

BAB IV

PENGHITUNGAN ULANG

4.1 Pemodelan

Sesuai dengan konsep dasar metode elemen yaitu membagi-bagi suatu bagian yang besar menjadi sub-bagian yang lebih kecil, yaitu dengan mengambil bentuk geometri tertentu yang sederhana guna mendekati bentuk struktur bangunan utuh (P.J. Soedarjana, Ir., 1992).

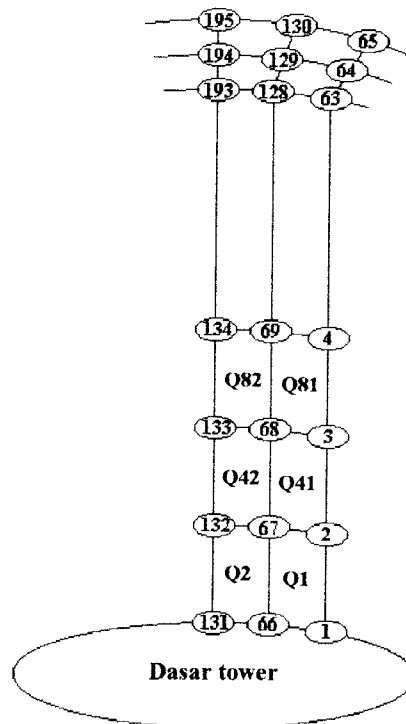
Perlu dikedepankan di sini, bahwa pada elemen tertentu khususnya pada struktur perkuatan (*lateral support*) terdapat bagian/sisi yang dalam pendekatannya tidak memungkinkan untuk diambil bentuk segi empat yang simetris.

Hal ini dilakukan sebagai upaya agar didapatkan model yang menyerupai bangunan aslinya, disamping dalam studi kasus permasalahan yang dijumpai sangat berbeda kondisinya dengan perencanaan. Dalam perencanaan struktur bangunan, bentuk bangunan dimaksud dapat direncanakan sesuai dengan keinginan dan kebutuhan perencana. Akan tetapi pada studi kasus bangunan telah ada, sehingga bagaimanapun kondisinya, penulis harus sedapat mungkin mengaktualisasikan dan menerjemahkan bentuk bangunan menjadi data masukan pada SAP 90 hingga akhirnya dapat divisualisasikan mendekati kenyataan.

Langkah awal yang dikerjakan dalam menuliskan data masukan yaitu setelah mempelajari gambar bangunan, maka ditentukan koordinat-koordinat dengan meng-

sumsikan badan bangunan tersusun dari elemen-elemen *shell* segi empat, terhadap sumbu-sumbu koordinat global X, Y dan Z (tiga dimensi).

Pada bangunan menara utama penomoran joint dimulai dari nomor joint 1 hingga nomor joint 2600, sedangkan shell dimulai dari nomor shell 1 hingga nomor shell 2560. Seperti dapat dilihat pada gambar berikut,



Gambar 4.1 Penomoran joint dan shell tower utama

Keterangan :

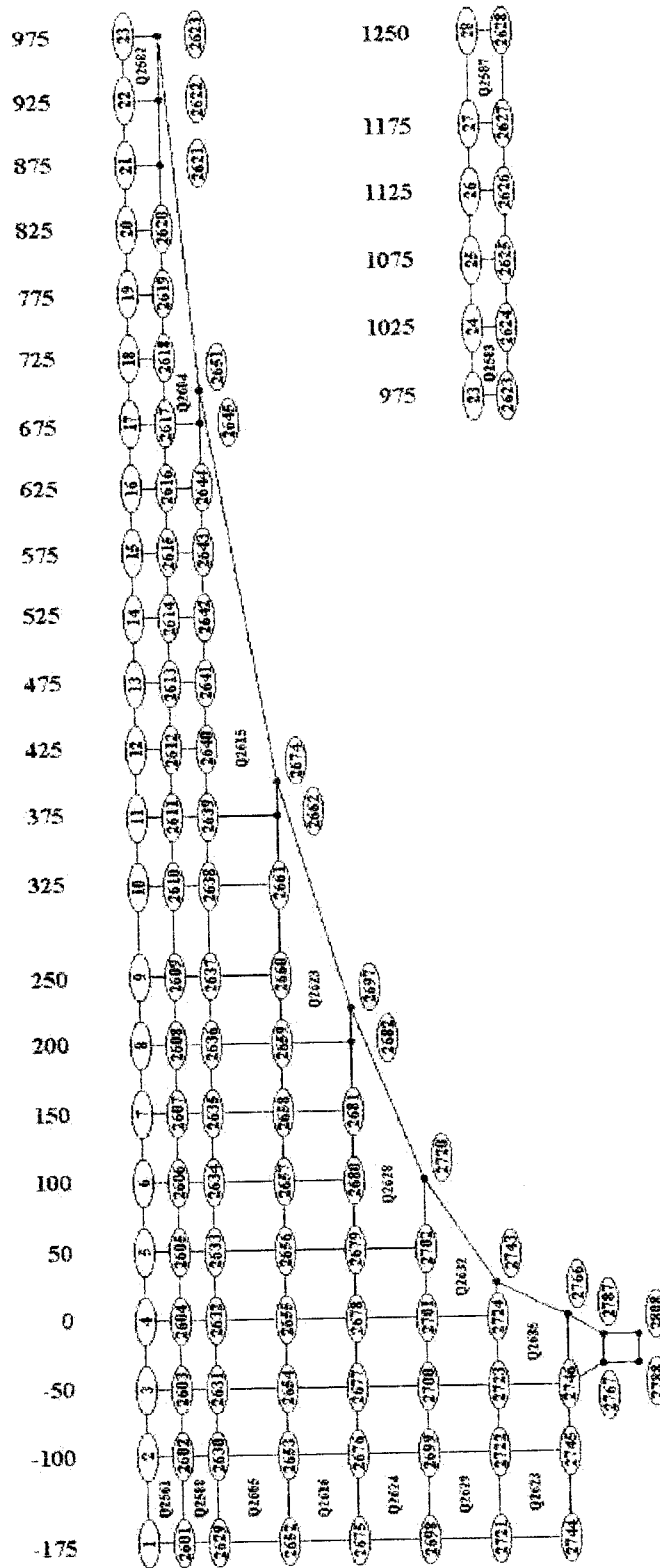
- a. Menara berbentuk lingkaran dengan garis tengah dalam 140 cm.
- b. Keliling menara dibagi menjadi 40 pias, dengan pias pertama dimulai dari nomor joint 1 sampai 65, demikian seterusnya hingga pias ke 40 dengan nomor joint 2536 sampai 2600.

- c. Shell pada menara berbentuk segi empat dengan 2 macam ukuran, yaitu berukuran lebar 11 cm dan tinggi 75 cm, serta lebar 11 cm dan tinggi 50 cm. Adanya dua macam ukuran ini adalah untuk menyesuaikan pembagian shell pada *lateral support* (sayap) sehingga joint-joint pada bagian pertemuan antara sayap dengan menara utama dapat berimpit.
- d. Elemen shell (Q) penomoran secara melingkar, dengan lingkaran pertama dimulai Q1 sampai Q40, demikian seterusnya hingga lingkaran teratas dimulai Q2521 sampai Q2560

Sedangkan pembagian pada sayap *lateral support* dapat dilihat pada gambar 4.2, dengan keterangan sebagai berikut :

- a. Joint dimulai dari nomor 2601, merupakan lanjutan nomor joint terakhir menara utama yaitu 2600, sedangkan nomor joint 1-28 menunjukkan bagian sayap yang berimpit dengan menara utama.
- b. Shell dilambangkan dengan Q, dimulai dari nomor 2561 yang merupakan lanjutan nomor shell terakhir menara utama.

Tampak pada gambar bahwa bagian-bagian tertentu (untuk mendekati bentuk) dengan tetap mempertahankan bentuk segi empat diambil pendekatan dengan bentuk yang tidak simetris dan terdapat juga segi empat simetris dengan ukuran yang lebih besar dibanding lainnya. Pemilihan bentuk ini dipilih setelah dilakukan beberapa kali percobaan dan dilakukan *running* program, dimana gaya maksimum yang timbul tidak terdapat pada bagian tersebut, sehingga agar joint dan shell tidak terlalu banyak, maka dilakukan penyederhanaan bentuk sebagaimana dapat dilihat pada gambar 4.2 yang merupakan bentuk yang paling mendekati wujud nyata bangunan.



Gambar 4.2 Penomoran joint dan shell pada sayap

Dari penomoran koordinat dan shell yang telah dilakukan di atas, maka selanjutnya dituliskan dalam baris-baris input data sesuai aturan penulisan SAP 90, sebagai mana disajikan berikut ini.

Fugus Albi
RECALCULATE MENARA KARTINI BATAN YOGYAKARTA



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SYSTEM
L=2 V=7
JOINTS
C ----- TOWER -----
8000 X=0 Y=0 Z=0
8001 X=0 Y=0 Z=30.75
  1 X=0.950 Y=0 Z=-1.75 A=8000,8001, 1,39,65,9
  2 X=0.947637 Y=0 Z=-1.00 A=8000,8001, 2,39,65,9
  3 X=0.946062 Y=0 Z=-.50 A=8000,8001, 3,39,65,9
  4 X=0.944488 Y=0 Z= .0 A=8000,8001, 4,39,65,9
  5 X=0.942913 Y=0 Z= .50 A=8000,8001, 5,39,65,9
  6 X=0.941338 Y=0 Z= 1.00 A=8000,8001, 6,39,65,9
  7 X=0.939763 Y=0 Z= 1.50 A=8000,8001, 7,39,65,9
  8 X=0.938188 Y=0 Z= 2.00 A=8000,8001, 8,39,65,9
  9 X=0.936614 Y=0 Z= 2.50 A=8000,8001, 9,39,65,9
 10 X=0.934251 Y=0 Z= 3.25 A=8000,8001,10,39,65,9
 11 X=0.932677 Y=0 Z= 3.75 A=8000,8001,11,39,65,9
 12 X=0.931102 Y=0 Z= 4.25 A=8000,8001,12,39,65,9
 13 X=0.929527 Y=0 Z= 4.75 A=8000,8001,13,39,65,9
 14 X=0.927952 Y=0 Z= 5.25 A=8000,8001,14,39,65,9
 15 X=0.926377 Y=0 Z= 5.75 A=8000,8001,15,39,65,9
 16 X=0.924803 Y=0 Z= 6.25 A=8000,8001,16,39,65,9
 17 X=0.923228 Y=0 Z= 6.75 A=8000,8001,17,39,65,9
 18 X=0.921653 Y=0 Z= 7.25 A=8000,8001,18,39,65,9
 19 X=0.920078 Y=0 Z= 7.75 A=8000,8001,19,39,65,9
 20 X=0.918503 Y=0 Z= 8.25 A=8000,8001,20,39,65,9
 21 X=0.916929 Y=0 Z= 8.75 A=8000,8001,21,39,65,9
 22 X=0.915354 Y=0 Z= 9.25 A=8000,8001,22,39,65,9
 23 X=0.913779 Y=0 Z= 9.75 A=8000,8001,23,39,65,9
 24 X=0.912204 Y=0 Z=10.25 A=8000,8001,24,39,65,9
 25 X=0.910629 Y=0 Z=10.75 A=8000,8001,25,39,65,9
 26 X=0.909055 Y=0 Z=11.25 A=8000,8001,26,39,65,9
 27 X=0.907480 Y=0 Z=11.75 A=8000,8001,27,39,65,9
 28 X=0.905905 Y=0 Z=12.50 A=8000,8001,28,39,65,9
 29 X=0.904330 Y=0 Z=13.00 A=8000,8001,29,39,65,9
 30 X=0.902755 Y=0 Z=13.50 A=8000,8001,30,39,65,9
 31 X=0.901181 Y=0 Z=14.00 A=8000,8001,31,39,65,9
 32 X=0.899606 Y=0 Z=14.50 A=8000,8001,32,39,65,9
 33 X=0.898031 Y=0 Z=15.00 A=8000,8001,33,39,65,9
 34 X=0.896456 Y=0 Z=15.50 A=8000,8001,34,39,65,9
 35 X=0.894881 Y=0 Z=16.00 A=8000,8001,35,39,65,9
 36 X=0.893307 Y=0 Z=16.50 A=8000,8001,36,39,65,9
 37 X=0.891732 Y=0 Z=17.00 A=8000,8001,37,39,65,9
 38 X=0.890157 Y=0 Z=17.50 A=8000,8001,38,39,65,9
 39 X=0.888582 Y=0 Z=18.00 A=8000,8001,39,39,65,9
 40 X=0.887007 Y=0 Z=18.50 A=8000,8001,40,39,65,9
 41 X=0.885433 Y=0 Z=19.00 A=8000,8001,41,39,65,9
 42 X=0.883858 Y=0 Z=19.50 A=8000,8001,42,39,65,9
 43 X=0.882283 Y=0 Z=20.00 A=8000,8001,43,39,65,9
 44 X=0.880708 Y=0 Z=20.50 A=8000,8001,44,39,65,9
 45 X=0.879133 Y=0 Z=21.00 A=8000,8001,45,39,65,9
 46 X=0.877559 Y=0 Z=21.50 A=8000,8001,46,39,65,9
 47 X=0.875984 Y=0 Z=22.00 A=8000,8001,47,39,65,9
 48 X=0.874409 Y=0 Z=22.50 A=8000,8001,48,39,65,9
 49 X=0.872834 Y=0 Z=23.00 A=8000,8001,49,39,65,9
 50 X=0.871259 Y=0 Z=23.50 A=8000,8001,50,39,65,9
 51 X=0.869685 Y=0 Z=24.00 A=8000,8001,51,39,65,9

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52	X=0.868110	Y=0	Z=24.50	A=8000,8001,52,39,65,9
53	X=0.866535	Y=0	Z=25.00	A=8000,8001,53,39,65,9
54	X=0.864960	Y=0	Z=25.50	A=8000,8001,54,39,65,9
55	X=0.863385	Y=0	Z=26.00	A=8000,8001,55,39,65,9
56	X=0.861811	Y=0	Z=26.50	A=8000,8001,56,39,65,9
57	X=0.860236	Y=0	Z=27.00	A=8000,8001,57,39,65,9
58	X=0.858661	Y=0	Z=27.50	A=8000,8001,58,39,65,9
59	X=0.857086	Y=0	Z=28.00	A=8000,8001,59,39,65,9
60	X=0.855511	Y=0	Z=28.50	A=8000,8001,60,39,65,9
61	X=0.853937	Y=0	Z=29.00	A=8000,8001,61,39,65,9
62	X=0.852362	Y=0	Z=29.50	A=8000,8001,62,39,65,9
63	X=0.850	Y=0	Z=30.00	A=8000,8001,63,39,65,9
64	X=1.35	Y=0	Z=30.00	A=8000,8001,64,39,65,9
65	X=1.85	Y=0	Z=30.00	A=8000,8001,65,39,65,9

C ----- SAYAP 1 (X+ ; Yo) -----

2601	X=1.25	Y=0	Z=-1.75	
2602	X=1.25	Y=0	Z=-1.00	Q= 1,2601, 2,2602,2600,1
2609	X=1.25	Y=0	Z= 2.50	Q= 2,2602, 9,2609,2600,1
2610	X=1.25	Y=0	Z= 3.25	Q= 9,2609,10,2610,2600,1
2627	X=1.25	Y=0	Z=11.75	Q=10,2610,27,2627,2600,1
2628	X=1.25	Y=0	Z=12.50	Q=27,2627,28,2628,2600,1
2629	X=1.50	Y=0	Z=-1.75	
2630	X=1.50	Y=0	Z=-1.00	Q=2601,2629,2602,2630,28,1
2637	X=1.50	Y=0	Z= 2.50	Q=2602,2630,2609,2637,28,1
2638	X=1.50	Y=0	Z= 3.25	Q=2609,2637,2610,2638,28,1
2645	X=1.50	Y=0	Z= 6.75	Q=2610,2638,2617,2645,28,1
2651	X=1.50	Y=0	Z= 7.00	Q=2617,2645,2623,2651,28,6
2652	X=2.00	Y=0	Z=-1.75	
2653	X=2.00	Y=0	Z=-1.00	Q=2629,2652,2630,2653,23,1
2660	X=2.00	Y=0	Z= 2.50	Q=2630,2653,2637,2660,23,1
2661	X=2.00	Y=0	Z= 3.25	Q=2637,2660,2638,2661,23,1
2662	X=2.00	Y=0	Z= 3.75	Q=2638,2661,2639,2662,23,1
2674	X=2.00	Y=0	Z= 4.00	Q=2639,2662,2651,2674,23,12
2675	X=2.50	Y=0	Z=-1.75	
2676	X=2.50	Y=0	Z=-1.00	Q=2652,2675,2653,2676,23,1
2682	X=2.50	Y=0	Z= 2.00	Q=2653,2676,2659,2682,23,1
2697	X=2.50	Y=0	Z= 2.25	Q=2659,2682,2674,2697,23,15
2698	X=3.00	Y=0	Z=-1.75	
2699	X=3.00	Y=0	Z=-1.00	Q=2675,2698,2676,2699,23,1
2702	X=3.00	Y=0	Z= .50	Q=2676,2699,2679,2702,23,1
2720	X=3.00	Y=0	Z= 1.00	Q=2679,2702,2697,2720,23,18
2721	X=3.50	Y=0	Z=-1.75	
2722	X=3.50	Y=0	Z=-1.00	Q=2698,2721,2699,2722,23,1
2724	X=3.50	Y=0	Z= .00	Q=2699,2722,2701,2724,23,1
2743	X=3.50	Y=0	Z= .25	Q=2701,2724,2720,2743,23,19
2744	X=4.00	Y=0	Z=-1.75	
2745	X=4.00	Y=0	Z=-1.00	Q=2721,2744,2722,2745,23,1
2746	X=4.00	Y=0	Z= -.50	Q=2722,2745,2723,2746,23,1
2766	X=4.00	Y=0	Z= -.10	Q=2723,2746,2743,2766,23,20
2767	X=4.25	Y=0	Z= -.40	
2787	X=4.25	Y=0	Z= -.20	Q=2746,2767,2766,2787,21,20
2788	X=4.50	Y=0	Z= -.40	
2808	X=4.50	Y=0	Z= -.20	Q=2767,2788,2787,2808,21,20

