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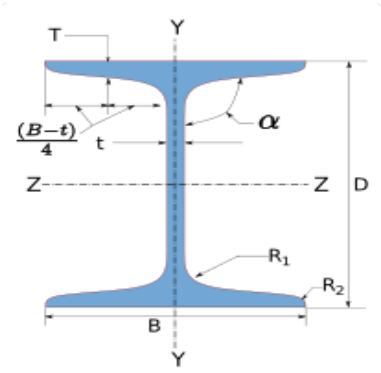
1 Input Parameters

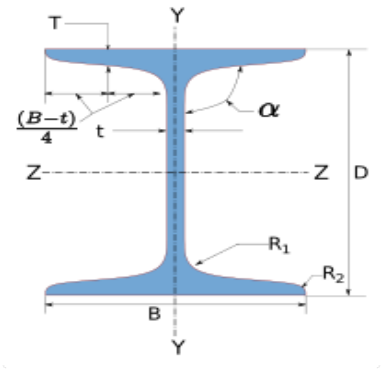
Module	Fin Plate
MainModule	Shear Connection
Connectivity	Column flange-Beam web
Shear(kN)*	30.0

Supporting Section



Supporting Section		PBP 300X222.9	
Material *		E 250 (Fe 410 W)B	
Ultimate strength, fu (MPa)		410	
Yield Strength , fy (MPa)		250	
Mass	222.92	Iz(cm4)	526988000.0
Area(cm2) - A	28400.0	Iy(cm4)	175746300.0
D(mm)	337.9	rz(cm)	136.2
B(mm)	325.7	ry(cm)	78.7
t(mm)	30.3	Zz(cm3)	3119190.0
T(mm)	30.4	Zy(cm3)	1079190.0
FlangeSlope	90	Zpz(cm3)	3653090.0
R1(mm)	1.52	Zpy(cm3)	1079190.0
R2(mm)	0.0		

Supported Section



Supported Section		LB 300	
Material *		E 250 (Fe 410 W)B	
Ultimate strength, fu (MPa)		410	
Yield Strength , fy (MPa)		250	
Mass	37.7	Iz(cm4)	73300000.0
Area(cm2) - A	4810.0	Iy(cm4)	3760000.0
D(mm)	300.0	rz(cm)	124.0
B(mm)	150.0	ry(cm)	28.0
t(mm)	6.7	Zz(cm3)	489000.0
T(mm)	9.4	Zy(cm3)	50200.0
FlangeSlope	98	Zpz(cm3)	535000.0
R1(mm)	15.0	Zpy(cm3)	50200.0
R2(mm)	7.5		

Bolt Details

Diameter (mm)*	[12.0, 16.0, 20.0, 24.0, 30.0, 36.0]
Grade *	[3.6, 4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 9.8, 10.9, 12.9]
Type *	Bearing Bolt
Bolt hole type	Standard
Slip factor (μ_f)	0.3
Type of edges	a - Sheared or hand flame cut

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Gap between beam and support (mm)	10.0
Are the members exposed to corrosive influences	False
Plate Details	
Thickness(mm)*	[3.0, 4.0, 5.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0]
Material *	E 250 (Fe 410 W)A
Ultimate strength, fu (MPa)	410
Yield Strength , fy (MPa)	250
Weld Details	
Weld Type	Fillet
Type of weld fabrication	Shop Weld
Material grade overwrite (MPa) Fu	410.0

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2 Design Checks

2.1 Bolt Design Checks

Check	Required	Provided	Remarks
Diameter (mm)*		12.0	
Grade *		6.8	
Shear Capacity (kN)		$V_{dsb} = \frac{f_u b\ n_n\ A_{nb}}{\sqrt{3}\ \gamma_{mb}}$ $= \frac{600.0 * 1 * 84.3}{\sqrt{3}\ *\ 1.25}$ $= 23.36$	
Bearing Capacity (kN)		$V_{dpb} = \frac{2.5\ k_b\ d\ t\ f_u}{\gamma_{mb}}$ $= \frac{2.5\ * 0.52 * 12.0 * 6.7 * 410}{1.25}$ $= 34.28$	
Capacity (kN)		$V_{db} = min\ (V_{dsb}, V_{dpb})$ $= min\ (23.36, 34.28)$ $= 23.36$	
No of Bolts	$R_u = \sqrt{V_u^2 + A_u^2}$ $n_{trial} = R_u / V_{bolt}$ $R_u = \frac{\sqrt{30.0^2 + 30.0^2}}{23.36}$ $= 2$	2	
No of Columns		1	
No of Rows		2	
Min. Pitch (mm)	$p/g_{min} = 2.5\ d$ $=2.5 * 12.0 \quad = 30.0$	0.0	N/A
Max. Pitch (mm)	$p/g_{max} = \min(32\ t,\ 300\ mm)$ $= \min(32 *\ 6.7,\ 300\ mm)$ $= 300$	0.0	N/A
Min. Gauge (mm)	$p/g_{min} = 2.5\ d$ $=2.5 * 12.0 \quad = 30.0$	130	Pass
Max. Gauge (mm)	$p/g_{max} = \min(32\ t,\ 300\ mm)$ $= \min(32 *\ 6.7,\ 300\ mm)$ $= 300$	130	Pass
Min. End Distance (mm)	$e/e`_{min} = [1.5\ or\ 1.7] * d_0$ $= 1.7 * 13.0 = 22.1$	25	Pass
Max. End Distance (mm)	$e/e`_{max} = 12\ t\ \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e`_{max} = 12\ * 8.0 * \sqrt{\frac{250}{250}}$ $= 96.0$	25	Pass

