

Structure Point

CONCRETE SOFTWARE SOLUTIONS

sp slab

sp column

sp mats

sp beam

sp frame

sp wall

Work quickly.
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StructurePoint's Productivity Suite of powerful software tools for reinforced concrete analysis & design

sp wall

Finite element analysis & design of reinforced, precast ICF & tilt-up concrete walls

sp column

Design & investigation of rectangular, round & irregularly shaped concrete column sections

sp mats

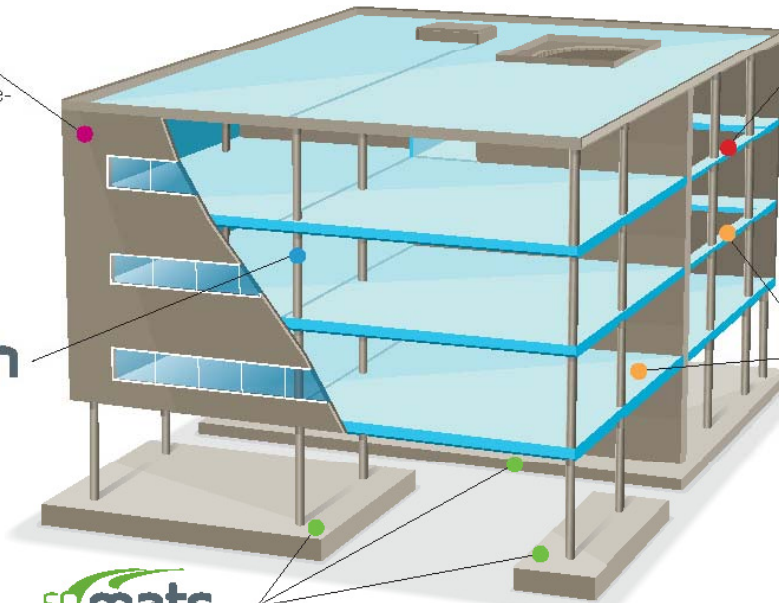
Finite element analysis & design of reinforced concrete foundations, combined footings or slabs on grade

sp beam

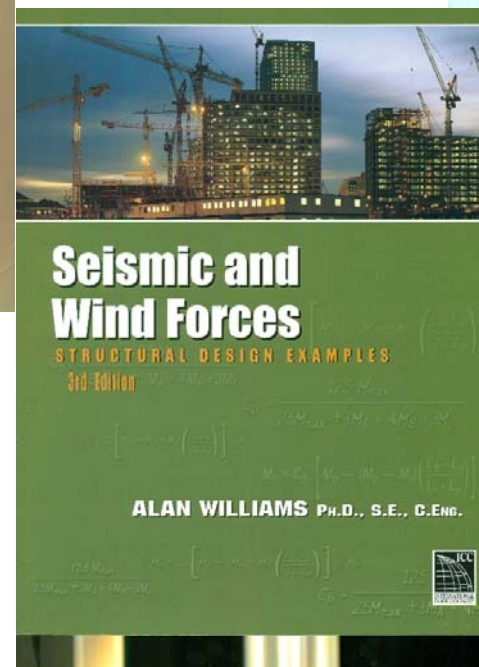
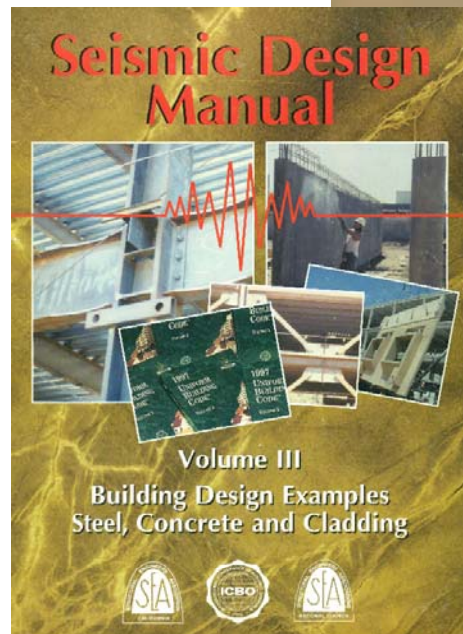
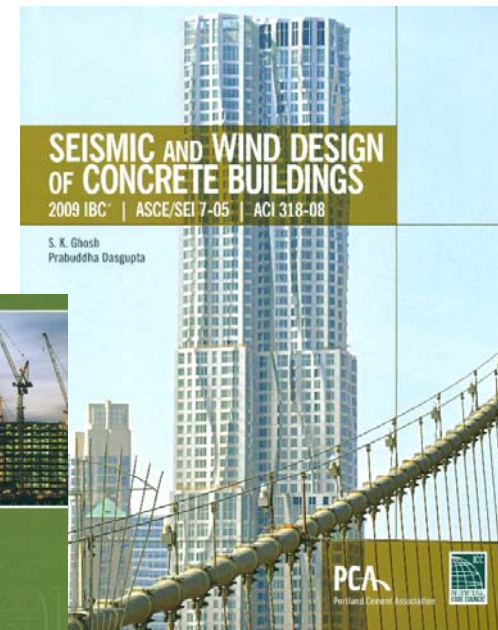
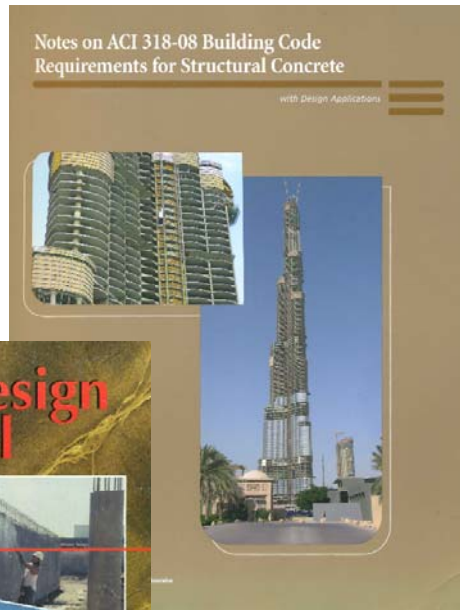
Analysis, design & investigation of reinforced concrete beams & one-way slab systems

