Company Name		Project Title
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Designer		Job Number
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1 Input Parameters

Mod	ule		Beam	Coverplate Weld Connection
MainModule				Moment Connection
Moment	kNm)*			9.0
Shear(kN)*			9.0
Axial (kN) *			9.0
		Section		
	Beam S	Section *		UB 305 x 165 x 46
	Mate	erial *		E 250 (Fe 410 W)A
т Ү	Ultimate stren	ngth, fu (MPa)		410
	Yield Streng	th , fy (MPa)	230	
$(B-t)$ α	Mass	46.1	Iz(mm4)	98990000.0
ZZ D	Area(mm2) -	5870.0	Iy(mm4)	8960000.0
	D(mm)	307.0	rz(mm)	130.0
R ₁	B(mm)	165.7	ry(mm)	39.0
R ₂	t(mm)	6.7	Zz(mm3)	646000.0
В	T(mm)	11.8	Zy(mm3)	108000.0
	FlangeSlope	90	Zpz(mm3)	720000.0
	R1(mm)	8.9	Zpy(mm3)	108000.0
	R2(mm)	0.0		
		Weld Details		
Weld Type		Fillet		
Type of weld	fabrication		Shop Weld	
Material grade ove	rwrite (MPa) Fu	l		410.0

2 Design Checks

2.1 Member Capacity

Check	Required	Provided	Remarks
Axial Capacity Member Ac (kN)		$Ac = \frac{A * f_y}{\gamma_{m0} * 1000}$ $= \frac{5870.0 * 230}{1.1 * 1000}$ $= 1227.36$	

2.2 Member Capacity

heck Required	Provided	Remarks
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Group/Team Name		Subtitle	
Designer		Job Number	
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Check	Required	Provided	Remarks
Axial Capacity Member Ac (kN)		$Ac = \frac{A * f_y}{\gamma_{m0} * 1000}$ $= \frac{5870.0 * 230}{1.1 * 1000}$ $= 1227.36$	
Shear Capacity Member Sc (kN)		$S_c = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo} * 1000}$ $= \frac{283.4 * 6.7 * 230}{\sqrt{3} * 1.1 * 1000}$ $= 229.2182399999998$	
Plastic Moment Capacity Pmc (kNm)		$Pmc = \frac{\beta_b * Z_p * fy}{\gamma_{mo} * 1000000}$ $= \frac{1 * 134529 * 230}{1.1 * 1000000}$ $= 28.13$	
Moment Deformation Criteria Mdc (kNm)		$Mdc = \frac{1.5 * Z_e * fy}{1.1}$ $= \frac{1.5 * 646000.0 * 230}{1.1}$ $= 202.61$	
Moment Capacity Member Mc (kNm)		$M_c = min(Pmc, Mdc)$ = $min(28.13, 202.61)$ = 28.13	

2.3 Load Considered

Check	Required	Provided	Remarks
Applied Axial Load Au (kN)	$Ac_{min} = 0.3 * A_c$ $= 0.3 * 1227.36$ $= 368.21$	$Au = max(A, Ac_{min})$ = $max(9.0, 368.21)$ = 368.21	Pass
Applied Shear Load Vu (kN)	$Sc_{min} = 0.6 * A_c$ = $0.6 * 229.22$ = 137.53	$Vu = max(V, Vc_{min})$ = max(9.0, 137.53) = 137.53	Pass
Applied Moment Load Mu (kNm)	$Mc_{min} = 0.5 * M_c$ = $0.5 * 28.13$ = 14.06	$Mu = max(M, Mc_{min})$ = $max(9.0, 14.06)$ = 14.06	Pass

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Check	Required	Provided	Remarks
		$A_w = Axial \ force \ in \ web$	
		$=\frac{(D-2*T)*t*Au}{A}$	
		$= \frac{(307.0 - 2 * 11.8) * 6.7 * 368.22}{5870.0}$	-
		= 119.11	
Forces Carried by Web		$M_w = Moment \ in \ web$	
		$=\frac{Z_w * Mu}{Z}$	
		$=\frac{134529*14.06}{720000.0}$	
		=2.63	
		$A_f = Axial \ force \ in \ flange$	
		$=\frac{Au*B*T}{A}$	
		$=\frac{368.21*165.7*11.8}{5870.0}$	
		= 122.65	
		$M_f = Moment \ in \ flange$	
Forces Carried by Flange		$=Mu-M_w$	
Torces carried by Flange		= 14.06 - 2.63	
		= 11.44	
		$f_f = flange \ force$	
		$=\frac{M_f * 1000}{D-T} + A_f$	
		$= \frac{11.44}{307.0 - 11.8} + 122.65$	
		= 161.39	
		$S_c = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo} * 1000}$	
		$S_c = \sqrt{3} * \gamma_{mo} * 1000$	
Shear Capacity Member		$= \frac{283.4 * 6.7 * 230}{\sqrt{3} * 1.1 * 1000}$	
Sc (kN)			
		$=229.2182399999998$ $\beta_{1}*Z_{-}*f_{2}$	
		$Pmc = \frac{\beta_b * Z_p * fy}{\gamma_{mo} * 1000000}$	
Plastic Moment Capacity		1 * 134529 * 230	
Pmc (kNm)		$= \frac{1*134529*230}{1.1*1000000}$	
		=28.13	
		$Mdc = \frac{1.5 * Z_e * fy}{1.1}$	
Moment Deformation Cri-		1.5 * 646000.0 * 230	
teria Mdc (kNm)		$=\frac{1.5*646000.0*230}{1.1}$	
		= 202.61	
		$M_c = min(Pmc, Mdc)$	
Moment Capacity Mem-		= min(28.13, 202.61)	
ber Mc (kNm)		= 28.13	