C ----- SAYAP 2 (X+ ; Y+) -----

2809	X= .883884	Y= .883884	Z=-1.75	
2810	X= .883884	Y= .883884	Z=-1.00	Q=326,2809,327,2810,2483,1
2817	X= .883884	Y= .883884	Z= 2.50	Q=327,2810,334,2817,2483,1
2818	X= .883884	Y= .883884	Z= 3.25	Q=334,2817,335,2818,2483,1
2835	X= .883884	Y= .883884	Z=11.75	Q=335,2818,352,2835,2483,1
2836	X= .883884	Y= .883884	Z=12.50	Q=352,2835,353,2836,2483,1
2837	X=1.060660	Y=1.060660	Z=-1.75	
2838	X=1.060660	Y=1.060660	Z=-1.00	Q=2809,2837,2810,2838,28,1
2845	X=1.060660	Y=1.060660	Z= 2.50	Q=2810,2838,2817,2845,28,1
2846	X=1.060660	Y=1.060660	Z= 3.25	Q=2817,2845,2818,2846,28,1
2853	X=1.060660	Y=1.060660	Z= 6.75	Q=2818,2846,2825,2853,28,1
2859	X=1.060660	Y=1.060660	Z= 7.00	Q=2825,2853,2831,2859,28,6
2860	X=1.414214	Y=1.414214	Z=-1.75	

2861	X=1.414214	Y=1.414214	Z=-1.00	Q=2837,2860,2838,2861,23,1
2868	X=1.414214	Y=1.414214	Z= 2.50	Q=2838,2861,2845,2868,23,1
2869	X=1.414214	Y=1.414214	Z= 3.25	Q=2845,2868,2846,2869,23,1
2870	X=1.414214	Y=1.414214	Z= 3.75	Q=2846,2869,2847,2870,23,1
2882	X=1.414214	Y=1.414214	Z= 4.00	Q=2847,2870,2859,2882,23,12
2883	X=1.767768	Y=1.767768	Z=-1.75	
2884	X=1.767768	Y=1.767768	Z=-1.00	Q=2860,2883,2861,2884,23,1
2890	X=1.767768	Y=1.767768	Z= 2.00	Q=2861,2884,2867,2890,23,1
2905	X=1.767768	Y=1.767768	Z= 2.25	Q=2867,2890,2882,2905,23,15
2906	X=2.121321	Y=2.121321	Z=-1.75	
2907	X=2.121321	Y=2.121321	Z=-1.00	Q=2883,2906,2884,2907,23,1
2910	X=2.121321	Y=2.121321	Z= .50	Q=2884,2907,2887,2910,23,1
2928	X=2.121321	Y=2.121321	Z= 1.00	Q=2887,2910,2905,2928,23,18
2929	X=2.474875	Y=2.474875	Z=-1.75	
2930	X=2.474875	Y=2.474875	Z=-1.00	Q=2906,2929,2907,2930,23,1
2932	X=2.474875	Y=2.474875	Z= .00	Q=2907,2930,2909,2932,23,1
2951	X=2.474875	Y=2.474875	Z= .25	Q=2909,2932,2928,2951,23,19
2952	X=2.828429	Y=2.828429	Z=-1.75	
2953	X=2.828429	Y=2.828429	Z=-1.00	Q=2929,2952,2930,2953,23,1
2954	X=2.828429	Y=2.828429	Z= -.50	Q=2930,2953,2931,2954,23,1
2974	X=2.828429	Y=2.828429	Z= -.10	Q=2931,2954,2951,2974,23,20
2975	X=3.005205	Y=3.005205	Z= -.40	
2995	X=3.005205	Y=3.005205	Z= -.20	Q=2954,2975,2974,2995,21,20
2996	X=3.181982	Y=3.181982	Z= -.40	
3016	X=3.181982	Y=3.181982	Z= -.20	Q=2975,2996,2995,3016,21,20

C ----- SAYAP 3 (X₀ ; Y+) -----

3017	X=0	Y=1.25	Z=-1.75	
3018	X=0	Y=1.25	Z=-1.00	Q=651,3017,652,3018,2366,1
3025	X=0	Y=1.25	Z= 2.50	Q=652,3018,659,3025,2366,1
3026	X=0	Y=1.25	Z= 3.25	Q=659,3025,660,3026,2366,1
3043	X=0	Y=1.25	Z=11.75	Q=660,3026,677,3043,2366,1
3044	X=0	Y=1.25	Z=12.50	Q=677,3043,678,3044,2366,1
3045	X=0	Y=1.50	Z=-1.75	
3046	X=0	Y=1.50	Z=-1.00	Q=3017,3045,3018,3046,28,1
3053	X=0	Y=1.50	Z= 2.50	Q=3018,3046,3025,3053,28,1
3054	X=0	Y=1.50	Z= 3.25	Q=3025,3053,3026,3054,28,1
3061	X=0	Y=1.50	Z= 6.75	Q=3026,3054,3033,3061,28,1
3067	X=0	Y=1.50	Z= 7.00	Q=3033,3061,3039,3067,28,6
3068	X=0	Y=2.00	Z=-1.75	
3069	X=0	Y=2.00	Z=-1.00	Q=3045,3068,3046,3069,23,1
3076	X=0	Y=2.00	Z= 2.50	Q=3046,3069,3053,3076,23,1
3077	X=0	Y=2.00	Z= 3.25	Q=3053,3076,3054,3077,23,1
3078	X=0	Y=2.00	Z= 3.75	Q=3054,3077,3055,3078,23,1
3090	X=0	Y=2.00	Z= 4.00	Q=3055,3078,3067,3090,23,12
3091	X=0	Y=2.50	Z=-1.75	
3092	X=0	Y=2.50	Z=-1.00	Q=3068,3091,3069,3092,23,1
3098	X=0	Y=2.50	Z= 2.00	Q=3069,3092,3075,3098,23,1
3113	X=0	Y=2.50	Z= 2.25	Q=3075,3098,3090,3113,23,15
3114	X=0	Y=3.00	Z=-1.75	
3115	X=0	Y=3.00	Z=-1.00	Q=3091,3114,3092,3115,23,1
3118	X=0	Y=3.00	Z= .50	Q=3092,3115,3095,3118,23,1
3136	X=0	Y=3.00	Z= 1.00	Q=3095,3118,3113,3136,23,18
3137	X=0	Y=3.50	Z=-1.75	
3138	X=0	Y=3.50	Z=-1.00	Q=3114,3137,3115,3138,23,1
3140	X=0	Y=3.50	Z= .00	Q=3115,3138,3117,3140,23,1
3159	X=0	Y=3.50	Z= .25	Q=3117,3140,3136,3159,23,19
3160	X=0	Y=4.00	Z=-1.75	
3161	X=0	Y=4.00	Z=-1.00	Q=3137,3160,3138,3161,23,1
3162	X=0	Y=4.00	Z= -.50	Q=3138,3161,3139,3162,23,1
3182	X=0	Y=4.00	Z= -.10	Q=3139,3162,3159,3182,23,20
3183	X=0	Y=4.25	Z= -.40	
3203	X=0	Y=4.25	Z= -.20	Q=3162,3183,3182,3203,21,20
3204	X=0	Y=4.50	Z= -.40	
3224	X=0	Y=4.50	Z= -.20	Q=3183,3204,3203,3224,21,20

C ----- SAYAP 4 (X- ; Y+) -----

3225	X=-.883884	Y=.883884	Z=-1.75	
3226	X=-.883884	Y=.883884	Z=-1.00	Q= 976,3225, 977,3226,2249,1

3233	X=-.883884	Y=.883884	Z= 2.50	Q= 977,3226, 984,3233,2249,1
3234	X=-.883884	Y=.883884	Z= 3.25	Q= 984,3233, 985,3234,2249,1
3251	X=-.883884	Y=.883884	Z=11.75	Q= 985,3234,1002,3251,2249,1
3252	X=-.883884	Y=.883884	Z=12.50	Q=1002,3251,1003,3252,2249,1
3253	X=-1.060660	Y=1.060660	Z=-1.75	
3254	X=-1.060660	Y=1.060660	Z=-1.00	Q=3225,3253,3226,3254,28,1
3261	X=-1.060660	Y=1.060660	Z= 2.50	Q=3226,3254,3233,3261,28,1
3262	X=-1.060660	Y=1.060660	Z= 3.25	Q=3233,3261,3234,3262,28,1
3269	X=-1.060660	Y=1.060660	Z= 6.75	Q=3234,3262,3241,3269,28,1
3275	X=-1.060660	Y=1.060660	Z= 7.00	Q=3241,3269,3247,3275,28,6
3276	X=-1.414214	Y=1.414214	Z=-1.75	
3277	X=-1.414214	Y=1.414214	Z=-1.00	Q=3253,3276,3254,3277,23,1
3284	X=-1.414214	Y=1.414214	Z= 2.50	Q=3254,3277,3261,3284,23,1
3285	X=-1.414214	Y=1.414214	Z= 3.25	Q=3261,3284,3262,3285,23,1
3286	X=-1.414214	Y=1.414214	Z= 3.75	Q=3262,3285,3263,3286,23,1
3298	X=-1.414214	Y=1.414214	Z= 4.00	Q=3263,3286,3275,3298,23,12
3299	X=-1.767768	Y=1.767768	Z=-1.75	
3300	X=-1.767768	Y=1.767768	Z=-1.00	Q=3276,3299,3277,3300,23,1
3306	X=-1.767768	Y=1.767768	Z= 2.00	Q=3277,3300,3283,3306,23,1
3321	X=-1.767768	Y=1.767768	Z= 2.25	Q=3283,3306,3298,3321,23,15
3322	X=-2.121321	Y=2.121321	Z=-1.75	
3323	X=-2.121321	Y=2.121321	Z=-1.00	Q=3299,3322,3300,3323,23,1
3326	X=-2.121321	Y=2.121321	Z= .50	Q=3300,3323,3303,3326,23,1
3344	X=-2.121321	Y=2.121321	Z= 1.00	Q=3303,3326,3321,3344,23,18
3345	X=-2.474875	Y=2.474875	Z=-1.75	
3346	X=-2.474875	Y=2.474875	Z=-1.00	Q=3322,3345,3323,3346,23,1
3348	X=-2.474875	Y=2.474875	Z= .00	Q=3323,3346,3325,3348,23,1
3367	X=-2.474875	Y=2.474875	Z= .25	Q=3325,3348,3344,3367,23,19
3368	X=-2.828429	Y=2.828429	Z=-1.75	
3369	X=-2.828429	Y=2.828429	Z=-1.00	Q=3345,3368,3346,3369,23,1
3370	X=-2.828429	Y=2.828429	Z= -.50	Q=3346,3369,3347,3370,23,1
3390	X=-2.828429	Y=2.828429	Z= -.10	Q=3347,3370,3367,3390,23,20
3391	X=-3.005205	Y=3.005205	Z= -.40	
3411	X=-3.005205	Y=3.005205	Z= -.20	Q=3370,3391,3390,3411,21,20
3412	X=-3.181982	Y=3.181982	Z= -.40	
3432	X=-3.181982	Y=3.181982	Z= -.20	Q=3391,3412,3411,3432,21,20
C ----- SAYAP 5 (X- ; Yo) -----				
3433	X=-1.25	Y=0	Z=-1.75	
3434	X=-1.25	Y=0	Z=-1.00	Q=1301,3433,1302,3434,2132,1
3441	X=-1.25	Y=0	Z= 2.50	Q=1302,3434,1309,3441,2132,1
3442	X=-1.25	Y=0	Z= 3.25	Q=1309,3441,1310,3442,2132,1
3459	X=-1.25	Y=0	Z=11.75	Q=1310,3442,1327,3459,2132,1
3460	X=-1.25	Y=0	Z=12.50	Q=1327,3459,1328,3460,2132,1
3461	X=-1.50	Y=0	Z=-1.75	
3462	X=-1.50	Y=0	Z=-1.00	Q=3433,3461,3434,3462,28,1
3469	X=-1.50	Y=0	Z= 2.50	Q=3434,3462,3441,3469,28,1
3470	X=-1.50	Y=0	Z= 3.25	Q=3441,3469,3442,3470,28,1
3477	X=-1.50	Y=0	Z= 6.75	Q=3442,3470,3449,3477,28,1
3483	X=-1.50	Y=0	Z= 7.00	Q=3449,3477,3455,3483,28,6
3484	X=-2.00	Y=0	Z=-1.75	
3485	X=-2.00	Y=0	Z=-1.00	Q=3461,3484,3462,3485,23,1
3492	X=-2.00	Y=0	Z= 2.50	Q=3462,3485,3469,3492,23,1
3493	X=-2.00	Y=0	Z= 3.25	Q=3469,3492,3470,3493,23,1
3494	X=-2.00	Y=0	Z= 3.75	Q=3470,3493,3471,3494,23,1
3506	X=-2.00	Y=0	Z= 4.00	Q=3471,3494,3483,3506,23,12
3507	X=-2.50	Y=0	Z=-1.75	
3508	X=-2.50	Y=0	Z=-1.00	Q=3484,3507,3485,3508,23,1
3514	X=-2.50	Y=0	Z= 2.00	Q=3485,3508,3491,3514,23,1
3529	X=-2.50	Y=0	Z= 2.25	Q=3491,3514,3506,3529,23,15
3530	X=-3.00	Y=0	Z=-1.75	
3531	X=-3.00	Y=0	Z=-1.00	Q=3507,3530,3508,3531,23,1
3534	X=-3.00	Y=0	Z= .50	Q=3508,3531,3511,3534,23,1
3552	X=-3.00	Y=0	Z= 1.00	Q=3511,3534,3529,3552,23,18
3553	X=-3.50	Y=0	Z=-1.75	
3554	X=-3.50	Y=0	Z=-1.00	Q=3530,3553,3531,3554,23,1
3556	X=-3.50	Y=0	Z= .00	Q=3531,3554,3533,3556,23,1
3575	X=-3.50	Y=0	Z= .25	Q=3533,3556,3552,3575,23,19

