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File name: C:\Users\suryas\OneDrive - S&B Engineers and Constructors, Ltd\Desktop\Projects\C1720\02 Check OSBL Pipe Rack Bridge
 L\Pulsation Study\2.1 Connections\02 Modified Connections\05 112ft Bridge Connections\TO BENTLEY.rcnx

Steel connections

Results

Connection name : CBB_EP
Connection ID : 1

Family: Column - Beams - Braces (CBB)

Type: Gusset

Description: DET4_BottomConn_112ft Bridge

Design code: AISC 360-16 LRFD

DEMANDS

Description	Right beam			Left beam			Column		Load type
	Pu [kip]	Vu [kip]	Mu33 [kip*ft]	Pu [kip]	Vu [kip]	Mu33 [kip*ft]	Pu [kip]	Vu [kip]	
L1001	-38.11	0.00	0.00	0.00	0.00	0.00	-11.76	-0.28	Design
L1002	-38.15	0.00	0.00	0.00	0.00	0.00	-7.27	-0.25	Design
L1003	-38.58	-0.01	0.00	0.00	0.00	0.00	-15.83	-0.30	Design
L1004	-38.75	0.00	0.00	0.00	0.00	0.00	-8.30	-0.26	Design
L1005	-38.92	-0.01	0.00	0.00	0.00	0.00	-8.73	-0.30	Design
L1006	-41.70	-0.01	0.00	0.00	0.00	0.00	5.54	-0.29	Design
L1007	-41.73	0.00	0.00	0.00	0.00	0.00	10.11	-0.26	Design
L2001	-42.08	0.00	0.00	0.00	0.00	0.00	17.55	-0.26	Design
L2002	-42.16	0.00	0.00	0.00	0.00	0.00	6.67	-0.27	Design
L2003	-42.32	0.00	0.00	0.00	0.00	0.00	6.23	-0.30	Design
L2004	-42.46	0.00	0.00	0.00	0.00	0.00	13.80	-0.27	Design
L2005	-42.51	0.00	0.00	0.00	0.00	0.00	14.11	-0.26	Design
L2006	-43.08	0.00	0.00	0.00	0.00	0.00	12.74	-0.29	Design
L2007	-49.33	0.00	10.00	0.00	0.00	0.00	-65.66	0.53	Design
L2008	-49.56	0.00	14.00	0.00	0.00	0.00	-23.16	0.45	Design
L2009	-91.01	-3.20	34.00	0.00	0.00	0.00	-212.82	0.89	Design
L2010	-91.01	-3.20	36.00	0.00	0.00	0.00	-212.82	0.89	Design
L2011	-91.27	-1.72	50.00	0.00	0.00	0.00	-195.50	0.89	Design
L2012	-91.51	-1.01	55.00	0.00	0.00	0.00	-121.80	0.77	Design
L2013	-91.06	-2.68	27.00	0.00	0.00	0.00	-148.15	0.86	Design
L2014	-91.34	-2.68	23.00	0.00	0.00	0.00	-105.86	0.78	Design
L2015	-91.64	-1.72	52.00	0.00	0.00	0.00	-183.91	0.88	Design
L2016	-92.15	-1.72	47.00	0.00	0.00	0.00	-147.33	0.81	Design
L2017	-92.38	-5.10	21.00	0.00	0.00	0.00	-170.39	0.90	Design
L2018	-92.60	-8.61	1.00	0.00	0.00	0.00	-161.60	0.88	Design
L2019	-92.60	-8.61	3.00	0.00	0.00	0.00	-161.60	0.88	Design
L2020	-92.60	-8.61	5.00	0.00	0.00	0.00	-161.60	0.88	Design
L2021	-92.75	-5.10	19.00	0.00	0.00	0.00	-158.79	0.89	Design
L2022	-93.03	-5.11	15.00	0.00	0.00	0.00	-116.51	0.81	Design
L2023	-101.47	0.00	0.00	0.00	0.00	0.00	-110.27	0.83	Design
L2024	-102.56	0.00	31.00	0.00	0.00	0.00	-110.92	0.81	Design
id0	-38.11	0.00	0.00	0.00	0.00	0.00	-11.76	-0.28	Design
id1	-38.15	0.00	0.00	0.00	0.00	0.00	-7.27	-0.25	Design
id2	-38.58	-0.01	0.00	0.00	0.00	0.00	-15.83	-0.30	Design
id3	-38.75	0.00	0.00	0.00	0.00	0.00	-8.30	-0.26	Design
id4	-38.92	-0.01	0.00	0.00	0.00	0.00	-8.73	-0.30	Design
id5	-41.70	-0.01	0.00	0.00	0.00	0.00	5.54	-0.29	Design
id6	-41.73	0.00	0.00	0.00	0.00	0.00	10.11	-0.26	Design
id7	-42.08	0.00	0.00	0.00	0.00	0.00	17.55	-0.26	Design
id8	-42.16	0.00	0.00	0.00	0.00	0.00	6.67	-0.27	Design

