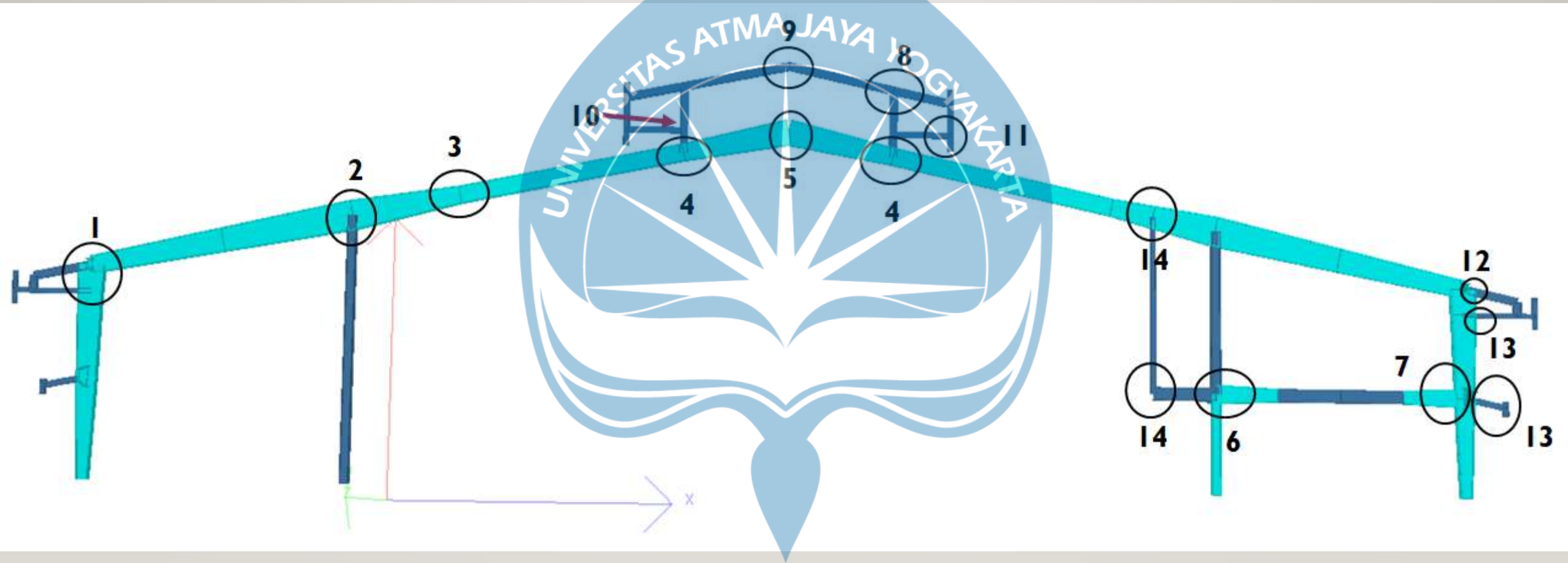


The logo of Universitas Atma Jaya Yogyakarta is a light blue emblem. It features a circular upper portion with a compass rose design and the university's name in Indonesian, "UNIVERSITAS ATMA JAYA YOGYAKARTA", written in a circular path. Below the circle is a stylized, symmetrical base that resembles an open book or a pair of wings.

LAMPIRAN
RAM CONNECTION
ELEMEN

DETAIL-DETAIL CONNECTION PADA PORTAL AS-15



Steel Connections Results

Connection: 1 - MEP Knee BCF - Vertical

Family: Beam - Column flange (BCF)
Type: Knee moment end plate
Description: Connection Column WB-500/1200x350x10x14 to Rafter WB-800/1400x300x8x14

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-133.78	17.12	-628.73	808.48	-791.36	0.00	0.00	-105.92	674.40	Design
LC2	-93.51	85.95	-92.05	160.09	-74.15	0.00	0.00	75.16	98.44	Design
LC3	47.29	-173.56	-350.08	358.61	-532.18	0.00	0.00	-105.92	398.10	Design
LC4	11.36	-141.21	-104.11	61.84	-203.06	0.00	0.00	-12.57	193.84	Design
LC5	11.36	-141.21	-104.11	61.84	-203.06	0.00	0.00	-11.00	193.84	Design
LC6	-91.31	-26.50	-722.98	906.58	-933.08	0.00	0.00	-69.88	870.77	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.00	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	115.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	100.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	100.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	115.00	30.35	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	1139.09	578.00	1156.00	✓	Sec. J10.8
Width	[mm]	145.00	111.67	--	✓	Sec. J10.8

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by bolt rupture with prying action

End plate behavior (internal flange)

Thin plate behavior controlled by bolt rupture with prying action

Connection plate behavior (external flange)

Thin plate behavior controlled by plate yielding

Connection plate behavior (internal flange)

Thick plate behavior controlled by no prying bolt rupture

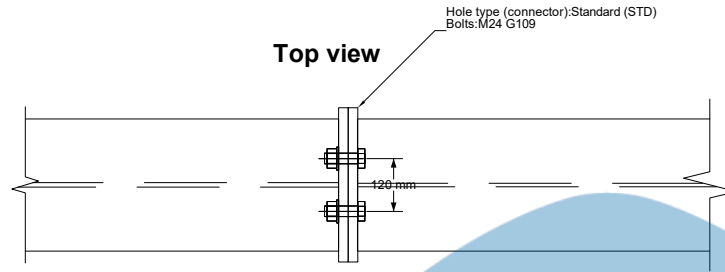
Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1801.90	712.57	LC6	0.40	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1435.70	712.57	LC6	0.50	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1040.51	712.57	LC6	0.68	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	0.00	LC1	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3201.78	133.78	LC1	0.04	Eq. J3-6
Shear yielding	[KN]	1433.41	453.38	LC6	0.32	DG4 Eq. 3.12
Shear rupture	[KN]	1297.64	453.38	LC6	0.35	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1802.37	0.00	LC1	0.00	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1435.85	0.00	LC1	0.00	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1040.63	0.00	LC1	0.00	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	133.78	LC1	0.11	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3201.78	47.29	LC3	0.01	Eq. J3-6
Shear yielding	[KN]	1433.41	466.63	LC6	0.33	DG4 Eq. 3.12
Shear rupture	[KN]	1297.64	466.63	LC6	0.36	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	769.66	47.29	LC3	0.06	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2893.76	2482.10	LC1	0.86	Eq. J4-1
Shear yielding	[KN]	1323.79	47.29	LC3	0.04	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	906.77	LC6	0.70	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	1220.49	712.57	LC6	0.58	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1027.34	712.57	LC6	0.69	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	3201.78	133.78	LC1	0.04	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	2176.37	0.00	LC1	0.00	DG4 Eq. 3.21
Support bolt bearing (internal flange)	[KN]	3407.43	47.29	LC3	0.01	Eq. J3-6
Panel web shear	[KN]	1987.99	870.77	LC6	0.44	Sec. G1
Support - right side						
Local web yielding	[KN]	2356.44	933.08	LC6	0.40	Sec. J10
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	1939.14	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	898.20	515.78	LC6	0.57	Sec. J4.4
Global critical strength ratio						
		0.86				

References

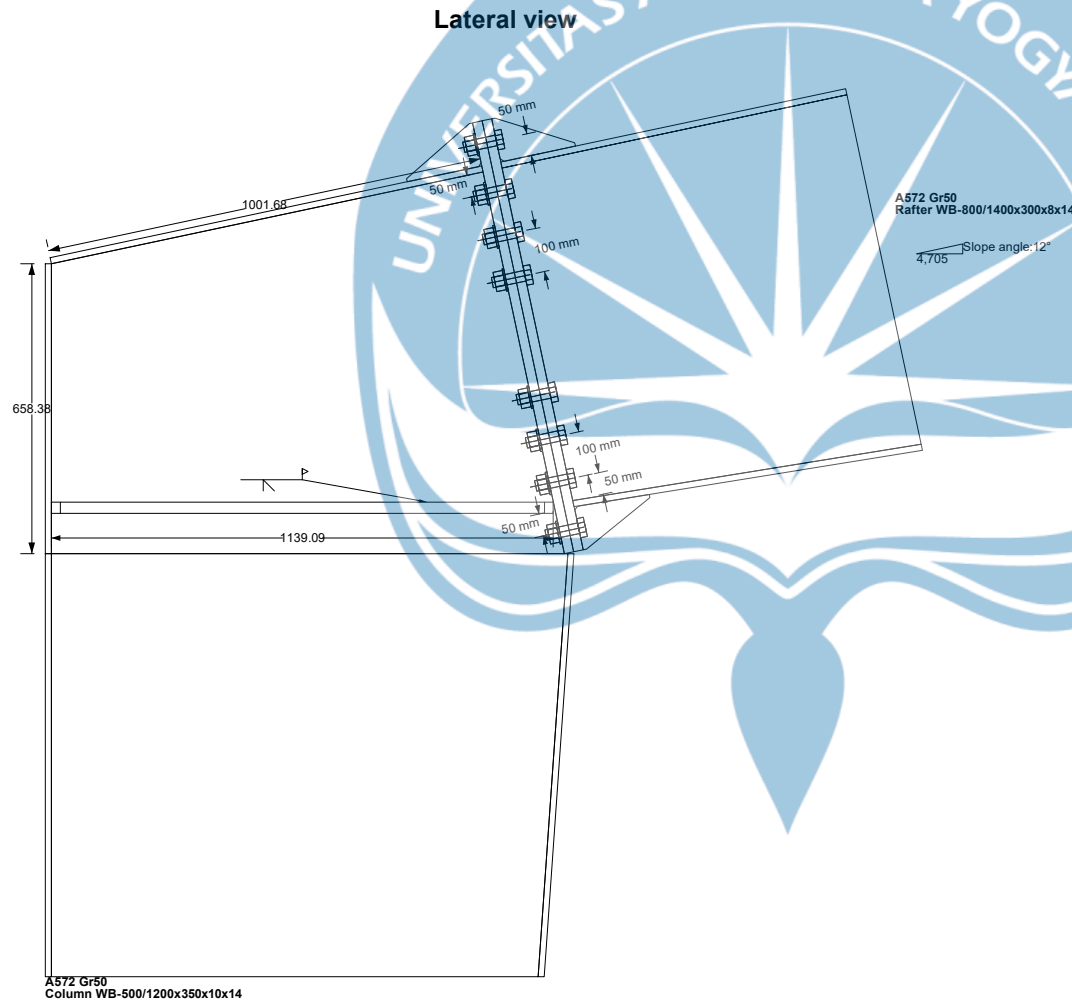
[12] European Committee for Standardization (CEN), Eurocode 3: Design of steel structures – Part 1-8: General – Design of joints (EN 1993-1-8:2005), Sections 6.2.4 to 6.2.6

Top view

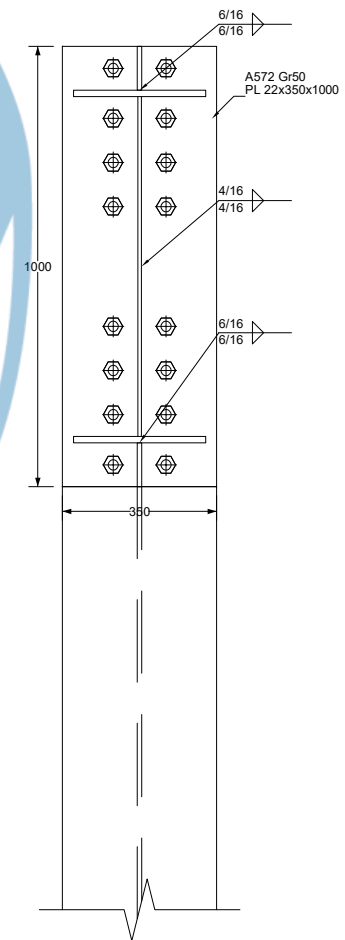


CONNECTION COLUMN WB-500/1200X350X10X14 TO
RAFTER WB-800/1400X300X8X14

Lateral view



Front view



Steel Connections Results

Connection: 2 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column H-400x400x13x21 to Rafter WB-800/1400x300x8x14

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-201.71	-5.32	-1650.14	1188.26	-1193.58	0.00	0.00	-211.80	1094.49	Design
LC2	-139.66	59.73	-763.45	580.85	-521.12	0.00	0.00	51.62	537.32	Design
LC3	40.38	-152.75	-182.87	55.60	-208.36	0.00	0.00	-523.02	182.41	Design
LC4	-60.71	-0.68	-242.53	174.70	-175.37	0.00	0.00	-106.70	174.76	Design
LC5	-90.66	-0.64	-696.85	502.60	-503.24	0.00	0.00	-106.70	502.62	Design
LC6	-201.71	-5.32	-1650.14	1188.26	-1193.58	0.00	0.00	-196.01	1094.49	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.00	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	100.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	100.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	50.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	140.00	30.35	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	358.00	179.00	358.00	✓	Sec. J10.8
Width	[mm]	190.00	100.17	--	✓	Sec. J10.8

Doublers

Recommended thickness for beveling and welding [mm] 10.00 5.13 --  DG 13 Eq. 4.4-4

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by bolt rupture with prying action

End plate behavior (internal flange)

Thin plate behavior controlled by bolt rupture with prying action

Column flange behavior (external flange)

Thin plate behavior controlled by bolt rupture with prying action

Column flange behavior (internal flange)

Thin plate behavior controlled by plate yielding

Design Check

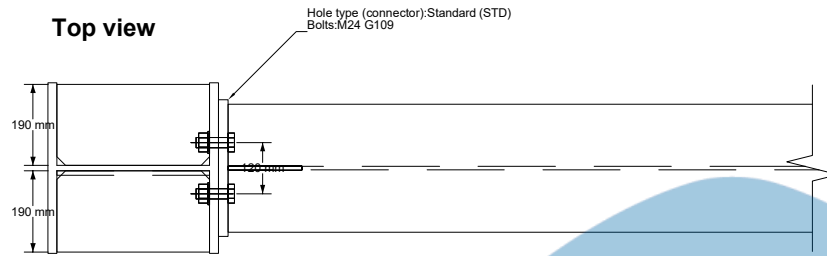
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	3256.02	1646.46	LC1	0.51	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2697.82	1646.46	LC1	0.61	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1968.37	1646.46	LC1	0.84	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	0.00	LC1	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3201.78	201.71	LC1	0.06	Eq. J3-6
Shear yielding	[KN]	1310.55	594.13	LC1	0.45	DG4 Eq. 3.12
Shear rupture	[KN]	1164.54	594.13	LC1	0.51	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	2956.98	0.00	LC1	0.00	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	3238.74	0.00	LC1	0.00	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	2228.16	0.00	LC1	0.00	DG16 Sec 2.5
Bolts shear	[KN]	1578.25	201.71	LC1	0.13	Tables (7-1..14)
Bolt bearing under shear load	[KN]	4053.64	40.38	LC3	0.01	Eq. J3-6
Shear yielding	[KN]	1310.55	596.79	LC1	0.46	DG4 Eq. 3.12
Shear rupture	[KN]	1164.54	596.79	LC1	0.51	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	1367.84	40.38	LC3	0.03	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2893.76	2482.10	LC1	0.86	Eq. J4-1
Shear yielding	[KN]	2316.63	40.38	LC3	0.02	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	1188.26	LC1	0.91	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	2465.68	1646.46	LC1	0.67	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1970.83	1646.46	LC1	0.84	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	2727.11	201.71	LC1	0.07	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	0.00	0.00	LC1	NAN	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	2229.48	0.00	LC1	0.00	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	3627.84	40.38	LC3	0.01	Eq. J3-6
Panel web shear	[KN]	1441.60	1094.49	LC1	0.76	Eq. J10-9
Support - right side						
Local web yielding	[KN]	2785.62	1193.58	LC1	0.43	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	2109.78	512.42	LC1	0.24	Eq. J4-1
Compression	[KN]	1873.50	0.00	LC1	0.00	Sec. J4.4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	2109.78	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	1873.50	517.74	LC1	0.28	Sec. J4.4

