

Company Name	Harsha Gamidi	Project Title	Problem 1
Group/Team Name	IEOT	Subtitle	Fin Plate
Designer	Harsha	Job Number	1
Date	05 /06 /2016	Method	Limit State Design (No Earthquake Load)

Design Conclusion	
Finplate	Pass
Finplate	
Connection Properties	
Connection	
Connection Title	Single Finplate
Connection Type	Shear Connection
Connection Category	
Connectivity	Column flange-Beam web
Beam Connection	Bolted
Column Connection	Welded
Loading (Factored Load)	
Shear Force (kN)	160
Components	
Column Section	
Material	Fe 410
Beam Section	
Material	Fe 410
Hole	STD
Plate Section	
Thickness (mm)	10
Width (mm)	100
Depth (mm)	300
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	8
Bolts	
Type	HSFG
Grade	8.8
Diameter (mm)	16
Bolt Numbers	3
Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	120
End Distance (mm)	30

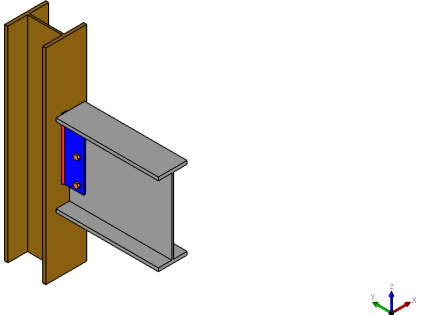
Edge Distance (mm)	30
Assembly	
Column-Beam Clearance (mm)	20

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Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = (800 \times 0.6126 \times 16 \times 16) / (\sqrt{3} \times 1.25 \times 1000)$ = 58.012 [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 8.9 \times 410) / (1.25 \times 1000)$ = 57.333 [cl. 10.3.4]	
Bolt capacity (kN)		Min (58.012, 57.333) = 57.333	
No. of bolts	$160 / 57.333 = 2.8$	3	Pass
No. of column(s)	≤ 2	1	
No. of bolts per column		3	
Bolt pitch (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 8.9, 300)$ = 285 [cl. 10.2.2]	120	Pass
Bolt gauge (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 18 = 30.6, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	30	Pass
Edge distance (mm)	$\geq 1.7 \times 18 = 30.6, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	≥ 160	$V_{db} = 416$	Pass
Plate thickness (mm)	$(5 \times 160 \times 1000) / (300 \times 250) = 10.67$ [Owens and Cheal, 1989]	10	Pass
Plate height (mm)	$\geq 0.6 \times 400 = 240.0, \leq 400 - 16 - 14 - 10 = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	300	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 \times 58.012 \times 120^2) / (120 \times 1000) = 13.923$	$M_d = (1.2 \times 250 \times Z) / (1000 \times 1.1) = 40.91$ [cl. 8.2.1.2]	Pass
Effective weld length (mm)		$300 - 2 \times 8 = 284$	
Weld strength (kN/mm)	$\sqrt{[(13923 \times 6) / (2 \times 284^2)]^2 + [160 / (2 \times 284)]^2} = 0.59$	$f_v = (0.7 \times 8 \times 410) / (\sqrt{3} \times 1.25)$ = 1.06 [cl. 10.5.7]	Pass

Weld thickness (mm)	$\text{Max}((0.59 \cdot 1000 \cdot \sqrt{3} \cdot 1.25) / (0.7 \cdot 410), 10 \cdot 0.8) = 8.0$ [cl. 10.5.7, Insdag Detailing Manual, 2002]	8	Pass
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Views	
	

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Additional Comments	
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