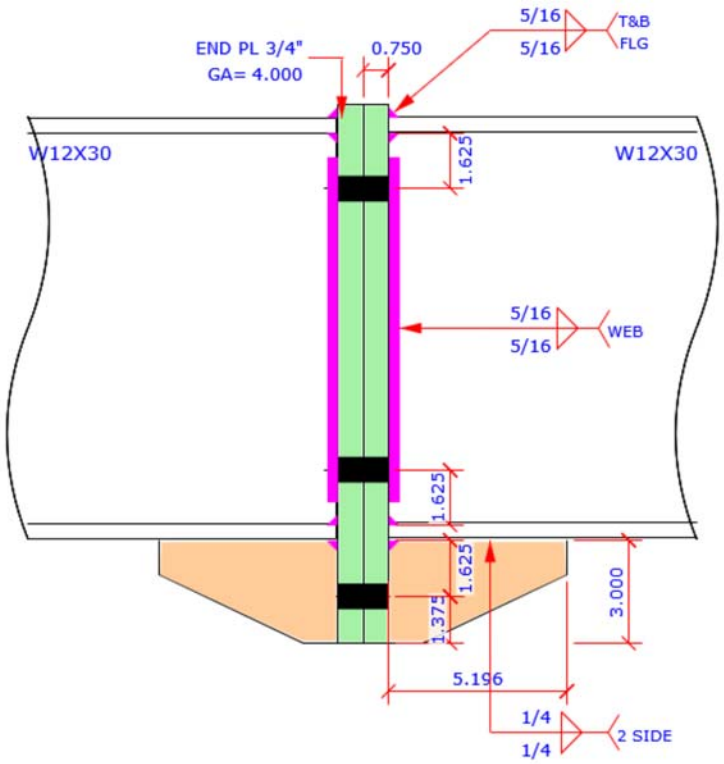
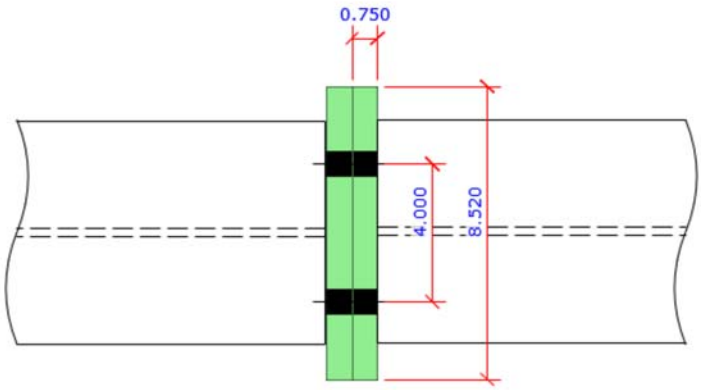
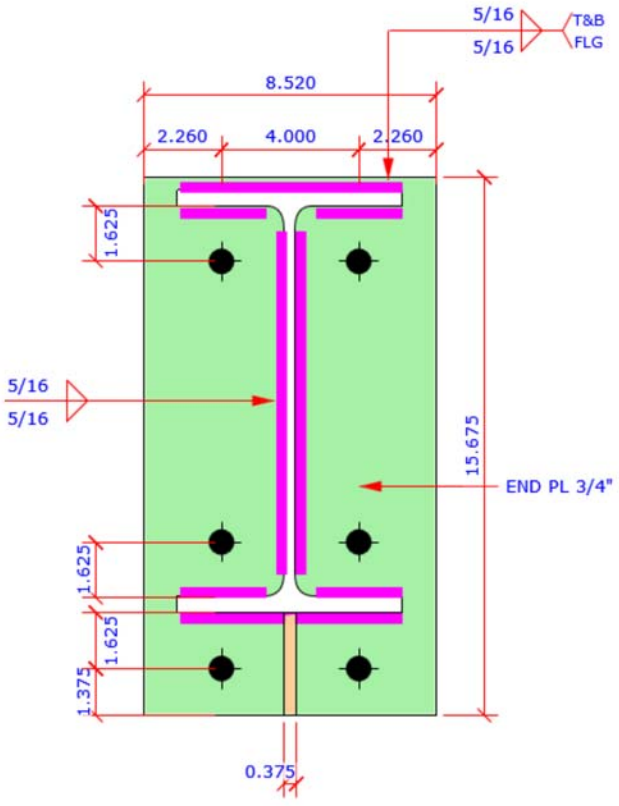
Result Summary - Overall	Moment Connection - Beam Splice	Code=AISC 360-10 LRFD