Global critical strength ratio 0.91

References

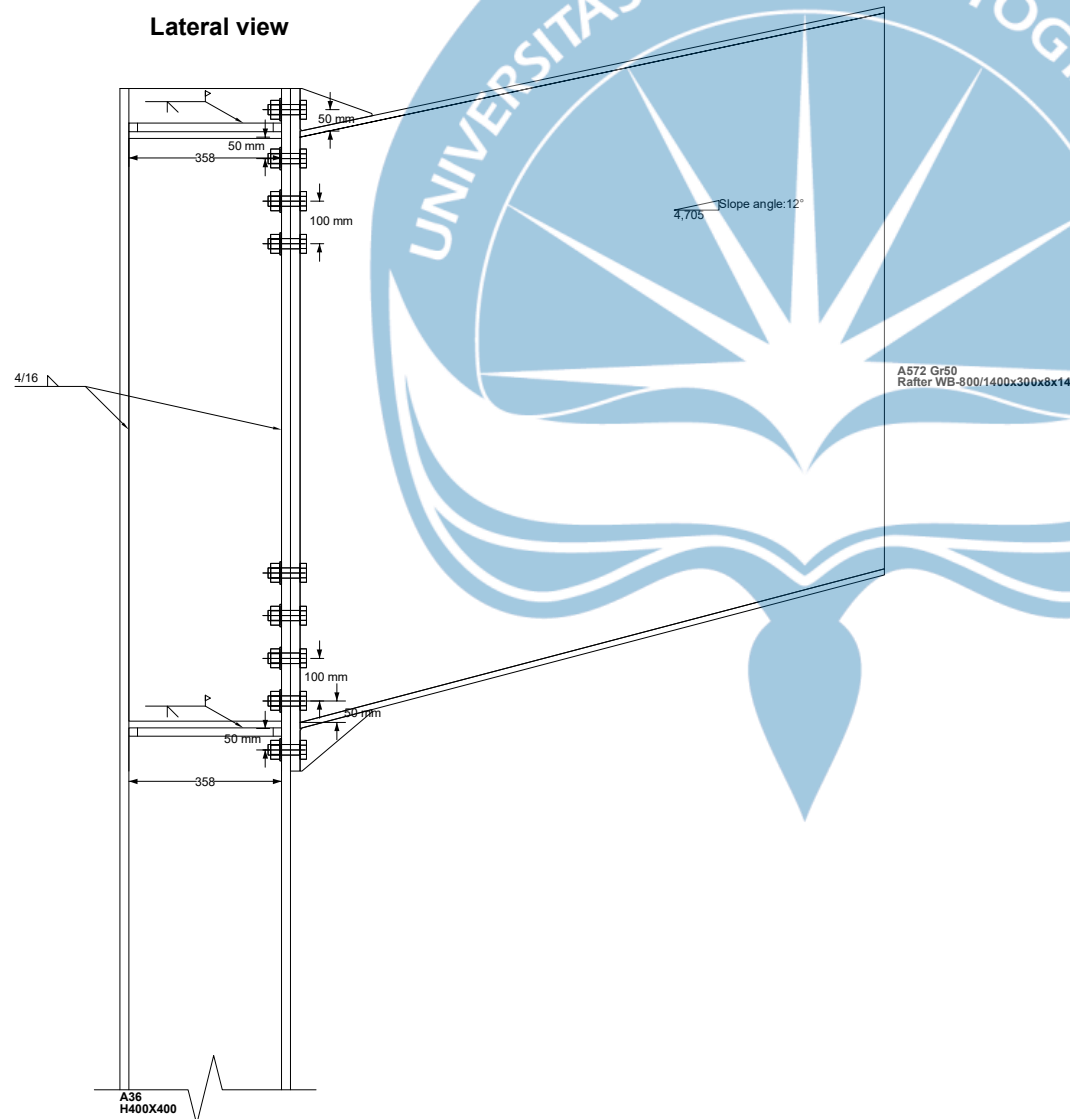
[12] European Committee for Standardization (CEN), Eurocode 3: Design of steel structures – Part 1-8: General – Design of joints (EN 1993-1-8:2005), Sections 6.2.4 to 6.2.6

Top view

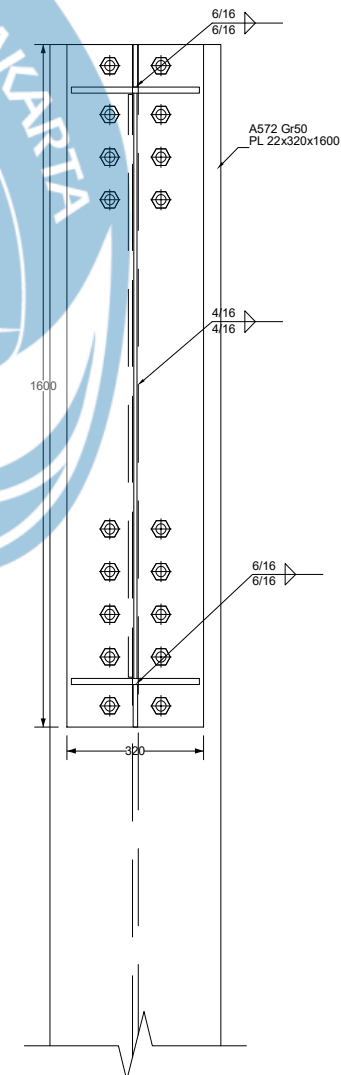


CONNECTION COLUMN H-400X400X13X21 TO
RAFTER WB-800/1400X300X8X14

Lateral view



Front view



Steel Connections Results

Connection: 3 - MEP_BS_EU_1 1/4_PL_4B_1B1 1/2

Family: Beam splice (BS)
Type: Moment end plate
Description: Connection Rafter WB-800/1400x300x8x14 to Rafter WB-800x300x8x14

Design code: AISC 360-16 LRFD

Demands

Description	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	Load type
LC1	228.57	-130.66	-876.74	1050.12	-1180.78	Design
LC2	53.22	-115.51	437.58	-498.96	614.47	Design
LC3	120.70	-200.68	239.38	-404.89	204.21	Design
LC4	69.33	-33.89	143.59	-199.62	165.73	Design
LC5	38.20	-27.23	445.98	-581.02	553.79	Design
LC6	95.88	-65.59	961.81	-1256.47	1190.89	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Right side beam						
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.16	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4
Left side beam						
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.16	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5

Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Right side beam						
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1432.85	825.39	LC1	0.58	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.12	825.39	LC1	0.59	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.69	825.39	LC1	0.81	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	120.70	LC3	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1191.41	628.24	LC6	0.53	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	628.24	LC6	0.59	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1432.85	936.04	LC6	0.65	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.12	936.04	LC6	0.67	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.69	936.04	LC6	0.92	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	228.57	LC1	0.18	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	228.57	LC1	0.08	Eq. J3-6
Shear yielding	[KN]	1191.41	595.44	LC6	0.50	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	595.44	LC6	0.56	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	752.84	228.57	LC1	0.30	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2925.55	2482.10	LC1	0.85	Eq. J4-1
Shear yielding	[KN]	1323.79	228.57	LC1	0.17	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	1050.12	LC1	0.81	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	1298.94	1190.89	LC6	0.92	Eq. J2-4
Left side beam						
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1432.85	825.40	LC1	0.58	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.02	825.40	LC1	0.59	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.62	825.40	LC1	0.81	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	120.70	LC3	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1191.41	628.27	LC6	0.53	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	628.27	LC6	0.59	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1432.72	936.04	LC6	0.65	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1393.97	936.04	LC6	0.67	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.58	936.04	LC6	0.92	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	228.57	LC1	0.18	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	228.57	LC1	0.08	Eq. J3-6
Shear yielding	[KN]	1191.41	595.48	LC6	0.50	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	595.48	LC6	0.56	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	752.84	228.57	LC1	0.30	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2925.55	2482.10	LC1	0.85	Eq. J4-1
Shear yielding	[KN]	1323.79	228.57	LC1	0.17	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	1050.19	LC1	0.81	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	1298.94	1190.96	LC6	0.92	Eq. J2-4

Global critical strength ratio

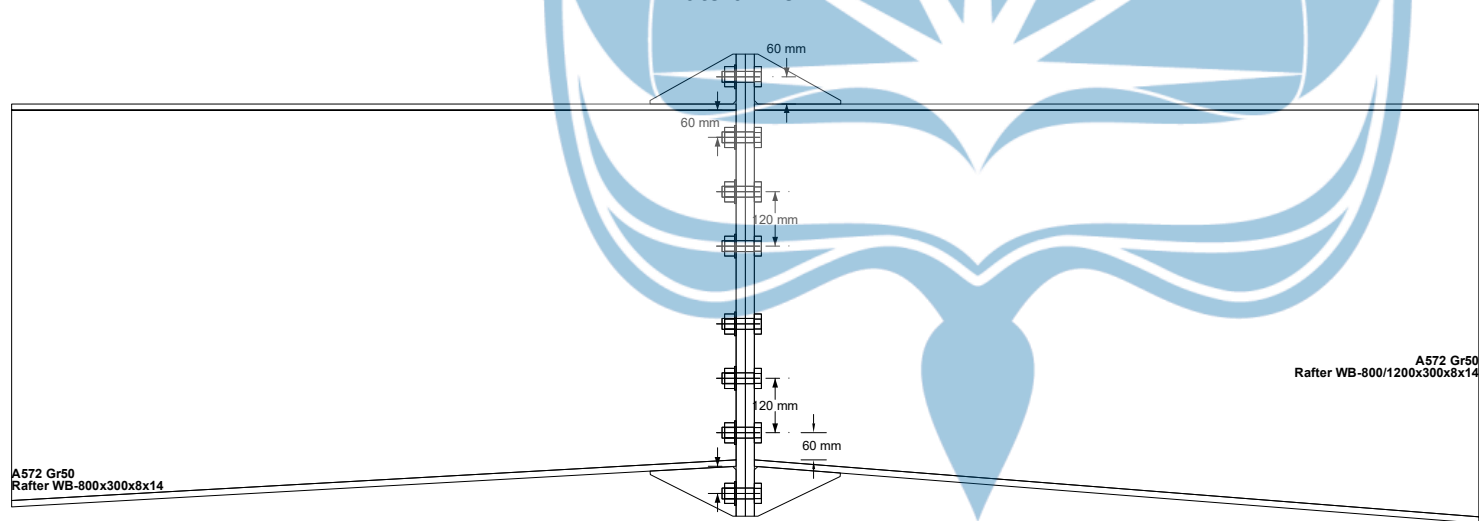
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Top view

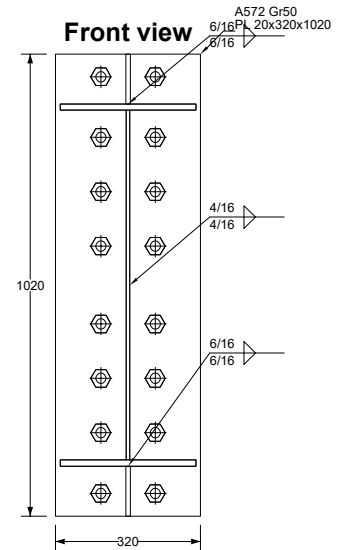
Hole type (connector): Standard (STD)
Bolts: M24 G109

CONNECTION RAFTER WB-800/1400X300X8X14 TO
RAFTER WB-800X300X8X14

Lateral view



Front view



Steel Connections Results

Connection: 4 - MEP_BS_EU_1 1/4_PL_4B_1B1 1/2

Family: Beam splice (BS)
Type: Moment end plate
Description: Connection Rafter WB-800/1200x300x8x14 to Rafter WB-800x300x8x14

Design code: AISC 360-16 LRFD

Demands

Description	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	Load type
LC1	228.57	-130.66	-876.74	1050.12	-1180.78	Design
LC2	53.22	-115.51	437.58	-498.96	614.47	Design
LC3	120.70	-200.68	239.38	-404.89	204.21	Design
LC4	69.33	-33.89	143.59	-199.62	165.73	Design
LC5	38.20	-27.23	445.98	-581.02	553.79	Design
LC6	95.88	-65.59	961.81	-1256.47	1190.89	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Right side beam						
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.16	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4
Left side beam						
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.16	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5

Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Right side beam						
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1432.85	825.40	LC1	0.58	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.08	825.40	LC1	0.59	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.66	825.40	LC1	0.81	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	120.70	LC3	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1191.41	628.25	LC6	0.53	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	628.25	LC6	0.59	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1432.79	936.04	LC6	0.65	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.05	936.04	LC6	0.67	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.64	936.04	LC6	0.92	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	228.57	LC1	0.18	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	228.57	LC1	0.08	Eq. J3-6
Shear yielding	[KN]	1191.41	595.46	LC6	0.50	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	595.46	LC6	0.56	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	752.84	228.57	LC1	0.30	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2925.55	2482.10	LC1	0.85	Eq. J4-1
Shear yielding	[KN]	1323.79	228.57	LC1	0.17	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	1050.15	LC1	0.81	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	1298.94	1190.92	LC6	0.92	Eq. J2-4
Left side beam						
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1432.85	825.40	LC1	0.58	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.10	825.40	LC1	0.59	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.67	825.40	LC1	0.81	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	120.70	LC3	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1191.41	628.24	LC6	0.53	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	628.24	LC6	0.59	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1432.82	936.04	LC6	0.65	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	1394.09	936.04	LC6	0.67	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1014.66	936.04	LC6	0.92	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	228.57	LC1	0.18	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	228.57	LC1	0.08	Eq. J3-6
Shear yielding	[KN]	1191.41	595.45	LC6	0.50	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	595.45	LC6	0.56	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	752.84	228.57	LC1	0.30	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2925.55	2482.10	LC1	0.85	Eq. J4-1
Shear yielding	[KN]	1323.79	228.57	LC1	0.17	Eq. J4-3
Flange weld capacity (external flange)	[KN]	1298.94	1050.14	LC1	0.81	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	1298.94	1190.90	LC6	0.92	Eq. J2-4

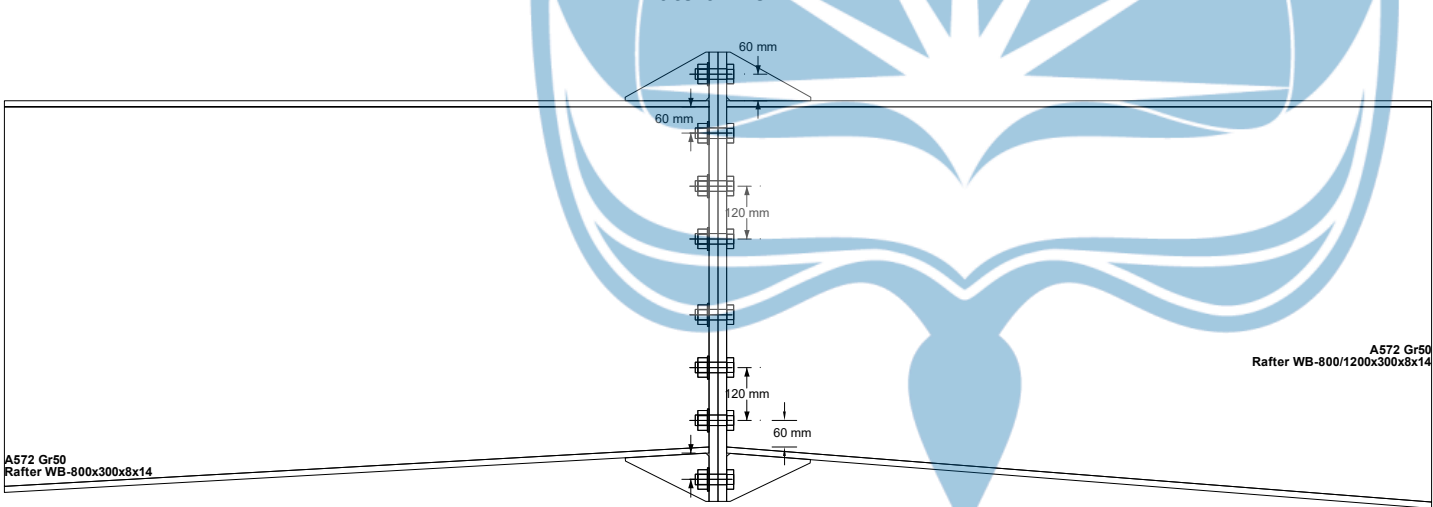
Global critical strength ratio

0.92

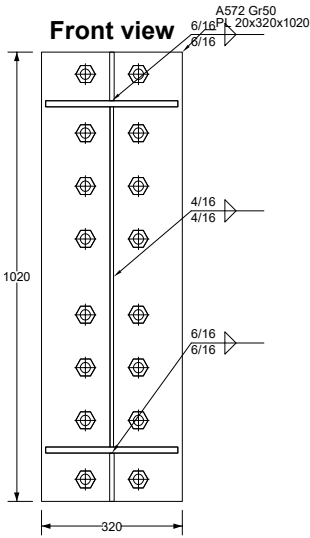
CONNECTION RAFTER WB-800/1200X300X8X14 TO
RAFTER WB-800X300X8X14

Top view
Hole type (connector): Standard (STD)
Bolts: M24 G109

Lateral view



Front view



Steel Connections Results

Connection: 5 - MEP_BS_EU_1 1/4_PL_4B_1B1 1/2

Family: Beam splice (BS)
Type: Moment end plate
Description: Connection Rafter WB-800/1200x300x8x14 to Rafter WB-800/1200x300x8x14

Design code: AISC 360-16 LRFD

Demands

Description	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	Load type
LC1	70.03	56.95	627.08	-488.70	545.65	Design
LC2	57.77	108.43	659.58	-489.77	598.20	Design
LC3	-41.05	-163.82	732.11	-685.71	521.89	Design
LC4	-10.35	-96.96	199.42	-212.95	115.99	Design
LC5	13.94	-22.70	448.94	-381.61	358.91	Design
LC6	-5.41	-21.65	983.00	-821.55	799.90	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.16	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	30.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	30.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	64.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	64.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	36.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	24.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	6	4	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	4	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	2239.06	0.00	LC1	0.00	DG16 Sec 2.5

