

<b>Company Name</b>	Vasudev R. Upadhye	<b>Project Title</b>	Fin Plate
<b>Group/Team Name</b>	MIT	<b>Subtitle</b>	
<b>Designer</b>	VRU	<b>Job Number</b>	Numerical 1
<b>Date</b>	04 /06 /2016	<b>Method</b>	Limit State Design (No Earthquake Load)

## Design Conclusion

<b>Finplate</b>	<b>Pass</b>
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## 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
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## Components

<b>Column Section</b>	ISSC 200
Material	Fe 410
<b>Beam Section</b>	ISMB 400
Material	Fe 410
Hole	STD
<b>Plate Section</b>	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
<b>Assembly</b>	
<b>Column-Beam Clearance (mm)</b>	20

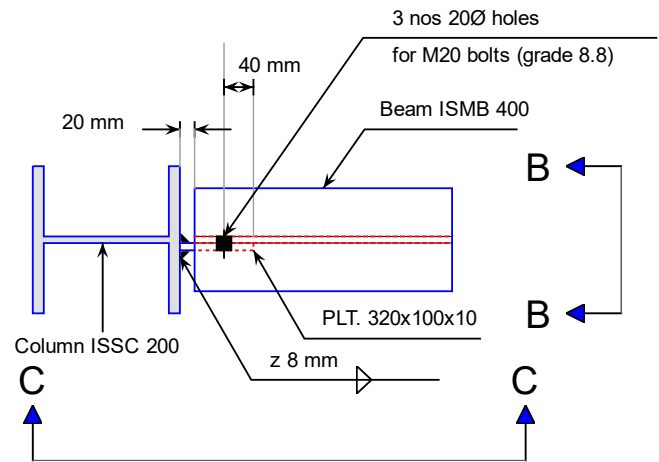
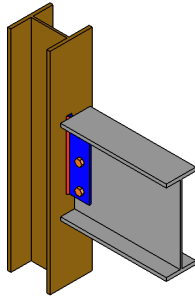
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Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = (800 \times 0.6126 \times 20 \times 20) / (\sqrt{3} \times 1.25 \times 1000)$ = 90.529 [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 8.9 \times 410) / (1.25 \times 1000)$ = 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)	$\leq 2$	1	
No. of bolts per column		3	
Bolt pitch (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	120	Pass
Bolt gauge (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
Edge distance (mm)	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
Block shear capacity (kN)	$\geq 160$	$V_{db} = 453$	Pass
Plate thickness (mm)	$(5 \times 160 \times 1000) / (320 \times 250) = 10.0$ [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]	320	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 \times 90.529 \times 120^2) / (120 \times 1000) = 14.485$	$M_d = (1.2 \times 250 \times Z) / (1000 \times 1.1) = 46.55$ [cl. 8.2.1.2]	Pass
Effective weld length (mm)		$320 - 2 \times 8 = 304$	

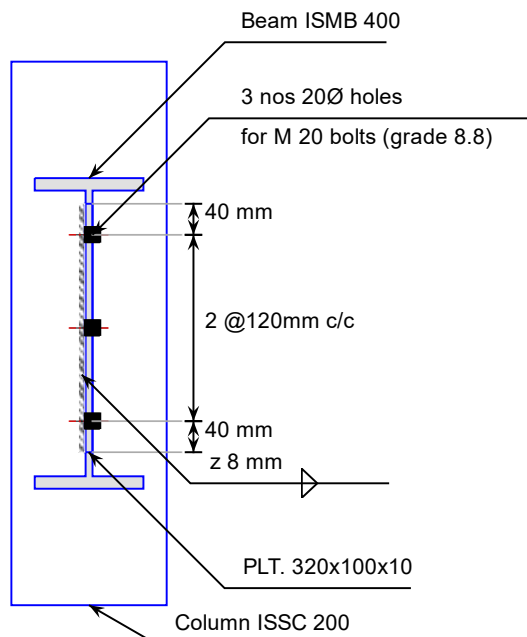
<b>Weld strength (kN/mm)</b>	$\sqrt{[(14485 \cdot 6)/(2 \cdot 304^2)]^2 + [160/(2 \cdot 304)]^2}$ = 0.539	$f_v = (0.7 \cdot 8 \cdot 410)/(\sqrt{3} \cdot 1.25)$ = 1.06 [cl. 10.5.7]	<b>Pass</b>
<b>Weld thickness (mm)</b>	$\text{Max}((0.539 \cdot 1000 \cdot \sqrt{3} \cdot 1.25)/(0.7 \cdot 410), 10 \cdot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

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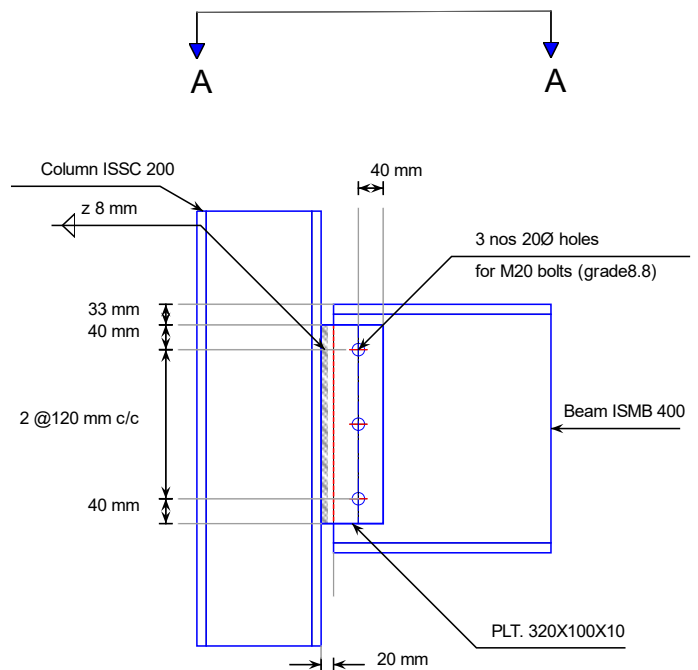
## Views



Top view (Sec A-A)



Side view (Sec B-B)



Front view (Sec C-C)

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<b>Additional Comments</b>	Ok
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