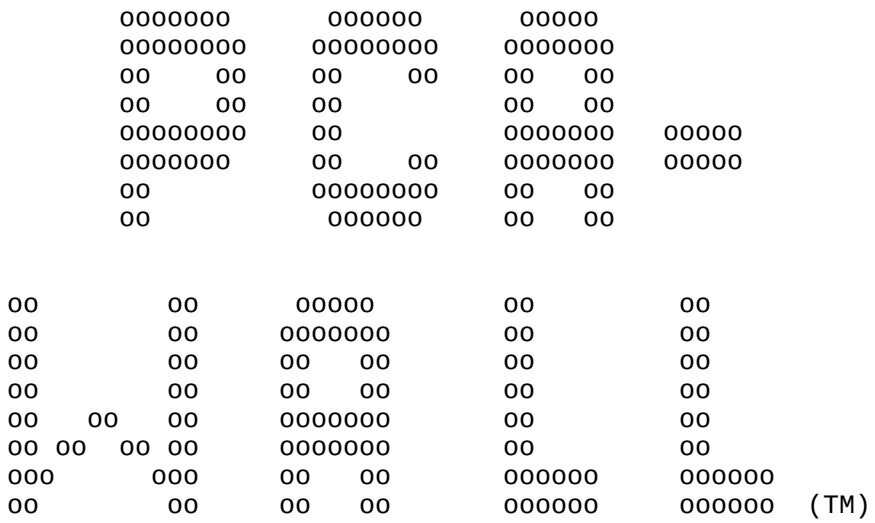


pcaWall (tm) - A Computer Program for:
Analysis and design of reinforced concrete, precast, and tilt-up walls

GENERAL INFORMATION:
==========
Project : Slender Wall - Ultimate Load Level - Second Order Analysis
File : C:\Data\pcaWall\Slender Wall - Ultimate - 2nd Order.wa3
Units : English Date : 12/2/2003
Code : ACI 318-05 Time : 4:52:36 PM

THICKNESS DEFINITIONS:
==========
thick: (in)

Label	thick
thick	6.50

PLATE CRACKING COEFFICIENTS:
==========
Label	In-plane	Out-plane
cracking	1.000	0.044

PLATE DESIGN CRITERIA:
==========
Location measured from left face: (in)

				Horizontal		Vertical	
Label	Curtains	X-Location	Y-Location	%ro_min	%ro_max	%ro_min	%ro_max
DC1	1	3.25	3.25	0.20	8.00	0.12	8.00

CONCRETE DEFINITIONS:
==========
f'c, Ec: (ksi)
Wc: (pcf)

Label	f'c	Wc	Ec	v
conc	4	150	3834.3	0.150

REINFORCING STEEL DEFINITIONS:
==========
Fy, Es: (ksi)

Label	Fy	Es
steel	60	29000

RIGID SUPPORT DEFINITIONS:
==========

Label	dx	dy	dz	rx	ry	rz
Simple	Fixed	Fixed	Fixed	Free	Fixed	Fixed
Symmetry	Fixed	Free	Free	Free	Fixed	Fixed
Roller	Fixed	Free	Fixed	Free	Fixed	Fixed

POINT LOAD DEFINITIONS:
==========

Fx, Fy, Fz: (kips)
Mx, My, Mz: (k-ft)
Eccentricity: (in)

Label	Case	Fx	Fy	Fz	Mx	My	Mz	E
Dead	A	0.000	-6.400	0.000	0.000	0.000	0.000	
Live	B	0.000	-2.560	0.000	0.000	0.000	0.000	

UNIFORM AREA LOAD DEFINITIONS:
==========

wx, wy, wz: (psf)

Label	Case	wx	wy	wz
Wind	C	0.000	0.000	-20.000

LOAD COMBINATIONS:
==========

Self weight is included under Case A.

Ld Combo	Case A	Case B	Case C	Case D	Case E	Case F	Type
S1	1.000	1.000	1.000	0.000	0.000	0.000	Ser.
1.2D+0.5	1.200	0.500	1.600	0.000	0.000	0.000	Ult.

X-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4		

Y-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4	6	5
7	6	8	7	9	8
10	9	11	10	12	11
13	12	14	13	15	14
16	15	17	16	18	17
19	18				

NODAL DATA:
==========

Node	X-Grid	Y-Grid	Rigid Support	Spring Support	Point load
1	0	0	Simple		
2	1	0	Simple		
3	2	0	Simple		
4	3	0	Simple		
5	4	0	Simple		
6	0	1	Symmetry		
7	1	1			
8	2	1			
9	3	1			
10	4	1	Symmetry		
11	0	2	Symmetry		
12	1	2			
13	2	2			
14	3	2			
15	4	2	Symmetry		
16	0	3	Symmetry		
17	1	3			
18	2	3			
19	3	3			
20	4	3	Symmetry		
21	0	4	Symmetry		
22	1	4			
23	2	4			
24	3	4			
25	4	4	Symmetry		
26	0	5	Symmetry		
27	1	5			
28	2	5			
29	3	5			
30	4	5	Symmetry		
31	0	6	Symmetry		
32	1	6			
33	2	6			
34	3	6			
35	4	6	Symmetry		
36	0	7	Symmetry		
37	1	7			
38	2	7			
39	3	7			
40	4	7	Symmetry		
41	0	8	Symmetry		
42	1	8			
43	2	8			
44	3	8			
45	4	8	Symmetry		
46	0	9	Symmetry		
47	1	9			
48	2	9			
49	3	9			
50	4	9	Symmetry		
51	0	10	Symmetry		
52	1	10			
53	2	10			
54	3	10			
55	4	10	Symmetry		
56	0	11	Symmetry		
57	1	11			
58	2	11			
59	3	11			
60	4	11	Symmetry		
61	0	12	Symmetry		
62	1	12			

63	2	12		
64	3	12		
65	4	12	Symmetry	
66	0	13	Symmetry	
67	1	13		
68	2	13		
69	3	13		
70	4	13	Symmetry	
71	0	14	Symmetry	
72	1	14		
73	2	14		
74	3	14		
75	4	14	Symmetry	
76	0	15	Symmetry	
77	1	15		
78	2	15		
79	3	15		
80	4	15	Symmetry	
81	0	16	Roller	
82	1	16	Roller	
83	2	16	Roller	Load applied
84	3	16	Roller	
85	4	16	Roller	
86	0	17	Symmetry	
87	1	17		
88	2	17		
89	3	17		
90	4	17	Symmetry	
91	0	18	Symmetry	
92	1	18		
93	2	18		
94	3	18		
95	4	18	Symmetry	

PLATE ELEMENT DEFINITIONS:
==========

X-Dim, Y-Dim: (ft)

	Nodes				Dimensions	
Elem	L-B	R-B	L-T	R-T	Width	Height
1	1	2	6	7	1.00	1.00
2	2	3	7	8	1.00	1.00
3	3	4	8	9	1.00	1.00
4	4	5	9	10	1.00	1.00
5	6	7	11	12	1.00	1.00
6	7	8	12	13	1.00	1.00
7	8	9	13	14	1.00	1.00
8	9	10	14	15	1.00	1.00
9	11	12	16	17	1.00	1.00
10	12	13	17	18	1.00	1.00
11	13	14	18	19	1.00	1.00
12	14	15	19	20	1.00	1.00
13	16	17	21	22	1.00	1.00
14	17	18	22	23	1.00	1.00
15	18	19	23	24	1.00	1.00
16	19	20	24	25	1.00	1.00
17	21	22	26	27	1.00	1.00
18	22	23	27	28	1.00	1.00
19	23	24	28	29	1.00	1.00
20	24	25	29	30	1.00	1.00
21	26	27	31	32	1.00	1.00
22	27	28	32	33	1.00	1.00
23	28	29	33	34	1.00	1.00
24	29	30	34	35	1.00	1.00
25	31	32	36	37	1.00	1.00
26	32	33	37	38	1.00	1.00

27	33	34	38	39	1.00	1.00
28	34	35	39	40	1.00	1.00
29	36	37	41	42	1.00	1.00
30	37	38	42	43	1.00	1.00
31	38	39	43	44	1.00	1.00
32	39	40	44	45	1.00	1.00
33	41	42	46	47	1.00	1.00
34	42	43	47	48	1.00	1.00
35	43	44	48	49	1.00	1.00
36	44	45	49	50	1.00	1.00
37	46	47	51	52	1.00	1.00
38	47	48	52	53	1.00	1.00
39	48	49	53	54	1.00	1.00
40	49	50	54	55	1.00	1.00
41	51	52	56	57	1.00	1.00
42	52	53	57	58	1.00	1.00
43	53	54	58	59	1.00	1.00
44	54	55	59	60	1.00	1.00
45	56	57	61	62	1.00	1.00
46	57	58	62	63	1.00	1.00
47	58	59	63	64	1.00	1.00
48	59	60	64	65	1.00	1.00
49	61	62	66	67	1.00	1.00
50	62	63	67	68	1.00	1.00
51	63	64	68	69	1.00	1.00
52	64	65	69	70	1.00	1.00
53	66	67	71	72	1.00	1.00
54	67	68	72	73	1.00	1.00
55	68	69	73	74	1.00	1.00
56	69	70	74	75	1.00	1.00
57	71	72	76	77	1.00	1.00
58	72	73	77	78	1.00	1.00
59	73	74	78	79	1.00	1.00
60	74	75	79	80	1.00	1.00
61	76	77	81	82	1.00	1.00
62	77	78	82	83	1.00	1.00
63	78	79	83	84	1.00	1.00
64	79	80	84	85	1.00	1.00
65	81	82	86	87	1.00	1.00
66	82	83	87	88	1.00	1.00
67	83	84	88	89	1.00	1.00
68	84	85	89	90	1.00	1.00
69	86	87	91	92	1.00	1.00
70	87	88	92	93	1.00	1.00
71	88	89	93	94	1.00	1.00
72	89	90	94	95	1.00	1.00

PLATE ELEMENT ASSIGNMENTS:

Elem	Thick.	Cracking Concrete	Steel	DesParam
1	thick	cracking conc	steel	DC1
2	thick	cracking conc	steel	DC1
3	thick	cracking conc	steel	DC1
4	thick	cracking conc	steel	DC1
5	thick	cracking conc	steel	DC1
6	thick	cracking conc	steel	DC1
7	thick	cracking conc	steel	DC1
8	thick	cracking conc	steel	DC1
9	thick	cracking conc	steel	DC1
10	thick	cracking conc	steel	DC1
11	thick	cracking conc	steel	DC1
12	thick	cracking conc	steel	DC1
13	thick	cracking conc	steel	DC1
14	thick	cracking conc	steel	DC1
15	thick	cracking conc	steel	DC1
16	thick	cracking conc	steel	DC1
17	thick	cracking conc	steel	DC1
18	thick	cracking conc	steel	DC1
19	thick	cracking conc	steel	DC1
20	thick	cracking conc	steel	DC1
21	thick	cracking conc	steel	DC1
22	thick	cracking conc	steel	DC1
23	thick	cracking conc	steel	DC1
24	thick	cracking conc	steel	DC1
25	thick	cracking conc	steel	DC1
26	thick	cracking conc	steel	DC1
27	thick	cracking conc	steel	DC1
28	thick	cracking conc	steel	DC1
29	thick	cracking conc	steel	DC1
30	thick	cracking conc	steel	DC1
31	thick	cracking conc	steel	DC1
32	thick	cracking conc	steel	DC1
33	thick	cracking conc	steel	DC1
34	thick	cracking conc	steel	DC1
35	thick	cracking conc	steel	DC1
36	thick	cracking conc	steel	DC1
37	thick	cracking conc	steel	DC1
38	thick	cracking conc	steel	DC1
39	thick	cracking conc	steel	DC1
40	thick	cracking conc	steel	DC1
41	thick	cracking conc	steel	DC1
42	thick	cracking conc	steel	DC1
43	thick	cracking conc	steel	DC1
44	thick	cracking conc	steel	DC1
45	thick	cracking conc	steel	DC1
46	thick	cracking conc	steel	DC1
47	thick	cracking conc	steel	DC1
48	thick	cracking conc	steel	DC1
49	thick	cracking conc	steel	DC1
50	thick	cracking conc	steel	DC1
51	thick	cracking conc	steel	DC1
52	thick	cracking conc	steel	DC1
53	thick	cracking conc	steel	DC1
54	thick	cracking conc	steel	DC1
55	thick	cracking conc	steel	DC1
56	thick	cracking conc	steel	DC1
57	thick	cracking conc	steel	DC1
58	thick	cracking conc	steel	DC1
59	thick	cracking conc	steel	DC1
60	thick	cracking conc	steel	DC1
61	thick	cracking conc	steel	DC1
62	thick	cracking conc	steel	DC1