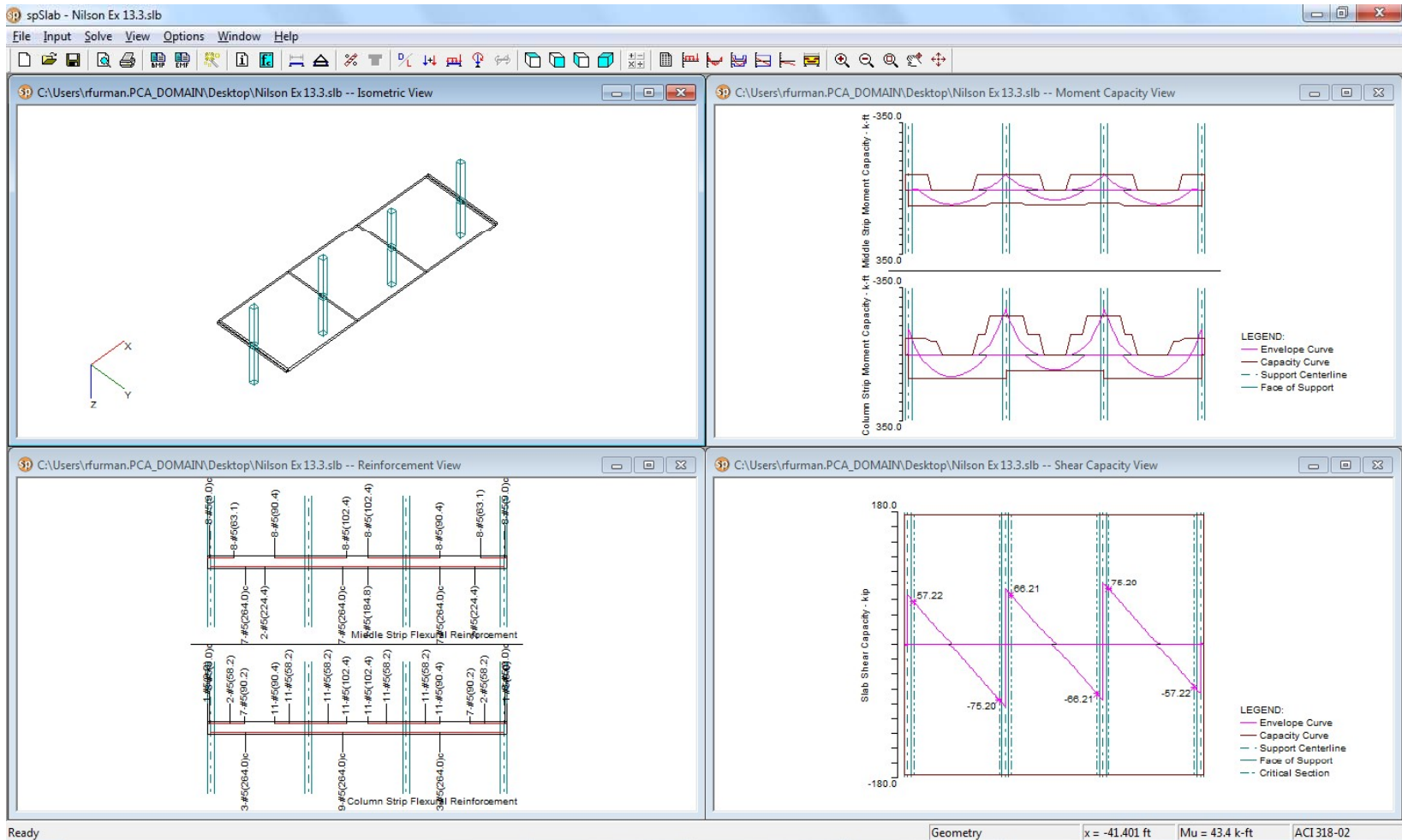
sp slab

Analysis, design & investigation of reinforced concrete beams & slab systems



The Industry Standard





Options



General Information

General Information | Span Control | Solve Options

Labels
Project:
Frame:
Engineer:

