



K2 Engineering, Inc.
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Bolted Plate Design Results Page 1

Engineer: Robert P Kiser, PE
 Printed at: Sunday, January 09, 2011 12:49:28 PM

Analysis completed successfully? True
 Bolts meet design criteria? True
 Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
 AASHTO Minimum Plate Thickness Warning encountered? False

General Data

Project Data File: C:\K2_Projects\Bolted Plate\Design Text Baseplate 95 inch flat-flat.XML
 Customer Name: test customer
 Project Number: test project
 Project Description: test description
 Site Name: test site
 Job Number: J12345
 Structure Number: S123

Analysis Settings

Desired Pole Number: 1
 Connection Type: Baseplate
 Tube index (for Flange only): 0
 Analysis Type: Redesign
 Plate Bending Stress Analysis Method: Bend Lines at Pole Flat or Point
 Bolt Analysis Method: ASCE 48-05
 Assume shear resisted by 1/2 of bolts? True
 Use plate thickness in 1/4 inch increments? False
 Limit Bend Line Length to Pole Point/Point Width? False
 Limit Bend Line Length to 1/2 Plate Outer Dimension? False
 Limit Bend Line Length to 45° Line from End-Most Bolt? True
 Limit Bend Line Length to Pole Perimeter / (# of Bolts)? False
 Limit Bend Line Length to Pole Flat Width? False
 Bypass Minimum Edge Distance Warnings? False
 Bypass AASHTO Minimum Plate Thickness Warning? False
 Bypass Anchor Bolt Development Length Calculation? False

Pole Data

Pole Type: Transmission
 Pole Shape: 12F - 12 Sides, Flat on Transverse Axis
 Pole Material: A572-50
 Pole Thickness: 0.6875 (in)
 Pole Flat/Flat Width: 95.0000 (in)
 Pole Weld Size: 0.6875 (in)
 Is Stealth Pole? False

Plate Data

Plate Shape: 0 - Round
 Plate Material: A572-50
 Plate is Galvanized? True
 Socket Style Weld? False
 Plate Outer Dimension: 115.250 (in)
 Plate Thickness: 4.0000 (in)
 Plate Corner Clip Length: 0.000 (in)
 Plate Blank Dimension 1: 115.250 (in)
 Plate Blank Dimension 2: 115.250 (in)
 Bolt Hole Diameter: 2.5625 (in)
 Plate Center Hole Shape: None
 Center Hole Dimension 1: 0.000 (in)
 Center Hole Dimension 2: 0.000 (in)
 Center Hole Corner Radius: 0.000 (in)
 Galvanizing Drain Method: None
 Galvanizing Drain Dimension 1: 0.000 (in)
 Galvanizing Drain Dimension 2: 0.000 (in)

Bolt Data

Bolt Grade: 18J Gr. 75
 Bolt Diameter: 2.250 (in)
 Bolt Length: 129.000 (in)
 Bolt Pattern: Equally Spaced
 Bolt Circle Diameter 1: 105.000 (in)
 Number of Bolts on BC1: 48
 Bolt Circle Diameter 2: 0.000 (in)
 Number of Bolts on BC2: 0
 Bolt Threads are in Shear Plane? True
 Nuts on Top Side: 1
 Nuts on Bottom Side: 1
 Total Number of Nuts: 96

User Mandates

Pole Out-of-Roundness Tolerance: 1.0 (%)
 Plate Max OD as adder to BC: 11.00 (in)
 Min Distance Center Hole to Pole: 2.00 (in)
 Min Distance Center Pole to Edge: 2.00 (in)
 Min Bolt Edge Distance: 2.00 (in)
 Quadrant On-Center Bolt Spacing: 6.00 (in)
 Minimum Bolt Spacing: 6.00 (in)
 Maximum Bend Line Length: 0.00 (in)
 Maximum Plate Thickness: 4.00 (in)
 Rotation Angle for Eq. Spaced Bolts: 0.00 (Deg)
 Maximum Flange Bolt Spacing: 9.00 (in)

Anchorage Data

Concrete Strength: 3000 (psi)
 Foundation Diameter: 129.00 (in)
 Clear Distance Above Foundation: 0.00 (in)
 Top Template Thickness: 0.5000 (in)
 Template ID: 100.00 (in)
 Template OD: 110.00 (in)
 Bottom Template Thickness: 0.5000 (in)
 Anchor Bolt Embedded Length: 119.63 (in)
 Has Uplift Plates? False
 Uplift Plate Width: 6.00 (in)
 Uplift Plate Thickness: 0.25 (in)



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Bolted Plate Design Results Page 2

Engineer: Robert P Kiser, PE
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Analysis completed successfully? True
 Bolts meet design criteria? True
 Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
 AASHTO Minimum Plate Thickness Warning encountered? False

Active Load Cases

Load Case	Load Name	Axial (kips)	Forces Axis 1 (kips)	Axis 2 (kips)	Axial (ft-k)	Moments Axis 1 (ft-k)	Axis 2 (ft-k)	Strs Inc Factor	Str Red Factor	Load Factor
1 A		-151.44	-146.33	58.23	14.90	6177.69	-16058.841.00	1.00	1.00	1.00
2 B		-124.92	-106.19	48.17	10.50	5381.90	-11716.631.00	1.00	1.00	1.00
3 C		-107.01	-79.92	64.48	6.60	5992.86	-8754.06 1.00	1.00	1.00	1.00
4 D		-137.16	-210.07	35.45	13.40	3650.69	-23382.471.00	1.00	1.00	1.00
5 E		-128.02	-203.00	79.46	31.10	8478.56	-22570.011.00	1.00	1.00	1.00
6 F		-95.52	-178.72	11.55	3.50	1147.19	-20016.731.00	1.00	1.00	1.00
7 G		-95.80	-173.11	63.16	24.00	6935.91	-19392.431.00	1.00	1.00	1.00
8 H		-96.21	-62.22	15.79	2.00	1766.43	-6791.09 1.00	1.00	1.00	1.00
9 I		-96.49	-63.49	16.61	-33.70	1898.29	-6983.41 1.00	1.00	1.00	1.00
10 I2		-98.57	-72.17	18.15	-232.50	2145.72	-8154.24 1.00	1.00	1.00	1.00
11 J		-92.15	-55.43	13.83	1.60	1543.78	-6048.78 1.00	1.00	1.00	1.00
12 K		-98.39	-88.56	27.71	5.10	3145.87	-9673.71 1.00	1.00	1.00	1.00

Bolt Loading Results Summary

Bolt Analysis Method = ASCE 48-05

Bolts meet design criteria? True

Shear Load resisted by only 1/2 of Bolts? True

Worst Case Compression Load = -232.12 kips

Worst Case Tension Load = 226.79 kips

Worst Case Shear Load = 9.08 kips

Worst Case Bolt Tension Ratio = 0.955

Worst Case Tension Ratio Bolt Number = 27

Load Case for Worst Case Tension Ratio = 5 (E)

Worst Case Bolt Shear Ratio = 0.061

Worst Case Shear Ratio Bolt Number = 1

Load Case for Worst Case Shear Ratio = 5 (E)



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Bolted Plate Design Results Page 3