No prying bolt moment strength	[KN*m]	2235.23	0.00	LC1	0.00	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1625.13	0.00	LC1	0.00	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	70.03	LC1	0.06	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	41.05	LC3	0.01	Eq. J3-6
Shear yielding	[KN]	1191.41	419.91	LC6	0.35	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	419.91	LC6	0.40	DG4 Eq. 3.13

Moment end plate (internal flange)

Flexural yielding	[KN*m]	2239.32	970.17	LC6	0.43	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2235.33	970.17	LC6	0.43	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1625.20	970.17	LC6	0.60	DG16 Sec 2.5
Bolts shear	[KN]	1262.60	0.00	LC1	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	2910.71	70.03	LC1	0.02	Eq. J3-6
Shear yielding	[KN]	1191.41	409.08	LC6	0.34	DG4 Eq. 3.12
Shear rupture	[KN]	1058.67	409.08	LC6	0.39	DG4 Eq. 3.13

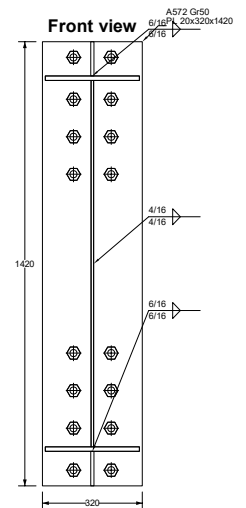
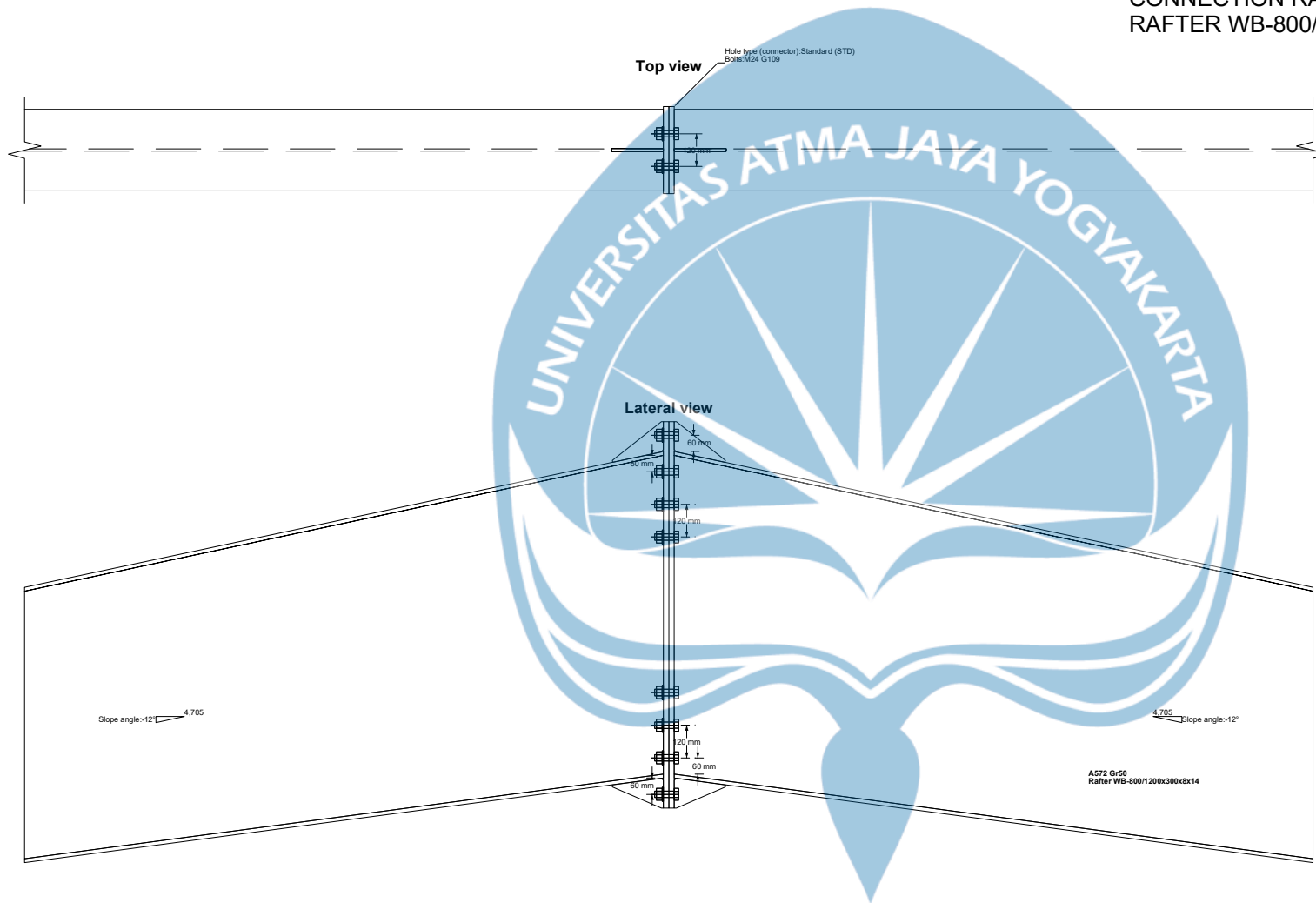
Beam

Web weld shear strength	[KN]	1168.45	70.03	LC1	0.06	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2893.76	2482.10	LC1	0.86	Eq. J4-1
Shear yielding	[KN]	1985.68	70.03	LC1	0.04	Eq. J4-3
Flange weld capacity (internal flange)	[KN]	1298.94	818.17	LC6	0.63	Eq. J2-4

Global critical strength ratio **0.86**



CONNECTION RAFTER WB-800/1200X300X8X14 TO
RAFTER WB-800/1200X300X8X14



Steel Connections Results

Connection: 6 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column WB-400x400x14x24 to Haunch WF-588x300x12x20

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-470.56	-0.36	-1358.51	1575.91	-1576.27	1575.91	-1576.26	-326.64	91.60	Design
LC2	-95.51	7.04	-23.86	31.20	-24.16	31.20	-24.16	0.00	0.00	Design
LC3	-232.52	-60.76	11.27	-43.45	-17.31	-43.45	-17.31	-1160.04	9.48	Design
LC4	-195.64	-17.69	8.29	-18.47	0.78	-18.47	0.78	-1069.20	33.58	Design
LC5	-241.01	-0.09	-657.58	762.85	-762.93	762.85	-762.93	-1057.48	33.58	Design
LC6	-470.56	-0.36	-1358.51	1575.91	-1576.27	1575.91	-1576.26	-314.92	91.60	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.64	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	39.53	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	39.53	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	80.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	80.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	80.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	30.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Web	[1/16in]	5	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	140.00	39.53	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	358.00	179.00	358.00	✓	Sec. J10.8
Width	[mm]	190.00	100.17	--	✓	Sec. J10.8

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (external flange)

Thin plate behavior controlled by plate yielding

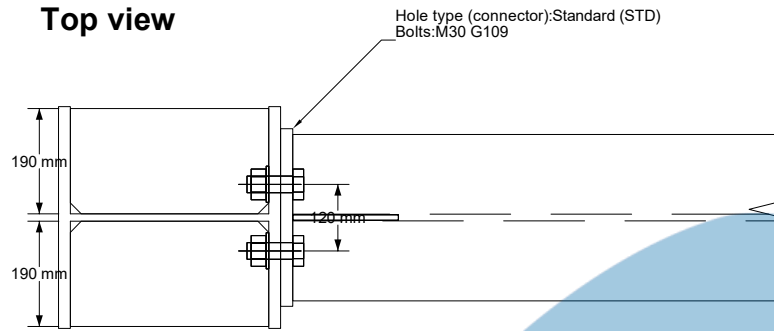
Column flange behavior (internal flange)

Thin plate behavior controlled by plate yielding

Design Check

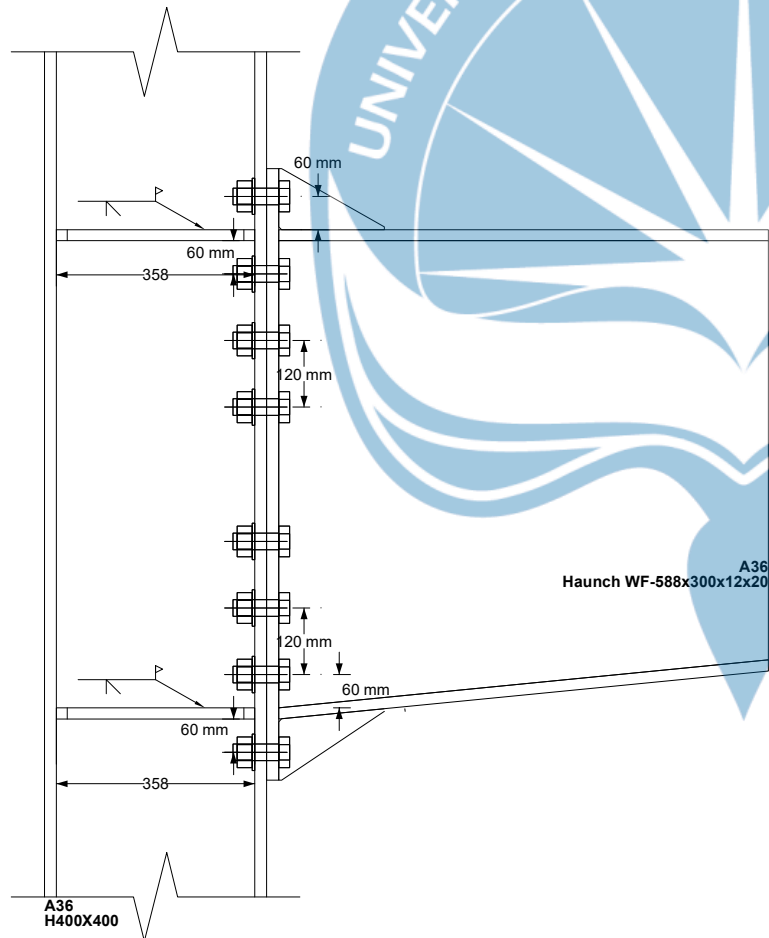
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1923.98	1358.36	LC1	0.71	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2423.12	1358.36	LC1	0.56	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1736.49	1358.36	LC1	0.78	DG16 Sec 2.5
Bolts shear	[KN]	1972.81	195.64	LC4	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3787.43	470.56	LC1	0.12	Eq. J3-6
Shear yielding	[KN]	1310.55	787.95	LC1	0.60	DG4 Eq. 3.12
Shear rupture	[KN]	1111.30	787.95	LC1	0.71	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1923.83	0.67	LC4	0.00	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2423.04	0.67	LC4	0.00	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1736.44	0.67	LC4	0.00	DG16 Sec 2.5
Bolts shear	[KN]	1972.81	470.56	LC1	0.24	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3787.43	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1310.55	788.13	LC1	0.60	DG4 Eq. 3.12
Shear rupture	[KN]	1111.30	788.13	LC1	0.71	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	1026.38	0.00	LC1	0.00	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	3656.94	2680.67	LC1	0.73	Eq. J4-1
Shear yielding	[KN]	1576.23	0.00	LC1	0.00	Eq. J4-3
Support						
Flexural yielding (external flange)	[KN*m]	1583.83	1358.36	LC1	0.86	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1735.27	1358.36	LC1	0.78	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	3627.84	470.56	LC1	0.13	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	1583.40	0.67	LC4	0.00	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1735.21	0.67	LC4	0.00	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	3627.84	0.00	LC1	0.00	Eq. J3-6
Compression buckling of the web	[KN]	3043.61	1576.26	LC1	0.52	Eq. J10-8
Panel web shear	[KN]	777.39	91.60	LC1	0.12	Eq. J10-11
Support - left side						
Top local flange bending	[KN]	3357.61	1575.91	LC1	0.47	Sec. J10
Bottom local flange bending	[KN]	3357.71	0.78	LC4	0.00	Sec. J10
Local web yielding	[KN]	2513.13	1576.26	LC1	0.63	Eq. J10-2
Support - right side						
Local web yielding	[KN]	2722.86	1576.27	LC1	0.58	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	2109.78	962.83	LC1	0.46	Eq. J4-1
Compression	[KN]	1873.50	0.00	LC1	0.00	Sec. J4.4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	2109.78	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	1873.50	963.19	LC1	0.51	Sec. J4.4
Global critical strength ratio						
		0.86				

Top view

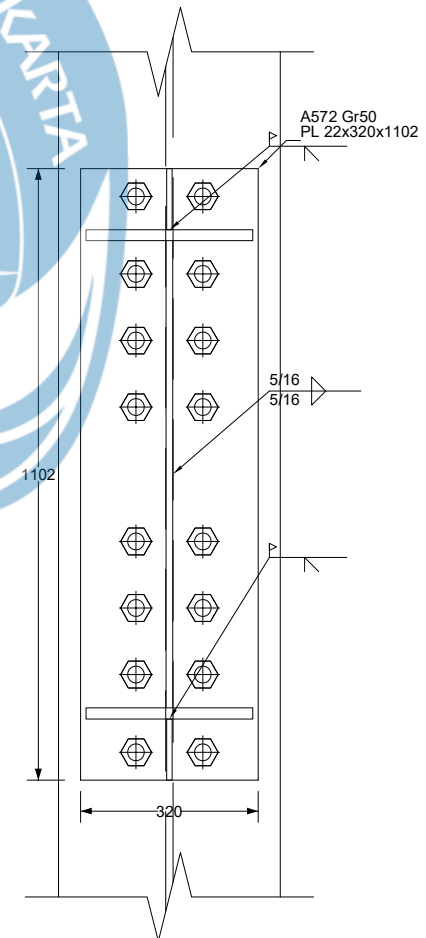


CONNECTION COLUMN WB-400X400X14X24 TO
HAUNCH WF-588X300X12X20

Lateral view



Front view





Steel Connections Results

Connection: 7 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column WB-500/1200x350x10x14 to Haunch WF-588x300x12x20

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-470.56	-0.36	-1358.51	1575.91	-1576.27	0.00	0.00	-572.95	1423.82	Design
LC2	-95.51	7.04	-23.86	31.20	-24.16	0.00	0.00	64.61	20.12	Design
LC3	-232.52	-60.76	11.27	-43.45	-17.31	0.00	0.00	-572.95	108.99	Design
LC4	-195.64	-17.69	8.29	-18.47	0.78	0.00	0.00	-83.68	5.02	Design
LC5	-241.01	-0.09	-657.58	762.85	-762.93	0.00	0.00	-74.66	749.49	Design
LC6	-470.56	-0.36	-1358.51	1575.91	-1576.27	0.00	0.00	-563.94	1423.82	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	10.00	8.64	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	39.53	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	100.00	39.53	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	120.00	80.00	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	120.00	80.00	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	80.00	300.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	60.00	49.05	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	30.00	--	38.10	✓	DG4 Sec. 1.1
- Use CJP weld for the end plate stiffener						
Beam						
Web	[1/16in]	5	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	115.00	39.53	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	856.00	428.00	856.00	✓	Sec. J10.8
Width	[mm]	190.00	101.67	--	✓	Sec. J10.8

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (external flange)

Thin plate behavior controlled by bolt rupture with prying action

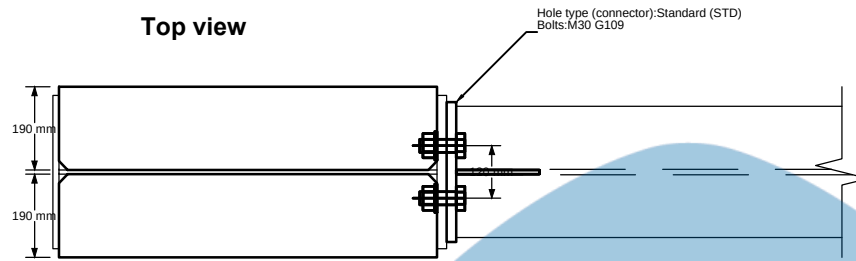
Column flange behavior (internal flange)

