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Designer	LoremIpsum	Job Number	123
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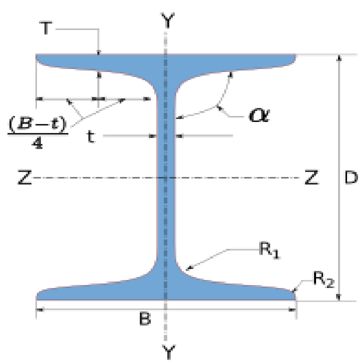
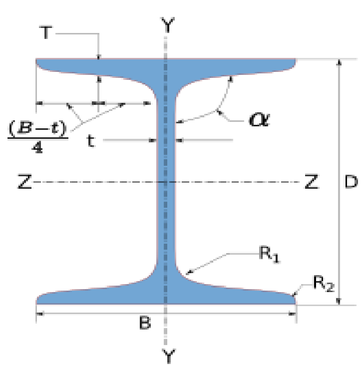
1 Input Parameters

Module			Fin Plate	
MainModule			Shear Connection	
Connectivity			Beam-Beam	
Shear(kN)*			50.0	
Supporting Section				
	Supporting Section		NPB 300x150x36.5	
	Material *		E 250 (Fe 410 W)A	
	Ultimate strength, fu (MPa)		410	
	Yield Strength , fy (MPa)		250	
	Mass	36.52	Iz(cm4)	71735000.0
	Area(cm2) - A	4650.0	Iy(cm4)	5183900.0
	D(mm)	297.0	rz(cm)	124.2
	B(mm)	150.0	ry(cm)	33.4
	t(mm)	6.1	Zz(cm3)	483060.0
	T(mm)	9.2	Zy(cm3)	69120.0
	FlangeSlope	90	Zpz(cm3)	541790.0
	R1(mm)	1.5	Zpy(cm3)	69120.0
	R2(mm)	0.0		
Supported Section				
	Supported Section		MB 250	
	Material *		E 250 (Fe 410 W)A	
	Ultimate strength, fu (MPa)		410	
	Yield Strength , fy (MPa)		250	
	Mass	37.2	Iz(cm4)	51190000.0
	Area(cm2) - A	4740.0	Iy(cm4)	3210000.0
	D(mm)	250.0	rz(cm)	104.0
	B(mm)	125.0	ry(cm)	26.0
	t(mm)	6.9	Zz(cm3)	409600.0
	T(mm)	12.5	Zy(cm3)	51000.0
	FlangeSlope	98	Zpz(cm3)	464500.0
	R1(mm)	13.0	Zpy(cm3)	51000.0
	R2(mm)	6.5		
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, 22.0, 2
Material *	E 165 (Fe 290)
Ultimate strength, fu (MPa)	290
Yield Strength , fy (MPa)	165
Weld Details	
Weld Type	Fillet
Type of weld fabrication	Shop Weld
Material grade overwrite (MPa) Fu	410.0

2 Design Checks

2.1 Bolt Design Checks

Check	Required	Provided	Remarks
Diameter (mm)*		20.0	
Grade *		3.6	
Shear Capacity (kN)		$V_{dsb} = \frac{f_u b\ n_n\ A_{nb}}{\sqrt{3}\ \gamma_{mb}}$ $= \frac{300.0 * 1 * 245}{\sqrt{3}\ *\ 1.25}$ $= 33.95$	
Bearing Capacity (kN)		$V_{dpb} = \frac{2.5\ k_b\ d\ t\ f_u}{\gamma_{mb}}$ $= \frac{2.5\ * 0.51 * 20.0 * 8.0 * 290}{1.25}$ $= 47.33$	
Capacity (kN)		$V_{db} = min\ (V_{dsb}, V_{dpb})$ $= min\ (33.95, 47.33)$ $= 33.95$	
No of Bolts	$R_u = \sqrt{V_u^2 + A_u^2}$ $n_{trial} = R_u/V_{bolt}$ $R_u = \frac{\sqrt{50.0^2 + 50.0^2}}{33.95}$ $= 3$	3	
No of Columns		1	
No of Rows		3	
Min. Pitch (mm)	$p/g_{min} = 2.5\ d$ $=2.5 * 20.0 \quad = 50.0$	0.0	N/A
Max. Pitch (mm)	$p/g_{max} = \min(32\ t,\ 300\ mm)$ $= \min(32 *\ 6.9,\ 300\ mm)$ $= 300$	0.0	N/A
Min. Gauge (mm)	$p/g_{min} = 2.5\ d$ $=2.5 * 20.0 \quad = 50.0$	50	Pass
Max. Gauge (mm)	$p/g_{max} = \min(32\ t,\ 300\ mm)$ $= \min(32 *\ 6.9,\ 300\ mm)$ $= 300$	50	Pass
Min. End Distance (mm)	$e/e`_{min} = [1.5\ or\ 1.7] * d_0$ $= 1.7 * 22.0 = 37.4$	40	Pass
Max. End Distance (mm)	$e/e`_{max} = 12\ t\ \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e`_{max} = 12\ * 8.0 * \sqrt{\frac{250}{165}}$ $= 118.08$	40	Pass

