Created with

Company Name	IIT-M	Project Title	
Group/Team Name		Subtitle	
Designer	satish	Job Number	Question4
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 web-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	330X80X12
Thickness (mm)	12
Width (mm)	80
Depth (mm)	330
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	10
Bolts	
Type	Black Bolt
Grade	9.8
Diameter (mm)	12
Bolt Numbers	6
Columns (Vertical Lines)	1
Bolts Per Column	6
Gauge (mm)	0

Pitch (mm)	54
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} = (900*0.6126*12*12)/(√3*1.25*1000) = 35.126 [cl. 10.3.3]	
Bolt bearing capacity (kN)		V_{dpb} = (2.5*0.519*12*8.9*410)/(1.25*1000) = 45.452 [cl. 10.3.4]	
Bolt capacity (kN)		Min (35.126, 45.452) = 35.126	
No. of bolts	200/35.126 = 5.7	6	**Pass**
No.of column(s)	≤ 2	1	
No. of bolts per column		6	
Bolt pitch (mm)	≥ 2.5* 12 = 30, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2]	54	**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} = 549	**Pass**
Plate thickness (mm)	(5*200*1000)/(330*250) = 12.12 [Owens and Cheal, 1989]	12	**Pass**
Plate height (mm)	≥ 0.6*400=240.0, ≤ 400-16-14-10=330.0 [cl. 10.2.4, Insdag Detailing Manual,	330	**Pass**

	2002]		
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2*35.126*54^2)/(54*1000) = 17.071$	$M_d = (1.2*250*Z)/(1000*1.1) = 59.4$ [cl. 8.2.1.2]	**Pass**
Effective weld length (mm)		330-2*12 = 306	
Weld strength (kN/mm)	$\sqrt{[(17071*6)/(2*306^2)]^2 + [200/(2*306)]^2}$ = 0.637	$f_v = (0.7*10*410)/(\sqrt{3}*1.25)$ = 1.591 [cl. 10.5.7]	**Pass**
Weld thickness (mm)	Max((0.637*1000*√3* 1.25)/(0.7 * 410),12* 0.8) = 9.6 [cl. 10.5.7, Insdag Detailing Manual, 2002]	10	**Pass**

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Additional Comments