
 Created with	
Company Name	Nandadeep Designers And Valuers Pvt.Ltd	Project Title	job3b
Group/Team Name	NDVPL	Subtitle	
Designer	Aditya	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 100X100X8
Thickness (mm)	8
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>	
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)		$V_{dpb} = (2.5*0.508*20*8*410)/(1.25*1000) = 66.65$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (62.586, 64.15, 66.65) = 62.586	
Bolt capacity (kN)		Min (90.529, 62.586) = 62.586	
Critical bolt shear (kN)	$\leq 62.586$	22.66	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	
	$\geq 1.7*22.0 = 37.4, \leq 12*7.7 =$		

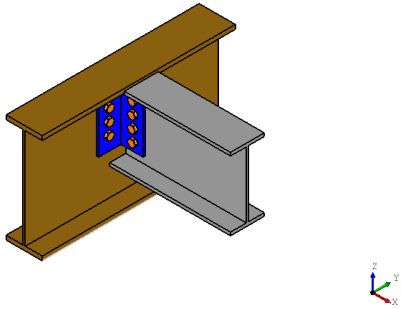
<b>End distance (mm)</b>	92.4 [cl. 10.2.4]	37	<b>Pass</b>
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 7.7 = 92.4$ [cl. 10.2.4]	37	<b>Pass</b>
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 217.254$ [cl. 6.4.1]	<b>Pass</b>
<b>Cleat height (mm)</b>	$\geq 0.6 \cdot 300.0 = 180.0, \leq 300.0 - 13.1 - 14.0 - 17.4 - 15.0 - 5 = 235.5$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	224	<b>Pass</b>
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 90.529 \cdot 50^2) / (50 \cdot 1000) = 3.15$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 120.422$ [cl. 8.2.1.2]	<b>Pass</b>


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Design Check: Primary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400 \times 0.6126 \times 20 \times 20) / (\sqrt{3} \times 1.25 \times 1000)) = 45.264$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 8.0 \times 400) / (1.25 \times 1000) = 65.024$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 9.4 \times 410) / (1.25 \times 1000) = 78.313$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 8 \times 410) / (1.25 \times 1000) = 66.65$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (65.024, 78.313, 66.65) = 66.65	
Bolt capacity (kN)		Min (45.264, 66.65) = 45.264	
Critical bolt shear (kN)	$\leq 45.264$	37.35	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)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.0, 300) = 256$ [cl. 10.2.2]	50	Pass
Bolt gauge (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.0, 300) = 256$ [cl. 10.2.2]	0	

<b>End distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 8.0 = 96.0$ [cl. 10.2.4]	62	<b>Pass</b>
<b>Edge distance (mm)</b>	$\geq 1.7 \cdot 22.0 = 37.4, \leq 12 \cdot 8.0 = 96.0$ [cl. 10.2.4]	37	<b>Pass</b>
<b>Block shear capacity (kN)</b>	$\geq 100.0$	$V_{db} = 213.164$ [cl. 6.4.1]	<b>Pass</b>
<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	<b>Pass</b>
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 45.264 \cdot 50^2) / (50 \cdot 1000) = 3.342$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 120.422$ [cl. 8.2.1.2]	<b>Pass</b>

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Views	
	

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<b>Additional Comments</b>			