
    Garis Picture1, p * pengali, q * pengali, p * pengali, (q - 0.5)
    * pengali, &HFF0000
    Garis Picture1, (p - 0.75) * pengali, (q - 0.5) * pengali, (p +
    0.75) * pengali, (q - 0.5) * pengali, &HFF0000
  ElseIf K(i, 1) = 1 And K(i, 2) = 1 And K(i, 3) = 0 Then
    Garis Picture1, (p - 0.75) * pengali, (q - 0.75) * pengali, p *
    pengali, q * pengali, &HFF0000
    Garis Picture1, p * pengali, q * pengali, (p + 0.75) * pengali,
    (q - 0.75) * pengali, &HFF0000
    Garis Picture1, (p + 0.75) * pengali, (q - 0.75) * pengali, (p -
    0.75) * pengali, (q - 0.75) * pengali, &HFF0000
  Else
    Lingkaran Picture1, p * pengali, (q - 0.25) * pengali, 0.3 *
    pengali, &HFF0000
    Garis Picture1, (p - 0.75) * pengali, (q - 0.6) * pengali, (p +
    0.75) * pengali, (q - 0.6) * pengali, &HFF0000
  End If
Next i
jumlah_batang = (Form1.Text4.Text)
jumlah_btg_lgk = (Form1.Text5.Text)
jumlah_btg_lrs = jumlah_batang - jumlah_btg_lgk
For i = 1 To jumlah_btg_lrs
  titik1 = (Form1.MSFlexGrid3.TextMatrix(i, 1))
  titik2 = (Form1.MSFlexGrid3.TextMatrix(i, 2))
  E = a(titik1, 1) + 4 'joint xj
  f = a(titik1, 2) + 4 'joint yj
  g = a(titik2, 1) + 4 'joint xk
```

```

    h = a(titik2, 2) + 4 'joint yk
    Garis Picture1, E * pengali, f * pengali, g * pengali, h *
pengali, vbBlack & i
    Picture1.FillStyle = 0
    Lingkarn Picture1, E * pengali, f * pengali, 0.2 * pengali, &HC000& &
titik1
    Lingkarn Picture1, g * pengali, h * pengali, 0.2 * pengali, &HC000& &
titik2
    Picture1.FillStyle = 1
Next i
    For j = 1 To jumlah_btg_lgk
titik1 = (Form1.MSFlexGrid4.TextMatrix(j, 1))
titik2 = (Form1.MSFlexGrid4.TextMatrix(j, 2))
pusatX = (Form1.MSFlexGrid4.TextMatrix(j, 3))
pusatY = (Form1.MSFlexGrid4.TextMatrix(j, 4))
radius = (Form1.MSFlexGrid4.TextMatrix(j, 5))
sudut1 = (Form2.MSFlexGrid1.TextMatrix(j, 1))
sudut2 = (Form2.MSFlexGrid1.TextMatrix(j, 2))
        f = a(titik1, 2) + 4
        E = a(titik1, 1) + 4
        g = a(titik2, 1) + 4
        h = a(titik2, 2) + 4
        w = pusatX + 4
        v = pusatY + 4
        If f > h Then
            tt1 = -(sudut2 - (2 * sudut1))
            tt2 = -(sudut2)
        Else
            tt1 = -(3.14159265 - (sudut1 + sudut2 + sudut1))
            tt2 = -(3.14159265 - (sudut2))
        End If
        Lengkung Picture1, w * pengali, v * pengali, radius * pengali,
vbBlack & j, tt1 * pengali, tt2 * pengali
        Picture1.FillStyle = 0
        Lingkarn Picture1, E * pengali, f * pengali, 0.2 * pengali, &HC000& &
titik1
        Lingkarn Picture1, g * pengali, h * pengali, 0.2 * pengali, &HC000& &
titik2
        Picture1.FillStyle = 1
    Next j
End Sub

Private Sub Lengkung(pic As PictureBox, x As Single, y As Single, rad As
Single, warna As Long, sdt1 As Single, sdt2 As Single)
pic.Circle (Round(x), Round(maxy - y)), rad, warna, tt1, tt2
End Sub

Private Sub Garis(pic As PictureBox, x1 As Single, y1 As Single, x2 As
Single, y2 As Single, warna As Long)
pic.Line (Round(x1), Round(maxy - y1))-(Round(x2), Round(maxy - y2)),
warna
End Sub

Private Sub Lingkarn(pic As PictureBox, x As Single, y As Single, rad As
Single, warna As Long)
pic.Circle (Round(x), Round(maxy - y)), rad, warna
End Sub

Private Sub titik(pic As PictureBox, x As Single, y As Single, warna As
Long)
pic.PSet (Round(x), Round(maxy - y)), warna
End Sub

```

```
Private Sub Command1_Click()  
pengali = pengali + pengali / magnify  
DrawAll  
Check1.Value = 0  
Check2.Value = 0  
End Sub  
  
Private Sub Command2_Click()  
pengali = pengali - pengali / magnify  
DrawAll  
Check1.Value = 0  
Check2.Value = 0  
End Sub  
  
Private Sub Form_Activate()  
Mnew.Enabled = False  
Msave.Enabled = False  
Mopen.Enabled = False  
maxy = Picture1.Height  
Picture1.BackColor = vbWhite  
Picture1.DrawWidth = 2  
DrawAll  
End Sub  
  
Private Sub Form_Load()  
NJ = (Form1.Text1.Text)  
NR = (Form1.Text2.Text)  
NRJ = (Form1.Text3.Text)  
M = (Form1.Text4.Text)  
MAR = (Form1.Text5.Text)  
ReDim x33(NJ)  
ReDim y33(NJ)  
For i = 1 To NJ  
    j = (Form1.MSFlexGrid1.TextMatrix(i, 0))  
    xa = (Form1.MSFlexGrid1.TextMatrix(i, 1))  
    xb = (Form1.MSFlexGrid1.TextMatrix(i, 2))  
    x33(j) = xa  
    y33(j) = xb  
Next i  
ReDim jj(M)  
ReDim jk(M)  
ReDim LL(M)  
ReDim LR(M)  
ReDim CXR(M)  
ReDim CYR(M)  
ReDim CXLj(M)  
ReDim CYLj(M)  
ReDim CXLk(M)  
ReDim CYLk(M)  
ReDim XCL(M)  
ReDim YCL(M)  
ReDim R(M)  
ReDim dz(M)  
ReDim YY(M)  
ReDim r1(M)  
ReDim r2(M)  
ReDim xP(M)  
ReDim yP(M)  
ReDim phi(M)  
ReDim MM(M)  
ReDim ee(M)  
ReDim ff(M)  
ReDim we(M)  
For j = 1 To MAR
```

