




		Created with 	
Company Name	ONGC	Project Title	IIT B
Group/Team Name	IEOT	Subtitle	
Designer	Harsha Gamidi	Job Number	
Date	06 /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 80X80X8
Thickness (mm)	8
Cleat Leg Size B (mm)	80
Cleat Leg Size A (mm)	80
Hole	STD
Bolts on Beam	
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
Bolts on Column	
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
Assembly	
Column-Beam Clearance (mm)	20

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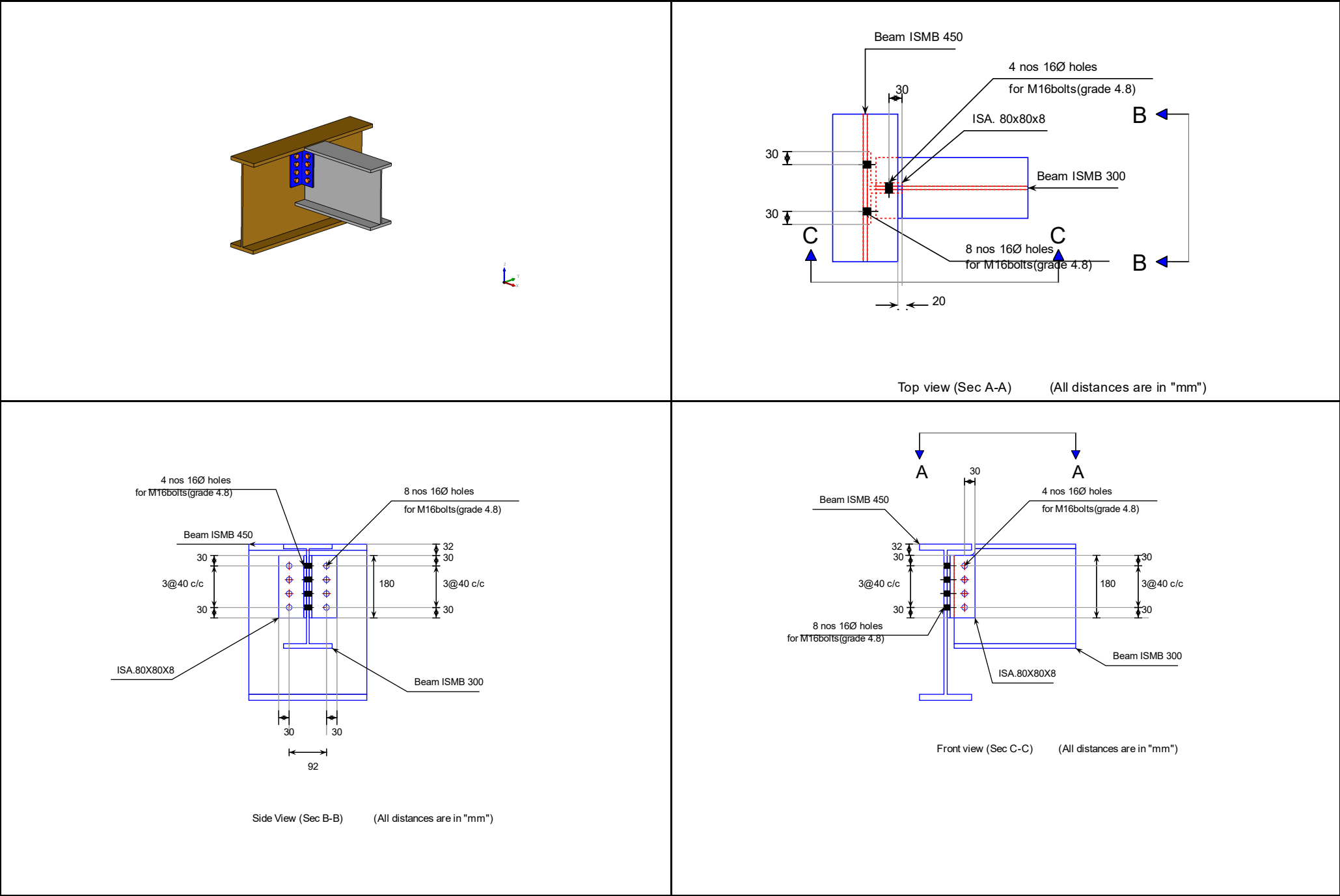
Design Check: Secondary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((2*400*0.6126*16*16)/(\sqrt{3}*1.25*1000)) = 58.012$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5*0.491*16*7.7*400)/(1.25*1000) = 48.393$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5*0.491*16*7.7*410)/(1.25*1000) = 49.603$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5*0.491*16*8*410)/(1.25*1000) = 51.535$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (48.393, 49.603, 51.535) = 48.393	
Bolt capacity (kN)		Min (58.012, 48.393) = 48.393	
Critical bolt shear (kN)	≤ 48.393	22.535	Pass
No. of bolts		4	
No.of column(s)	≤ 2	1	
No. of bolts per column		4	
Bolt pitch (mm)	$\geq 2.5*16 = 40, \leq \text{Min}(32*7.7, 300) = 247$ [cl. 10.2.2]	40	Pass
Bolt gauge (mm)	$\geq ;2.5*16 = 40, \leq \text{Min}(32*7.7, 300) = 247$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7*18.0 = 30.6, \leq 12*7.7 = 92.4$ [cl. 10.2.4]	30	Pass
Edge distance (mm)	$\geq 1.7*18.0 = 30.6, \leq 12*7.7 = 92.4$ [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	≥ 100.0	$V_{db} = 173.167$ [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]	180	Pass
Cleat moment capacity (kNm)	$(2*58.012*40^2)/(40*1000) = 2.5$	$M_d = (1.2*250*Z)/(1000*1.1) = 77.76$ [cl. 8.2.1.2]	Pass


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Design Check: Primary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400*0.6126*16*16))/(\sqrt{3}*1.25*1000)$ = 29.006 [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5*0.491*16*8.0*400)/(1.25*1000) = 50.278$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5*0.491*16*9.4*410)/(1.25*1000) = 60.554$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5*0.491*16*8*410)/(1.25*1000) = 51.535$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (50.278, 60.554, 51.535) = 51.535	
Bolt capacity (kN)		Min (29.006, 51.535) = 29.006	
Critical bolt shear (kN)	≤ 29.006	23.749	Pass
No. of bolts		8	
No.of column(s) per angle	≤ 2	1	
No. of bolts per column per angle		4	
Bolt pitch (mm)	$\geq 2.5*16 = 40, \leq \text{Min}(32*8.0, 300) = 256$ [cl. 10.2.2]	40	Pass
Bolt gauge (mm)	$\geq 2.5*16 = 40, \leq \text{Min}(32*8.0, 300) = 256$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7*18.0 = 30.6, \leq 12*8.0 = 96.0$ [cl. 10.2.4]	30	Pass
Edge distance (mm)	$\geq 1.7*18.0 = 30.6, \leq 12*8.0 = 96.0$ [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	≥ 100.0	$V_{db} = 173.167$ [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]	180	Pass
Cleat moment capacity (kNm)	$(2*29.006*40^2)/(40*1000) = 2.692$	$M_d = (1.2*250*Z)/(1000*1.1) = 77.76$ [cl. 8.2.1.2]	Pass

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Additional Comments			