



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Finplate shear connection
Designer	Engineer #1	Job Number	1.1.2.3.1
Date	19 /06 /2017	Client	Pradyumna M

Design Conclusion

End Plate	Pass
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End Plate

Connection Properties

Connection

Connection Title	Flexible End Plate
Connection Type	Shear Connection

Connection Category

Connectivity	Beam-Beam
Beam Connection	Welded
Column Connection	Bolted

Loading (Factored Load)

Shear Force (kN)	180
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Components

Column Section	MB 500
Material	Fe 410
Beam Section	MB 400
Material	Fe 410
Hole	STD
Plate Section	272X172X14
Thickness (mm)	14
Width (mm)	172
Depth (mm)	272
Hole	STD

Weld

Type	Double Fillet
Size (mm)	12

Bolts

Type	HSFG
Grade	8.8
Diameter (mm)	20
Bolt Numbers	10
Columns (Vertical Lines)	1
Bolts Per Column	5
Gauge (mm)	0
Pitch (mm)	50

End Distance (mm)	36
Edge Distance (mm)	36
Assembly	
Column-Beam Clearance (mm)	14



Created with

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Design Preferences**Bolt**

Hole Type	Over-sized
Hole Clearance (mm)	4.0
Material Grade (MPa) (overwrite)	800.0
Slip factor	0.2

Weld

Type of Weld	Shop weld
Material Grade (MPa) (overwrite)	410.0

Detailing

Type of Edges	Rolled, machine-flame cut, sawn and planed
Minimum Edge-End Distance	1.5 times the hole diameter
Are members exposed to corrosive influences?	No

Design

Design Method	Limit State Design
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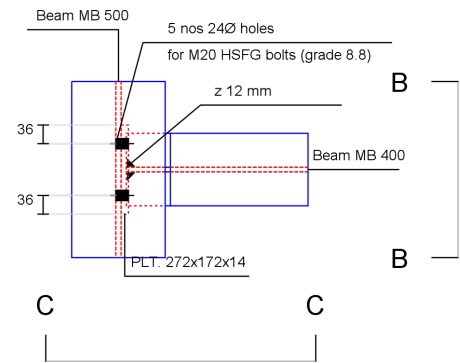
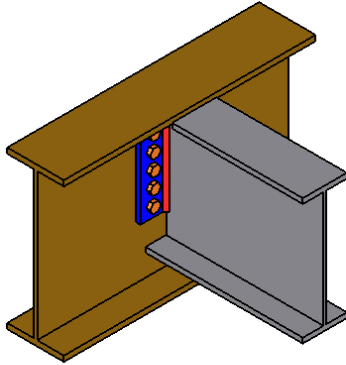
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Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsf} = ((0.2 \times 1 \times 0.85 \times 137.2) / (1.25)) = 18.659$ [cl. 10.4.3]	
Bolt bearing capacity (kN)		N/A	
Bolt capacity (kN)		18.659	Pass
Critical bolt shear (kN)	≤ 18.659	18.0	Pass
No. of bolts		10	
No. of column(s) per side of end plate	≤ 2	1	
No. of bolts per column per side of end plate		5	
Bolt pitch (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	50	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)	$\geq 1.5 \times 24.0 = 36, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	36	Pass
Edge distance (mm)	$\geq 1.5 \times 24.0 = 36, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	36	Pass
Block shear capacity (kN)	≥ 180	$V_{db} = 191$ [cl. 6.4.1]	Pass
Plate thickness (mm)	≥ 8	14	Pass
Plate height (mm)	$\geq 0.6 \times 400.0 = 240.0, \leq 400.0 - 16.0 - 14.0 - 17.2 - 17.0 - 5 = 330.8$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	272	Pass
Plate Width (mm)	$\geq 172, \leq 212$	172	Pass
Effective weld length on each side (mm)		$272 - 2 \times 12 = 248$	
Weld strength (kN/mm)	0.363	$f_v = (0.7 \times 12 \times 410) / (\sqrt{3} \times 1.25 \times 1000) = 1.591$ [cl. 10.5.7]	Pass

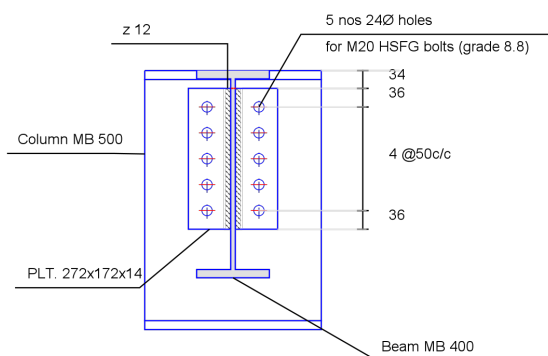


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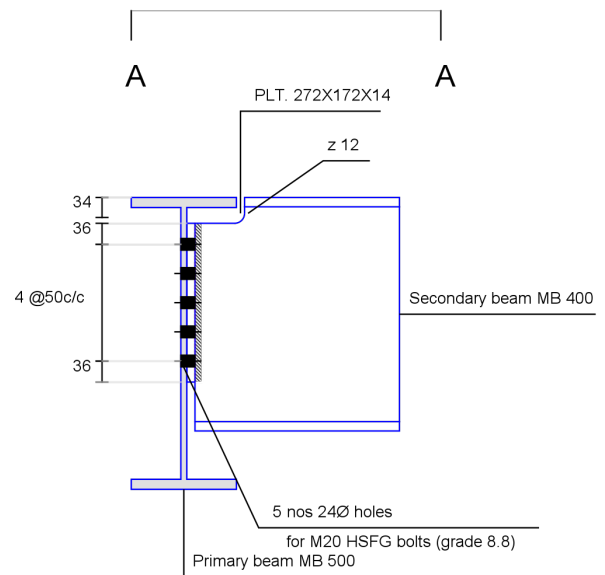
Views



Top view (Sec A-A)
(All Dimensions are in mm)



Side view (Sec B-B)
(All Dimensions are in mm)



Front view (Sec C-C)
(All Dimensions are in mm)



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Additional Comments	
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