63	thick	cracking conc	steel	DC1
64	thick	cracking conc	steel	DC1
65	thick	cracking conc	steel	DC1
66	thick	cracking conc	steel	DC1
67	thick	cracking conc	steel	DC1
68	thick	cracking conc	steel	DC1
69	thick	cracking conc	steel	DC1
70	thick	cracking conc	steel	DC1
71	thick	cracking conc	steel	DC1
72	thick	cracking conc	steel	DC1

APPLIED POINT LOADS:
==========

Node	Case A	Case B	Case C	Case D	Case E	Case F
83	Dead	Live				

APPLIED UNIFORM LINE LOADS:
==========

Grid lines in X direction

Nodes							
Start	End	Case A	Case B	Case C	Case D	Case E	Case F

Grid lines in Y direction

Nodes							
Start	End	Case A	Case B	Case C	Case D	Case E	Case F

APPLIED UNIFORM AREA LOADS:

Elem	Case A	Case B	Case C	Case D	Case E	Case F
1			Wind			
2			Wind			
3			Wind			
4			Wind			
5			Wind			
6			Wind			
7			Wind			
8			Wind			
9			Wind			
10			Wind			
11			Wind			
12			Wind			
13			Wind			
14			Wind			
15			Wind			
16			Wind			
17			Wind			
18			Wind			
19			Wind			
20			Wind			
21			Wind			
22			Wind			
23			Wind			
24			Wind			
25			Wind			
26			Wind			
27			Wind			
28			Wind			
29			Wind			
30			Wind			
31			Wind			
32			Wind			
33			Wind			
34			Wind			
35			Wind			
36			Wind			
37			Wind			
38			Wind			
39			Wind			
40			Wind			
41			Wind			
42			Wind			
43			Wind			
44			Wind			
45			Wind			
46			Wind			
47			Wind			
48			Wind			
49			Wind			
50			Wind			
51			Wind			
52			Wind			
53			Wind			
54			Wind			
55			Wind			
56			Wind			
57			Wind			
58			Wind			
59			Wind			
60			Wind			
61			Wind			
62			Wind			

63	Wind
64	Wind

APPLIED LINEAR AREA LOADS:

Elem	Case A	Case B	Case C	Case D	Case E	Case F

ULTIMATE COMBINATIONS: PLATE INTERNAL FORCES

Axial force (Nxx, Nyy, Nxy): klf, bending moment (Mxx, Myy, Mxy): k-ft/ft

Ultimate combination: 1.2D+0.5L+1.6W

Elem	Nxx	Nyy	Nxy	Mxx	Myy	Mxy
1	-5.9194E-001	-3.9463E+000	8.2915E-011	3.3830E-002	2.2553E-001	-9.8723E-01
2	-5.9194E-001	-3.9463E+000	8.3000E-011	3.3830E-002	2.2553E-001	-9.9228E-01
3	-5.9194E-001	-3.9463E+000	-8.3000E-011	3.3830E-002	2.2553E-001	9.9178E-01
4	-5.9194E-001	-3.9463E+000	-8.2914E-011	3.3830E-002	2.2553E-001	9.8706E-01
5	-5.7731E-001	-3.8488E+000	4.2925E-010	9.8430E-002	6.5620E-001	-4.0445E-01
6	-5.7731E-001	-3.8488E+000	4.3114E-010	9.8430E-002	6.5620E-001	-4.0490E-01
7	-5.7731E-001	-3.8488E+000	-4.3114E-010	9.8430E-002	6.5620E-001	4.0485E-01
8	-5.7731E-001	-3.8488E+000	-4.2924E-010	9.8430E-002	6.5620E-001	4.0443E-01
9	-5.6269E-001	-3.7513E+000	2.1083E-009	1.5658E-001	1.0439E+000	-1.9398E-00
10	-5.6269E-001	-3.7513E+000	2.1083E-009	1.5658E-001	1.0439E+000	-1.9402E-00
11	-5.6269E-001	-3.7513E+000	-2.1083E-009	1.5658E-001	1.0439E+000	1.9402E-00
12	-5.6269E-001	-3.7513E+000	-2.1083E-009	1.5658E-001	1.0439E+000	1.9398E-00
13	-5.4806E-001	-3.6538E+000	1.0177E-008	2.0768E-001	1.3845E+000	-9.3665E-00
14	-5.4806E-001	-3.6538E+000	1.0177E-008	2.0768E-001	1.3845E+000	-9.3668E-00
15	-5.4806E-001	-3.6538E+000	-1.0177E-008	2.0768E-001	1.3845E+000	9.3669E-00
16	-5.4806E-001	-3.6538E+000	-1.0177E-008	2.0768E-001	1.3845E+000	9.3665E-00
17	-5.3344E-001	-3.5563E+000	4.9075E-008	2.5127E-001	1.6751E+000	-4.4707E-00
18	-5.3344E-001	-3.5563E+000	4.9075E-008	2.5127E-001	1.6751E+000	-4.4707E-00
19	-5.3344E-001	-3.5563E+000	-4.9075E-008	2.5127E-001	1.6751E+000	4.4707E-00
20	-5.3344E-001	-3.5563E+000	-4.9075E-008	2.5127E-001	1.6751E+000	4.4707E-00
21	-5.1881E-001	-3.4588E+000	2.3664E-007	2.8700E-001	1.9134E+000	-2.1356E-00
22	-5.1881E-001	-3.4588E+000	2.3664E-007	2.8700E-001	1.9134E+000	-2.1356E-00
23	-5.1881E-001	-3.4588E+000	-2.3664E-007	2.8700E-001	1.9134E+000	2.1356E-00
24	-5.1881E-001	-3.4588E+000	-2.3664E-007	2.8700E-001	1.9134E+000	2.1356E-00
25	-5.0419E-001	-3.3612E+000	1.1410E-006	3.1466E-001	2.0977E+000	-1.0020E-00
26	-5.0419E-001	-3.3613E+000	1.1410E-006	3.1466E-001	2.0977E+000	-1.0020E-00
27	-5.0419E-001	-3.3613E+000	-1.1410E-006	3.1466E-001	2.0977E+000	1.0020E-00
28	-5.0419E-001	-3.3612E+000	-1.1410E-006	3.1466E-001	2.0977E+000	1.0020E-00
29	-4.8957E-001	-3.2637E+000	5.5002E-006	3.3412E-001	2.2275E+000	-4.7088E-00
30	-4.8956E-001	-3.2638E+000	5.5002E-006	3.3413E-001	2.2275E+000	-4.7088E-00
31	-4.8956E-001	-3.2638E+000	-5.5002E-006	3.3413E-001	2.2275E+000	4.7088E-00
32	-4.8957E-001	-3.2637E+000	-5.5002E-006	3.3412E-001	2.2275E+000	4.7088E-00
33	-4.7496E-001	-3.1662E+000	2.6507E-005	3.4538E-001	2.3027E+000	-2.1478E-00
34	-4.7491E-001	-3.1663E+000	2.6507E-005	3.4543E-001	2.3027E+000	-2.1478E-00
35	-4.7491E-001	-3.1663E+000	-2.6507E-005	3.4543E-001	2.3027E+000	2.1478E-00
36	-4.7496E-001	-3.1662E+000	-2.6507E-005	3.4538E-001	2.3027E+000	2.1478E-00
37	-4.6043E-001	-3.0686E+000	1.2779E-004	3.4848E-001	2.3240E+000	-9.8139E-00
38	-4.6019E-001	-3.0689E+000	1.2779E-004	3.4869E-001	2.3238E+000	-9.8141E-00
39	-4.6019E-001	-3.0689E+000	-1.2779E-004	3.4869E-001	2.3238E+000	9.8141E-00
40	-4.6043E-001	-3.0686E+000	-1.2779E-004	3.4848E-001	2.3240E+000	9.8139E-00
41	-4.4627E-001	-2.9706E+000	6.1797E-004	3.4335E-001	2.2925E+000	-4.2423E-00
42	-4.4510E-001	-2.9719E+000	6.1799E-004	3.4432E-001	2.2919E+000	-4.2428E-00
43	-4.4510E-001	-2.9719E+000	-6.1799E-004	3.4432E-001	2.2919E+000	4.2428E-00
44	-4.4627E-001	-2.9706E+000	-6.1797E-004	3.4335E-001	2.2925E+000	4.2423E-00
45	-4.3394E-001	-2.8705E+000	3.0127E-003	3.2937E-001	2.2107E+000	-1.8282E-00
46	-4.2819E-001	-2.8770E+000	3.0133E-003	3.3344E-001	2.2080E+000	-1.8293E-00
47	-4.2819E-001	-2.8770E+000	-3.0133E-003	3.3344E-001	2.2080E+000	1.8293E-00
48	-4.3394E-001	-2.8705E+000	-3.0127E-003	3.2937E-001	2.2107E+000	1.8282E-00
49	-4.3054E-001	-2.7605E+000	1.4804E-002	3.0257E-001	2.0818E+000	-6.9330E-00
50	-4.0234E-001	-2.7920E+000	1.4828E-002	3.2065E-001	2.0730E+000	-6.9584E-00
51	-4.0234E-001	-2.7920E+000	-1.4828E-002	3.2065E-001	2.0730E+000	6.9584E-00
52	-4.3054E-001	-2.7605E+000	-1.4804E-002	3.0257E-001	2.0818E+000	6.9330E-00
53	-4.6648E-001	-2.6045E+000	7.0944E-002	2.5298E-001	1.9127E+000	-2.4822E-00
54	-3.3715E-001	-2.7530E+000	7.1785E-002	3.1663E-001	1.8847E+000	-2.5420E-00
55	-3.3715E-001	-2.7530E+000	-7.1785E-002	3.1663E-001	1.8847E+000	2.5420E-00
56	-4.6648E-001	-2.6045E+000	-7.0944E-002	2.5298E-001	1.9127E+000	2.4822E-00
57	-6.0809E-001	-2.2666E+000	2.8574E-001	1.2827E-001	1.6640E+000	-4.3268E-00
58	-1.6628E-001	-2.8959E+000	3.1601E-001	3.7452E-001	1.6879E+000	-5.6825E-00