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2.4 Load Considered

$\begin{aligned} M_w &= Moment \ in \ web \\ &= \frac{Z_w * Mu}{Z} \\ &= \frac{134529 * 14.06}{720000.0} \\ &= 2.63 \\ A_f &= Axial \ force \ in \ flange \\ &= \frac{Au * B * T}{A} \\ &= \frac{368.21 * 165.7 * 11.8}{5870.0} \\ &= 122.65 \\ M_f &= Moment \ in \ flange \\ &= Mu - M_w \\ &= 14.06 - 2.63 \\ &= 11.44 \\ f_f &= flange \ force \\ &= \frac{M_f * 1000}{D - T} + A_f \end{aligned}$	Check	Required	Provided	Remarks
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$Ac_{min} = 0.3 * A_c$	$Au = max(A, Ac_{min})$	
$Sc_{min} = 0.6 * A_c \\ = 0.6 * 229.22 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 137.53 \\ = 14.06 \\ = \frac{(D-2*T)*t**Au}{A} \\ = \frac{(G-2*T)*t**Au}{A} \\ = \frac{(307.0-2*11.8)*6.7*368.2}{5870.0} \\ = 119.11 \\ M_w = Moment in web \\ = \frac{Z_w * Mu}{Z} \\ = \frac{134529*14.06}{720000.0} \\ = 2.63 \\ = 13.4529*14.06 \\ 720000.0 \\ = 2.63 \\ = 12.265 \\ M_f = Moment in flange \\ = \frac{Au*B*T}{A} \\ = \frac{368.21*165.7*11.8}{5870.0} \\ = 122.65 \\ M_f = Moment in flange \\ = Mu - M_w \\ = 14.06 - 2.63 \\ = 11.44 \\ f_f = flange force \\ = \frac{M_f*1000}{D-T} + A_f$	Applied Axial Load Au	= 0.3 * 1227.36	= max(9.0, 368.21)	Pass
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(kN)	= 368.21	= 368.21	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$Sc_{min} = 0.6 * A_c$	$Vu = max(V, Vc_{min})$	
$\begin{array}{c} Mc_{min} = 0.5*M_c \\ = 0.5*M_c \\ = 0.5*28.13 \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Mu = max(M,Mc_{min}) \\ = max(9.0,14.06) \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Pass \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} max(9.0,14.06) \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Pass \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} max(9.0,14.06) \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Pass \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} max(9.0,14.06) \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Pass \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} max(9.0,14.06) \\ = 14.06 \\ \end{array} \qquad \begin{array}{c} Pass \\ = \frac{(07.0-2*11.8)*6.7*368.21}{5870.0} \\ = 119.11 \\ M_w = Moment in web \\ = \frac{Z_w*Mu}{Z} \\ = \frac{134529*14.06}{720000.0} \\ = 2.63 \\ \end{array} \qquad \begin{array}{c} 2.63 \\ = 11.44 \\ = \frac{368.21*165.7*11.8}{5870.0} \\ = 122.65 \\ M_f = Moment in flange \\ = Mu - M_w \\ = 14.06 - 2.63 \\ = 11.44 \\ f_f = flange force \\ = \frac{M_f*1000}{D-T} + A_f \end{array} \qquad \begin{array}{c} Mu = max(M,Mc_{min}) \\ = max(9.0,14.06) \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 19.11 \\ = 14.06 \\ = 19.11 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.06 \\ = 14.0$	Applied Shear Load Vu	= 0.6 * 229.22	= max(9.0, 137.53)	Pass
$\begin{array}{c} \text{Applied Moment Load Mu} \\ (\text{kNm}) \\ &= 14.06 \\ \\ &= 14.06 \\ \\ &= 14.06 \\ \\ &= 14.06 \\ \\ &= \frac{14.06}{A_w = Axial \ force \ in \ web} \\ &= \frac{(D-2*T)*t*Au}{A} \\ &= \frac{(307.0-2*11.8)*6.7*368.2!}{5870.0} \\ &= 119.11 \\ M_w = Moment \ in \ web \\ &= \frac{Z_w*Mu}{Z} \\ &= \frac{134529*14.06}{720000.0} \\ &= 2.63 \\ \\ A_f = Axial \ force \ in \ flange \\ &= \frac{Au*B*T}{A} \\ &= \frac{368.2!*165.7*11.8}{5870.0} \\ &= 122.65 \\ M_f = Moment \ in \ flange \\ &= Mu-M_w \\ &= 14.06-2.63 \\ &= 11.44 \\ f_f = flange \ force \\ &= \frac{M_f*1000}{D-T} + A_f \\ \end{array}$	(kN)	= 137.53	= 137.53	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$Mc_{min} = 0.5 * M_c$	$Mu = max(M, Mc_{min})$	
Forces Carried by Web	= =	= 0.5 * 28.13	= max(9.0, 14.06)	Pass