Result Summary - Overall	geometries & weld limitations = **PASS**	limit states max ratio = **0.84**	**PASS**
Right Beam	geometries & weld limitations = **PASS**	limit states max ratio = **0.84**	**PASS**
Left Beam	geometries & weld limitations = **PASS**	limit states max ratio = **0.84**	**PASS**

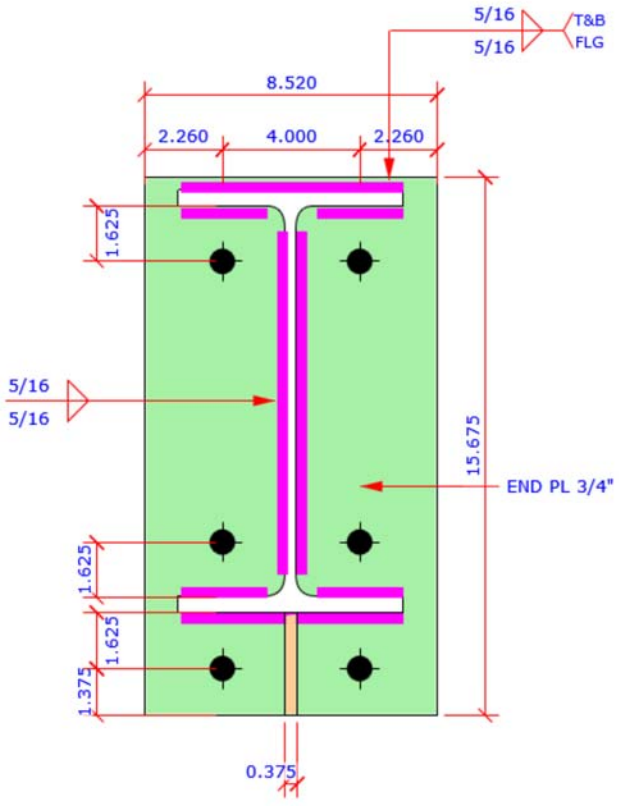
Sketch	Moment Connection - Beam Splice	Code=AISC 360-10 LRFD



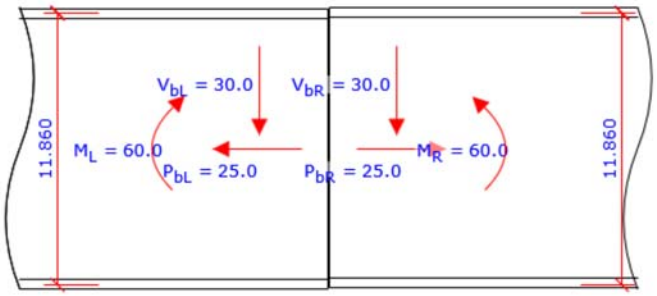




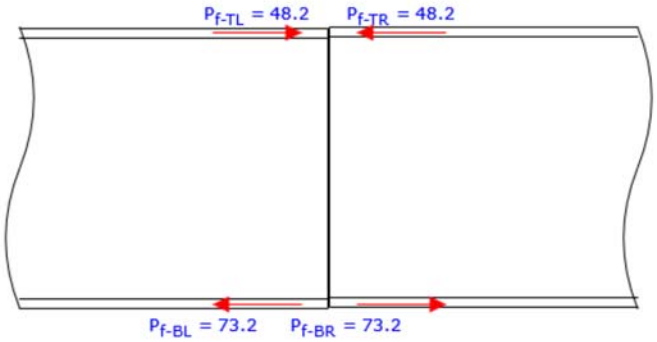
Left Side Beam



Right Side Beam



Design Load



Beam Flange Force

Members & Components Summary

Member	Moment Connection				Code=AISC 360-10 LRFD
Right Side Beam Section					
W12X30	d = 12.300	[in]	b_f = 6.520	[in]	
	t_f = 0.440	[in]	t_w = 0.260	[in]	
	k_{des} = 0.740	[in]	k_{det} = 1.125	[in]	
	k_1 = 0.750	[in]	A = 8.790	[in^2]	
	S_x = 38.60	[in^3]	Z_x = 43.10	[in^3]	
Steel Grade A992	F_y = 50.0	[ksi]	F_u = 65.0	[ksi]	
Left Side Beam Section					
W12X30	d = 12.300	[in]	b_f = 6.520	[in]	
	t_f = 0.440	[in]	t_w = 0.260	[in]	
	k_{des} = 0.740	[in]	k_{det} = 1.125	[in]	
	k_1 = 0.750	[in]	A = 8.790	[in^2]	
	S_x = 38.60	[in^3]	Z_x = 43.10	[in^3]	
Steel Grade A992	F_y = 50.0	[ksi]	F_u = 65.0	[ksi]	