```

i = (Form1.MSFlexGrid4.TextMatrix(j, 0))
xa = (Form1.MSFlexGrid4.TextMatrix(j, 1))
xb = (Form1.MSFlexGrid4.TextMatrix(j, 2))
xh = (Form1.MSFlexGrid4.TextMatrix(j, 3))
xi = (Form1.MSFlexGrid4.TextMatrix(j, 4))
xc = (Form1.MSFlexGrid4.TextMatrix(j, 5))
xd = (Form1.MSFlexGrid6.TextMatrix(j, 1))
jj(i) = xa
jk(i) = xb
R(i) = xc
xP(i) = xh
yP(i) = xi
XCL(i) = x33(jk(i)) - x33(jj(i))
YCL(i) = y33(jk(i)) - y33(jj(i))
r1(i) = Sqr(XCL(i) * XCL(i) + YCL(i) * YCL(i))
r2(i) = r1(i) / 2
yy(i) = (r2(i)) / R(i)
ee(i) = y33(jj(i)) - yP(i)
ff(i) = ee(i) / R(i)
If ff(i) = 1 Then
we(i) = 2 * Atn(ff(i))
Else
we(i) = Atn((ff(i)) / (Sqr(-ff(i) * ff(i) + 1)))
End If
If yy(i) = 1 Then
dz(i) = 2 * Atn(yy(i))
Else
dz(i) = Atn((yy(i)) / (Sqr(-yy(i) * yy(i) + 1)))
End If
With Form2.MSFlexGrid1
.ColWidth(-1) = 1800
.TextMatrix(j, 0) = i
.TextMatrix(j, 1) = dz(i)
.TextMatrix(j, 2) = we(i)
.Rows = MAR + 1
End With
Next j
Mnew.Enabled = False
pengali = 300
magnify = 10
baris = 0
End Sub

Private Sub Plot()
jumlah_joint = (Form1.Text1.Text)
ReDim a(jumlah_joint, jumlah_joint)
For i = 1 To jumlah_joint
For j = 1 To 2
a(i, j) = Form1.MSFlexGrid1.TextMatrix(i, j)
Next j
Next i
If Check1.Value = 1 Then
Picture1.FontBold = True
Picture1.ForeColor = vbMagenta
Picture1.FontSize = 8
For i = 1 To jumlah_joint
x = a(i, 1) + 4
y = a(i, 2) + 4
Picture1.CurrentX = x * pengali
Picture1.CurrentY = maxy - (y * pengali)
Picture1.Print i
Next i
End If

```

```

jumlah_batang = (Form1.Text4.Text)
jumlah_btg_lgk = (Form1.Text5.Text)
jumlah_btg_lrs = jumlah_batang - jumlah_btg_lgk

For i = 1 To jumlah_btg_lrs
    u = (Form1.MSFlexGrid3.TextMatrix(i, 0))
    titik1 = (Form1.MSFlexGrid3.TextMatrix(i, 1))
    titik2 = (Form1.MSFlexGrid3.TextMatrix(i, 2))
    E = a(titik1, 1) + 4
    f = a(titik1, 2) + 4
    g = a(titik2, 1) + 4
    h = a(titik2, 2) + 4
    If Check2.Value = 1 Then
        Picture1.FontBold = True
        Picture1.ForeColor = vbRed
        Picture1.FontSize = 6
        xe = ((E + g) / 2)
        ye = ((f + h) / 2)
        Picture1.CurrentX = xe * pengali
        Picture1.CurrentY = maxy - (ye * pengali)
        Picture1.Print u
    End If
Next i
For j = 1 To jumlah_btg_lgk
    u = (Form1.MSFlexGrid4.TextMatrix(j, 0))
    titik1 = (Form1.MSFlexGrid4.TextMatrix(j, 1))
    titik2 = (Form1.MSFlexGrid4.TextMatrix(j, 2))
    E = a(titik1, 1) + 4
    f = a(titik1, 2) + 4
    g = a(titik2, 1) + 4
    h = a(titik2, 2) + 4
    If Check2.Value = 1 Then
        Picture1.FontBold = True
        Picture1.ForeColor = vbRed
        Picture1.FontSize = 6
        xe = ((E + g) / 2)
        ye = ((f + h) / 2)
        Picture1.CurrentX = xe * pengali
        Picture1.CurrentY = maxy - (ye * pengali)
        Picture1.Print u
    End If
Next j
End Sub

Private Sub Zin_Click()
    pengali = pengali - pengali / magnify
    DrawAll
    Plot
End Sub

Private Sub Zout_Click()
    pengali = pengali + pengali / magnify
    DrawAll
    Plot
End Sub

Form Output data

Dim NJ As Integer, NR As Integer, NRJ As Integer, M As Integer, MAR As
Integer, NLJ As Integer, El As Double
Dim x() As Single, y() As Single, jrl() As Single, jj() As Single, jk()
As Single
Dim BL() As Double, HL1() As Double, HL2() As Double, HL3() As Double,
R() As Double

```


Dim phi() As Double, y1() As Double, LL() As Double, dz() As Double, p()
As Double
Dim q() As Double, aa() As Double, bb() As Double, cc() As Double, dd()
As Double
Dim ee() As Double, ff() As Double, gg() As Double, CYLj() As Double,
CXLj() As Double, CYLk() As Double, CXLk() As Double
Dim z() As Double, xP() As Double, yP() As Double, r1() As Double, r2()
As Double
Dim BLR() As Double, HLR() As Double, ALR() As Double, CXR() As Double,
CYR() As Double, inersia() As Double
Dim LR() As Double, ql() As Double, qa() As Double, qb() As Double, qc()
As Double, qd() As Double
Dim qe() As Double, qf() As Double, integral() As Double, valuea1() As
Double
Dim Aa1() As Double, Bb1() As Double, Cc1() As Double, Dd1() As Double,
Ff1() As Double
Dim NDJ As Integer, ND As Integer, DF() As Double, DJ() As Single, z1()
As Double
Dim b() As Double, K As Integer, sff() As Double, sms() As Single, AC()
As Double
Dim N1 As Integer, ID() As Integer, a() As Double, IM() As Integer, N As
Integer
Dim AJ() As Double, NB As Integer, JE As Integer, nomorfile As Integer,
I1 As Integer
Dim I2 As Integer, IR As Integer, IC As Integer, JR As Integer
Dim J1 As Integer, J2 As Integer, J3 As Integer, TEMP As Single, SUM As
Single
Dim ITEM As Integer, K3 As Integer, AMD() As Double, AM() As Single, MD
As Integer
Dim u() As Double, AML() As Single, LML() As Single, AR() As Single, AE()
As Double
Dim gauss As Integer, cgauss As Single, xgauss As Single, ii() As Double
Dim MM() As Integer, o As Integer, d11() As Double, d12() As Double,
d13() As Double, d22() As Double, d23() As Double, d33() As Double
Dim valuea2() As Double, valuea3() As Double, valuea4() As Double,
valuea5() As Double, valuea6() As Double, intega2() As Double
Dim intega3() As Double, intega4() As Double, intega5() As Double,
intega6() As Double
Dim xa As Single, xb As Single, xc As Single, xd As Single, xe As Single,
xf As Single, xg As Single, xh As Single, xi As Single
Dim i As Integer, j As Integer, kjj112() As Double, XCL() As Double,
YCL() As Double
Dim kk11() As Double, kk12() As Double, kk13() As Double, kk21() As
Double, kk22() As Double, kk23() As Double, kk24() As Double, kk25() As
Double, kk26() As Double, kk14() As Double
Dim kk15() As Double, kk16() As Double, kk31() As Double, kk32() As
Double, kk33() As Double, kk34() As Double, kk35() As Double, kk36() As
Double, kk41() As Double, kk42() As Double, kk43() As Double, kk44() As
Double, kk45() As Double, kk46() As Double, kk51() As Double, kk52() As
Double, kk53() As Double, kk54() As Double, kk55() As Double, kk56() As
Double, kk61() As Double, kk62() As Double, kk63() As Double, kk64() As
Double, kk65() As Double, kk66() As Double
Dim flx11() As Double, flx12() As Double, flx13() As Double, flx21() As
Double, flx22() As Double, flx23() As Double, flx31() As Double, flx32()
As Double, flx33() As Double
Dim kii11() As Double, kii12() As Double, kii13() As Double, kii21() As
Double, kii22() As Double, kii23() As Double, kii31() As Double, kii32()
As Double, kii33() As Double
Dim kij11() As Double, kij12() As Double, kij13() As Double, kij21() As
Double, kij22() As Double, kij23() As Double, kij31() As Double, kij32()
As Double, kij33() As Double