Options
Design code:
Reinforcement:

Run mode
 Design
 Investigation

Frame
No. of Supports:
 Left cantilever Right cantilever

Floor System
 Two-Way
 One-Way/Beam

Other
 Distance location as ratio of span

OK Cancel Help

Two-way systems

General Information

General Information | Span Control | Solve Options

Design Options
Live load pattern ratio: %

Compression Reinforcement
 Decremental Reinf. Design
 One-way Shear In Drop Panels
 Distribute Shear to Slab Strips

User Slab Strip Widths
 User Distribution Factors
 Beam T-Section Design
 Long. Bm. Supt. Design
 Trans. Bm. Supt. Design

Critical section for punching shear
Ignore side on a free edge if within times the slab thickness from the face of the support.

Deflection calculation options
Sections to use in deflection calculations are
 Gross (uncracked) Effective (cracked)

In negative moment regions, to calculate I_g and M_{cr} use
 Rectangular Section T-Section

Calculate long-term deflections
Duration of load months
Sustained part of live load %

OK Cancel Help

One-way systems

General Information

General Information | Span Control | Solve Options

Design Options
Live load pattern ratio: %

Compression Reinforcement
 Decremental Reinf. Design

Effective flange width
 Rigid beam-column joint
 Moment Redistribution

Torsion Analysis and Design
Torsion type
 Equilibrium No
 Compatibility Yes
Stirrups in flanges

Deflection calculation options
Sections to use in deflection calculations are
 Gross (uncracked) Effective (cracked)

In negative moment regions, to calculate I_g and M_{cr} use
 Rectangular Section T-Section

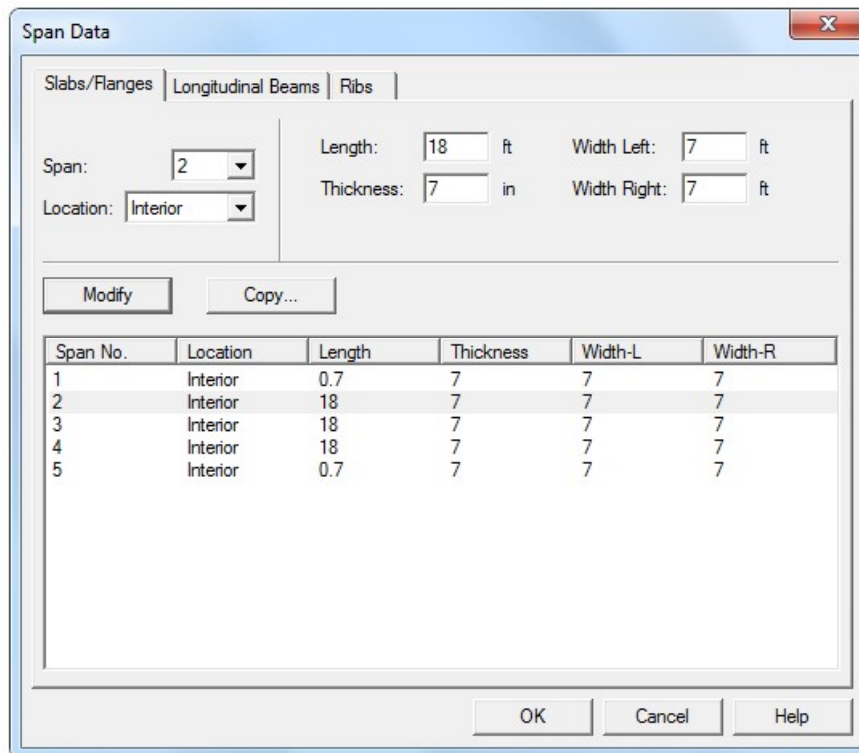
Calculate long-term deflections
Duration of load months
Sustained part of live load %