Beam Flange Force Calc

Beam Flange Force

Beam section	d_b = 12.300	[in]	t_{fb} = 0.440	[in]
Flange force moment arm	$d_m = d_b - t_{fb}$		= 11.860	[in]
User input load	axial P_{bR} = -25.00	[kips]	moment M_R = 60.00	[kip-ft]
	in tension			
Beam flange force - top	$P_{f\text{-}TR} = P_{bR}/2 + M_R/d_m$		= **48.21**	[kips]
Beam flange force - bottom	$P_{f\text{-}BR} = P_{bR}/2 - M_R/d_m$		= **-73.21**	[kips]

Right Beam	Splice MC Connection	Code=AISC 360-10 LRFD

Result Summary	geometries & weld limitations = **PASS**	limit states max ratio = **0.84** **PASS**

Geometry Restriction Checks				**PASS**
Min Bolt Spacing - End Plate				
Bolt diameter	d_b =	= 0.750	[in]	
Min bolt spacing allowed	$L_{s\text{-}min} = 2.667\ d_b$	= **2.000**	[in]	AISC 14th J3.3
Min Bolt spacing in End Plate	L_s =	= **3.690**	[in]	
		> $L_{s\text{-}min}$	OK	
Min Bolt Edge Distance - End Plate				
Bolt diameter	d_b =	= 0.750	[in]	
Min edge distance allowed	$L_{e\text{-}min}$ =	= **1.000**	[in]	AISC 14th Table J3.4
Min edge distance in End Plate	L_e =	= **1.375**	[in]	
		> $L_{e\text{-}min}$	OK	
Max Bolt Edge Distance - End Plate				
Connecting plate thickness	t_p =	= 0.750	[in]	
Max edge distance allowed	$L_{e\text{-}max}$ = min (12t , 6")	= **6.000**	[in]	AISC 14th J3.5
Max edge distance in End Plate	L_e =	= **2.260**	[in]	
		< $L_{e\text{-}max}$	OK	

Beam Flange Fillet Weld Limitation				**PASS**
Min Fillet Weld Size				
Thinner part joined thickness	t =	= 0.440	[in]	
Min fillet weld size allowed	w_{min} =	= **0.188**	[in]	AISC 14th Table J2.4
Fillet weld size provided	w =	= **0.313**	[in]	
		> w_{min}	OK	
Min Fillet Weld Length				
Fillet weld size provided	w =	= 0.313	[in]	
Min fillet weld length allowed	$L_{min} = 4 \times w$	= **1.250**	[in]	AISC 14th J2.2b
Min fillet weld length	$L = 0.5\ b_{fb} - k_{1b}$	= **2.510**	[in]	
		> L_{min}	OK	

Beam Web Fillet Weld Limitation				**PASS**
Min Fillet Weld Size				
Thinner part joined thickness	t =	= 0.260	[in]	
Min fillet weld size allowed	w_{min} =	= **0.188**	[in]	AISC 14th Table J2.4
Fillet weld size provided	w =	= **0.313**	[in]	
		> w_{min}	OK	
Min Fillet Weld Length				
Fillet weld size provided	w =	= 0.313	[in]	
Min fillet weld length allowed	$L_{min} = 4 \times w$	= **1.250**	[in]	AISC 14th J2.2b
Min fillet weld length	$L = 0.5\ d_b - k_b$	= **5.025**	[in]	
		> L_{min}	OK	