```

Dim kji11() As Double, kji12() As Double, kji13() As Double, kji21() As
Double, kji22() As Double, kji23() As Double, kji31() As Double, kji32()
As Double, kji33() As Double
Dim kjj11() As Double, kjj12() As Double, kjj13() As Double, kjj21() As
Double, kjj22() As Double, kjj23() As Double, kjj31() As Double, kjj32()
As Double, kjj33() As Double
Dim hij11() As Double, hij12() As Double, hij13() As Double, hij21() As
Double, hij22() As Double, hij23() As Double, hij31() As Double, hij32()
As Double, hij33() As Double

```

```

Sub sdata()
NJ = (Form1.Text1.Text)      'jumlah joint
NR = (Form1.Text2.Text)     'jumlah kekangan
NRJ = (Form1.Text3.Text)    'jumlah tumpuan
M = (Form1.Text4.Text)      'jumlah batang
MAR = (Form1.Text5.Text)    'jumlah batang lengkung
E1 = (Form1.Text6.Text)     'modulus elastisitas
NDJ = 3                     'jumlah perpindahan @ joint
ND = NDJ * NJ               'jumlah perpindahan
N = ND - NR                 'jumlah dof
ReDim AML(6, M)
ReDim DF(N)
ReDim DJ(ND)
ReDim z1(N)
ReDim x(NJ)
ReDim y(NJ)
ReDim b(N)
For K = 1 To NJ
  j = (Form1.MSFlexGrid1.TextMatrix(K, 0))
  xa = (Form1.MSFlexGrid1.TextMatrix(K, 1))
  xb = (Form1.MSFlexGrid1.TextMatrix(K, 2))
  x(j) = xa
  y(j) = xb
Next K
MD = 2 * NDJ
NB = 0
ReDim jj(M)
ReDim jk(M)
ReDim LL(M)
ReDim LR(M)
ReDim CXR(M)
ReDim CYR(M)
ReDim CXLj(M)
ReDim CYLj(M)
ReDim CXLk(M)
ReDim CYLk(M)
ReDim XCL(M)
ReDim YCL(M)
ReDim BLR(M)
ReDim HLR(M)
ReDim BL(M)
ReDim R(M)
ReDim HL1(M)
ReDim HL2(M)
ReDim HL3(M)
ReDim ALR(M)
ReDim inersia(M)
ReDim dz(M)
ReDim y1(M)
ReDim r1(M)
ReDim r2(M)

```

```

ReDim xP (M)
ReDim yP (M)
ReDim phi (M)
ReDim z (M)
ReDim p (M)
ReDim q (M)
ReDim aa (M)
ReDim bb (M)
ReDim cc (M)
ReDim dd (M)
ReDim ee (M)
ReDim ff (M)
ReDim gg (M)
ReDim MM (M)
ReDim ii (M)
ReDim d11 (M)
ReDim d12 (M)
ReDim d13 (M)
ReDim d22 (M)
ReDim d23 (M)
ReDim d33 (M)
ReDim integral (M)
ReDim valuea1 (M)
ReDim integra2 (M)
ReDim valuea2 (M)
ReDim integra3 (M)
ReDim valuea3 (M)
ReDim integra4 (M)
ReDim valuea4 (M)
ReDim integra5 (M)
ReDim valuea5 (M)
ReDim integra6 (M)
ReDim valuea6 (M)
ReDim kk11 (M), kk12 (M), kk13 (M), kk14 (M), kk15 (M), kk16 (M)
ReDim kk21 (M), kk22 (M), kk23 (M), kk24 (M), kk25 (M), kk26 (M)
ReDim kk31 (M), kk32 (M), kk33 (M), kk34 (M), kk35 (M), kk36 (M)
ReDim kk41 (M), kk42 (M), kk43 (M), kk44 (M), kk45 (M), kk46 (M)
ReDim kk51 (M), kk52 (M), kk53 (M), kk54 (M), kk55 (M), kk56 (M)
ReDim kk61 (M), kk62 (M), kk63 (M), kk64 (M), kk65 (M), kk66 (M)
ReDim flx11 (M), flx12 (M), flx13 (M)
ReDim flx21 (M), flx22 (M), flx23 (M)
ReDim flx31 (M), flx32 (M), flx33 (M)
ReDim kjj112 (M)
ReDim kii11 (M), kii12 (M), kii13 (M)
ReDim kii21 (M), kii22 (M), kii23 (M)
ReDim kii31 (M), kii32 (M), kii33 (M)
ReDim hij11 (M), hij12 (M), hij13 (M)
ReDim hij21 (M), hij22 (M), hij23 (M)
ReDim hij31 (M), hij32 (M), hij33 (M)
ReDim kij11 (M), kij12 (M), kij13 (M)
ReDim kij21 (M), kij22 (M), kij23 (M)
ReDim kij31 (M), kij32 (M), kij33 (M)
ReDim kji11 (M), kji12 (M), kji13 (M)
ReDim kji21 (M), kji22 (M), kji23 (M)
ReDim kji31 (M), kji32 (M), kji33 (M)
ReDim kjj11 (M), kjj12 (M), kjj13 (M)
ReDim kjj21 (M), kjj22 (M), kjj23 (M)
ReDim kjj31 (M), kjj32 (M), kjj33 (M)
o = M - MAR
For j = 1 To o
  i = (Form1.MSFlexGrid3.TextMatrix(j, 0)) 'frame id
  xa = (Form1.MSFlexGrid3.TextMatrix(j, 1)) 'jj
  xb = (Form1.MSFlexGrid3.TextMatrix(j, 2)) 'jk

```

