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Design Summary		
Connection is OK		
Maximum utility ratio for connection		0.608
Design Inputs		
Design method		ASD
Young's modulus of elasticity		200000.000 MPa
Poisson's ratio		0.300
Connection forces:		
Transfer force (TF)		15000.000 N
Shear force (SF)		90000.000 N
Bolt Details:		
Bolt Diameter		22.000 mm
Number of bolts per clip angle (n)		2.000
Bolt Gage		140.000 mm
Bolt Spacing		70.000 mm
Nominal tensile capacity of bolt		620.000 MPa
Nominal shear capacity of bolt		372.000 MPa
Weld Details:		
Weld thickness		6.000 mm
Weld tensile strength		482.000 MPa
Clip angle dimensions:		
Clip angle size (li x lo x ta)		102x102x9.53 mm
Clip angle length		140.000 mm
Yield strength of clip angle		250.000 MPa
Tensile strenght of clip angle		400.000 MPa
Connecting beam properties:		
Section size		
Depth		409.000 mm
Flange width		179.000 mm
Flange thickness		14.400 mm
Web thickness (tw)		8.760 mm
Yield strength of beam		345.000 MPa
Tensile strength of beam		450.000 MPa
Beam setback from connection member (s)		12.000 mm
Top cope depth		50.000 mm
Bottom cope depth		50.000 mm
Cope length (c)		150.000 mm
Supporting member properties:		
Support type		Beam Web
Section size		W410X67
Depth		409.000 mm
Flange width		179.000 mm
Flange thickness		14.400 mm
Web thickness		8.760 mm
Design Calculations		
Bolt Shear Check:		
Shear per bolt		
[Vb=SF/(2*n)]		22500.000 N
Nominal shear strength of bolt (Rn)		141337.680 N
ASD factor in bolt shear (omega)		2.000
Allowable shear strength of bolt		
[Ra=Rn/omega]		70668.840 N
Utility ratio in bolt shear		
[Vb/Ra]		0.318
Bolt Bearing at Clip Angle Check:		
Nominal strength in bearing at clip angle (Rn)		105211.200 N
ASD factor in bolt bearing (omega)		2.000
Allowable strength in bearing at clip angle		
[Ra=Rn/omega]		52605.600 N
Utility ratio in bearing at clip angle		
[Vb/Ra]		0.428
Bolt Bearing at Support Check:		
Nominal strength in bearing at support (Rn)		208137.600 N
ASD factor in bolt bearing (omega)		2.000
Allowable strength in bearing at support		
[Ra=Rn/omega]		104068.800 N
Strength reduction factor to account for backing beam (r)		0.500
Utility ratio inbearing at support		
[Vb/(Ra*r)]		0.432

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Bolt Tension Check (without prying:		
Tension per bolt without prying		
[Tb=TF/(2*n)]	3750.000 N	
Nominal bolt strength in tension (Rn)	231231.640 N	
ASD factor in bolt tension (omega)	2.000	
Allowable bolt strength in tension		
[B=Rn/omega]	115615.820 N	
Utility ratio in bolt tension		
[Tb/B]	0.032	
Clip angle prying action check:		
Bolt strength reduction factor due to clip prying (Q)	0.109	
Interaction ratio in clip prying		
[Tb/(Q*B)]	0.296	
Weld Check:		
Maximum stress in weld group (fw)	359.777 N/mm	
Nominal strength of weld (Rn)	1226.786 N/mm	
ASD factor for weld (omega)	2.000	
Allowable weld strength		
[Ra=Rn/omega]	613.393 N/mm	
Utility ratio for weld		
[fw/Ra]	0.587	
Web Rupture at Weld Check:		
Minimum thickness of web at weld (tw`)	5.330 mm	
Utility ratio in rupture at weld		
[tw`/tw]	0.608	
Clip Angle Shear Yielding Check:		
Shear in clip angle		
[Va=sqrt(TF^2+SF^2)/2]	45620.719 N	
Nominal shear yeilding strength of clip angle (Rn)	200130.000 N	
ASD factor for shear yielding (omega)	1.500	
Allowable shear yielding strength of clip angle		
[Ra=Rn/omega]	133420.000 N	
Utility ratio in shear yielding		
[Va/Ra]	0.342	
Clip Angle Shear Rupture Check:		
Nominal shear rupture strength of clip angle (Rn)	210422.400 N	
ASD factor for shear rupture (omega)	2.000	
Shear rupture strength of clip angle		
[Ra=Rn/omega]	105211.200 N	
Utility ratio in shear rupture		
[Va/Ra]	0.434	
Beam Cope Flexure Check:		
Eccetricity of applied transfer force from centroid of cope (e)	74.000 mm	
Bending moment in coped section		
[M=SF*(s+c)+TF*e]	15690000.000 N mm	
Section modulus of coped section about major axis (Sx)	139402.260 mm^3	
Critical stress in coped section (Fcr)	345.000 MPa	
Nominal flexural strength of coped section		
[Mn=Fcr*Sx]	48093779.700 N mm	
ASD factor in flexure (omega)	1.670	
Allowable flexural strength of coped section		
[Ma=Mn/omega]	28798670.479 N mm	
Utility ratio in coped section flexure		
[M/Ma]	0.545	
Beam Cope Compression Check:		
Cross section area of coped section (Ac)	2706.840 mm^2	
Critical compressive stress in coped section (fcr)	255.526 MPa	
Nominal strength of coped section in compression (Pn)		
[Pn=fcr*Ac]	691667.931 N	
ASD factor in compression (omega)	1.670	
Allowable compression strength of coped section		
[Pa=Pn/omega]	414172.414 N	
Utility ratio in coped section compression		
[TF/Pa]	0.036	
Beam Cope Shear Check:		
Nominal strength of cope in shear (Rn)	560315.880 N	
ASD factor in shear (omega)	1.500	
Allowable shear strength of coped section		
[Ra=Rn/omega]	373543.920 N	
Utility ratio in coped section shear		
[SF/Ra]	0.241	