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
1	1	100.0	74.9	48.8	150.0	153.28	6.56	47.20	2.14	0.73
1	2	100.0	74.9	48.8	150.0	158.30	6.56	48.74	2.14	0.73
1	3	100.0	74.9	48.8	150.0	160.55	6.56	49.44	2.14	0.73
1	4	100.0	74.9	48.8	150.0	160.01	6.56	49.27	2.14	0.73
1	5	100.0	74.9	48.8	150.0	156.67	6.56	48.24	2.14	0.73
1	6	100.0	74.9	48.8	150.0	150.60	6.56	46.37	2.14	0.73
1	7	100.0	74.9	48.8	150.0	141.89	6.56	43.69	2.14	0.73
1	8	100.0	74.9	48.8	150.0	130.71	6.56	40.25	2.14	0.73
1	9	100.0	74.9	48.8	150.0	117.23	6.56	36.10	2.14	0.73
1	10	100.0	74.9	48.8	150.0	101.70	6.56	31.31	2.14	0.73
1	11	100.0	74.9	48.8	150.0	84.37	6.56	25.98	2.14	0.73
1	12	100.0	74.9	48.8	150.0	65.54	6.56	20.18	2.14	0.73
1	13	100.0	74.9	48.8	150.0	45.54	6.56	14.02	2.14	0.73
1	14	100.0	74.9	48.8	150.0	24.71	6.56	7.61	2.14	0.73
1	15	100.0	74.9	48.8	150.0	3.40	6.56	1.05	2.14	0.73
1	16	100.0	74.9	48.8	150.0	-18.03	6.56	-5.55	2.14	0.73
1	17	100.0	74.9	48.8	150.0	-39.20	6.56	-12.07	2.14	0.73
1	18	100.0	74.9	48.8	150.0	-59.75	6.56	-18.40	2.14	0.73
1	19	100.0	74.9	48.8	150.0	-79.34	6.56	-24.43	2.14	0.73
1	20	100.0	74.9	48.8	150.0	-97.62	6.56	-30.06	2.14	0.73
1	21	100.0	74.9	48.8	150.0	-114.28	6.56	-35.19	2.14	0.73
1	22	100.0	74.9	48.8	150.0	-129.04	6.56	-39.73	2.14	0.73
1	23	100.0	74.9	48.8	150.0	-141.65	6.56	-43.62	2.14	0.73
1	24	100.0	74.9	48.8	150.0	-151.89	6.56	-46.77	2.14	0.73
1	25	100.0	74.9	48.8	150.0	-159.59	6.56	-49.14	2.14	0.73
1	26	100.0	74.9	48.8	150.0	-164.61	6.56	-50.68	2.14	0.73
1	27	100.0	74.9	48.8	150.0	-166.86	6.56	-51.38	2.14	0.73
1	28	100.0	74.9	48.8	150.0	-166.32	6.56	-51.21	2.14	0.73
1	29	100.0	74.9	48.8	150.0	-162.98	6.56	-50.18	2.14	0.73
1	30	100.0	74.9	48.8	150.0	-156.91	6.56	-48.31	2.14	0.73
1	31	100.0	74.9	48.8	150.0	-148.20	6.56	-45.63	2.14	0.73
1	32	100.0	74.9	48.8	150.0	-137.02	6.56	-42.19	2.14	0.73
1	33	100.0	74.9	48.8	150.0	-123.54	6.56	-38.04	2.14	0.73
1	34	100.0	74.9	48.8	150.0	-108.01	6.56	-33.26	2.14	0.73
1	35	100.0	74.9	48.8	150.0	-90.68	6.56	-27.92	2.14	0.73
1	36	100.0	74.9	48.8	150.0	-71.85	6.56	-22.12	2.14	0.73
1	37	100.0	74.9	48.8	150.0	-51.85	6.56	-15.97	2.14	0.73
1	38	100.0	74.9	48.8	150.0	-31.02	6.56	-9.55	2.14	0.73
1	39	100.0	74.9	48.8	150.0	-9.71	6.56	-2.99	2.14	0.73
1	40	100.0	74.9	48.8	150.0	11.72	6.56	3.61	2.14	0.73
1	41	100.0	74.9	48.8	150.0	32.89	6.56	10.13	2.14	0.73
1	42	100.0	74.9	48.8	150.0	53.44	6.56	16.46	2.14	0.73
1	43	100.0	74.9	48.8	150.0	73.03	6.56	22.49	2.14	0.73
1	44	100.0	74.9	48.8	150.0	91.31	6.56	28.11	2.14	0.73
1	45	100.0	74.9	48.8	150.0	107.97	6.56	33.25	2.14	0.73
1	46	100.0	74.9	48.8	150.0	122.73	6.56	37.79	2.14	0.73
1	47	100.0	74.9	48.8	150.0	135.34	6.56	41.67	2.14	0.73
1	48	100.0	74.9	48.8	150.0	145.58	6.56	44.83	2.14	0.73



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Bolted Plate Design Results Page 4

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
2	1	100.0	75.0	48.8	150.0	112.08	4.86	34.51	1.58	0.54
2	2	100.0	75.0	48.8	150.0	116.82	4.86	35.97	1.58	0.54
2	3	100.0	75.0	48.8	150.0	119.52	4.86	36.80	1.58	0.54
2	4	100.0	75.0	48.8	150.0	120.12	4.86	36.99	1.58	0.54
2	5	100.0	75.0	48.8	150.0	118.63	4.86	36.53	1.58	0.54
2	6	100.0	75.0	48.8	150.0	115.07	4.86	35.43	1.58	0.54
2	7	100.0	75.0	48.8	150.0	109.49	4.86	33.71	1.58	0.54
2	8	100.0	75.0	48.8	150.0	101.99	4.86	31.40	1.58	0.54
2	9	100.0	75.0	48.8	150.0	92.70	4.86	28.54	1.58	0.54
2	10	100.0	75.0	48.8	150.0	81.79	4.86	25.18	1.58	0.54
2	11	100.0	75.0	48.8	150.0	69.42	4.86	21.38	1.58	0.54
2	12	100.0	75.0	48.8	150.0	55.83	4.86	17.19	1.58	0.54
2	13	100.0	75.0	48.8	150.0	41.24	4.86	12.70	1.58	0.54
2	14	100.0	75.0	48.8	150.0	25.89	4.86	7.97	1.58	0.54
2	15	100.0	75.0	48.8	150.0	10.06	4.86	3.10	1.58	0.54
2	16	100.0	75.0	48.8	150.0	-5.99	4.86	-1.84	1.58	0.54
2	17	100.0	75.0	48.8	150.0	-21.98	4.86	-6.77	1.58	0.54
2	18	100.0	75.0	48.8	150.0	-37.63	4.86	-11.59	1.58	0.54
2	19	100.0	75.0	48.8	150.0	-52.69	4.86	-16.22	1.58	0.54
2	20	100.0	75.0	48.8	150.0	-66.90	4.86	-20.60	1.58	0.54
2	21	100.0	75.0	48.8	150.0	-80.00	4.86	-24.63	1.58	0.54
2	22	100.0	75.0	48.8	150.0	-91.78	4.86	-28.26	1.58	0.54
2	23	100.0	75.0	48.8	150.0	-102.03	4.86	-31.42	1.58	0.54
2	24	100.0	75.0	48.8	150.0	-110.58	4.86	-34.05	1.58	0.54
2	25	100.0	75.0	48.8	150.0	-117.28	4.86	-36.11	1.58	0.54
2	26	100.0	75.0	48.8	150.0	-122.02	4.86	-37.57	1.58	0.54
2	27	100.0	75.0	48.8	150.0	-124.72	4.86	-38.40	1.58	0.54
2	28	100.0	75.0	48.8	150.0	-125.33	4.86	-38.59	1.58	0.54
2	29	100.0	75.0	48.8	150.0	-123.84	4.86	-38.13	1.58	0.54
2	30	100.0	75.0	48.8	150.0	-120.27	4.86	-37.03	1.58	0.54
2	31	100.0	75.0	48.8	150.0	-114.69	4.86	-35.32	1.58	0.54
2	32	100.0	75.0	48.8	150.0	-107.20	4.86	-33.01	1.58	0.54
2	33	100.0	75.0	48.8	150.0	-97.91	4.86	-30.15	1.58	0.54
2	34	100.0	75.0	48.8	150.0	-86.99	4.86	-26.79	1.58	0.54
2	35	100.0	75.0	48.8	150.0	-74.63	4.86	-22.98	1.58	0.54
2	36	100.0	75.0	48.8	150.0	-61.04	4.86	-18.79	1.58	0.54
2	37	100.0	75.0	48.8	150.0	-46.44	4.86	-14.30	1.58	0.54
2	38	100.0	75.0	48.8	150.0	-31.10	4.86	-9.58	1.58	0.54
2	39	100.0	75.0	48.8	150.0	-15.27	4.86	-4.70	1.58	0.54
2	40	100.0	75.0	48.8	150.0	0.78	4.86	0.24	1.58	0.54
2	41	100.0	75.0	48.8	150.0	16.77	4.86	5.16	1.58	0.54
2	42	100.0	75.0	48.8	150.0	32.43	4.86	9.99	1.58	0.54
2	43	100.0	75.0	48.8	150.0	47.49	4.86	14.62	1.58	0.54
2	44	100.0	75.0	48.8	150.0	61.69	4.86	19.00	1.58	0.54
2	45	100.0	75.0	48.8	150.0	74.79	4.86	23.03	1.58	0.54
2	46	100.0	75.0	48.8	150.0	86.57	4.86	26.66	1.58	0.54
2	47	100.0	75.0	48.8	150.0	96.82	4.86	29.81	1.58	0.54
2	48	100.0	75.0	48.8	150.0	105.37	4.86	32.45	1.58	0.54



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Bolted Plate Design Results Page 5