3576	X=-4.00	Y=0	Z=-1.75	
3577	X=-4.00	Y=0	Z=-1.00	Q=3553, 3576, 3554, 3577, 23, 1
3578	X=-4.00	Y=0	Z=-.50	Q=3554, 3577, 3555, 3578, 23, 1
3598	X=-4.00	Y=0	Z=-.10	Q=3555, 3578, 3575, 3598, 23, 20
3599	X=-4.25	Y=0	Z=-.40	
3619	X=-4.25	Y=0	Z=-.20	Q=3578, 3599, 3598, 3619, 21, 20
3620	X=-4.50	Y=0	Z=-.40	
3640	X=-4.50	Y=0	Z=-.20	Q=3599, 3620, 3619, 3640, 21, 20
C ----- SAYAP 6 (X- ; Y-) -----				
3641	X=-.883884	Y=-.883884	Z=-1.75	
3642	X=-.883884	Y=-.883884	Z=-1.00	Q=1626, 3641, 1627, 3642, 2015, 1
3649	X=-.883884	Y=-.883884	Z= 2.50	Q=1627, 3642, 1634, 3649, 2015, 1
3650	X=-.883884	Y=-.883884	Z= 3.25	Q=1634, 3649, 1635, 3650, 2015, 1
3667	X=-.883884	Y=-.883884	Z=11.75	Q=1635, 3650, 1652, 3667, 2015, 1
3668	X=-.883884	Y=-.883884	Z=12.50	Q=1652, 3667, 1653, 3668, 2015, 1
3669	X=-1.060660	Y=-1.060660	Z=-1.75	
3670	X=-1.060660	Y=-1.060660	Z=-1.00	Q=3641, 3669, 3642, 3670, 28, 1
3677	X=-1.060660	Y=-1.060660	Z= 2.50	Q=3642, 3670, 3649, 3677, 28, 1
3678	X=-1.060660	Y=-1.060660	Z= 3.25	Q=3649, 3677, 3650, 3678, 28, 1
3685	X=-1.060660	Y=-1.060660	Z= 6.75	Q=3650, 3678, 3657, 3685, 28, 1
3691	X=-1.060660	Y=-1.060660	Z= 7.00	Q=3657, 3685, 3663, 3691, 28, 6
3692	X=-1.414214	Y=-1.414214	Z=-1.75	
3693	X=-1.414214	Y=-1.414214	Z=-1.00	Q=3669, 3692, 3670, 3693, 23, 1
3700	X=-1.414214	Y=-1.414214	Z= 2.50	Q=3670, 3693, 3677, 3700, 23, 1
3701	X=-1.414214	Y=-1.414214	Z= 3.25	Q=3677, 3700, 3678, 3701, 23, 1
3702	X=-1.414214	Y=-1.414214	Z= 3.75	Q=3678, 3701, 3679, 3702, 23, 1
3714	X=-1.414214	Y=-1.414214	Z= 4.00	Q=3679, 3702, 3691, 3714, 23, 12
3715	X=-1.767768	Y=-1.767768	Z=-1.75	
3716	X=-1.767768	Y=-1.767768	Z=-1.00	Q=3692, 3715, 3693, 3716, 23, 1
3722	X=-1.767768	Y=-1.767768	Z= 2.00	Q=3693, 3716, 3699, 3722, 23, 1
3737	X=-1.767768	Y=-1.767768	Z= 2.25	Q=3699, 3722, 3714, 3737, 23, 15
3738	X=-2.121321	Y=-2.121321	Z=-1.75	
3739	X=-2.121321	Y=-2.121321	Z=-1.00	Q=3715, 3738, 3716, 3739, 23, 1
3742	X=-2.121321	Y=-2.121321	Z= .50	Q=3716, 3739, 3719, 3742, 23, 1
3760	X=-2.121321	Y=-2.121321	Z= 1.00	Q=3719, 3742, 3737, 3760, 23, 18
3761	X=-2.474875	Y=-2.474875	Z=-1.75	
3762	X=-2.474875	Y=-2.474875	Z=-1.00	Q=3738, 3761, 3739, 3762, 23, 1
3764	X=-2.474875	Y=-2.474875	Z= .00	Q=3739, 3762, 3741, 3764, 23, 1
3783	X=-2.474875	Y=-2.474875	Z= .25	Q=3741, 3764, 3760, 3783, 23, 19
3784	X=-2.828429	Y=-2.828429	Z=-1.75	
3785	X=-2.828429	Y=-2.828429	Z=-1.00	Q=3761, 3784, 3762, 3785, 23, 1
3786	X=-2.828429	Y=-2.828429	Z= -.50	Q=3762, 3785, 3763, 3786, 23, 1
3806	X=-2.828429	Y=-2.828429	Z= -.10	Q=3763, 3786, 3783, 3806, 23, 20
3807	X=-3.005205	Y=-3.005205	Z= -.40	
3827	X=-3.005205	Y=-3.005205	Z= -.20	Q=3786, 3807, 3806, 3827, 21, 20
3828	X=-3.181982	Y=-3.181982	Z= -.40	
3848	X=-3.181982	Y=-3.181982	Z= -.20	Q=3807, 3828, 3827, 3848, 21, 20
C ----- SAYAP 7 (Xo ; Y-) -----				
3849	X=0	Y=-1.25	Z=-1.75	
3850	X=0	Y=-1.25	Z=-1.00	Q=1951, 3849, 1952, 3850, 1898, 1
3857	X=0	Y=-1.25	Z= 2.50	Q=1952, 3850, 1959, 3857, 1898, 1
3858	X=0	Y=-1.25	Z= 3.25	Q=1959, 3857, 1960, 3858, 1898, 1
3875	X=0	Y=-1.25	Z=11.75	Q=1960, 3858, 1977, 3875, 1898, 1
3876	X=0	Y=-1.25	Z=12.50	Q=1977, 3875, 1978, 3876, 1898, 1
3877	X=0	Y=-1.50	Z=-1.75	
3878	X=0	Y=-1.50	Z=-1.00	Q=3849, 3877, 3850, 3878, 28, 1
3885	X=0	Y=-1.50	Z= 2.50	Q=3850, 3878, 3857, 3885, 28, 1
3886	X=0	Y=-1.50	Z= 3.25	Q=3857, 3885, 3858, 3886, 28, 1
3893	X=0	Y=-1.50	Z= 6.75	Q=3858, 3886, 3865, 3893, 28, 1
3899	X=0	Y=-1.50	Z= 7.00	Q=3865, 3893, 3871, 3899, 28, 6
3900	X=0	Y=-2.00	Z=-1.75	
3901	X=0	Y=-2.00	Z=-1.00	Q=3877, 3900, 3878, 3901, 23, 1
3908	X=0	Y=-2.00	Z= 2.50	Q=3878, 3901, 3885, 3908, 23, 1
3909	X=0	Y=-2.00	Z= 3.25	Q=3885, 3908, 3886, 3909, 23, 1
3910	X=0	Y=-2.00	Z= 3.75	Q=3886, 3909, 3887, 3910, 23, 1
3922	X=0	Y=-2.00	Z= 4.00	Q=3887, 3910, 3899, 3922, 23, 12
3923	X=0	Y=-2.50	Z=-1.75	

3924	X=0	Y=-2.50	Z=-1.00	Q=3900, 3923, 3901, 3924, 23, 1
3930	X=0	Y=-2.50	Z= 2.00	Q=3901, 3924, 3907, 3930, 23, 1
3945	X=0	Y=-2.50	Z= 2.25	Q=3907, 3930, 3922, 3945, 23, 15
3946	X=0	Y=-3.00	Z=-1.75	
3947	X=0	Y=-3.00	Z=-1.00	Q=3923, 3946, 3924, 3947, 23, 1
3950	X=0	Y=-3.00	Z= .50	Q=3924, 3947, 3927, 3950, 23, 1
3968	X=0	Y=-3.00	Z= 1.00	Q=3927, 3950, 3945, 3968, 23, 18
3969	X=0	Y=-3.50	Z=-1.75	
3970	X=0	Y=-3.50	Z=-1.00	Q=3946, 3969, 3947, 3970, 23, 1
3972	X=0	Y=-3.50	Z= .00	Q=3947, 3970, 3949, 3972, 23, 1
3991	X=0	Y=-3.50	Z= .25	Q=3949, 3972, 3968, 3991, 23, 19
3992	X=0	Y=-4.00	Z=-1.75	
3993	X=0	Y=-4.00	Z=-1.00	Q=3969, 3992, 3970, 3993, 23, 1
3994	X=0	Y=-4.00	Z= -.50	Q=3970, 3993, 3971, 3994, 23, 1
4014	X=0	Y=-4.00	Z= -.10	Q=3971, 3994, 3991, 4014, 23, 20
4015	X=0	Y=-4.25	Z= -.40	
4035	X=0	Y=-4.25	Z= -.20	Q=3994, 4015, 4014, 4035, 21, 20
4036	X=0	Y=-4.50	Z= -.40	
4056	X=0	Y=-4.50	Z= -.20	Q=4015, 4036, 4035, 4056, 21, 20
C ----- SAYAP 8 (X+ ; Y-) -----				
4057	X= .883884	Y=- .883884	Z=-1.75	
4058	X= .883884	Y=- .883884	Z=-1.00	Q=2276, 4057, 2277, 4058, 1781, 1
4065	X= .883884	Y=- .883884	Z= 2.50	Q=2277, 4058, 2284, 4065, 1781, 1
4066	X= .883884	Y=- .883884	Z= 3.25	Q=2284, 4065, 2285, 4066, 1781, 1
4083	X= .883884	Y=- .883884	Z=11.75	Q=2285, 4066, 2302, 4083, 1781, 1
4084	X= .883884	Y=- .883884	Z=12.50	Q=2302, 4083, 2303, 4084, 1781, 1
4085	X=1.060660	Y=-1.060660	Z=-1.75	
4086	X=1.060660	Y=-1.060660	Z=-1.00	Q=4057, 4085, 4058, 4086, 28, 1
4093	X=1.060660	Y=-1.060660	Z= 2.50	Q=4058, 4086, 4065, 4093, 28, 1
4094	X=1.060660	Y=-1.060660	Z= 3.25	Q=4065, 4093, 4066, 4094, 28, 1
4101	X=1.060660	Y=-1.060660	Z= 6.75	Q=4066, 4094, 4073, 4101, 28, 1
4107	X=1.060660	Y=-1.060660	Z= 7.00	Q=4073, 4101, 4079, 4107, 28, 6
4108	X=1.414214	Y=-1.414214	Z=-1.75	
4109	X=1.414214	Y=-1.414214	Z=-1.00	Q=4085, 4108, 4086, 4109, 23, 1
4116	X=1.414214	Y=-1.414214	Z= 2.50	Q=4086, 4109, 4093, 4116, 23, 1
4117	X=1.414214	Y=-1.414214	Z= 3.25	Q=4093, 4116, 4094, 4117, 23, 1
4118	X=1.414214	Y=-1.414214	Z= 3.75	Q=4094, 4117, 4095, 4118, 23, 1
4130	X=1.414214	Y=-1.414214	Z= 4.00	Q=4095, 4118, 4107, 4130, 23, 12
4131	X=1.767768	Y=-1.767768	Z=-1.75	
4132	X=1.767768	Y=-1.767768	Z=-1.00	Q=4108, 4131, 4109, 4132, 23, 1
4138	X=1.767768	Y=-1.767768	Z= 2.00	Q=4109, 4132, 4115, 4138, 23, 1
4153	X=1.767768	Y=-1.767768	Z= 2.25	Q=4115, 4138, 4130, 4153, 23, 15
4154	X=2.121321	Y=-2.121321	Z=-1.75	
4155	X=2.121321	Y=-2.121321	Z=-1.00	Q=4131, 4154, 4132, 4155, 23, 1
4158	X=2.121321	Y=-2.121321	Z= .50	Q=4132, 4155, 4135, 4158, 23, 1
4176	X=2.121321	Y=-2.121321	Z= 1.00	Q=4135, 4158, 4153, 4176, 23, 18
4177	X=2.474875	Y=-2.474875	Z=-1.75	
4178	X=2.474875	Y=-2.474875	Z=-1.00	Q=4154, 4177, 4155, 4178, 23, 1
4180	X=2.474875	Y=-2.474875	Z= .00	Q=4155, 4178, 4157, 4180, 23, 1
4199	X=2.474875	Y=-2.474875	Z= .25	Q=4157, 4180, 4176, 4199, 23, 19
4200	X=2.828429	Y=-2.828429	Z=-1.75	
4201	X=2.828429	Y=-2.828429	Z=-1.00	Q=4177, 4200, 4178, 4201, 23, 1
4202	X=2.828429	Y=-2.828429	Z= -.50	Q=4178, 4201, 4179, 4202, 23, 1
4222	X=2.828429	Y=-2.828429	Z= -.10	Q=4179, 4202, 4199, 4222, 23, 20
4223	X=3.005205	Y=-3.005205	Z= -.40	
4243	X=3.005205	Y=-3.005205	Z= -.20	Q=4202, 4223, 4222, 4243, 21, 20
4244	X=3.181982	Y=-3.181982	Z= -.40	
4264	X=3.181982	Y=-3.181982	Z= -.20	Q=4223, 4244, 4243, 4264, 21, 20

RESTRAINTS

8000	8001	1	R=1, 1, 1, 1, 1, 1	: JOINT PUSAT TOWER
1	2536	65	R=1, 1, 1, 1, 1, 1	: JOINT DASAR TOWER
2601	2629	28	R=1, 1, 1, 1, 1, 1	: JOINT DASAR SAYAP 1
2629	2744	23	R=1, 1, 1, 1, 1, 1	
2809	2837	28	R=1, 1, 1, 1, 1, 1	: JOINT DASAR SAYAP 2
2837	2952	23	R=1, 1, 1, 1, 1, 1	
3017	3045	28	R=1, 1, 1, 1, 1, 1	: JOINT DASAR SAYAP 3

3045	3160	23	R=1,1,1,1,1,1	
3225	3253	28	R=1,1,1,1,1,1	: JOINT DASAR SAYAP 4
3253	3368	23	R=1,1,1,1,1,1	
3433	3461	28	R=1,1,1,1,1,1	: JOINT DASAR SAYAP 5
3461	3576	23	R=1,1,1,1,1,1	
3641	3669	28	R=1,1,1,1,1,1	: JOINT DASAR SAYAP 6
3669	3784	23	R=1,1,1,1,1,1	
3849	3877	28	R=1,1,1,1,1,1	: JOINT DASAR SAYAP 7
3877	3992	23	R=1,1,1,1,1,1	
4057	4085	28	R=1,1,1,1,1,1	: JOINT DASAR SAYAP 8
4085	4200	23	R=1,1,1,1,1,1	

SHELL

C CONTROL INFORMATION DATA

C ----- TOWER -----

NM=1 Z=-1

C ----- MATERIAL SECTOR PROPERTIES -----

1 E=1.79125E7 U=0.2 W=24 M=24/9.8

C ----- ELEMENT LOCATION DATA -----

1	JQ=	1,	2,	66,	67	G=1,39	TH=.50	M=1	ETYPE=0
41	JQ=	2,	3,	67,	68	G=1,39	TH=.492913	M=1	ETYPE=0
81	JQ=	3,	4,	68,	69	G=1,39	TH=.488188	M=1	ETYPE=0
121	JQ=	4,	5,	69,	70	G=1,39	TH=.483465	M=1	ETYPE=0
161	JQ=	5,	6,	70,	71	G=1,39	TH=.478740	M=1	ETYPE=0
201	JQ=	6,	7,	71,	72	G=1,39	TH=.474016	M=1	ETYPE=0
241	JQ=	7,	8,	72,	73	G=1,39	TH=.469291	M=1	ETYPE=0
281	JQ=	8,	9,	73,	74	G=1,39	TH=.464567	M=1	ETYPE=0
321	JQ=	9,	10,	74,	75	G=1, 1	TH=.459843	M=1	ETYPE=0
325	JQ=	269,	270,	334,	335	G=1,35	TH=.459843	M=1	ETYPE=0
361	JQ=	10,	11,	75,	76	G=1,39	TH=.452756	M=1	ETYPE=0
401	JQ=	11,	12,	76,	77	G=1,39	TH=.448031	M=1	ETYPE=0
441	JQ=	12,	13,	77,	78	G=1,39	TH=.443307	M=1	ETYPE=0
481	JQ=	13,	14,	78,	79	G=1,39	TH=.438583	M=1	ETYPE=0
521	JQ=	14,	15,	79,	80	G=1,39	TH=.433858	M=1	ETYPE=0
561	JQ=	15,	16,	80,	81	G=1,39	TH=.424134	M=1	ETYPE=0
601	JQ=	16,	17,	81,	82	G=1,39	TH=.424406	M=1	ETYPE=0
641	JQ=	17,	18,	82,	83	G=1,39	TH=.419685	M=1	ETYPE=0
681	JQ=	18,	19,	83,	84	G=1,39	TH=.414961	M=1	ETYPE=0
721	JQ=	19,	20,	84,	85	G=1,39	TH=.405512	M=1	ETYPE=0
761	JQ=	20,	21,	85,	86	G=1,39	TH=.400787	M=1	ETYPE=0
801	JQ=	21,	22,	86,	87	G=1,39	TH=.396063	M=1	ETYPE=0
841	JQ=	22,	23,	87,	88	G=1,39	TH=.391339	M=1	ETYPE=0
881	JQ=	23,	24,	88,	89	G=1,39	TH=.386614	M=1	ETYPE=0
921	JQ=	24,	25,	89,	90	G=1,39	TH=.381890	M=1	ETYPE=0
961	JQ=	25,	26,	90,	91	G=1,39	TH=.377165	M=1	ETYPE=0
1001	JQ=	26,	27,	91,	92	G=1,39	TH=.372441	M=1	ETYPE=0
1041	JQ=	27,	28,	92,	93	G=1,39	TH=.365354	M=1	ETYPE=0
1081	JQ=	28,	29,	93,	94	G=1,39	TH=.360630	M=1	ETYPE=0
1121	JQ=	29,	30,	94,	95	G=1,39	TH=.355906	M=1	ETYPE=0
1161	JQ=	30,	31,	95,	96	G=1,39	TH=.351181	M=1	ETYPE=0
1201	JQ=	31,	32,	96,	97	G=1,39	TH=.346457	M=1	ETYPE=0
1241	JQ=	32,	33,	97,	98	G=1,39	TH=.341732	M=1	ETYPE=0
1281	JQ=	33,	34,	98,	99	G=1,39	TH=.337008	M=1	ETYPE=0
1321	JQ=	34,	35,	99,	100	G=1,39	TH=.332283	M=1	ETYPE=0
1361	JQ=	35,	36,	100,	101	G=1,39	TH=.327559	M=1	ETYPE=0
1401	JQ=	36,	37,	101,	102	G=1,39	TH=.322835	M=1	ETYPE=0
1441	JQ=	37,	38,	102,	103	G=1,39	TH=.318110	M=1	ETYPE=0
1481	JQ=	38,	39,	103,	104	G=1,39	TH=.313386	M=1	ETYPE=0
1521	JQ=	39,	40,	104,	105	G=1,39	TH=.308661	M=1	ETYPE=0
1561	JQ=	40,	41,	105,	106	G=1,39	TH=.303937	M=1	ETYPE=0
1601	JQ=	41,	42,	106,	107	G=1,39	TH=.299213	M=1	ETYPE=0
1641	JQ=	42,	43,	107,	108	G=1,39	TH=.294488	M=1	ETYPE=0
1681	JQ=	43,	44,	108,	109	G=1,39	TH=.289764	M=1	ETYPE=0
1721	JQ=	44,	45,	109,	110	G=1,39	TH=.285039	M=1	ETYPE=0
1761	JQ=	45,	46,	110,	111	G=1,39	TH=.280315	M=1	ETYPE=0
1801	JQ=	46,	47,	111,	112	G=1,39	TH=.275591	M=1	ETYPE=0
1841	JQ=	47,	48,	112,	113	G=1,39	TH=.270866	M=1	ETYPE=0

