Company Name	**Leslie E. Robertson Associates**	**Project Title**	**Senior Engineer**
Group/Team Name	**Individual**	**Subtitle**	
Designer	**Karthik Bandi**	**Job Number**	**P786**
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	ISSC 200
Material	Fe 410
Beam Section	ISMB 400
Material	Fe 410
Hole	STD
Plate Section	320X100X10
Thickness (mm)	10
Width (mm)	100
Depth (mm)	320
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	8
Bolts	
Type	HSFG
Grade	8.8
Diameter (mm)	20
Bolt Numbers	3
Columns (Vertical Lines)	1
Bolts Per Column	3

Gauge (mm)	0
Pitch (mm)	120
End Distance (mm)	40
Edge Distance (mm)	40
Assembly	
Column-Beam Clearance (mm)	20

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Design Check			
Check	**Required**	**Provided**	**Remark**
Bolt shear capacity (kN)		V_{dsb} = (800*0.6126*20*20)/(√3*1.25*1000) = 90.529 [cl. 10.3.3]	
Bolt bearing capacity (kN)		V_{dpb} = (2.5*0.508*20*8.9*410)/(1.25*1000) = 74.148 [cl. 10.3.4]	
Bolt capacity (kN)		Min (90.529, 74.148) = 74.148	
No. of bolts	160/74.148 = 2.2	3	**Pass**
No.of column(s)	≤ 2	1	
No. of bolts per column		3	
Bolt pitch (mm)	≥ 2.5* 20 = 50, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2]	120	**Pass**
Bolt gauge (mm)	≥ 2.5*20 = 50, ≤ Min(32*8.9, 300) = 285 [cl. 10.2.2]	0	
End distance (mm)	≥ 1.7*22 = 37.4, ≤ 12*8.9 = 106.8 [cl. 10.2.4]	40	**Pass**
Edge distance (mm)	≥ 1.7*22 = 37.4, ≤ 12*8.9 = 106.8 [cl. 10.2.4]	40	**Pass**
Block shear capacity (kN)	≥ 160	V_{db} = 453	**Pass**
Plate thickness (mm)	(5*160*1000)/(320*250) = 10.0 [Owens and Cheal, 1989]	10	**Pass**
Plate height (mm)	≥ 0.6*400=240.0, ≤ 400-16-14-10=330.0 [cl. 10.2.4, Insdag Detailing Manual, 2002]	320	**Pass**
Plate width (mm)		100	
Plate moment capacity (kNm)	(2*90.529*120^2)/(120*1000) = 14.485	M_d = (1.2*250*Z)/(1000*1.1) = 46.55 [cl. 8.2.1.2]	**Pass**
Effective weld length (mm)		320-2*8 = 304	

Weld strength (kN/mm)	$\sqrt{[(14485*6)/(2*304^2)]^2}$ + $[160/(2*304)]^2$ = 0.539	f_v= (0.7*8*410)/(√3*1.25) = 1.06 [cl. 10.5.7]	**Pass**
Weld thickness (mm)	Max((0.539*1000*√3* 1.25)/(0.7 * 410),10* 0.8) = 8.0 [cl. 10.5.7, Insdag Detailing Manual, 2002]	8	**Pass**

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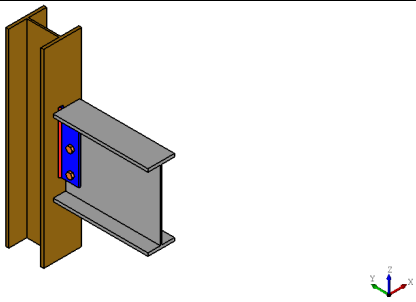
Views	
	

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Additional Comments	Fin-Plate shear connection design