OK Cancel Help

Span Data



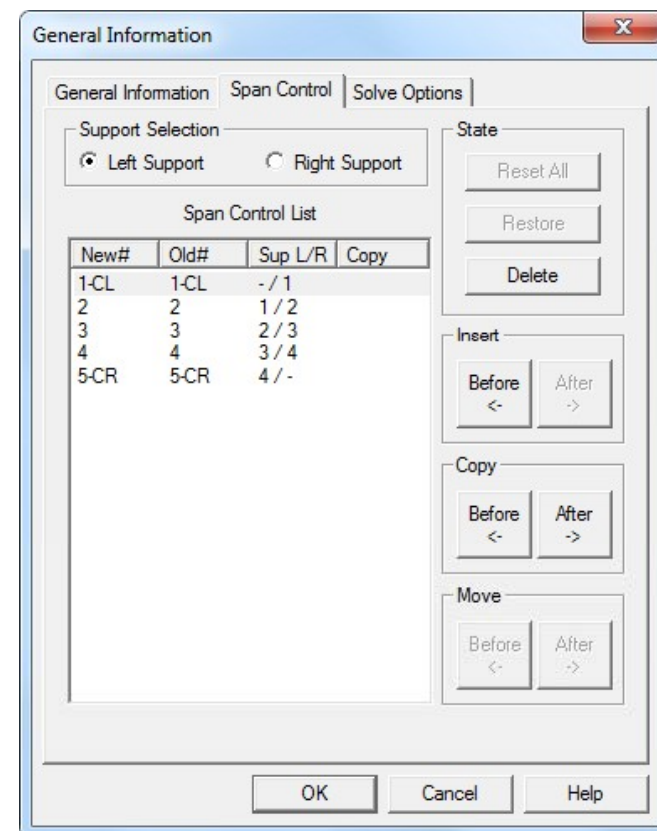
■ Defining Spans



Span Data dialog box showing configuration for Slabs/Flanges, Longitudinal Beams, and Ribs. The 'Slabs/Flanges' tab is active. Fields include Span (2), Location (Interior), Length (18 ft), Thickness (7 in), Width Left (7 ft), and Width Right (7 ft). A table lists 5 spans with their respective parameters.

Span No.	Location	Length	Thickness	Width-L	Width-R
1	Interior	0.7	7	7	7
2	Interior	18	7	7	7
3	Interior	18	7	7	7
4	Interior	18	7	7	7
5	Interior	0.7	7	7	7

■ Span Manipulation



General Information dialog box showing configuration for Span Control. The 'Span Control' tab is active. It includes a 'Support Selection' section with 'Left Support' selected, a 'Span Control List' table, and sections for 'State', 'Insert', 'Copy', and 'Move' operations.

New#	Old#	Sup L/R	Copy
1-CL	1-CL	- / 1	
2	2	1 / 2	
3	3	2 / 3	
4	4	3 / 4	
5-CR	5-CR	4 / -	

Support Data



■ Defining Supports

Support Data

Columns | Drop Panels | Column Capitals | Transverse Beams | Boundary Conditions

Support: 1

Stiffness share %: 100

Height (ft): Above: 9, Below: 9

c1 (in): 16

c2 (in): 16

Check punching shear around column Increase GammaF

Modify Copy...

Sup. No.	Stiff%	HtA	c1A	c2A	HtB	c1B	c2B	Shear	Gamma
1	100	9	16	16	9	16	16	Yes	No
2	100	9	16	16	9	16	16	Yes	No
3	100	9	16	16	9	16	16	Yes	No
4	100	9	16	16	9	16	16	Yes	No

OK Cancel Help

■ Boundary Conditions

Support Data

Columns | Drop Panels | Column Capitals | Transverse Beams | Boundary Conditions

Support: 1

Support Springs

Vertical Kz: 0 kip/in

Rotation Kry: 0 kip-in/rad

Far End

Column Above: Fixed

Column Below: Fixed

Modify Copy...

Sup. No	Kz	Kry	Far End - Above	Far End - Below
1	0	0	Fixed	Fixed
2	0	0	Fixed	Fixed
3	0	0	Fixed	Fixed
4	0	0	Fixed	Fixed

OK Cancel Help

Reinforcement



■ Design

Reinforcement Criteria

Slabs and Ribs | Beams

	Top bars	Bottom bars
Cover (in)		
Clear:	1.5	1.5
Bar size		
Min:	#4	#4
Max:	#4	#4
Spacing (in)		
Min:	1	1
Max:	10	10
Reinf. ratio (%)		
Min:	0.18	0.18
Max:	2	2

There is more than 12 in of concrete below top bars.