```

xc = (Form1.MSFlexGrid3.TextMatrix(j, 3)) 'B
xd = (Form1.MSFlexGrid3.TextMatrix(j, 4)) 'H
jj(i) = xa
jk(i) = xb
BLR(i) = xc
HLR(i) = xd
inersia(i) = BLR(i) * HLR(i) ^ 3 / 12
ALR(i) = BLR(i) * HLR(i)
NBI = NDJ * (Abs(jk(i) - jj(i)) + 1)
If NBI > NB Then NB = NBI
XCR = x(jk(i)) - x(jj(i))
YCR = y(jk(i)) - y(jj(i))
LR(i) = Sqr(XCR * XCR + YCR * YCR)
CXR(i) = XCR / LR(i)
CYR(i) = YCR / LR(i)
Next j
For j = 1 To MAR
i = (Form1.MSFlexGrid4.TextMatrix(j, 0)) 'frame id
xa = (Form1.MSFlexGrid4.TextMatrix(j, 1)) 'jj
xb = (Form1.MSFlexGrid4.TextMatrix(j, 2)) 'jk
xh = (Form1.MSFlexGrid4.TextMatrix(j, 3)) 'X pusat
xi = (Form1.MSFlexGrid4.TextMatrix(j, 4)) 'Y pusat
xc = (Form1.MSFlexGrid4.TextMatrix(j, 5)) 'R
xd = (Form1.MSFlexGrid6.TextMatrix(j, 1)) 'B
xe = (Form1.MSFlexGrid6.TextMatrix(j, 2)) 'H1
xf = (Form1.MSFlexGrid6.TextMatrix(j, 3)) 'H2
xg = (Form1.MSFlexGrid6.TextMatrix(j, 4)) 'H3
jj(i) = xa
jk(i) = xb
R(i) = xc
BL(i) = xd
HL1(i) = xe
HL2(i) = xf
HL3(i) = xg
xP(i) = xh
yP(i) = xi
NBI = NDJ * (Abs(jk(i) - jj(i)) + 1)
If NBI > NB Then NB = NBI
XCL(i) = x(jk(i)) - x(jj(i))
YCL(i) = y(jk(i)) - y(jj(i))
r1(i) = Sqr(XCL(i) * XCL(i) + YCL(i) * YCL(i))
r2(i) = r1(i) / 2
y1(i) = (r2(i)) / R(i)
If y1(i) = 1 Then
dz(i) = 2 * Atn(y1(i))
Else
dz(i) = Atn((y1(i)) / (Sqr(-y1(i) * y1(i) + 1))) 'sin-1(X)
End If
CXLj(i) = (xP(i) - x(jj(i))) / R(i)
CYLj(i) = (yP(i) - y(jj(i))) / R(i)
CXlk(i) = (xP(i) - x(jk(i))) / R(i)
CYLk(i) = (yP(i) - y(jk(i))) / R(i)
Next j
ReDim jrl(ND)
For j = 1 To NRJ
K = (Form1.MSFlexGrid2.TextMatrix(j, 0))
xa = (Form1.MSFlexGrid2.TextMatrix(j, 1))
xb = (Form1.MSFlexGrid2.TextMatrix(j, 2))
xc = (Form1.MSFlexGrid2.TextMatrix(j, 3))
jrl(3 * K - 2) = xa
jrl(3 * K - 1) = xb
jrl(3 * K) = xc
Next j

```

```

N1 = 0
ReDim ID(ND)
For j = 1 To ND
  N1 = N1 + jrl(j)

  If jrl(j) > 0 Then
    ID(j) = N + N1
  Else
    ID(j) = j - N1
  End If
Next j
ReDim a(N, NB)
End Sub

Sub stiff()
ReDim sff(N, NB)
ReDim IM(6)
ReDim flx(3, 3)
ReDim kii(3, 3)
ReDim hij(3, 3)
ReDim kjj(3, 3)
ReDim kij(3, 3)
ReDim kji(3, 3)
ReDim sms(6, 6)
o = M - MAR
For j = 1 To o
  i = (Form1.MSFlexGrid3.TextMatrix(j, 0))
  MM(i) = 0
Next j
For j = 1 To MAR
  i = (Form1.MSFlexGrid4.TextMatrix(j, 0))
  MM(i) = 1
Next j
For i = 1 To M
  If MM(i) = 0 Then
    kk11(i) = ALR(i) * E1 / LR(i)
    kk12(i) = kk13(i)
    kk14(i) = -kk11(i)
    kk15(i) = 0
    kk16(i) = 0
    kk21(i) = 0
    kk22(i) = 12 * E1 * inersia(i) / (LR(i) ^ 3)
    kk23(i) = 6 * E1 * inersia(i) / (LR(i) ^ 2)
    kk24(i) = 0
    kk25(i) = -kk22(i)
    kk26(i) = kk23(i)
    kk31(i) = 0
    kk32(i) = kk23(i)
    kk33(i) = 4 * E1 * inersia(i) / LR(i)
    kk34(i) = 0
    kk35(i) = -kk23(i)
    kk36(i) = 2 * E1 * inersia(i) / LR(i)
    kk41(i) = -kk11(i)
    kk42(i) = 0
    kk43(i) = 0
    kk44(i) = kk11(i)
    kk45(i) = 0
    kk46(i) = 0
    kk51(i) = 0
    kk52(i) = -kk22(i)
    kk53(i) = -kk23(i)
    kk54(i) = 0
    kk55(i) = kk22(i)
  End If
End For

```

