



Created with



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Finplate shear connection
Designer	Engineer #1	Job Number	1.1.4.1.1
Date	19 /06 /2017	Client	Somnath Mukherjee, MN Dastur & Co (P) Ltd, Kolkata

Design Conclusion	
Seated Angle	Pass
Seated Angle	
Connection Properties	
Connection	
Connection Title	Seated Angle
Connection Type	Shear Connection
Connection Category	
Connectivity	Column flange-Beam flange
Beam Connection	Bolted
Column Connection	Bolted
Loading (Factored Load)	
Shear Force (kN)	100.0
Components	
Column Section	
Material	Fe 410
Hole	Standard
Beam Section	
Material	Fe 410
Hole	Standard
Seated Angle Section	
Material	Fe 410
Hole	Standard
Top Angle Section	
Material	Fe 410
Hole	Standard
Bolts	
Type	HSFG
Grade	10.9
Diameter (mm)	20
Bolts - Required	2
Bolts - Provided	2

Rows	1
Columns	2
Gauge (mm)	60.0
Pitch (mm)	0.0
End Distance (mm)	85
Edge Distance (mm)	40
Assembly	
Column-Beam Clearance (mm)	10



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Design Preferences

Bolt

Hole Type	Standard Hole
Material Grade Fu (MPa) (overwrite)	940
Slip Factor	0.55

Detailing

Type of Edge	Sheared or hand flame cut
Minimum Edge Distance check multiplier	1.7 * bolt_hole_diameter
Are members exposed to corrosive influences?	No
Gap between Beam and Column (mm)	10

Design

Design Method	Limit State Design
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Design Check			
Check	Required	Provided	Remark
Bolt Checks			
Bolt shear capacity (kN)	HSFG bolt shear capacity: [cl. 10.3.3]	$V_{dsf} = (0.55)*(1)*(1.0)*(0.6126*20^2) * (0.70*1000)/1.25/1000$ $= 75.46$	
Bolt bearing capacity (kN)	V_{dpb} : [Cl. 10.3.4]	N/A	
Bolt capacity (kN)	min (bolt_shear_capacity, bolt_bearing_capacity)	min (75.46, 0.0) = 75.46	
No. of bolts	$100.0/75.46 = 2.0$	2	Pass
No. of columns		2	
No. of row(s)	≤ 2	1	
Bolt pitch (mm)	N/A	N/A	
Bolt gauge (mm)	$\geq 2.5*20 = 50$, $\leq \min(32*15.0, 300) = 300.0$ [cl. 10.2.2]	60.0	Pass
End distance (mm)	$\geq 1.7*22 = 38$	85	Pass
Edge distance (mm)	$\geq 1.7*22 = 38$ [cl. 10.2.4.2] $\leq 12*15.0\sqrt{250/250} = 180.0$ [Cl 10.2.4.3]	40	Pass
Seated Angle 150 150 X 15			
Length (mm)	$= \min(140.0, 209.1)$	140	
Outstanding leg length (mm)	[Cl. 8.7.4] $= (100.0*1000*1.1/(250*7.7)) + 10$	150	Pass

Shear capacity of outstanding leg (kN)	$V_{dp} \geq V$ $V_{dp} \geq 100.0 \text{ kN}$ [Cl. 8.4.1]	$= (140 \times 15.0) \times 250 / (\sqrt{3} \times 1.1)$ $= 333.4$	Pass
Moment capacity of outstanding leg (kN-mm)	As $V \leq 0.6 V_d$, [Cl 8.2.1.2] is applicable $M_d \geq \text{Moment at root of angle}$ $M_d \geq 136.1$	$M_d = \min(\beta_b Z_e f_y / \gamma_{m0}, 1.5 Z_e f_y / \gamma_{m0})$ $= \min(1.0 \times 140 \times (15.0^2 / 6) \times 250 / 1.1, 1.5 \times 140 \times (15.0^2 / 6) \times 250 / 1.1)$ $= 1193.2$	Pass
Top Angle			
Section	Recommended size (based on stability only): 80 80 X 8	User selected size: 150 150 X 10	
End distance (mm)	$\geq 1.7 \times \text{bolt_hole_diameter}$ [cl. 10.2.4.2] $\geq 1.7 \times 22 = 38$	on leg connected to Beam: 70 on leg connected to Column: 70	Pass