59	-1.6628E-001	-2.8959E+000	-3.1601E-001	3.7452E-001	1.6879E+000	5.6825E-00
60	-6.0809E-001	-2.2666E+000	-2.8574E-001	1.2827E-001	1.6640E+000	4.3268E-00
61	-4.1713E-001	-1.4663E+000	2.0089E-001	6.4025E-002	1.0623E+000	7.7402E-00
62	-3.2800E-001	-3.5012E+000	1.2898E+000	3.5962E-001	1.7620E+000	9.1583E-00
63	-3.2800E-001	-3.5012E+000	-1.2898E+000	3.5962E-001	1.7620E+000	-9.1583E-00
64	-4.1713E-001	-1.4663E+000	-2.0089E-001	6.4025E-002	1.0623E+000	-7.7402E-00
65	8.2490E-003	-1.0919E+000	2.4423E-001	1.5388E-001	3.4871E-001	8.3999E-00
66	-5.2124E-002	7.9944E-001	1.3331E+000	-1.5209E-001	-3.3680E-001	1.0125E-00
67	-5.2124E-002	7.9944E-001	-1.3331E+000	-1.5209E-001	-3.3680E-001	-1.0125E-00
68	8.2490E-003	-1.0919E+000	-2.4423E-001	1.5388E-001	3.4871E-001	-8.3999E-00
69	3.3092E-001	-2.0284E-001	2.9959E-001	1.4889E-001	1.5627E-002	-2.5873E-00
70	-3.4555E-001	1.0534E-001	3.3071E-001	-1.4853E-001	-1.3258E-002	-4.1606E-00
71	-3.4555E-001	1.0534E-001	-3.3071E-001	-1.4853E-001	-1.3258E-002	4.1606E-00
72	3.3092E-001	-2.0284E-001	-2.9959E-001	1.4889E-001	1.5627E-002	2.5873E-00

ULTIMATE COMBINATIONS: REACTIONS
==========

Force (Fx, Fy, Fz): kips, Moment (Mx, My, Mz): k-ft

Ultimate combination: 1.2D+0.5L+1.6W

Node	Fx	Fy	Fz	Mx	My	Mz
1	2.9597E-001	1.9975E+000	1.6157E-001	-2.0867E-015	-1.8014E-003	2.7953E-0
2	4.6955E-011	3.9950E+000	3.2314E-001	-6.3652E-015	-9.8528E-013	9.0948E-0
3	-7.5182E-017	3.9950E+000	3.2314E-001	6.1973E-015	-3.8993E-015	8.9920E-0
4	-4.6955E-011	3.9950E+000	3.2314E-001	9.0634E-016	9.9030E-013	-9.0946E-0
5	-2.9597E-001	1.9975E+000	1.6157E-001	1.1819E-015	1.8014E-003	-2.7953E-0
6	5.8463E-001	-3.6530E-016	-1.0132E-013	1.3290E-014	6.8175E-002	-6.9063E-0
10	-5.8463E-001	-4.1521E-016	3.3895E-014	-4.6803E-015	-6.8175E-002	6.9063E-0
11	5.7000E-001	-1.9005E-016	-2.3881E-014	-6.8931E-015	1.2948E-001	-6.9063E-0
15	-5.7000E-001	4.3868E-016	-7.5463E-014	-4.0095E-015	-1.2948E-001	6.9063E-0
16	5.5538E-001	-1.7409E-015	1.0634E-013	-5.0088E-014	1.8405E-001	-6.9063E-0
20	-5.5538E-001	1.6183E-016	1.0646E-013	-2.2136E-014	-1.8405E-001	6.9063E-0
21	5.4075E-001	-1.7511E-015	-1.4426E-013	-2.0913E-014	2.3136E-001	-6.9063E-0
25	-5.4075E-001	1.5601E-015	-2.0013E-013	3.1970E-014	-2.3136E-001	6.9063E-0
26	5.2613E-001	-4.3079E-015	1.6250E-013	-6.8478E-015	2.7099E-001	-6.9063E-0
30	-5.2613E-001	-5.2358E-015	-8.6934E-014	-1.0460E-014	-2.7099E-001	6.9063E-0
31	5.1150E-001	-2.9342E-015	-7.3377E-014	5.3092E-014	3.0267E-001	-6.9064E-0
35	-5.1150E-001	2.0921E-015	-8.2836E-014	5.3645E-014	-3.0267E-001	6.9064E-0
36	4.9688E-001	4.4724E-015	6.8159E-014	4.2920E-014	3.2622E-001	-6.9069E-0
40	-4.9688E-001	-1.4294E-015	-3.4581E-013	4.4733E-014	-3.2622E-001	6.9069E-0
41	4.8227E-001	-3.4416E-015	-3.4368E-013	4.1353E-014	3.4158E-001	-6.9096E-0
45	-4.8227E-001	-1.3456E-016	1.6561E-013	1.7148E-013	-3.4158E-001	6.9096E-0
46	4.6773E-001	1.7984E-015	3.9805E-014	-9.3306E-014	3.4875E-001	-6.9222E-0
50	-4.6773E-001	-2.0587E-015	3.3472E-013	-5.8272E-014	-3.4875E-001	6.9222E-0
51	4.5349E-001	-9.2322E-016	1.0360E-013	-1.1261E-013	3.4766E-001	-6.9835E-0
55	-4.5349E-001	-6.0342E-016	-2.5647E-013	-9.8099E-014	-3.4766E-001	6.9835E-0
56	4.4077E-001	-3.3533E-015	-3.1705E-014	5.4359E-014	3.3762E-001	-7.2829E-0
60	-4.4077E-001	-3.4657E-015	-2.0104E-013	-1.2616E-014	-3.3762E-001	7.2829E-0
61	4.3555E-001	-1.0053E-014	-1.7741E-013	-2.0122E-015	3.1571E-001	-8.7577E-0
65	-4.3555E-001	6.8207E-015	-2.9980E-013	5.1468E-015	-3.1571E-001	8.7577E-0
66	4.6547E-001	-6.1604E-015	8.4941E-014	-1.0992E-014	2.6838E-001	-1.5753E-0
70	-4.6547E-001	1.3281E-014	-2.3665E-013	-1.4861E-016	-2.6838E-001	1.5753E-0
71	6.1665E-001	1.6733E-014	-1.0552E-013	-1.0320E-014	1.7455E-001	-4.2114E-0
75	-6.1665E-001	-1.6481E-014	3.9378E-014	-1.4491E-014	-1.7455E-001	4.2114E-0
76	5.5968E-001	2.8993E-015	8.2451E-014	-9.8645E-015	8.9157E-002	-3.0335E-0
80	-5.5968E-001	-8.3972E-015	-1.4882E-014	1.9965E-014	-8.9157E-002	3.0335E-0
81	2.2003E-001	-2.9281E-015	1.7516E-001	8.2781E-015	8.5100E-002	-3.4009E-0
82	4.1141E-002	-1.8361E-015	2.4560E-001	2.2084E-014	1.6098E-002	-8.9481E-0
83	4.4894E-015	-2.1582E-015	-8.6070E-002	-8.7347E-015	-5.1407E-016	2.9204E-0
84	-4.1141E-002	9.0109E-015	2.4560E-001	-2.6687E-015	-1.6098E-002	8.9481E-0
85	-2.2003E-001	8.3965E-015	1.7516E-001	3.4736E-015	-8.5100E-002	3.4009E-0
86	-1.9446E-001	5.8059E-015	2.9904E-014	5.8140E-015	1.7312E-001	-2.9994E-0
90	1.9446E-001	-1.0360E-014	-2.8958E-014	1.6455E-014	-1.7312E-001	2.9994E-0
91	-3.0372E-001	-8.0381E-015	-3.2212E-014	-1.0119E-014	9.1879E-002	-6.4399E-0
95	3.0372E-001	-4.4744E-015	2.7401E-014	-3.3082E-014	-9.1879E-002	6.4399E-0

ENVELOPE: PLATE FLEXURE REINFORCEMENT

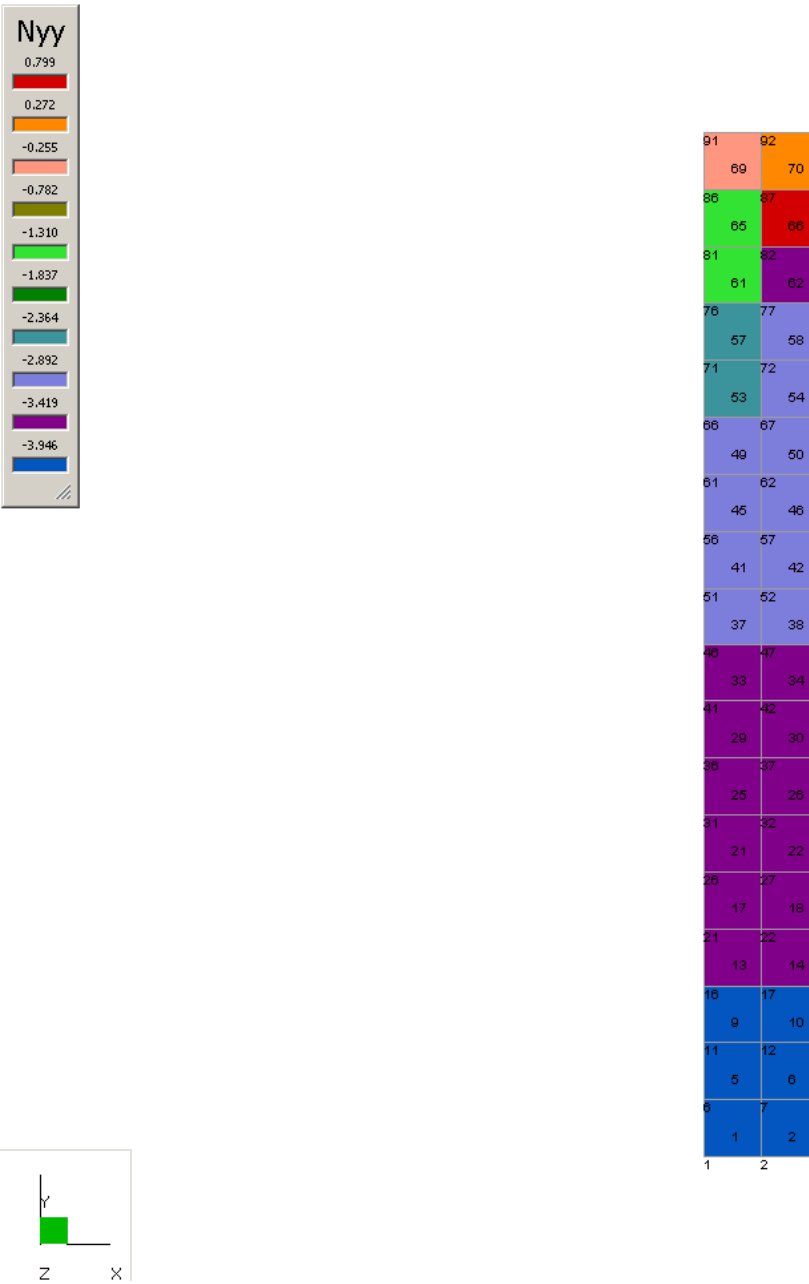
Total required area of steel (As): in^2/ft
Bending moment (Mu): k-ft/ft, axial force (Nu): klf