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Check	Required	Provided	Remarks
Min. Edge Distance (mm)	$e/e`_{min} = [1.5\ or\ 1.7] * d_0$ $= 1.7 * 13.0 = 22.1$	25	Pass
Max. Edge Distance (mm)	$e/e`_{max} = 12\ t\ \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e`_{max} = 12\ * 8.0 * \sqrt{\frac{250}{250}}$ $= 96.0$	25	Pass
Capacity (kN)	27.52	34.28	Pass

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2.2 Plate Design Checks

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$0.6 * d_b = 0.6 * 300.0 = 180.0$	180	Pass
Max. Plate Height (mm)	$d_b - 2(t_{bf} + r_{b1} + gap)$ $= 300.0 - 2 * (9.4 + 15.0 + 10)$ $= 251.2$	180	Pass
Min. Plate Length (mm)	$2 * e_{min} + (n\ c - 1) * p_{min})$ $= 2 * 22.1 + (1 - 1) * 30.0$ $= 54.2$	60.0	Pass
Min.Plate Thickness (mm)	$t_w = 6.7$	8.0	Pass
Shear yielding Capacity (V_dy) (kN)		$V_{dg} = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo}}$ $= \frac{180 * 8.0 * 250}{\sqrt{3} * 1.1}$ $= 188.95$	
Shear Rupture Capacity (V_dn) (kN)		$V_{dn} = \frac{0.75 * A_{vn} * f_u}{\sqrt{3} * \gamma_{mo}}$ $= 1 * (180 - (2 * 13.0)) * 8.0 * 410$ $= 378.84$	
Block Shear Capacity in Shear (V_db) (kN)		206.4	
Shear Capacity (V_d) (kN)	30.0	$V_d = Min(V_{dy}, V_{dn}, V_{db})$ $= Min(188.95, 378.84, 206.4)$ $= 188.95$	Pass
Tension Yielding Capacity (kN)		$T_{dg} = \frac{l * t_p * f_y}{\gamma_{mo}}$ $= \frac{180 * 8.0 * 250}{1.1}$ $= 327.27$	
Tension Rupture Capacity (kN)		$T_{dn} = \frac{0.9 * A_n * f_u}{\gamma_{m1}}$ $= \frac{0.9 * (180 - 2 * 13.0) * 8.0 * 410}{1.25}$ $= 394.39$	
Block Shear Capacity in Tension (T_db) (kN)		223.84	
Tension Capacity (kN)	30.0	$T_d = Min(T_{dg}, T_{dn}, T_{db})$ $= Min(327.27, 394.39, 223.84)$ $= 223.84$	Pass
Moment Capacity (kN-m)	1.05	14.73	Pass
Interaction Ratio	≤ 1	$\frac{1.05}{14.73} + \frac{30.0}{223.84} = 0.21$	Pass

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2.3 Weld Checks

Check	Required	Provided	Remarks
Min Weld Size (mm)	$Thickness\ of\ Thicker\ part$ $= max(30.4, 8.0)$ $= 30.4$ $IS800:2007\ cl.10.5.2.3\ Table21,$ $t_{w_{min}} = 6$	6	Pass
Max Weld Size (mm)	$Thickness\ of\ Thinner\ part$ $= Min(30.4, 8.0) = 8.0$ $t_{w_{max}} = 8.0$	6	Pass
Weld Strength (kN/mm)	$R_w = \sqrt{(T_{wh} + A_{wh})^2 + (T_{wv} + V_{wv})^2}$ $T_{wh} = \frac{M * y_{max}}{Ipw} = \frac{1050000.0 * 84.0}{790272.0}$ $T_{wv} = \frac{M * x_{max}}{Ipw} = \frac{1050000.0 * 0.0}{790272.0}$ $V_{wv} = \frac{V}{l_w} = \frac{30000.0}{336}$ $A_{wh} = \frac{A}{l_w} = \frac{30000.0}{336}$ $R_w = \sqrt{(111.61 + 89.29)^2 + (0.0 + 89.29)^2}$ $= 219.84$	$f_w = \frac{t_t * f_u}{\sqrt{3} * \gamma_{mw}}$ $= \frac{4.2 * 410}{\sqrt{3} * 1.25}$ $= 795.36$	Pass