id9	-42.32	0.00	0.00	0.00	0.00	0.00	6.23	-0.30	Design
id10	-42.46	0.00	0.00	0.00	0.00	0.00	13.80	-0.27	Design
id11	-42.51	0.00	0.00	0.00	0.00	0.00	14.11	-0.26	Design
id12	-43.08	0.00	0.00	0.00	0.00	0.00	12.74	-0.29	Design
id13	-49.33	0.00	10.00	0.00	0.00	0.00	-65.66	0.53	Design
id14	-49.56	0.00	14.00	0.00	0.00	0.00	-23.16	0.45	Design
id15	-91.01	-3.20	34.00	0.00	0.00	0.00	-212.82	0.89	Design
id16	-91.01	-3.20	36.00	0.00	0.00	0.00	-212.82	0.89	Design
id17	-91.27	-1.72	50.00	0.00	0.00	0.00	-195.50	0.89	Design
id18	-91.51	-1.01	55.00	0.00	0.00	0.00	-121.80	0.77	Design
id19	-91.06	-2.68	27.00	0.00	0.00	0.00	-148.15	0.86	Design
id20	-91.34	-2.68	23.00	0.00	0.00	0.00	-105.86	0.78	Design
id21	-91.64	-1.72	52.00	0.00	0.00	0.00	-183.91	0.88	Design
id22	-92.15	-1.72	47.00	0.00	0.00	0.00	-147.33	0.81	Design
id23	-92.38	-5.10	21.00	0.00	0.00	0.00	-170.39	0.90	Design
id24	-92.60	-8.61	1.00	0.00	0.00	0.00	-161.60	0.88	Design
id25	-92.60	-8.61	3.00	0.00	0.00	0.00	-161.60	0.88	Design
id26	-92.60	-8.61	5.00	0.00	0.00	0.00	-161.60	0.88	Design
id27	-92.75	-5.10	19.00	0.00	0.00	0.00	-158.79	0.89	Design
id28	-93.03	-5.11	15.00	0.00	0.00	0.00	-116.51	0.81	Design
id29	-101.47	0.00	0.00	0.00	0.00	0.00	-110.27	0.83	Design

