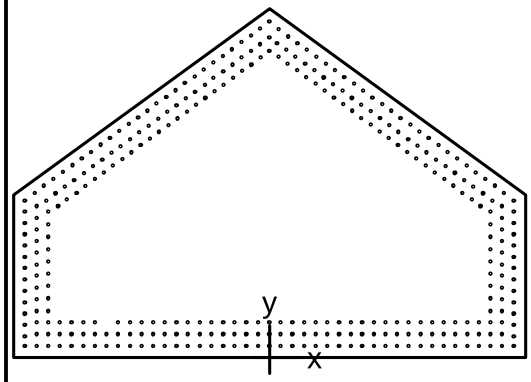


264 x 180 in

Code: ACI 318-08

Units: English

Run axis: About X-axis

Run option: Investigation

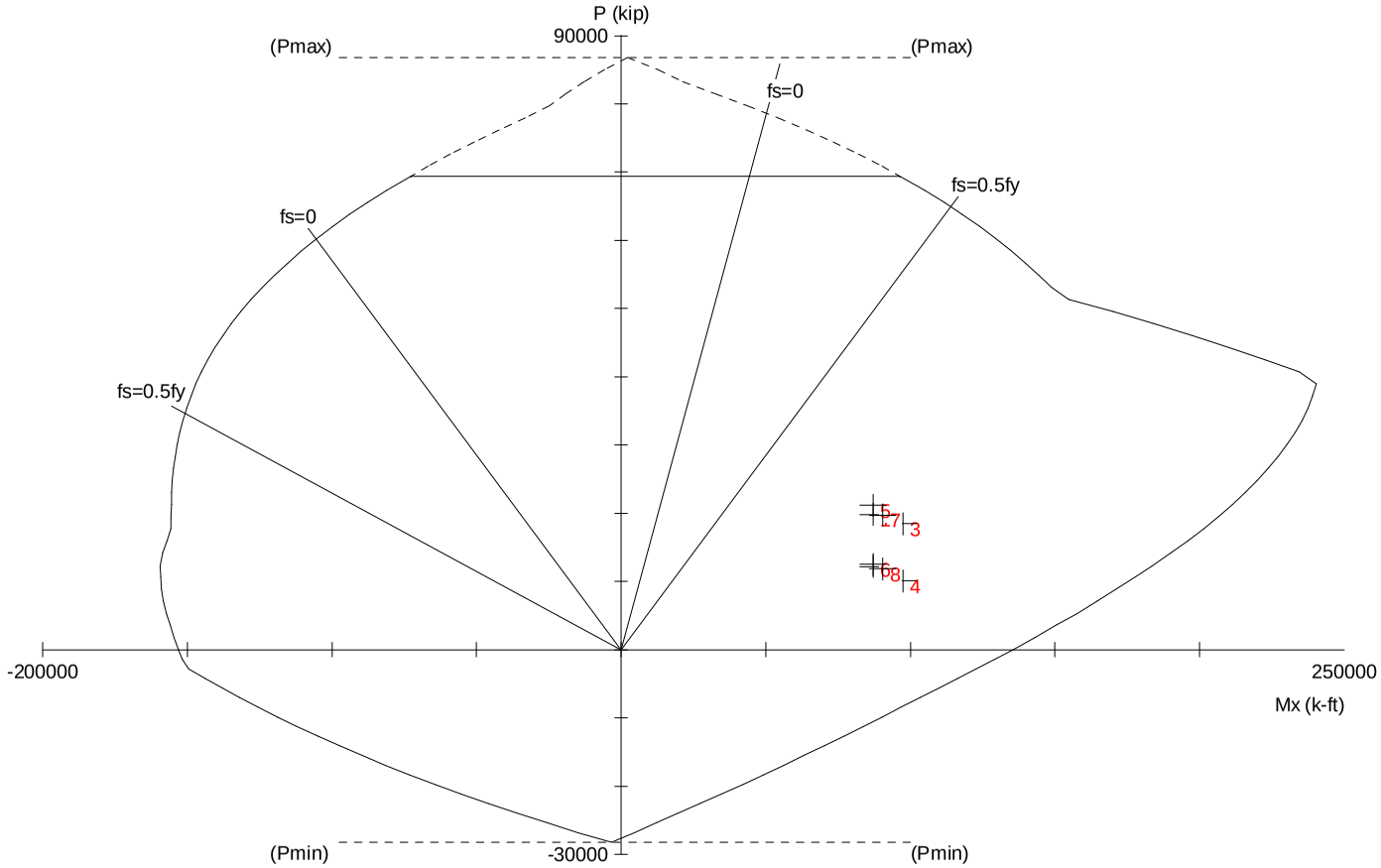
Slenderness: Not considered

Column type: Structural

Bars: ASTM A615

Date: 10/29/11

Time: 11:42:36



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File: P:\PR50312\Bridge Design\Main Spans\alt-A-P3.col