1881	JQ=	48,	49,113,114	G=1,39	TH=.266142	M=1	ETYPE=0
1921	JQ=	49,	50,114,115	G=1,39	TH=.261417	M=1	ETYPE=0
1961	JQ=	50,	51,115,116	G=1,39	TH=.256693	M=1	ETYPE=0
2001	JQ=	51,	52,116,117	G=1,39	TH=.251969	M=1	ETYPE=0
2041	JQ=	52,	53,117,118	G=1,39	TH=.247244	M=1	ETYPE=0
2081	JQ=	53,	54,118,119	G=1,39	TH=.242520	M=1	ETYPE=0
2121	JQ=	54,	55,119,120	G=1,39	TH=.237795	M=1	ETYPE=0
2161	JQ=	55,	56,120,121	G=1,39	TH=.233071	M=1	ETYPE=0
2201	JQ=	56,	57,121,122	G=1,39	TH=.228346	M=1	ETYPE=0
2241	JQ=	57,	58,122,123	G=1,39	TH=.223622	M=1	ETYPE=0
2281	JQ=	58,	59,123,124	G=1,39	TH=.218898	M=1	ETYPE=0
2321	JQ=	59,	60,124,125	G=1,39	TH=.214173	M=1	ETYPE=0
2361	JQ=	60,	61,125,126	G=1,39	TH=.209449	M=1	ETYPE=0
2401	JQ=	61,	62,126,127	G=1,39	TH=.204724	M=1	ETYPE=0
2441	JQ=	62,	63,127,128	G=1,39	TH=.20	M=1	ETYPE=0
2481	JQ=	63,	64,128,129	G=1,39	TH=.20	M=1	ETYPE=0
2521	JQ=	64,	65,129,130	G=1,39	TH=.20	M=1	ETYPE=0
40	JQ=	2536,	2537, 1, 2	G=1,1	TH=.50	M=1	ETYPE=0
80	JQ=	2537,	2538, 2, 3	G=1,1	TH=.492913	M=1	ETYPE=0
120	JQ=	2538,	2539, 3, 4	G=1,1	TH=.488188	M=1	ETYPE=0
160	JQ=	2539,	2540, 4, 5	G=1,1	TH=.483465	M=1	ETYPE=0
200	JQ=	2540,	2541, 5, 6	G=1,1	TH=.478740	M=1	ETYPE=0
240	JQ=	2541,	2542, 6, 7	G=1,1	TH=.474016	M=1	ETYPE=0
280	JQ=	2542,	2543, 7, 8	G=1,1	TH=.469291	M=1	ETYPE=0
320	JQ=	2543,	2544, 8, 9	G=1,1	TH=.464567	M=1	ETYPE=0
360	JQ=	2544,	2545, 9, 10	G=1,1	TH=.459843	M=1	ETYPE=0
400	JQ=	2545,	2546, 10, 11	G=1,1	TH=.452756	M=1	ETYPE=0
440	JQ=	2546,	2547, 11, 12	G=1,1	TH=.448031	M=1	ETYPE=0
480	JQ=	2547,	2548, 12, 13	G=1,1	TH=.443307	M=1	ETYPE=0
520	JQ=	2548,	2549, 13, 14	G=1,1	TH=.438583	M=1	ETYPE=0
560	JQ=	2549,	2550, 14, 15	G=1,1	TH=.433858	M=1	ETYPE=0
600	JQ=	2550,	2551, 15, 16	G=1,1	TH=.424134	M=1	ETYPE=0
640	JQ=	2551,	2552, 16, 17	G=1,1	TH=.424406	M=1	ETYPE=0
680	JQ=	2552,	2553, 17, 18	G=1,1	TH=.419685	M=1	ETYPE=0
720	JQ=	2553,	2554, 18, 19	G=1,1	TH=.414961	M=1	ETYPE=0
760	JQ=	2554,	2555, 19, 20	G=1,1	TH=.405512	M=1	ETYPE=0
800	JQ=	2555,	2556, 20, 21	G=1,1	TH=.400787	M=1	ETYPE=0
840	JQ=	2556,	2557, 21, 22	G=1,1	TH=.396063	M=1	ETYPE=0
880	JQ=	2557,	2558, 22, 23	G=1,1	TH=.391339	M=1	ETYPE=0
920	JQ=	2558,	2559, 23, 24	G=1,1	TH=.386614	M=1	ETYPE=0
960	JQ=	2559,	2560, 24, 25	G=1,1	TH=.381890	M=1	ETYPE=0
1000	JQ=	2560,	2561, 25, 26	G=1,1	TH=.377165	M=1	ETYPE=0
1040	JQ=	2561,	2562, 26, 27	G=1,1	TH=.372441	M=1	ETYPE=0
1080	JQ=	2562,	2563, 27, 28	G=1,1	TH=.365354	M=1	ETYPE=0
1120	JQ=	2563,	2564, 28, 29	G=1,1	TH=.360630	M=1	ETYPE=0
1160	JQ=	2564,	2565, 29, 30	G=1,1	TH=.355906	M=1	ETYPE=0
1200	JQ=	2565,	2566, 30, 31	G=1,1	TH=.351181	M=1	ETYPE=0
1240	JQ=	2566,	2567, 31, 32	G=1,1	TH=.346457	M=1	ETYPE=0
1280	JQ=	2567,	2568, 32, 33	G=1,1	TH=.341732	M=1	ETYPE=0
1320	JQ=	2568,	2569, 33, 34	G=1,1	TH=.337008	M=1	ETYPE=0
1360	JQ=	2569,	2570, 34, 35	G=1,1	TH=.332283	M=1	ETYPE=0
1400	JQ=	2570,	2571, 35, 36	G=1,1	TH=.327559	M=1	ETYPE=0
1440	JQ=	2571,	2572, 36, 37	G=1,1	TH=.322835	M=1	ETYPE=0
1480	JQ=	2572,	2573, 37, 38	G=1,1	TH=.318110	M=1	ETYPE=0
1520	JQ=	2573,	2574, 38, 39	G=1,1	TH=.313386	M=1	ETYPE=0
1560	JQ=	2574,	2575, 39, 40	G=1,1	TH=.308661	M=1	ETYPE=0
1600	JQ=	2575,	2576, 40, 41	G=1,1	TH=.303937	M=1	ETYPE=0
1640	JQ=	2576,	2577, 41, 42	G=1,1	TH=.299213	M=1	ETYPE=0
1680	JQ=	2577,	2578, 42, 43	G=1,1	TH=.294488	M=1	ETYPE=0
1720	JQ=	2578,	2579, 43, 44	G=1,1	TH=.289764	M=1	ETYPE=0
1760	JQ=	2579,	2580, 44, 45	G=1,1	TH=.285039	M=1	ETYPE=0
1800	JQ=	2580,	2581, 45, 46	G=1,1	TH=.280315	M=1	ETYPE=0
1840	JQ=	2581,	2582, 46, 47	G=1,1	TH=.275591	M=1	ETYPE=0
1880	JQ=	2582,	2583, 47, 48	G=1,1	TH=.270866	M=1	ETYPE=0
1920	JQ=	2583,	2584, 48, 49	G=1,1	TH=.266142	M=1	ETYPE=0
1960	JQ=	2584,	2585, 49, 50	G=1,1	TH=.261417	M=1	ETYPE=0
2000	JQ=	2585,	2586, 50, 51	G=1,1	TH=.256693	M=1	ETYPE=0

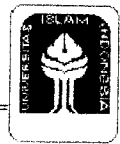


2040	JQ=2586,2587, 51, 52	G=1,1	TH=.251969	M=1	ETYPE=0
2080	JQ=2587,2588, 52, 53	G=1,1	TH=.247244	M=1	ETYPE=0
2120	JQ=2588,2589, 53, 54	G=1,1	TH=.242520	M=1	ETYPE=0
2160	JQ=2589,2590, 54, 55	G=1,1	TH=.237795	M=1	ETYPE=0
2200	JQ=2590,2591, 55, 56	G=1,1	TH=.233071	M=1	ETYPE=0
2240	JQ=2591,2592, 56, 57	G=1,1	TH=.228346	M=1	ETYPE=0
2280	JQ=2592,2593, 57, 58	G=1,1	TH=.223622	M=1	ETYPE=0
2320	JQ=2593,2594, 58, 59	G=1,1	TH=.218898	M=1	ETYPE=0
2360	JQ=2594,2595, 59, 60	G=1,1	TH=.214173	M=1	ETYPE=0
2400	JQ=2595,2596, 60, 61	G=1,1	TH=.209449	M=1	ETYPE=0
2440	JQ=2596,2597, 61, 62	G=1,1	TH=.204724	M=1	ETYPE=0
2480	JQ=2597,2598, 62, 63	G=1,1	TH=.20	M=1	ETYPE=0
2520	JQ=2598,2599, 63, 64	G=1,1	TH=.20	M=1	ETYPE=0
2560	JQ=2599,2600, 64, 65	G=1,1	TH=.20	M=1	ETYPE=0
C ----- SAYAP 1 (X+ ; Yo) -----					
2561	JQ= 1,2601, 2,2602	G=1, 1	TH=.25	M=1	ETYPE=0
2562	JQ= 2,2602, 3,2603	G=1, 7	TH=.25	M=1	ETYPE=0
2569	JQ= 9,2609, 10,2610	G=1, 1	TH=.25	M=1	ETYPE=0
2570	JQ= 10,2610, 11,2611	G=1, 17	TH=.25	M=1	ETYPE=0
2587	JQ= 27,2627, 28,2628	G=1, 1	TH=.25	M=1	ETYPE=0
2588	JQ=2601,2629,2602,2630	G=1, 1	TH=.25	M=1	ETYPE=0
2589	JQ=2602,2630,2603,2631	G=1, 7	TH=.25	M=1	ETYPE=0
2596	JQ=2609,2637,2610,2638	G=1, 1	TH=.25	M=1	ETYPE=0
2597	JQ=2610,2638,2611,2639	G=1, 7	TH=.25	M=1	ETYPE=0
2604	JQ=2617,2645,2623,2651	G=1, 1	TH=.25	M=1	ETYPE=0
2605	JQ=2629,2652,2630,2653	G=1, 1	TH=.25	M=1	ETYPE=0
2606	JQ=2630,2653,2631,2654	G=1, 7	TH=.25	M=1	ETYPE=0
2613	JQ=2637,2660,2638,2661	G=1, 1	TH=.25	M=1	ETYPE=0
2614	JQ=2638,2661,2639,2662	G=1, 1	TH=.25	M=1	ETYPE=0
2615	JQ=2639,2662,2651,2674	G=1, 1	TH=.25	M=1	ETYPE=0
2616	JQ=2652,2675,2653,2676	G=1, 1	TH=.25	M=1	ETYPE=0
2617	JQ=2653,2676,2654,2677	G=1, 6	TH=.25	M=1	ETYPE=0
2623	JQ=2659,2682,2674,2697	G=1, 1	TH=.25	M=1	ETYPE=0
2624	JQ=2675,2698,2676,2699	G=1, 1	TH=.25	M=1	ETYPE=0
2625	JQ=2676,2699,2677,2700	G=1, 3	TH=.25	M=1	ETYPE=0
2628	JQ=2679,2702,2697,2720	G=1, 1	TH=.25	M=1	ETYPE=0
2629	JQ=2698,2721,2699,2722	G=1, 1	TH=.25	M=1	ETYPE=0
2630	JQ=2699,2722,2700,2723	G=1, 2	TH=.25	M=1	ETYPE=0
2632	JQ=2701,2724,2720,2743	G=1, 1	TH=.25	M=1	ETYPE=0
2633	JQ=2721,2744,2722,2745	G=1, 1	TH=.25	M=1	ETYPE=0
2634	JQ=2722,2745,2723,2746	G=1, 1	TH=.25	M=1	ETYPE=0
2635	JQ=2723,2746,2743,2766	G=1, 1	TH=.25	M=1	ETYPE=0
2636	JQ=2746,2767,2766,2787	G=1, 1	TH=.25	M=1	ETYPE=0
2637	JQ=2767,2788,2787,2808	G=1, 1	TH=.25	M=1	ETYPE=0
C ----- SAYAP 2 (X+ ; Y+) -----					
2638	JQ= 326,2809, 327,2810	G=1, 1	TH=.25	M=1	ETYPE=0
2639	JQ= 327,2810, 328,2811	G=1, 7	TH=.25	M=1	ETYPE=0
2646	JQ= 334,2817, 335,2818	G=1, 1	TH=.25	M=1	ETYPE=0
2647	JQ= 335,2818, 336,2819	G=1, 17	TH=.25	M=1	ETYPE=0
2664	JQ= 352,2835, 353,2836	G=1, 1	TH=.25	M=1	ETYPE=0
2665	JQ=2809,2837,2810,2838	G=1, 1	TH=.25	M=1	ETYPE=0
2666	JQ=2810,2838,2811,2839	G=1, 7	TH=.25	M=1	ETYPE=0
2673	JQ=2817,2845,2818,2846	G=1, 1	TH=.25	M=1	ETYPE=0
2674	JQ=2818,2846,2819,2847	G=1, 7	TH=.25	M=1	ETYPE=0
2681	JQ=2825,2853,2831,2859	G=1, 1	TH=.25	M=1	ETYPE=0
2682	JQ=2837,2860,2838,2861	G=1, 1	TH=.25	M=1	ETYPE=0
2683	JQ=2838,2861,2839,2862	G=1, 7	TH=.25	M=1	ETYPE=0
2690	JQ=2845,2868,2846,2869	G=1, 1	TH=.25	M=1	ETYPE=0
2691	JQ=2846,2869,2847,2870	G=1, 1	TH=.25	M=1	ETYPE=0
2692	JQ=2847,2870,2859,2882	G=1, 1	TH=.25	M=1	ETYPE=0
2693	JQ=2860,2883,2861,2884	G=1, 1	TH=.25	M=1	ETYPE=0
2694	JQ=2861,2884,2862,2885	G=1, 6	TH=.25	M=1	ETYPE=0
2700	JQ=2867,2890,2882,2905	G=1, 1	TH=.25	M=1	ETYPE=0
2701	JQ=2883,2906,2884,2907	G=1, 1	TH=.25	M=1	ETYPE=0
2702	JQ=2884,2907,2885,2908	G=1, 3	TH=.25	M=1	ETYPE=0
2705	JQ=2887,2910,2905,2928	G=1, 1	TH=.25	M=1	ETYPE=0
2706	JQ=2906,2929,2907,2930	G=1, 1	TH=.25	M=1	ETYPE=0