Description	Pu				Load type
	Brace1 [kip]	Brace2 [kip]	Brace3 [kip]	Brace4 [kip]	
L1001	66.45	0.00	0.00	0.00	Design
L1002	66.52	0.00	0.00	0.00	Design
L1003	67.17	0.00	0.00	0.00	Design
L1004	67.41	0.00	0.00	0.00	Design
L1005	67.66	0.00	0.00	0.00	Design
L1006	71.96	0.00	0.00	0.00	Design
L1007	72.02	0.00	0.00	0.00	Design
L2001	72.52	0.00	0.00	0.00	Design
L2002	72.65	0.00	0.00	0.00	Design
L2003	72.88	0.00	0.00	0.00	Design
L2004	73.08	0.00	0.00	0.00	Design
L2005	73.15	0.00	0.00	0.00	Design
L2006	74.01	0.00	0.00	0.00	Design
L2007	84.54	0.00	0.00	0.00	Design
L2008	84.75	0.00	0.00	0.00	Design
L2009	156.37	0.00	0.00	0.00	Design
L2010	156.37	0.00	0.00	0.00	Design
L2011	156.76	0.00	0.00	0.00	Design
L2012	156.88	0.00	0.00	0.00	Design
L2013	156.88	0.00	0.00	0.00	Design
L2014	157.14	0.00	0.00	0.00	Design
L2015	157.32	0.00	0.00	0.00	Design
L2016	157.95	0.00	0.00	0.00	Design
L2017	159.00	0.00	0.00	0.00	Design
L2018	159.31	0.00	0.00	0.00	Design
L2019	159.31	0.00	0.00	0.00	Design
L2020	159.31	0.00	0.00	0.00	Design
L2021	159.54	0.00	0.00	0.00	Design
L2022	159.79	0.00	0.00	0.00	Design
L2023	175.35	0.00	0.00	0.00	Design
L2024	176.40	0.00	0.00	0.00	Design
id0	66.45	0.00	0.00	0.00	Design
id1	66.52	0.00	0.00	0.00	Design
id2	67.17	0.00	0.00	0.00	Design
id3	67.41	0.00	0.00	0.00	Design
id4	67.66	0.00	0.00	0.00	Design
id5	71.96	0.00	0.00	0.00	Design
id6	72.02	0.00	0.00	0.00	Design
id7	72.52	0.00	0.00	0.00	Design
id8	72.65	0.00	0.00	0.00	Design
id9	72.88	0.00	0.00	0.00	Design
id10	73.08	0.00	0.00	0.00	Design
id11	73.15	0.00	0.00	0.00	Design
id12	74.01	0.00	0.00	0.00	Design

id13	84.54	0.00	0.00	0.00	Design
id14	84.75	0.00	0.00	0.00	Design
id15	156.37	0.00	0.00	0.00	Design
id16	156.37	0.00	0.00	0.00	Design
id17	156.76	0.00	0.00	0.00	Design
id18	156.88	0.00	0.00	0.00	Design
id19	156.88	0.00	0.00	0.00	Design
id20	157.14	0.00	0.00	0.00	Design
id21	157.32	0.00	0.00	0.00	Design
id22	157.95	0.00	0.00	0.00	Design
id23	159.00	0.00	0.00	0.00	Design
id24	159.31	0.00	0.00	0.00	Design
id25	159.31	0.00	0.00	0.00	Design
id26	159.31	0.00	0.00	0.00	Design
id27	159.54	0.00	0.00	0.00	Design
id28	159.79	0.00	0.00	0.00	Design
id29	175.35	0.00	0.00	0.00	Design

Interface between Gusset - Top right brace
Connection: Directly bolted

DEMANDS

Pu [kip]	Description	Load type
66.45	L1001	Design
66.52	L1002	Design
67.17	L1003	Design
67.41	L1004	Design
67.66	L1005	Design
71.96	L1006	Design
72.02	L1007	Design
72.52	L2001	Design
72.65	L2002	Design
72.88	L2003	Design
73.08	L2004	Design
73.15	L2005	Design
74.01	L2006	Design
84.54	L2007	Design
84.75	L2008	Design
156.37	L2009	Design
156.37	L2010	Design
156.76	L2011	Design
156.88	L2012	Design
156.88	L2013	Design
157.14	L2014	Design
157.32	L2015	Design
157.95	L2016	Design
159.00	L2017	Design
159.31	L2018	Design
159.31	L2019	Design
159.31	L2020	Design
159.54	L2021	Design
159.79	L2022	Design
175.35	L2023	Design
176.40	L2024	Design
66.45	id0	Design
66.52	id1	Design
67.17	id2	Design
67.41	id3	Design
67.66	id4	Design
71.96	id5	Design
72.02	id6	Design
72.52	id7	Design
72.65	id8	Design
72.88	id9	Design
73.08	id10	Design
73.15	id11	Design
74.01	id12	Design
84.54	id13	Design
84.75	id14	Design