Project:

Column:

Engineer:

f'c = 3.5 ksi	fy = 60 ksi	Ag = 34848 in^2	335 #11 bars
Ec = 3372 ksi	Es = 29000 ksi	As = 522.60 in^2	rho = 1.50%
fc = 2.975 ksi		Xo = 0.00 in	Ix = 6.3686e+007 in^4
e_u = 0.003 in/in		Yo = 68.91 in	Iy = 1.65598e+008 in^4
Beta1 = 0.85		Min clear spacing = 3.59 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

```
                        oooooo              o
                       oo    oo            oo
 ooooo    oooooo     oo          ooooo    oo      oo   oo   o oooooooooo    o ooooo
oo    o   oo   oo    oo         oo   oo   oo      oo   oo    oo   oo   oo    oo   oo
oo        oo   oo    oo         oo   oo   oo      oo   oo    oo   oo   oo    oo   oo
 ooooo    oo   oo    oo         oo   oo   oo      oo   oo    oo   oo   oo    oo   oo
     oo   oooooo     oo         oo   oo   oo      oo   oo    oo   oo   oo    oo   oo
o    oo   oo         oo    oo   oo   oo   oo  o   oo   oo    oo   oo   oo    oo   oo
 ooooo    oo          oooooo     ooooo     ooo     ooooo o   oo   oo   oo    oo   oo (TM)
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spColumn v4.60 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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General Information:

File Name: P:\PR50312\Bridge Design\Main Spans\alt-A-P3.col
Project:
Column: Engineer:
Code: ACI 318-08 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:

f'c = 3.5 ksi fy = 60 ksi
Ec = 3372.17 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:

Exterior Points

No.	X (in)	Y (in)	No.	X (in)	Y (in)	No.	X (in)	Y (in)
1	-132.0	0.0	2	-132.0	84.0	3	0.0	180.0
4	132.0	84.0	5	132.0	0.0			

Gross section area, Ag = 34848 in^2
Ix = 6.3686e+007 in^4 Iy = 1.65598e+008 in^4
rx = 42.7497 in ry = 68.9348 in
Xo = 0 in Yo = 68.9091 in

Reinforcement:

Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Pattern: Irregular
Total steel area: As = 522.60 in^2 at rho = 1.50%
Minimum clear spacing = 3.59 in

Area in^2	X (in)	Y (in)	Area in^2	X (in)	Y (in)	Area in^2	X (in)	Y (in)
1.56	-126.0	6.0	1.56	-120.0	6.0	1.56	-114.0	6.0
1.56	-108.0	6.0	1.56	-102.0	6.0	1.56	-96.0	6.0
1.56	-90.0	6.0	1.56	-84.0	6.0	1.56	-78.0	6.0
1.56	-72.0	6.0	1.56	-66.0	6.0	1.56	-60.0	6.0
1.56	-54.0	6.0	1.56	-48.0	6.0	1.56	-42.0	6.0
1.56	-36.0	6.0	1.56	-30.0	6.0	1.56	-24.0	6.0
1.56	-18.0	6.0	1.56	-12.0	6.0	1.56	-6.0	6.0
1.56	0.0	6.0	1.56	6.0	6.0	1.56	12.0	6.0
1.56	18.0	6.0	1.56	24.0	6.0	1.56	30.0	6.0
1.56	36.0	6.0	1.56	42.0	6.0	1.56	48.0	6.0
1.56	54.0	6.0	1.56	60.0	6.0	1.56	66.0	6.0
1.56	72.0	6.0	1.56	78.0	6.0	1.56	84.0	6.0
1.56	90.0	6.0	1.56	96.0	6.0	1.56	102.0	6.0
1.56	108.0	6.0	1.56	114.0	6.0	1.56	120.0	6.0
1.56	126.0	6.0	1.56	-126.0	11.0	1.56	126.0	11.0
