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Company Name	Fossee	Project Title	Project 3
Group/Team Name	OSDAG	Subtitle	
Designer	Engineer	Job Number	12345
Date	05 /06 /2016	Method	Limit State Design (No Earthquake Load)


Design Conclusion	
Cleat Angle	Pass
Cleat Angle	
Connection Properties	
Connection	
Connection Title	Double Angle Web Cleat
Connection Type	Shear Connection
Connection Category	
Connectivity	Beam-Beam
Beam Connection	Bolted
Column Connection	Bolted
Loading (Factored Load)	
Shear Force (kN)	100.0
Components	
Column Section	ISMB 450
Material	Fe 410
Beam Section	ISMB 300
Material	Fe 410
Hole	STD
Cleat Section	ISA 120X120X10
Thickness (mm)	10
Cleat Leg Size B (mm)	120
Cleat Leg Size A (mm)	120
Hole	STD
Bolts on Beam	
Type	Black Bolt
Grade	4.8
Diameter (mm)	20
Bolt Numbers	4
Columns (Vertical Lines)	1
Bolts Per Column	4
Gauge (mm)	0
Pitch (mm)	50
End Distance (mm)	37
Edge Distance (mm)	37
Bolts on Column	
Type	Black Bolt
Grade	4.8
Diameter (mm)	20
Bolt Numbers	6

Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	50
End Distance (mm)	62
Edge Distance (mm)	53.85
<b>Assembly</b>	
Column-Beam Clearance (mm)	20

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Design Check: Secondary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((2*400*0.6126*20*20)/(\sqrt{3}*1.25*1000)) = 90.529$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5*0.508*20*7.7*400)/(1.25*1000) = 62.586$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5*0.508*20*7.7*410)/(1.25*1000) = 64.15$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5*0.508*20*10*410)/(1.25*1000) = 83.312$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (62.586, 64.15, 83.312) = 62.586	
Bolt capacity (kN)		Min (90.529, 62.586) = 62.586	
Critical bolt shear (kN)	$\leq 62.586$	27.861	Pass
No. of bolts		4	
No.of column(s)	$\leq 2$	1	
No. of bolts per column		4	
Bolt pitch (mm)	$\geq 2.5* 20 = 50, \leq \text{Min}(32*7.7, 300) = 247$ [cl. 10.2.2]	50	Pass
Bolt gauge (mm)	$\geq ;2.5*20 = 50, \leq \text{Min}(32*7.7, 300) = 247$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7*22.0 = 37.4, \leq 12*7.7 = 92.4$ [cl. 10.2.4]	37	Pass
Edge distance (mm)	$\geq 1.7*22.0 = 37.4, \leq 12*7.7 = 92.4$ [cl. 10.2.4]	37	Pass
Block shear capacity (kN)	$\geq 100.0$	$V_{db} = 271.568$ [cl. 6.4.1]	Pass
Cleat height (mm)	$\geq 0.6*300.0=180.0, \leq 300.0-13.1-14.0-17.4-15.0- 5=235.5$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	224	Pass
Cleat moment	$(2*90.529*50^2)/(50*1000) = 4.15$	$M_d = (1.2*250*Z)/(1000*1.1) = 150.528$	Pass

capacity (kNm)		[cl. 8.2.1.2]	
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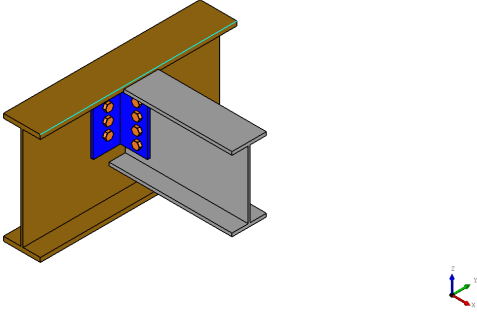
		<div> <div>Created with</div>  </div>	
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Design Check: Primary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400*0.6126*20*20)/(\sqrt{3}*1.25*1000)) = 45.264$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5*0.508*20*9.4*400)/(1.25*1000) = 76.403$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5*0.508*20*9.4*410)/(1.25*1000) = 78.313$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5*0.508*20*10*410)/(1.25*1000) = 83.312$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (76.403, 78.313, 83.312) = 83.312	
Bolt capacity (kN)		Min (45.264, 83.312) = 45.264	
Critical bolt shear (kN)	$\leq 45.264$	38.766	Pass
No. of bolts		6	
No.of column(s) per angle	$\leq 2$	1	
No. of bolts per column per angle		3	
Bolt pitch (mm)	$\geq 2.5* 20 = 50, \leq \text{Min}(32*9.4, 300) = 300$ [cl. 10.2.2]	50	Pass
Bolt gauge (mm)	$\geq 2.5*20 = 50, \leq \text{Min}(32*9.4, 300) = 300$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7*22.0 = 37.4, \leq 12*9.4 = 112.8$ [cl. 10.2.4]	62	Pass
Edge distance (mm)	$\geq 1.7*22.0 = 37.4, \leq 12*9.4 = 112.8$ [cl. 10.2.4]	53.85	Pass
Block shear capacity (kN)	$\geq 100.0$	$V_{db} = 304.751$ [cl. 6.4.1]	Pass
Cleat height (mm)	$\geq 0.6*300.0=180.0, \leq 300.0-13.1-14.0-17.4-15.0- 5=235.5$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	224	Pass