156.37	id15	Design
156.37	id16	Design
156.76	id17	Design
156.88	id18	Design
156.88	id19	Design
157.14	id20	Design
157.32	id21	Design
157.95	id22	Design
159.00	id23	Design
159.31	id24	Design
159.31	id25	Design
159.31	id26	Design
159.54	id27	Design
159.79	id28	Design
175.35	id29	Design

GEOMETRIC CONSIDERATIONS

Dimensions	Unit	Value	Min. value	Max. value	Sta.	References
<u>Directly bolted</u>						
Transverse edge distance	[in]	2.50	1.00	--	✓	Tables J3.4, J3.5
Longitudinal edge distance	[in]	1.50	1.00	--	✓	Tables J3.4, J3.5
Longitudinal center-to-center spacing (pitch)	[in]	3.00	2.00	12.00	✓	Sec. J3.3, Sec. J3.5
<u>Gusset</u>						
Transverse edge distance	[in]	3.37	1.00	--	✓	Tables J3.4, J3.5
Longitudinal edge distance	[in]	1.50	1.00	--	✓	Tables J3.4, J3.5

DESIGN CHECK

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
<u>Directly bolted</u>						
Bolts shear	[Kip]	179.01	176.40	L2024	0.99	Tables (7-1..14)
Bolt bearing under shear load	[Kip]	414.98	176.40	L2024	0.43	Eq. J3-6
Block shear rupture at brace web	[Kip]	380.25	176.40	L2024	0.46	Eq. J4-5
<u>Gusset</u>						
Bolt bearing on gusset	[Kip]	259.37	176.40	L2024	0.68	Eq. J3-6
Ratio		0.99				

Checks for gusset and brace

DEMANDS

Pu	Description	Load type
[kip]		

66.45	L1001	Design
66.52	L1002	Design
67.17	L1003	Design
67.41	L1004	Design
67.66	L1005	Design
71.96	L1006	Design
72.02	L1007	Design
72.52	L2001	Design
72.65	L2002	Design
72.88	L2003	Design
73.08	L2004	Design
73.15	L2005	Design
74.01	L2006	Design
84.54	L2007	Design
84.75	L2008	Design
156.37	L2009	Design
156.37	L2010	Design

156.76	L2011	Design
156.88	L2012	Design
156.88	L2013	Design
157.14	L2014	Design
157.32	L2015	Design
157.95	L2016	Design
159.00	L2017	Design
159.31	L2018	Design
159.31	L2019	Design
159.31	L2020	Design
159.54	L2021	Design
159.79	L2022	Design
175.35	L2023	Design
176.40	L2024	Design
66.45	id0	Design
66.52	id1	Design
67.17	id2	Design
67.41	id3	Design
67.66	id4	Design
71.96	id5	Design
72.02	id6	Design
72.52	id7	Design
72.65	id8	Design
72.88	id9	Design
73.08	id10	Design
73.15	id11	Design
74.01	id12	Design
84.54	id13	Design
84.75	id14	Design
156.37	id15	Design
156.37	id16	Design
156.76	id17	Design
156.88	id18	Design
156.88	id19	Design
157.14	id20	Design
157.32	id21	Design
157.95	id22	Design
159.00	id23	Design
159.31	id24	Design
159.31	id25	Design
159.31	id26	Design
159.54	id27	Design
159.79	id28	Design
175.35	id29	Design

DESIGN CHECK

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
<u>Member</u>						
Yielding strength due to axial load	[Kip]	431.10	176.40	L2024	0.41	Eq. J4-1
Tension rupture	[Kip]	373.65	176.40	L2024	0.47	Eq. J4-2
<u>Gusset</u>						
Tension yielding on the Whitmore section	[Kip]	367.69	176.40	L2024	0.48	Eq. J4-1
Ratio	0.48					