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
3	1	100.0	75.0	48.8	150.0	84.68	4.28	26.07	1.39	0.48
3	2	100.0	75.0	48.8	150.0	90.66	4.28	27.91	1.39	0.48
3	3	100.0	75.0	48.8	150.0	95.05	4.28	29.27	1.39	0.48
3	4	100.0	75.0	48.8	150.0	97.77	4.28	30.10	1.39	0.48
3	5	100.0	75.0	48.8	150.0	98.78	4.28	30.42	1.39	0.48
3	6	100.0	75.0	48.8	150.0	98.07	4.28	30.20	1.39	0.48
3	7	100.0	75.0	48.8	150.0	95.63	4.28	29.45	1.39	0.48
3	8	100.0	75.0	48.8	150.0	91.53	4.28	28.18	1.39	0.48
3	9	100.0	75.0	48.8	150.0	85.82	4.28	26.42	1.39	0.48
3	10	100.0	75.0	48.8	150.0	78.60	4.28	24.20	1.39	0.48
3	11	100.0	75.0	48.8	150.0	70.00	4.28	21.55	1.39	0.48
3	12	100.0	75.0	48.8	150.0	60.16	4.28	18.53	1.39	0.48
3	13	100.0	75.0	48.8	150.0	49.26	4.28	15.17	1.39	0.48
3	14	100.0	75.0	48.8	150.0	37.48	4.28	11.54	1.39	0.48
3	15	100.0	75.0	48.8	150.0	25.01	4.28	7.70	1.39	0.48
3	16	100.0	75.0	48.8	150.0	12.08	4.28	3.72	1.39	0.48
3	17	100.0	75.0	48.8	150.0	-1.09	4.28	-0.34	1.39	0.48
3	18	100.0	75.0	48.8	150.0	-14.29	4.28	-4.40	1.39	0.48
3	19	100.0	75.0	48.8	150.0	-27.27	4.28	-8.40	1.39	0.48
3	20	100.0	75.0	48.8	150.0	-39.83	4.28	-12.27	1.39	0.48
3	21	100.0	75.0	48.8	150.0	-51.75	4.28	-15.93	1.39	0.48
3	22	100.0	75.0	48.8	150.0	-62.82	4.28	-19.34	1.39	0.48
3	23	100.0	75.0	48.8	150.0	-72.85	4.28	-22.43	1.39	0.48
3	24	100.0	75.0	48.8	150.0	-81.68	4.28	-25.15	1.39	0.48
3	25	100.0	75.0	48.8	150.0	-89.14	4.28	-27.45	1.39	0.48
3	26	100.0	75.0	48.8	150.0	-95.12	4.28	-29.29	1.39	0.48
3	27	100.0	75.0	48.8	150.0	-99.50	4.28	-30.64	1.39	0.48
3	28	100.0	75.0	48.8	150.0	-102.23	4.28	-31.48	1.39	0.48
3	29	100.0	75.0	48.8	150.0	-103.24	4.28	-31.79	1.39	0.48
3	30	100.0	75.0	48.8	150.0	-102.53	4.28	-31.57	1.39	0.48
3	31	100.0	75.0	48.8	150.0	-100.09	4.28	-30.82	1.39	0.48
3	32	100.0	75.0	48.8	150.0	-95.99	4.28	-29.56	1.39	0.48
3	33	100.0	75.0	48.8	150.0	-90.28	4.28	-27.80	1.39	0.48
3	34	100.0	75.0	48.8	150.0	-83.06	4.28	-25.57	1.39	0.48
3	35	100.0	75.0	48.8	150.0	-74.46	4.28	-22.93	1.39	0.48
3	36	100.0	75.0	48.8	150.0	-64.62	4.28	-19.90	1.39	0.48
3	37	100.0	75.0	48.8	150.0	-53.72	4.28	-16.54	1.39	0.48
3	38	100.0	75.0	48.8	150.0	-41.94	4.28	-12.91	1.39	0.48
3	39	100.0	75.0	48.8	150.0	-29.47	4.28	-9.07	1.39	0.48
3	40	100.0	75.0	48.8	150.0	-16.54	4.28	-5.09	1.39	0.48
3	41	100.0	75.0	48.8	150.0	-3.37	4.28	-1.04	1.39	0.48
3	42	100.0	75.0	48.8	150.0	9.83	4.28	3.03	1.39	0.48
3	43	100.0	75.0	48.8	150.0	22.82	4.28	7.03	1.39	0.48
3	44	100.0	75.0	48.8	150.0	35.38	4.28	10.89	1.39	0.48
3	45	100.0	75.0	48.8	150.0	47.29	4.28	14.56	1.39	0.48
3	46	100.0	75.0	48.8	150.0	58.36	4.28	17.97	1.39	0.48
3	47	100.0	75.0	48.8	150.0	68.39	4.28	21.06	1.39	0.48
3	48	100.0	75.0	48.8	150.0	77.22	4.28	23.78	1.39	0.48



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Bolted Plate Design Results Page 6

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
4	1	100.0	74.9	48.8	150.0	221.59	8.88	68.23	2.89	0.99
4	2	100.0	74.9	48.8	150.0	222.29	8.88	68.45	2.89	0.99
4	3	100.0	74.9	48.8	150.0	219.15	8.88	67.48	2.89	0.99
4	4	100.0	74.9	48.8	150.0	212.20	8.88	65.34	2.89	0.99
4	5	100.0	74.9	48.8	150.0	201.58	8.88	62.07	2.89	0.99
4	6	100.0	74.9	48.8	150.0	187.46	8.88	57.72	2.89	0.99
4	7	100.0	74.9	48.8	150.0	170.08	8.88	52.37	2.89	0.99
4	8	100.0	74.9	48.8	150.0	149.74	8.88	46.11	2.89	0.99
4	9	100.0	74.9	48.8	150.0	126.79	8.88	39.04	2.89	0.99
4	10	100.0	74.9	48.8	150.0	101.63	8.88	31.29	2.89	0.99
4	11	100.0	74.9	48.8	150.0	74.67	8.88	22.99	2.89	0.99
4	12	100.0	74.9	48.8	150.0	46.39	8.88	14.28	2.89	0.99
4	13	100.0	74.9	48.8	150.0	17.27	8.88	5.32	2.89	0.99
4	14	100.0	74.9	48.8	150.0	-12.20	8.88	-3.76	2.89	0.99
4	15	100.0	74.9	48.8	150.0	-41.51	8.88	-12.78	2.89	0.99
4	16	100.0	74.9	48.8	150.0	-70.16	8.88	-21.60	2.89	0.99
4	17	100.0	74.9	48.8	150.0	-97.65	8.88	-30.07	2.89	0.99
4	18	100.0	74.9	48.8	150.0	-123.52	8.88	-38.03	2.89	0.99
4	19	100.0	74.9	48.8	150.0	-147.33	8.88	-45.37	2.89	0.99
4	20	100.0	74.9	48.8	150.0	-168.67	8.88	-51.94	2.89	0.99
4	21	100.0	74.9	48.8	150.0	-187.17	8.88	-57.63	2.89	0.99
4	22	100.0	74.9	48.8	150.0	-202.52	8.88	-62.36	2.89	0.99
4	23	100.0	74.9	48.8	150.0	-214.45	8.88	-66.03	2.89	0.99
4	24	100.0	74.9	48.8	150.0	-222.76	8.88	-68.59	2.89	0.99
4	25	100.0	74.9	48.8	150.0	-227.30	8.88	-69.99	2.89	0.99
4	26	100.0	74.9	48.8	150.0	-228.01	8.88	-70.21	2.89	0.99
4	27	100.0	74.9	48.8	150.0	-224.86	8.88	-69.24	2.89	0.99
4	28	100.0	74.9	48.8	150.0	-217.92	8.88	-67.10	2.89	0.99
4	29	100.0	74.9	48.8	150.0	-207.30	8.88	-63.83	2.89	0.99
4	30	100.0	74.9	48.8	150.0	-193.17	8.88	-59.48	2.89	0.99
4	31	100.0	74.9	48.8	150.0	-175.80	8.88	-54.13	2.89	0.99
4	32	100.0	74.9	48.8	150.0	-155.46	8.88	-47.87	2.89	0.99
4	33	100.0	74.9	48.8	150.0	-132.51	8.88	-40.80	2.89	0.99
4	34	100.0	74.9	48.8	150.0	-107.34	8.88	-33.05	2.89	0.99
4	35	100.0	74.9	48.8	150.0	-80.39	8.88	-24.75	2.89	0.99
4	36	100.0	74.9	48.8	150.0	-52.11	8.88	-16.04	2.89	0.99
4	37	100.0	74.9	48.8	150.0	-22.98	8.88	-7.08	2.89	0.99
4	38	100.0	74.9	48.8	150.0	6.49	8.88	2.00	2.89	0.99
4	39	100.0	74.9	48.8	150.0	35.79	8.88	11.02	2.89	0.99
4	40	100.0	74.9	48.8	150.0	64.44	8.88	19.84	2.89	0.99
4	41	100.0	74.9	48.8	150.0	91.94	8.88	28.31	2.89	0.99
4	42	100.0	74.9	48.8	150.0	117.81	8.88	36.27	2.89	0.99
4	43	100.0	74.9	48.8	150.0	141.62	8.88	43.61	2.89	0.99
4	44	100.0	74.9	48.8	150.0	162.96	8.88	50.18	2.89	0.99
4	45	100.0	74.9	48.8	150.0	181.45	8.88	55.87	2.89	0.99
4	46	100.0	74.9	48.8	150.0	196.80	8.88	60.60	2.89	0.99
4	47	100.0	74.9	48.8	150.0	208.73	8.88	64.27	2.89	0.99
4	48	100.0	74.9	48.8	150.0	217.04	8.88	66.83	2.89	0.99



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Bolted Plate Design Results Page 7

