
 Osdag Created with	
Company Name	LERA	Project Title	cleat angle
Group/Team Name	LERA	Subtitle	
Designer	charugalla j p sreeram	Job Number	
Date	06 /06 /2016	Method	Limit State Design (No Earthquake Load)


<b>Design Conclusion</b>	
Cleat Angle	Pass
<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 80X80X10
Thickness (mm)	10
Cleat Leg Size B (mm)	80
Cleat Leg Size A (mm)	80
Hole	STD
<b>Bolts on Beam</b>	
Type	Black Bolt
Grade	4.8
Diameter (mm)	16
Bolt Numbers	4

Columns (Vertical Lines)	1
Bolts Per Column	4
Gauge (mm)	0
Pitch (mm)	40
End Distance (mm)	30
Edge Distance (mm)	30
<b>Bolts on Column</b>	
Type	Black Bolt
Grade	4.8
Diameter (mm)	16
Bolt Numbers	8
Columns (Vertical Lines)	1
Bolts Per Column	4
Gauge (mm)	0
Pitch (mm)	40
End Distance (mm)	30
Edge Distance (mm)	30
<b>Assembly</b>	
<b>Column-Beam Clearance (mm)</b>	20

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Design Check: Secondary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((2 \times 400 \times 0.6126 \times 16 \times 16) / (\sqrt{3} \times 1.25 \times 1000)) = 58.012$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 7.7 \times 400) / (1.25 \times 1000) = 48.393$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 7.7 \times 410) / (1.25 \times 1000) = 49.603$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 10 \times 410) / (1.25 \times 1000) = 64.419$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (48.393, 49.603, 64.419) = 48.393	
Bolt capacity (kN)		Min (58.012, 48.393) = 48.393	
Critical bolt shear (kN)	$\leq 48.393$	22.535	Pass
No. of bolts		4	
No. of column(s)	$\leq 2$	1	
No. of bolts per column		4	
Bolt pitch	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 7.7, 300) = 247$	40	Pass

(mm)	[cl. 10.2.2]		
<b>Bolt gauge (mm)</b>	$\geq 2.5 \cdot 16 = 40, \leq \text{Min}(32 \cdot 7.7, 300) = 247$ [cl. 10.2.2]	0	
<b>End distance (mm)</b>	$\geq 1.7 \cdot 18.0 = 30.6, \leq 12 \cdot 7.7 = 92.4$ [cl. 10.2.4]	30	Pass
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 18.0 = 30.6, \leq 12 \cdot 7.7 = 92.4$ [cl. 10.2.4]	30	Pass
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 216.459$ [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]	180	Pass
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 58.012 \cdot 40^2) / (40 \cdot 1000) = 2.5$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 97.2$ [cl. 8.2.1.2]	Pass

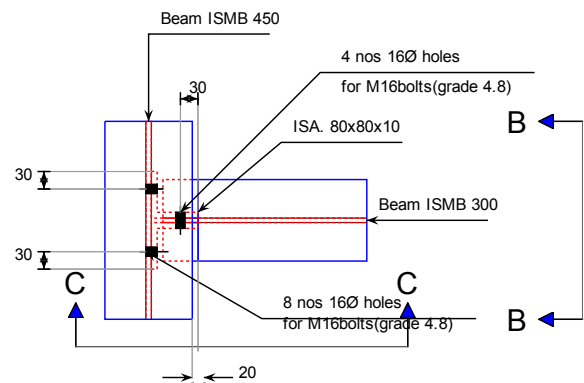
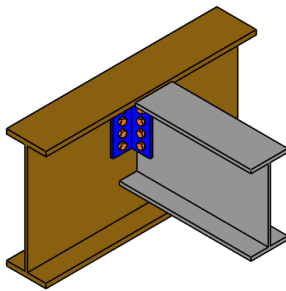
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Design Check: Primary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400 \times 0.6126 \times 16 \times 16) / (\sqrt{3} \times 1.25 \times 1000))$ = 29.006 [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 9.4 \times 400) / (1.25 \times 1000)$ = 59.077 [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 9.4 \times 410) / (1.25 \times 1000)$ = 60.554 [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 10 \times 410) / (1.25 \times 1000)$ = 64.419 [cl. 10.3.4]	
Bearing capacity (kN)		Min (59.077, 60.554, 64.419) = 64.419	
Bolt capacity (kN)		Min (29.006, 64.419) = 29.006	
Critical bolt shear (kN)	$\leq 29.006$	23.749	Pass
No. of bolts		8	
No. of column(s) per angle	$\leq 2$	1	
No. of bolts per column per angle		4	
Bolt pitch	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 9.4, 300) = 300$	40	Pass

(mm)	[cl. 10.2.2]		
<b>Bolt gauge (mm)</b>	$\geq 2.5 \cdot 16 = 40, \leq \text{Min}(32 \cdot 9.4, 300) = 300$ [cl. 10.2.2]	0	
<b>End distance (mm)</b>	$\geq 1.7 \cdot 18.0 = 30.6, \leq 12 \cdot 9.4 = 112.8$ [cl. 10.2.4]	30	Pass
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 18.0 = 30.6, \leq 12 \cdot 9.4 = 112.8$ [cl. 10.2.4]	30	Pass
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 216.459$ [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]	180	Pass
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 29.006 \cdot 40^2) / (40 \cdot 1000) = 2.692$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 97.2$ [cl. 8.2.1.2]	Pass

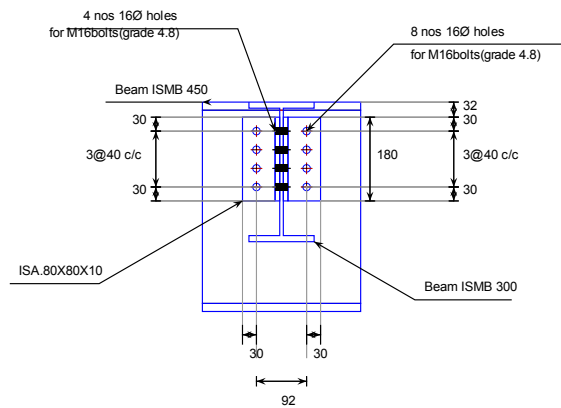
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<b>Designer</b>	<b>charugalla j p sreeram</b>	<b>Job Number</b>	
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## Views



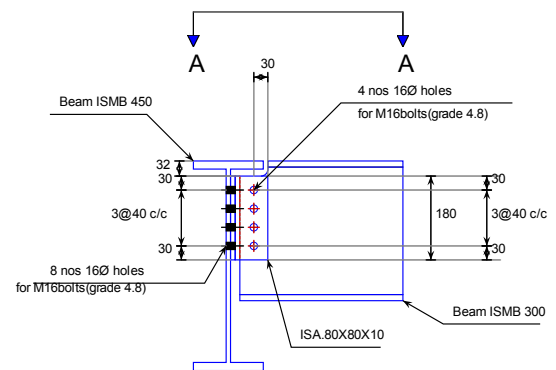
Top view (Sec A-A)

(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>			