Upper right gusset interface - beam Directly welded

DEMANDS

Description	Beam			Column			Load type
	Ru [kip]	Pu [kip]	Mu [kip*ft]	Pu [kip]	Mu22 [kip*ft]	Mu33 [kip*ft]	
L1001	26.70	11.55	0.01	0.00	0.00	0.00	Design
L1002	26.73	11.57	0.01	0.00	0.00	0.00	Design
L1003	26.99	11.68	0.01	0.00	0.00	0.00	Design
L1004	27.09	11.72	0.01	0.00	0.00	0.00	Design
L1005	27.19	11.76	0.01	0.00	0.00	0.00	Design

L1006	28.92	12.51	0.02	0.00	0.00	0.00	Design
L1007	28.94	12.52	0.02	0.00	0.00	0.00	Design
L2001	29.14	12.61	0.02	0.00	0.00	0.00	Design
L2002	29.20	12.63	0.02	0.00	0.00	0.00	Design
L2003	29.29	12.67	0.02	0.00	0.00	0.00	Design
L2004	29.37	12.71	0.02	0.00	0.00	0.00	Design
L2005	29.40	12.72	0.02	0.00	0.00	0.00	Design
L2006	29.74	12.87	0.02	0.00	0.00	0.00	Design
L2007	33.98	14.70	0.02	0.00	0.00	0.00	Design
L2008	34.06	14.74	0.02	0.00	0.00	0.00	Design
L2009	62.84	27.19	0.03	0.00	0.00	0.00	Design
L2010	62.84	27.19	0.03	0.00	0.00	0.00	Design
L2011	63.00	27.26	0.03	0.00	0.00	0.00	Design
L2012	63.05	27.28	0.03	0.00	0.00	0.00	Design
L2013	63.05	27.28	0.03	0.00	0.00	0.00	Design
L2014	63.15	27.32	0.03	0.00	0.00	0.00	Design
L2015	63.22	27.35	0.03	0.00	0.00	0.00	Design
L2016	63.48	27.46	0.03	0.00	0.00	0.00	Design
L2017	63.90	27.64	0.03	0.00	0.00	0.00	Design
L2018	64.02	27.70	0.03	0.00	0.00	0.00	Design
L2019	64.02	27.70	0.03	0.00	0.00	0.00	Design
L2020	64.02	27.70	0.03	0.00	0.00	0.00	Design
L2021	64.12	27.74	0.03	0.00	0.00	0.00	Design
L2022	64.22	27.78	0.03	0.00	0.00	0.00	Design
L2023	70.47	30.49	0.04	0.00	0.00	0.00	Design
L2024	70.89	30.67	0.04	0.00	0.00	0.00	Design
id0	26.70	11.55	0.01	0.00	0.00	0.00	Design
id1	26.73	11.57	0.01	0.00	0.00	0.00	Design
id2	26.99	11.68	0.01	0.00	0.00	0.00	Design
id3	27.09	11.72	0.01	0.00	0.00	0.00	Design
id4	27.19	11.76	0.01	0.00	0.00	0.00	Design
id5	28.92	12.51	0.02	0.00	0.00	0.00	Design
id6	28.94	12.52	0.02	0.00	0.00	0.00	Design
id7	29.14	12.61	0.02	0.00	0.00	0.00	Design
id8	29.20	12.63	0.02	0.00	0.00	0.00	Design
id9	29.29	12.67	0.02	0.00	0.00	0.00	Design
id10	29.37	12.71	0.02	0.00	0.00	0.00	Design
id11	29.40	12.72	0.02	0.00	0.00	0.00	Design
id12	29.74	12.87	0.02	0.00	0.00	0.00	Design
id13	33.98	14.70	0.02	0.00	0.00	0.00	Design
id14	34.06	14.74	0.02	0.00	0.00	0.00	Design
id15	62.84	27.19	0.03	0.00	0.00	0.00	Design
id16	62.84	27.19	0.03	0.00	0.00	0.00	Design
id17	63.00	27.26	0.03	0.00	0.00	0.00	Design
id18	63.05	27.28	0.03	0.00	0.00	0.00	Design
id19	63.05	27.28	0.03	0.00	0.00	0.00	Design
id20	63.15	27.32	0.03	0.00	0.00	0.00	Design
id21	63.22	27.35	0.03	0.00	0.00	0.00	Design
id22	63.48	27.46	0.03	0.00	0.00	0.00	Design
id23	63.90	27.64	0.03	0.00	0.00	0.00	Design
id24	64.02	27.70	0.03	0.00	0.00	0.00	Design
id25	64.02	27.70	0.03	0.00	0.00	0.00	Design
id26	64.02	27.70	0.03	0.00	0.00	0.00	Design
id27	64.12	27.74	0.03	0.00	0.00	0.00	Design
id28	64.22	27.78	0.03	0.00	0.00	0.00	Design
id29	70.47	30.49	0.04	0.00	0.00	0.00	Design

