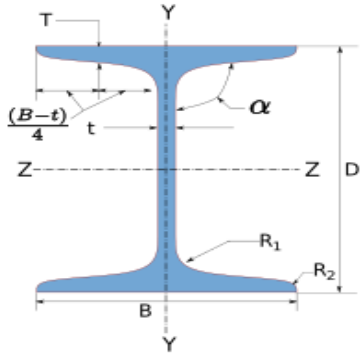
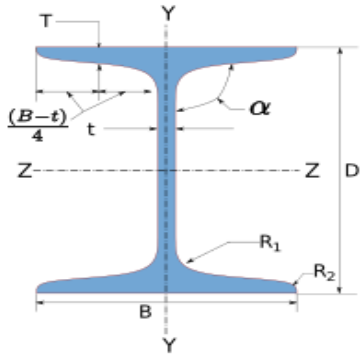


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## 1 Input Parameters

Module		Fin Plate		
MainModule		Shear Connection		
Connectivity		Column flange-Beam web		
Shear(kN)*		150.0		
Supporting Section				
	Supporting Section		PBP 300X222.9	
	Material *		E 300 (Fe 440)	
	Ultimate strength, fu (MPa)		440	
	Yield Strength , fy (MPa)		280	
	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		UB 406 x 178 x 74	
	Material *		E 410 (Fe 540)	
	Ultimate strength, fu (MPa)		540	
	Yield Strength , fy (MPa)		380	
	Mass	74.2	Iz(cm4)	273100000.0
	Area(cm2) - A	9450.0	Iy(cm4)	15450000.0
	D(mm)	413.0	rz(cm)	170.0
	B(mm)	179.5	ry(cm)	40.0
	t(mm)	9.5	Zz(cm3)	1323000.0
	T(mm)	16.0	Zy(cm3)	172000.0
	FlangeSlope	90	Zpz(cm3)	1501000.0
	R1(mm)	10.2	Zpy(cm3)	172000.0
	R2(mm)	0.0		
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
<b>Weld Details</b>	
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
Shear Capacity (kN)		$V_{dsb} = \frac{f_u b n_n A_{nb}}{\sqrt{3} \gamma_{mb}}$ $= \frac{410 * 1 * 561}{\sqrt{3} * 1.25}$ $= 129.56$	
Bearing Capacity (kN)		$V_{dpb} = \frac{2.5 k_b d t f_u}{\gamma_{mb}}$ $= \frac{2.5 * 0.51 * 30.0 * 9.5 * 540}{1.25}$ $= 129.56$	
Capacity (KN)		$V_{db} = \min (V_{dsb}, V_{dpb})$ $= \min (129.56, 129.56)$ $= 129.56$	
No of Bolts	$R_u = \sqrt{V_u^2 + A_u^2}$ $n_{trial} = R_u / V_{bolt}$ $R_u = \frac{\sqrt{150.0^2 + 300.0^2}}{129.56}$ $= 3$	4	
No of Columns		1	
No of Rows		4	
Min. Pitch (mm)	$p/g_{min} = 2.5 d$ $= 2.5 * 30.0 = 75.0$	0.0	N/A
Max. Pitch (mm)	$p/g_{max} = \min(32 t, 300 mm)$ $= \min(32 * 9.5, 300 mm)$ $= 304.0$	0.0	N/A
Min. Gauge (mm)	$p/g_{min} = 2.5 d$ $= 2.5 * 30.0 = 75.0$	85	Pass
Max. Gauge (mm)	$p/g_{max} = \min(32 t, 300 mm)$ $= \min(32 * 9.5, 300 mm)$ $= 304.0$	85	Pass
Min. End Distance (mm)	$e/e'_{min} = [1.5 \text{ or } 1.7] * d_0$ $= 1.7 * 33.0 = 56.1$	60	Pass

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Check	Required	Provided	Remarks
Max. End Distance (mm)	$e/e'_{max} = 12 t \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e'_{max} = 12 * 14.0 * \sqrt{\frac{250}{230}}$ $= 174.72$	60	Pass
Min. Edge Distance (mm)	$e/e'_{min} = [1.5 \text{ or } 1.7] * d_0$ $= 1.7 * 33.0 = 56.1$	60	Pass
Max. Edge Distance (mm)	$e/e'_{max} = 12 t \varepsilon$ $\varepsilon = \sqrt{\frac{250}{f_y}}$ $e/e'_{max} = 12 * 14.0 * \sqrt{\frac{250}{230}}$ $= 174.72$	60	Pass
Capacity (KN)	52774.72	124863.64	Pass