Thin plate behavior controlled by bolt rupture with prying action

Design Check

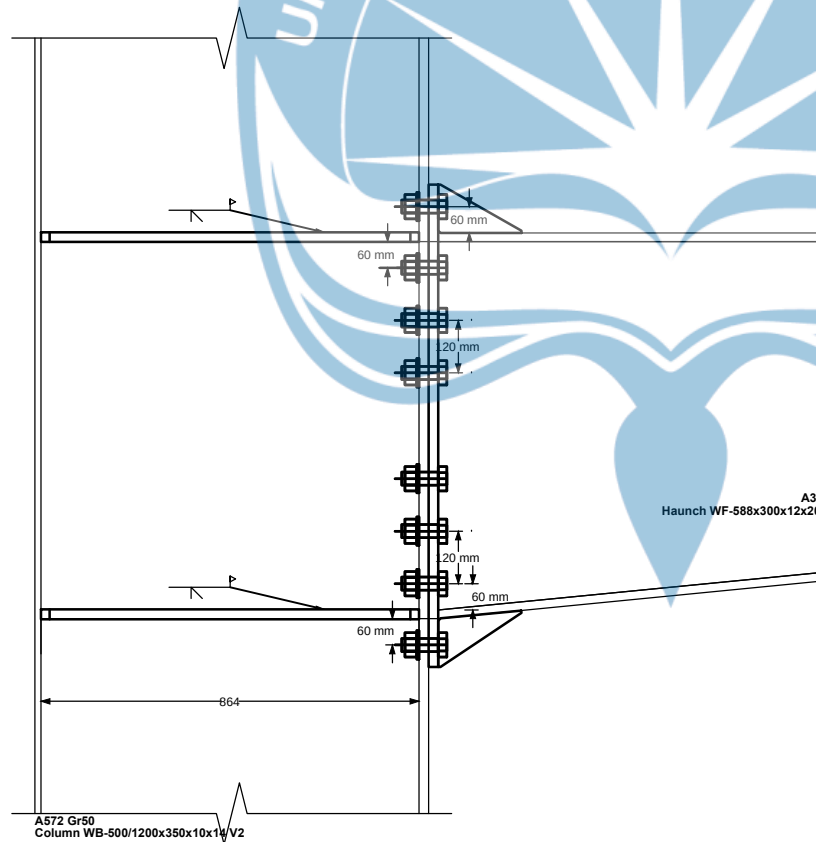
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	1923.98	1358.36	LC1	0.71	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2423.12	1358.36	LC1	0.56	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1736.49	1358.36	LC1	0.78	DG16 Sec 2.5
Bolts shear	[KN]	1972.81	195.64	LC4	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3787.43	470.56	LC1	0.12	Eq. J3-6
Shear yielding	[KN]	1310.55	787.95	LC1	0.60	DG4 Eq. 3.12
Shear rupture	[KN]	1111.30	787.95	LC1	0.71	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	1923.83	0.67	LC4	0.00	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	2423.04	0.67	LC4	0.00	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	1736.44	0.67	LC4	0.00	DG16 Sec 2.5
Bolts shear	[KN]	1972.81	470.56	LC1	0.24	Tables (7-1..14)
Bolt bearing under shear load	[KN]	3787.43	0.00	LC1	0.00	Eq. J3-6
Shear yielding	[KN]	1310.55	788.13	LC1	0.60	DG4 Eq. 3.12
Shear rupture	[KN]	1111.30	788.13	LC1	0.71	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	1026.38	0.00	LC1	0.00	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	3656.94	2680.67	LC1	0.73	Eq. J4-1
Shear yielding	[KN]	1576.23	0.00	LC1	0.00	Eq. J4-3
Support						
Flexural yielding (external flange)	[KN*m]	2260.46	1358.36	LC1	0.60	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1701.27	1358.36	LC1	0.80	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	4259.28	470.56	LC1	0.11	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	2259.87	0.67	LC4	0.00	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	1701.22	0.67	LC4	0.00	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	4259.28	0.00	LC1	0.00	Eq. J3-6
Panel web shear	[KN]	1782.68	1423.82	LC1	0.80	Eq. J10-11
Support - right side						
Local web yielding	[KN]	2830.97	1576.27	LC1	0.56	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	2320.76	1065.70	LC1	0.46	Eq. J4-1
Compression	[KN]	1324.03	0.00	LC1	0.00	Sec. J4.4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	2320.76	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	1324.03	1066.06	LC1	0.81	Sec. J4.4
Global critical strength ratio						
		0.81				

Top view

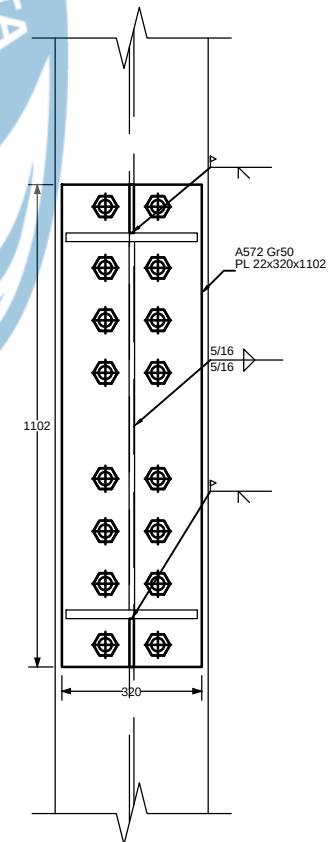


CONNECTION COLUMN WB-500/1200X350X10X14 TO HAUNCH WF-588X300X12X20

Lateral view



Front view



Steel Connections Results

Connection: 8 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column JR1 WF-350x175x7x11 to Rafter JR1 WF-350x175x7x11

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	43.52	-32.95	-85.81	231.12	-264.07	0.00	0.00	-23.18	214.65	Design
LC2	-20.87	51.75	-30.53	113.98	-62.23	0.00	0.00	46.28	82.80	Design
LC3	-5.27	-94.46	9.05	-73.35	-21.11	0.00	0.00	-93.49	58.86	Design
LC4	-4.12	-36.95	0.00	-18.48	-18.48	0.00	0.00	-37.00	14.82	Design
LC5	-1.87	-34.87	14.74	-59.95	25.08	0.00	0.00	-34.50	54.53	Design
LC6	42.06	-35.50	-86.07	230.58	-266.08	0.00	0.00	-25.98	217.56	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
End plate stiffener thickness	[mm]	8.00	7.41	--	✓	DG4 Eq. 3.15, AISC 358-10 Eq. 6.10-9, Eq. 6.10-10
Vertical edge distance	[mm]	50.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	40.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	111.25	53.33	--	✓	Sec. J3.3
Vertical bolt spacing (internal flange)	[mm]	111.25	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	100.00	53.33	175.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Outer bolt distance (external flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (external flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Outer bolt distance (internal flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
- Use 5/16" weld filets for the end plate stiffener						
Beam						
Weld size (external flange)	[1/16in]	4	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	4	3	--	✓	table J2.4
Web	[1/16in]	3	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	37.50	26.35	132.00	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	328.00	164.00	328.00	✓	Sec. J10.8
Width	[mm]	80.00	56.50	--	✓	Sec. J10.8



Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by bolt rupture with prying action

Column flange behavior (external flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (internal flange)

Thin plate behavior controlled by plate yielding

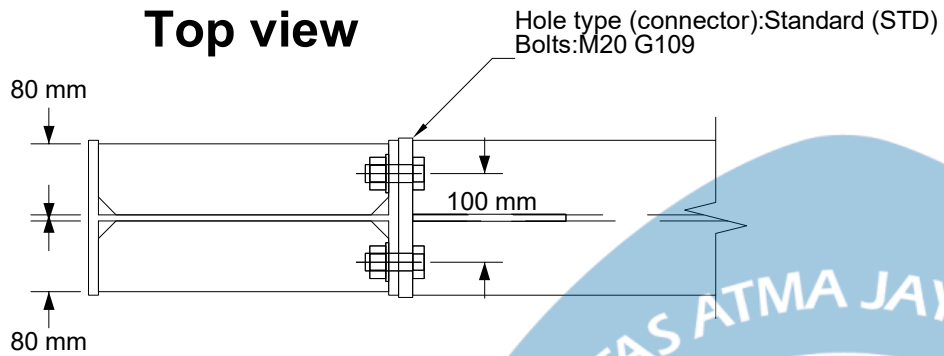
Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	212.12	80.10	LC1	0.38	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	317.88	80.10	LC1	0.25	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	261.88	80.10	LC1	0.31	DG16 Sec 2.5
Bolts shear	[KN]	657.60	1.87	LC5	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1538.59	20.87	LC2	0.01	Eq. J3-6
Shear yielding	[KN]	536.13	115.56	LC1	0.22	DG4 Eq. 3.12
Shear rupture	[KN]	431.25	115.56	LC1	0.27	DG4 Eq. 3.13
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	273.98	8.69	LC5	0.03	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	253.23	8.69	LC5	0.03	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	220.73	8.69	LC5	0.04	DG16 Sec 2.5
Bolts shear	[KN]	438.40	43.52	LC1	0.10	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1022.31	43.52	LC1	0.04	Eq. J3-6
Shear yielding	[KN]	536.13	133.04	LC6	0.25	DG4 Eq. 3.12
Shear rupture	[KN]	431.25	133.04	LC6	0.31	DG4 Eq. 3.13
Beam						
Web weld shear strength	[KN]	181.38	43.52	LC1	0.24	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2170.32	1563.72	LC1	0.72	Eq. J4-1
Shear yielding	[KN]	364.87	43.52	LC1	0.12	Eq. J4-3
Flange weld capacity (external flange)	[KN]	501.73	231.12	LC1	0.46	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	501.73	25.08	LC5	0.05	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	111.79	80.10	LC1	0.72	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	260.15	80.10	LC1	0.31	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	950.15	20.87	LC2	0.02	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	102.07	8.69	LC5	0.09	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	219.01	8.69	LC5	0.04	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	633.43	43.52	LC1	0.07	Eq. J3-6
Panel web shear	[KN]	328.38	217.56	LC6	0.66	Eq. J10-9
Support - right side						
Local web yielding	[KN]	434.84	266.08	LC6	0.61	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	223.39	19.67	LC1	0.09	Eq. J4-1
Compression	[KN]	74.02	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	242.40	19.67	LC1	0.08	Eq. J2-4
Web weld capacity	[KN]	814.69	19.67	LC1	0.02	Eq. J2-4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	223.39	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	74.02	54.63	LC6	0.74	Sec. J4.4
Flange weld capacity	[KN]	242.40	54.63	LC6	0.23	Eq. J2-4
Web weld capacity	[KN]	814.69	54.63	LC6	0.07	Eq. J2-4

Global critical strength ratio

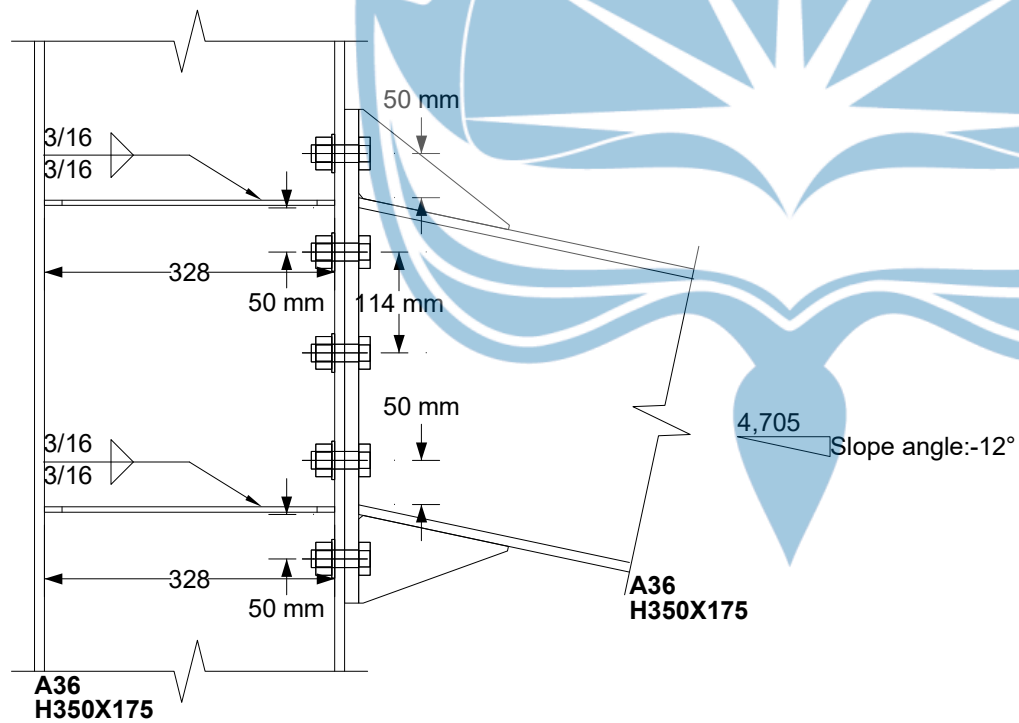
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Top view

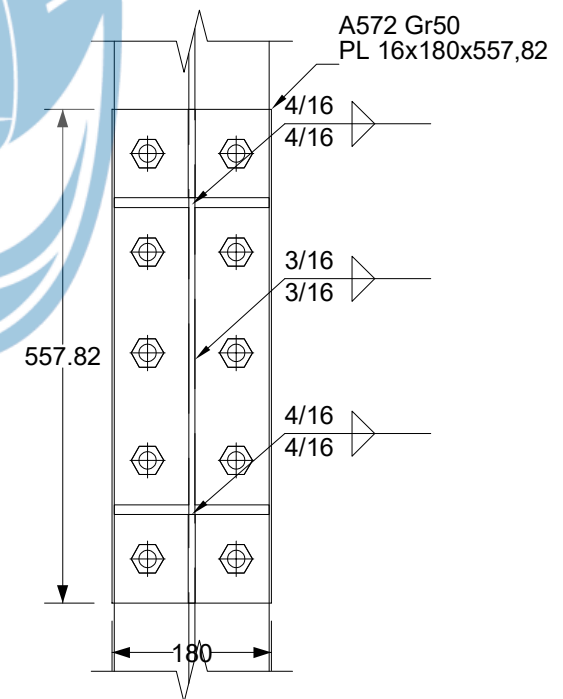


CONNECTION COLUMN JR1 WF-350X175X7X11 TO
RAFTER JR1 WF-350X175X7X11

Lateral view



Front view



Steel Connections Results

Connection: 9 - MEP_BS_EU_1 1/4_PL_4B_1B1 1/2

Family: Beam splice (BS)
Type: Moment end plate
Description: Connection Rafter JR1 WF-350x175x7x11 to Rafter JR1 WF-350x175x7x11 (Nok)

Design code: AISC 360-16 LRFD

Demands

Description	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	Load type
LC1	43.52	-32.95	-85.81	231.12	-264.07	Design
LC2	-20.87	51.75	-30.53	113.98	-62.23	Design
LC3	-5.27	-94.46	9.05	-73.35	-21.11	Design
LC4	-4.12	-36.95	0.00	-18.48	-18.48	Design
LC5	-1.87	-34.87	14.74	-59.95	25.08	Design
LC6	42.06	-35.50	-86.07	230.58	-266.08	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
Vertical edge distance	[mm]	50.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	40.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	114.00	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	100.00	53.33	175.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Inner bolt distance (external flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
Beam						
Weld size (external flange)	[1/16in]	5	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	5	3	--	✓	table J2.4
Web	[1/16in]	5	3	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	125.91	80.10	LC1	0.64	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	170.94	80.10	LC1	0.47	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	149.00	80.10	LC1	0.54	DG16 Sec 2.5
Bolts shear	[KN]	438.40	1.87	LC5	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1022.31	20.87	LC2	0.02	Eq. J3-6
Shear yielding	[KN]	536.13	115.56	LC1	0.22	DG4 Eq. 3.12
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	103.33	8.69	LC5	0.08	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	106.29	8.69	LC5	0.08	DG16 Sec 2.5

Bolt rupture with prying moment strength	[KN*m]	92.65	8.69	LC5	0.09	DG16 Sec 2.5
Bolts shear	[KN]	219.20	43.52	LC1	0.20	Tables (7-1..14)
Bolt bearing under shear load	[KN]	506.03	43.52	LC1	0.09	Eq. J3-6
Shear yielding	[KN]	536.13	133.04	LC6	0.25	DG4 Eq. 3.12
Beam						
Web weld shear strength	[KN]	302.31	43.52	LC1	0.14	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	3617.20	1563.72	LC1	0.43	Eq. J4-1
Shear yielding	[KN]	364.87	43.52	LC1	0.12	Eq. J4-3
Flange weld capacity (external flange)	[KN]	627.16	231.12	LC1	0.37	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	627.16	25.08	LC5	0.04	Eq. J2-4