Elem	Curtains	As (x/y)	ro(%)	Ld_combo	Mu (x/y)	Nu (x/y)	Tie
1	1	1.56E-001	0.20	1.2D+0.5	3.3830E-002	-5.9194E-001	
		9.36E-002	0.12	1.2D+0.5	2.2553E-001	-3.9463E+000	
2	1	1.56E-001	0.20	1.2D+0.5	3.3830E-002	-5.9194E-001	
		9.36E-002	0.12	1.2D+0.5	2.2553E-001	-3.9463E+000	
3	1	1.56E-001	0.20	1.2D+0.5	3.3830E-002	-5.9194E-001	
		9.36E-002	0.12	1.2D+0.5	2.2553E-001	-3.9463E+000	
4	1	1.56E-001	0.20	1.2D+0.5	3.3830E-002	-5.9194E-001	
		9.36E-002	0.12	1.2D+0.5	2.2553E-001	-3.9463E+000	
5	1	1.56E-001	0.20	1.2D+0.5	9.8430E-002	-5.7731E-001	
		9.36E-002	0.12	1.2D+0.5	6.5620E-001	-3.8488E+000	
6	1	1.56E-001	0.20	1.2D+0.5	9.8430E-002	-5.7731E-001	
		9.36E-002	0.12	1.2D+0.5	6.5620E-001	-3.8488E+000	
7	1	1.56E-001	0.20	1.2D+0.5	9.8430E-002	-5.7731E-001	
		9.36E-002	0.12	1.2D+0.5	6.5620E-001	-3.8488E+000	
8	1	1.56E-001	0.20	1.2D+0.5	9.8430E-002	-5.7731E-001	
		9.36E-002	0.12	1.2D+0.5	6.5620E-001	-3.8488E+000	
9	1	1.56E-001	0.20	1.2D+0.5	1.5658E-001	-5.6269E-001	
		9.36E-002	0.12	1.2D+0.5	1.0439E+000	-3.7513E+000	
10	1	1.56E-001	0.20	1.2D+0.5	1.5658E-001	-5.6269E-001	
		9.36E-002	0.12	1.2D+0.5	1.0439E+000	-3.7513E+000	
11	1	1.56E-001	0.20	1.2D+0.5	1.5658E-001	-5.6269E-001	
		9.36E-002	0.12	1.2D+0.5	1.0439E+000	-3.7513E+000	
12	1	1.56E-001	0.20	1.2D+0.5	1.5658E-001	-5.6269E-001	
		9.36E-002	0.12	1.2D+0.5	1.0439E+000	-3.7513E+000	
13	1	1.56E-001	0.20	1.2D+0.5	2.0768E-001	-5.4806E-001	
		9.36E-002	0.12	1.2D+0.5	1.3845E+000	-3.6538E+000	
14	1	1.56E-001	0.20	1.2D+0.5	2.0768E-001	-5.4806E-001	
		9.36E-002	0.12	1.2D+0.5	1.3845E+000	-3.6538E+000	
15	1	1.56E-001	0.20	1.2D+0.5	2.0768E-001	-5.4806E-001	
		9.36E-002	0.12	1.2D+0.5	1.3845E+000	-3.6538E+000	
16	1	1.56E-001	0.20	1.2D+0.5	2.0768E-001	-5.4806E-001	
		9.36E-002	0.12	1.2D+0.5	1.3845E+000	-3.6538E+000	
17	1	1.56E-001	0.20	1.2D+0.5	2.5127E-001	-5.3344E-001	
		9.36E-002	0.12	1.2D+0.5	1.6751E+000	-3.5563E+000	
18	1	1.56E-001	0.20	1.2D+0.5	2.5127E-001	-5.3344E-001	
		9.36E-002	0.12	1.2D+0.5	1.6751E+000	-3.5563E+000	
19	1	1.56E-001	0.20	1.2D+0.5	2.5127E-001	-5.3344E-001	
		9.36E-002	0.12	1.2D+0.5	1.6751E+000	-3.5563E+000	
20	1	1.56E-001	0.20	1.2D+0.5	2.5127E-001	-5.3344E-001	
		9.36E-002	0.12	1.2D+0.5	1.6751E+000	-3.5563E+000	
21	1	1.56E-001	0.20	1.2D+0.5	2.8700E-001	-5.1881E-001	
		9.36E-002	0.12	1.2D+0.5	1.9134E+000	-3.4588E+000	
22	1	1.56E-001	0.20	1.2D+0.5	2.8700E-001	-5.1881E-001	
		9.36E-002	0.12	1.2D+0.5	1.9134E+000	-3.4588E+000	
23	1	1.56E-001	0.20	1.2D+0.5	2.8700E-001	-5.1881E-001	
		9.36E-002	0.12	1.2D+0.5	1.9134E+000	-3.4588E+000	
24	1	1.56E-001	0.20	1.2D+0.5	2.8700E-001	-5.1881E-001	
		9.36E-002	0.12	1.2D+0.5	1.9134E+000	-3.4588E+000	
25	1	1.56E-001	0.20	1.2D+0.5	3.1466E-001	-5.0419E-001	
		9.36E-002	0.12	1.2D+0.5	2.0977E+000	-3.3612E+000	
26	1	1.56E-001	0.20	1.2D+0.5	3.1466E-001	-5.0419E-001	
		9.36E-002	0.12	1.2D+0.5	2.0977E+000	-3.3613E+000	
27	1	1.56E-001	0.20	1.2D+0.5	3.1466E-001	-5.0419E-001	
		9.36E-002	0.12	1.2D+0.5	2.0977E+000	-3.3613E+000	
28	1	1.56E-001	0.20	1.2D+0.5	3.1466E-001	-5.0419E-001	
		9.36E-002	0.12	1.2D+0.5	2.0977E+000	-3.3612E+000	
29	1	1.56E-001	0.20	1.2D+0.5	3.3413E-001	-4.8957E-001	
		9.96E-002	0.13	1.2D+0.5	2.2275E+000	-3.2637E+000	

30	1	1.56E-001	0.20	1.2D+0.5	3.3414E-001	-4.8956E-001
		9.96E-002	0.13	1.2D+0.5	2.2275E+000	-3.2638E+000
31	1	1.56E-001	0.20	1.2D+0.5	3.3414E-001	-4.8956E-001
		9.96E-002	0.13	1.2D+0.5	2.2275E+000	-3.2638E+000
32	1	1.56E-001	0.20	1.2D+0.5	3.3413E-001	-4.8957E-001
		9.96E-002	0.13	1.2D+0.5	2.2275E+000	-3.2637E+000
33	1	1.56E-001	0.20	1.2D+0.5	3.4540E-001	-4.7496E-001
		1.06E-001	0.14	1.2D+0.5	2.3027E+000	-3.1662E+000
34	1	1.56E-001	0.20	1.2D+0.5	3.4545E-001	-4.7491E-001
		1.06E-001	0.14	1.2D+0.5	2.3027E+000	-3.1663E+000
35	1	1.56E-001	0.20	1.2D+0.5	3.4545E-001	-4.7491E-001
		1.06E-001	0.14	1.2D+0.5	2.3027E+000	-3.1663E+000
36	1	1.56E-001	0.20	1.2D+0.5	3.4540E-001	-4.7496E-001
		1.06E-001	0.14	1.2D+0.5	2.3027E+000	-3.1662E+000
37	1	1.56E-001	0.20	1.2D+0.5	3.4858E-001	-4.6043E-001
		1.09E-001	0.14	1.2D+0.5	2.3241E+000	-3.0686E+000
38	1	1.56E-001	0.20	1.2D+0.5	3.4879E-001	-4.6019E-001
		1.09E-001	0.14	1.2D+0.5	2.3239E+000	-3.0689E+000
39	1	1.56E-001	0.20	1.2D+0.5	3.4879E-001	-4.6019E-001
		1.09E-001	0.14	1.2D+0.5	2.3239E+000	-3.0689E+000
40	1	1.56E-001	0.20	1.2D+0.5	3.4858E-001	-4.6043E-001
		1.09E-001	0.14	1.2D+0.5	2.3241E+000	-3.0686E+000
41	1	1.56E-001	0.20	1.2D+0.5	3.4377E-001	-4.4627E-001
		1.09E-001	0.14	1.2D+0.5	2.2930E+000	-2.9706E+000
42	1	1.56E-001	0.20	1.2D+0.5	3.4474E-001	-4.4510E-001
		1.09E-001	0.14	1.2D+0.5	2.2923E+000	-2.9719E+000
43	1	1.56E-001	0.20	1.2D+0.5	3.4474E-001	-4.4510E-001
		1.09E-001	0.14	1.2D+0.5	2.2923E+000	-2.9719E+000
44	1	1.56E-001	0.20	1.2D+0.5	3.4377E-001	-4.4627E-001
		1.09E-001	0.14	1.2D+0.5	2.2930E+000	-2.9706E+000
45	1	1.56E-001	0.20	1.2D+0.5	3.3120E-001	-4.3393E-001
		1.06E-001	0.14	1.2D+0.5	2.2126E+000	-2.8705E+000
46	1	1.56E-001	0.20	1.2D+0.5	3.3527E-001	-4.2819E-001
		1.06E-001	0.14	1.2D+0.5	2.2099E+000	-2.8770E+000
47	1	1.56E-001	0.20	1.2D+0.5	3.3527E-001	-4.2819E-001
		1.06E-001	0.14	1.2D+0.5	2.2099E+000	-2.8770E+000
48	1	1.56E-001	0.20	1.2D+0.5	3.3120E-001	-4.3393E-001
		1.06E-001	0.14	1.2D+0.5	2.2126E+000	-2.8705E+000
49	1	1.56E-001	0.20	1.2D+0.5	3.0950E-001	-4.3046E-001
		9.96E-002	0.13	1.2D+0.5	2.0888E+000	-2.7600E+000
50	1	1.56E-001	0.20	1.2D+0.5	3.2761E-001	-4.0226E-001
		9.66E-002	0.12	1.2D+0.5	2.0799E+000	-2.7914E+000
51	1	1.56E-001	0.20	1.2D+0.5	3.2761E-001	-4.0226E-001
		9.66E-002	0.12	1.2D+0.5	2.0799E+000	-2.7914E+000
52	1	1.56E-001	0.20	1.2D+0.5	3.0950E-001	-4.3046E-001
		9.96E-002	0.13	1.2D+0.5	2.0888E+000	-2.7600E+000
53	1	1.56E-001	0.20	1.2D+0.5	2.7780E-001	-4.6454E-001
		9.36E-002	0.12	1.2D+0.5	1.9375E+000	-2.5937E+000
54	1	1.56E-001	0.20	1.2D+0.5	3.4205E-001	-3.3528E-001
		9.36E-002	0.12	1.2D+0.5	1.9101E+000	-2.7377E+000
55	1	1.56E-001	0.20	1.2D+0.5	3.4205E-001	-3.3528E-001
		9.36E-002	0.12	1.2D+0.5	1.9101E+000	-2.7377E+000
56	1	1.56E-001	0.20	1.2D+0.5	2.7780E-001	-4.6454E-001
		9.36E-002	0.12	1.2D+0.5	1.9375E+000	-2.5937E+000
57	1	1.56E-001	0.20	1.2D+0.5	1.7154E-001	-5.7207E-001
		9.36E-002	0.12	1.2D+0.5	1.7073E+000	-2.1323E+000
58	1	1.56E-001	0.20	1.2D+0.5	4.3134E-001	-1.3180E-001
		9.36E-002	0.12	1.2D+0.5	1.7447E+000	-2.5799E+000
59	1	1.56E-001	0.20	1.2D+0.5	4.3134E-001	-1.3180E-001
		9.36E-002	0.12	1.2D+0.5	1.7447E+000	-2.5799E+000
60	1	1.56E-001	0.20	1.2D+0.5	1.7154E-001	-5.7207E-001
		9.36E-002	0.12	1.2D+0.5	1.7073E+000	-2.1323E+000
61	1	1.56E-001	0.20	1.2D+0.5	1.4143E-001	-3.8960E-001
		9.36E-002	0.12	1.2D+0.5	1.1397E+000	-1.3696E+000
62	1	1.56E-001	0.20	1.2D+0.5	4.5120E-001	1.4712E-001
		9.36E-002	0.12	1.2D+0.5	1.8536E+000	-2.2114E+000
63	1	1.56E-001	0.20	1.2D+0.5	4.5120E-001	1.4712E-001