```

kk56(i) = -kk23(i)
kk61(i) = 0
kk62(i) = kk23(i)
kk63(i) = kk36(i)
kk64(i) = 0
kk65(i) = -kk23(i)
kk66(i) = kk33(i)
sms(1, 1) = (CXR(i) * kk11(i) - CYR(i) * kk21(i)) * CXR(i) -
(CXR(i) * kk12(i) - CYR(i) * kk22(i)) * CYR(i)
sms(1, 2) = (CXR(i) * kk11(i) - CYR(i) * kk21(i)) * CYR(i) +
(CXR(i) * kk12(i) - CYR(i) * kk22(i)) * CXR(i)
sms(1, 3) = CXR(i) * kk13(i) - CYR(i) * kk23(i)
sms(1, 4) = (CXR(i) * kk14(i) - CYR(i) * kk24(i)) * CXR(i) -
(CXR(i) * kk15(i) - CYR(i) * kk25(i)) * CYR(i)
sms(1, 5) = (CXR(i) * kk14(i) - CYR(i) * kk24(i)) * CYR(i) +
(CXR(i) * kk15(i) - CYR(i) * kk25(i)) * CXR(i)
sms(1, 6) = CXR(i) * kk16(i) - CYR(i) * kk26(i)
sms(2, 2) = (CYR(i) * kk11(i) + CXR(i) * kk21(i)) * CYR(i) +
(CYR(i) * kk12(i) + CXR(i) * kk22(i)) * CXR(i)
sms(2, 3) = CYR(i) * kk13(i) + CXR(i) * kk23(i)
sms(2, 4) = (CYR(i) * kk14(i) + CXR(i) * kk24(i)) * CXR(i) -
(CYR(i) * kk15(i) + CXR(i) * kk25(i)) * CYR(i)
sms(2, 5) = (CYR(i) * kk14(i) + CXR(i) * kk24(i)) * CYR(i) +
(CYR(i) * kk15(i) + CXR(i) * kk25(i)) * CXR(i)
sms(2, 6) = CYR(i) * kk16(i) + CXR(i) * kk26(i)
sms(3, 3) = kk33(i)
sms(3, 4) = kk34(i) * CXR(i) - kk35(i) * CYR(i)
sms(3, 5) = kk34(i) * CYR(i) + kk35(i) * CXR(i)
sms(3, 6) = kk36(i)
sms(4, 4) = (CXR(i) * kk44(i) - CYR(i) * kk54(i)) * CXR(i) -
(CXR(i) * kk45(i) - CYR(i) * kk55(i)) * CYR(i)
sms(4, 5) = (CXR(i) * kk44(i) - CYR(i) * kk54(i)) * CYR(i) +
(CXR(i) * kk45(i) - CYR(i) * kk55(i)) * CXR(i)
sms(4, 6) = CXR(i) * kk46(i) - CYR(i) * kk56(i)
sms(5, 5) = (CYR(i) * kk44(i) + CXR(i) * kk54(i)) * CYR(i) +
(CYR(i) * kk45(i) + CXR(i) * kk55(i)) * CXR(i)
sms(5, 6) = CYR(i) * kk46(i) + CXR(i) * kk56(i)
sms(6, 6) = kk66(i)
Else
phi(i) = 2 * dz(i)
p(i) = 2 * (HL1(i) + HL2(i) - 2 * HL3(i))
q(i) = HL1(i) - HL2(i) + p(i)
aa(i) = HL1(i) ^ 3
bb(i) = -3 * (HL1(i) ^ 2) * q(i)
cc(i) = 3 * HL1(i) * q(i) ^ 2 + 3 * p(i) * HL1(i) ^ 2
dd(i) = -(q(i) ^ 3 + 6 * p(i) * HL1(i) * q(i))
ee(i) = 3 * p(i) * q(i) ^ 2 + 3 * HL1(i) * p(i) ^ 2
ff(i) = -3 * q(i) * p(i) ^ 2
gg(i) = p(i) ^ 3
For gauss = 1 To 15
Select Case gauss
Case 1
xgauss = -0.987992518020485
cgauss = 3.07532419961173E-02
Case 2
xgauss = -0.937273392400706
cgauss = 7.03660474881081E-02
Case 3
xgauss = -0.848206583410427
cgauss = 0.107159220467172
Case 4
xgauss = -0.72441773136017
cgauss = 0.139570677926154

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Case 5
  xgauss = -0.570972172608539
  cgauss = 0.166269205816994
Case 6
  xgauss = -0.394151347077563
  cgauss = 0.186161000015562
Case 7
  xgauss = -0.201194093997435
  cgauss = 0.198431485327112
Case 8
  xgauss = 0
  cgauss = 0.202578241925561
Case 9
  xgauss = 0.201194093997435
  cgauss = 0.198431485327112
Case 10
  xgauss = 0.394151347077563
  cgauss = 0.186161000015562
Case 11
  xgauss = 0.570972172608539
  cgauss = 0.166269205816994
Case 12
  xgauss = 0.72441773136017
  cgauss = 0.139570677926154
Case 13
  xgauss = 0.848206583410427
  cgauss = 0.107159220467172
Case 14
  xgauss = 0.937273392400706
  cgauss = 7.03660474881081E-02
Case 15
  xgauss = 0.987992518020485
  cgauss = 3.07532419961173E-02
End Select
' matrik fleksibilitas d11
  z(i) = dz(i) + (dz(i) * xgauss)
  ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / phi(i) ^ 3) + (ee(i) *
z(i) ^ 4 / phi(i) ^ 4) + (ff(i) * z(i) ^ 5 / phi(i) ^ 5) + (gg(i) * z(i)
^ 6 / phi(i) ^ 6))
  d11(i) = (((1 - (2 * Cos(z(i))) + (Cos(z(i)) * Cos(z(i))))
* dz(i))) / (ii(i)))
  integral(i) = 12 * R(i) ^ 3 * (cgauss * d11(i)) / (E1 *
BL(i))
  valuea1(i) = valuea1(i) + integral(i)
  flx11(i) = valuea1(i)
  z(i) = dz(i) + (dz(i) * xgauss)
  ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / phi(i) ^ 3) + (ee(i) *
z(i) ^ 4 / phi(i) ^ 4) + (ff(i) * z(i) ^ 5 / phi(i) ^ 5) + (gg(i) * z(i)
^ 6 / phi(i) ^ 6))
  d12(i) = (((-1 * Cos(z(i)) * Sin(z(i))) + Sin(z(i))) *
dz(i)) / (ii(i)))
  integra2(i) = 12 * R(i) ^ 3 * (cgauss * d12(i)) / (E1 *
BL(i))
  valuea2(i) = valuea2(i) + integra2(i)
  flx12(i) = valuea2(i)
  z(i) = dz(i) + (dz(i) * xgauss)
  ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / phi(i) ^ 3) + (ee(i) *
z(i) ^ 4 / phi(i) ^ 4) + (ff(i) * z(i) ^ 5 / phi(i) ^ 5) + (gg(i) * z(i)
^ 6 / phi(i) ^ 6))
  d13(i) = ((1 - Cos(z(i))) * dz(i)) / (ii(i))