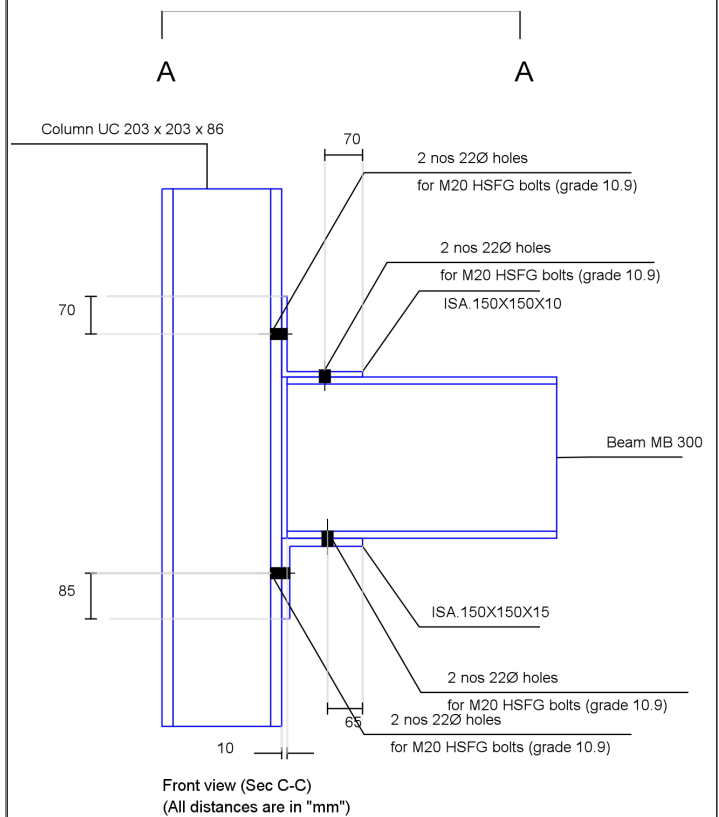
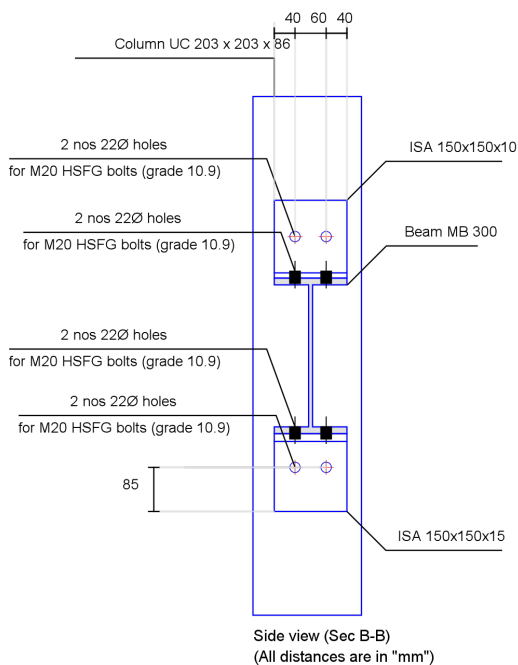
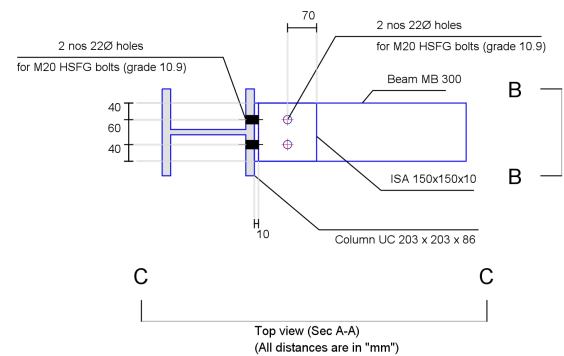
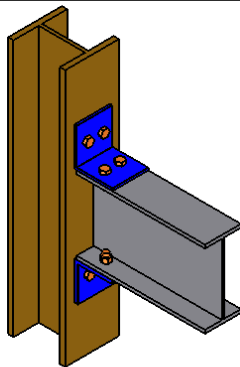


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Views





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Additional Comments	
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