2707	JQ=2907, 2930, 2908, 2931	G=1, 2	TH=.25	M=1	ETYPE=0
2709	JQ=2909, 2932, 2928, 2951	G=1, 1	TH=.25	M=1	ETYPE=0
2710	JQ=2929, 2952, 2930, 2953	G=1, 1	TH=.25	M=1	ETYPE=0
2711	JQ=2930, 2953, 2931, 2954	G=1, 1	TH=.25	M=1	ETYPE=0
2712	JQ=2931, 2954, 2951, 2974	G=1, 1	TH=.25	M=1	ETYPE=0
2713	JQ=2954, 2975, 2974, 2995	G=1, 1	TH=.25	M=1	ETYPE=0
2714	JQ=2975, 2996, 2995, 3016	G=1, 1	TH=.25	M=1	ETYPE=0
C ----- SAYAP 3 (Xo ; Y+) -----					
2715	JQ= 651, 3017, 652, 3018	G=1, 1	TH=.25	M=1	ETYPE=0
2716	JQ= 652, 3018, 653, 3019	G=1, 7	TH=.25	M=1	ETYPE=0
2723	JQ= 659, 3025, 660, 3026	G=1, 1	TH=.25	M=1	ETYPE=0
2724	JQ= 660, 3026, 661, 3027	G=1, 17	TH=.25	M=1	ETYPE=0
2741	JQ= 677, 3043, 678, 3044	G=1, 1	TH=.25	M=1	ETYPE=0
2742	JQ=3017, 3045, 3018, 3046	G=1, 1	TH=.25	M=1	ETYPE=0
2743	JQ=3018, 3046, 3019, 3047	G=1, 7	TH=.25	M=1	ETYPE=0
2750	JQ=3025, 3053, 3026, 3054	G=1, 1	TH=.25	M=1	ETYPE=0
2751	JQ=3026, 3054, 3027, 3055	G=1, 7	TH=.25	M=1	ETYPE=0
2758	JQ=3033, 3061, 3039, 3067	G=1, 1	TH=.25	M=1	ETYPE=0
2759	JQ=3045, 3068, 3046, 3069	G=1, 1	TH=.25	M=1	ETYPE=0
2760	JQ=3046, 3069, 3047, 3070	G=1, 7	TH=.25	M=1	ETYPE=0
2767	JQ=3053, 3076, 3054, 3077	G=1, 1	TH=.25	M=1	ETYPE=0
2768	JQ=3054, 3077, 3055, 3078	G=1, 1	TH=.25	M=1	ETYPE=0
2769	JQ=3055, 3078, 3067, 3090	G=1, 1	TH=.25	M=1	ETYPE=0
2770	JQ=3068, 3091, 3069, 3092	G=1, 1	TH=.25	M=1	ETYPE=0
2771	JQ=3069, 3092, 3070, 3093	G=1, 6	TH=.25	M=1	ETYPE=0
2777	JQ=3075, 3098, 3090, 3113	G=1, 1	TH=.25	M=1	ETYPE=0
2778	JQ=3091, 3114, 3092, 3115	G=1, 1	TH=.25	M=1	ETYPE=0
2779	JQ=3092, 3115, 3093, 3116	G=1, 3	TH=.25	M=1	ETYPE=0
2782	JQ=3095, 3118, 3113, 3136	G=1, 1	TH=.25	M=1	ETYPE=0
2783	JQ=3114, 3137, 3115, 3138	G=1, 1	TH=.25	M=1	ETYPE=0
2784	JQ=3115, 3138, 3116, 3139	G=1, 2	TH=.25	M=1	ETYPE=0
2786	JQ=3117, 3140, 3136, 3159	G=1, 1	TH=.25	M=1	ETYPE=0
2787	JQ=3137, 3160, 3138, 3161	G=1, 1	TH=.25	M=1	ETYPE=0
2788	JQ=3138, 3161, 3139, 3162	G=1, 1	TH=.25	M=1	ETYPE=0
2789	JQ=3139, 3162, 3159, 3182	G=1, 1	TH=.25	M=1	ETYPE=0
2790	JQ=3162, 3183, 3182, 3203	G=1, 1	TH=.25	M=1	ETYPE=0
2791	JQ=3183, 3204, 3203, 3224	G=1, 1	TH=.25	M=1	ETYPE=0
C ----- SAYAP 4 (X- ; Y+) -----					
2792	JQ= 976, 3225, 977, 3226	G=1, 1	TH=.25	M=1	ETYPE=0
2793	JQ= 977, 3226, 978, 3227	G=1, 7	TH=.25	M=1	ETYPE=0
2800	JQ= 984, 3233, 985, 3234	G=1, 1	TH=.25	M=1	ETYPE=0
2801	JQ= 985, 3234, 986, 3235	G=1, 17	TH=.25	M=1	ETYPE=0
2818	JQ=1002, 3251, 1003, 3252	G=1, 1	TH=.25	M=1	ETYPE=0
2819	JQ=3225, 3253, 3226, 3254	G=1, 1	TH=.25	M=1	ETYPE=0
2820	JQ=3226, 3254, 3227, 3255	G=1, 7	TH=.25	M=1	ETYPE=0
2827	JQ=3233, 3261, 3234, 3262	G=1, 1	TH=.25	M=1	ETYPE=0
2828	JQ=3234, 3262, 3235, 3263	G=1, 7	TH=.25	M=1	ETYPE=0
2835	JQ=3241, 3269, 3247, 3275	G=1, 1	TH=.25	M=1	ETYPE=0
2836	JQ=3253, 3276, 3254, 3277	G=1, 1	TH=.25	M=1	ETYPE=0
2837	JQ=3254, 3277, 3255, 3278	G=1, 7	TH=.25	M=1	ETYPE=0
2844	JQ=3261, 3284, 3262, 3285	G=1, 1	TH=.25	M=1	ETYPE=0
2845	JQ=3262, 3285, 3263, 3286	G=1, 1	TH=.25	M=1	ETYPE=0
2846	JQ=3263, 3286, 3275, 3298	G=1, 1	TH=.25	M=1	ETYPE=0
2847	JQ=3276, 3299, 3277, 3300	G=1, 1	TH=.25	M=1	ETYPE=0
2848	JQ=3277, 3300, 3278, 3301	G=1, 6	TH=.25	M=1	ETYPE=0
2854	JQ=3283, 3306, 3298, 3321	G=1, 1	TH=.25	M=1	ETYPE=0
2855	JQ=3299, 3322, 3300, 3323	G=1, 1	TH=.25	M=1	ETYPE=0
2856	JQ=3300, 3323, 3301, 3324	G=1, 3	TH=.25	M=1	ETYPE=0
2859	JQ=3303, 3326, 3321, 3344	G=1, 1	TH=.25	M=1	ETYPE=0
2860	JQ=3322, 3345, 3323, 3346	G=1, 1	TH=.25	M=1	ETYPE=0
2861	JQ=3323, 3346, 3324, 3347	G=1, 2	TH=.25	M=1	ETYPE=0
2863	JQ=3325, 3348, 3344, 3367	G=1, 1	TH=.25	M=1	ETYPE=0
2864	JQ=3345, 3368, 3346, 3369	G=1, 1	TH=.25	M=1	ETYPE=0
2865	JQ=3346, 3369, 3347, 3370	G=1, 1	TH=.25	M=1	ETYPE=0
2866	JQ=3347, 3370, 3367, 3390	G=1, 1	TH=.25	M=1	ETYPE=0
2867	JQ=3370, 3391, 3390, 3411	G=1, 1	TH=.25	M=1	ETYPE=0
2868	JQ=3391, 3412, 3411, 3432	G=1, 1	TH=.25	M=1	ETYPE=0



C ----- SAYAP 5 (X- ; Yo) -----						
2869	JQ=1301, 3433, 1302, 3434	G=1, 1	TH=.25	M=1	ETYP	E=0
2870	JQ=1302, 3434, 1303, 3435	G=1, 7	TH=.25	M=1	ETYP	E=0
2877	JQ=1309, 3441, 1310, 3442	G=1, 1	TH=.25	M=1	ETYP	E=0
2878	JQ=1310, 3442, 1311, 3443	G=1, 17	TH=.25	M=1	ETYP	E=0
2895	JQ=1327, 3459, 1328, 3460	G=1, 1	TH=.25	M=1	ETYP	E=0
2896	JQ=3433, 3461, 3434, 3462	G=1, 1	TH=.25	M=1	ETYP	E=0
2897	JQ=3434, 3462, 3435, 3463	G=1, 7	TH=.25	M=1	ETYP	E=0
2904	JQ=3441, 3469, 3442, 3470	G=1, 1	TH=.25	M=1	ETYP	E=0
2905	JQ=3442, 3470, 3443, 3471	G=1, 7	TH=.25	M=1	ETYP	E=0
2912	JQ=3449, 3477, 3455, 3483	G=1, 1	TH=.25	M=1	ETYP	E=0
2913	JQ=3461, 3484, 3462, 3485	G=1, 1	TH=.25	M=1	ETYP	E=0
2914	JQ=3462, 3485, 3463, 3486	G=1, 7	TH=.25	M=1	ETYP	E=0
2921	JQ=3469, 3492, 3470, 3493	G=1, 1	TH=.25	M=1	ETYP	E=0
2922	JQ=3470, 3493, 3471, 3494	G=1, 1	TH=.25	M=1	ETYP	E=0
2923	JQ=3471, 3494, 3483, 3506	G=1, 1	TH=.25	M=1	ETYP	E=0
2924	JQ=3484, 3507, 3485, 3508	G=1, 1	TH=.25	M=1	ETYP	E=0
2925	JQ=3485, 3508, 3486, 3509	G=1, 6	TH=.25	M=1	ETYP	E=0
2931	JQ=3491, 3514, 3506, 3529	G=1, 1	TH=.25	M=1	ETYP	E=0
2932	JQ=3507, 3530, 3508, 3531	G=1, 1	TH=.25	M=1	ETYP	E=0
2933	JQ=3508, 3531, 3509, 3532	G=1, 3	TH=.25	M=1	ETYP	E=0
2936	JQ=3511, 3534, 3529, 3552	G=1, 1	TH=.25	M=1	ETYP	E=0
2937	JQ=3530, 3553, 3531, 3554	G=1, 1	TH=.25	M=1	ETYP	E=0
2938	JQ=3531, 3554, 3532, 3555	G=1, 2	TH=.25	M=1	ETYP	E=0
2940	JQ=3533, 3556, 3552, 3575	G=1, 1	TH=.25	M=1	ETYP	E=0
2941	JQ=3553, 3576, 3554, 3577	G=1, 1	TH=.25	M=1	ETYP	E=0
2942	JQ=3554, 3577, 3555, 3578	G=1, 1	TH=.25	M=1	ETYP	E=0
2943	JQ=3555, 3578, 3575, 3598	G=1, 1	TH=.25	M=1	ETYP	E=0
2944	JQ=3578, 3599, 3598, 3619	G=1, 1	TH=.25	M=1	ETYP	E=0
2945	JQ=3599, 3620, 3619, 3640	G=1, 1	TH=.25	M=1	ETYP	E=0
C ----- SAYAP 6 (X- ; Y-) -----						
2946	JQ=1626, 3641, 1627, 3642	G=1, 1	TH=.25	M=1	ETYP	E=0
2947	JQ=1627, 3642, 1628, 3643	G=1, 7	TH=.25	M=1	ETYP	E=0
2954	JQ=1634, 3649, 1635, 3650	G=1, 1	TH=.25	M=1	ETYP	E=0
2955	JQ=1635, 3650, 1636, 3651	G=1, 17	TH=.25	M=1	ETYP	E=0
2972	JQ=1652, 3667, 1653, 3668	G=1, 1	TH=.25	M=1	ETYP	E=0
2973	JQ=3641, 3669, 3642, 3670	G=1, 1	TH=.25	M=1	ETYP	E=0
2974	JQ=3642, 3670, 3643, 3671	G=1, 7	TH=.25	M=1	ETYP	E=0
2981	JQ=3649, 3677, 3650, 3678	G=1, 1	TH=.25	M=1	ETYP	E=0
2982	JQ=3650, 3678, 3651, 3679	G=1, 7	TH=.25	M=1	ETYP	E=0
2989	JQ=3657, 3685, 3662, 3691	G=1, 1	TH=.25	M=1	ETYP	E=0
2990	JQ=3669, 3692, 3670, 3693	G=1, 1	TH=.25	M=1	ETYP	E=0
2991	JQ=3670, 3693, 3671, 3694	G=1, 7	TH=.25	M=1	ETYP	E=0
2998	JQ=3677, 3700, 3678, 3701	G=1, 1	TH=.25	M=1	ETYP	E=0
2999	JQ=3678, 3701, 3679, 3702	G=1, 1	TH=.25	M=1	ETYP	E=0
3000	JQ=3679, 3702, 3691, 3714	G=1, 1	TH=.25	M=1	ETYP	E=0
3001	JQ=3692, 3715, 3693, 3716	G=1, 1	TH=.25	M=1	ETYP	E=0
3002	JQ=3693, 3716, 3694, 3717	G=1, 6	TH=.25	M=1	ETYP	E=0
3008	JQ=3699, 3722, 3714, 3737	G=1, 1	TH=.25	M=1	ETYP	E=0
3009	JQ=3715, 3738, 3716, 3739	G=1, 1	TH=.25	M=1	ETYP	E=0
3010	JQ=3716, 3739, 3717, 3740	G=1, 3	TH=.25	M=1	ETYP	E=0
3013	JQ=3719, 3742, 3737, 3760	G=1, 1	TH=.25	M=1	ETYP	E=0
3014	JQ=3738, 3761, 3739, 3762	G=1, 1	TH=.25	M=1	ETYP	E=0
3015	JQ=3739, 3762, 3740, 3763	G=1, 2	TH=.25	M=1	ETYP	E=0
3017	JQ=3741, 3764, 3760, 3783	G=1, 1	TH=.25	M=1	ETYP	E=0
3018	JQ=3761, 3784, 3762, 3785	G=1, 1	TH=.25	M=1	ETYP	E=0
3019	JQ=3762, 3785, 3763, 3786	G=1, 1	TH=.25	M=1	ETYP	E=0
3020	JQ=3763, 3786, 3783, 3806	G=1, 1	TH=.25	M=1	ETYP	E=0
3021	JQ=3786, 3807, 3806, 3827	G=1, 1	TH=.25	M=1	ETYP	E=0
3022	JQ=3807, 3828, 3827, 3848	G=1, 1	TH=.25	M=1	ETYP	E=0
C ----- SAYAP 7 (Xo ; Y-) -----						
3023	JQ=1951, 3849, 1952, 3850	G=1, 1	TH=.25	M=1	ETYP	E=0
3024	JQ=1952, 3850, 1953, 3851	G=1, 7	TH=.25	M=1	ETYP	E=0
3031	JQ=1959, 3857, 1960, 3858	G=1, 1	TH=.25	M=1	ETYP	E=0
3032	JQ=1960, 3858, 1961, 3859	G=1, 17	TH=.25	M=1	ETYP	E=0
3049	JQ=1977, 3875, 1978, 3876	G=1, 1	TH=.25	M=1	ETYP	E=0
3050	JQ=3849, 3877, 3850, 3878	G=1, 1	TH=.25	M=1	ETYP	E=0