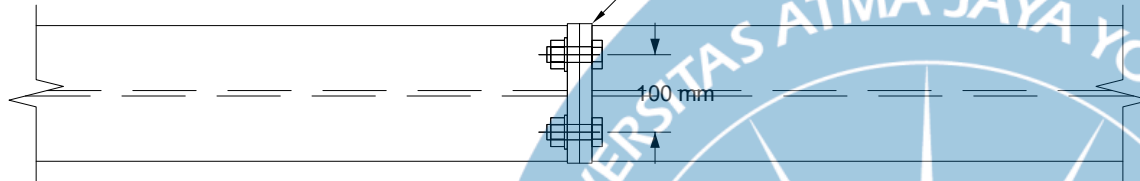
Global critical strength ratio **0.64**



Top view

Hole type (connector):Standard (STD)
Bolts:M20 G109

CONNECTION RAFTER JR1 WF-350X175X7X11 TO
RAFTER JR1 WF-350X175X7X11

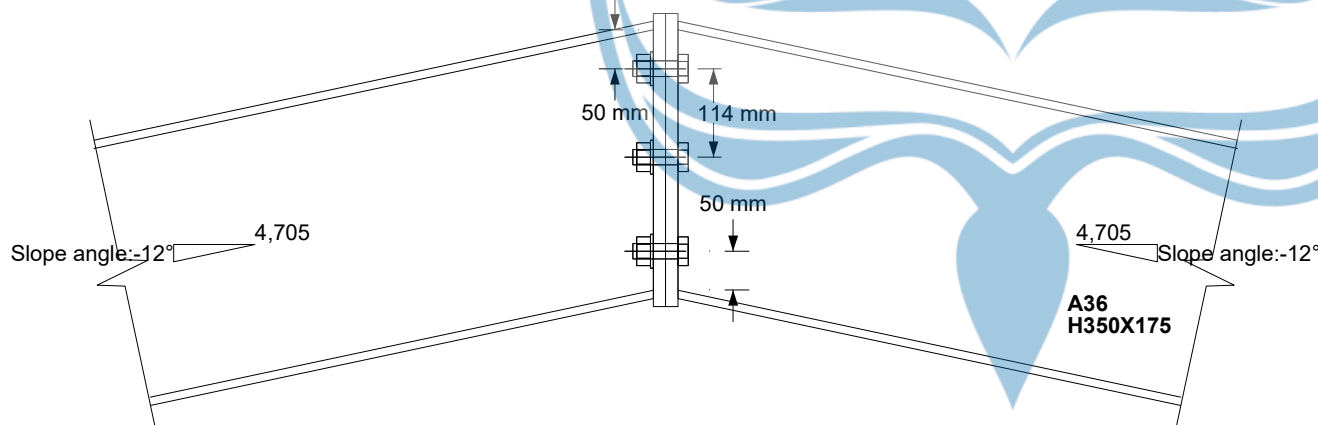


Lateral view

Slope angle: -12° 

A36
H350X175

☐ Slope angle: -12°



Front view

5/16 A572 Gr50

5/16 PL 16x180x377,82

3/16

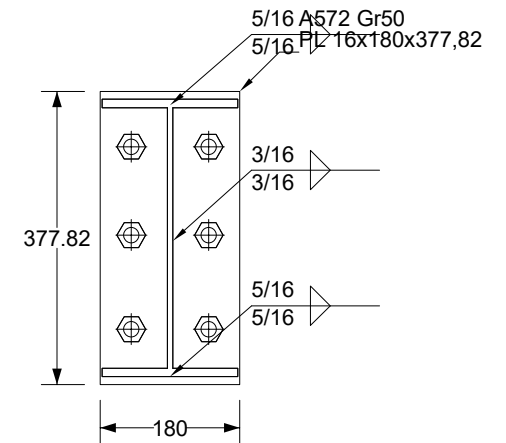
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5/16

377.82

—180—



Steel Connections Results

Connection: 10 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Collumn JR1 WF-350x175x7x11 to Beam FS1 WF-250x125x6x9

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-20.48	4.64	-22.63	96.24	-91.60	0.00	0.00	-23.18	46.81	Design
LC2	0.11	6.32	-1.71	10.27	-3.95	0.00	0.00	46.28	20.90	Design
LC3	-3.56	-10.38	4.32	-23.10	12.72	0.00	0.00	-93.49	8.62	Design
LC4	1.46	3.15	1.88	-6.21	9.36	0.00	0.00	-37.00	5.71	Design
LC5	0.53	0.24	-0.15	0.73	-0.49	0.00	0.00	-34.50	4.70	Design
LC6	20.48	4.63	-22.63	96.23	-91.60	0.00	0.00	-25.98	47.71	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
Vertical edge distance	[mm]	50.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	30.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	76.00	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	80.00	53.33	125.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Inner bolt distance (external flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
Beam						
Weld size (external flange)	[1/16in]	4	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	4	3	--	✓	table J2.4
Web	[1/16in]	3	2	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	47.50	26.35	132.00	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	328.00	164.00	328.00	✓	Sec. J10.8
Width	[mm]	80.00	43.17	--	✓	Sec. J10.8
Weld size	[1/16in]	3	3	--	✓	DG 13 Eq. 4.3-6

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (external flange)

Thin plate behavior controlled by plate yielding

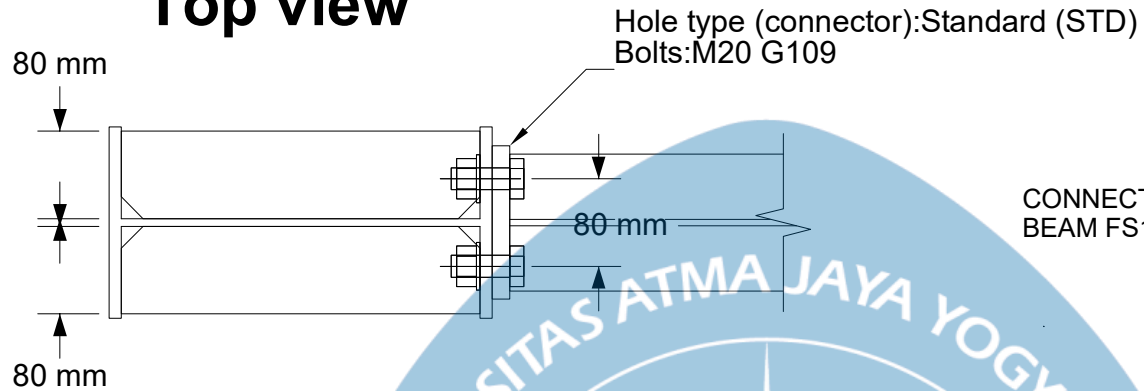
Column flange behavior (internal flange)

Thin plate behavior controlled by plate yielding

Design Check

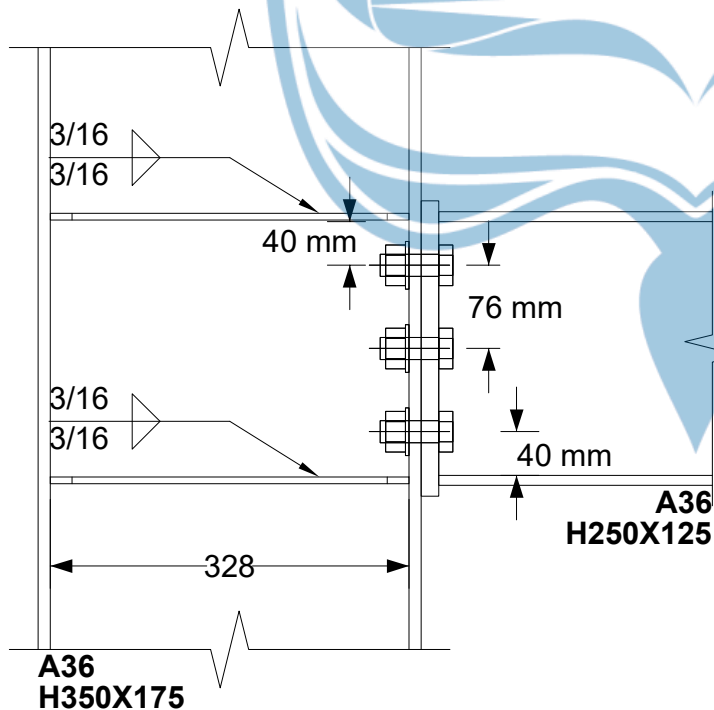
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	80.65	23.19	LC1	0.29	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	115.81	23.19	LC1	0.20	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	105.89	23.19	LC1	0.22	DG16 Sec 2.5
Bolts shear	[KN]	438.40	3.56	LC3	0.01	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1022.31	20.48	LC1	0.02	Eq. J3-6
Shear yielding	[KN]	416.99	48.12	LC1	0.12	DG4 Eq. 3.12
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	68.91	3.07	LC3	0.04	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	71.79	3.07	LC3	0.04	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	65.64	3.07	LC3	0.05	DG16 Sec 2.5
Bolts shear	[KN]	219.20	20.48	LC1	0.09	Tables (7-1..14)
Bolt bearing under shear load	[KN]	506.03	20.48	LC6	0.04	Eq. J3-6
Shear yielding	[KN]	416.99	45.80	LC6	0.11	DG4 Eq. 3.12
Beam						
Web weld shear strength	[KN]	111.17	20.48	LC6	0.18	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2194.16	1340.33	LC1	0.61	Eq. J4-1
Shear yielding	[KN]	223.39	20.48	LC6	0.09	Eq. J4-3
Flange weld capacity (external flange)	[KN]	356.92	96.24	LC1	0.27	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	356.92	12.72	LC3	0.04	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	37.51	23.19	LC1	0.62	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	99.54	23.19	LC1	0.23	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	633.43	20.48	LC1	0.03	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	33.16	3.07	LC3	0.09	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	61.70	3.07	LC3	0.05	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	316.72	20.48	LC6	0.06	Eq. J3-6
Panel web shear	[KN]	328.38	47.71	LC6	0.15	Eq. J10-9
Support - right side						
Local web yielding	[KN]	431.36	96.24	LC1	0.22	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	223.39	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	74.02	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	242.40	0.00	LC1	0.00	Eq. J2-4
Web weld capacity	[KN]	814.69	0.00	LC1	0.00	Eq. J2-4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	223.39	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	74.02	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	242.40	0.00	LC1	0.00	Eq. J2-4
Web weld capacity	[KN]	814.69	0.00	LC1	0.00	Eq. J2-4
Global critical strength ratio		0.62				

Top view

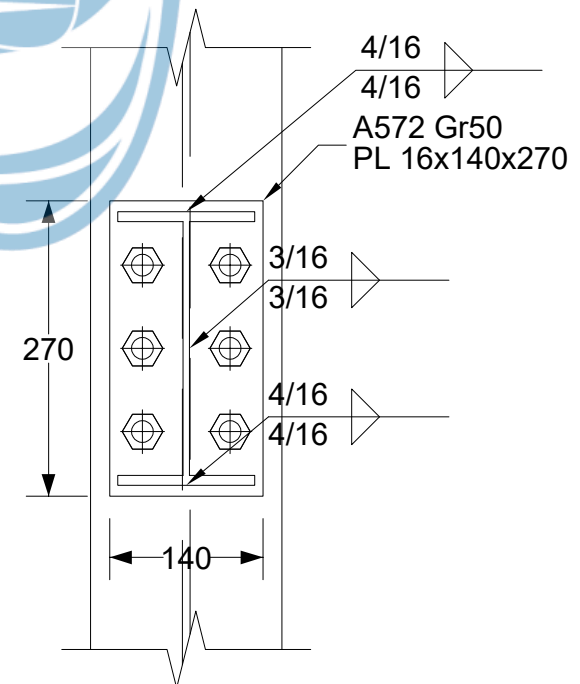


CONNECTION COLLUMN JR1 WF-350X175X7X11 TO
BEAM FS1 WF-250X125X6X9

Lateral view



Front view



Steel Connections Results

Connection: 11 - MEP_BCF_DG16_F_3/8PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column FS1 WF-250x125x6x9 to Beam FS1 WF-250x125x6x9

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-20.48	4.64	-22.63	96.24	-91.60	0.00	0.00	4.64	75.76	Design
LC2	0.11	6.32	-1.71	10.27	-3.95	0.00	0.00	6.32	10.17	Design
LC3	-3.56	-10.38	4.32	-23.10	12.72	0.00	0.00	-10.38	19.55	Design
LC4	1.46	3.15	1.88	-6.21	9.36	0.00	0.00	3.15	7.91	Design
LC5	0.53	0.24	-0.15	0.73	-0.49	0.00	0.00	0.24	0.20	Design
LC6	20.48	4.63	-22.63	96.23	-91.60	0.00	0.00	4.63	75.75	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
Vertical edge distance	[mm]	50.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	30.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	76.00	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	70.00	53.33	125.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Inner bolt distance (external flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
Beam						
Weld size (external flange)	[1/16in]	4	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	4	3	--	✓	table J2.4
Web	[1/16in]	3	2	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	27.50	26.35	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	218.00	109.00	218.00	✓	Sec. J10.8
Width	[mm]	58.00	40.33	--	✓	Sec. J10.8
Weld size	[1/16in]	3	3	--	✓	DG 13 Eq. 4.3-6

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (external flange)

Thin plate behavior controlled by plate yielding

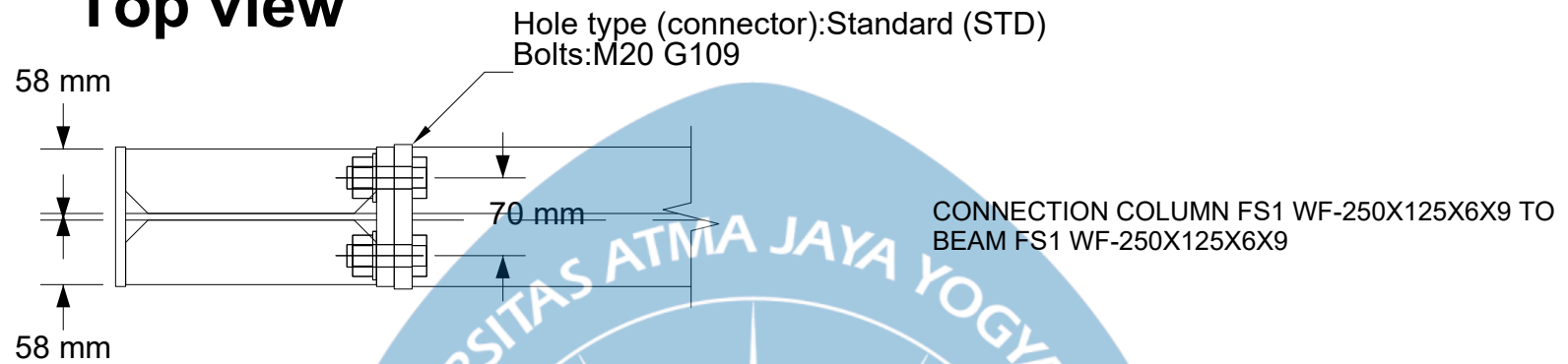
Column flange behavior (internal flange)

Thin plate behavior controlled by plate yielding

Design Check

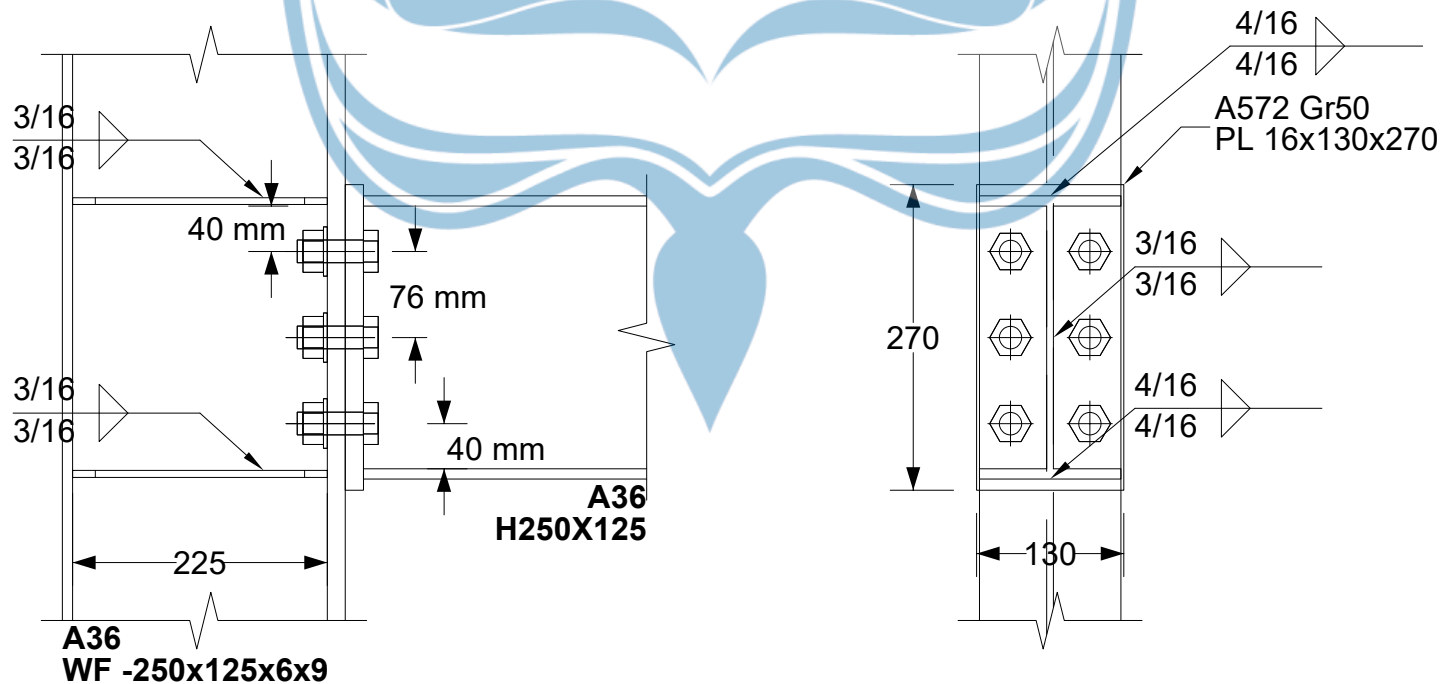
Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	84.33	23.19	LC1	0.28	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	115.81	23.19	LC1	0.20	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	107.02	23.19	LC1	0.22	DG16 Sec 2.5
Bolts shear	[KN]	438.40	3.56	LC3	0.01	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1022.31	20.48	LC1	0.02	Eq. J3-6
Shear yielding	[KN]	387.21	48.12	LC1	0.12	DG4 Eq. 3.12
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	70.16	3.07	LC3	0.04	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	71.79	3.07	LC3	0.04	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	66.34	3.07	LC3	0.05	DG16 Sec 2.5
Bolts shear	[KN]	219.20	20.48	LC1	0.09	Tables (7-1..14)
Bolt bearing under shear load	[KN]	506.03	20.48	LC6	0.04	Eq. J3-6
Shear yielding	[KN]	387.21	45.80	LC6	0.12	DG4 Eq. 3.12
Beam						
Web weld shear strength	[KN]	111.17	20.48	LC6	0.18	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2194.16	1340.33	LC1	0.61	Eq. J4-1
Shear yielding	[KN]	223.39	20.48	LC6	0.09	Eq. J4-3
Flange weld capacity (external flange)	[KN]	356.92	96.24	LC1	0.27	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	356.92	12.72	LC3	0.04	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	74.65	23.19	LC1	0.31	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	110.06	23.19	LC1	0.21	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	921.36	20.48	LC1	0.02	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	61.66	3.07	LC3	0.05	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	68.22	3.07	LC3	0.04	DG16 Sec 2.5
Support bolt bearing (internal flange)	[KN]	460.68	20.48	LC6	0.04	Eq. J3-6
Panel web shear	[KN]	201.05	75.76	LC1	0.38	Eq. J10-9
Support - right side						
Local web yielding	[KN]	301.87	96.24	LC1	0.32	Sec. J10
Transverse stiffeners - top						
Yielding strength due to axial load	[KN]	141.48	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	86.73	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	145.86	0.00	LC1	0.00	Eq. J2-4
Web weld capacity	[KN]	492.88	0.00	LC1	0.00	Eq. J2-4
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	141.48	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	86.73	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	145.86	0.00	LC1	0.00	Eq. J2-4
Web weld capacity	[KN]	492.88	0.00	LC1	0.00	Eq. J2-4
Global critical strength ratio						
		0.61				