## 2.2 Plate Design Checks

Check	Required	Provided	Remarks
Min. Plate Height (mm)	$0.6 * d_b = 0.6 * 413.0 = 247.79999999999998$	345	Pass
Max. Plate Height (mm)	$d_b - 2(t_{bf} + r_{b1} + gap)$ $= 413.0 - 2 * (16.0 + 10.2 + 10)$ $= 360.6$	345	Pass
Min. Plate Length (mm)	$2 * e_{min} + (n c - 1) * p_{min}$ $= 2 * 56.1 + (1 - 1) * 75.0$ $= 122.2$	130.0	Pass
Min. Plate Thickness (mm)	$t_w = 9.5$	14.0	Pass
Shear yielding Capacity (V_dy) (kN)		$V_{dg} = \frac{A_v * f_y}{\sqrt{3} * \gamma_{mo}}$ $= \frac{345 * 14.0 * 230}{\sqrt{3} * 1.1}$ $= 349.84$	
Shear Rupture Capacity (V_dn) (kN)		$V_{dn} = \frac{0.75 * A_{vn} * f_u}{\sqrt{3} * \gamma_{mo}}$ $= 1 * (345 - (4 * 33.0)) * 14.0 * 410$ $= 916.96$	
Block Shear Capacity in Shear (V_db) (kN)		948.56	
Shear Capacity (V_d) (kN)	150.0	$V_d = Min(V_{dy}, V_{dn}, V_{db})$ $= Min(349.84, 916.96, 948.56)$ $= 349.84$	Pass

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Check	Required	Provided	Remarks
Tension Yielding Capacity (kN)		$T_{dg} = \frac{l * t * f_y}{\gamma_{mo}}$ $= \frac{130.0 * 14.0 * 230}{\sqrt{3} * 1.1}$ $= 380.55$	
Tension Rupture Capacity(kN)		$T_{dn} = \frac{0.9 * A_n * f_u}{\gamma_{m1}}$ $= \frac{0.9 * (130.0 - 4 * 33.0) * 14.0 * 410}{1.25}$ $= 400.88$	
Block Shear Capacity in Tension (T_db) (kN)		948.56	
Tension Capacity (kN)	300.0	$T_d = \text{Min}(T_{dg}, T_{dn}, T_{db})$ $= \text{Min}(380.55, 400.88, 948.56)$ $= 380.55$	Pass
Moment Capacity (kNm)	10.5	69.68	Pass
Interaction Ratio	$\leq 1$	$\frac{10.5}{69.68} + \frac{300.0}{380.55} = 0.94$	Pass

### 2.3 Weld Checks

Check	Required	Provided	Remarks
Min Weld Size (mm)	$\text{Thickness of Thicker part}$ $= \text{Max}(30.4, 30.4) = 30.4$ $\text{IS800 : 2007 cl.10.5.2.3 Table21,}$ $t_{w_{min}} = 6$	6	Pass
Max Weld Size (mm)	$\text{Thickness of Thinner part}$ $= \text{Min}(30.4, 30.4) = 14.0$ $t_{w_{max}} = 14.0$	6	Pass
Weld Strength (kN/mm)	$R_w = \sqrt{(T_{wh} + A_{wh})^2 + (T_{wv} + V_{wv})^2}$ $T_{wh} = \frac{M * y_{max}}{I_{pw}} = \frac{10500000.0 * 166.5}{6154339.5}$ $T_{wv} = \frac{M * x_{max}}{I_{pw}} = \frac{10500000.0 * 0.0}{6154339.5}$ $V_{wv} = \frac{V}{l_w} = \frac{150000.0}{666}$ $A_{wh} = \frac{A}{l_w} = \frac{300000.0}{666}$ $R_w = \sqrt{(284.07 + 450.45)^2 + (0.0 + 225.23)^2}$ $= 768.27$	$f_w = \frac{t_t * f_u}{\sqrt{3} * \gamma_{mw}}$ $= \frac{4.2 * 410}{\sqrt{3}} * 1.25$ $= 795.36$	Pass

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3 3D View



Figure 1: 3D View