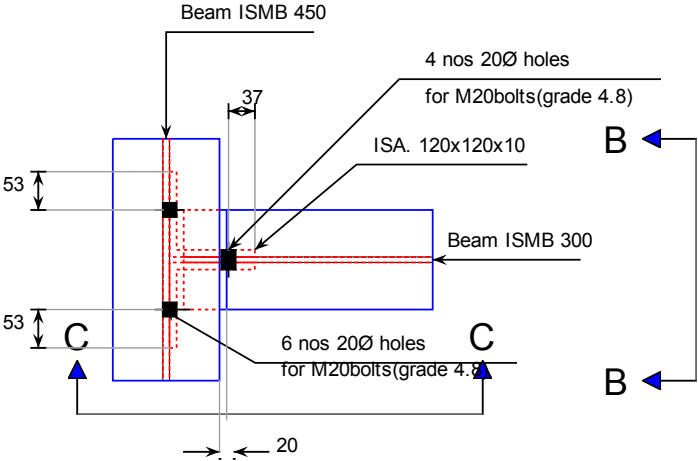
Cleat moment capacity (kNm)	$(2 \cdot 45.264 \cdot 50^2) / (50 \cdot 1000) = 3.5$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 150.528$ [cl. 8.2.1.2]	Pass
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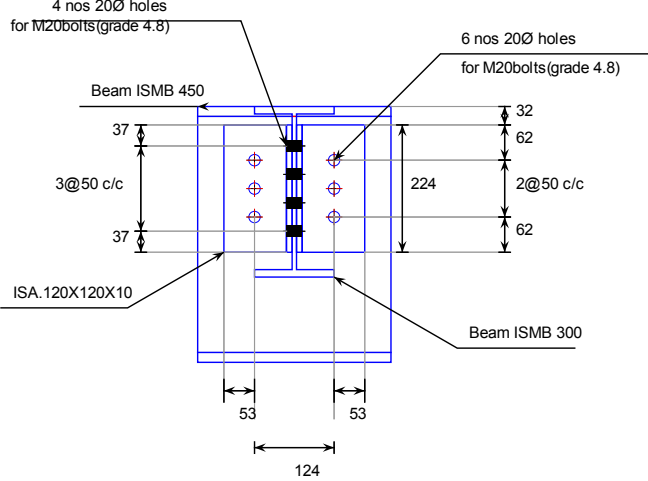
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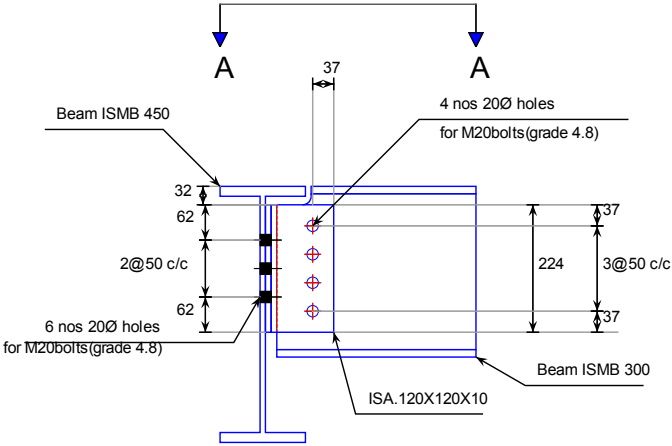
3D perspective view of the beam connection.




Top view (Sec A-A) (All distances are in "mm")



Side View (Sec B-B) (All distances are in "mm")



Front view (Sec C-C) (All distances are in "mm")

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<b>Date</b>	<b>05 /06 /2016</b>	<b>Method</b>	<b>Limit State Design (No Earthquake Load)</b>
<b>Additional Comments</b>		This connection was designed to demonstrate the functionality of Osdag	