



Created with

<b>Company Name</b>	<b>KLECET</b>	<b>Project Title</b>	<b>cleat connection</b>
<b>Group/Team Name</b>	<b>Civil</b>	<b>Subtitle</b>	
<b>Designer</b>	<b>Deepak</b>	<b>Job Number</b>	<b>123456789</b>
<b>Date</b>	<b>05 /06 /2016</b>	<b>Method</b>	<b>Limit State Design (No Earthquake Load)</b>

<b>Design Conclusion</b>	
<b>Cleat Angle</b>	<b>Pass</b>
<b>Cleat Angle</b>	
<b>Connection Properties</b>	
<b>Connection</b>	
Connection Title	Double Angle Web Cleat
Connection Type	Shear Connection
<b>Connection Category</b>	
Connectivity	Beam-Beam
Beam Connection	Bolted
Column Connection	Bolted
<b>Loading (Factored Load)</b>	
Shear Force (kN)	100.0
<b>Components</b>	
<b>Column Section</b>	ISMB 450
Material	Fe 410
<b>Beam Section</b>	ISMB 300
Material	Fe 410
Hole	STD
<b>Cleat Section</b>	ISA 100X100X10
Thickness (mm)	10
Cleat Leg Size B (mm)	100
Cleat Leg Size A (mm)	100
Hole	STD
<b>Bolts on Beam</b>	
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
<b>Bolts on Column</b>	
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)	37
<b>Assembly</b>	
<b>Column-Beam Clearance (mm)</b>	20



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### Design Check: Secondary Beam Connectivity

Check	Required	Provided	Remark
<b>Bolt shear capacity (kN)</b>		$V_{dsb} = ((2*400*0.6126*20*20)/(\sqrt{3}*1.25*1000)) = 90.529$ [cl. 10.3.3]	
<b>Bolt bearing capacity (kN)</b>		$V_{dpb} = (2.5*0.508*20*7.7*400)/(1.25*1000) = 62.586$ [cl. 10.3.4]	
<b>Bearing capacity of beam web (kN)</b>		$V_{dpb} = (2.5*0.508*20*7.7*410)/(1.25*1000) = 64.15$ [cl. 10.3.4]	
<b>Bearing capacity of cleat (kN)</b>		$V_{dpb} = (2.5*0.508*20*10*410)/(1.25*1000) = 83.312$ [cl. 10.3.4]	
<b>Bearing capacity (kN)</b>		Min (62.586, 64.15, 83.312) = 62.586	
<b>Bolt capacity (kN)</b>		Min (90.529, 62.586) = 62.586	
<b>Critical bolt shear (kN)</b>	$\leq 62.586$	22.66	<b>Pass</b>
<b>No. of bolts</b>		4	
<b>No. of column(s)</b>	$\leq 2$	1	

<b>No. of bolts per column</b>		4	
<b>Bolt pitch (mm)</b>	$\geq 2.5 \cdot 20 = 50, \leq \text{Min}(32 \cdot 7.7, 300) = 247$ [cl. 10.2.2]	50	Pass
<b>Bolt gauge (mm)</b>	$\geq ; 2.5 \cdot 20 = 50, \leq \text{Min}(32 \cdot 7.7, 300) = 247$ [cl. 10.2.2]	0	
<b>End distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 7.7 = 92.4$ [cl. 10.2.4]	37	Pass
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 7.7 = 92.4$ [cl. 10.2.4]	37	Pass
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 271.568$ [cl. 6.4.1]	Pass
<b>Cleat height (mm)</b>	$\geq 0.6 \cdot 300.0 = 180.0, \leq 300.0 - 13.1 - 14.0 - 17.4 - 15.0 - 5 = 235.5$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	224	Pass
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 90.529 \cdot 50^2) / (50 \cdot 1000) = 3.15$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 150.528$ [cl. 8.2.1.2]	Pass



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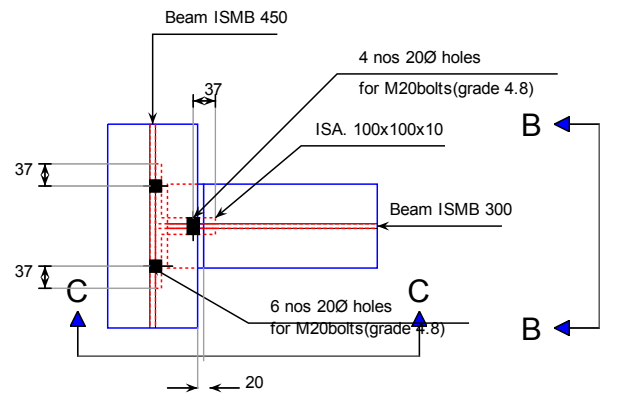
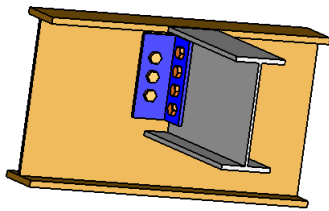
### Design Check: Primary Beam Connectivity