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        integra3(i) = 12 * R(i) ^ 2 * (cgauss * d13(i)) / (E1 *
BL(i))
        valuea3(i) = valuea3(i) + integra3(i)
        flx13(i) = valuea3(i)
        flx21(i) = flx12(i)
        z(i) = dz(i) + (dz(i) * xgauss)
        ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / phi(i) ^ 3) + (ee(i) *
z(i) ^ 4 / phi(i) ^ 4) + (ff(i) * z(i) ^ 5 / phi(i) ^ 5) + (gg(i) * z(i)
^ 6 / phi(i) ^ 6))
        d22(i) = (Sin(z(i)) * Sin(z(i)) * dz(i)) / (ii(i))
        integra4(i) = 12 * R(i) ^ 3 * (cgauss * d22(i)) / (E1 *
BL(i))
        valuea4(i) = valuea4(i) + integra4(i)
        flx22(i) = valuea4(i)
        z(i) = dz(i) + (dz(i) * xgauss)
        ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / (phi(i) ^ 3)) + (ee(i) *
z(i) ^ 4 / (phi(i) ^ 4)) + (ff(i) * z(i) ^ 5 / (phi(i) ^ 5)) + (gg(i) *
z(i) ^ 6 / (phi(i) ^ 6))
        d23(i) = (Sin(z(i)) * dz(i)) / (ii(i))
        integra5(i) = 12 * R(i) ^ 2 * (cgauss * d23(i)) / (E1 *
BL(i))
        valuea5(i) = valuea5(i) + integra5(i)
        flx23(i) = valuea5(i)
        flx31(i) = flx13(i)
        flx32(i) = flx23(i)
        z(i) = dz(i) + (dz(i) * xgauss)
        ii(i) = (aa(i) + (bb(i) * z(i) / (phi(i))) + (cc(i) *
z(i) ^ 2 / (phi(i) ^ 2)) + (dd(i) * z(i) ^ 3 / (phi(i) ^ 3)) + (ee(i) *
z(i) ^ 4 / (phi(i) ^ 4)) + (ff(i) * z(i) ^ 5 / (phi(i) ^ 5)) + (gg(i) *
z(i) ^ 6 / (phi(i) ^ 6))
        d33(i) = (dz(i)) / (ii(i))
        integra6(i) = 12 * R(i) * (cgauss * d33(i)) / (E1 * BL(i))
        valuea6(i) = valuea6(i) + integra6(i)
        flx33(i) = valuea6(i)

Next gauss
' matriks kii
        kii11(i) = (flx22(i) * flx33(i) - flx23(i) * flx32(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *
flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
        kii12(i) = -(flx12(i) * flx33(i) - flx13(i) * flx32(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *
flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
        kii13(i) = (flx12(i) * flx23(i) - flx13(i) * flx22(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *
flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
        kii21(i) = kii12(i)
        kii22(i) = (flx11(i) * flx33(i) - flx13(i) * flx31(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *
flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
        kii23(i) = -(flx11(i) * flx23(i) - flx13(i) * flx21(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *
flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
        kii31(i) = kii13(i)
        kii32(i) = kii23(i)
        kii33(i) = (flx11(i) * flx22(i) - flx12(i) * flx21(i)) / (flx11(i) *
flx22(i) * flx33(i) - flx11(i) * flx23(i) * flx32(i) - flx21(i) *

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flx12(i) * flx33(i) + flx21(i) * flx13(i) * flx32(i) + flx31(i) *
flx12(i) * flx23(i) - flx31(i) * flx13(i) * flx22(i))
' matriks hij
hij11(i) = Cos(phi(i))
hij12(i) = -1 * Sin(phi(i))
hij13(i) = 0
hij21(i) = Sin(phi(i))
hij22(i) = Cos(phi(i))
hij23(i) = 0
hij31(i) = R(i) - (R(i) * Cos(phi(i)))
hij32(i) = R(i) * Sin(phi(i))
hij33(i) = 1
' matriks kji(-1*hij*kii)
kji11(i) = -(hij11(i) * kii11(i)) - (hij12(i) * kii21(i)) -
(hij13(i) * kii31(i))
kji12(i) = -(hij11(i) * kii12(i)) - (hij12(i) * kii22(i)) -
(hij13(i) * kii32(i))
kji13(i) = -(hij11(i) * kii13(i)) - (hij12(i) * kii23(i)) -
(hij13(i) * kii33(i))
kji21(i) = -(hij21(i) * kii11(i)) - (hij22(i) * kii21(i)) -
(hij23(i) * kii31(i))
kji22(i) = -(hij21(i) * kii12(i)) - (hij22(i) * kii22(i)) -
(hij23(i) * kii32(i))
kji23(i) = -(hij21(i) * kii13(i)) - (hij22(i) * kii23(i)) -
(hij23(i) * kii33(i))
kji31(i) = -(hij31(i) * kii11(i)) - (hij32(i) * kii21(i)) -
(hij33(i) * kii31(i))
kji32(i) = -(hij31(i) * kii12(i)) - (hij32(i) * kii22(i)) -
(hij33(i) * kii32(i))
kji33(i) = -(hij31(i) * kii13(i)) - (hij32(i) * kii23(i)) -
(hij33(i) * kii33(i))
' matriks kij (transpose matriks kji)
kij11(i) = kji11(i)
kij12(i) = kji21(i)
kij13(i) = kji31(i)
kij21(i) = kji12(i)
kij22(i) = kji22(i)
kij23(i) = kji32(i)
kij31(i) = kji13(i)
kij32(i) = kji23(i)
kij33(i) = kji33(i)
' matriks kjj(hij *kii*hijtrans)
kjj11(i) = (hij11(i) * kii11(i) + hij12(i) * kii21(i) + hij13(i) *
kii31(i)) * hij11(i) + (hij11(i) * kii12(i) + hij12(i) * kii22(i) +
hij13(i) * kii32(i)) * hij12(i) + (hij11(i) * kii13(i) + hij12(i) *
kii23(i) + hij13(i) * kii33(i)) * hij13(i)
kjj12(i) = (hij11(i) * kii11(i) + hij12(i) * kii21(i) + hij13(i) *
kii31(i)) * hij21(i) + (hij11(i) * kii12(i) + hij12(i) * kii22(i) +
hij13(i) * kii32(i)) * hij22(i) + (hij11(i) * kii13(i) + hij12(i) *
kii23(i) + hij13(i) * kii33(i)) * hij23(i)
kjj13(i) = (hij11(i) * kii11(i) + hij12(i) * kii21(i) + hij13(i) *
kii31(i)) * hij31(i) + (hij11(i) * kii12(i) + hij12(i) * kii22(i) +
hij13(i) * kii32(i)) * hij32(i) + (hij11(i) * kii13(i) + hij12(i) *
kii23(i) + hij13(i) * kii33(i)) * hij33(i)
kjj21(i) = (hij21(i) * kii11(i) + hij22(i) * kii21(i) + hij23(i) *
kii31(i)) * hij11(i) + (hij21(i) * kii12(i) + hij22(i) * kii22(i) +
hij23(i) * kii32(i)) * hij12(i) + (hij21(i) * kii13(i) + hij22(i) *
kii23(i) + hij23(i) * kii33(i)) * hij13(i)
kjj22(i) = (hij21(i) * kii11(i) + hij22(i) * kii21(i) + hij23(i) *
kii31(i)) * hij21(i) + (hij21(i) * kii12(i) + hij22(i) * kii22(i) +
hij23(i) * kii32(i)) * hij22(i) + (hij21(i) * kii13(i) + hij22(i) *
kii23(i) + hij23(i) * kii33(i)) * hij23(i)