3051 JQ=3850, 3878, 3851, 3879 G=1, 7 TH=.25 M=1 ETYPE=0
 3058 JQ=3857, 3885, 3858, 3886 G=1, 1 TH=.25 M=1 ETYPE=0
 3059 JQ=3858, 3886, 3859, 3887 G=1, 7 TH=.25 M=1 ETYPE=0
 3066 JQ=3865, 3893, 3871, 3899 G=1, 1 TH=.25 M=1 ETYPE=0
 3067 JQ=3877, 3900, 3878, 3901 G=1, 1 TH=.25 M=1 ETYPE=0
 3068 JQ=3878, 3901, 3879, 3902 G=1, 7 TH=.25 M=1 ETYPE=0
 3075 JQ=3885, 3908, 3886, 3909 G=1, 1 TH=.25 M=1 ETYPE=0
 3076 JQ=3886, 3909, 3887, 3910 G=1, 1 TH=.25 M=1 ETYPE=0
 3077 JQ=3887, 3910, 3899, 3922 G=1, 1 TH=.25 M=1 ETYPE=0
 3078 JQ=3900, 3923, 3901, 3924 G=1, 1 TH=.25 M=1 ETYPE=0
 3079 JQ=3901, 3924, 3902, 3925 G=1, 6 TH=.25 M=1 ETYPE=0
 3085 JQ=3907, 3930, 3922, 3945 G=1, 1 TH=.25 M=1 ETYPE=0
 3086 JQ=3923, 3946, 3924, 3947 G=1, 1 TH=.25 M=1 ETYPE=0
 3087 JQ=3924, 3947, 3925, 3948 G=1, 3 TH=.25 M=1 ETYPE=0
 3090 JQ=3927, 3950, 3945, 3968 G=1, 1 TH=.25 M=1 ETYPE=0
 3091 JQ=3946, 3969, 3947, 3970 G=1, 1 TH=.25 M=1 ETYPE=0
 3092 JQ=3947, 3970, 3948, 3971 G=1, 2 TH=.25 M=1 ETYPE=0
 3094 JQ=3949, 3972, 3968, 3991 G=1, 1 TH=.25 M=1 ETYPE=0
 3095 JQ=3969, 3992, 3970, 3993 G=1, 1 TH=.25 M=1 ETYPE=0
 3096 JQ=3970, 3993, 3971, 3994 G=1, 1 TH=.25 M=1 ETYPE=0
 3097 JQ=3971, 3994, 3991, 4014 G=1, 1 TH=.25 M=1 ETYPE=0
 3098 JQ=3994, 4015, 4014, 4035 G=1, 1 TH=.25 M=1 ETYPE=0
 3099 JQ=4015, 4036, 4035, 4056 G=1, 1 TH=.25 M=1 ETYPE=0

C ----- SAYAP 8 (X+ ; Y-) -----

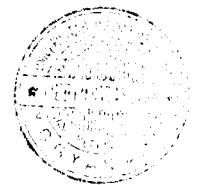
3100 JQ=2276, 4057, 2277, 4058 G=1, 1 TH=.25 M=1 ETYPE=0
 3101 JQ=2277, 4058, 2278, 4059 G=1, 7 TH=.25 M=1 ETYPE=0
 3108 JQ=2284, 4065, 2285, 4066 G=1, 1 TH=.25 M=1 ETYPE=0
 3109 JQ=2285, 4066, 2286, 4067 G=1, 17 TH=.25 M=1 ETYPE=0
 3126 JQ=2302, 4083, 2303, 4084 G=1, 1 TH=.25 M=1 ETYPE=0
 3127 JQ=4057, 4085, 4058, 4086 G=1, 1 TH=.25 M=1 ETYPE=0
 3128 JQ=4058, 4086, 4059, 4087 G=1, 7 TH=.25 M=1 ETYPE=0
 3135 JQ=4065, 4093, 4066, 4094 G=1, 1 TH=.25 M=1 ETYPE=0
 3136 JQ=4066, 4094, 4067, 4095 G=1, 7 TH=.25 M=1 ETYPE=0
 3143 JQ=4073, 4101, 4079, 4107 G=1, 1 TH=.25 M=1 ETYPE=0
 3144 JQ=4085, 4108, 4086, 4109 G=1, 1 TH=.25 M=1 ETYPE=0
 3145 JQ=4086, 4109, 4087, 4110 G=1, 7 TH=.25 M=1 ETYPE=0
 3152 JQ=4093, 4116, 4094, 4117 G=1, 1 TH=.25 M=1 ETYPE=0
 3153 JQ=4094, 4117, 4095, 4118 G=1, 1 TH=.25 M=1 ETYPE=0
 3154 JQ=4095, 4118, 4107, 4130 G=1, 1 TH=.25 M=1 ETYPE=0
 3155 JQ=4108, 4131, 4109, 4132 G=1, 1 TH=.25 M=1 ETYPE=0
 3156 JQ=4109, 4132, 4110, 4133 G=1, 6 TH=.25 M=1 ETYPE=0
 3162 JQ=4115, 4138, 4130, 4153 G=1, 1 TH=.25 M=1 ETYPE=0
 3163 JQ=4131, 4154, 4132, 4155 G=1, 1 TH=.25 M=1 ETYPE=0
 3164 JQ=4132, 4155, 4133, 4156 G=1, 3 TH=.25 M=1 ETYPE=0
 3167 JQ=4135, 4158, 4153, 4176 G=1, 1 TH=.25 M=1 ETYPE=0
 3168 JQ=4154, 4177, 4155, 4178 G=1, 1 TH=.25 M=1 ETYPE=0
 3169 JQ=4155, 4178, 4156, 4179 G=1, 2 TH=.25 M=1 ETYPE=0
 3171 JQ=4157, 4180, 4176, 4199 G=1, 1 TH=.25 M=1 ETYPE=0
 3172 JQ=4177, 4200, 4178, 4201 G=1, 1 TH=.25 M=1 ETYPE=0
 3173 JQ=4178, 4201, 4179, 4202 G=1, 1 TH=.25 M=1 ETYPE=0
 3174 JQ=4179, 4202, 4199, 4222 G=1, 1 TH=.25 M=1 ETYPE=0
 3175 JQ=4202, 4223, 4222, 4243 G=1, 1 TH=.25 M=1 ETYPE=0
 3176 JQ=4223, 4244, 4243, 4264 G=1, 1 TH=.25 M=1 ETYPE=0

:

SPEC

A=45 D=0.05 S=9.8

C	T	AP1	AP2	AP3
	.0	.0500	.0500	
	0.5	.0490	.0490	
	1.0	.0410	.0410	
	2.0	.0260	.0260	
	3.0	.0250	.0250	
	5.0	.0230	.0230	
	10.0	.0180	.0180	




```

15.0 .0130 .0130
20.0 .0080 .0080
25.0 .0030 .0030
28.0 .0000 .0000
:
COMBO
1 C=1.2
2 C=0.9 D= 0.9
3 C=0.9 D=-0.9
    
```

Keterangan penulisan data masukan.

a. Format penulisan system yaitu,

```

SYSTEM
L=2 V=7
    
```

1. SYSTEM adalah judul (*sparator line*)
2. L=2, menunjukkan bahwa jenis beban yang bekerja pada struktur adalah 2 yaitu berat sendiri struktur dan beban gempa.
3. V=7, adalah *eigen value* yang digunakan dalam analisa perhitungan adalah 7.

b. Format penulisan joint pada struktur tower utama yaitu,

```

JOINTS
C ----- TOWER -----
8000 X=0 Y=0 Z=0
8001 X=0 Y=0 Z=30.75
1 X=0.950 Y=0 Z=-1.75 A=8000,8001, 1,39,65,9
    
```

1. JOINT adalah judul (*sparator line*)
2. C --, merupakan baris komentar yang digunakan untuk memberi keterangan.
3. 8000 X=0 Y=0 Z=0
8000 = adalah nomor joint sembarang (syarat tidak boleh sama dengan nomor joint struktur), untuk menentukan pusat struktur bagian dasar.
X, Y, Z = 0 adalah asumsi koordinat pusat bagian bawah.
4. 8001 X=0 Y=0 Z=30.75
8001 = adalah nomor joint pusat dasar struktur bagian puncak.

X, Y, Z = adalah asumsi koordinat pusat puncak (30.75 menunjukkan ketinggian puncak tower).

5. A=8000,8001,1,39,65,9

A = menunjukkan penggenerasian bentuk silinder (*cylindrical generation*).

8000 = joint pusat dasar tower.

8001 = joint pusat puncak tower.

1 = joint permulaan yang ditentukan.

39 = jumlah nomor joint yang akan dibuat.

65 = penambahan nomor joint arah horizontal (melingkar).

6. 9, merupakan penambahan sudut dalam derajat (syarat $< 90^\circ$).

c. Format penulisan joint pada struktur perkuatan samping (sayap) yaitu,

```
C ----- SAYAP 1 (X+ ; Yo) -----
2609 X=1.25 Y=0 Z=-1.75
2609 X=1.25 Y=0 Z=-1.00 Q= 1,2601, 2,2602,2600,1
2609 X=1.25 Y=0 Z= 2.50 Q= 2,2602, 9,2609,2600,1
```

Q=1,2601,2,2602,2600,1

1. 1,2601,2,2602 nomor joint pembentuk shell (*quadrilateral generation*).

2. 2600,1 adalah penambahan nomor joint.

c. Format penulisan restraints yaitu,

```
RESTRAINTS
8000 8001 1 R=1,1,1,1,1,1 : JOINT PUSAT TOWER
1 2536 65 R=1,1,1,1,1,1 : JOINT DASAR TOWER
2601 2629 28 R=1,1,1,1,1,1 : JOINT DASAR SAYAP 1
2629 2744 23 R=1,1,1,1,1,1
2809 2837 28 R=1,1,1,1,1,1 : JOINT DASAR SAYAP 2
```

1. RESTRAINTS adalah judul (*sparator line*)

2. 1 2536 65

1 = nomor joint awal (batas awal *generate*).

2536 = nomor joint akhir (batas akhir *generate*).

65 = penambahan joint.

3. R=1,1,1,1,1

1,1,1 = *restraint* untuk translasi arah X,Y,Z.

1,1,1 = code *restraint* untuk rotasi arah X,Y,Z.

d. Format penulisan shell yaitu,

```
SHELL
C CONTROL INFORMATION DATA
C ----- TOWER -----
NM=1  Z=-1
C ----- MATERIAL SECTOR PROPERTIES -----
1 E=1.79125E7  U=0.2  W=24  M=24/9.8
C ----- ELEMENT LOCATION DATA -----
1  JQ= 1, 2, 66, 67  G=1,39  TH=.50  M=1  ETYPE=0
41 JQ= 2, 3, 67, 68  G=1,39  TH=.492913  M=1  ETYPE=0
```

1. SHELL adalah judul (*sparator line*)

2. NM=1 menunjukkan bahwa *number of material* (material pendukung) 1 jenis.

3. Z=-1 arah beban gravitasi pada sumbu -Z.

4. E=1.79125E7 U=0.2 W=24 M=24/9.8

E = adalah modulus elastisitas bahan.

U = angka poisson (*poisson ratio*).

W = berat jenis bahan.

M = massa jenis bahan.

4. 1 JQ=1,2,66,67 G=1,39 TH=.50 M=1 ETYPE=0

1 = nomor shell yang ditunjuk.

JQ = nomor-nomor joint pembentuk shell.

G = parameter penggenerasian shell.

TH = ketebalan shell.

M = nomor jenis material.

e. Format penulisan spec yaitu,

```

SPEC
A=45 D=0.05 S=9.8
C      T      AP1      AP2      AP3
      .0      .0500    .0500
  
```

1. SPEC adalah judul (*separator line*)

2. A=45 D=0.05 S=9.8

A = sudut (*angle*) datang gempa.

D = damping rasio struktur.

S = faktor skala respon spektrum.

3. T AP1 AP2 AP3

T = periode.

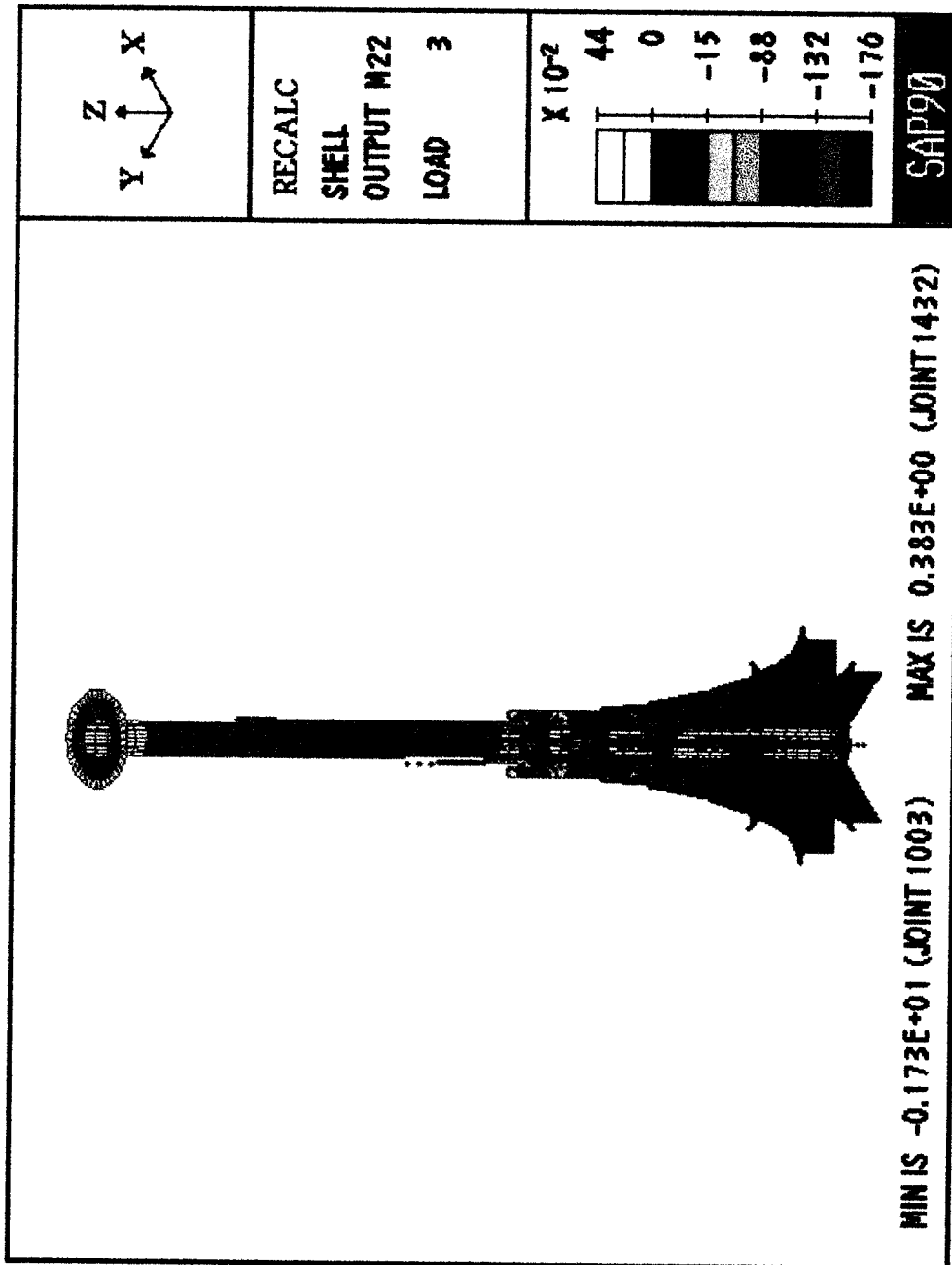
AP1, AP2, AP3 adalah nilai spektrum pada periode dan arah yang ditunjuk.