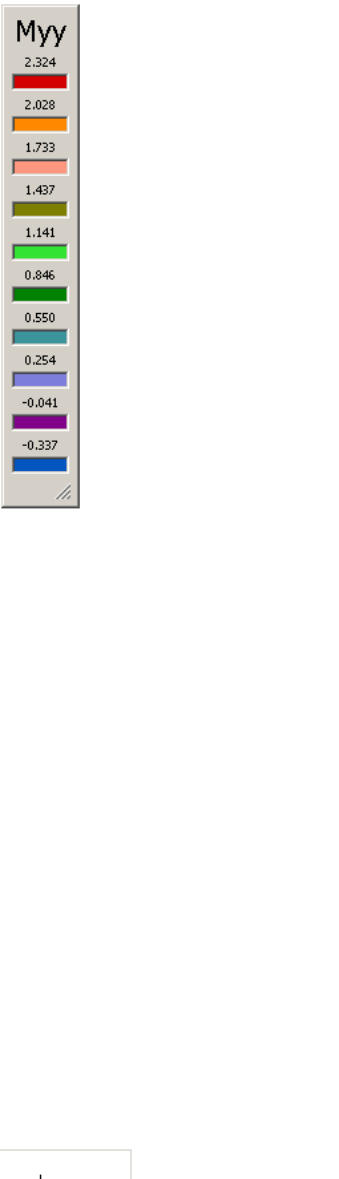
		9.36E-002	0.12	1.2D+0.5	1.8536E+000	-2.2114E+000
64	1	1.56E-001	0.20	1.2D+0.5	1.4143E-001	-3.8960E-001
		9.36E-002	0.12	1.2D+0.5	1.1397E+000	-1.3696E+000
65	1	1.56E-001	0.20	1.2D+0.5	2.3788E-001	6.2877E-002
		9.36E-002	0.12	1.2D+0.5	4.3271E-001	-8.4771E-001
66	1	1.56E-001	0.20	1.2D+0.5	-1.2165E-001	1.2810E+000
		9.36E-002	0.12	1.2D+0.5	-4.3805E-001	2.1326E+000
67	1	1.56E-001	0.20	1.2D+0.5	-1.2165E-001	1.2810E+000
		9.36E-002	0.12	1.2D+0.5	-4.3805E-001	2.1326E+000
68	1	1.56E-001	0.20	1.2D+0.5	2.3788E-001	6.2877E-002
		9.36E-002	0.12	1.2D+0.5	4.3271E-001	-8.4771E-001
69	1	1.56E-001	0.20	1.2D+0.5	1.7476E-001	6.3051E-001
		9.36E-002	0.12	1.2D+0.5	4.1500E-002	9.6757E-002
70	1	1.56E-001	0.20	1.2D+0.5	-1.9014E-001	-1.4840E-002
		9.36E-002	0.12	1.2D+0.5	-1.6043E-003	4.2184E-001
71	1	1.56E-001	0.20	1.2D+0.5	-1.9014E-001	-1.4840E-002
		9.36E-002	0.12	1.2D+0.5	-1.6043E-003	4.2184E-001
72	1	1.56E-001	0.20	1.2D+0.5	1.7476E-001	6.3051E-001
		9.36E-002	0.12	1.2D+0.5	4.1500E-002	9.6757E-002

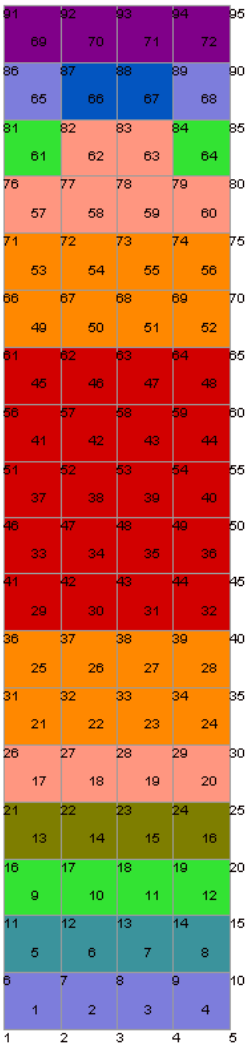
Slender Wall - Ultimate Load Level - Second Order Analysis

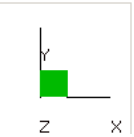


Nyy [klf]; LC: 1.2D+0.5L+1.6W; Nyy,max = 0.799 klf; Nyy,min = -3.946 klf

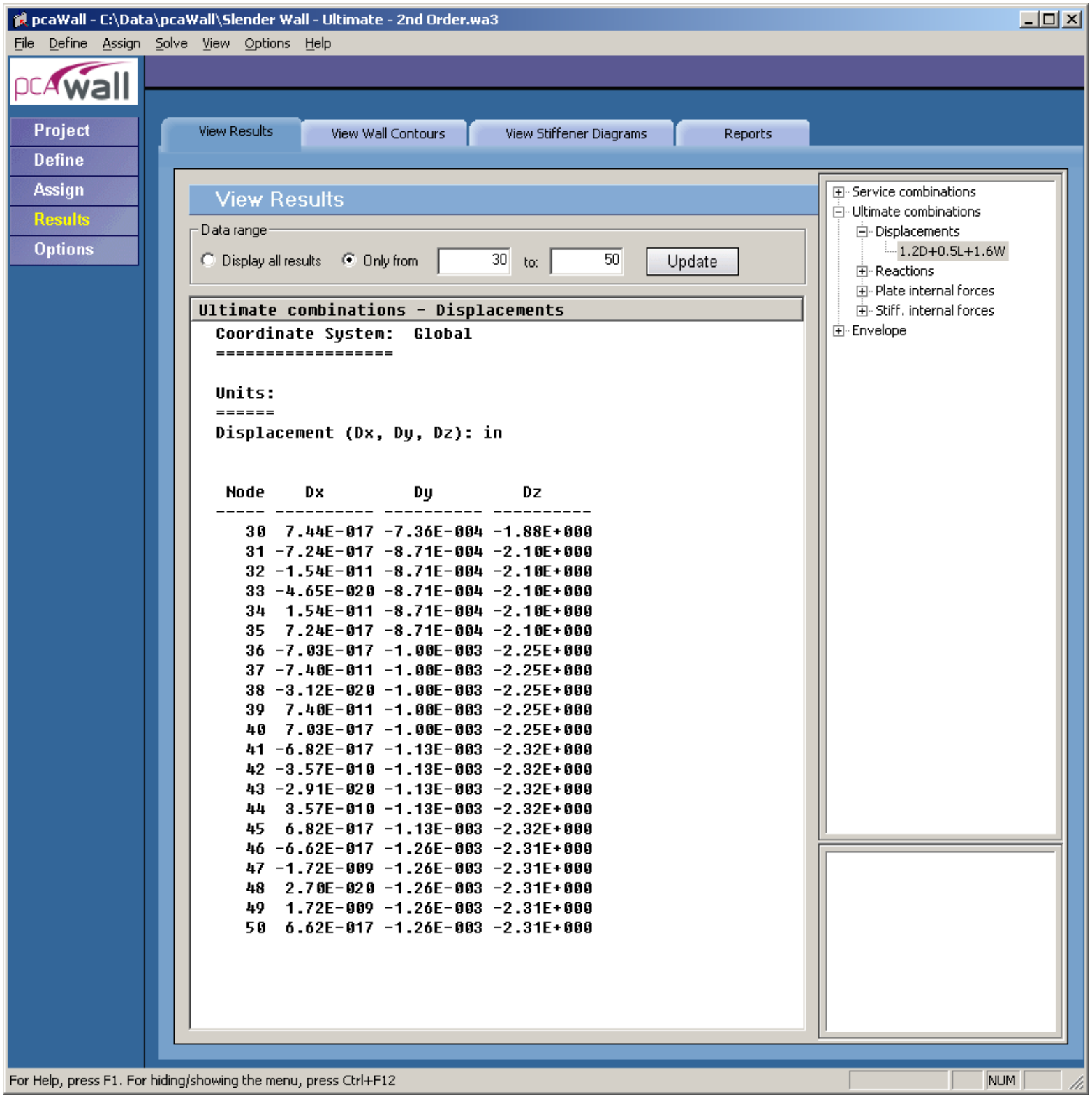
Slender Wall - Ultimate Load Level - Second Order Analysis



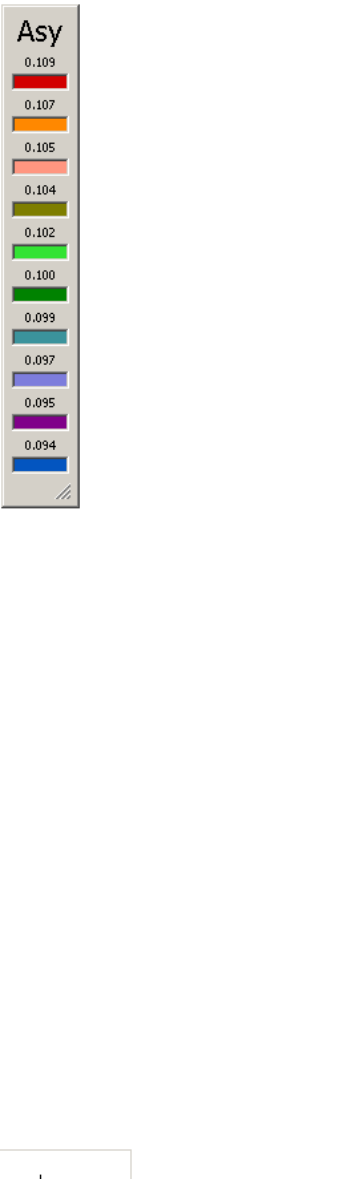


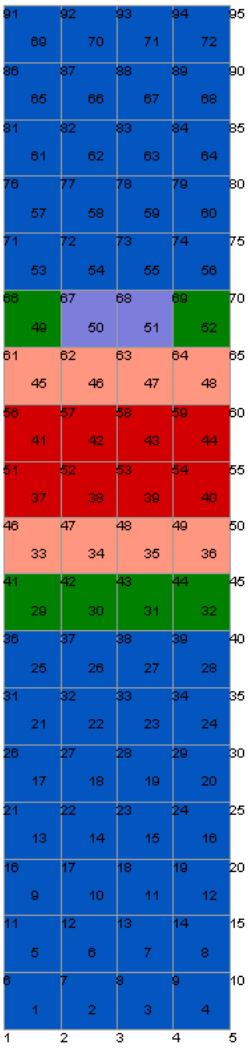


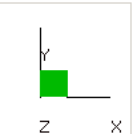
Myy [k-ft/ft]; LC: 1.2D+0.5L+1.6W; Myy,max = 2.324 k-ft/ft; Myy,min = -0.337 k-ft/ft