OK Cancel Help

■ Investigation

Reinforcing Bars

Column Strip Bars | Middle Strip Bars | Beam Bars | Beam Stirrups

Span 1
Span 2
Span 3
Span 4
Span 5

Bar size: #5 No. of bars: 11 Length (ft): 7.5311

Top left Cover (in): 1.125

Span = 22 ft

Span Copy... Add Modify Delete

Size	Type	Count	Cover	Length	Start
#5	TopL	11	1.125	7.53112	--
#5	TopL	11	1.125	4.8506	--
#5	TopR	7	1.125	7.51534	--
#5	TopR	2	1.125	4.8506	--
#5	BotC	13	1.125	--	--

OK Cancel Help

Loads



Load Combinations

SELF: 1.4 Dead: 1.4 Live: 0 Snow: 0 Wind: 0 EQ: 0

Add Modify Delete

Comb	SELF	Dead	Live	Snow	Wind	EQ
U1	1.4	1.4	0	0	0	0
U2	1.2	1.2	1.6	0.5	0	0
U3	1.2	1.2	1	1.6	0	0
U4	1.2	1.2	0	1.6	0.8	0
U5	1.2	1.2	0	1.6	-0.8	0
U6	1.2	1.2	1	0.5	1.6	0
U7	1.2	1.2	1	0.5	-1.6	0
U8	0.9	0.9	0	0	1.6	0
U9	0.9	0.9	0	0	-1.6	0
U10	1.2	1.2	1	0.2	0	1
U11	1.2	1.2	1	0.2	0	-1
U12	0.9	0.9	0	0	0	1
U13	0.9	0.9	0	0	0	-1

Support Loads and Displacements

Current Case: Dead Support: 1 Displacement/Rotation: Dz: 1.5 in Force/Moment: Fz: 0 kip

Live Ry: 0 rad My: 0 k-ft

Modify Copy...

Supp No.	Dz	Ry	Fz	My
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0

Load Cases

Label: SELF Type: DEAD

Selfweight Add Modify Delete

Label	Type
SELF	DEAD
Dead	DEAD
Live	LIVE
Snow	DEAD
Wind	LATERAL
EQ	LATERAL

OK Cancel Help

Span Loads

Current Case: Dead Span: 1 Magnitude: 20 lb/ft²

Live Type: Area Load

Span = 0.7 ft

Case Copy... Add Modify Delete

Span No.	Type	Wa	La	Wb	Lb
1	Area Load	20	-	-	-
2	Area Load	20	-	-	-
3	Area Load	20	-	-	-
4	Area Load	20	-	-	-
5	Area Load	20	-	-	-

