



Company Name	LERA	Project Title	Fin Plate Design
Group/Team Name		Subtitle	Problem 1
Designer	Renuka	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	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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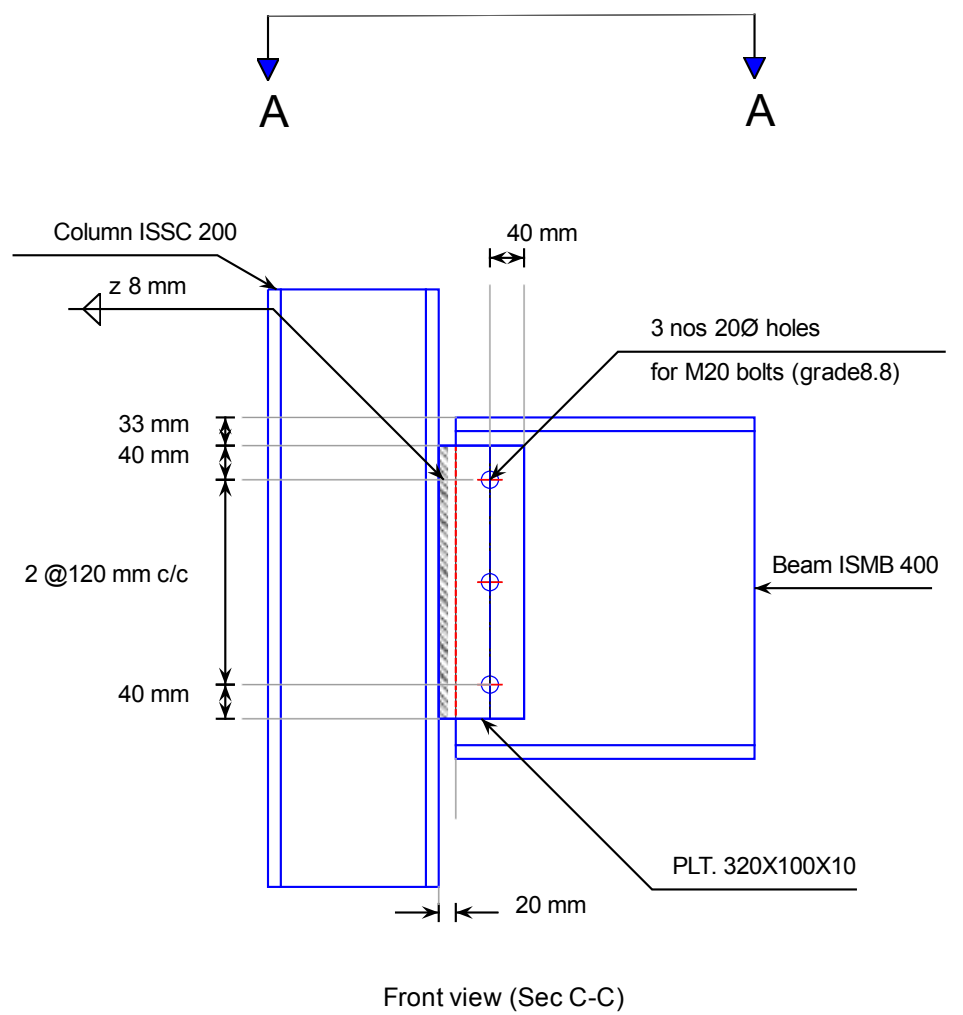
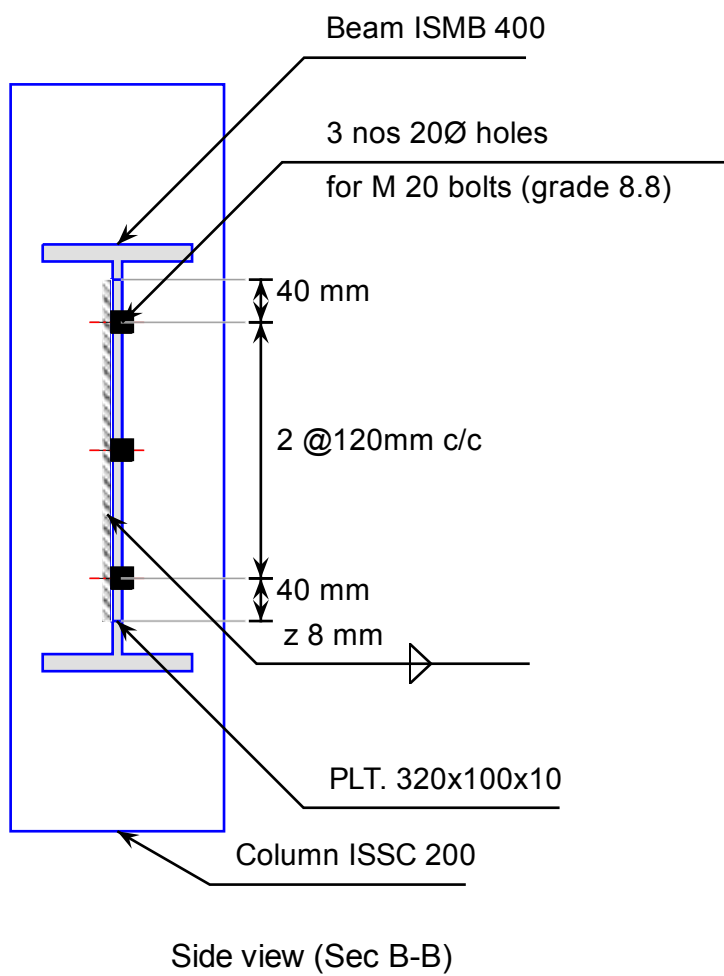
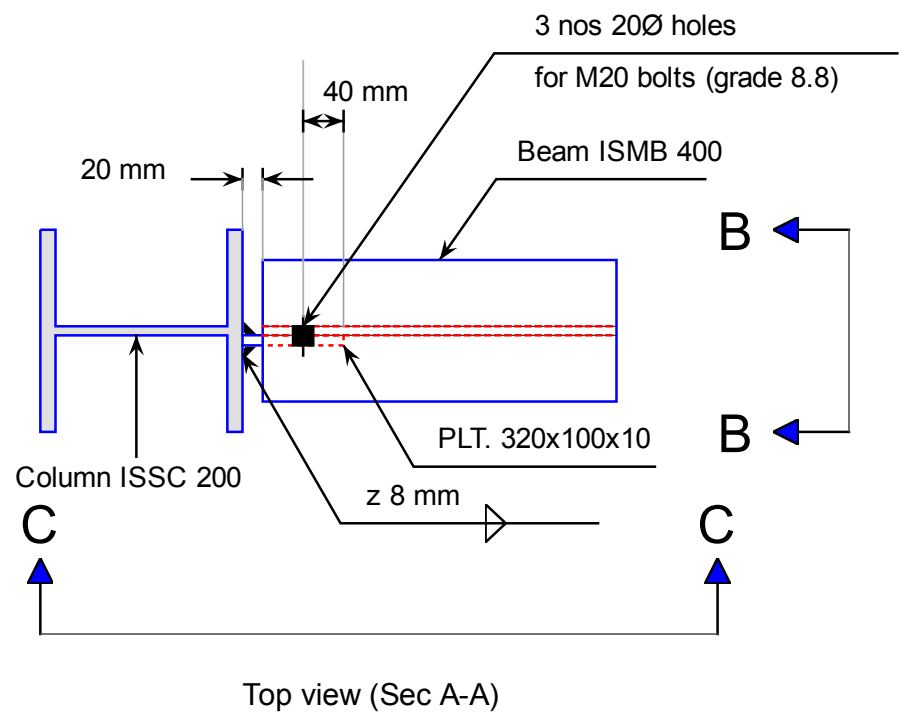
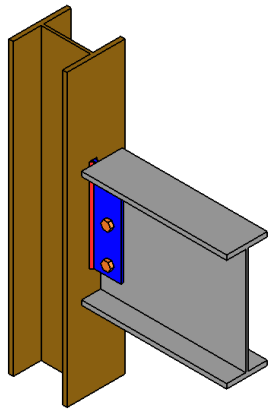
Design Check			
Check	Required	Provided	Remark
<b>Bolt shear capacity (kN)</b>		$V_{dsb} = (800 \times 0.6126 \times 20 \times 20) / (\sqrt{3} \times 1.25 \times 1000) = 90.529$ [cl. 10.3.3]	
<b>Bolt bearing capacity (kN)</b>		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 8.9 \times 410) / (1.25 \times 1000) = 74.148$ [cl. 10.3.4]	
<b>Bolt capacity (kN)</b>		Min (90.529, 74.148) = 74.148	
<b>No. of bolts</b>	160/74.148 = 2.2	3	Pass
<b>No. of column(s)</b>	$\leq 2$	1	
<b>No. of bolts per column</b>		3	
<b>Bolt pitch (mm)</b>	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	120	Pass
<b>Bolt gauge (mm)</b>	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	0	
<b>End distance (mm)</b>	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