GEOMETRIC CONSIDERATIONS

Dimensions	Unit	Value	Min. value	Max. value	Sta.	References
<u>Gusset</u>						
Weld size	[1/16in]	4	3	5	✓	table J2.4, Sec. J2.2b

DESIGN CHECK

Verification

Gusset

Beam yielding (normal stress)	[Kip]	444.38	30.78	L2024	0.07	Eq. B-1, Appendix B, DG29, Eq. J4-1
Shear yielding	[Kip]	296.25	70.89	L2024	0.24	Eq. J4-3
Gusset edge tension stress	[Kip/in2]	45.00	3.11	L2024	0.07	Eq. B-1, Appendix B, DG29
Gusset edge shear stress	[Kip/in2]	30.00	7.18	L2024	0.24	J4-1
Weld capacity	[Kip]	198.08	96.55	L2024	0.49	Tables 8-4 .. 8-11

Chord

Weld block shear	[Kip]	221.80	70.89	L2024	0.32	Eq. J4-5
Web crippling	[Kip]	214.19	30.78	L2024	0.14	Eq. B-1, Appendix B, DG29, Eq. J10-4
Local web yielding	[Kip]	217.87	30.78	L2024	0.14	Eq. J10-3, Eq. B-1, Appendix B, DG29
Transverse section web yielding	[Kip]	58.29	70.89	L2024	1.22	Eq. G2-1

Ratio

1.22

Right beam interface - column

Bolted end plate

End plate - Upper right gusset to column

DEMANDS

Description	N [kip]	V [kip]	M [kip*ft]
L1001	23.75	31.69	0.05
L1002	23.78	31.73	0.05
L1003	24.01	32.04	0.05
L1004	24.09	32.15	0.05
L1005	24.18	32.27	0.05
L1006	25.72	34.32	0.05
L1007	25.74	34.35	0.05
L2001	25.92	34.58	0.05
L2002	25.96	34.65	0.05
L2003	26.05	34.76	0.05
L2004	26.12	34.86	0.05
L2005	26.14	34.89	0.05
L2006	26.45	35.30	0.05
L2007	30.21	40.32	0.06
L2008	30.29	40.42	0.06
L2009	55.89	74.58	0.11
L2010	55.89	74.58	0.11
L2011	56.02	74.76	0.11
L2012	56.07	74.82	0.11
L2013	56.07	74.82	0.11
L2014	56.16	74.94	0.11
L2015	56.22	75.03	0.11
L2016	56.45	75.33	0.11
L2017	56.82	75.83	0.11
L2018	56.94	75.98	0.11
L2019	56.94	75.98	0.11
L2020	56.94	75.98	0.11
L2021	57.02	76.09	0.11
L2022	57.11	76.21	0.11
L2023	62.67	83.63	0.13
L2024	63.04	84.13	0.13
id0	23.75	31.69	0.05
id1	23.78	31.73	0.05
id2	24.01	32.04	0.05
id3	24.09	32.15	0.05