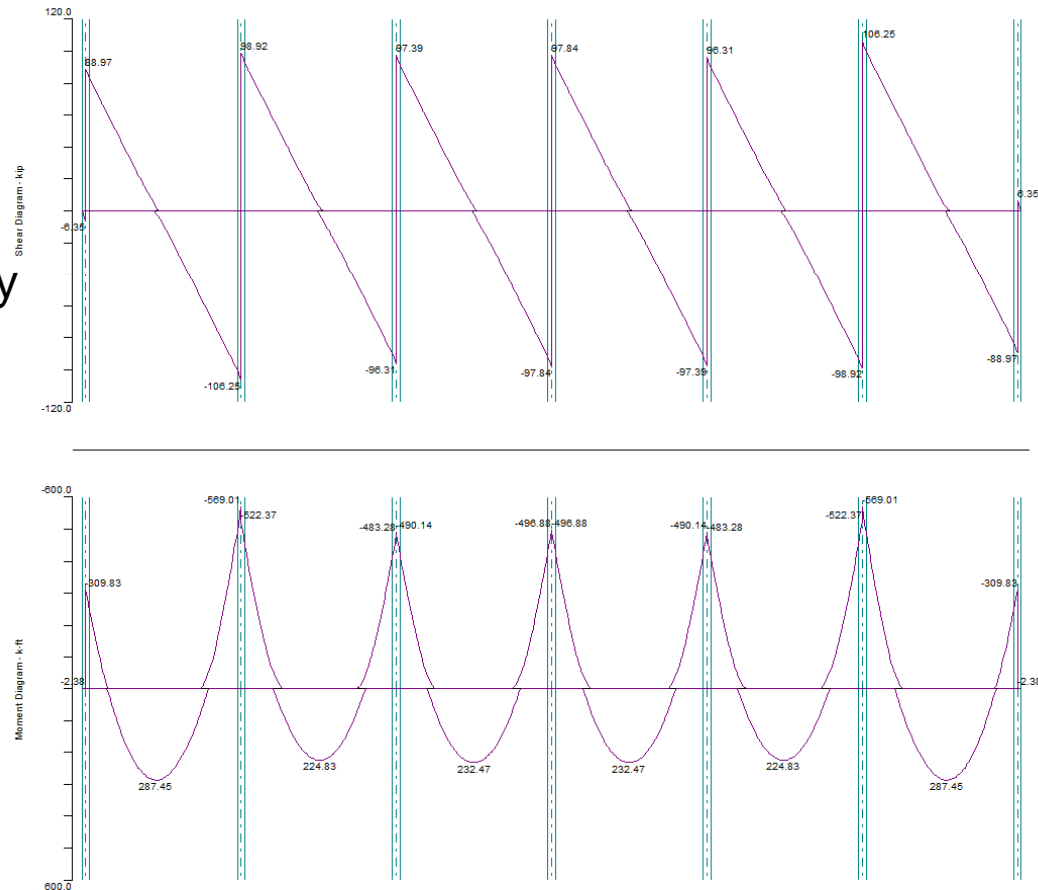
OK Cancel Help

Graphical Output



- Loads
- Internal Forces
- Moment Capacity
- Shear Capacity

- Deflections
- Reinforcemet

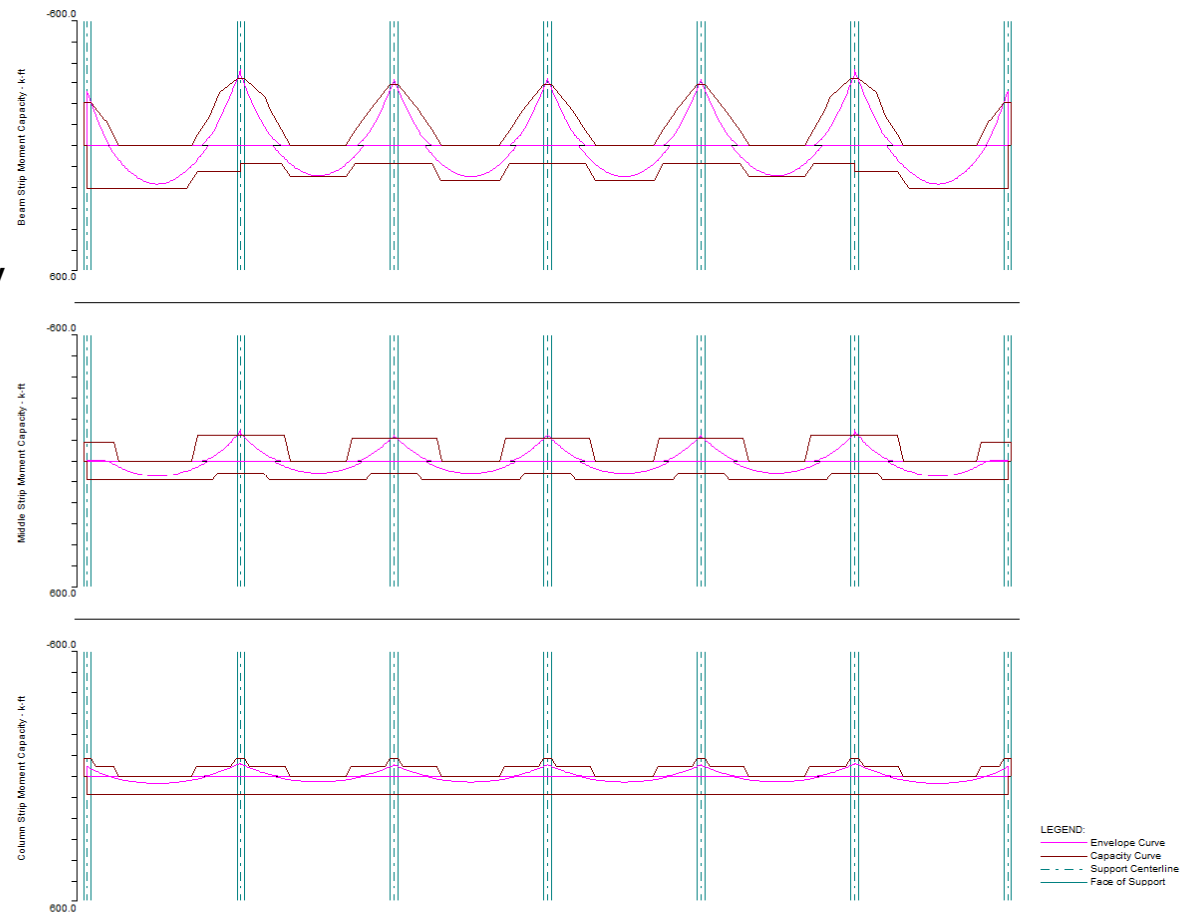


Internal Force Diagrams

Graphical Output



- Loads
- Internal Forces
- Moment Capacity
- Shear Capacity
- Deflections
- Reinforcement