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
5	1	100.0	74.9	48.8	150.0	217.07	9.08	66.84	2.96	1.01
5	2	100.0	74.9	48.8	150.0	223.87	9.08	68.93	2.96	1.01
5	3	100.0	74.9	48.8	150.0	226.79	9.08	69.83	2.96	1.01
5	4	100.0	74.9	48.8	150.0	225.79	9.08	69.52	2.96	1.01
5	5	100.0	74.9	48.8	150.0	220.88	9.08	68.01	2.96	1.01
5	6	100.0	74.9	48.8	150.0	212.14	9.08	65.32	2.96	1.01
5	7	100.0	74.9	48.8	150.0	199.73	9.08	61.50	2.96	1.01
5	8	100.0	74.9	48.8	150.0	183.86	9.08	56.61	2.96	1.01
5	9	100.0	74.9	48.8	150.0	164.79	9.08	50.74	2.96	1.01
5	10	100.0	74.9	48.8	150.0	142.86	9.08	43.99	2.96	1.01
5	11	100.0	74.9	48.8	150.0	118.44	9.08	36.47	2.96	1.01
5	12	100.0	74.9	48.8	150.0	91.95	9.08	28.31	2.96	1.01
5	13	100.0	74.9	48.8	150.0	63.84	9.08	19.66	2.96	1.01
5	14	100.0	74.9	48.8	150.0	34.59	9.08	10.65	2.96	1.01
5	15	100.0	74.9	48.8	150.0	4.70	9.08	1.45	2.96	1.01
5	16	100.0	74.9	48.8	150.0	-25.31	9.08	-7.79	2.96	1.01
5	17	100.0	74.9	48.8	150.0	-54.94	9.08	-16.92	2.96	1.01
5	18	100.0	74.9	48.8	150.0	-83.67	9.08	-25.76	2.96	1.01
5	19	100.0	74.9	48.8	150.0	-111.02	9.08	-34.18	2.96	1.01
5	20	100.0	74.9	48.8	150.0	-136.51	9.08	-42.03	2.96	1.01
5	21	100.0	74.9	48.8	150.0	-159.71	9.08	-49.18	2.96	1.01
5	22	100.0	74.9	48.8	150.0	-180.22	9.08	-55.49	2.96	1.01
5	23	100.0	74.9	48.8	150.0	-197.70	9.08	-60.87	2.96	1.01
5	24	100.0	74.9	48.8	150.0	-211.84	9.08	-65.23	2.96	1.01
5	25	100.0	74.9	48.8	150.0	-222.40	9.08	-68.48	2.96	1.01
5	26	100.0	74.9	48.8	150.0	-229.20	9.08	-70.57	2.96	1.01
5	27	100.0	74.9	48.8	150.0	-232.12	9.08	-71.47	2.96	1.01
5	28	100.0	74.9	48.8	150.0	-231.12	9.08	-71.17	2.96	1.01
5	29	100.0	74.9	48.8	150.0	-226.21	9.08	-69.65	2.96	1.01
5	30	100.0	74.9	48.8	150.0	-217.48	9.08	-66.96	2.96	1.01
5	31	100.0	74.9	48.8	150.0	-205.07	9.08	-63.14	2.96	1.01
5	32	100.0	74.9	48.8	150.0	-189.19	9.08	-58.25	2.96	1.01
5	33	100.0	74.9	48.8	150.0	-170.13	9.08	-52.38	2.96	1.01
5	34	100.0	74.9	48.8	150.0	-148.20	9.08	-45.63	2.96	1.01
5	35	100.0	74.9	48.8	150.0	-123.78	9.08	-38.11	2.96	1.01
5	36	100.0	74.9	48.8	150.0	-97.28	9.08	-29.95	2.96	1.01
5	37	100.0	74.9	48.8	150.0	-69.17	9.08	-21.30	2.96	1.01
5	38	100.0	74.9	48.8	150.0	-39.92	9.08	-12.29	2.96	1.01
5	39	100.0	74.9	48.8	150.0	-10.03	9.08	-3.09	2.96	1.01
5	40	100.0	74.9	48.8	150.0	19.98	9.08	6.15	2.96	1.01
5	41	100.0	74.9	48.8	150.0	49.60	9.08	15.27	2.96	1.01
5	42	100.0	74.9	48.8	150.0	78.34	9.08	24.12	2.96	1.01
5	43	100.0	74.9	48.8	150.0	105.68	9.08	32.54	2.96	1.01
5	44	100.0	74.9	48.8	150.0	131.17	9.08	40.39	2.96	1.01
5	45	100.0	74.9	48.8	150.0	154.37	9.08	47.53	2.96	1.01
5	46	100.0	74.9	48.8	150.0	174.89	9.08	53.85	2.96	1.01
5	47	100.0	74.9	48.8	150.0	192.37	9.08	59.23	2.96	1.01
5	48	100.0	74.9	48.8	150.0	206.50	9.08	63.59	2.96	1.01



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Bolted Plate Design Results Page 8

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
6	1	100.0	74.9	48.8	150.0	188.92	7.46	58.17	2.43	0.83
6	2	100.0	74.9	48.8	150.0	187.08	7.46	57.60	2.43	0.83
6	3	100.0	74.9	48.8	150.0	182.01	7.46	56.04	2.43	0.83
6	4	100.0	74.9	48.8	150.0	173.79	7.46	53.51	2.43	0.83
6	5	100.0	74.9	48.8	150.0	162.56	7.46	50.05	2.43	0.83
6	6	100.0	74.9	48.8	150.0	148.51	7.46	45.73	2.43	0.83
6	7	100.0	74.9	48.8	150.0	131.89	7.46	40.61	2.43	0.83
6	8	100.0	74.9	48.8	150.0	112.98	7.46	34.79	2.43	0.83
6	9	100.0	74.9	48.8	150.0	92.11	7.46	28.36	2.43	0.83
6	10	100.0	74.9	48.8	150.0	69.62	7.46	21.44	2.43	0.83
6	11	100.0	74.9	48.8	150.0	45.91	7.46	14.14	2.43	0.83
6	12	100.0	74.9	48.8	150.0	21.38	7.46	6.58	2.43	0.83
6	13	100.0	74.9	48.8	150.0	-3.56	7.46	-1.09	2.43	0.83
6	14	100.0	74.9	48.8	150.0	-28.46	7.46	-8.76	2.43	0.83
6	15	100.0	74.9	48.8	150.0	-52.91	7.46	-16.29	2.43	0.83
6	16	100.0	74.9	48.8	150.0	-76.49	7.46	-23.55	2.43	0.83
6	17	100.0	74.9	48.8	150.0	-98.80	7.46	-30.42	2.43	0.83
6	18	100.0	74.9	48.8	150.0	-119.45	7.46	-36.78	2.43	0.83
6	19	100.0	74.9	48.8	150.0	-138.09	7.46	-42.52	2.43	0.83
6	20	100.0	74.9	48.8	150.0	-154.40	7.46	-47.54	2.43	0.83
6	21	100.0	74.9	48.8	150.0	-168.10	7.46	-51.76	2.43	0.83
6	22	100.0	74.9	48.8	150.0	-178.96	7.46	-55.10	2.43	0.83
6	23	100.0	74.9	48.8	150.0	-186.80	7.46	-57.52	2.43	0.83
6	24	100.0	74.9	48.8	150.0	-191.47	7.46	-58.96	2.43	0.83
6	25	100.0	74.9	48.8	150.0	-192.90	7.46	-59.40	2.43	0.83
6	26	100.0	74.9	48.8	150.0	-191.06	7.46	-58.83	2.43	0.83
6	27	100.0	74.9	48.8	150.0	-185.99	7.46	-57.27	2.43	0.83
6	28	100.0	74.9	48.8	150.0	-177.77	7.46	-54.74	2.43	0.83
6	29	100.0	74.9	48.8	150.0	-166.54	7.46	-51.28	2.43	0.83
6	30	100.0	74.9	48.8	150.0	-152.49	7.46	-46.95	2.43	0.83
6	31	100.0	74.9	48.8	150.0	-135.87	7.46	-41.84	2.43	0.83
6	32	100.0	74.9	48.8	150.0	-116.96	7.46	-36.01	2.43	0.83
6	33	100.0	74.9	48.8	150.0	-96.09	7.46	-29.59	2.43	0.83
6	34	100.0	74.9	48.8	150.0	-73.60	7.46	-22.66	2.43	0.83
6	35	100.0	74.9	48.8	150.0	-49.89	7.46	-15.36	2.43	0.83
6	36	100.0	74.9	48.8	150.0	-25.36	7.46	-7.81	2.43	0.83
6	37	100.0	74.9	48.8	150.0	-0.42	7.46	-0.13	2.43	0.83
6	38	100.0	74.9	48.8	150.0	24.48	7.46	7.54	2.43	0.83
6	39	100.0	74.9	48.8	150.0	48.93	7.46	15.07	2.43	0.83
6	40	100.0	74.9	48.8	150.0	72.51	7.46	22.33	2.43	0.83
6	41	100.0	74.9	48.8	150.0	94.82	7.46	29.20	2.43	0.83
6	42	100.0	74.9	48.8	150.0	115.47	7.46	35.55	2.43	0.83
6	43	100.0	74.9	48.8	150.0	134.11	7.46	41.29	2.43	0.83
6	44	100.0	74.9	48.8	150.0	150.42	7.46	46.32	2.43	0.83
6	45	100.0	74.9	48.8	150.0	164.12	7.46	50.54	2.43	0.83
6	46	100.0	74.9	48.8	150.0	174.98	7.46	53.88	2.43	0.83
6	47	100.0	74.9	48.8	150.0	182.82	7.46	56.29	2.43	0.83
6	48	100.0	74.9	48.8	150.0	187.49	7.46	57.73	2.43	0.83



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Bolted Plate Design Results Page 9