Check	Required	Provided	Remark
<b>Bolt shear capacity (kN)</b>		$V_{dsb} = ((400*0.6126*20*20)/(\sqrt{3}*1.25*1000))$ $= 45.264$ [cl. 10.3.3]	
<b>Bolt bearing capacity (kN)</b>		$V_{dpb} = (2.5*0.508*20*9.4*400)/(1.25*1000)$ $= 76.403$ [cl. 10.3.4]	
<b>Bearing capacity of beam web (kN)</b>		$V_{dpb} = (2.5*0.508*20*9.4*410)/(1.25*1000)$ $= 78.313$ [cl. 10.3.4]	
<b>Bearing capacity of cleat (kN)</b>		$V_{dpb} = (2.5*0.508*20*10*410)/(1.25*1000)$ $= 83.312$ [cl. 10.3.4]	
<b>Bearing capacity (kN)</b>		Min (76.403, 78.313, 83.312) = 76.403	
<b>Bolt capacity (kN)</b>		Min (45.264, 76.403) = 45.264	
<b>Critical bolt shear (kN)</b>	$\leq 45.264$	37.35	<b>Pass</b>
<b>No. of bolts</b>		6	
<b>No. of column(s) per angle</b>	$\leq 2$	1	

<b>No. of bolts per column per angle</b>		3	
<b>Bolt pitch (mm)</b>	$\geq 2.5 \cdot 20 = 50, \leq \text{Min}(32 \cdot 9.4, 300) = 300$ [cl. 10.2.2]	50	Pass
<b>Bolt gauge (mm)</b>	$\geq 2.5 \cdot 20 = 50, \leq \text{Min}(32 \cdot 9.4, 300) = 300$ [cl. 10.2.2]	0	
<b>End distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 9.4 = 112.8$ [cl. 10.2.4]	62	Pass
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 9.4 = 112.8$ [cl. 10.2.4]	37	Pass
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 266.455$ [cl. 6.4.1]	Pass
<b>Cleat height (mm)</b>	$\geq 0.6 \cdot 300.0 = 180.0, \leq 300.0 - 13.1 - 14.0 - 17.4 - 15.0 - 5 = 235.5$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	224	Pass
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 45.264 \cdot 50^2) / (50 \cdot 1000) = 3.342$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 150.528$ [cl. 8.2.1.2]	Pass

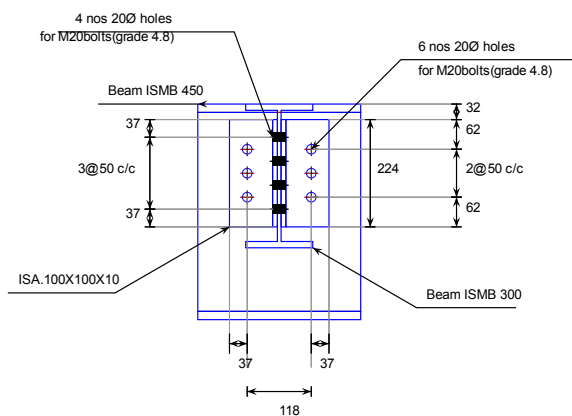
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## Views



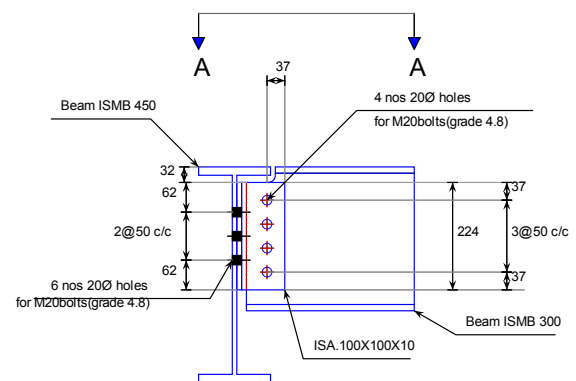
Top view (Sec A-A)

(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>Additional Comments</b>	
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