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kjj23(i) = (hij21(i) * kii11(i) + hij22(i) * kii21(i) + hij23(i) *
kii31(i)) * hij31(i) + (hij21(i) * kii12(i) + hij22(i) * kii22(i) +
hij23(i) * kii32(i)) * hij32(i) + (hij21(i) * kii13(i) + hij22(i) *
kii23(i) + hij23(i) * kii33(i)) * hij33(i)
kjj31(i) = (hij31(i) * kii11(i) + hij32(i) * kii21(i) + hij33(i) *
kii31(i)) * hij11(i) + (hij31(i) * kii12(i) + hij32(i) * kii22(i) +
hij33(i) * kii32(i)) * hij12(i) + (hij31(i) * kii13(i) + hij32(i) *
kii23(i) + hij33(i) * kii33(i)) * hij13(i)
kjj32(i) = (hij31(i) * kii11(i) + hij32(i) * kii21(i) + hij33(i) *
kii31(i)) * hij21(i) + (hij31(i) * kii12(i) + hij32(i) * kii22(i) +
hij33(i) * kii32(i)) * hij22(i) + (hij31(i) * kii13(i) + hij32(i) *
kii23(i) + hij33(i) * kii33(i)) * hij23(i)
kjj33(i) = (hij31(i) * kii11(i) + hij32(i) * kii21(i) + hij33(i) *
kii31(i)) * hij31(i) + (hij31(i) * kii12(i) + hij32(i) * kii22(i) +
hij33(i) * kii32(i)) * hij32(i) + (hij31(i) * kii13(i) + hij32(i) *
kii23(i) + hij33(i) * kii33(i)) * hij33(i)
sms(1, 1) = (CYLj(i) * kii11(i) + CXLj(i) * kii21(i)) * CYLj(i) +
(CYLj(i) * kii12(i) + CXLj(i) * kii22(i)) * CXLj(i)
sms(1, 2) = -(CYLj(i) * kii11(i) + CXLj(i) * kii21(i)) * CXLj(i) +
(CYLj(i) * kii12(i) + CXLj(i) * kii22(i)) * CYLj(i)
sms(1, 3) = CYLj(i) * kii13(i) + CXLj(i) * kii23(i)
sms(1, 4) = (CYLj(i) * kij11(i) + CXLj(i) * kij21(i)) * CYLk(i) +
(CYLj(i) * kij12(i) + CXLj(i) * kij22(i)) * CXLk(i)
sms(1, 5) = -(CYLj(i) * kij11(i) + CXLj(i) * kij21(i)) * CXLk(i) +
(CYLj(i) * kij12(i) + CXLj(i) * kij22(i)) * CYLk(i)
sms(1, 6) = CYLj(i) * kij13(i) + CXLj(i) * kij23(i)
sms(2, 2) = -(CXLj(i) * kii11(i) + CYLj(i) * kii21(i)) * CXLj(i) +
(-CXLj(i) * kii12(i) + CYLj(i) * kii22(i)) * CYLj(i)
sms(2, 3) = -CXLj(i) * kii13(i) + CYLj(i) * kii23(i)
sms(2, 4) = (-CXLj(i) * kij11(i) + CYLj(i) * kij21(i)) * CYLk(i) +
(-CXLj(i) * kij12(i) + CYLj(i) * kij22(i)) * CXLk(i)
sms(2, 5) = -(CXLj(i) * kij11(i) + CYLj(i) * kij21(i)) * CXLk(i) +
(-CXLj(i) * kij12(i) + CYLj(i) * kij22(i)) * CYLk(i)
sms(2, 6) = -CXLj(i) * kij13(i) + CYLj(i) * kij23(i)
sms(3, 3) = kii33(i)
sms(3, 4) = kij31(i) * CYLk(i) + kij32(i) * CXLk(i)
sms(3, 5) = -kij31(i) * CXLk(i) + kij32(i) * CYLk(i)
sms(3, 6) = kij33(i)
sms(4, 4) = (CYLk(i) * kjj11(i) + CXLk(i) * kjj21(i)) * CYLk(i) +
(CYLk(i) * kjj12(i) + CXLk(i) * kjj22(i)) * CXLk(i)
sms(4, 5) = -(CYLk(i) * kjj11(i) + CXLk(i) * kjj21(i)) * CXLk(i) +
(CYLk(i) * kjj12(i) + CXLk(i) * kjj22(i)) * CYLk(i)
sms(4, 6) = CYLk(i) * kjj13(i) + CXLk(i) * kjj23(i)
sms(5, 5) = -(CXLk(i) * kjj11(i) + CYLk(i) * kjj21(i)) * CXLk(i) +
(-CXLk(i) * kjj12(i) + CYLk(i) * kjj22(i)) * CYLk(i)
sms(5, 6) = -CXLk(i) * kjj13(i) + CYLk(i) * kjj23(i)
sms(6, 6) = kjj33(i)
End If
IM(1) = 3 * jj(i) - 2
IM(2) = 3 * jj(i) - 1
IM(3) = 3 * jj(i)
IM(4) = 3 * jk(i) - 2
IM(5) = 3 * jk(i) - 1
IM(6) = 3 * jk(i)
For j = 1 To MD
  I1 = IM(j)
  If jrl(I1) > 0 Then
    GoTo 2
  Else
    For K = j To MD
      I2 = IM(K)
      If jrl(I2) > 0 Then
        GoTo 2
      End If
    Next K
  End If
Next j

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Else
  IR = ID(I1)
  IC = ID(I2)
  If IR < IC Then
    GoTo 1
  Else
    ITEM = IR
    IR = IC
    IC = ITEM
    IC = IC - IR + 1
    sff(IR, IC) = sff(IR, IC) + sms(j, K)
  End If
End If
2: Next K
  End If
  Next j
Next i
End Sub