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Check	Required	Provided	Remarks
Min. Edge Distance (mm)	$e/e`_{min} = [1.5\ or\ 1.7] * d_0$ $= 1.7 * 22.0 = 37.4$	40	Pass
Max. Edge Distance (mm)	$e/e`_{max} = 12\ t\ \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e`_{max} = 12\ * 8.0 * \sqrt{\frac{250}{165}}$ $= 118.08$	40	Pass
Capacity (kN)	44.88	47.33	Pass

2.2 Plate Design Checks

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$0.6 * d_b = 0.6 * 250.0 = 150.0$	180	Pass
Max. Plate Height (mm)	$d_b - t_{bf} + r_{b1} - notch_h$ $= 250.0 - 12.5 + 13.0 - 20$ $= 200.0$	180	Pass
Min. Plate Length (mm)	$2 * e_{min} + (n\ c - 1) * p_{min})$ $= 2 * 37.4 + (1 - 1) * 50.0$ $= 84.8$	90.0	Pass
Min.Plate Thickness (mm)	$t_w = 6.9$	8.0	Pass
Shear yielding Capacity (V_dy) (kN)		$V_{dg} = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo}}$ $= \frac{180 * 8.0 * 165}{\sqrt{3} * 1.1}$ $= 124.71$	
Shear Rupture Capacity (V_dn) (kN)		$V_{dn} = \frac{0.75 * A_{vn} * f_u}{\sqrt{3} * \gamma_{mo}}$ $= 1 * (180 - (3 * 22.0)) * 8.0 * 290$ $= 198.36$	
Block Shear Capacity in Shear (V_db) (kN)		129.97	
Shear Capacity (V_d) (kN)	50.0	$V_d = Min(V_{dy}, V_{dn}, V_{db})$ $= Min(124.71, 198.36, 129.97)$ $= 124.71$	Pass
Tension Yielding Capacity (kN)		$T_{dg} = \frac{l * t_p * f_y}{\gamma_{mo}}$ $= \frac{180 * 8.0 * 165}{1.1}$ $= 216.0$	
Tension Rupture Capacity (kN)		$T_{dn} = \frac{0.9 * A_n * f_u}{\gamma_{m1}}$ $= \frac{0.9 * (180 - 3 * 22.0) * 8.0 * 290}{1.25}$ $= 263.92$	
Block Shear Capacity in Tension (T_db) (kN)		166.17	
Tension Capacity (kN)	50.0	$T_d = Min(T_{dg}, T_{dn}, T_{db})$ $= Min(216.0, 263.92, 166.17)$ $= 166.17$	Pass
Moment Capacity (kN-m)	2.5	9.72	Pass
Interaction Ratio	≤ 1	$\frac{2.5}{9.72} + \frac{50.0}{166.17} = 0.56$	Pass

2.3 Weld Checks

Check	Required	Provided	Remarks
Min Weld Size (mm)	$Thickness\ of\ Thicker\ part$ $= max(6.1, 8.0)$ $= 8.0$ $IS800 : 2007\ cl.10.5.2.3\ Table21,$ $t_{w_{min}} = 3$	3	Pass
Max Weld Size (mm)	$Thickness\ of\ Thinner\ part$ $= Min(6.1, 8.0) = 6.1$ $t_{w_{max}} = 6.1$	3	Pass
Weld Strength (kN/mm)	$R_w = \sqrt{(T_{wh} + A_{wh})^2 + (T_{wv} + V_{wv})^2}$ $T_{wh} = \frac{M * y_{max}}{Ipw} = \frac{2500000.0 * 87.0}{878004.0}$ $T_{wv} = \frac{M * x_{max}}{Ipw} = \frac{2500000.0 * 0.0}{878004.0}$ $V_{wv} = \frac{V}{l_w} = \frac{50000.0}{348}$ $A_{wh} = \frac{A}{l_w} = \frac{50000.0}{348}$ $R_w = \sqrt{(247.72 + 143.68)^2 + (0.0 + 143.68)^2}$ $= 416.94$	$f_w = \frac{t_t * f_u}{\sqrt{3} * \gamma_{mw}}$ $= \frac{3 * 290}{\sqrt{3} * 1.25}$ $= 568.11$	Pass