Forces Carried by Web $ = \frac{(D-2*T)*t*Au}{A} $ $ = \frac{(307.0-2*11.8)*6.7*368.2}{5870.0} $ $ = 119.11$ $M_w = Moment \ in \ web $ $ = \frac{Z_w*Mu}{Z} $ $ = \frac{134529*14.06}{720000.0} $ $ = 2.63 $ $A_f = Axial \ force \ in \ flange $ $ = \frac{Au*B*T}{A} $ $ = \frac{368.21*165.7*11.8}{5870.0} $ $ = 122.65 $ $M_f = Moment \ in \ flange $ $ = Mu - M_w $ $ = 14.06 - 2.63 $ $ = 11.44 $ $f_f = flange \ force $ $ = \frac{M_f*1000}{D-T} + A_f $	(kNm)	= 14.06		
Forces Carried by Web $ = \frac{(307.0 - 2*11.8)*6.7*368.2!}{5870.0} $ $= 119.11$ $M_w = Moment in web$ $= \frac{Z_w * Mu}{Z}$ $= \frac{134529*14.06}{720000.0}$ $= 2.63$ $A_f = Axial force in flange$ $= \frac{Au*B*T}{A}$ $= \frac{368.2!*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment in flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange force$ $= \frac{M_f*1000}{D-T} + A_f$				
Forces Carried by Web $ = \frac{(307.0 - 2*11.8)*6.7*368.21}{5870.0} $ $= 119.11$ $M_w = Moment in web$ $= \frac{Z_w * Mu}{Z}$ $= \frac{134529*14.06}{720000.0}$ $= 2.63$ $A_f = Axial force in flange$ $= \frac{Au*B*T}{A}$ $= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment in flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange force$ $= \frac{M_f*1000}{D-T} + A_f$			- (D-2*T)*t*Au	
Forces Carried by Web				
Forces Carried by Web			$= \frac{(307.0 - 2 * 11.8) * 6.7 * 368.2}{(307.0 - 2 * 11.8) * 6.7 * 368.2}$	1
Forces Carried by Web				
$= \frac{Z_w * Mu}{Z}$ $= \frac{134529 * 14.06}{72000.0}$ $= 2.63$ $A_f = Axial \ force \ in \ flange$ $= \frac{Au * B * T}{A}$ $= \frac{368.21 * 165.7 * 11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$	Forces Carried by Web			
$= \frac{134529 * 14.06}{720000.0}$ $= 2.63$ $A_f = Axial \ force \ in \ flange$ $= \frac{Au * B * T}{A}$ $= \frac{368.21 * 165.7 * 11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$				
$= \frac{134529 * 14.06}{720000.0}$ $= 2.63$ $A_f = Axial \ force \ in \ flange$ $= \frac{Au * B * T}{A}$ $= \frac{368.21 * 165.7 * 11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$			$=\frac{Z_w * Mu}{Z}$	
$= 2.63$ $A_f = Axial \ force \ in \ flange$ $= \frac{Au*B*T}{A}$ $= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f*1000}{D-T} + A_f$			<u> </u>	
$= 2.63$ $A_f = Axial \ force \ in \ flange$ $= \frac{Au*B*T}{A}$ $= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f*1000}{D-T} + A_f$			$=\frac{3320000000}{720000000000000000000000000000$	
$= \frac{Au*B*T}{A}$ $= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f*1000}{D-T} + A_f$				
$= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f*1000}{D-T} + A_f$			$A_f = Axial \ force \ in \ flange$	
$= \frac{368.21*165.7*11.8}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f*1000}{D-T} + A_f$			$_{-}$ $Au*B*T$	
Forces Carried by Flange $= \frac{122.65}{5870.0}$ $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$				
Forces Carried by Flange $= 122.65$ $M_f = Moment \ in \ flange$ $= Mu - M_w$ $= 14.06 - 2.63$ $= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$			=	
Forces Carried by Flange $ \begin{aligned} M_f &= Moment\ in\ flange \\ &= Mu - M_w \\ &= 14.06 - 2.63 \\ &= 11.44 \\ f_f &= flange\ force \\ &= \frac{M_f*1000}{D-T} + A_f \end{aligned} $				
Forces Carried by Flange $ = Mu - M_w $ $= 14.06 - 2.63 $ $= 11.44 $ $f_f = flange\ force $ $= \frac{M_f * 1000}{D - T} + A_f $				
Forces Carried by Flange $= 14.06 - 2.63$ $= 11.44$ $f_f = flange\ force$ $= \frac{M_f * 1000}{D - T} + A_f$				
$= 11.44$ $f_f = flange \ force$ $= \frac{M_f * 1000}{D - T} + A_f$	Forces Carried by Flange		***	
$f_f = flange\ force \ = rac{M_f*1000}{D-T} + A_f$				
$=rac{M_f*1000}{D-T}+A_f$				
			$=\frac{M_f*1000}{D_fT}+A_f$	
$-\frac{1111}{1111} \pm 199.65$				
$-\frac{307.0-11.8}{307.0-11.8}$			$= \frac{11.44}{307.0 - 11.8} + 122.65$	
= 161.39				