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
7	1	100.0	74.9	48.8	150.0	186.58	7.68	57.45	2.50	0.85
7	2	100.0	74.9	48.8	150.0	192.00	7.68	59.12	2.50	0.85
7	3	100.0	74.9	48.8	150.0	194.09	7.68	59.76	2.50	0.85
7	4	100.0	74.9	48.8	150.0	192.83	7.68	59.37	2.50	0.85
7	5	100.0	74.9	48.8	150.0	188.23	7.68	57.96	2.50	0.85
7	6	100.0	74.9	48.8	150.0	180.38	7.68	55.54	2.50	0.85
7	7	100.0	74.9	48.8	150.0	169.41	7.68	52.16	2.50	0.85
7	8	100.0	74.9	48.8	150.0	155.51	7.68	47.88	2.50	0.85
7	9	100.0	74.9	48.8	150.0	138.91	7.68	42.77	2.50	0.85
7	10	100.0	74.9	48.8	150.0	119.90	7.68	36.92	2.50	0.85
7	11	100.0	74.9	48.8	150.0	98.80	7.68	30.42	2.50	0.85
7	12	100.0	74.9	48.8	150.0	75.98	7.68	23.40	2.50	0.85
7	13	100.0	74.9	48.8	150.0	51.83	7.68	15.96	2.50	0.85
7	14	100.0	74.9	48.8	150.0	26.75	7.68	8.24	2.50	0.85
7	15	100.0	74.9	48.8	150.0	1.19	7.68	0.37	2.50	0.85
7	16	100.0	74.9	48.8	150.0	-24.43	7.68	-7.52	2.50	0.85
7	17	100.0	74.9	48.8	150.0	-49.67	7.68	-15.29	2.50	0.85
7	18	100.0	74.9	48.8	150.0	-74.09	7.68	-22.81	2.50	0.85
7	19	100.0	74.9	48.8	150.0	-97.28	7.68	-29.95	2.50	0.85
7	20	100.0	74.9	48.8	150.0	-118.84	7.68	-36.59	2.50	0.85
7	21	100.0	74.9	48.8	150.0	-138.40	7.68	-42.61	2.50	0.85
7	22	100.0	74.9	48.8	150.0	-155.62	7.68	-47.92	2.50	0.85
7	23	100.0	74.9	48.8	150.0	-170.22	7.68	-52.41	2.50	0.85
7	24	100.0	74.9	48.8	150.0	-181.94	7.68	-56.02	2.50	0.85
7	25	100.0	74.9	48.8	150.0	-190.58	7.68	-58.68	2.50	0.85
7	26	100.0	74.9	48.8	150.0	-195.99	7.68	-60.35	2.50	0.85
7	27	100.0	74.9	48.8	150.0	-198.08	7.68	-60.99	2.50	0.85
7	28	100.0	74.9	48.8	150.0	-196.82	7.68	-60.60	2.50	0.85
7	29	100.0	74.9	48.8	150.0	-192.22	7.68	-59.19	2.50	0.85
7	30	100.0	74.9	48.8	150.0	-184.37	7.68	-56.77	2.50	0.85
7	31	100.0	74.9	48.8	150.0	-173.40	7.68	-53.39	2.50	0.85
7	32	100.0	74.9	48.8	150.0	-159.50	7.68	-49.11	2.50	0.85
7	33	100.0	74.9	48.8	150.0	-142.90	7.68	-44.00	2.50	0.85
7	34	100.0	74.9	48.8	150.0	-123.89	7.68	-38.15	2.50	0.85
7	35	100.0	74.9	48.8	150.0	-102.80	7.68	-31.65	2.50	0.85
7	36	100.0	74.9	48.8	150.0	-79.98	7.68	-24.63	2.50	0.85
7	37	100.0	74.9	48.8	150.0	-55.82	7.68	-17.19	2.50	0.85
7	38	100.0	74.9	48.8	150.0	-30.75	7.68	-9.47	2.50	0.85
7	39	100.0	74.9	48.8	150.0	-5.18	7.68	-1.59	2.50	0.85
7	40	100.0	74.9	48.8	150.0	20.44	7.68	6.29	2.50	0.85
7	41	100.0	74.9	48.8	150.0	45.68	7.68	14.07	2.50	0.85
7	42	100.0	74.9	48.8	150.0	70.10	7.68	21.59	2.50	0.85
7	43	100.0	74.9	48.8	150.0	93.29	7.68	28.72	2.50	0.85
7	44	100.0	74.9	48.8	150.0	114.85	7.68	35.36	2.50	0.85
7	45	100.0	74.9	48.8	150.0	134.41	7.68	41.39	2.50	0.85
7	46	100.0	74.9	48.8	150.0	151.63	7.68	46.69	2.50	0.85
7	47	100.0	74.9	48.8	150.0	166.23	7.68	51.18	2.50	0.85
7	48	100.0	74.9	48.8	150.0	177.94	7.68	54.79	2.50	0.85



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Bolted Plate Design Results Page 10

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
8	1	100.0	75.0	48.8	150.0	63.62	2.67	19.59	0.87	0.30
8	2	100.0	75.0	48.8	150.0	64.70	2.67	19.92	0.87	0.30
8	3	100.0	75.0	48.8	150.0	64.64	2.67	19.90	0.87	0.30
8	4	100.0	75.0	48.8	150.0	63.43	2.67	19.53	0.87	0.30
8	5	100.0	75.0	48.8	150.0	61.11	2.67	18.82	0.87	0.30
8	6	100.0	75.0	48.8	150.0	57.70	2.67	17.77	0.87	0.30
8	7	100.0	75.0	48.8	150.0	53.28	2.67	16.40	0.87	0.30
8	8	100.0	75.0	48.8	150.0	47.91	2.67	14.75	0.87	0.30
8	9	100.0	75.0	48.8	150.0	41.68	2.67	12.83	0.87	0.30
8	10	100.0	75.0	48.8	150.0	34.71	2.67	10.69	0.87	0.30
8	11	100.0	75.0	48.8	150.0	27.11	2.67	8.35	0.87	0.30
8	12	100.0	75.0	48.8	150.0	19.01	2.67	5.85	0.87	0.30
8	13	100.0	75.0	48.8	150.0	10.55	2.67	3.25	0.87	0.30
8	14	100.0	75.0	48.8	150.0	1.88	2.67	0.58	0.87	0.30
8	15	100.0	75.0	48.8	150.0	-6.86	2.67	-2.11	0.87	0.30
8	16	100.0	75.0	48.8	150.0	-15.52	2.67	-4.78	0.87	0.30
8	17	100.0	75.0	48.8	150.0	-23.94	2.67	-7.37	0.87	0.30
8	18	100.0	75.0	48.8	150.0	-31.99	2.67	-9.85	0.87	0.30
8	19	100.0	75.0	48.8	150.0	-39.53	2.67	-12.17	0.87	0.30
8	20	100.0	75.0	48.8	150.0	-46.43	2.67	-14.30	0.87	0.30
8	21	100.0	75.0	48.8	150.0	-52.56	2.67	-16.18	0.87	0.30
8	22	100.0	75.0	48.8	150.0	-57.83	2.67	-17.81	0.87	0.30
8	23	100.0	75.0	48.8	150.0	-62.15	2.67	-19.14	0.87	0.30
8	24	100.0	75.0	48.8	150.0	-65.43	2.67	-20.15	0.87	0.30
8	25	100.0	75.0	48.8	150.0	-67.63	2.67	-20.82	0.87	0.30
8	26	100.0	75.0	48.8	150.0	-68.71	2.67	-21.16	0.87	0.30
8	27	100.0	75.0	48.8	150.0	-68.64	2.67	-21.14	0.87	0.30
8	28	100.0	75.0	48.8	150.0	-67.44	2.67	-20.77	0.87	0.30
8	29	100.0	75.0	48.8	150.0	-65.12	2.67	-20.05	0.87	0.30
8	30	100.0	75.0	48.8	150.0	-61.71	2.67	-19.00	0.87	0.30
8	31	100.0	75.0	48.8	150.0	-57.29	2.67	-17.64	0.87	0.30
8	32	100.0	75.0	48.8	150.0	-51.92	2.67	-15.99	0.87	0.30
8	33	100.0	75.0	48.8	150.0	-45.69	2.67	-14.07	0.87	0.30
8	34	100.0	75.0	48.8	150.0	-38.72	2.67	-11.92	0.87	0.30
8	35	100.0	75.0	48.8	150.0	-31.12	2.67	-9.58	0.87	0.30
8	36	100.0	75.0	48.8	150.0	-23.02	2.67	-7.09	0.87	0.30
8	37	100.0	75.0	48.8	150.0	-14.56	2.67	-4.48	0.87	0.30
8	38	100.0	75.0	48.8	150.0	-5.89	2.67	-1.81	0.87	0.30
8	39	100.0	75.0	48.8	150.0	2.85	2.67	0.88	0.87	0.30
8	40	100.0	75.0	48.8	150.0	11.51	2.67	3.54	0.87	0.30
8	41	100.0	75.0	48.8	150.0	19.94	2.67	6.14	0.87	0.30
8	42	100.0	75.0	48.8	150.0	27.99	2.67	8.62	0.87	0.30
8	43	100.0	75.0	48.8	150.0	35.52	2.67	10.94	0.87	0.30
8	44	100.0	75.0	48.8	150.0	42.42	2.67	13.06	0.87	0.30
8	45	100.0	75.0	48.8	150.0	48.55	2.67	14.95	0.87	0.30
8	46	100.0	75.0	48.8	150.0	53.82	2.67	16.57	0.87	0.30
8	47	100.0	75.0	48.8	150.0	58.14	2.67	17.90	0.87	0.30
8	48	100.0	75.0	48.8	150.0	61.42	2.67	18.91	0.87	0.30