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3 3D View

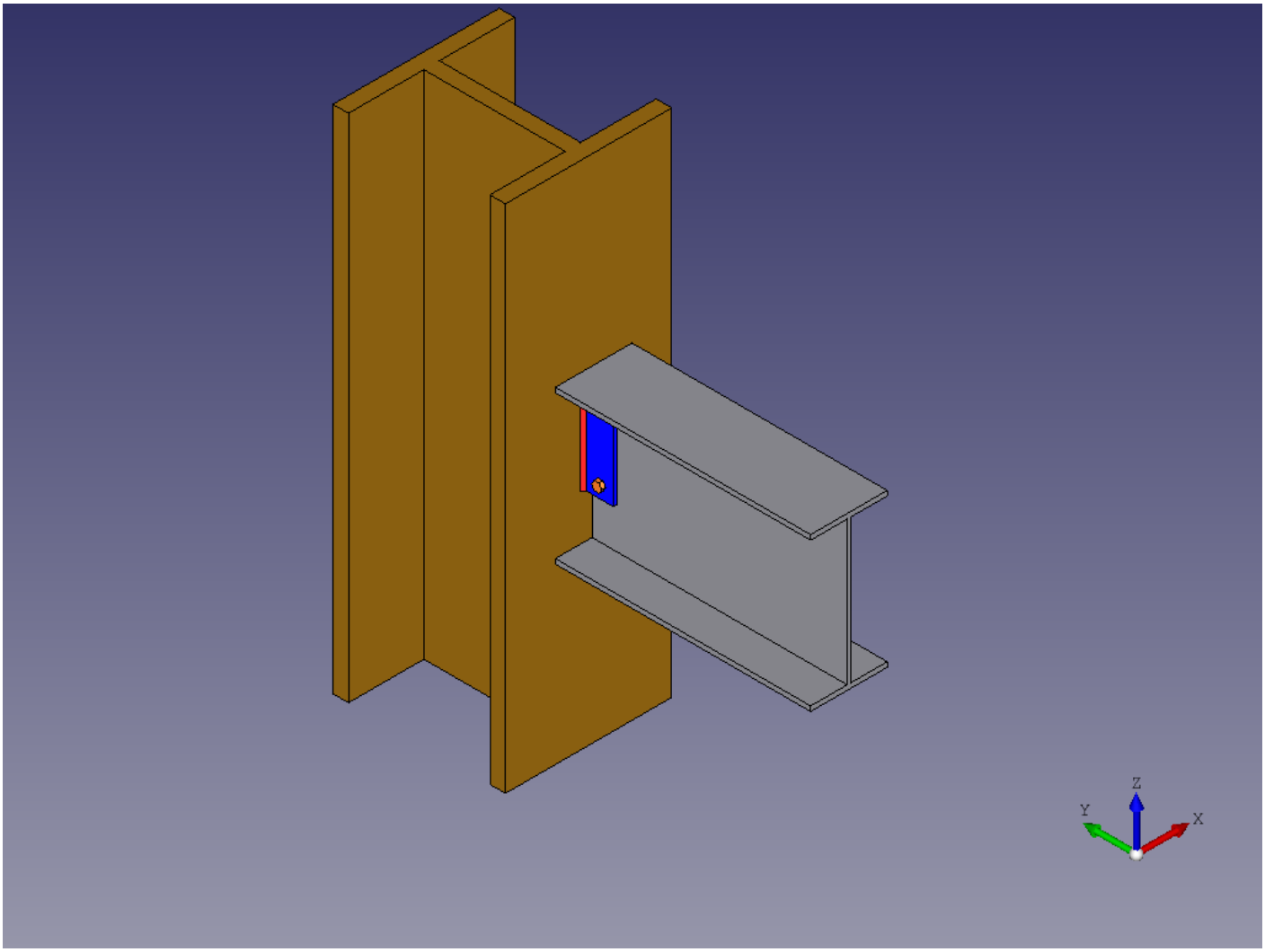

Figure 1: 3D View