Sub banfac(N As Integer, NB As Integer, a() As Double)
For j = 2 To N
  J1 = j - 1
  J2 = j - NB + 1
  If J2 < 1 Then J2 = 1
  If J1 = 1 Then GoTo 3
  For i = 2 To J1
    I1 = i - 1
    If I1 < J2 Then GoTo 2
    SUM = a(i, j - i + 1)
    For K = J2 To I1
      SUM = SUM - a(K, i - K + 1) * a(K, j - K + 1)
    Next K
    a(i, j - i + 1) = SUM
  2: Next i
  3: SUM = a(j, 1)
    For K = J2 To J1
      TEMP = a(K, j - K + 1) / a(K, 1)
      SUM = SUM - TEMP * a(K, j - K + 1)
      a(K, j - K + 1) = TEMP
    Next K
    a(j, 1) = SUM
  Next j
End Sub

Sub ldata()
ReDim AJ(3 * M + 3)
ReDim AE(ND)
NLJ = (Form1.Text7.Text) 'jumlah joint yang dibebani
If NLJ = 0 Then GoTo 4
For j = 1 To NLJ
  K = Form1.MSFlexGrid5.TextMatrix(j, 0) 'joint yang dibebani
  xa = Form1.MSFlexGrid5.TextMatrix(j, 1) 'beban joint arah x
  xb = Form1.MSFlexGrid5.TextMatrix(j, 2) 'beban joint arah y
  xc = Form1.MSFlexGrid5.TextMatrix(j, 3) 'beban joint arah z
  AJ(3 * K - 2) = xa
  AJ(3 * K - 1) = xb
  AJ(3 * K) = xc
Next j
4: End Sub

Sub loads()
ReDim AC(ND)
For j = 1 To ND

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        JR = ID(j)
        AC(JR) = AJ(j)
    Next j
End Sub

Sub bansol(N As Integer, NB As Integer, u() As Double, b() As Double,
z1() As Double)
For i = 1 To N
    j = i - NB + 1
    If i <= NB Then j = 1
    SUM = b(i)
    K1 = i - 1
    If j > K1 Then GoTo 1
    For K = j To K1
        SUM = SUM - u(K, i - K + 1) * z1(K)
    Next K
1:    z1(i) = SUM
Next i
For i = 1 To N
    z1(i) = z1(i) / u(i, 1)
Next i
For I1 = 1 To N
    i = N - I1 + 1
    j = i + NB - 1
    If j > N Then j = N
    SUM = z1(i)
    K2 = i + 1
    If K2 > j Then GoTo 2
    For K = K2 To j
        SUM = SUM - u(i, K - i + 1) * z1(K)
    Next K
2:    z1(i) = SUM
Next I1
End Sub

Sub resul()
j = N + 1
For K = 1 To ND
    JE = ND - K + 1
    If jrl(JE) = 0 Then GoTo 1
    DJ(JE) = 0
    GoTo 2
1: j = j - 1
    DJ(JE) = DF(j)
2: Next K
    '-----
    '-- PERPINDAHAN --
    '-----
    With Form3.MSFlexGrid1
        .Rows = NJ + 1
        .Cols = 4
        .ColWidth(0) = 1000
        If NJ <= 16 Then
            .ColWidth(1) = 1600
            .Width = .ColWidth(0) + 3 * .ColWidth(1) + 100
            .Height = (NJ + 1) * .RowHeight(0) + 90
        Else
            .ColWidth(1) = 1500
            .Width = .ColWidth(0) + 3 * .ColWidth(1) + 350
            .Height = 16 * .RowHeight(0) + 90
        End If
        .ColWidth(2) = .ColWidth(1)
        .ColWidth(3) = .ColWidth(1)
    End With
End Sub

```

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        .ColAlignment(-1) = flexAlignCenterCenter
        .TextMatrix(0, 0) = "Joint ID"
        .TextMatrix(0, 1) = "Ux"
        .TextMatrix(0, 2) = "Uy"
        .TextMatrix(0, 3) = "Rz"
    Print #1, "non-Prismatic Arc Frame Project"
    Print #1, "[" & dlgfile.FileName & "]"
    Print #1, "Unit: " & Form1.CboUnit.Text
    Print #1,
    Print #1, "Joint Displacements"
    Print #1, "Joint ID"; Tab(12); "Ux"; Tab(29); "Uy"; Tab(46); "Rz"
For j = 1 To NJ
With Form3.MSFlexGrid1
    .TextMatrix(j, 0) = j
    .TextMatrix(j, 1) = DJ(3 * j - 2)
    .TextMatrix(j, 2) = DJ(3 * j - 1)
    .TextMatrix(j, 3) = DJ(3 * j)
Print #1, j; Tab(12); DJ(3 * j - 2); Tab(29); DJ(3 * j - 1); Tab(46);
DJ(3 * j)
End With
Next j

'-----
'-- GAYA-GAYA BATANG --
'-----

With MSFlexGrid2
    .Rows = M + 1
    .Cols = 7
    .ColWidth(0) = 1000
    If M <= 16 Then
        .ColWidth(1) = 1400
        .Width = .ColWidth(0) + 6 * .ColWidth(1) + 100
        .Height = (M + 1) * .RowHeight(0) + 90
    Else
        .ColWidth(1) = 1300
        .Width = .ColWidth(0) + 6 * .ColWidth(1) + 350
        .Height = 16 * .RowHeight(0) + 90
    End If
    .ColWidth(2) = .ColWidth(1)
    .ColWidth(3) = .ColWidth(1)
    .ColWidth(4) = .ColWidth(1)
    .ColWidth(5) = .ColWidth(1)
    .ColWidth(6) = .ColWidth(1)
    .ColAlignment(-1) = flexAlignCenterCenter
    .TextMatrix(0, 0) = "Frame ID"
    .TextMatrix(0, 1) = "Axial-i"
    .TextMatrix(0, 2) = "Shear-i"
    .TextMatrix(0, 3) = "Moment-i"
    .TextMatrix(0, 4) = "Axial-j"
    .TextMatrix(0, 5) = "Shear-j"
    .TextMatrix(0, 6) = "Moment-j"
End With
Print #1,
Print #1, "Frame Element Forces"
Print #1, "Frame ID"; Tab(12); "Axial-i"; Tab(29); "Shear-i"; Tab(46);
"Moment-i"; Tab(63); "Axial-j"; Tab(80); "Shear-j"; Tab(97); "Moment-j"
o = M - MAR
For j = 1 To o
    i = (Form1.MSFlexGrid3.TextMatrix(j, 0))
    MM(i) = 0
Next j
For j = 1 To MAR
    i = (Form1.MSFlexGrid4.TextMatrix(j, 0))
    MM(i) = 1

```