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Bolted Plate Design Results Page 11

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
9	1	100.0	75.0	48.8	150.0	65.53	2.73	20.18	0.89	0.30
9	2	100.0	75.0	48.8	150.0	66.73	2.73	20.55	0.89	0.30
9	3	100.0	75.0	48.8	150.0	66.77	2.73	20.56	0.89	0.30
9	4	100.0	75.0	48.8	150.0	65.62	2.73	20.21	0.89	0.30
9	5	100.0	75.0	48.8	150.0	63.32	2.73	19.50	0.89	0.30
9	6	100.0	75.0	48.8	150.0	59.90	2.73	18.44	0.89	0.30
9	7	100.0	75.0	48.8	150.0	55.42	2.73	17.07	0.89	0.30
9	8	100.0	75.0	48.8	150.0	49.96	2.73	15.38	0.89	0.30
9	9	100.0	75.0	48.8	150.0	43.61	2.73	13.43	0.89	0.30
9	10	100.0	75.0	48.8	150.0	36.48	2.73	11.23	0.89	0.30
9	11	100.0	75.0	48.8	150.0	28.69	2.73	8.83	0.89	0.30
9	12	100.0	75.0	48.8	150.0	20.38	2.73	6.27	0.89	0.30
9	13	100.0	75.0	48.8	150.0	11.68	2.73	3.60	0.89	0.30
9	14	100.0	75.0	48.8	150.0	2.75	2.73	0.85	0.89	0.30
9	15	100.0	75.0	48.8	150.0	-6.27	2.73	-1.93	0.89	0.30
9	16	100.0	75.0	48.8	150.0	-15.21	2.73	-4.68	0.89	0.30
9	17	100.0	75.0	48.8	150.0	-23.92	2.73	-7.37	0.89	0.30
9	18	100.0	75.0	48.8	150.0	-32.26	2.73	-9.93	0.89	0.30
9	19	100.0	75.0	48.8	150.0	-40.09	2.73	-12.34	0.89	0.30
9	20	100.0	75.0	48.8	150.0	-47.26	2.73	-14.55	0.89	0.30
9	21	100.0	75.0	48.8	150.0	-53.65	2.73	-16.52	0.89	0.30
9	22	100.0	75.0	48.8	150.0	-59.17	2.73	-18.22	0.89	0.30
9	23	100.0	75.0	48.8	150.0	-63.70	2.73	-19.61	0.89	0.30
9	24	100.0	75.0	48.8	150.0	-67.18	2.73	-20.69	0.89	0.30
9	25	100.0	75.0	48.8	150.0	-69.55	2.73	-21.41	0.89	0.30
9	26	100.0	75.0	48.8	150.0	-70.76	2.73	-21.79	0.89	0.30
9	27	100.0	75.0	48.8	150.0	-70.79	2.73	-21.80	0.89	0.30
9	28	100.0	75.0	48.8	150.0	-69.64	2.73	-21.44	0.89	0.30
9	29	100.0	75.0	48.8	150.0	-67.34	2.73	-20.74	0.89	0.30
9	30	100.0	75.0	48.8	150.0	-63.92	2.73	-19.68	0.89	0.30
9	31	100.0	75.0	48.8	150.0	-59.44	2.73	-18.30	0.89	0.30
9	32	100.0	75.0	48.8	150.0	-53.98	2.73	-16.62	0.89	0.30
9	33	100.0	75.0	48.8	150.0	-47.63	2.73	-14.67	0.89	0.30
9	34	100.0	75.0	48.8	150.0	-40.50	2.73	-12.47	0.89	0.30
9	35	100.0	75.0	48.8	150.0	-32.71	2.73	-10.07	0.89	0.30
9	36	100.0	75.0	48.8	150.0	-24.40	2.73	-7.51	0.89	0.30
9	37	100.0	75.0	48.8	150.0	-15.70	2.73	-4.83	0.89	0.30
9	38	100.0	75.0	48.8	150.0	-6.77	2.73	-2.08	0.89	0.30
9	39	100.0	75.0	48.8	150.0	2.25	2.73	0.69	0.89	0.30
9	40	100.0	75.0	48.8	150.0	11.19	2.73	3.45	0.89	0.30
9	41	100.0	75.0	48.8	150.0	19.90	2.73	6.13	0.89	0.30
9	42	100.0	75.0	48.8	150.0	28.24	2.73	8.70	0.89	0.30
9	43	100.0	75.0	48.8	150.0	36.07	2.73	11.11	0.89	0.30
9	44	100.0	75.0	48.8	150.0	43.24	2.73	13.31	0.89	0.30
9	45	100.0	75.0	48.8	150.0	49.63	2.73	15.28	0.89	0.30
9	46	100.0	75.0	48.8	150.0	55.15	2.73	16.98	0.89	0.30
9	47	100.0	75.0	48.8	150.0	59.68	2.73	18.38	0.89	0.30
9	48	100.0	75.0	48.8	150.0	63.16	2.73	19.45	0.89	0.30



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Bolted Plate Design Results Page 12

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
10	1	100.0	75.0	48.8	150.0	76.76	3.12	23.64	1.02	0.35
10	2	100.0	75.0	48.8	150.0	78.09	3.12	24.04	1.02	0.35
10	3	100.0	75.0	48.8	150.0	78.04	3.12	24.03	1.02	0.35
10	4	100.0	75.0	48.8	150.0	76.62	3.12	23.59	1.02	0.35
10	5	100.0	75.0	48.8	150.0	73.86	3.12	22.74	1.02	0.35
10	6	100.0	75.0	48.8	150.0	69.79	3.12	21.49	1.02	0.35
10	7	100.0	75.0	48.8	150.0	64.50	3.12	19.86	1.02	0.35
10	8	100.0	75.0	48.8	150.0	58.07	3.12	17.88	1.02	0.35
10	9	100.0	75.0	48.8	150.0	50.61	3.12	15.58	1.02	0.35
10	10	100.0	75.0	48.8	150.0	42.25	3.12	13.01	1.02	0.35
10	11	100.0	75.0	48.8	150.0	33.13	3.12	10.20	1.02	0.35
10	12	100.0	75.0	48.8	150.0	23.41	3.12	7.21	1.02	0.35
10	13	100.0	75.0	48.8	150.0	13.26	3.12	4.08	1.02	0.35
10	14	100.0	75.0	48.8	150.0	2.84	3.12	0.87	1.02	0.35
10	15	100.0	75.0	48.8	150.0	-7.66	3.12	-2.36	1.02	0.35
10	16	100.0	75.0	48.8	150.0	-18.07	3.12	-5.56	1.02	0.35
10	17	100.0	75.0	48.8	150.0	-28.20	3.12	-8.68	1.02	0.35
10	18	100.0	75.0	48.8	150.0	-37.89	3.12	-11.67	1.02	0.35
10	19	100.0	75.0	48.8	150.0	-46.96	3.12	-14.46	1.02	0.35
10	20	100.0	75.0	48.8	150.0	-55.26	3.12	-17.02	1.02	0.35
10	21	100.0	75.0	48.8	150.0	-62.65	3.12	-19.29	1.02	0.35
10	22	100.0	75.0	48.8	150.0	-69.01	3.12	-21.25	1.02	0.35
10	23	100.0	75.0	48.8	150.0	-74.22	3.12	-22.85	1.02	0.35
10	24	100.0	75.0	48.8	150.0	-78.20	3.12	-24.08	1.02	0.35
10	25	100.0	75.0	48.8	150.0	-80.87	3.12	-24.90	1.02	0.35
10	26	100.0	75.0	48.8	150.0	-82.19	3.12	-25.31	1.02	0.35
10	27	100.0	75.0	48.8	150.0	-82.15	3.12	-25.29	1.02	0.35
10	28	100.0	75.0	48.8	150.0	-80.73	3.12	-24.86	1.02	0.35
10	29	100.0	75.0	48.8	150.0	-77.96	3.12	-24.01	1.02	0.35
10	30	100.0	75.0	48.8	150.0	-73.90	3.12	-22.76	1.02	0.35
10	31	100.0	75.0	48.8	150.0	-68.61	3.12	-21.13	1.02	0.35
10	32	100.0	75.0	48.8	150.0	-62.18	3.12	-19.15	1.02	0.35
10	33	100.0	75.0	48.8	150.0	-54.72	3.12	-16.85	1.02	0.35
10	34	100.0	75.0	48.8	150.0	-46.36	3.12	-14.27	1.02	0.35
10	35	100.0	75.0	48.8	150.0	-37.24	3.12	-11.47	1.02	0.35
10	36	100.0	75.0	48.8	150.0	-27.52	3.12	-8.47	1.02	0.35
10	37	100.0	75.0	48.8	150.0	-17.36	3.12	-5.35	1.02	0.35
10	38	100.0	75.0	48.8	150.0	-6.94	3.12	-2.14	1.02	0.35
10	39	100.0	75.0	48.8	150.0	3.56	3.12	1.10	1.02	0.35
10	40	100.0	75.0	48.8	150.0	13.96	3.12	4.30	1.02	0.35
10	41	100.0	75.0	48.8	150.0	24.10	3.12	7.42	1.02	0.35
10	42	100.0	75.0	48.8	150.0	33.78	3.12	10.40	1.02	0.35
10	43	100.0	75.0	48.8	150.0	42.85	3.12	13.19	1.02	0.35
10	44	100.0	75.0	48.8	150.0	51.15	3.12	15.75	1.02	0.35
10	45	100.0	75.0	48.8	150.0	58.55	3.12	18.03	1.02	0.35
10	46	100.0	75.0	48.8	150.0	64.90	3.12	19.98	1.02	0.35
10	47	100.0	75.0	48.8	150.0	70.11	3.12	21.59	1.02	0.35
10	48	100.0	75.0	48.8	150.0	74.09	3.12	22.81	1.02	0.35