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3 3D View

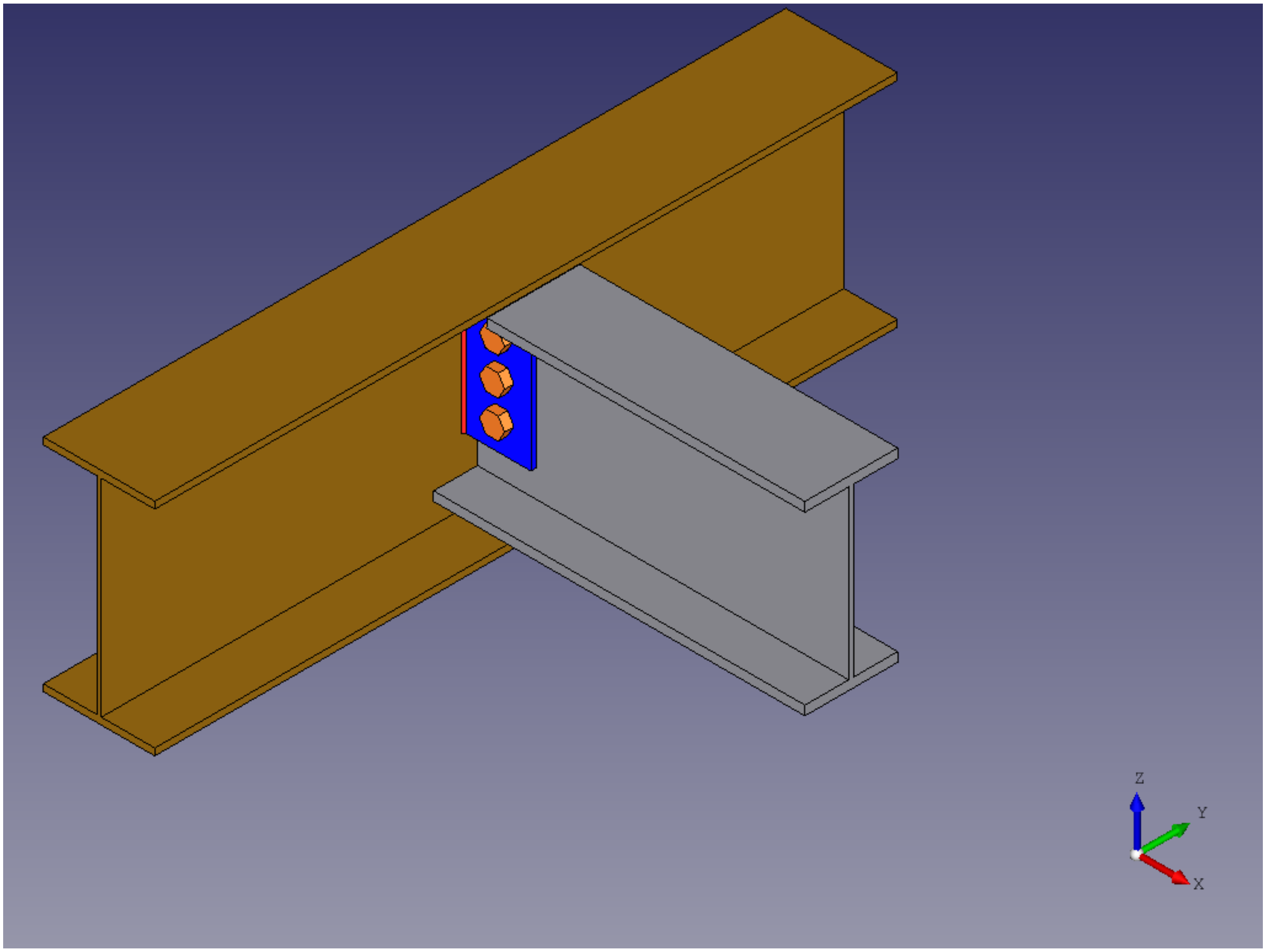

Figure 1: 3D View