Verify AISC DG4 Bolt No Prying Assumption					**AISC DG4 Is Used**
Bolt Moment Strength (No Prying)					
	bolt grade = A325-N		F_t = 90.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Bolt norminal tensile strength	$P_t = F_t A_b$		= 39.76	[kips]	AISC 14th Eq J3-1
Tension bolt moment arm	h_0 = 13.705	[in]	h_1 = 10.015	[in]	
Bolt moment strength (no prying)	$M_{np} = 2 P_t (h_0 + h_1)$		= 157.19	[kip-ft]	AISC DG4 Eq 3.7
Bolt resistance factor-LRFD	ϕ_v = 0.75				AISC 14th Eq J3-1
	$\phi^{np}_{v\,M}$ =		= **117.89**	[kip-ft]	
End Plate Bending Strength					
End plate width	b_{plate} = 8.520	[in]	thickness t_p = 0.750	[in]	
Beam flange width	b_{fb} = 6.520	[in]			
Effective end plate width	$b_p = \min (b_{plate}, b_{fb} + 1")$		= 7.520	[in]	AISC DG4 Page 9 item 5
End plate yield strength	F_{yp} = 50.0	[ksi]			
See AISC DG4 Table 3.2 for all formulas to derive the following parameters					AISC DG4 Table 3.2
Tension bolt moment arm	h_0 = 13.705	[in]	h_1 = 10.015	[in]	
	g = 4.000	[in]	d_e = 1.375	[in]	
	p_{fi} = 1.625	[in]	p_{fo} = 1.625	[in]	
	s = 2.742	[in]	Y_p = 120.44	[in]	
Flexure resistance factor-LRFD	ϕ^b_v = 0.90				AISC 14th F1 (1)
End plate bending strength	$\phi^b_v M_{pl} = \phi^b_v F_{yp} t_p^2 Y_p$		= **254.05**	[kip-ft]	AISC DG4 Table 3.1
Check thick end plate condition	$\phi^b_v M_{pl} >= 1.11 X \phi_v M_{np}$				AISC DG4 Eq 3.33
	ratio = **0.52** thick plate				
The thick end plate conditions are met. AISG DG4 is used and no bolt prying is considered					AISC DG4 Eq 3.33 & 3.35

Bolt Moment Strength (No Prying)			ratio = 73.21 / 119.28	= **0.61**	**PASS**
	bolt grade = A325-N		F_t = 90.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Bolt norminal tensile strength	$P_t = F_t A_b$		= 39.76	[kips]	AISC 14th Eq J3-1
Tension bolt moment arm	h_0 = 13.705	[in]	h_1 = 10.015	[in]	
Flange force moment arm	$d_m = d_b - t_{fb}$		= 11.860	[in]	
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$		= **73.21**	[kips]	
Flange force resistance by bolt	$F_n = 2 P_t (h_0 + h_1) / d_m$		= 159.04	[kips]	AISC DG4 Eq 3.7
Bolt resistance factor-LRFD	ϕ_v = 0.75				AISC 14th Eq J3-1
	$\phi^n_{v\,F}$ =		= **119.28**	[kips]	AISC DG4 Eq 3.7
	ratio = **0.61**		> P_{uf_t}	OK	

Bolt Shear Strength			ratio = 30.00 / 35.78	= **0.84**	**PASS**
Bolt shear stress	bolt grade = A325-N		F_{nv} = 54.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Number of bolt carried shear	n_s = 2.0		shear plane m = 1		
Required shear strength	V_u =		= **30.00**	[kips]	
Bolt shear strength	$R_n = F_{nv} A_b n_s m C_{ec}$		= 47.71	[kips]	AISC 14th Eq J3-1
Bolt resistance factor-LRFD	ϕ_v = 0.75				AISC 14th Eq J3-1
	$\phi^n_{v\,R}$ =		= **35.78**	[kips]	
	ratio = **0.84**		> V_u	OK	

Bolt Bearing / TearOut Strength on End Plate			ratio = 30.00 / 35.78	= **0.84**	**PASS**
Single Bolt Shear Strength					
Bolt shear stress	bolt grade = A325-N		F_{nv} = 54.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Single bolt shear strength	$R_{n\text{-}bolt} = F_{nv} A_b$		= 23.86	[kips]	AISC 14th Eq J3-1
Bolt Bearing / TearOut Strength on Plate					
Bolt hole diameter	bolt dia d_b = $^3/_4$	[in]	bolt hole dia d_h = $^{13}/_{16}$	[in]	AISC 14th Table J3.3
Bolt edge distance	edge L_e = 1.375	[in]			
Plate tensile strength	F_u = 65.0	[ksi]			
Plate thickness	t = 0.750	[in]			
Edge Bolt					
Bolt hole edge clear distance	$L_c = L_e - d_h / 2$		= 0.969	[in]	
Bolt tear out/bearing strength	$R_{n\text{-}t\&b\text{-}ed} = 1.5\, L_c\, t\, F_u \le 3.0\, d_b\, t\, F_u$				AISC 14th Eq J3-6b
	= 70.84 ≤ 109.69		= 70.84	[kips]	
Bolt strength at edge	$R_{n\text{-}ed} = \min(R_{n\text{-}t\&b\text{-}ed}, R_{n\text{-}bolt})$		= 23.86	[kips]	
Number of bolt	edge n_{ed} = 2				
Bolt bearing strength for all bolts	$R_n = n_{ed} R_{n\text{-}ed}$		= 47.71	[kips]	
Required shear strength	V_u =		= **30.00**	[kips]	
Bolt resistance factor-LRFD	ϕ_v = 0.75				AISC 14th J3-10
	$\phi^n_{v\,R}$ =		= **35.78**	[kips]	
	ratio = **0.84**		> V_u	OK	

