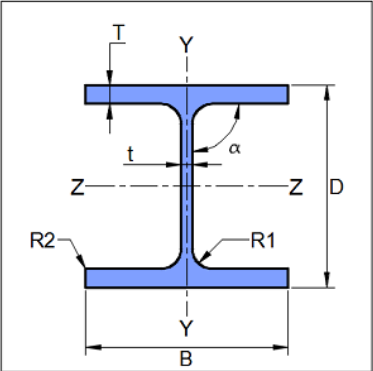
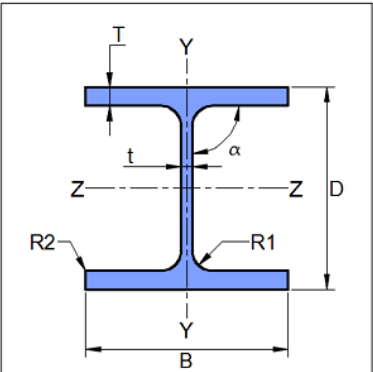




Company Name	IIT Bombay	Project Title	Shear Connection
Group/Team Name	Osdag	Subtitle	Fin Plate
Designer	Engineer#1	Job Number	1.1.1.2.2
Date	04 /02 /2021	Client	Prof. Meera Raghunandan, IIT Bombay

1 Input Parameters

Main Module		Shear Connection		
Module		Fin Plate Connection		
Connectivity		Column Web-Beam Web		
Shear Force (kN)		140.0		
Axial Force (kN)		0.0		
Supporting Section - Mechanical Properties				
	Supporting Section		UC 356 x 368 x 129	
	Material		E 250 (Fe 410 W)A	
	Ultimate Strength, F_u (MPa)		410	
	Yield Strength, F_y (MPa)		250	
	Mass, m (kg/m)	129.0	I_z (cm ⁴)	40246.0
	Area, A (cm ²)	164.3	I_y (cm ⁴)	14610.0
	D (mm)	355.6	r_z (cm)	15.6
	B (mm)	368.6	r_y (cm)	9.43
	t (mm)	10.4	Z_z (cm ³)	2264.0
	T (mm)	17.5	Z_y (cm ³)	793.0
	Flange Slope	90	Z_{pz} (cm ³)	2479.0
	R_1 (mm)	15.2	Z_{py} (cm ³)	1199.0
	R_2 (mm)	0.0		
	Supported Section - Mechanical Properties			
	Supported Section		WPB 300 X 300 X 100.85	
	Material		E 250 (Fe 410 W)A	
	Ultimate Strength, F_u (MPa)		410	
	Yield Strength, F_y (MPa)		250	
	Mass, m (kg/m)	100.85	I_z (cm ⁴)	21000.0
	Area, A (cm ²)	128.0	I_y (cm ⁴)	7210.0
	D (mm)	294.0	r_z (cm)	12.8
	B (mm)	300.0	r_y (cm)	7.49
	t (mm)	10.0	Z_z (cm ³)	1430.0
	T (mm)	16.0	Z_y (cm ³)	480.0
	Flange Slope	90	Z_{pz} (cm ³)	1580.0
	R_1 (mm)	27.0	Z_{py} (cm ³)	733.0
	R_2 (mm)	0.0		



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Bolt Details - Input and Design Preference	
Diameter (mm)	[16]
Property Class	[4.6]
Type	Bearing Bolt
Hole Type	Standard
Bolt Tension	Non pre-tensioned
Slip Factor, (μ_f)	0.3
Detailing - Design Preference	
Edge Preparation Method	Rolled, machine-flame cut, sawn and planed
Gap Between Members (mm)	10.0
Are the Members Exposed to Corrosive Influences?	False
Plate Details - Input and Design Preference	
Thickness (mm)	[16]
Material	E 250 (Fe 410 W)A
Ultimate Strength, F_u (MPa)	410
Yield Strength, F_y (MPa)	250
Weld Details - Input and Design Preference	
Weld Type	Fillet
Type of Weld Fabrication	Shop Weld
Material Grade Overwrite, F_u (MPa)	410.0



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2 Design Checks

Design Status	Fail
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2.1 Initial Section Check

Check	Required	Provided	Remarks
Shear Yielding Capacity (kN)	140.0	$V_{dy} = \frac{A_v f_y}{\sqrt{3} \gamma_{m0}}$ $= \frac{294.0 \times 10.0 \times 250}{\sqrt{3} \times 1.1 \times 1000}$ $= 385.77$ <p>[Ref. IS 800:2007, Cl.10.4.3]</p>	Pass
Allowable Shear Capacity (kN)	140.0	$V_d = 0.6 V_{dy}$ $= 0.6 \times 385.77$ $= 231.46$ <p>[Limited to low shear]</p>	Pass
Tension Yielding Capacity (kN)	0.0	$T_{dg} = \frac{A_g f_y}{\gamma_{m0}}$ $A_g = lt = 294.0 \times 10.0$ $= \frac{2940.0 \times 250}{1.1 \times 10^3}$ $= 668.18$ <p>[Ref. IS 800:2007, Cl.6.2]</p>	

2.2 Load Consideration

Check	Required	Provided	Remarks
Applied Axial Force (kN)	0.0	0.0	



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Check	Required	Provided	Remarks
Applied Shear Force (kN)	140.0	$V_{y\min} = \min(0.15V_{dy}, 40.0)$ $= \min(0.15 \times 385.77, 40.0)$ $= 40$ $V_u = \max(V_y, V_{y\min})$ $= \max(140.0, 40)$ $= 140.0$ [Ref. IS 800:2007, Cl.10.7]	

2.3 Bolt Design

Check	Required	Provided	Remarks
Diameter (mm)		16.0	
Property Class		4.6	
Plate Thickness (mm)	$t_w = 10.0$	16.0	Pass
No. of Bolt Columns		3	Fail
No. of Bolt Rows		3	
Min. Pitch Distance (mm)	$p_{\min} = 2.5d$ $= 2.5 \times 16.0$ $= 40.0$ [Ref. IS 800:2007, Cl.10.2.2]	40	Pass
Min. End Distance (mm)	$e_{\min} = 1.5d_0$ $= 1.5 \times 18.0$ $= 27.0$ [Ref. IS 800:2007, Cl.10.2.4.2]	30	Pass
Max. Plate Height (mm)	$d_b - 2(t_{bf} + r_{b1} + \text{gap})$ $= 294.0 - 2 \times (16.0 + 27.0 + 10)$ $= 208.0$	140	Pass

3 Design Log



Company Name	IIT Bombay	Project Title	Shear Connection
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2021-02-04 11:46:57 - Osdag - ERROR - Bolt line limit is reached. Select higher grade/Diameter or choose different connection