pcaWall - C:\Data\pcaWall\Slender Wall - Ultimate - 2nd Order.wa3
File Define Assign Solve View Options Help
pcaWall
Project
Define
Assign
Results
Options
View Results
View Wall Contours
View Stiffener Diagrams
Reports
View Results
Data range
Display all results
Only from
30
to:
50
Update
Ultimate combinations - Displacements
Coordinate System: Global
Units:
Displacement (Dx, Dy, Dz): in
Node Dx Dy Dz
30 7.44E-017 -7.36E-004 -1.88E+000
31 -7.24E-017 -8.71E-004 -2.10E+000
32 -1.54E-011 -8.71E-004 -2.10E+000
33 -4.65E-020 -8.71E-004 -2.10E+000
34 1.54E-011 -8.71E-004 -2.10E+000
35 7.24E-017 -8.71E-004 -2.10E+000
36 -7.03E-017 -1.00E-003 -2.25E+000
37 -7.40E-011 -1.00E-003 -2.25E+000
38 -3.12E-020 -1.00E-003 -2.25E+000
39 7.40E-011 -1.00E-003 -2.25E+000
40 7.03E-017 -1.00E-003 -2.25E+000
41 -6.82E-017 -1.13E-003 -2.32E+000
42 -3.57E-010 -1.13E-003 -2.32E+000
43 -2.91E-020 -1.13E-003 -2.32E+000
44 3.57E-010 -1.13E-003 -2.32E+000
45 6.82E-017 -1.13E-003 -2.32E+000
46 -6.62E-017 -1.26E-003 -2.31E+000
47 -1.72E-009 -1.26E-003 -2.31E+000
48 2.70E-020 -1.26E-003 -2.31E+000
49 1.72E-009 -1.26E-003 -2.31E+000
50 6.62E-017 -1.26E-003 -2.31E+000
Service combinations
Ultimate combinations
Displacements
1.2D+0.5L+1.6W
Reactions
Plate internal forces
Stiff. internal forces
Envelope
For Help, press F1. For hiding/showing the menu, press Ctrl+F12
NUM

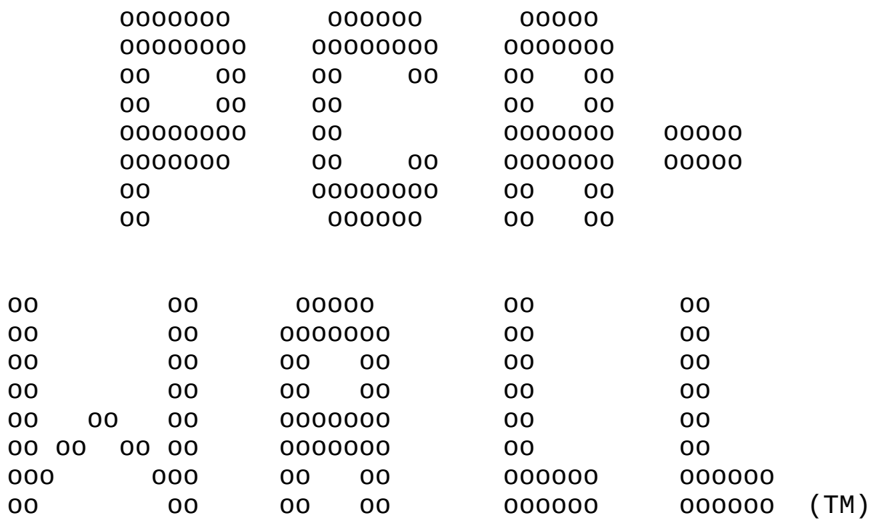
Slender Wall - Ultimate Load Level - Second Order Analysis







Asy [in^2/ft]; LC: Envelope; Asy,max = 0.109 in^2/ft; Asy,min = 0.094 in^2/ft



pcaWall (tm) - A Computer Program for:
Analysis and design of reinforced concrete, precast, and tilt-up walls

GENERAL INFORMATION:
==========
Project : Slender Wall - Service Load Level - Second Order Analysis
File : C:\Data\pcaWall\Slender Wall - Service - 2nd Order.wa3
Units : English Date : 12/2/2003
Code : ACI 318-05 Time : 4:52:36 PM

THICKNESS DEFINITIONS:
==========
thick: (in)

Label	thick
thick	6.50

PLATE CRACKING COEFFICIENTS:
==========
Label	In-plane	Out-plane
cracking	1.000	1.000

PLATE DESIGN CRITERIA:
==========
Location measured from left face: (in)

				Horizontal		Vertical	
Label	Curtains	X-Location	Y-Location	%ro_min	%ro_max	%ro_min	%ro_max
DC1	1	3.25	3.25	0.20	8.00	0.12	8.00

CONCRETE DEFINITIONS:
==========
f'c, Ec: (ksi)
Wc: (pcf)

Label	f'c	Wc	Ec	v
conc	4	150	3834.3	0.150

REINFORCING STEEL DEFINITIONS:
==========
Fy, Es: (ksi)

Label	Fy	Es
steel	60	29000

RIGID SUPPORT DEFINITIONS:
==========

Label	dx	dy	dz	rx	ry	rz
Simple	Fixed	Fixed	Fixed	Free	Fixed	Fixed
Symmetry	Fixed	Free	Free	Free	Fixed	Fixed
Roller	Fixed	Free	Fixed	Free	Fixed	Fixed

POINT LOAD DEFINITIONS:
==========

Fx, Fy, Fz: (kips)
Mx, My, Mz: (k-ft)
Eccentricity: (in)

Label	Case	Fx	Fy	Fz	Mx	My	Mz	E
Dead	A	0.000	-6.400	0.000	0.000	0.000	0.000	
Live	B	0.000	-2.560	0.000	0.000	0.000	0.000	

UNIFORM AREA LOAD DEFINITIONS:
==========

wx, wy, wz: (psf)

Label	Case	wx	wy	wz
Wind	C	0.000	0.000	-20.000

LOAD COMBINATIONS:
==========

Self weight is included under Case A.

Ld Combo	Case A	Case B	Case C	Case D	Case E	Case F	Type
S1	1.000	1.000	1.000	0.000	0.000	0.000	Ser.
1.2D+0.5	1.200	0.500	1.600	0.000	0.000	0.000	Ult.

X-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4		

Y-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4	6	5
7	6	8	7	9	8
10	9	11	10	12	11
13	12	14	13	15	14
16	15	17	16	18	17
19	18				

SERVICE COMBINATIONS: NODAL DISPLACEMENTS

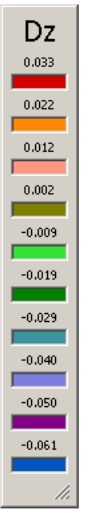
Displacement (Dx, Dy, Dz): in

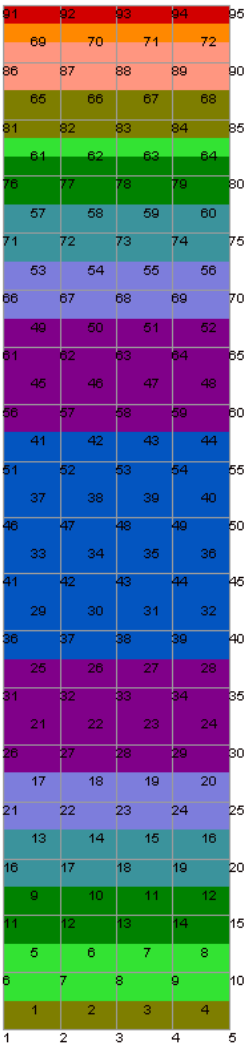
Service combination: S1

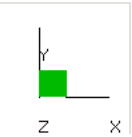
Node	Dx	Dy	Dz
1	-3.89E-017	-2.62E-016	-2.20E-017
2	-6.74E-027	-5.24E-016	-4.41E-017
3	-2.72E-033	-5.24E-016	-4.41E-017
4	6.74E-027	-5.24E-016	-4.41E-017
5	3.89E-017	-2.62E-016	-2.20E-017
6	-7.69E-017	-1.44E-004	-1.09E-002
7	-6.17E-015	-1.44E-004	-1.09E-002
8	-1.20E-020	-1.44E-004	-1.09E-002
9	6.17E-015	-1.44E-004	-1.09E-002
10	7.69E-017	-1.44E-004	-1.09E-002
11	-7.51E-017	-2.84E-004	-2.15E-002
12	-2.86E-014	-2.84E-004	-2.15E-002
13	-4.01E-020	-2.84E-004	-2.15E-002
14	2.86E-014	-2.84E-004	-2.15E-002
15	7.51E-017	-2.84E-004	-2.15E-002
16	-7.34E-017	-4.21E-004	-3.13E-002
17	-1.37E-013	-4.21E-004	-3.13E-002
18	-3.23E-020	-4.21E-004	-3.13E-002
19	1.37E-013	-4.21E-004	-3.13E-002
20	7.34E-017	-4.21E-004	-3.13E-002
21	-7.17E-017	-5.55E-004	-4.01E-002
22	-6.60E-013	-5.55E-004	-4.01E-002
23	1.02E-020	-5.55E-004	-4.01E-002
24	6.60E-013	-5.55E-004	-4.01E-002
25	7.17E-017	-5.55E-004	-4.01E-002
26	-7.00E-017	-6.86E-004	-4.76E-002
27	-3.18E-012	-6.86E-004	-4.76E-002
28	1.39E-021	-6.86E-004	-4.76E-002
29	3.18E-012	-6.86E-004	-4.76E-002
30	7.00E-017	-6.86E-004	-4.76E-002
31	-6.82E-017	-8.14E-004	-5.37E-002
32	-1.54E-011	-8.14E-004	-5.37E-002
33	-3.39E-020	-8.14E-004	-5.37E-002
34	1.54E-011	-8.14E-004	-5.37E-002
35	6.82E-017	-8.14E-004	-5.37E-002
36	-6.65E-017	-9.38E-004	-5.79E-002
37	-7.40E-011	-9.38E-004	-5.79E-002
38	-4.65E-020	-9.38E-004	-5.79E-002
39	7.40E-011	-9.38E-004	-5.79E-002
40	6.65E-017	-9.38E-004	-5.79E-002
41	-6.48E-017	-1.06E-003	-6.03E-002
42	-3.57E-010	-1.06E-003	-6.03E-002
43	-5.90E-020	-1.06E-003	-6.03E-002
44	3.57E-010	-1.06E-003	-6.03E-002
45	6.48E-017	-1.06E-003	-6.03E-002
46	-6.31E-017	-1.18E-003	-6.06E-002
47	-1.72E-009	-1.18E-003	-6.06E-002
48	-6.12E-020	-1.18E-003	-6.06E-002
49	1.72E-009	-1.18E-003	-6.06E-002
50	6.31E-017	-1.18E-003	-6.06E-002
51	-6.14E-017	-1.29E-003	-5.87E-002
52	-8.29E-009	-1.29E-003	-5.87E-002
53	1.59E-020	-1.29E-003	-5.87E-002
54	8.29E-009	-1.29E-003	-5.87E-002
55	6.14E-017	-1.29E-003	-5.87E-002
56	-6.00E-017	-1.40E-003	-5.46E-002
57	-4.02E-008	-1.40E-003	-5.46E-002
58	8.26E-021	-1.40E-003	-5.46E-002