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Bolted Plate Design Results Page 13

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
11	1	100.0	75.0	48.8	150.0	56.51	2.38	17.40	0.78	0.26
11	2	100.0	75.0	48.8	150.0	57.44	2.38	17.69	0.78	0.26
11	3	100.0	75.0	48.8	150.0	57.35	2.38	17.66	0.78	0.26
11	4	100.0	75.0	48.8	150.0	56.24	2.38	17.32	0.78	0.26
11	5	100.0	75.0	48.8	150.0	54.14	2.38	16.67	0.78	0.26
11	6	100.0	75.0	48.8	150.0	51.08	2.38	15.73	0.78	0.26
11	7	100.0	75.0	48.8	150.0	47.11	2.38	14.51	0.78	0.26
11	8	100.0	75.0	48.8	150.0	42.30	2.38	13.03	0.78	0.26
11	9	100.0	75.0	48.8	150.0	36.74	2.38	11.31	0.78	0.26
11	10	100.0	75.0	48.8	150.0	30.51	2.38	9.40	0.78	0.26
11	11	100.0	75.0	48.8	150.0	23.73	2.38	7.31	0.78	0.26
11	12	100.0	75.0	48.8	150.0	16.52	2.38	5.09	0.78	0.26
11	13	100.0	75.0	48.8	150.0	8.98	2.38	2.77	0.78	0.26
11	14	100.0	75.0	48.8	150.0	1.26	2.38	0.39	0.78	0.26
11	15	100.0	75.0	48.8	150.0	-6.51	2.38	-2.01	0.78	0.26
11	16	100.0	75.0	48.8	150.0	-14.21	2.38	-4.38	0.78	0.26
11	17	100.0	75.0	48.8	150.0	-21.70	2.38	-6.68	0.78	0.26
11	18	100.0	75.0	48.8	150.0	-28.84	2.38	-8.88	0.78	0.26
11	19	100.0	75.0	48.8	150.0	-35.53	2.38	-10.94	0.78	0.26
11	20	100.0	75.0	48.8	150.0	-41.64	2.38	-12.82	0.78	0.26
11	21	100.0	75.0	48.8	150.0	-47.08	2.38	-14.49	0.78	0.26
11	22	100.0	75.0	48.8	150.0	-51.73	2.38	-15.93	0.78	0.26
11	23	100.0	75.0	48.8	150.0	-55.54	2.38	-17.10	0.78	0.26
11	24	100.0	75.0	48.8	150.0	-58.43	2.38	-17.99	0.78	0.26
11	25	100.0	75.0	48.8	150.0	-60.35	2.38	-18.58	0.78	0.26
11	26	100.0	75.0	48.8	150.0	-61.28	2.38	-18.87	0.78	0.26
11	27	100.0	75.0	48.8	150.0	-61.18	2.38	-18.84	0.78	0.26
11	28	100.0	75.0	48.8	150.0	-60.08	2.38	-18.50	0.78	0.26
11	29	100.0	75.0	48.8	150.0	-57.98	2.38	-17.85	0.78	0.26
11	30	100.0	75.0	48.8	150.0	-54.92	2.38	-16.91	0.78	0.26
11	31	100.0	75.0	48.8	150.0	-50.95	2.38	-15.69	0.78	0.26
11	32	100.0	75.0	48.8	150.0	-46.14	2.38	-14.21	0.78	0.26
11	33	100.0	75.0	48.8	150.0	-40.58	2.38	-12.49	0.78	0.26
11	34	100.0	75.0	48.8	150.0	-34.35	2.38	-10.58	0.78	0.26
11	35	100.0	75.0	48.8	150.0	-27.57	2.38	-8.49	0.78	0.26
11	36	100.0	75.0	48.8	150.0	-20.36	2.38	-6.27	0.78	0.26
11	37	100.0	75.0	48.8	150.0	-12.82	2.38	-3.95	0.78	0.26
11	38	100.0	75.0	48.8	150.0	-5.10	2.38	-1.57	0.78	0.26
11	39	100.0	75.0	48.8	150.0	2.67	2.38	0.82	0.78	0.26
11	40	100.0	75.0	48.8	150.0	10.37	2.38	3.19	0.78	0.26
11	41	100.0	75.0	48.8	150.0	17.86	2.38	5.50	0.78	0.26
11	42	100.0	75.0	48.8	150.0	25.00	2.38	7.70	0.78	0.26
11	43	100.0	75.0	48.8	150.0	31.69	2.38	9.76	0.78	0.26
11	44	100.0	75.0	48.8	150.0	37.80	2.38	11.64	0.78	0.26
11	45	100.0	75.0	48.8	150.0	43.24	2.38	13.31	0.78	0.26
11	46	100.0	75.0	48.8	150.0	47.90	2.38	14.75	0.78	0.26
11	47	100.0	75.0	48.8	150.0	51.70	2.38	15.92	0.78	0.26
11	48	100.0	75.0	48.8	150.0	54.59	2.38	16.81	0.78	0.26



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Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Loading Results Detail as per ASCE 48-05

Load Case	Bolt Number	Fu (ksi)	Ft (ksi)	Fv (ksi)	Fb (ksi)	Axial Force (kips)	Shear Force (kips)	ft (ksi)	fv (ksi)	fbr (ksi)
12	1	100.0	75.0	48.8	150.0	91.83	3.87	28.27	1.26	0.43
12	2	100.0	75.0	48.8	150.0	94.14	3.87	28.99	1.26	0.43
12	3	100.0	75.0	48.8	150.0	94.80	3.87	29.19	1.26	0.43
12	4	100.0	75.0	48.8	150.0	93.81	3.87	28.89	1.26	0.43
12	5	100.0	75.0	48.8	150.0	91.18	3.87	28.08	1.26	0.43
12	6	100.0	75.0	48.8	150.0	86.96	3.87	26.77	1.26	0.43
12	7	100.0	75.0	48.8	150.0	81.21	3.87	25.00	1.26	0.43
12	8	100.0	75.0	48.8	150.0	74.03	3.87	22.80	1.26	0.43
12	9	100.0	75.0	48.8	150.0	65.56	3.87	20.19	1.26	0.43
12	10	100.0	75.0	48.8	150.0	55.92	3.87	17.22	1.26	0.43
12	11	100.0	75.0	48.8	150.0	45.30	3.87	13.95	1.26	0.43
12	12	100.0	75.0	48.8	150.0	33.87	3.87	10.43	1.26	0.43
12	13	100.0	75.0	48.8	150.0	21.82	3.87	6.72	1.26	0.43
12	14	100.0	75.0	48.8	150.0	9.36	3.87	2.88	1.26	0.43
12	15	100.0	75.0	48.8	150.0	-3.29	3.87	-1.01	1.26	0.43
12	16	100.0	75.0	48.8	150.0	-15.92	3.87	-4.90	1.26	0.43
12	17	100.0	75.0	48.8	150.0	-28.32	3.87	-8.72	1.26	0.43
12	18	100.0	75.0	48.8	150.0	-40.26	3.87	-12.40	1.26	0.43
12	19	100.0	75.0	48.8	150.0	-51.55	3.87	-15.87	1.26	0.43
12	20	100.0	75.0	48.8	150.0	-62.00	3.87	-19.09	1.26	0.43
12	21	100.0	75.0	48.8	150.0	-71.41	3.87	-21.99	1.26	0.43
12	22	100.0	75.0	48.8	150.0	-79.65	3.87	-24.52	1.26	0.43
12	23	100.0	75.0	48.8	150.0	-86.55	3.87	-26.65	1.26	0.43
12	24	100.0	75.0	48.8	150.0	-92.01	3.87	-28.33	1.26	0.43
12	25	100.0	75.0	48.8	150.0	-95.93	3.87	-29.54	1.26	0.43
12	26	100.0	75.0	48.8	150.0	-98.24	3.87	-30.25	1.26	0.43
12	27	100.0	75.0	48.8	150.0	-98.90	3.87	-30.45	1.26	0.43
12	28	100.0	75.0	48.8	150.0	-97.91	3.87	-30.15	1.26	0.43
12	29	100.0	75.0	48.8	150.0	-95.28	3.87	-29.34	1.26	0.43
12	30	100.0	75.0	48.8	150.0	-91.05	3.87	-28.04	1.26	0.43
12	31	100.0	75.0	48.8	150.0	-85.31	3.87	-26.27	1.26	0.43
12	32	100.0	75.0	48.8	150.0	-78.13	3.87	-24.06	1.26	0.43
12	33	100.0	75.0	48.8	150.0	-69.66	3.87	-21.45	1.26	0.43
12	34	100.0	75.0	48.8	150.0	-60.02	3.87	-18.48	1.26	0.43
12	35	100.0	75.0	48.8	150.0	-49.40	3.87	-15.21	1.26	0.43
12	36	100.0	75.0	48.8	150.0	-37.97	3.87	-11.69	1.26	0.43
12	37	100.0	75.0	48.8	150.0	-25.92	3.87	-7.98	1.26	0.43
12	38	100.0	75.0	48.8	150.0	-13.46	3.87	-4.14	1.26	0.43
12	39	100.0	75.0	48.8	150.0	-0.81	3.87	-0.25	1.26	0.43
12	40	100.0	75.0	48.8	150.0	11.83	3.87	3.64	1.26	0.43
12	41	100.0	75.0	48.8	150.0	24.22	3.87	7.46	1.26	0.43
12	42	100.0	75.0	48.8	150.0	36.16	3.87	11.14	1.26	0.43
12	43	100.0	75.0	48.8	150.0	47.45	3.87	14.61	1.26	0.43
12	44	100.0	75.0	48.8	150.0	57.90	3.87	17.83	1.26	0.43
12	45	100.0	75.0	48.8	150.0	67.32	3.87	20.73	1.26	0.43
12	46	100.0	75.0	48.8	150.0	75.55	3.87	23.26	1.26	0.43
12	47	100.0	75.0	48.8	150.0	82.45	3.87	25.39	1.26	0.43
12	48	100.0	75.0	48.8	150.0	87.91	3.87	27.07	1.26	0.43