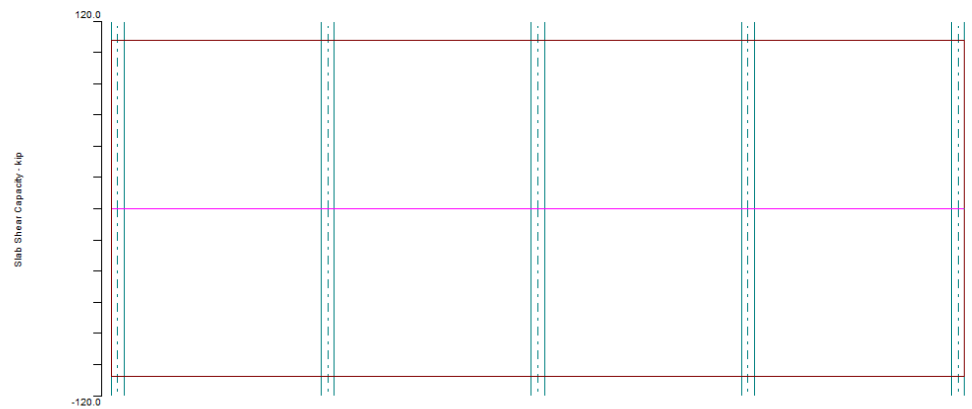
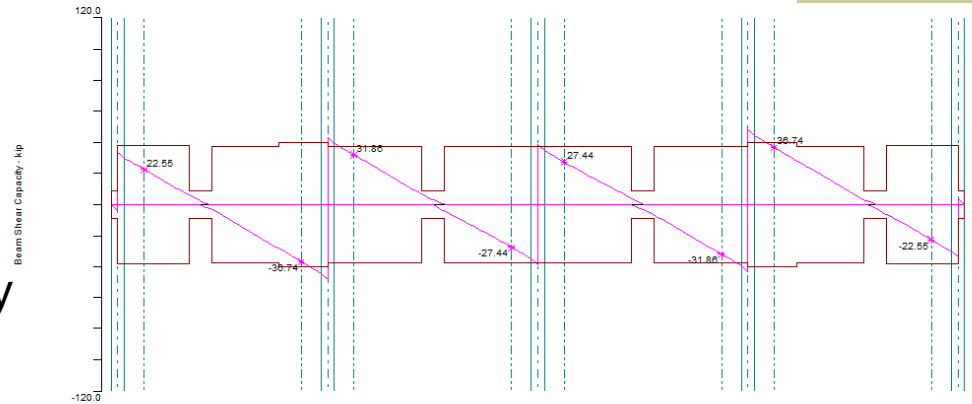


Moment Capacity Diagrams

Graphical Output



- Loads
- Internal Forces
- Moment Capacity
- Shear Capacity
- Deflections
- Reinforcement



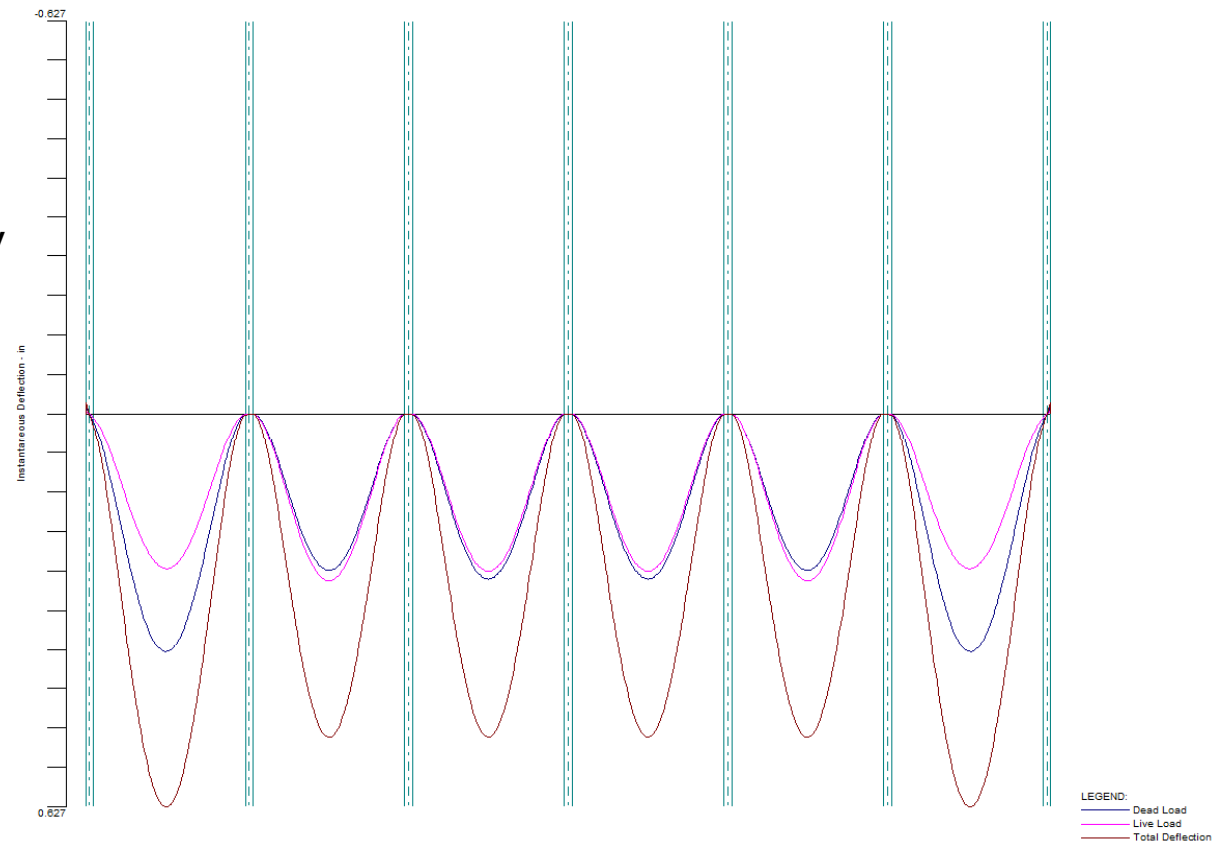
LEGEND:
— Envelope Curve
— Capacity Curve
- - - Support Centerline
- - - Face of Support
- - - Critical Section