59	4.02E-008	-1.40E-003	-5.46E-002
60	6.00E-017	-1.40E-003	-5.46E-002
61	-5.96E-017	-1.51E-003	-4.82E-002
62	-1.98E-007	-1.51E-003	-4.82E-002
63	-1.49E-021	-1.51E-003	-4.82E-002
64	1.98E-007	-1.51E-003	-4.82E-002
65	5.96E-017	-1.51E-003	-4.82E-002
66	-6.41E-017	-1.62E-003	-3.95E-002
67	-9.82E-007	-1.62E-003	-3.95E-002
68	9.05E-020	-1.62E-003	-3.95E-002
69	9.82E-007	-1.62E-003	-3.95E-002
70	6.41E-017	-1.62E-003	-3.95E-002
71	-8.59E-017	-1.71E-003	-2.85E-002
72	-4.64E-006	-1.72E-003	-2.85E-002
73	2.78E-020	-1.73E-003	-2.86E-002
74	4.64E-006	-1.72E-003	-2.85E-002
75	8.59E-017	-1.71E-003	-2.85E-002
76	-7.82E-017	-1.79E-003	-1.52E-002
77	-1.67E-005	-1.82E-003	-1.53E-002
78	8.09E-020	-1.86E-003	-1.55E-002
79	1.67E-005	-1.82E-003	-1.53E-002
80	7.82E-017	-1.79E-003	-1.52E-002
81	-3.04E-017	-1.85E-003	-1.26E-017
82	-5.82E-018	-1.87E-003	-1.54E-017
83	-5.51E-031	-2.08E-003	-4.25E-018
84	5.82E-018	-1.87E-003	-1.54E-017
85	3.04E-017	-1.85E-003	-1.26E-017
86	2.79E-017	-1.88E-003	1.62E-002
87	1.46E-005	-1.92E-003	1.64E-002
88	5.43E-021	-1.96E-003	1.65E-002
89	-1.46E-005	-1.92E-003	1.64E-002
90	-2.79E-017	-1.88E-003	1.62E-002
91	4.31E-017	-1.90E-003	3.26E-002
92	1.88E-005	-1.92E-003	3.27E-002
93	-1.16E-020	-1.94E-003	3.28E-002
94	-1.88E-005	-1.92E-003	3.27E-002
95	-4.31E-017	-1.90E-003	3.26E-002

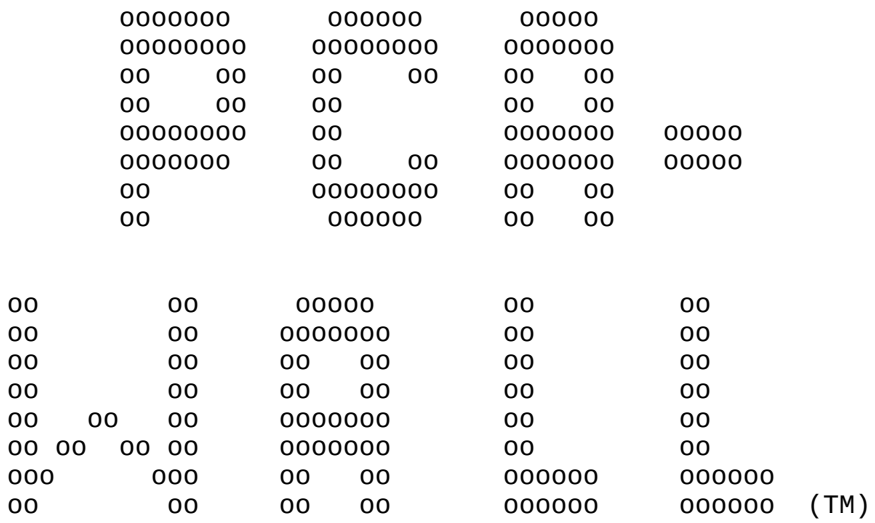
Slender Wall - Service Load Level - Second Order Analysis







Dz [in]; LC: S1; Dz,max = 0.033 in; Dz,min = -0.061 in



pcaWall (tm) - A Computer Program for:
Analysis and design of reinforced concrete, precast, and tilt-up walls

GENERAL INFORMATION:
==========
Project : Slender Wall - Ultimate Load Level - First Order Analysis
File : C:\Data\pcaWall\Slender Wall - Ultimate - 1st Order.wa3
Units : English Date : 12/2/2003
Code : ACI 318-05 Time : 4:52:36 PM

THICKNESS DEFINITIONS:
==========
thick: (in)

Label	thick
thick	6.50

PLATE CRACKING COEFFICIENTS:
==========
Label	In-plane	Out-plane
cracking	1.000	0.044

PLATE DESIGN CRITERIA:
==========
Location measured from left face: (in)

				Horizontal		Vertical	
Label	Curtains	X-Location	Y-Location	%ro_min	%ro_max	%ro_min	%ro_max
DC1	1	3.25	3.25	0.20	8.00	0.12	8.00

CONCRETE DEFINITIONS:
==========
f'c, Ec: (ksi)
Wc: (pcf)

Label	f'c	Wc	Ec	v
conc	4	150	3834.3	0.150

REINFORCING STEEL DEFINITIONS:
==========
Fy, Es: (ksi)

Label	Fy	Es
steel	60	29000

RIGID SUPPORT DEFINITIONS:
==========

Label	dx	dy	dz	rx	ry	rz
Simple	Fixed	Fixed	Fixed	Free	Fixed	Fixed
Symmetry	Fixed	Free	Free	Free	Fixed	Fixed
Roller	Fixed	Free	Fixed	Free	Fixed	Fixed

POINT LOAD DEFINITIONS:
==========
Fx, Fy, Fz: (kips)
Mx, My, Mz: (k-ft)
Eccentricity: (in)

Label	Case	Fx	Fy	Fz	Mx	My	Mz	E
Dead	A	0.000	-6.400	0.000	0.000	0.000	0.000	
Live	B	0.000	-2.560	0.000	0.000	0.000	0.000	

UNIFORM AREA LOAD DEFINITIONS:
==========
wx, wy, wz: (psf)

Label	Case	wx	wy	wz
Wind	C	0.000	0.000	-20.000

LOAD COMBINATIONS:
==========
Self weight is included under Case A.

Ld Combo	Case A	Case B	Case C	Case D	Case E	Case F	Type
S1	1.000	1.000	1.000	0.000	0.000	0.000	Ser.
1.2D+0.5	1.200	0.500	1.600	0.000	0.000	0.000	Ult.

X-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4		

Y-GRID LINE DEFINITIONS:

No.	Coord. (ft)	No.	Coord. (ft)	No.	Coord. (ft)
1	0	2	1	3	2
4	3	5	4	6	5
7	6	8	7	9	8
10	9	11	10	12	11
13	12	14	13	15	14
16	15	17	16	18	17
19	18				

ULTIMATE COMBINATIONS: PLATE INTERNAL FORCES
==========

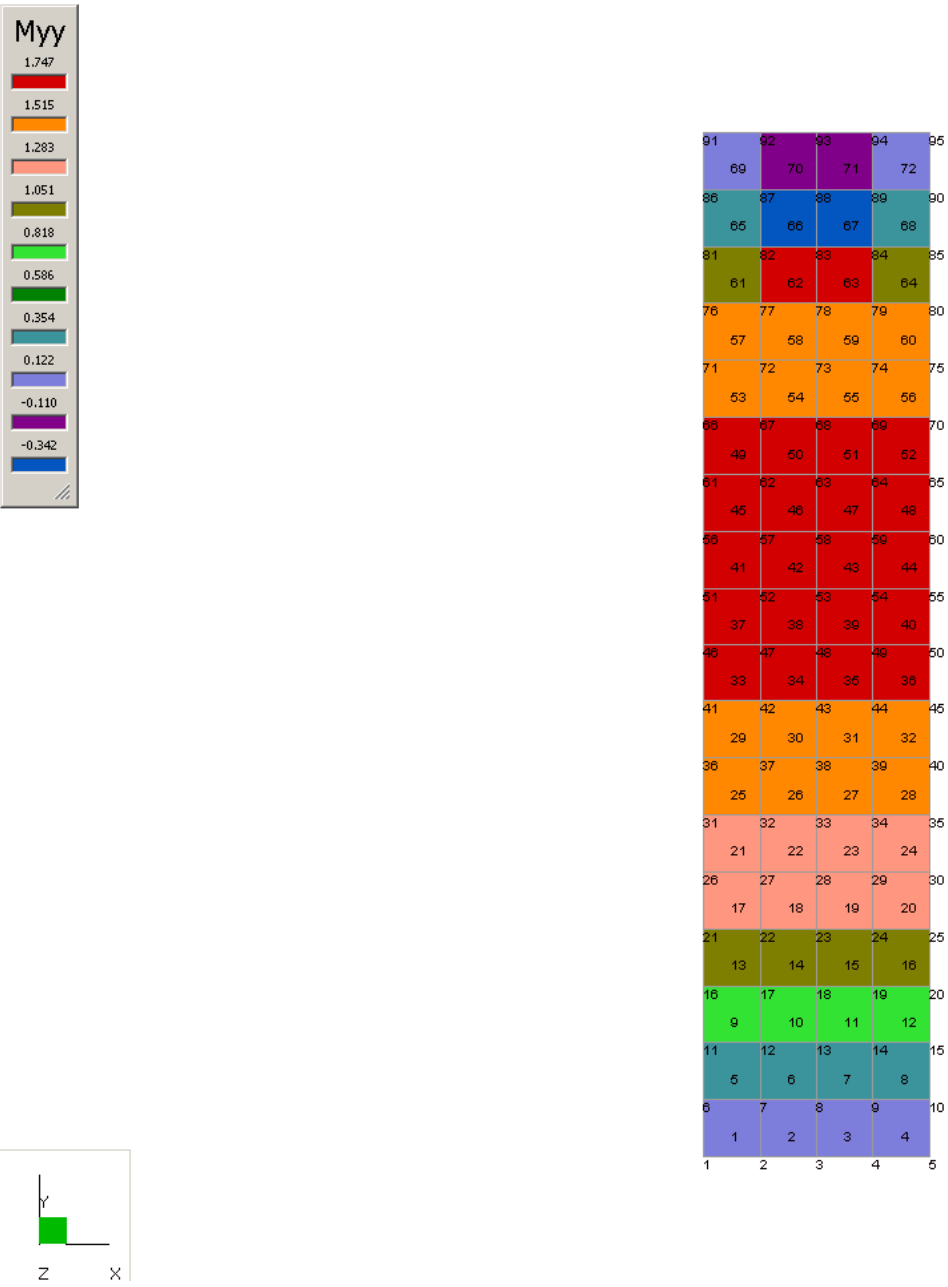
Axial force (Nxx, Nyy, Nxy): klf, bending moment (Mxx, Myy, Mxy): k-ft/ft