End Plate Flexural Yielding			ratio = 73.21 / 257.05	= **0.28**	**PASS**
End Plate Bending Strength					
End plate width	b_{plate} = 8.520 [in]		thickness t_p = 0.750	[in]	
Beam flange width	b_{fb} = 6.520 [in]				
Effective end plate width	b_p = min (b_{plate} , b_{fb} + 1")		= 7.520	[in]	AISC DG4 Page 9 item 5
End plate yield strength	F_{yp} = 50.0 [ksi]				
See AISC DG4 Table 3.2 for all formulas to derive the following parameters					AISC DG4 Table 3.2
Tension bolt moment arm	h_0 = 13.705 [in]		h_1 = 10.015	[in]	
	g = 4.000 [in]		d_e = 1.375	[in]	
	p_{fi} = 1.625 [in]		p_{fo} = 1.625	[in]	
	s = 2.742 [in]		Y_p = 120.44	[in]	
Flexure resistance factor-LRFD	ϕ_v^b = 0.90				AISC 14th F1 (1)
End plate bending strength	$\phi_v^b M_{pl} = \phi_v^b F_{yp} t_p^2 Y_p$		= **254.05**	[kip-ft]	AISC DG4 Table 3.1
Flange force moment arm	$d_m = d_b - t_{fb}$		= 11.860	[in]	
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$		= **73.21**	[kips]	
Flange force provided by end plate bending	$\phi_{v\,R}^{pl} = \phi_v M_{pl} / d_m$		= **257.05**	[kips]	AISC DG4 Eq 3.10
	ratio = **0.28**		> P_{uf_t}	OK	

End Plate Stiffener Geometry Limitations					**PASS**
Beam web thick	t_{wb} = 0.260 [in]		Stiff thick t_s = 0.375	[in]	
Beam yield strength	F_{yb} = 50.0 [ksi]		Stiff yield F_{ys} = 50.0	[ksi]	
Min Stiffener Plate Thickness					
Min stiffener plate thickness	$t_{smin} = t_{wb} F_{yb} / F_{ys}$		= **0.260**	[in]	AISC DG4 Eq 3.15
Stiffener plate thickness	t_s =		= **0.375**	[in]	
			> t_{smin}	OK	
Min Stiff Thick to Avoid Local Buckiling					
Stiffener plate height	h_{st} = 1.688 [in]		E = 29000	[ksi]	
Stiffener plate strength	F_{ys} = 50.0 [ksi]				
Min stiffener plate thickness	$t_{smin} = 1.79\, h_{st} \sqrt{F_{ys} / E}$		= **0.125**	[in]	AISC DG4 Eq 3.16
Stiffener plate thickness	t_s =		= **0.375**	[in]	
			> t_{smin}	OK	

Beam Flange Weld Strength					ratio = 73.21 / 120.47	= **0.61**	**PASS**	
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$				= **73.21**	[kips]		
Fillet weld length - double fillet	$L = [b_{fb} + (b_{fb} - 2k_{1b})] /2$ as dbl fillet				= 5.770	[in]		
Fillet Weld Strength Check								
Fillet weld leg size	$w = 5/16$	[in]	load angle θ = 90.0	[°]				
Electrode strength	F_{EXX} = 70.0	[ksi]	strength coeff C_1 = 1.00				AISC 14th	Table 8-3
Number of weld line	n = 2 for double fillet							
Load angle coefficient	$C_2 = (1 + 0.5 \sin^{1.5} \theta)$				= 1.50		AISC 14th	Page 8-9
Fillet weld shear strength	$R_{n-w} = 0.6 (C_1 \times 70$ ksi$) 0.707 w n C_2$				= 27.838	[kip/in]	AISC 14th	Eq 8-1
Base metal - beam flange	thickness t = 0.440	[in]	tensile F_u = 65.0	[ksi]				
Base metal - beam flange is in tension, tensile rupture as per AISC 14th Eq J4-2 is checked							AISC 14th	J2.4
Base metal tensile rupture	$R_{n-b} = F_u t$				= 28.600	[kip/in]	AISC 14th	Eq J4-2
Double fillet linear shear strength	$R_n = \min (R_{n-w}, R_{n-b})$				= **27.838**	[kip/in]	AISC 14th	Eq 9-2
Resistance factor-LRFD	ϕ_v = 0.75						AISC 14th	Eq 8-1
	$\phi^n_{v\,R}$ =				= **20.879**	[kip/in]		
Shear resistance required	P_{uf_t} =				= **73.21**	[kips]		
Fillet weld length - double fillet	L =				= 5.770	[in]		
Shear resistance provided	$\phi^n_{v\,F} = \phi_v R_n \times L$				= **120.47**	[kips]		
	ratio = **0.61**				> P_{uf_t}	OK		

