



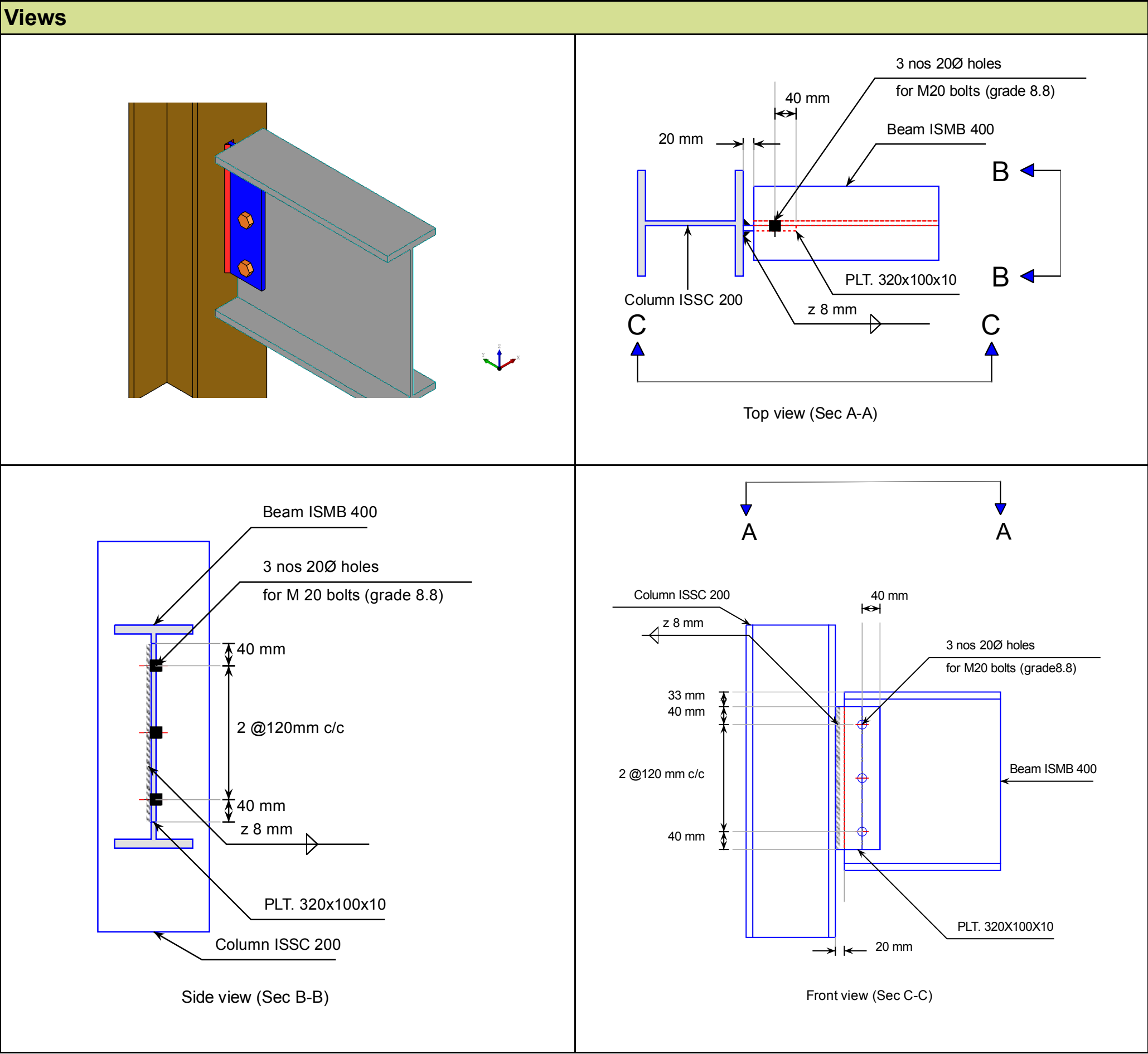
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Company Name	Nandadeep designers and valuers Pvt.ltd.	Project Title	Problem 1
Group/Team Name	NDVPL	Subtitle	
Designer	Priyanka Sharad Mahalpure	Job Number	1
Date	04 /06 /2016	Method	Limit State Design (No Earthquake Load)


Design Conclusion	
Finplate	Pass
Finplate	
Connection Properties	
Connection	
Connection Title	Single Finplate
Connection Type	Shear Connection
Connection Category	
Connectivity	Column flange-Beam web
Beam Connection	Bolted
Column Connection	Welded
Loading (Factored Load)	
Shear Force (kN)	160
Components	
Column Section	ISSC 200
Material	Fe 410
Beam Section	ISMB 400
Material	Fe 410
Hole	STD
Plate Section	320X100X10
Thickness (mm)	10
Width (mm)	100
Depth (mm)	320
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	8
Bolts	
Type	HSFG
Grade	8.8
Diameter (mm)	20
Bolt Numbers	3
Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	120
End Distance (mm)	40
Edge Distance (mm)	40
Assembly	
Column-Beam Clearance (mm)	20

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Design Check			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = (800 \times 0.6126 \times 20 \times 20) / (\sqrt{3} \times 1.25 \times 1000) = 90.529$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.508 \times 20 \times 8.9 \times 410) / (1.25 \times 1000) = 74.148$ [cl. 10.3.4]	
Bolt capacity (kN)		Min (90.529, 74.148) = 74.148	
No. of bolts	160/74.148 = 2.2	3	Pass
No.of column(s)	≤ 2	1	
No. of bolts per column		3	
Bolt pitch (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	120	Pass
Bolt gauge (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
Edge distance (mm)	$\geq 1.7 \times 22 = 37.4, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	40	Pass
Block shear capacity (kN)	≥ 160	$V_{db} = 453$	Pass
Plate thickness (mm)	$(5 \times 160 \times 1000) / (320 \times 250) = 10.0$ [Owens and Cheal, 1989]	10	Pass
Plate height (mm)	$\geq 0.6 \times 400 = 240.0, \leq 400 - 16 - 14 - 10 = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	320	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 \times 90.529 \times 120^2) / (120 \times 1000) = 14.485$	$M_d = (1.2 \times 250 \times Z) / (1000 \times 1.1) = 46.55$ [cl. 8.2.1.2]	Pass
Effective weld length (mm)		320-2*8 = 304	
Weld strength (kN/mm)	$\sqrt{[(14485 \times 6) / (2 \times 304^2)]^2 + [160 / (2 \times 304)]^2} = 0.539$	$f_v = (0.7 \times 8 \times 410) / (\sqrt{3} \times 1.25) = 1.06$ [cl. 10.5.7]	Pass
Weld thickness (mm)	$\text{Max}((0.539 \times 1000 \times \sqrt{3} \times 1.25) / (0.7 \times 410), 10 \times 0.8) = 8.0$ [cl. 10.5.7, Insdag Detailing Manual, 2002]	8	Pass

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Additional Comments			