Top view



Front view

Lateral view



Steel Connections Results

Connection: 12 - MEP Knee BCF - Vertical

Family: Beam - Column flange (BCF)
Type: Knee moment end plate
Description: Connection Column WB-500/1200x350x10x14 to Jack Roof WF-350x175x7x11

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	43.52	-32.95	-85.81	236.83	-269.78	0.00	0.00	-105.92	135.70	Design
LC2	-20.87	51.75	-30.53	116.01	-64.26	0.00	0.00	75.16	54.37	Design
LC3	-5.27	-94.46	9.05	-73.95	-20.51	0.00	0.00	-105.92	60.13	Design
LC4	-4.12	-36.95	0.00	-18.48	-18.48	0.00	0.00	-12.57	9.26	Design
LC5	-1.87	-34.87	14.74	-60.93	26.06	0.00	0.00	-11.00	51.71	Design
LC6	42.06	-35.50	-86.07	236.32	-271.82	0.00	0.00	-69.88	209.50	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
Vertical edge distance	[mm]	50.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	115.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	114.00	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	120.00	53.33	175.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Inner bolt distance (external flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	50.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
Beam						
Weld size (external flange)	[1/16in]	6	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	6	3	--	✓	table J2.4
Web	[1/16in]	4	3	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	115.00	26.35	152.40	✓	Sec. J3.5
Transverse stiffeners						
Length	[mm]	600.00	584.00	1168.00	✓	Sec. J10.8
Width	[mm]	145.00	111.67	--	✓	Sec. J10.8
Weld size	[1/16in]	3	3	--	✓	DG 13 Eq. 4.3-6

Plate / Column Behavior

End plate behavior (external flange)
Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Connection plate behavior (external flange)

Thin plate behavior controlled by plate yielding

Connection plate behavior (internal flange)

Thick plate behavior controlled by no prying bolt rupture

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	115.99	80.23	LC1	0.69	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	165.23	80.23	LC1	0.49	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	140.76	80.23	LC1	0.57	DG16 Sec 2.5
Bolts shear	[KN]	438.40	1.87	LC5	0.00	Tables (7-1..14)
Bolt bearing under shear load	[KN]	1022.31	20.87	LC2	0.02	Eq. J3-6
Shear yielding	[KN]	1042.48	118.42	LC1	0.11	DG4 Eq. 3.12
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	99.48	8.83	LC5	0.09	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	103.44	8.83	LC5	0.09	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	88.12	8.83	LC5	0.10	DG16 Sec 2.5
Bolts shear	[KN]	219.20	43.52	LC1	0.20	Tables (7-1..14)
Bolt bearing under shear load	[KN]	506.03	43.52	LC1	0.09	Eq. J3-6
Shear yielding	[KN]	1042.48	135.91	LC6	0.13	DG4 Eq. 3.12
Beam						
Web weld shear strength	[KN]	241.85	43.52	LC1	0.18	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2893.76	1563.72	LC1	0.54	Eq. J4-1
Shear yielding	[KN]	364.87	43.52	LC1	0.12	Eq. J4-3
Flange weld capacity (external flange)	[KN]	752.60	236.83	LC1	0.31	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	752.60	26.06	LC5	0.03	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	150.70	80.23	LC1	0.53	DG4 Eq. 3.21
Bolt rupture with prying moment strength	[KN*m]	116.88	80.23	LC1	0.69	DG16 Sec 2.5
Support bolt bearing (external flange)	[KN]	1022.31	20.87	LC2	0.02	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	175.82	8.83	LC5	0.05	DG4 Eq. 3.21
Support bolt bearing (internal flange)	[KN]	516.28	43.52	LC1	0.08	Eq. J3-6
Panel web shear	[KN]	2233.89	209.50	LC6	0.09	Sec. G1
Support - right side						
Local web yielding	[KN]	944.75	271.82	LC6	0.29	Sec. J10
Transverse stiffeners - bottom						
Yielding strength due to axial load	[KN]	620.52	0.00	LC1	0.00	Eq. J4-1
Compression	[KN]	109.23	0.00	LC1	0.00	Sec. J4.4
Flange weld capacity	[KN]	527.64	0.00	LC1	0.00	Eq. J2-4
Web weld capacity	[KN]	1682.89	0.00	LC1	0.00	Eq. J2-4
Global critical strength ratio						
		0.69				

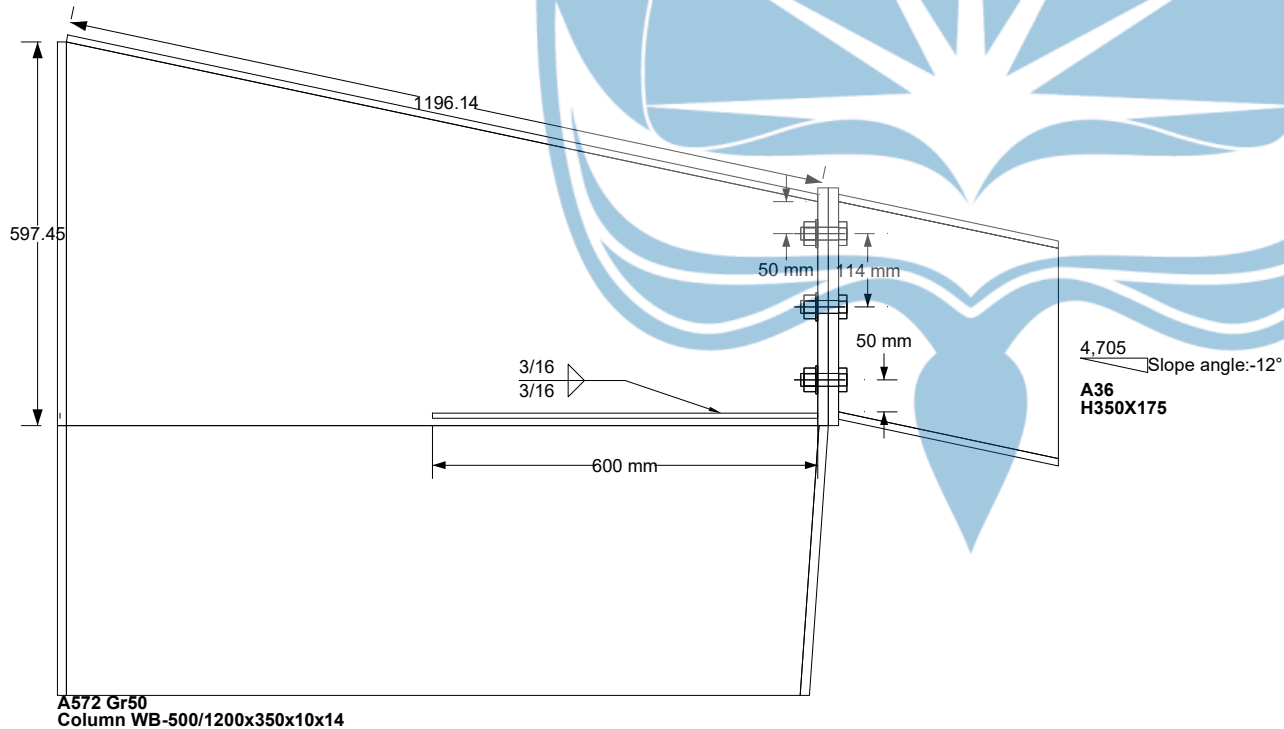
Hole type (connector): Standard (STD)
Bolts: M20 G109

Top view

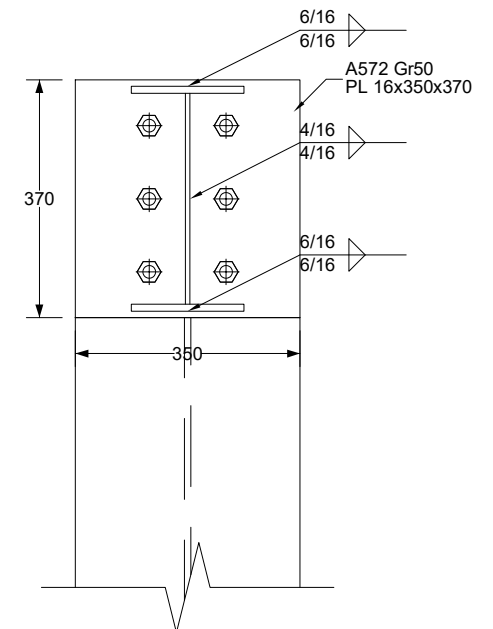


CONNECTION COLUMN WB-500/1200X350X10X14 TO
JACK ROOF WF-350X175X7X11

Lateral view



Front view



Steel Connections Results

Connection: 13 - MEP_BCF_DG16_F_1/2PL_1B_1B1/2

Family: Beam - Column flange (BCF)
Type: Moment end plate
Description: Connection Column WB-500/1200x350x10x14 to Fasad WF-250x125x6x9

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Right beam		Left beam		Column	Panel	Load type
	Ru [kN]	Pu [kN]	Mu [kN*m]	PufTop [kN]	PufBot [kN]	PufTop [kN]	PufBot [kN]	Pu [kN]	Vu [kN]	
LC1	-20.48	4.64	-22.63	96.24	-91.60	0.00	0.00	-105.92	37.85	Design
LC2	0.11	6.32	-1.71	10.27	-3.95	0.00	0.00	75.16	51.37	Design
LC3	-3.56	-10.38	4.32	-23.10	12.72	0.00	0.00	-105.92	110.98	Design
LC4	1.46	3.15	1.88	-6.21	9.36	0.00	0.00	-12.57	0.14	Design
LC5	0.53	0.24	-0.15	0.73	-0.49	0.00	0.00	-11.00	8.49	Design
LC6	20.48	4.63	-22.63	96.23	-91.60	0.00	0.00	-69.88	33.92	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Extended end plate						
Vertical edge distance	[mm]	40.00	26.35	152.40	✓	Sec. J3.5
Horizontal edge distance	[mm]	40.00	26.35	152.40	✓	Sec. J3.5
Vertical bolt spacing (external flange)	[mm]	76.00	53.33	--	✓	Sec. J3.3
Horizontal center-to-center spacing (gage)	[mm]	70.00	53.33	125.00	✓	DG4 Sec. 2.1, 2.4, DG16 Sec. 2.5
Inner bolt distance (external flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Inner bolt distance (internal flange)	[mm]	40.00	32.70	--	✓	DG4 Sec. 2.1
Bolt diameter	[mm]	20.00	--	38.10	✓	DG4 Sec. 1.1
Beam						
Weld size (external flange)	[1/16in]	4	3	--	✓	table J2.4
Weld size (internal flange)	[1/16in]	4	3	--	✓	table J2.4
Web	[1/16in]	3	2	--	✓	table J2.4
Support						
Horizontal edge distance	[mm]	140.00	26.35	152.40	✓	Sec. J3.5

Plate / Column Behavior

End plate behavior (external flange)

Thin plate behavior controlled by plate yielding

End plate behavior (internal flange)

Thin plate behavior controlled by plate yielding

Column flange behavior (external flange)

Thick plate behavior controlled by no prying bolt rupture

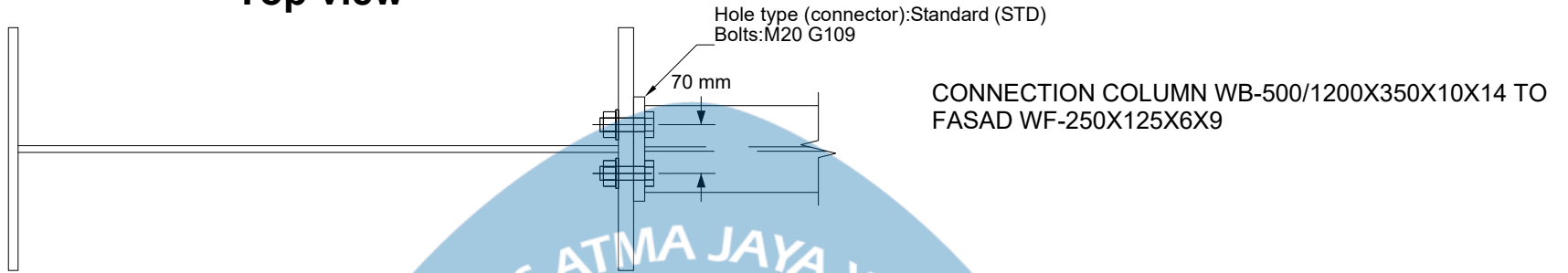
Column flange behavior (internal flange)

Thick plate behavior controlled by no prying bolt rupture

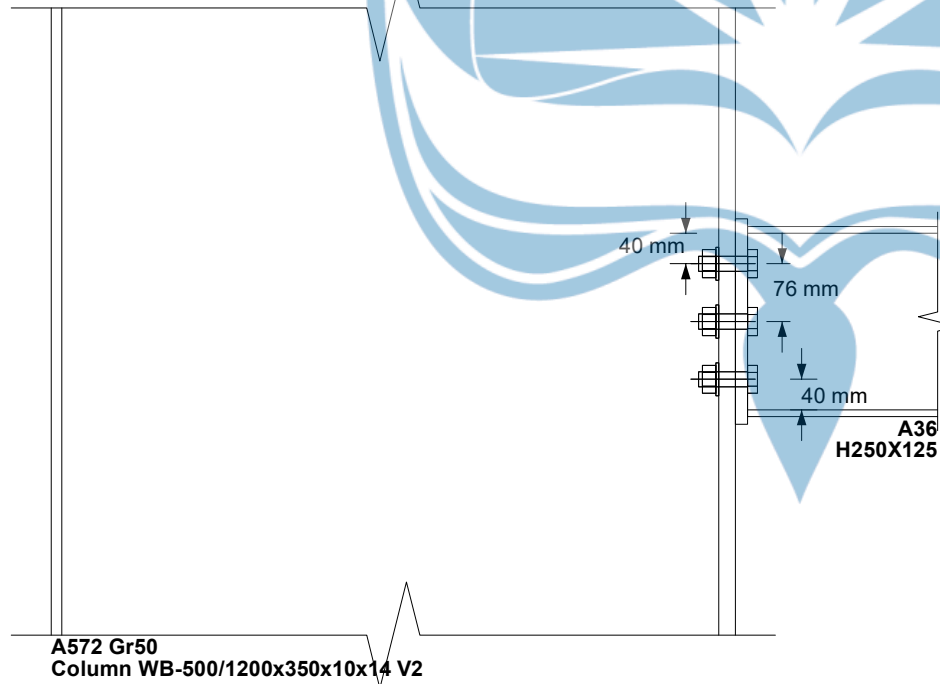
Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Moment end plate (external flange)						
Flexural yielding	[KN*m]	64.18	23.19	LC1	0.36	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	115.81	23.19	LC1	0.20	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	108.02	23.19	LC1	0.21	DG16 Sec 2.5
Bolts shear	[KN]	438.40	3.56	LC3	0.01	Tables (7-1..14)
Bolt bearing under shear load	[KN]	797.04	20.48	LC1	0.03	Eq. J3-6
Shear yielding	[KN]	321.68	48.12	LC1	0.15	DG4 Eq. 3.12
Moment end plate (internal flange)						
Flexural yielding	[KN*m]	54.67	3.07	LC3	0.06	DG16 Sec 2.5
No prying bolt moment strength	[KN*m]	71.79	3.07	LC3	0.04	DG16 Sec 2.5
Bolt rupture with prying moment strength	[KN*m]	66.96	3.07	LC3	0.05	DG16 Sec 2.5
Bolts shear	[KN]	219.20	20.48	LC1	0.09	Tables (7-1..14)
Bolt bearing under shear load	[KN]	336.37	20.48	LC6	0.06	Eq. J3-6
Shear yielding	[KN]	321.68	45.80	LC6	0.14	DG4 Eq. 3.12
Beam						
Web weld shear strength	[KN]	111.17	20.48	LC6	0.18	Eq. J2-4
Web weld strength to reach yield stress	[KN/m]	2194.16	1340.33	LC1	0.61	Eq. J4-1
Shear yielding	[KN]	223.39	20.48	LC6	0.09	Eq. J4-3
Flange weld capacity (external flange)	[KN]	356.92	96.24	LC1	0.27	Eq. J2-4
Flange weld capacity (internal flange)	[KN]	356.92	12.72	LC3	0.04	Eq. J2-4
Support						
Flexural yielding (external flange)	[KN*m]	283.53	23.19	LC1	0.08	DG4 Eq. 3.21
Support bolt bearing (external flange)	[KN]	1419.76	20.48	LC1	0.01	Eq. J3-6
Flexural yielding (internal flange)	[KN*m]	269.97	3.07	LC3	0.01	DG4 Eq. 3.21
Support bolt bearing (internal flange)	[KN]	709.88	20.48	LC6	0.03	Eq. J3-6
Panel web shear	[KN]	1675.42	110.98	LC3	0.07	Eq. J10-9
Support - right side						
Local web yielding	[KN]	474.70	96.24	LC1	0.20	DG4 eq. 3.24
Top web bearing	[KN]	755.24	23.10	LC3	0.03	Eq. J10-4
Bottom web bearing	[KN]	755.24	91.60	LC6	0.12	Eq. J10-4
Global critical strength ratio						
		0.61				

