



Created with



<b>Company Name</b>	<b>IIT Bombay</b>	<b>Project Title</b>	<b>Connection Design Examples</b>
<b>Group/Team Name</b>	<b>Osdag</b>	<b>Subtitle</b>	<b>Fin Plate shear connection</b>
<b>Designer</b>	<b>Engineer #1</b>	<b>Job Number</b>	<b>1.1.1.1.1</b>
<b>Date</b>	<b>18 /06 /2017</b>	<b>Client</b>	<b>Manas M. Ghosh, INSDAG, Kolkata</b>

<b>Design Conclusion</b>	
<b>Fin Plate</b>	<b>Pass</b>
<b>Fin Plate</b>	
<b>Connection Properties</b>	
<b>Connection</b>	
Connection Title	Single Fin Plate
Connection Type	Shear Connection
<b>Connection Category</b>	
Connectivity	Column flange-Beam web
Beam Connection	Bolted
Column Connection	Welded
<b>Loading (Factored Load)</b>	
Shear Force (kN)	140
<b>Components</b>	
<b>Column Section</b>	UC 305 x 305 x 97
Material	Fe 410.0
<b>Beam Section</b>	MB 500
Material	Fe 410.0
Hole	STD
<b>Plate Section</b>	300X100X12
Thickness (mm)	12
Width (mm)	100
Depth (mm)	300
Hole	STD
<b>Weld</b>	
Type	Double Fillet
Size (mm)	10
<b>Bolts</b>	
Type	HSFG
Grade	8.8
Diameter (mm)	12
Bolt Numbers	14
Columns (Vertical Lines)	2
Bolts Per Column	7
Gauge (mm)	30
Pitch (mm)	40

End Distance (mm)	30
Edge Distance (mm)	30
<b>Assembly</b>	
<b>Column-Beam Clearance (mm)</b>	10.0



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### Design Preferences

#### Bolt

Hole Type	Standard
Hole Clearance (mm)	1.0
Material Grade (MPa) (overwrite)	800.0
Slip factor	0.3

#### Weld

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

#### Detailing

Type of Edges	Sheared or hand flame cut
Minimum Edge-End Distance	1.7 times the hole diameter
Gap between Beam and Column (mm)	10.0
Are members exposed to corrosive influences?	No