Ultimate combination: 1.2D+0.5L+1.6W

Elem	Nxx	Nyy	Nxy	Mxx	Myy	Mxy
1	-5.9194E-001	-3.9463E+000	8.2915E-011	2.3906E-002	1.5938E-001	-9.9633E-01
2	-5.9194E-001	-3.9463E+000	8.3000E-011	2.3906E-002	1.5938E-001	-9.9981E-01
3	-5.9194E-001	-3.9463E+000	-8.3000E-011	2.3906E-002	1.5938E-001	9.9955E-01
4	-5.9194E-001	-3.9463E+000	-8.2914E-011	2.3906E-002	1.5938E-001	9.9620E-01
5	-5.7731E-001	-3.8488E+000	4.2925E-010	6.9319E-002	4.6213E-001	-4.0394E-01
6	-5.7731E-001	-3.8488E+000	4.3114E-010	6.9319E-002	4.6213E-001	-4.0426E-01
7	-5.7731E-001	-3.8488E+000	-4.3114E-010	6.9319E-002	4.6213E-001	4.0424E-01
8	-5.7731E-001	-3.8488E+000	-4.2924E-010	6.9319E-002	4.6213E-001	4.0393E-01
9	-5.6269E-001	-3.7513E+000	2.1083E-009	1.0993E-001	7.3288E-001	-1.9253E-00
10	-5.6269E-001	-3.7513E+000	2.1083E-009	1.0993E-001	7.3288E-001	-1.9256E-00
11	-5.6269E-001	-3.7513E+000	-2.1083E-009	1.0993E-001	7.3288E-001	1.9256E-00
12	-5.6269E-001	-3.7513E+000	-2.1083E-009	1.0993E-001	7.3288E-001	1.9253E-00
13	-5.4806E-001	-3.6538E+000	1.0177E-008	1.4574E-001	9.7163E-001	-9.2593E-00
14	-5.4806E-001	-3.6538E+000	1.0177E-008	1.4574E-001	9.7163E-001	-9.2596E-00
15	-5.4806E-001	-3.6538E+000	-1.0177E-008	1.4574E-001	9.7163E-001	9.2596E-00
16	-5.4806E-001	-3.6538E+000	-1.0177E-008	1.4574E-001	9.7163E-001	9.2593E-00
17	-5.3344E-001	-3.5563E+000	4.9075E-008	1.7676E-001	1.1784E+000	-4.4089E-00
18	-5.3344E-001	-3.5563E+000	4.9075E-008	1.7676E-001	1.1784E+000	-4.4089E-00
19	-5.3344E-001	-3.5563E+000	-4.9075E-008	1.7676E-001	1.1784E+000	4.4089E-00
20	-5.3344E-001	-3.5563E+000	-4.9075E-008	1.7676E-001	1.1784E+000	4.4089E-00
21	-5.1881E-001	-3.4588E+000	2.3664E-007	2.0297E-001	1.3531E+000	-2.1040E-00
22	-5.1881E-001	-3.4588E+000	2.3664E-007	2.0297E-001	1.3531E+000	-2.1040E-00
23	-5.1881E-001	-3.4588E+000	-2.3664E-007	2.0297E-001	1.3531E+000	2.1040E-00
24	-5.1881E-001	-3.4588E+000	-2.3664E-007	2.0297E-001	1.3531E+000	2.1040E-00
25	-5.0419E-001	-3.3612E+000	1.1410E-006	2.2438E-001	1.4959E+000	-9.8733E-00
26	-5.0419E-001	-3.3613E+000	1.1410E-006	2.2438E-001	1.4959E+000	-9.8733E-00
27	-5.0419E-001	-3.3613E+000	-1.1410E-006	2.2438E-001	1.4959E+000	9.8733E-00
28	-5.0419E-001	-3.3612E+000	-1.1410E-006	2.2438E-001	1.4959E+000	9.8733E-00
29	-4.8957E-001	-3.2637E+000	5.5002E-006	2.4099E-001	1.6066E+000	-4.6461E-00
30	-4.8956E-001	-3.2638E+000	5.5002E-006	2.4100E-001	1.6066E+000	-4.6461E-00
31	-4.8956E-001	-3.2638E+000	-5.5002E-006	2.4100E-001	1.6066E+000	4.6461E-00
32	-4.8957E-001	-3.2637E+000	-5.5002E-006	2.4099E-001	1.6066E+000	4.6461E-00
33	-4.7496E-001	-3.1662E+000	2.6507E-005	2.5278E-001	1.6854E+000	-2.1236E-00
34	-4.7491E-001	-3.1663E+000	2.6507E-005	2.5283E-001	1.6854E+000	-2.1237E-00
35	-4.7491E-001	-3.1663E+000	-2.6507E-005	2.5283E-001	1.6854E+000	2.1237E-00
36	-4.7496E-001	-3.1662E+000	-2.6507E-005	2.5278E-001	1.6854E+000	2.1236E-00
37	-4.6043E-001	-3.0686E+000	1.2779E-004	2.5972E-001	1.7322E+000	-9.7311E-00
38	-4.6019E-001	-3.0689E+000	1.2779E-004	2.5992E-001	1.7320E+000	-9.7314E-00
39	-4.6019E-001	-3.0689E+000	-1.2779E-004	2.5992E-001	1.7320E+000	9.7314E-00
40	-4.6043E-001	-3.0686E+000	-1.2779E-004	2.5972E-001	1.7322E+000	9.7311E-00
41	-4.4627E-001	-2.9706E+000	6.1797E-004	2.6155E-001	1.7472E+000	-4.2202E-00
42	-4.4510E-001	-2.9719E+000	6.1799E-004	2.6251E-001	1.7466E+000	-4.2208E-00
43	-4.4510E-001	-2.9719E+000	-6.1799E-004	2.6251E-001	1.7466E+000	4.2208E-00
44	-4.4627E-001	-2.9706E+000	-6.1797E-004	2.6155E-001	1.7472E+000	4.2202E-00
45	-4.3394E-001	-2.8705E+000	3.0127E-003	2.5742E-001	1.7310E+000	-1.8243E-00
46	-4.2819E-001	-2.8770E+000	3.0133E-003	2.6146E-001	1.7283E+000	-1.8256E-00
47	-4.2819E-001	-2.8770E+000	-3.0133E-003	2.6146E-001	1.7283E+000	1.8256E-00
48	-4.3394E-001	-2.8705E+000	-3.0127E-003	2.5742E-001	1.7310E+000	1.8243E-00
49	-4.3054E-001	-2.7605E+000	1.4804E-002	2.4305E-001	1.6848E+000	-6.9354E-00
50	-4.0234E-001	-2.7920E+000	1.4828E-002	2.6106E-001	1.6759E+000	-6.9663E-00
51	-4.0234E-001	-2.7920E+000	-1.4828E-002	2.6106E-001	1.6759E+000	6.9663E-00
52	-4.3054E-001	-2.7605E+000	-1.4804E-002	2.4305E-001	1.6848E+000	6.9354E-00
53	-4.6648E-001	-2.6045E+000	7.0944E-002	2.0812E-001	1.6132E+000	-2.4800E-00
54	-3.3715E-001	-2.7530E+000	7.1785E-002	2.7162E-001	1.5851E+000	-2.5500E-00
55	-3.3715E-001	-2.7530E+000	-7.1785E-002	2.7162E-001	1.5851E+000	2.5500E-00
56	-4.6648E-001	-2.6045E+000	-7.0944E-002	2.0812E-001	1.6132E+000	2.4800E-00
57	-6.0809E-001	-2.2666E+000	2.8574E-001	1.0023E-001	1.4741E+000	-4.2659E-00
58	-1.6628E-001	-2.8959E+000	3.1601E-001	3.4554E-001	1.4977E+000	-5.7563E-00

59	-1.6628E-001	-2.8959E+000	-3.1601E-001	3.4554E-001	1.4977E+000	5.7563E-00
60	-6.0809E-001	-2.2666E+000	-2.8574E-001	1.0023E-001	1.4741E+000	4.2659E-00
61	-4.1713E-001	-1.4663E+000	2.0089E-001	5.3722E-002	9.9093E-001	7.6765E-00
62	-3.2800E-001	-3.5012E+000	1.2898E+000	3.4847E-001	1.6903E+000	9.2401E-00
63	-3.2800E-001	-3.5012E+000	-1.2898E+000	3.4847E-001	1.6903E+000	-9.2401E-00
64	-4.1713E-001	-1.4663E+000	-2.0089E-001	5.3722E-002	9.9093E-001	-7.6765E-00
65	8.2490E-003	-1.0919E+000	2.4423E-001	1.5297E-001	3.4238E-001	8.4267E-00
66	-5.2124E-002	7.9944E-001	1.3331E+000	-1.5297E-001	-3.4238E-001	9.9939E-00
67	-5.2124E-002	7.9944E-001	-1.3331E+000	-1.5297E-001	-3.4238E-001	-9.9939E-00
68	8.2490E-003	-1.0919E+000	-2.4423E-001	1.5297E-001	3.4238E-001	-8.4267E-00
69	3.3092E-001	-2.0284E-001	2.9959E-001	1.4834E-001	1.4300E-002	-2.6553E-00
70	-3.4555E-001	1.0534E-001	3.3071E-001	-1.4834E-001	-1.4300E-002	-4.0931E-00
71	-3.4555E-001	1.0534E-001	-3.3071E-001	-1.4834E-001	-1.4300E-002	4.0931E-00
72	3.3092E-001	-2.0284E-001	-2.9959E-001	1.4834E-001	1.4300E-002	2.6553E-00

Slender Wall - Ultimate Load Level - First Order Analysis



Myy [k-ft/ft]; LC: 1.2D+0.5L+1.6W; Myy,max = 1.747 k-ft/ft; Myy,min = -0.342 k-ft/ft

www.pcaStructurePoint.com
info@pcaStructurePoint.com
847.966.4357 (HELP) phone
847.581.0644 fax

Comparison of cracking coefficients

$b = 12\,in$ $P_u = 3.759\,kips$

$c = 0.309\,in$ $f_y = 60\,ksi$

$d = 3.25\,in$ $E_c = 3605\,ksi$

$I_g = 274.625\,in^4$ $A_s = 0.109\,\frac{in^2}{ft}$

$\beta_d = 0.872$ $n := \frac{E_s}{E_c}$

Based on cracked section with actual area of steel, A_s

$$I_{cr} := \frac{b\cdot(c)^3}{3} + n\cdot A_s\cdot b\cdot(d-c)^2 \qquad I_{cr} = 7.702\,in^4 \qquad \frac{I_{cr}}{I_g} = 0.028$$

Based on Eq. 14-7, ACI 318-05, cracked section with effective area of steel, A_{se}

$$A_{se} := A_s + \frac{P_u}{b\cdot f_y} \qquad A_{se} = 0.172\,\frac{in^2}{ft}$$

$$I_{cr} := \frac{b\cdot(c)^3}{3} + n\cdot A_{se}\cdot b\cdot(d-c)^2 \qquad I_{cr} = 12.061\,in^4 \qquad \frac{I_{cr}}{I_g} = 0.044$$

Based on PCA Notes approach for one-layer of reinforcement

$$I_{cr} := \frac{EI}{E_c} \qquad I_{cr} = 21.732\,in^4 \qquad \frac{I_{cr}}{I_g} = 0.079$$

Based on Eq. 10-11, ACI 318-05
Note: for one layer of reinforcement in the middle, i.e. d = h/2, steel contribution is zero

$$I_{cr} := \frac{0.2I_g + n\cdot A_s\cdot b\cdot\left(d-\frac{h}{2}\right)^2}{1+\beta_d} \qquad I_{cr} = 29.335\,in^4 \qquad \frac{I_{cr}}{I_g} = 0.107$$

Based on Eq. 10-12, ACI 318-05

$$I_{cr} := \frac{0.4I_g}{1+\beta_d} \qquad I_{cr} = 58.671\,in^4 \qquad \frac{I_{cr}}{I_g} = 0.214$$