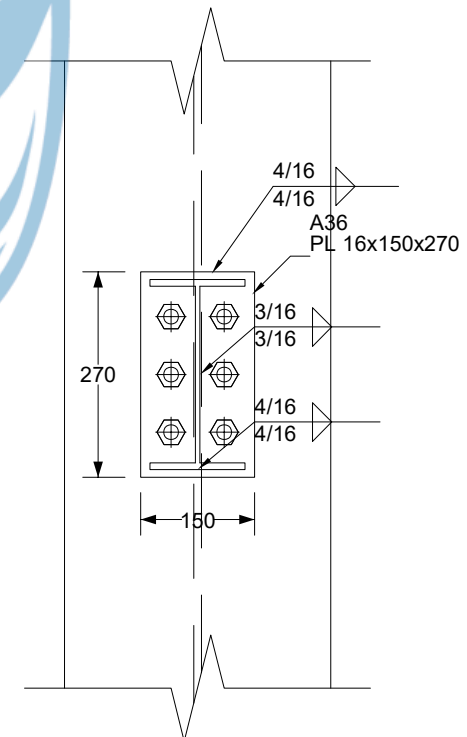
Top view



Lateral view



Front view



Steel Connections Results

Connection: 14V - SP_BCF_1/4PL_5B3/4

Family: Beam - Column flange (BCF)
Type: Single plate
Description: Connection Gusset Column H-200x200x8x12

Design code: AISC 360-16 LRFD

Demands

Description	Beam			Column		Load type
	Ru [kN]	Pu [kN]	Pu [kN]	Mu22 [kN*m]	Mu33 [kN*m]	
LC1	6.90	-138.12	-0.36	0.00	-1358.51	Design
LC2	0.00	0.00	7.04	0.00	-23.86	Design
LC3	0.00	-350.56	-60.76	0.00	11.27	Design
LC4	-0.57	-163.05	-17.69	0.00	8.29	Design
LC5	-0.85	-179.47	-0.09	0.00	-657.58	Design
LC6	6.90	-135.04	-0.36	0.00	-1358.51	Design

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Shear plate						
Thickness	[mm]	8.00	--	21.94	✓	p. 10-89
Length	[mm]	160.00	88.00	176.00	✓	p. 10-104
Vertical edge distance	[mm]	40.00	36.53	--	✓	Tables J3.4, J3.5
Horizontal edge distance	[mm]	40.00	36.53	--	✓	Tables J3.4, J3.5
Vertical center-to-center spacing (pitch)	[mm]	80.00	72.00	192.00	✓	Sec. J3.5
Beam						
Vertical edge distance	[mm]	60.00	36.53	--	✓	Tables J3.4, J3.5
Horizontal edge distance	[mm]	40.00	36.53	--	✓	Tables J3.4, J3.5
Support						
Weld size	[1/16in]	4	4	--	✓	p. 10-87
Weld length	[mm]	160.00	25.40	--	✓	Sec. J2.2b

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Shear plate						
Bolts shear	[KN]	399.49	350.56	LC3	0.88	Tables (7-1..14)
Bolt bearing under shear load	[KN]	132.46	6.90	LC6	0.05	p. 7-18
Shear yielding	[KN]	190.63	6.90	LC1	0.04	Eq. J4-3
Shear rupture	[KN]	138.89	6.90	LC1	0.05	Eq. J4-4
Block shear	[KN]	162.03	6.90	LC1	0.04	Eq. J4-5
Plate (support side)						
Weld capacity	[KN]	468.09	350.56	LC3	0.75	Tables 8-4 .. 8-11

Web crippling	[KN]	467.42	350.56	LC3	0.75	Eq. J10-5a
Beam						
Bolt bearing under shear load	[KN]	267.62	6.90	LC6	0.03	p. 7-18
Shear yielding	[KN]	330.95	6.90	LC1	0.02	Eq. J4-3
Bolt bearing under axial load	[KN]	160.77	0.00	LC1	0.00	Eq. J3-6
Support						
Welds rupture	[KN/m]	4798.73	973.78	LC3	0.20	p. 9-5

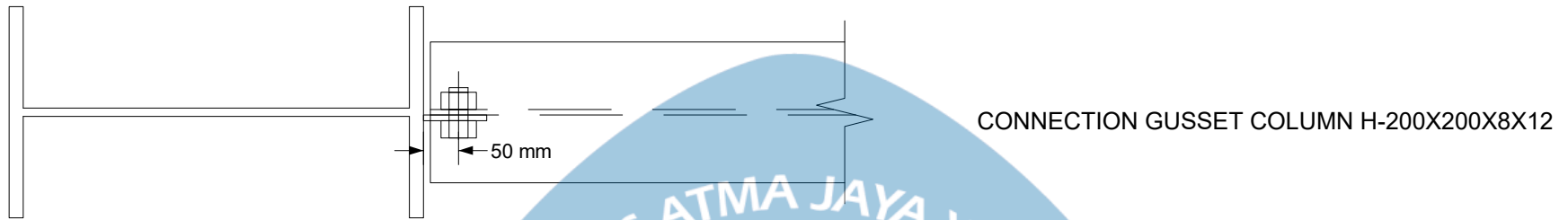
Global critical strength ratio **0.88**

Notes

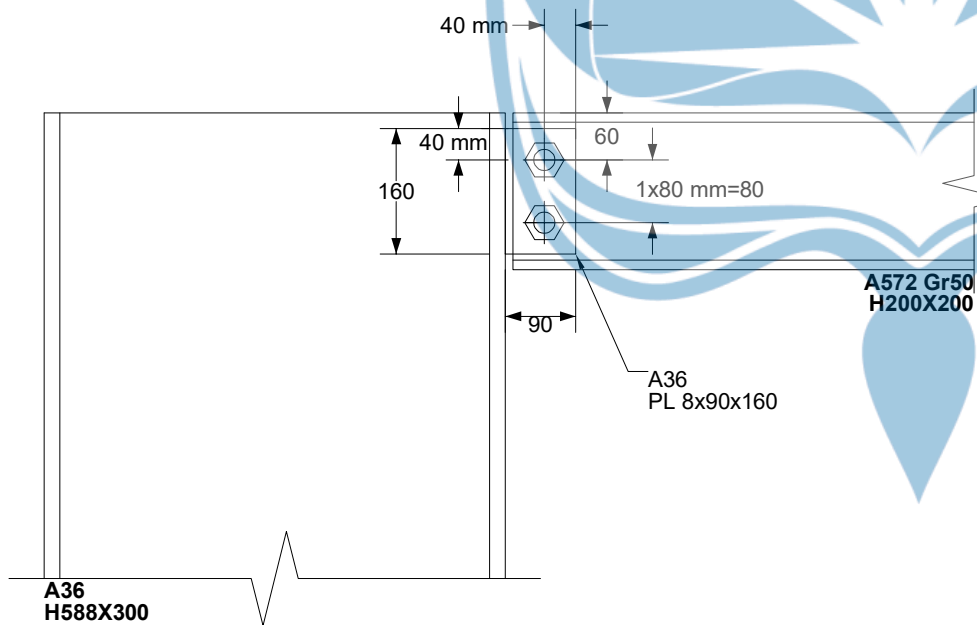
The plate is designed with the extended configuration criteria.



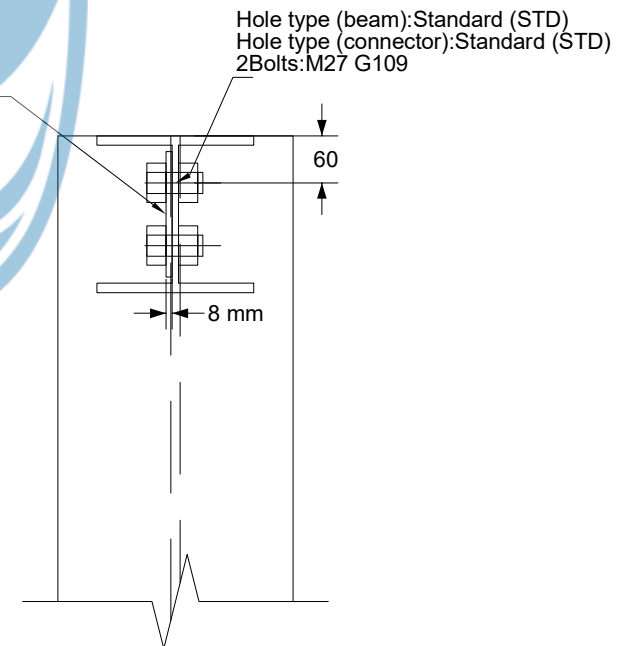
Top view



Lateral view

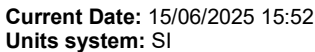


Front view



The logo of Universitas Atma Jaya Yogyakarta is a light blue emblem. It features a central white star with eight points. The star is superimposed on a circular background. The text "UNIVERSITAS ATMA JAYA YOGYAKARTA" is written in a circular path around the star. Below the star, there is a stylized white anchor.

LAMPIRAN
RAM CONNECTION
ANCHOR



Connection: 1 - Pinned BP

Family: Column - Base (CB)
Type: Base plate
Description: C1 Column WB-500/900x350x10x16/18

Design code: AISC 360-16 LRFD, ACI 318-19

Description	Pu [kN]	Mu22 [kN*m]	Mu33 [kN*m]	Vu2 [kN]	Vu3 [kN]	Load type
LC1	-572.95	0.00	0.00	-152.45	-9.81	Design
LC2	59.38	0.00	0.00	-11.09	31.48	Design
LC3	-572.95	0.00	0.00	-152.45	-9.81	Design
LC4	-83.68	0.00	0.00	13.44	-41.62	Design
LC5	-48.51	0.00	0.00	21.99	-0.10	Design
LC6	-48.51	0.00	0.00	21.99	-0.10	Design

Design for major axis
Base plate (AISC 360-16 LRFD)

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Base plate						
Distance from anchor to edge	[mm]	73.00	6.35	--	✓	
Weld size	[1/16in]	5	3	--	✓	table J2.4

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Pedestal						
Axial bearing	[KN/mm2]	0.02	0.00	LC1	0.16	DG1 3.1.1
Base plate						
Flexural yielding (bearing interface)	[KN*m/m]	31.03	3.56	LC1	0.11	DG1 Sec 3.1.2
Flexural yielding (tension interface)	[KN*m/m]	31.03	3.71	LC2	0.12	DG1 Eq. 3.3.13
Column						
Weld capacity	[KN/m]	1828.47	71.37	LC2	0.04	DG1 p. 35
Elastic method weld shear capacity	[KN/m]	1218.98	163.57	LC1	0.13	Sec. J2.4
Elastic method weld axial capacity	[KN/m]	1828.47	43.03	LC2	0.02	Sec. J2.4
Ratio		0.16				

Dimensions	Unit	Value	Min.	Max.	Sta.	References
<i> Anchors</i>						

Anchor spacing	[mm]	120.00	96.00	--	✓	Sec. 17.9.2
Concrete cover	[mm]	123.00	50.80	--	✓	Sec. 20.5.1.3.1
Effective length	[mm]	615.60	--	984.40	✓	

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Anchor tension	[KN]	91.76	7.42	LC2	0.08	Eq. 17.6.1.2
Pullout of anchor in tension	[KN]	103.53	7.42	LC2	0.07	Sec. 17.5.2
Side-face blowout of anchor in tension	[KN]	106.69	7.42	LC2	0.07	Sec. 17.5.2
Side-face blowout of group of anchors in tension	[KN]	210.00	14.84	LC2	0.07	Sec. 17.5.2
Anchors reinforcement in tension	[KN]	843.38	59.38	LC2	0.07	Sec. 17.5.3
Anchor shear	[KN]	40.66	19.06	LC1	0.47	Eq. 17.7.1.2b, Sec. 17.7.1.2.1
Pryout of anchor in shear	[KN]	109.15	19.06	LC1	0.17	Sec. 17.5.2
Pryout of group of anchors in shear	[KN]	209.50	152.45	LC1	0.73	Sec. 17.5.2
Anchors reinforcement in shear	[KN]	843.38	152.45	LC1	0.18	Sec. 17.5.3
Interaction of tensile and shear forces	[KN]	1.20	0.00	LC2	0.00	Sec. 17.8.1
Ratio					0.73	

Design for minor axis Base plate (AISC 360-16 LRFD)

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Base plate						
Distance from anchor to edge	[mm]	73.00	6.35	--	✓	
Weld size	[1/16in]	5	3	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Pedestal						
Axial bearing	[KN/mm ²]	0.02	0.00	LC1	0.16	DG1 3.1.1
Base plate						
Flexural yielding (bearing interface)	[KN*m/m]	31.03	3.56	LC1	0.11	DG1 Sec 3.1.2
Flexural yielding (tension interface)	[KN*m/m]	31.03	3.71	LC2	0.12	DG1 Eq. 3.3.13
Column						
Weld capacity	[KN/m]	1828.47	71.37	LC2	0.04	DG1 p. 35
Elastic method weld shear capacity	[KN/m]	1218.98	30.16	LC4	0.02	Sec. J2.4
Elastic method weld axial capacity	[KN/m]	1828.47	43.03	LC2	0.02	Sec. J2.4
Ratio					0.16	

Anchors

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Anchors						
Anchor spacing	[mm]	120.00	96.00	--	✓	Sec. 17.9.2
Concrete cover	[mm]	123.00	50.80	--	✓	Sec. 20.5.1.3.1
Effective length	[mm]	615.60	--	984.40	✓	

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Anchor tension	[KN]	91.76	7.42	LC2	0.08	Eq. 17.6.1.2
Pullout of anchor in tension	[KN]	103.53	7.42	LC2	0.07	Sec. 17.5.2