#### Design

Design Method	Limit State Design
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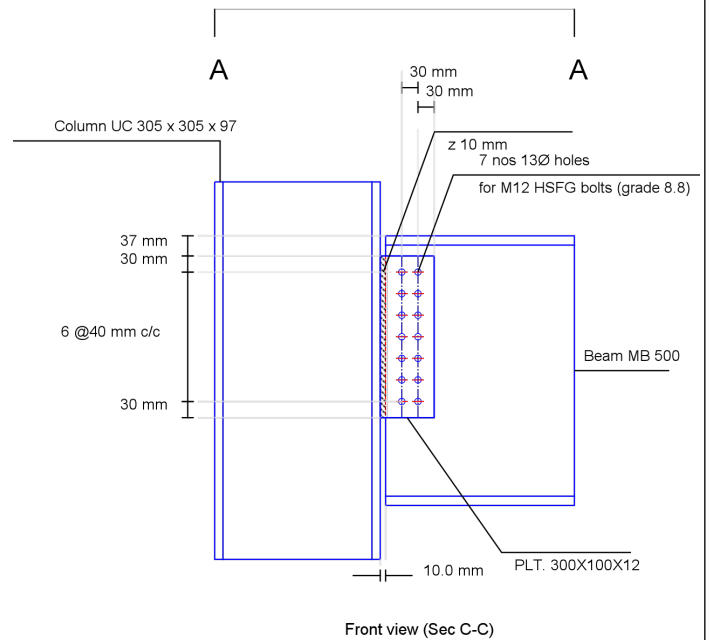
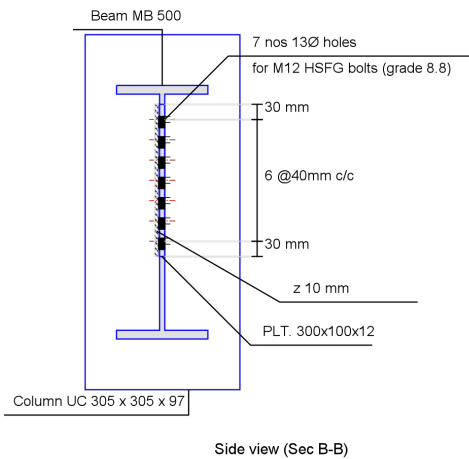
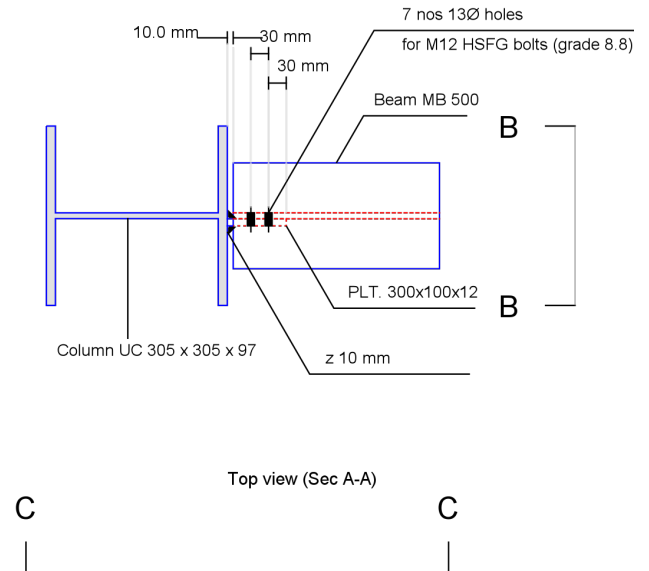
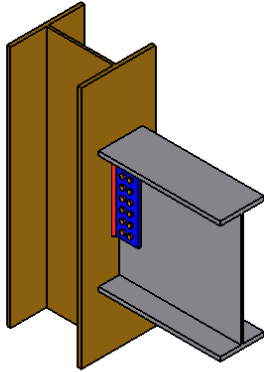
Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsf} = ((0.3 \times 1 \times 1.0 \times 47.208) / (1.25)) = 11.32992$ [cl. 10.4.3]	
Bolt bearing capacity (kN)		N/A	
Bolt capacity (kN)		11.32992	Pass
No. of bolts	$140 / 11.32992 = 12.4$	14	Pass
No. of column(s)	$\leq 2$	2	
No. of bolts per column		7	
Bolt pitch (mm)	$\geq 2.5 \times 12 = 30, \leq \text{Min}(32 \times 10.2, 300) = 300$ [cl. 10.2.2]	40	Pass
Bolt gauge (mm)	$\geq 2.5 \times 12 = 30, \leq \text{Min}(32 \times 10.2, 300) = 300$ [cl. 10.2.2]	30	
End distance (mm)	$\geq 1.7 \times 13 = 22, \leq 12 \times 10.2 = 122.4$ [cl. 10.2.4]	30	Pass
Edge distance (mm)	$\geq 1.7 \times 13 = 22, \leq 12 \times 10.2 = 122.4$ [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	$\geq 140$	$V_{db} = 461$	Pass
Plate thickness (mm)	$(5 \times 140 \times 1000) / (300 \times 250.0) = 9$ [Owens and Cheal, 1989]	12	Pass
Plate height (mm)	$\geq 0.6 \times 500 = 300.0, \leq 500 - 17 - 17 - 10 = 422.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	300	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 \times 11.32992 \times 40^2) / (40 \times 1000) = 11.105$	$M_d = (1.2 \times 250.0 \times Z) / (1000 \times 1.1) = 49.09$ [cl. 8.2.1.2]	Pass
Effective weld length on each side (mm)		$300 - 2 \times 10 = 280$	
Weld strength (kN/mm)	$\sqrt{[(11105 \times 6) / (2 \times 280^2)]^2 + [140 / (2 \times 280)]^2} = 0.493$	$f_v = (0.7 \times 10 \times 410) / (\sqrt{3} \times 1.25) = 1.326$ [cl. 10.5.7]	Pass

<b>Weld thickness (mm)</b>	$\text{Max}((0.493 \cdot 1000 \cdot \sqrt{3} \cdot 1.25) / (0.7 \cdot 410), 12 \cdot 0.8) = 9.6$ [cl. 10.5.7, Insdag Detailing Manual, 2002]	10	<b>Pass</b>
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## Views





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<b>Additional Comments</b>	
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