Left Beam | Splice MC Connection | Code=AISC 360-10 LRFD

Result Summary	geometries & weld limitations = **PASS**	limit states max ratio = **0.84**	**PASS**

Geometry Restriction Checks					**PASS**
Min Bolt Spacing - End Plate					
Bolt diameter	d_b =	= 0.750	[in]		
Min bolt spacing allowed	$L_{s\text{-}min} = 2.667\ d_b$	= **2.000**	[in]	AISC 14th J3.3	
Min Bolt spacing in End Plate	L_s =	= **3.690**	[in]		
		> $L_{s\text{-}min}$	OK		
Min Bolt Edge Distance - End Plate					
Bolt diameter	d_b =	= 0.750	[in]		
Min edge distance allowed	$L_{e\text{-}min}$ =	= **1.000**	[in]	AISC 14th Table J3.4	
Min edge distance in End Plate	L_e =	= **1.375**	[in]		
		> $L_{e\text{-}min}$	OK		
Max Bolt Edge Distance - End Plate					
Connecting plate thickness	t_p =	= 0.750	[in]		
Max edge distance allowed	$L_{e\text{-}max}$ = min (12t , 6")	= **6.000**	[in]	AISC 14th J3.5	
Max edge distance in End Plate	L_e =	= **2.260**	[in]		
		< $L_{e\text{-}max}$	OK		

Beam Flange Fillet Weld Limitation					**PASS**
Min Fillet Weld Size					
Thinner part joined thickness	t =	= 0.440	[in]		
Min fillet weld size allowed	w_{min} =	= **0.188**	[in]	AISC 14th Table J2.4	
Fillet weld size provided	w =	= **0.313**	[in]		
		> w_{min}	OK		
Min Fillet Weld Length					
Fillet weld size provided	w =	= 0.313	[in]		
Min fillet weld length allowed	$L_{min} = 4 \times w$	= **1.250**	[in]	AISC 14th J2.2b	
Min fillet weld length	$L = 0.5\ b_{fb} - k_{1b}$	= **2.510**	[in]		
		> L_{min}	OK		

Beam Web Fillet Weld Limitation				**PASS**
Min Fillet Weld Size				
Thinner part joined thickness	t =	= 0.260	[in]	
Min fillet weld size allowed	w_{min} =	= **0.188**	[in]	AISC 14th Table J2.4
Fillet weld size provided	w =	= **0.313**	[in]	
		> w_{min}	OK	
Min Fillet Weld Length				
Fillet weld size provided	w =	= 0.313	[in]	
Min fillet weld length allowed	$L_{min} = 4 \times w$	= **1.250**	[in]	AISC 14th J2.2b
Min fillet weld length	$L = 0.5\, d_b - k_b$	= **5.025**	[in]	
		> L_{min}	OK	

Verify AISC DG4 Bolt No Prying Assumption					**AISC DG4 Is Used**
Bolt Moment Strength (No Prying)					
	bolt grade = A325-N		F_t = 90.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750 [in]		bolt area A_b = 0.442	[in^2]	
Bolt norminal tensile strength	$P_t = F_t A_b$		= 39.76	[kips]	AISC 14th Eq J3-1
Tension bolt moment arm	h_0 = 13.705 [in]		h_1 = 10.015	[in]	
Bolt moment strength (no prying)	$M_{np} = 2\, P_t (h_0 + h_1)$		= 157.19	[kip-ft]	AISC DG4 Eq 3.7
Bolt resistance factor-LRFD	ϕ_v^v = 0.75				AISC 14th Eq J3-1
	ϕ_v =		= **117.89**	[kip-ft]	
End Plate Bending Strength					
End plate width	b_{plate} = 8.520 [in]		thickness t_p = 0.750	[in]	
Beam flange width	b_{fb} = 6.520 [in]				
Effective end plate width	$b_p = \min(b_{plate}, b_{fb} + 1")$		= 7.520	[in]	AISC DG4 Page 9 item 5
End plate yield strength	F_{yp} = 50.0 [ksi]				
See AISC DG4 Table 3.2 for all formulas to derive the following parameters					AISC DG4 Table 3.2
Tension bolt moment arm	h_0 = 13.705 [in]		h_1 = 10.015	[in]	
	g = 4.000 [in]		d_e = 1.375	[in]	
	p_{fi} = 1.625 [in]		p_{fo} = 1.625	[in]	
	s = 2.742 [in]		Y_p = 120.44	[in]	
Flexure resistance factor-LRFD	ϕ_v = 0.90				AISC 14th F1 (1)
End plate bending strength	$\phi_v M_{pl} = \phi_v F_{yp} t_p^2 Y_p$		= **254.05**	[kip-ft]	AISC DG4 Table 3.1
Check thick end plate condition	$\phi_v M_{pl} >= 1.11 \times \phi_v^v M_{np}$				AISC DG4 Eq 3.33
	ratio = **0.52** thick plate				
The thick end plate conditions are met. AISG DG4 is used and no bolt prying is considered					AISC DG4 Eq 3.33 & 3.35