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Bolted Plate Design Results Page 15

Engineer: Robert P Kiser, PE
Printed at: Sunday, January 09, 2011 12:49:29 PM

Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Pole Flat Bolt Moment Arm Details

Flat Number	Bolt Number	Moment Arm (in)
1	2	2.214
1	3	3.991
1	4	4.888
1	5	4.888
1	6	3.991
1	7	2.214
2	6	2.214
2	7	3.991
2	8	4.888
2	9	4.888
2	10	3.991
2	11	2.214
3	10	2.214
3	11	3.991
3	12	4.888
3	13	4.888
3	14	3.991
3	15	2.214
4	14	2.214
4	15	3.991
4	16	4.888
4	17	4.888
4	18	3.991
4	19	2.214
5	18	2.214
5	19	3.991
5	20	4.888
5	21	4.888
5	22	3.991
5	23	2.214
6	22	2.214
6	23	3.991
6	24	4.888
6	25	4.888
6	26	3.991
6	27	2.214
7	26	2.214
7	27	3.991
7	28	4.888
7	29	4.888
7	30	3.991
7	31	2.214
8	30	2.214
8	31	3.991
8	32	4.888
8	33	4.888
8	34	3.991
8	35	2.214



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Bolted Plate Design Results Page 16

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Pole Flat Bolt Moment Arm Details

Flat Number	Bolt Number	Moment Arm (in)
9	34	2.214
9	35	3.991
9	36	4.888
9	37	4.888
9	38	3.991
9	39	2.214
10	38	2.214
10	39	3.991
10	40	4.888
10	41	4.888
10	42	3.991
10	43	2.214
11	42	2.214
11	43	3.991
11	44	4.888
11	45	4.888
11	46	3.991
11	47	2.214
12	46	2.214
12	47	3.991
12	48	4.888
12	1	4.888
12	2	3.991
12	3	2.214

Pole Point Bolt Moment Arm Details

Point Number	Bolt Number	Moment Arm (in)
1	48	0.538
1	1	2.316
1	2	3.212
1	3	3.212
1	4	2.316
1	5	0.538
2	4	0.538
2	5	2.316
2	6	3.212
2	7	3.212
2	8	2.316
2	9	0.538



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Bolted Plate Design Results Page 17

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Pole Point Bolt Moment Arm Details

Point Number	Bolt Number	Moment Arm (in)
3	8	0.538
3	9	2.316
3	10	3.212
3	11	3.212
3	12	2.316
3	13	0.538
4	12	0.538
4	13	2.316
4	14	3.212
4	15	3.212
4	16	2.316
4	17	0.538
5	16	0.538
5	17	2.316
5	18	3.212
5	19	3.212
5	20	2.316
5	21	0.538
6	20	0.538
6	21	2.316
6	22	3.212
6	23	3.212
6	24	2.316
6	25	0.538
7	24	0.538
7	25	2.316
7	26	3.212
7	27	3.212
7	28	2.316
7	29	0.538
8	28	0.538
8	29	2.316
8	30	3.212
8	31	3.212
8	32	2.316
8	33	0.538
9	32	0.538
9	33	2.316
9	34	3.212
9	35	3.212
9	36	2.316
9	37	0.538
10	36	0.538
10	37	2.316
10	38	3.212
10	39	3.212
10	40	2.316
10	41	0.538



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Bolted Plate Design Results Page 18

Engineer: Robert P Kiser, PE
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Analysis completed successfully? True
 Bolts meet design criteria? True
 Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
 AASHTO Minimum Plate Thickness Warning encountered? False

Pole Point Bolt Moment Arm Details

Point Number	Bolt Number	Moment Arm (in)
11	40	0.538
11	41	2.316
11	42	3.212
11	43	3.212
11	44	2.316
11	45	0.538
12	44	0.538
12	45	2.316
12	46	3.212
12	47	3.212
12	48	2.316
12	1	0.538

Overall Worst Case Plate Stress Details

Occurred at Pole Flat # 7 for Load Case 5 (E)
 Total Bending Moment: -415.93 ft-kip
 Eff. Bend Line Length: 38.179 in
 Bend Line Length Limiting Criteria: 45 Degree lines back from End-Most Bolts
 Bending Stress: -49.024 ksi
 Adjusted Yield Strength: 50.000 ksi (Fy x 1.00 x 1.00)
 Usage: 0.980

Worst Case Plate Stress Details for Each Load Case

Load Case	Location	Eff. BL Length (in)	Bending Moment (ft-kip)	Bending Stress (ksi)	Allowable Stress (ksi)	Usage
1 A	Flat 7	38.179	-299.516	-35.303	50.000	0.706
2 B	Flat 7	38.179	-226.641	-26.713	50.000	0.534
3 C	Flat 7	38.179	-186.896	-22.029	50.000	0.441
4 D	Flat 6	38.179	-409.316	-48.245	50.000	0.965
5 E	Flat 7	38.179	-415.928	-49.024	50.000	0.980
6 F	Flat 6	38.179	-349.554	-41.201	50.000	0.824
7 G	Flat 7	38.179	-353.808	-41.702	50.000	0.834
8 H	Flat 6	38.179	-121.051	-14.268	50.000	0.285
9 I	Flat 7	38.179	-124.619	-14.688	50.000	0.294
10 I2	Flat 6	38.179	-144.696	-17.055	50.000	0.341
11 J	Flat 6	38.179	-108.068	-12.738	50.000	0.255
12 K	Flat 7	38.179	-175.729	-20.713	50.000	0.414



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Bolted Plate Design Results Page 19

Engineer: Robert P Kiser, PE

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Analysis completed successfully? True
Bolts meet design criteria? True
Plate meets design criteria? True

Minimum Edge Distance Warnings encountered? False
AASHTO Minimum Plate Thickness Warning encountered? False

Bolt Properties

Bolt Grade:	18J Gr. 75
Bolt Diameter:	2.2500 inches
Min. Tensile Strength (Fu):	100.0 ksi
Bolt Yield Strength (Fy):	75.0 ksi
Stress or Net Area (An):	3.2500 in ²
Tensile Area:	3.2500 in ²
Bolt Root Area:	3.0700 in ²
Bolt Gross Area:	3.9800 in ²
Min. Edge Distance:	2.8125 inches
Min. Spacing:	6.0000 inches
Nut Point/Point Width:	4.0625 inches
Nut Height:	2.1875 inches
Bolt Threads per inch:	4.5
Standard Hole Diameter:	2.3125 inches
Oversize Hole Diameter:	2.5625 inches

Miscellaneous Results Data

Pole Cross Section Area:	208.49 (in ²)
Pole Moment of Inertia:	235985 (in ⁴)
Pole Perimeter:	305.462 (in)
Pole Point/Point Width:	98.351 (in)
Width of Pole Flat:	25.455 (in)
Adjusted Pole Maximum Width:	99.335 (in)
Inertia of bolt group about X Axis:	215027.846 (in ⁴)
Inertia of bolt group about Y Axis:	215027.846 (in ⁴)
Moment at Onset of Pole Yield:	19995 (ft-kip)
ASCE 48-05 Eq. 6.2-7 (Le = 1.3d):	2.925 (in)
ASCE 48-05 Eq. 6.2-8 (Le = t + d/2):	5.125 (in)
Minimum Embedment Length (Ld):	119.485 (in)
Ratio of Clear Distance to Bolt Dia.:	0.000
Worst Case Bolt Bending Stress:	0.000 (ksi)
Minimum Required Bolt Length:	129.000 (in)
Plate Superscribing Diameter:	115.250 (in)

Component Weight Data

Gross Plate Weight:	15067.7 (lbf)
Net Plate Weight:	11553.4 (lbf)
Total Bolt Weight:	6982.2 (lbf)
Total Nut Weight:	402.2 (lbf)
Top Template Net Weight:	198.8 (lbf)
Bottom Template Net Weight:	198.8 (lbf)