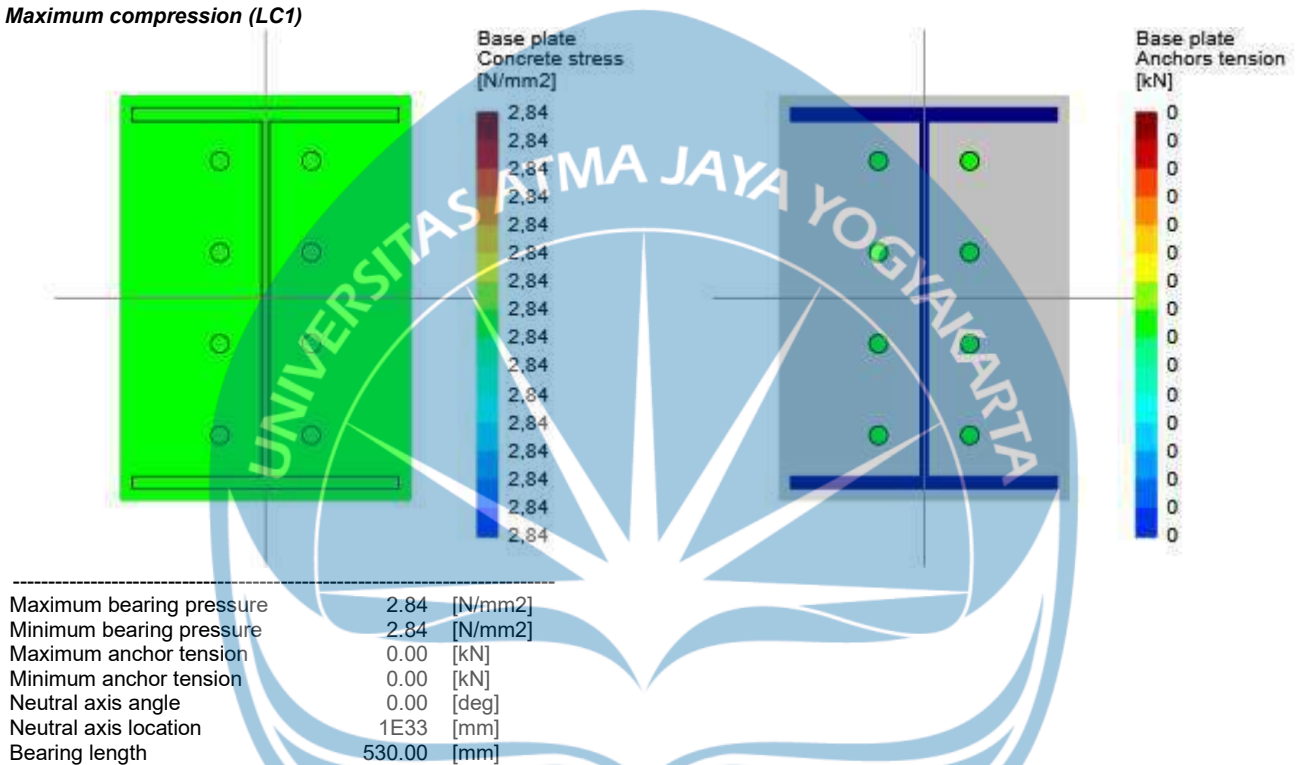
Side-face blowout of anchor in tension	[kN]	106.69	7.42	LC2	0.07	Sec. 17.5.2
Side-face blowout of group of anchors in tension	[kN]	325.16	29.69	LC2	0.09	Sec. 17.5.2
Anchors reinforcement in tension	[kN]	843.38	59.38	LC2	0.07	Sec. 17.5.3
Anchor shear	[kN]	40.66	5.20	LC4	0.13	Eq. 17.7.1.2b, Sec. 17.7.1.2.1
Pryout of anchor in shear	[kN]	109.15	5.20	LC4	0.05	Sec. 17.5.2
Pryout of group of anchors in shear	[kN]	209.50	41.62	LC4	0.20	Sec. 17.5.2
Anchors reinforcement in shear	[kN]	843.38	41.62	LC4	0.05	Sec. 17.5.3
Interaction of tensile and shear forces	[kN]	1.20	0.00	LC2	0.00	Sec. 17.8.1

Ratio **0.20**

Global critical strength ratio **0.73**

Major axis

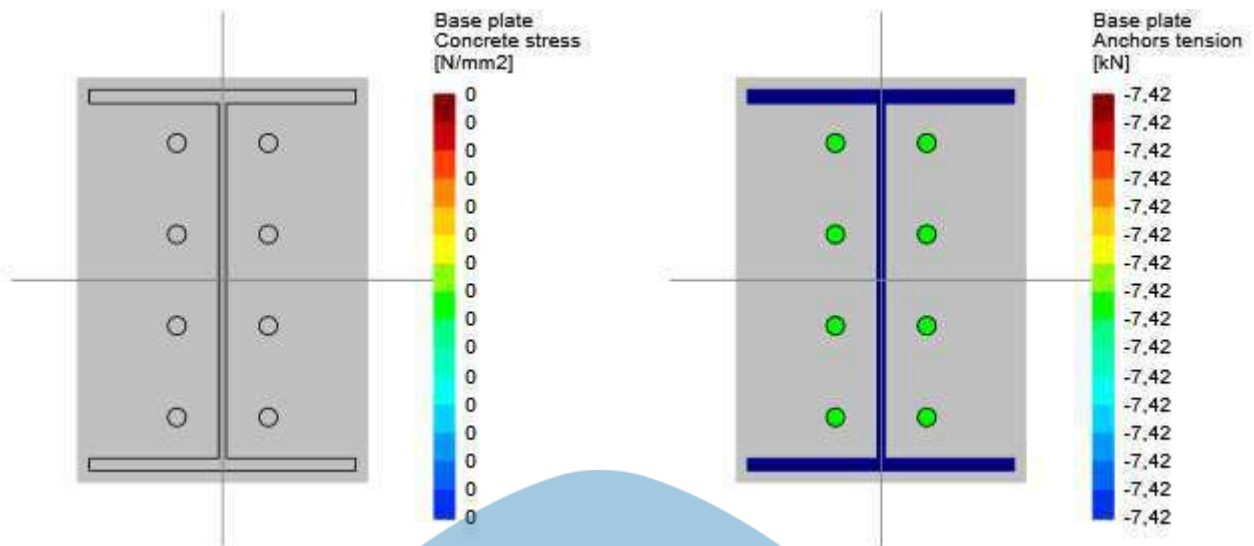
Maximum compression (LC1)



Anchors tensions

Anchor	Transverse [mm]	Longitudinal [mm]	Shear [kN]	Tension [kN]
1	-60.00	-180.00	-19.06	0.00
2	-60.00	-60.00	-19.06	0.00
3	-60.00	60.00	-19.06	0.00
4	-60.00	180.00	-19.06	0.00
5	60.00	180.00	-19.06	0.00
6	60.00	60.00	-19.06	0.00
7	60.00	-60.00	-19.06	0.00
8	60.00	-180.00	-19.06	0.00

Maximum tension (LC2)



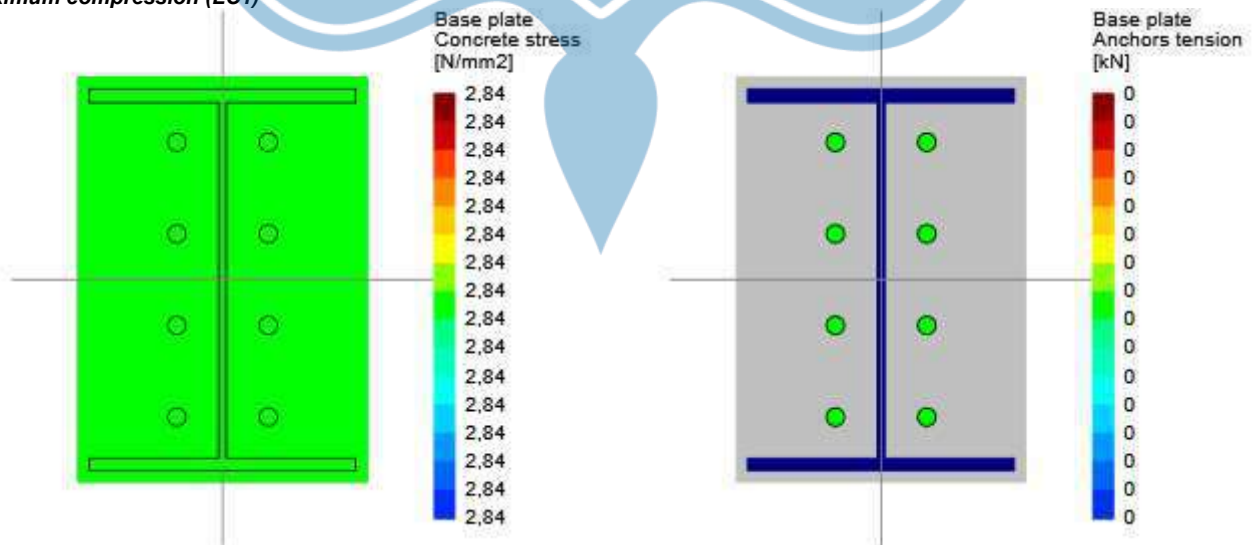
Maximum bearing pressure	0.00	[N/mm2]
Minimum bearing pressure	0.00	[N/mm2]
Maximum anchor tension	7.42	[kN]
Minimum anchor tension	7.42	[kN]
Neutral axis angle	0.00	[deg]
Neutral axis location	-1E33	[mm]
Bearing length	0.00	[mm]

Anchors tensions

Anchor	Transverse [mm]	Longitudinal [mm]	Shear [kN]	Tension [kN]
1	-60.00	-180.00	-1.39	7.42
2	-60.00	-60.00	-1.39	7.42
3	-60.00	60.00	-1.39	7.42
4	-60.00	180.00	-1.39	7.42
5	60.00	180.00	-1.39	7.42
6	60.00	60.00	-1.39	7.42
7	60.00	-60.00	-1.39	7.42
8	60.00	-180.00	-1.39	7.42

Minor axis

Maximum compression (LC1)

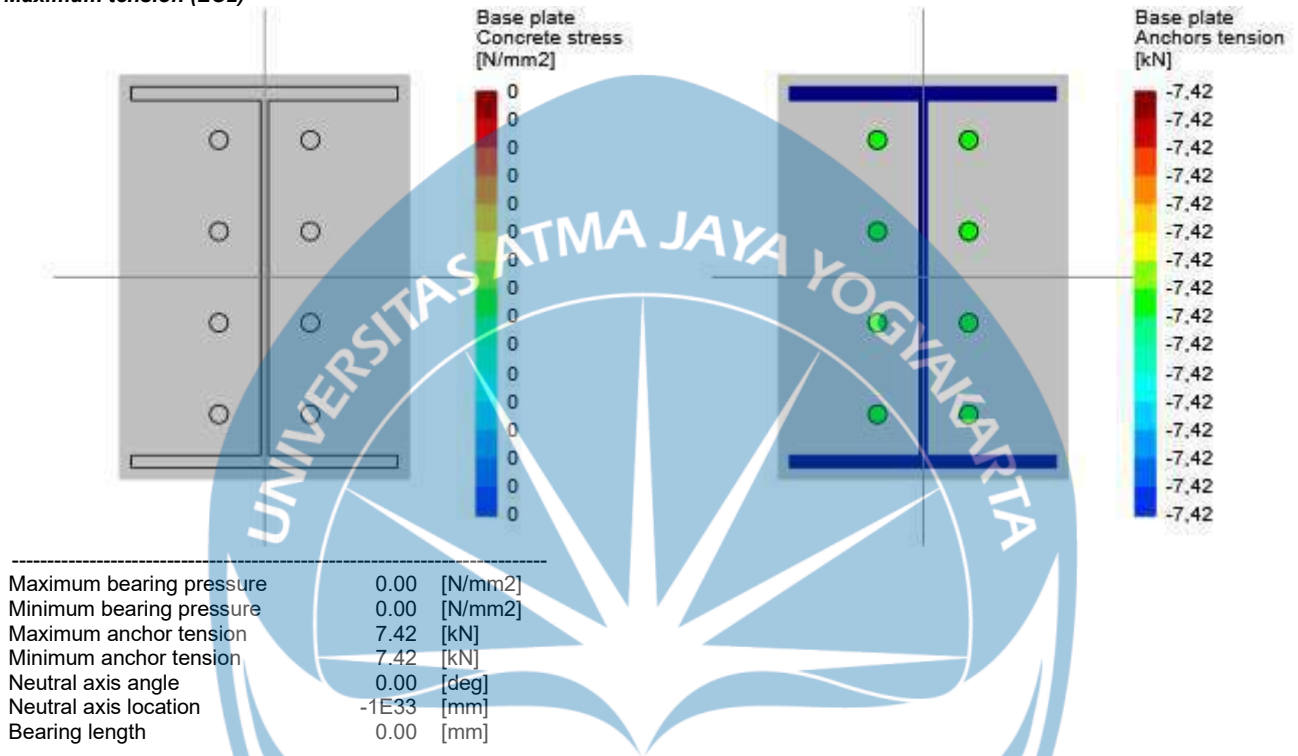


Maximum bearing pressure	2.84	[N/mm2]
Minimum bearing pressure	2.84	[N/mm2]
Maximum anchor tension	0.00	[kN]
Minimum anchor tension	0.00	[kN]
Neutral axis angle	0.00	[deg]
Neutral axis location	1E33	[mm]
Bearing length	380.00	[mm]

Anchors tensions

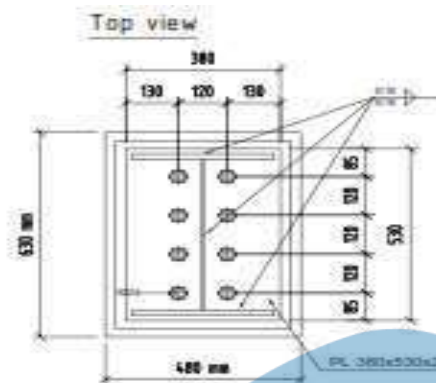
Anchor	Transverse [mm]	Longitudinal [mm]	Shear [kN]	Tension [kN]
1	-60.00	-180.00	-1.23	0.00
2	-60.00	-60.00	-1.23	0.00
3	-60.00	60.00	-1.23	0.00
4	-60.00	180.00	-1.23	0.00
5	60.00	180.00	-1.23	0.00
6	60.00	60.00	-1.23	0.00
7	60.00	-60.00	-1.23	0.00
8	60.00	-180.00	-1.23	0.00

Maximum tension (LC2)

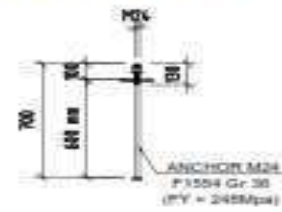


Anchors tensions

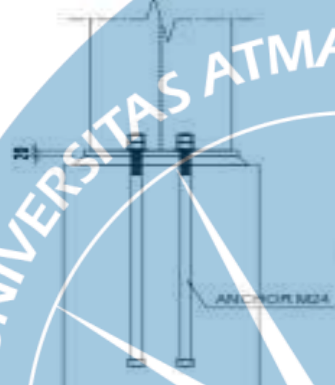
Anchor	Transverse [mm]	Longitudinal [mm]	Shear [kN]	Tension [kN]
1	-60.00	-180.00	3.93	7.42
2	-60.00	-60.00	3.93	7.42
3	-60.00	60.00	3.93	7.42
4	-60.00	180.00	3.93	7.42
5	60.00	180.00	3.93	7.42
6	60.00	60.00	3.93	7.42
7	60.00	-60.00	3.93	7.42
8	60.00	-180.00	3.93	7.42



Anchor detailing, Scl.: 2:1

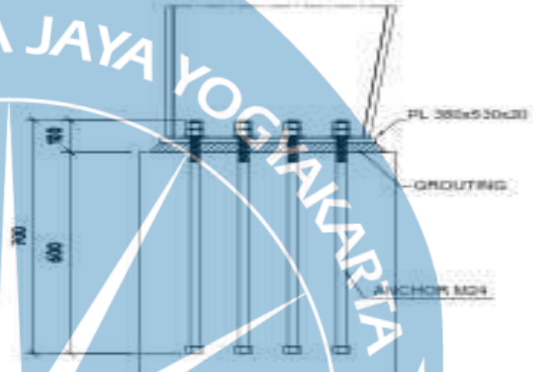


Lateral view



Front view

Column WB-500/500x250x10x10/10 Scl



UNIVERSITAS ATMA JAYA YOGYAKARTA

Current Date: 15/06/2025 15:50
Units system: SI

Steel Connections Results

Connection: 2 - Pinned BP

Family: Column - Base (CB)
Type: Base plate
Description: C2 Column WB-400x400x14x24

Design code: AISC 360-16 LRFD, ACI 318-19

Demands

Description	Pu [kN]	Mu22 [kN*m]	Mu33 [kN*m]	Vu2 [kN]	Vu3 [kN]	Load type
LC1	-326.64	0.00	0.00	-91.61	10.02	Design
LC2	0.00	0.00	0.00	0.00	0.00	Design
LC3	-1160.04	0.00	0.00	9.48	-1.44	Design
LC4	-1069.20	0.00	0.00	33.58	-61.75	Design
LC5	-319.38	0.00	0.00	7.01	4.42	Design
LC6	-319.38	0.00	0.00	7.01	4.42	Design

Design calculations

Design for major axis
Base plate (AISC 360-16 LRFD)

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
Base plate						
Distance from anchor to edge	[mm]	83.00	6.35	--	✓	
Weld size	[1/16in]	5	4	--	✓	table J2.4

Design Check

Verification	Unit	Capacity	Demand	Ctrl EQ	Ratio	References
Pedestal						
Axial bearing	[KN/mm2]	0.02	0.01	LC3	0.33	DG1 3.1.1
Base plate						
Flexural yielding (bearing interface)	[KN*m/m]	44.68	12.71	LC3	0.28	DG1 Sec 3.1.2
Flexural yielding (tension interface)	[KN*m/m]	44.68	0.00	LC1	0.00	DG1 Eq. 3.3.13
Column						
Weld capacity	[KN/m]	1828.47	0.00	LC1	0.00	Sec. J2.4
Elastic method weld shear capacity	[KN/m]	1218.98	130.12	LC1	0.11	Sec. J2.4
Elastic method weld axial capacity	[KN/m]	1828.47	0.00	LC1	0.00	Sec. J2.4
Ratio	0.33					

Anchors

Geometric Considerations

Dimensions	Unit	Value	Min.	Max.	Sta.	References
<i>Anchors</i>						