id4	24.18	32.27	0.05
id5	25.72	34.32	0.05
id6	25.74	34.35	0.05
id7	25.92	34.58	0.05
id8	25.96	34.65	0.05
id9	26.05	34.76	0.05
id10	26.12	34.86	0.05
id11	26.14	34.89	0.05
id12	26.45	35.30	0.05
id13	30.21	40.32	0.06
id14	30.29	40.42	0.06
id15	55.89	74.58	0.11
id16	55.89	74.58	0.11
id17	56.02	74.76	0.11
id18	56.07	74.82	0.11
id19	56.07	74.82	0.11
id20	56.16	74.94	0.11
id21	56.22	75.03	0.11
id22	56.45	75.33	0.11
id23	56.82	75.83	0.11
id24	56.94	75.98	0.11
id25	56.94	75.98	0.11
id26	56.94	75.98	0.11
id27	57.02	76.09	0.11
id28	57.11	76.21	0.11
id29	62.67	83.63	0.13

GEOMETRIC CONSIDERATIONS

Dimensions	Unit	Value	Min. value	Max. value	Sta.	References
<u>End plate</u>						
Vertical edge distance	[in]	1.75	1.00	--	✓	Tables J3.4, J3.5
Horizontal edge distance	[in]	1.75	1.00	--	✓	Tables J3.4, J3.5
Horizontal center-to-center spacing (gage)	[in]	5.50	2.00	12.00	✓	Sec. J3.3, Sec. J3.5
Vertical center-to-center spacing (pitch)	[in]	4.00	2.00	12.00	✓	Sec. J3.3, Sec. J3.5
Horizontal edge distance	[in]	2.35	1.00	--	✓	Tables J3.4, J3.5
Weld size	[1/16in]	4	4	--	✓	table J2.4

⚠ WARNINGS

- The extended end plate portion is not adequate to the gusset dimensions.

DESIGN CHECK

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
<u>End plate</u>						
Bolts shear	[Kip]	179.01	84.13	L2024	0.47	Tables (7-1..14)
Bolt tension	[Kip]	247.64	63.04	L2024	0.25	p. 9-10
Bolt bearing under shear load	[Kip]	1074.02	84.13	L2024	0.08	Eq. J3-6
Block shear	[Kip]	1158.40	84.13	L2024	0.07	Eq. J4-5
Resulting tension capacity due prying action	[Kip]	247.64	63.04	L2024	0.25	p. 9-12, p. 9-13, p. 9-10
<u>Gusset</u>						
Shear yielding at the gusset-to-end plate interface	[Kip]	384.37	84.13	L2024	0.22	Eq. J4-3
Tensile yielding at the gusset-to-end plate interface	[Kip]	576.56	63.04	L2024	0.11	Eq. J4-1
<u>Welds</u>						
Gusset to end plate weld capacity	[Kip]	281.32	105.13	L2024	0.37	Tables 8-4 .. 8-11
<u>Support</u>						
Bolt bearing under shear load	[Kip]	583.54	84.13	L2024	0.14	Eq. J3-6
Tension capacity with prying action	[Kip]	189.10	63.04	L2024	0.33	p. 9-12, p. 9-13, p. 9-10

