

Company Name	KLE Technological University	Project Title	Problem Set 2 - Problem 4: Fin plate Column flange to beam
Group/Team Name	Civil Engineering Department	Subtitle	
Designer	Satish Annigeri	Job Number	
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)	200
Components	
Column Section	ISSC 200
Material	Fe 410
Beam Section	ISMB 400
Material	Fe 410
Hole	STD
Plate Section	250X80X16
Thickness (mm)	16
Width (mm)	80
Depth (mm)	250
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	13
Bolts	
Type	HSFG
Grade	8.8
Diameter (mm)	12
Bolt Numbers	7
Columns (Vertical Lines)	1
Bolts Per Column	7
Gauge (mm)	0

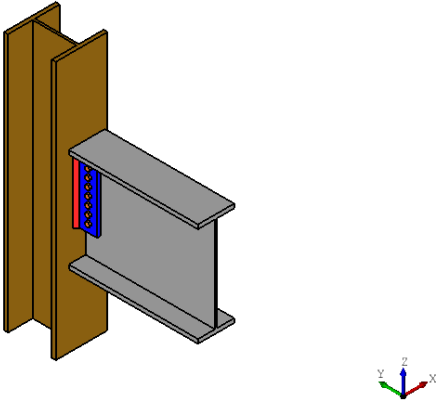
Pitch (mm)	31
End Distance (mm)	30
Edge Distance (mm)	30
Assembly	
Column-Beam Clearance (mm)	20


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Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = (800 \times 0.6126 \times 12 \times 12) / (\sqrt{3} \times 1.25 \times 1000)$ = 31.223 [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.519 \times 12 \times 8.9 \times 410) / (1.25 \times 1000)$ = 45.452 [cl. 10.3.4]	
Bolt capacity (kN)		Min (31.223, 45.452) = 31.223	
No. of bolts	200/31.223 = 6.4	7	Pass
No. of column(s)	≤ 2	1	
No. of bolts per column		7	
Bolt pitch (mm)	≥ 2.5 * 12 = 30, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2]	31	Pass
Bolt gauge (mm)	≥ 2.5*12 = 30, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2]	0	
End distance (mm)	≥ 1.7*13 = 22.1, ≤ 12*8.9 = 106.8 [cl. 10.2.4]	30	Pass
Edge distance (mm)	≥ 1.7*13 = 22.1, ≤ 12*8.9 = 106.8 [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	≥ 200	$V_{db} = 467$	Pass
Plate thickness (mm)	$(5 \times 200 \times 1000) / (250 \times 250) = 16.0$ [Owens and Cheal, 1989]	16	Pass
Plate height (mm)	≥ 0.6*400=240.0, ≤ 400-16-14-10=330.0 [cl. 10.2.4, Insdag Detailing Manual, 2002]	250	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 \times 31.223 \times 31^2) / (31 \times 1000) = 11.99$	$M_d = (1.2 \times 250 \times Z) / (1000 \times 1.1) = 45.45$ [cl. 8.2.1.2]	Pass
Effective weld length (mm)		250-2*16 = 218	

Weld strength (kN/mm)	$\sqrt{[(11990 \cdot 6)/(2 \cdot 218^2)]^2 + [200/(2 \cdot 218)]^2}$ = 0.885	$f_v = (0.7 \cdot 13 \cdot 410)/(\sqrt{3} \cdot 1.25)$ = 2.121	Pass
Weld thickness (mm)	$\text{Max}((0.885 \cdot 1000 \cdot \sqrt{3} \cdot 1.25)/(0.7 \cdot 410), 16 \cdot 0.8) = 12.8$ [cl. 10.5.7, Insdag Detailing Manual, 2002]	[cl. 10.5.7] 13	Pass

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Views	
	

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Additional Comments			