1.56	-120.0	12.0	1.56	-114.0	12.0	1.56	-108.0	12.0
1.56	-102.0	12.0	1.56	-96.0	12.0	1.56	-90.0	12.0
1.56	-84.0	12.0	1.56	-78.0	12.0	1.56	-72.0	12.0
1.56	-66.0	12.0	1.56	-60.0	12.0	1.56	-54.0	12.0
1.56	-48.0	12.0	1.56	-42.0	12.0	1.56	-36.0	12.0
1.56	-30.0	12.0	1.56	-24.0	12.0	1.56	-18.0	12.0
1.56	-12.0	12.0	1.56	-6.0	12.0	1.56	0.0	12.0
1.56	6.0	12.0	1.56	12.0	12.0	1.56	18.0	12.0
1.56	24.0	12.0	1.56	30.0	12.0	1.56	36.0	12.0
1.56	42.0	12.0	1.56	48.0	12.0	1.56	54.0	12.0
1.56	60.0	12.0	1.56	66.0	12.0	1.56	72.0	12.0
1.56	78.0	12.0	1.56	84.0	12.0	1.56	90.0	12.0
1.56	96.0	12.0	1.56	102.0	12.0	1.56	108.0	12.0
1.56	114.0	12.0	1.56	120.0	12.0	1.56	-126.0	16.8
1.56	126.0	16.8	1.56	-120.0	18.0	1.56	-114.0	18.0

1.56	-108.0	18.0	1.56	-102.0	18.0	1.56	-96.0	18.0
1.56	-90.0	18.0	1.56	-78.0	18.0	1.56	-72.0	18.0
1.56	-66.0	18.0	1.56	-60.0	18.0	1.56	-54.0	18.0
1.56	-48.0	18.0	1.56	-42.0	18.0	1.56	-36.0	18.0
1.56	-30.0	18.0	1.56	-24.0	18.0	1.56	-18.0	18.0
1.56	-12.0	18.0	1.56	-6.0	18.0	1.56	0.0	18.0
1.56	6.0	18.0	1.56	12.0	18.0	1.56	18.0	18.0
1.56	24.0	18.0	1.56	30.0	18.0	1.56	36.0	18.0
1.56	42.0	18.0	1.56	48.0	18.0	1.56	54.0	18.0
1.56	60.0	18.0	1.56	66.0	18.0	1.56	72.0	18.0
1.56	78.0	18.0	1.56	84.0	18.0	1.56	90.0	18.0
1.56	96.0	18.0	1.56	102.0	18.0	1.56	108.0	18.0
1.56	114.0	18.0	1.56	120.0	18.0	1.56	-126.0	22.7
1.56	126.0	22.7	1.56	-120.0	24.0	1.56	-114.0	24.0
1.56	114.0	24.0	1.56	120.0	24.0	1.56	-126.0	28.5
1.56	126.0	28.5	1.56	-120.0	30.0	1.56	120.0	30.0
1.56	-114.0	30.4	1.56	114.0	30.4	1.56	-126.0	34.3
1.56	126.0	34.3	1.56	-120.0	36.0	1.56	120.0	36.0
1.56	-114.0	36.8	1.56	114.0	36.8	1.56	-126.0	40.2
1.56	126.0	40.2	1.56	-120.0	42.0	1.56	120.0	42.0
1.56	-114.0	43.1	1.56	114.0	43.1	1.56	-126.0	46.0
1.56	126.0	46.0	1.56	-120.0	48.0	1.56	120.0	48.0
1.56	-114.0	49.5	1.56	114.0	49.5	1.56	-126.0	51.8
1.56	126.0	51.8	1.56	-120.0	54.0	1.56	120.0	54.0
1.56	-114.0	55.9	1.56	114.0	55.9	1.56	-126.0	57.7
1.56	126.0	57.7	1.56	-120.0	60.0	1.56	120.0	60.0
1.56	-114.0	62.3	1.56	114.0	62.3	1.56	-126.0	63.5
1.56	126.0	63.5	1.56	-120.0	66.0	1.56	120.0	66.0
1.56	-114.0	68.6	1.56	114.0	68.6	1.56	-126.0	69.3
1.56	126.0	69.3	1.56	-120.0	72.0	1.56	120.0	72.0
1.56	-114.0	75.0	1.56	114.0	75.0	1.56	-126.0	75.2
1.56	126.0	75.2	1.56	-120.0	78.0	1.56	-109.0	78.0
1.56	109.0	78.0	1.56	120.0	78.0	1.56	-126.0	81.0
1.56	-115.0	81.0	1.56	115.0	81.0	1.56	126.0	81.0
1.56	-104.3	81.5	1.56	104.3	81.5	1.56	-110.2	84.5
1.56	110.2	84.5	1.56	-121.0	85.0	1.56	-99.5	85.0
1.56	99.5	85.0	1.56	121.0	85.0	1.56	-105.4	88.0
1.56	105.3	88.0	1.56	-94.8	88.4	1.56	-116.2	88.5
1.56	94.8	88.5	1.56	116.2	88.5	1.56	-100.6	91.5
1.56	100.5	91.6	1.56	-90.0	91.9	1.56	-111.3	92.0
1.56	90.1	92.0	1.56	111.3	92.0	1.56	-95.8	95.0