End plate - Right beam to column

DEMANDS			
Description	N	V	M
	[kip]	[kip]	[kip*ft]
L1001	-11.41	-11.56	0.00
L1002	-11.42	-11.57	0.00
L1003	-11.58	-11.68	0.00
L1004	-11.66	-11.72	0.00
L1005	-11.72	-11.77	0.00
L1006	-12.79	-12.52	0.00
L1007	-12.79	-12.52	0.00
L2001	-12.93	-12.61	0.00
L2002	-12.97	-12.63	0.00
L2003	-13.03	-12.68	0.00
L2004	-13.09	-12.71	0.00
L2005	-13.11	-12.72	0.00
L2006	-13.33	-12.87	0.00
L2007	-15.36	-14.70	0.00
L2008	-15.50	-14.73	0.00
L2009	-28.17	-30.38	0.00
L2010	-28.17	-30.38	0.00
L2011	-28.27	-28.97	0.00
L2012	-28.46	-28.28	0.00
L2013	-28.02	-29.96	0.00
L2014	-28.19	-30.00	0.00
L2015	-28.42	-29.07	0.00
L2016	-28.67	-29.18	0.00
L2017	-28.48	-32.75	0.00
L2018	-28.58	-36.31	0.00
L2019	-28.58	-36.31	0.00
L2020	-28.58	-36.31	0.00
L2021	-28.63	-32.84	0.00
L2022	-28.81	-32.89	0.00
L2023	-31.00	-30.49	0.00
L2024	-31.67	-30.67	0.00
id0	-11.41	-11.56	0.00
id1	-11.42	-11.57	0.00
id2	-11.58	-11.68	0.00
id3	-11.66	-11.72	0.00
id4	-11.72	-11.77	0.00
id5	-12.79	-12.52	0.00
id6	-12.79	-12.52	0.00
id7	-12.93	-12.61	0.00
id8	-12.97	-12.63	0.00
id9	-13.03	-12.68	0.00
id10	-13.09	-12.71	0.00
id11	-13.11	-12.72	0.00
id12	-13.33	-12.87	0.00
id13	-15.36	-14.70	0.00
id14	-15.50	-14.73	0.00
id15	-28.17	-30.38	0.00
id16	-28.17	-30.38	0.00
id17	-28.27	-28.97	0.00
id18	-28.46	-28.28	0.00
id19	-28.02	-29.96	0.00
id20	-28.19	-30.00	0.00
id21	-28.42	-29.07	0.00
id22	-28.67	-29.18	0.00
id23	-28.48	-32.75	0.00
id24	-28.58	-36.31	0.00
id25	-28.58	-36.31	0.00
id26	-28.58	-36.31	0.00
id27	-28.63	-32.84	0.00

id28	-28.81	-32.89	0.00
id29	-31.00	-30.49	0.00

GEOMETRIC CONSIDERATIONS

Dimensions	Unit	Value	Min. value	Max. value	Sta.	References
<u>End plate</u>						
Vertical edge distance	[in]	1.75	1.00	--	✓	Tables J3.4, J3.5
Horizontal edge distance	[in]	1.75	1.00	--	✓	Tables J3.4, J3.5
Horizontal center-to-center spacing (gage)	[in]	5.50	2.00	12.00	✓	Sec. J3.3, Sec. J3.5
Vertical center-to-center spacing (pitch)	[in]	3.00	2.00	12.00	✓	Sec. J3.3, Sec. J3.5
Horizontal edge distance	[in]	2.35	1.00	--	✓	Tables J3.4, J3.5
Flange weld size	[1/16in]	4	3	--	✓	table J2.4
Web weld size	[1/16in]	4	2	--	✓	table J2.4

DESIGN CHECK

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
<u>End plate</u>						
Bolts shear	[Kip]	71.60	36.31	L2018	0.51	Tables (7-1..14)
Bolt tension	[Kip]	104.50	0.00	L2009	0.00	p. 9-10
Bolt bearing under shear load	[Kip]	415.90	36.31	L2018	0.09	Eq. J3-6
Block shear	[Kip]	521.65	36.31	L2018	0.07	Eq. J4-5
<u>Beam</u>						
Shear yielding at the web-to-end plate interface	[Kip]	52.45	36.31	L2018	0.69	Eq. J4-3
Tensile yielding at the web-to-end plate interface	[Kip]	78.67	31.67	L2024	0.40	Eq. J4-1
<u>Welds</u>						
Web weld shear strength	[Kip]	98.80	46.20	L2018	0.47	Tables 8-4 .. 8-11
<u>Support</u>						
Bolt bearing under shear load	[Kip]	233.42	36.31	L2018	0.16	Eq. J3-6
Ratio	0.69					

Column flange zone

DESIGN CHECK

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
<u>Column</u>						
Web shear strength	[Kip]	193.16	31.67	L2024	0.16	Eq. J4-3
Ratio	0.16					
Global critical strength ratio	1.22					

REFERENCES

- [9] AISC 2005, Design Examples Version 13.0, pp. IIC-26 - IIC-27
 [8] Dowswell, B., 2003, Connection Design For Steel Structures, Structural Design Solutions, LLC. Chapter 13, p. 14