2.5 Flange Weld Design Check

Check	Required	Provided	Remarks
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Company Name		Project Title	
Group/Team Name		Subtitle	
Designer		Job Number	
Date	04 /05 /2020	Client	

Check	Required	Provided	Remarks
	Thickness of Thicker part		
	= max(11.8, 11.8)		
Min Weld Size (mm)	= 18.0	10	Pass
	$IS800:2007\ cl.10.5.2.3\ Table 21,$		
	$t_{w_{min}} = 5$		
	Thickness of Thinner part		
Max Weld Size (mm)	= Min(11.8, 11.8) = 11.8	10	Pass
	$t_{w_{max}} = 11.8$		

2.6 Outer Flange plate Check

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$b_{fp} = \{B - 2 * sp \\ = \{165.7 - 2 * 15 = 135\}$	115	Fail
Min. Plate Length (mm)	$l_{fp} = [2 * (l_w l + 2 * s) + g]$ $= +\frac{10.0}{]}$ $= 420$	185	Fail

2.7 Inner and Outer flange plate Checks

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$b_{fp} = \{B - 2 * sp \\ = \{165.7 - 2 * 15 = 135\}$	115	Fail
Min. Plate Length (mm)	$l_{fp} = [2 * (l_w l + 2 * s) + g]$ $= +\frac{10.0}{]}$ $= 420$	185	Fail

2.8 Web Weld Design Check

Check	Required	Provided	Remarks
	Thickness of Thicker part		
	= max(6.7, 6.7)		
Min Weld Size (mm)	= 6.7	10	Pass
	$IS800:2007\ cl.10.5.2.3\ Table 21,$		
	$t_{w_{min}} = 3$		
	Thickness of Thinner part		
Max Weld Size (mm)	= Min(6.7, 6.7) = 6.0	10	Fail
	$t_{w_{max}} = 6.0$		

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3 3D View

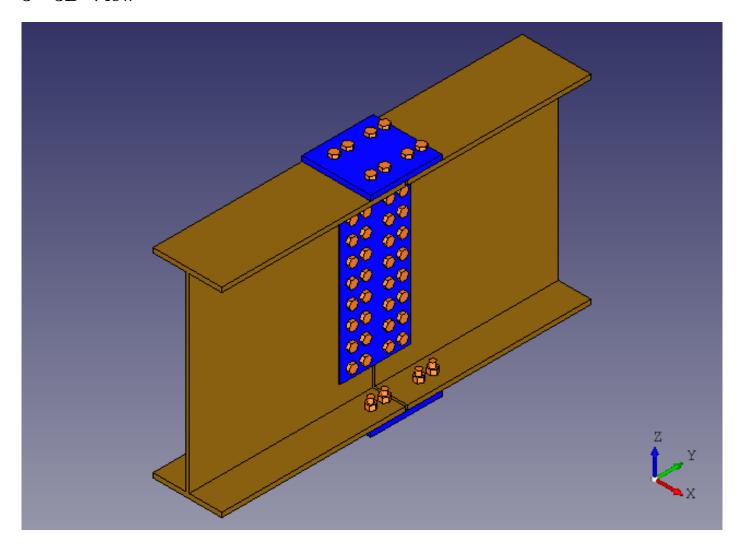


Figure 1: 3D View