1.56	95.7	95.1	1.56	-85.3	95.4	1.56	85.4	95.5
1.56	106.5	95.5	1.56	-106.5	95.6	1.56	-91.0	98.5
1.56	90.9	98.6	1.56	-80.6	98.9	1.56	80.6	99.0
1.56	101.7	99.0	1.56	-101.6	99.1	1.56	-86.3	102.0
1.56	86.0	102.1	1.56	-75.8	102.3	1.56	75.9	102.5
1.56	96.8	102.5	1.56	-96.8	102.6	1.56	-81.5	105.5
1.56	81.2	105.7	1.56	-71.1	105.8	1.56	71.2	106.0
1.56	92.0	106.0	1.56	-92.0	106.1	1.56	-76.7	109.0
1.56	76.4	109.2	1.56	-66.3	109.3	1.56	66.5	109.5
1.56	87.2	109.5	1.56	-87.1	109.6	1.56	-71.9	112.5
1.56	71.6	112.7	1.56	-61.6	112.8	1.56	61.7	113.0
1.56	82.3	113.0	1.56	-82.3	113.2	1.56	-67.1	116.0
1.56	66.7	116.2	1.56	-56.9	116.3	1.56	57.0	116.5
1.56	77.5	116.5	1.56	-77.4	116.7	1.56	-62.3	119.5
1.56	-52.1	119.7	1.56	61.9	119.7	1.56	52.3	120.0
1.56	72.7	120.0	1.56	-72.6	120.2	1.56	-57.5	123.0
1.56	-47.4	123.2	1.56	57.1	123.3	1.56	47.5	123.5
1.56	67.8	123.5	1.56	-67.8	123.7	1.56	-52.7	126.5
1.56	-42.7	126.7	1.56	52.3	126.8	1.56	42.8	127.0
1.56	63.0	127.0	1.56	-62.9	127.2	1.56	-47.9	130.0
1.56	-37.9	130.2	1.56	47.4	130.3	1.56	38.1	130.5
1.56	58.2	130.5	1.56	-58.1	130.8	1.56	-43.1	133.5
1.56	-33.2	133.7	1.56	42.6	133.8	1.56	33.4	134.0
1.56	53.3	134.0	1.56	-53.2	134.3	1.56	-38.3	137.0
1.56	-28.4	137.1	1.56	37.8	137.3	1.56	28.6	137.5
1.56	48.5	137.5	1.56	-48.4	137.8	1.56	-33.5	140.5
1.56	-23.7	140.6	1.56	33.0	140.9	1.56	23.9	141.0
1.56	43.7	141.0	1.56	-43.6	141.3	1.56	-28.8	144.0
1.56	-19.0	144.1	1.56	28.1	144.4	1.56	19.2	144.5
1.56	38.8	144.5	1.56	-38.7	144.8	1.56	-24.0	147.5
1.56	-14.2	147.6	1.56	23.3	147.9	1.56	14.5	148.0
1.56	34.0	148.0	1.56	-33.9	148.4	1.56	-19.2	151.0
1.56	-9.5	151.0	1.56	18.5	151.4	1.56	9.7	151.5
1.56	29.2	151.5	1.56	-29.0	151.9	1.56	-14.4	154.5
1.56	-4.7	154.5	1.56	5.0	155.0	1.56	13.7	155.0
1.56	24.3	155.0	1.56	-24.2	155.4	1.56	-9.6	158.0
1.56	0.0	158.0	1.56	8.8	158.5	1.56	19.5	158.5
1.56	-19.4	158.9	1.56	-4.8	161.5	1.56	4.0	162.0
1.56	14.7	162.0	1.56	-14.5	162.4	1.56	0.0	165.0

1.56	9.8	165.5	1.56	-9.7	166.0	1.56	5.0	169.0
1.56	-4.8	169.5	1.56	0.0	173.0			

Factored Loads and Moments with Corresponding Capacities:
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No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	19788.00	87097.00	207401.11	2.381	40.45	174.00	0.00983	0.900
2	12174.00	87097.00	183394.45	2.106	31.62	174.00	0.01341	0.900
3	18445.00	97573.00	203629.66	2.087	38.79	174.00	0.01038	0.900
4	10077.00	97573.00	175895.19	1.803	29.32	174.00	0.01470	0.900
5	21124.00	87119.00	210970.97	2.422	42.09	174.00	0.00933	0.900
6	12488.00	87119.00	184492.58	2.118	31.97	174.00	0.01323	0.900
7	19699.00	90478.00	207155.63	2.290	40.33	174.00	0.00987	0.900
8	11830.00	90478.00	182185.83	2.014	31.24	174.00	0.01362	0.900

*** End of output ***