Shear Capacity Diagrams

Graphical Output



- Loads
- Internal Forces
- Moment Capacity
- Shear Capacity
- Deflections
- Reinforcemet



Deflection Diagram

Text Output



- Input Echo
- Design Results
- Column Forces
- Internal Forces
- Deflections

Results Report

Close Select All Copy Print... [2] Design Results 551 lines

Deflections

Section properties

Units: Ig, Icr, Ie (in⁴), Mcr, Mmax (k

Span	Dead			Zone	Ie, avg	Mmax	Load Level			
	Dead	Dead+Live	Zone				Mmax	Ie	Mmax	Ie
1	9333	9333	Right	9333	8345	36.89	-0.52	9333	-1.14	9333
2	20489	20338	Left	9333	8345	36.89	-30.61	9333	-66.92	8511
			Middle	25395	2625	63.14	27.19	25395	59.43	25395
3	20421	20348	Left	9333	8547	36.89	-58.35	8746	-127.56	8566
			Middle	9333	8547	36.89	-52.93	8913	-115.73	8573
4	20489	20338	Left	25395	1961	63.14	18.06	25395	39.49	25395
			Middle	9333	8547	36.89	-52.93	8913	-115.73	8573
5	9333	9333	Right	9333	8547	36.89	-58.35	8746	-127.56	8566
			Left	25395	2625	63.14	27.19	25395	59.43	25395

Maximum Instantaneous Deflections - Direction of Analysis

Units: D (in), Ig (in⁴)

Span	Frame			Strip	Ig	LDF	Ratio	Strips		
	Ddead	Dlive	Dtotal					Ddead	Dlive	Dtotal
1	-0.001	-0.001	-0.003	Column	20040.5	0.781	0.990	-0.001	-0.001	-0.003
				Middle	2862	0.219	1.943	-0.002	-0.003	-0.005
2	0.012	0.014	0.026	Column	20040.5	0.693	0.878	0.010	0.012	0.023
				Middle	2862	0.307	2.723	0.032	0.039	0.071
3	0.006	0.007	0.013	Column	20040.5	0.673	0.853	0.005	0.006	0.011
				Middle	2862	0.327	2.903	0.017	0.020	0.037
4	0.012	0.014	0.026	Column	20040.5	0.693	0.878	0.010	0.012	0.023
				Middle	2862	0.307	2.723	0.032	0.039	0.071
5	-0.001	-0.001	-0.003	Column	20040.5	0.781	0.990	-0.001	-0.001	-0.003
				Middle	2862	0.219	1.943	-0.002	-0.003	-0.005

Maximum Long-term Deflections - Direction of Analysis

Time dependant factor for sustained loads = 2.000

Units: D (in)

Span	Column Strip					Middle Strip						
	Dsust	Lambda	Dcs	Dcs+lu	Dcs+1	Dtotal	Dsust	Lambda	Dcs	Dcs+lu	Dcs+1	Dtotal
1	-0.001	2.000	-0.002	-0.004	-0.004	-0.005	-0.002	2.000	-0.005	-0.007	-0.007	-0.010
2	0.010	2.000	0.021	0.033	0.033	0.044	0.032	2.000	0.065	0.103	0.103	0.136
3	0.005	2.000	0.010	0.016	0.016	0.021	0.017	2.000	0.034	0.054	0.054	0.071
4	0.010	2.000	0.021	0.033	0.033	0.044	0.032	2.000	0.065	0.103	0.103	0.136
5	-0.001	2.000	-0.002	-0.004	-0.004	-0.005	-0.002	2.000	-0.005	-0.007	-0.007	-0.010

Material Takeoff

Reinforcement in the Direction of Analysis



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