<b>Edge distance (mm)</b>	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
<b>Block shear capacity (kN)</b>	$\geq 160$	$V_{db} = 453$	Pass
<b>Plate thickness (mm)</b>	$(5 \times 160 \times 1000) / (320 \times 250) = 10.0$ [Owens and Cheal, 1989]	10	Pass
<b>Plate height (mm)</b>	$\geq 0.6 \times 400 = 240.0, \leq 400 - 16 - 14 - 10 = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	320	Pass
<b>Plate width (mm)</b>		100	
<b>Plate moment capacity (kNm)</b>	$(2 \times 90.529 \times 120^2) / (120 \times 1000) = 14.485$	$M_d = (1.2 \times 250 \times Z) / (1000 \times 1.1) = 46.55$ [cl. 8.2.1.2]	Pass
<b>Effective weld length (mm)</b>		$320 - 2 \times 8 = 304$	
<b>Weld strength (kN/mm)</b>	$\sqrt{[(14485 \times 6) / (2 \times 304^2)]^2 + [160 / (2 \times 304)]^2} = 0.539$	$f_v = (0.7 \times 8 \times 410) / (\sqrt{3} \times 1.25) = 1.06$ [cl. 10.5.7]	Pass
<b>Weld thickness (mm)</b>	$\text{Max}((0.539 \times 1000 \times \sqrt{3} \times 1.25) / (0.7 \times 410), 10 \times 0.8) = 8.0$ [cl. 10.5.7, Insdag Detailing Manual,	8	Pass

	2002]		
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Additional Comments	
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