Dalam kasus ini berdasarkan grafik pembagian wilayah gempa (lihat lampiran

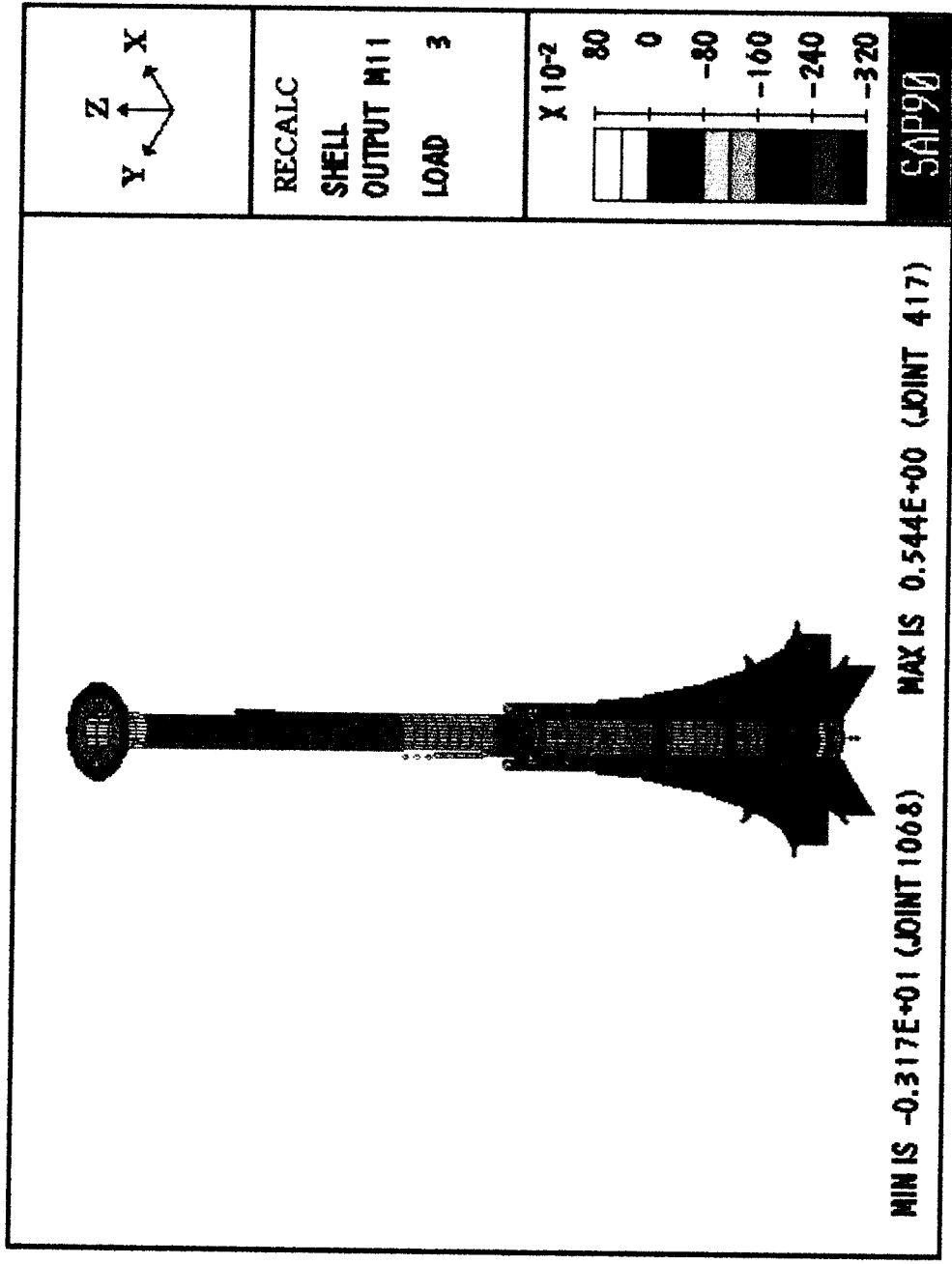
2.b) dan setelah dilakukan interpolasi, maka nilai T dan AP yang digunakan ada-

lah (diambil waktu dari 0-28 detik) :

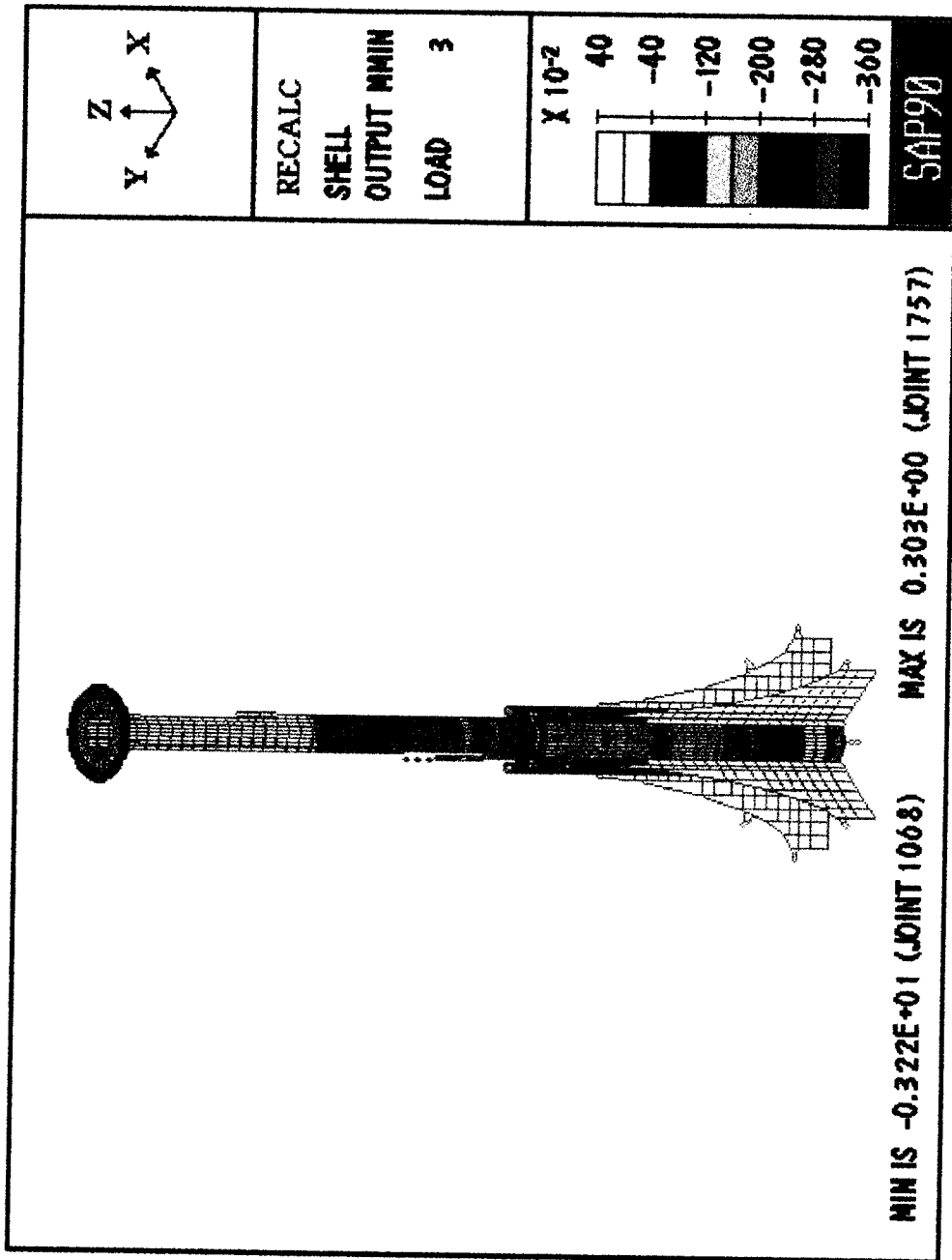
T	AP1	AP2
.0	.0500	.0500
0.5	.0490	.0490
1.0	.0410	.0410
2.0	.0260	.0260
T	AP1	AP2
3.0	.0250	.0250
5.0	.0230	.0230
10.0	.0180	.0180
15.0	.0130	.0130
20.0	.0080	.0080
25.0	.0030	.0030
28.0	.0000	.0000



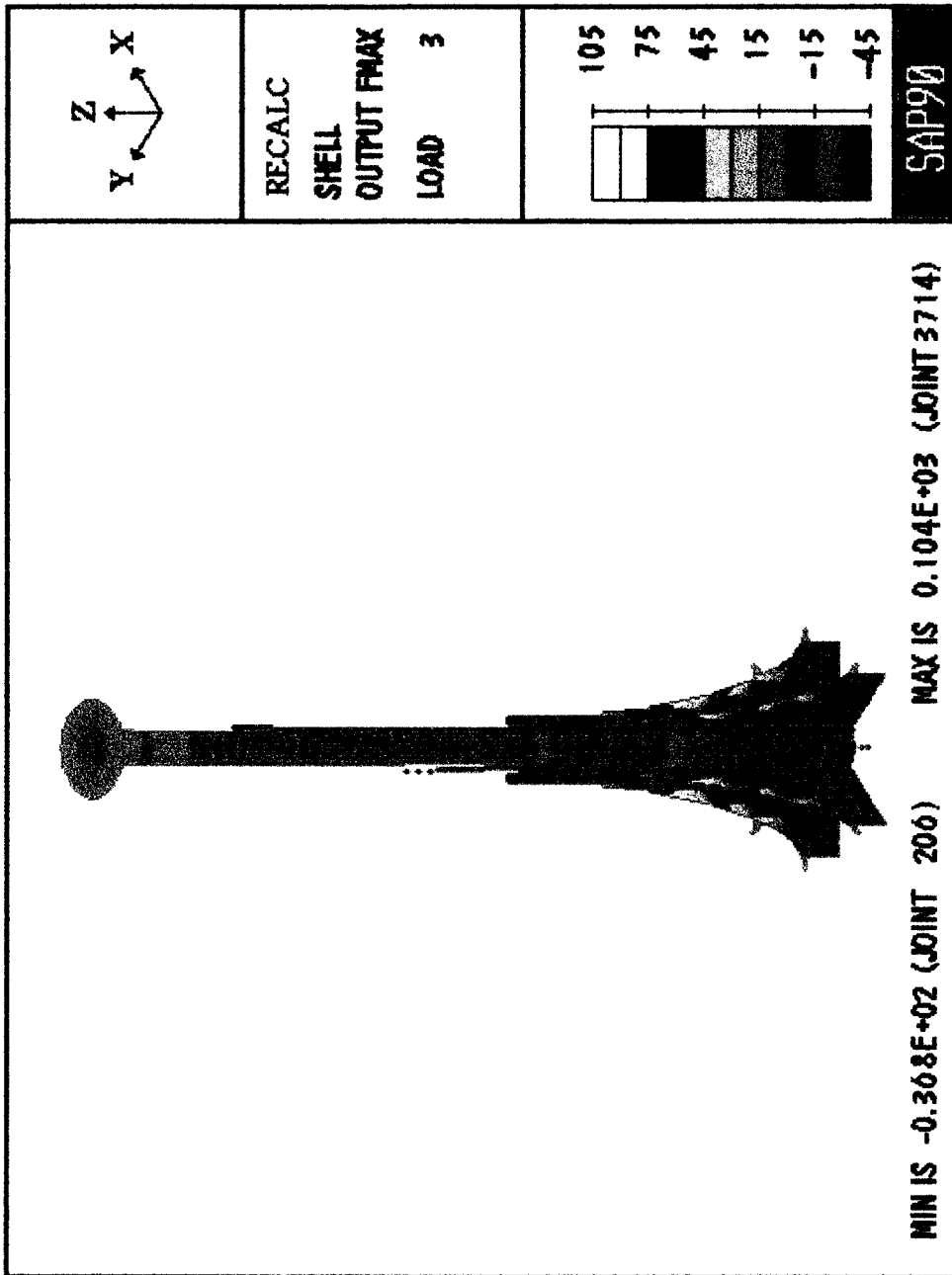
Gambar 4.3 Momen M22 pada kombinasi beban 3



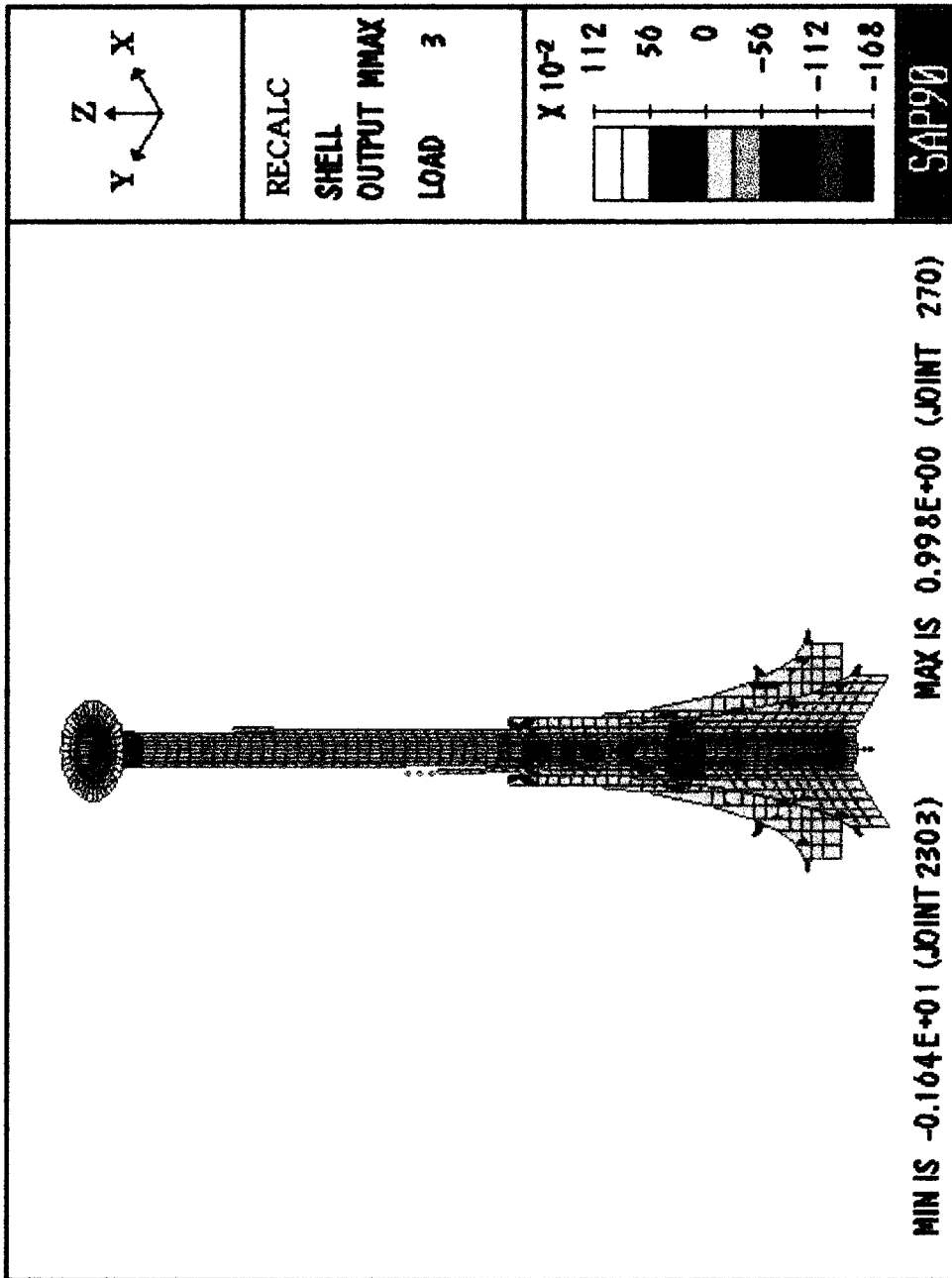
Gambar 4.4 Momen M11 pada kombinasi beban 3



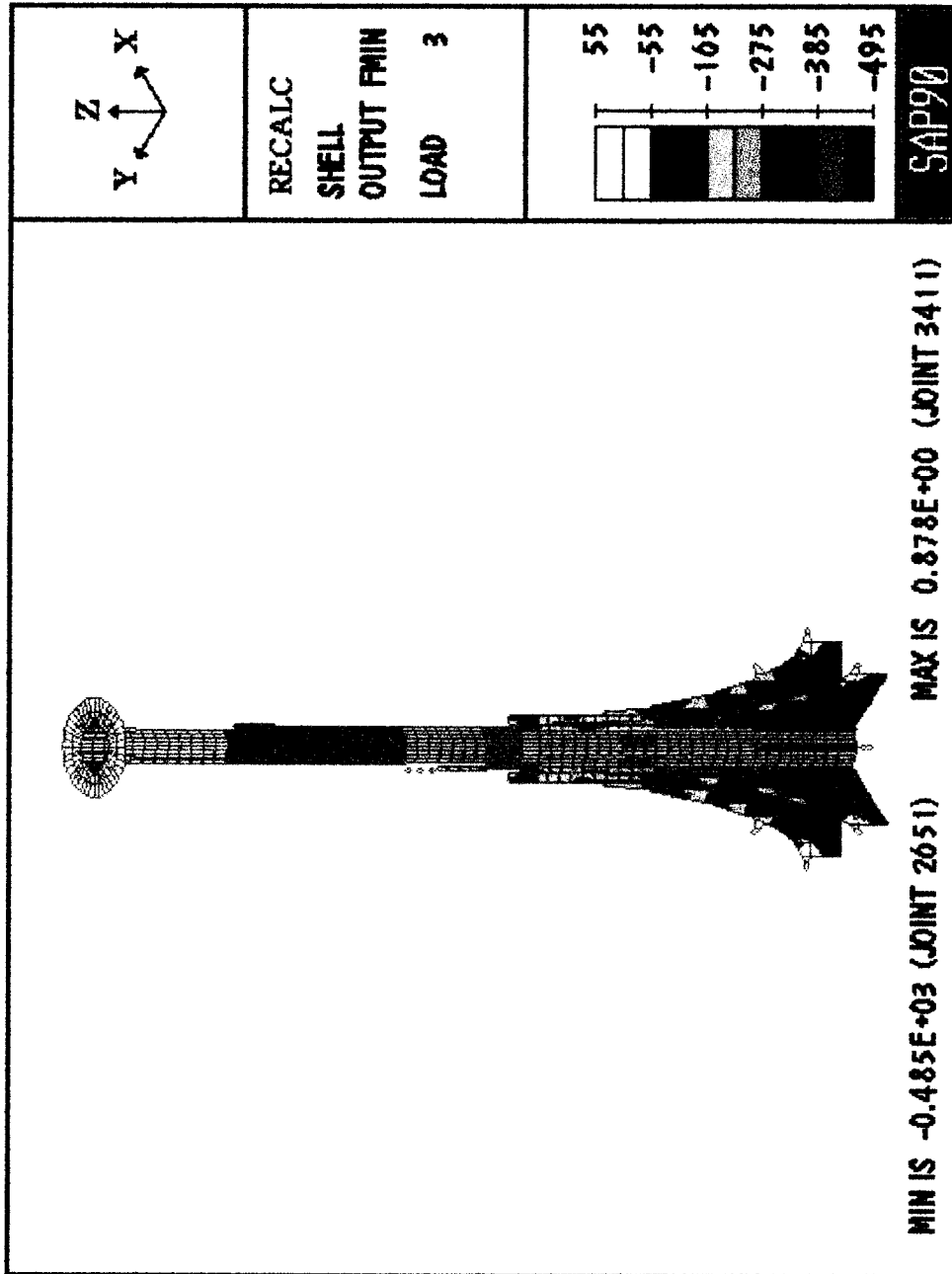
Gambar 4.5 Momen Mmin pada kombinasi beban 3