Bolt Moment Strength (No Prying)			ratio = 73.21 / 119.28	= **0.61**	**PASS**
	bolt grade = A325-N		F_t = 90.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Bolt norminal tensile strength	$P_t = F_t A_b$		= 39.76	[kips]	AISC 14th Eq J3-1
Tension bolt moment arm	h_0 = 13.705	[in]	h_1 = 10.015	[in]	
Flange force moment arm	$d_m = d_b - t_{fb}$		= 11.860	[in]	
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$		= **73.21**	[kips]	
Flange force resistance by bolt	$F_n = 2 P_t (h_0 + h_1) / d_m$		= 159.04	[kips]	AISC DG4 Eq 3.7
Bolt resistance factor-LRFD	ϕ_v^v = 0.75				AISC 14th Eq J3-1
	ϕ_v =		= **119.28**	[kips]	AISC DG4 Eq 3.7
	ratio = **0.61**		> P_{uf_t}	OK	

Bolt Shear Strength			ratio = 30.00 / 35.78	= **0.84**	**PASS**
Bolt shear stress	bolt grade = A325-N		F_{nv} = 54.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]	bolt area A_b = 0.442	[in^2]	
Number of bolt carried shear	n_s = 2.0		shear plane m = 1		
Required shear strength	V_u =		= **30.00**	[kips]	
Bolt shear strength	$R_n = F_{nv} A_b n_s m C_{ec}$		= 47.71	[kips]	AISC 14th Eq J3-1
Bolt resistance factor-LRFD	ϕ_v^v = 0.75				AISC 14th Eq J3-1
	ϕ_v =		= **35.78**	[kips]	
	ratio = **0.84**		> V_u	OK	

Bolt Bearing / TearOut Strength on End Plate					ratio = 30.00 / 35.78	= **0.84**	**PASS**
Single Bolt Shear Strength							
Bolt shear stress	bolt grade = A325-N				F_{nv} = 54.0	[ksi]	AISC 14th Table J3.2
	bolt dia d_b = 0.750	[in]			bolt area A_b = 0.442	[in^2]	
Single bolt shear strength	$R_{n\text{-}bolt} = F_{nv} A_b$				= 23.86	[kips]	AISC 14th Eq J3-1
Bolt Bearing / TearOut Strength on Plate							
Bolt hole diameter	bolt dia d_b = $^3/_4$	[in]			bolt hole dia d_h = $^{13}/_{16}$	[in]	AISC 14th Table J3.3
Bolt edge distance	edge L_e = 1.375	[in]					
Plate tensile strength	F_u = 65.0	[ksi]					
Plate thickness	t = 0.750	[in]					
Edge Bolt							
Bolt hole edge clear distance	$L_c = L_e - d_h / 2$				= 0.969	[in]	
Bolt tear out/bearing strength	$R_{n\text{-}t\&b\text{-}ed} = 1.5\, L_c\, t\, F_u \le 3.0\, d_b\, t\, F_u$						AISC 14th Eq J3-6b
	= 70.84 ≤ 109.69				= 70.84	[kips]	
Bolt strength at edge	$R_{n\text{-}ed}$ = min ($R_{n\text{-}t\&b\text{-}ed}$, $R_{n\text{-}bolt}$)				= 23.86	[kips]	
Number of bolt	edge n_{ed} = 2						
Bolt bearing strength for all bolts	$R_n = n_{ed} R_{n\text{-}ed}$				= 47.71	[kips]	
Required shear strength	V_u =				= **30.00**	[kips]	
Bolt resistance factor-LRFD	ϕ_v^v = 0.75						AISC 14th J3-10
	ϕ_v =				= **35.78**	[kips]	
	ratio = **0.84**				> V_u	OK	

End Plate Flexural Yielding			ratio = 73.21 / 257.05	= **0.28**	**PASS**
End Plate Bending Strength					
End plate width	b_{plate} = 8.520 [in]		thickness t_p = 0.750 [in]		
Beam flange width	b_{fb} = 6.520 [in]				
Effective end plate width	b_p = min (b_{plate} , b_{fb} + 1")		= 7.520 [in]		AISC DG4 Page 9 item 5
End plate yield strength	F_{yp} = 50.0 [ksi]				
See AISC DG4 Table 3.2 for all formulas to derive the following parameters					AISC DG4 Table 3.2
Tension bolt moment arm	h_0 = 13.705 [in]		h_1 = 10.015 [in]		
	g = 4.000 [in]		d_e = 1.375 [in]		
	p_{fi} = 1.625 [in]		p_{fo} = 1.625 [in]		
	s = 2.742 [in]		Y_p = 120.44 [in]		
Flexure resistance factor-LRFD	ϕ_v = 0.90				AISC 14th F1 (1)
End plate bending strength	$\phi_v M_{pl} = \phi_v F_{yp} t_p^2 Y_p$		= **254.05** [kip-ft]		AISC DG4 Table 3.1
Flange force moment arm	$d_m = d_b - t_{fb}$		= 11.860 [in]		
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$		= **73.21** [kips]		
Flange force provided by end plate bending	$\phi_v = \phi_v M_{pl} / d_m$		= **257.05** [kips]		AISC DG4 Eq 3.10
	ratio = **0.28**		> P_{uf_t}	OK	

End Plate Stiffener Geometry Limitations					**PASS**
Beam web thick	t_{wb} = 0.260 [in]		Stiff thick t_s = 0.375 [in]		
Beam yield strength	F_{yb} = 50.0 [ksi]		Stiff yield F_{ys} = 50.0 [ksi]		
Min Stiffener Plate Thickness					
Min stiffener plate thickness	$t_{smin} = t_{wb} F_{yb} / F_{ys}$		= **0.260** [in]		AISC DG4 Eq 3.15
Stiffener plate thickness	t_s =		= **0.375** [in]		
			> t_{smin}	OK	
Min Stiff Thick to Avoid Local Buckiling					
Stiffener plate height	h_{st} = 1.688 [in]		E = 29000 [ksi]		
Stiffener plate strength	F_{ys} = 50.0 [ksi]				
Min stiffener plate thickness	$t_{smin} = 1.79\, h_{st} \sqrt{F_{ys} / E}$		= **0.125** [in]		AISC DG4 Eq 3.16
Stiffener plate thickness	t_s =		= **0.375** [in]		
			> t_{smin}	OK	

Beam Flange Weld Strength						ratio = 73.21 / 120.47	= **0.61**	**PASS**
Flange force required in tension	$P_{uf\_t} = P_u / 2 - M_u / d_m$					= **73.21**	[kips]	
Fillet weld length - double fillet	$L = [b_{fb} + (b_{fb} - 2k_{1b})] /2$ as dbl fillet					= 5.770	[in]	
Fillet Weld Strength Check								
Fillet weld leg size	$w = {}^{5}/_{16}$	[in]		load angle θ = 90.0	[°]			
Electrode strength	F_{EXX} = 70.0	[ksi]		strength coeff C_1 = 1.00			AISC 14th	Table 8-3
Number of weld line	n = 2 for double fillet							
Load angle coefficient	$C_2 = (1 + 0.5 \sin^{1.5} \theta)$					= 1.50	AISC 14th	Page 8-9
Fillet weld shear strength	$R_{n-w} = 0.6 (C_1 \times 70$ ksi$) 0.707 w n C_2$					= 27.838	[kip/in]	AISC 14th Eq 8-1
Base metal - beam flange	thickness t = 0.440	[in]		tensile F_u = 65.0	[ksi]			
Base metal - beam flange is in tension, tensile rupture as per AISC 14th Eq J4-2 is checked							AISC 14th	J2.4
Base metal tensile rupture	$R_{n-b} = F_u t$					= 28.600	[kip/in]	AISC 14th Eq J4-2
Double fillet linear shear strength	$R_n = \min (R_{n-w}, R_{n-b})$					= **27.838**	[kip/in]	AISC 14th Eq 9-2
Resistance factor-LRFD	$\phi_v^v = 0.75$						AISC 14th	Eq 8-1
	$\phi_v =$					= **20.879**	[kip/in]	
Shear resistance required	$P_{uf\_t} =$					= **73.21**	[kips]	
Fillet weld length - double fillet	$L =$					= 5.770	[in]	
Shear resistance provided	$\phi_v = \phi_v^v R_n \times L$					= **120.47**	[kips]	
	ratio = **0.61**					> P_{uf_t}	OK	