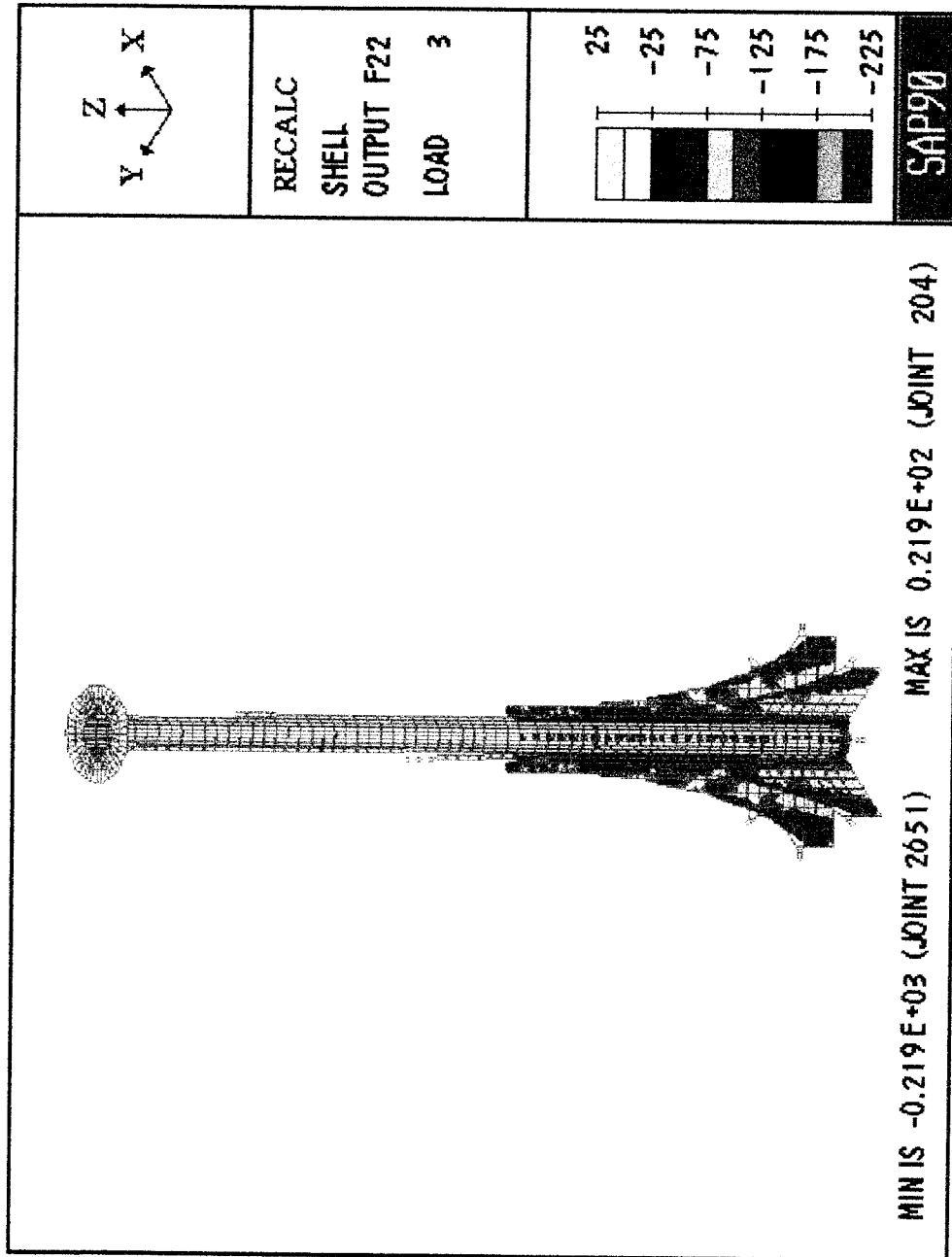
Gambar 4 6 Momen Fmax pada kombinasi beban 3



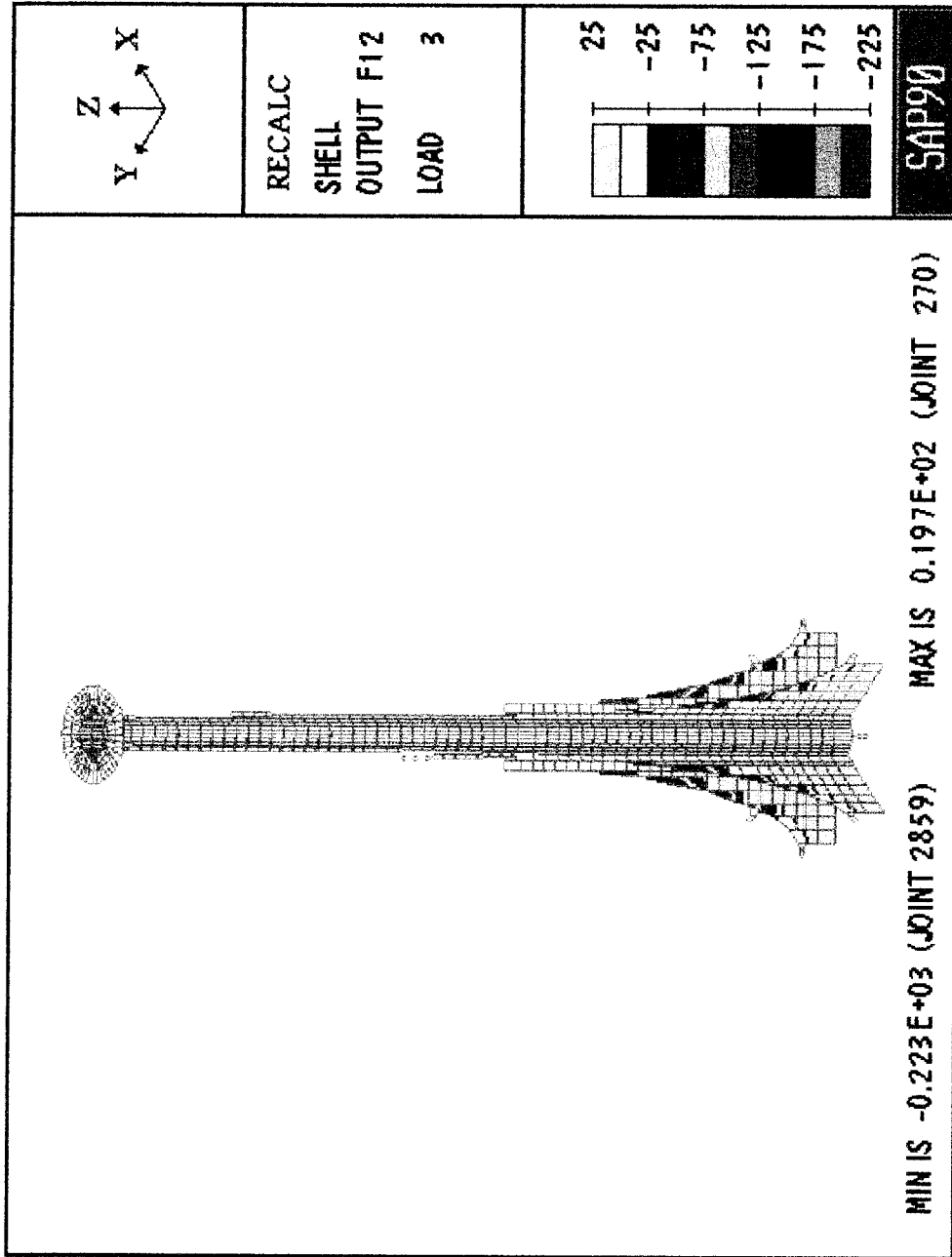
Gambar 4.7 Momen Mmax pada kombinasi beban 3



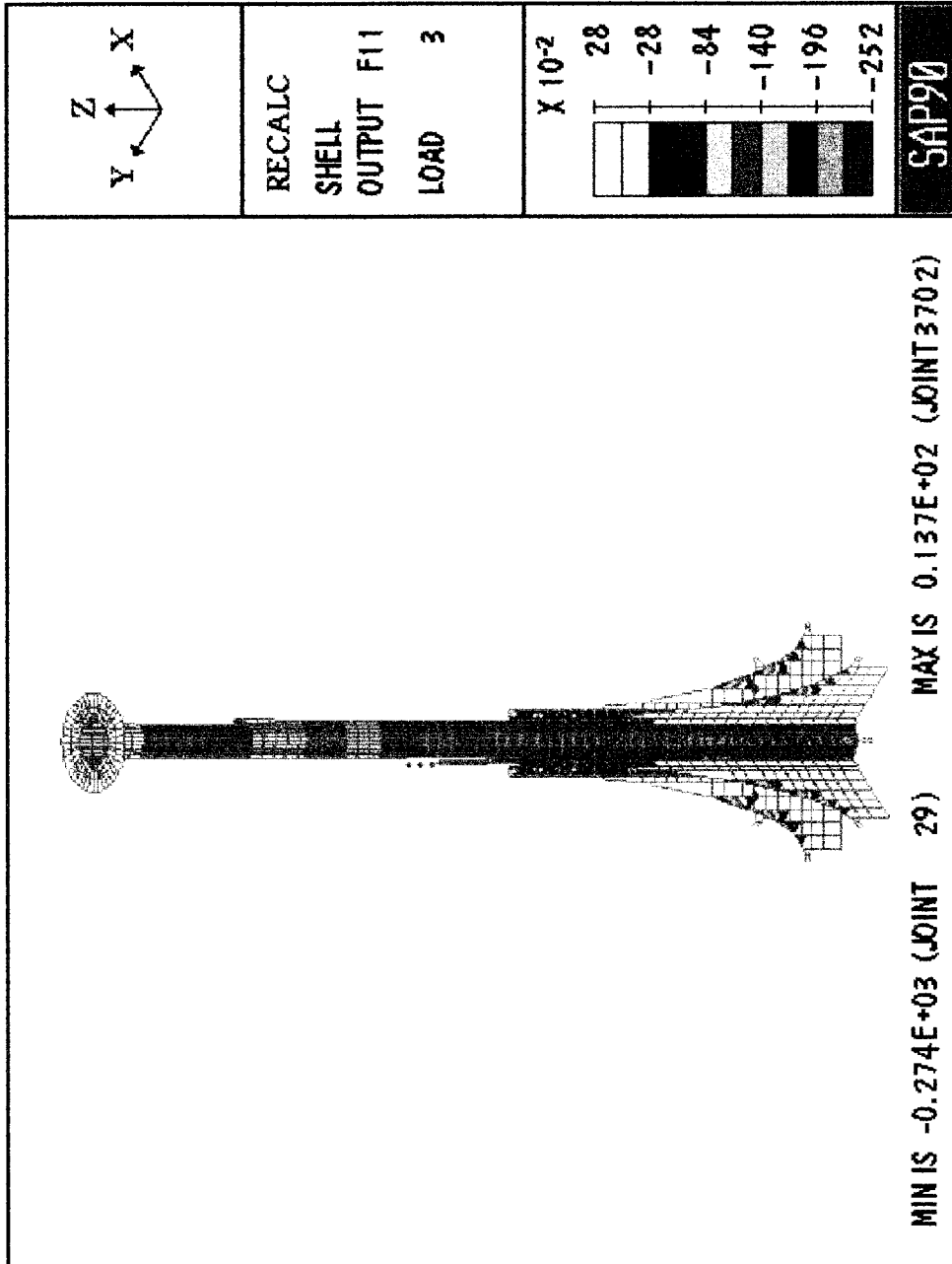
Gambar 4.8 Momen Fmin pada kombinasi beban 3



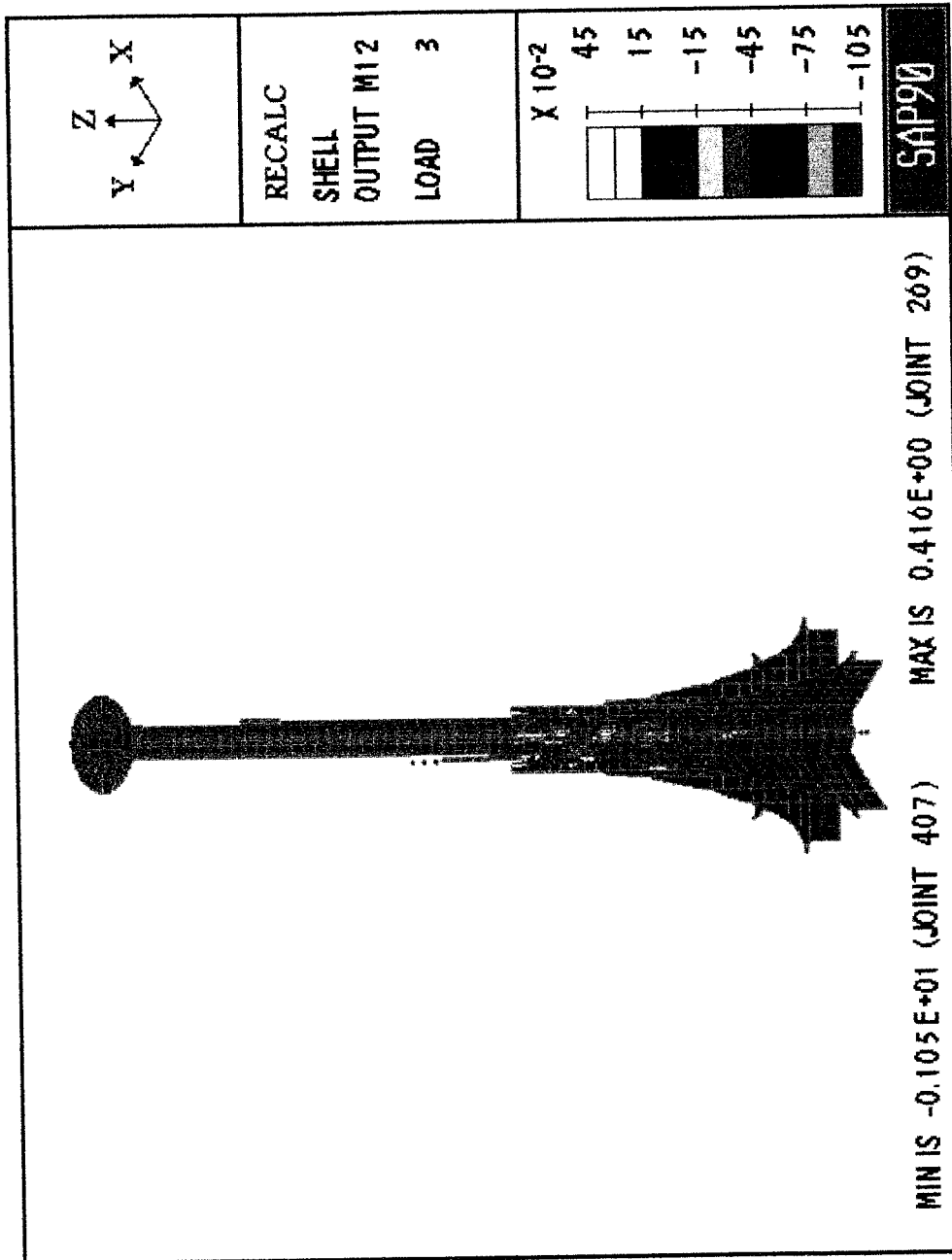
Gambar 4.9 Momen F22 pada kombinasi beban 3



Gambar 4 10 Momen F12 pada kombinasi beban 3



Gambar 4.11 Momen F11 pada kombinasi beban 3



Gambar 4.12 Momen M12 pada kombinasi beban 3