



Created with



Company Name	IIT B	Project Title	Moment Connection Design Examples
Group/Team Name	Osdag	Subtitle	End Plate Moment Connexion
Designer	Enginner 2	Job Number	1.2.1.2.2.1
Date	13 /06 /2019	Client	Yogesh D Pisal

Design Conclusion**Beam to Beam Extended One Way End Plate Splice Connection****Pass****Connection Properties****Connection**

Connection Title	Beam to Beam Extended One Way End Plate Splice
Connection Type	Moment Connection

Connection Category

Connectivity	Beam - Beam
Beam to End Plate Connection	Welded
End Plate to End Plate Connection	Bolted
End plate type	Extended one way

Loading (Factored Loads)

Bending Moment (kNm)	75.0
Shear Force (kN)	12.0
Axial Force (kN)	0.0

Components

Beam Section	MB 400
Grade of Steel	Fe 410.0
Plate Section	535.0 X 268.9 X 16.0
Thickness (mm)	16.0
Width (mm)	268.9
Height (mm)	535.0
Clearance Holes for Fasteners	Over-sized
Grade of Steel	Fe 410.0

Weld

Type	Groove Weld (CJP)
Size of Weld (mm)	16.0

Bolts

Type	Bearing Bolt
Property Class	3.6
Diameter (d) (mm)	30
Hole Diameter (d_o) (mm)	38
Number of Bolts (n)	6
End Distance (e) (mm)	65
Edge Distance (e') (mm)	64
Gauge Distance (g) (mm)	75
Cross-centre gauge (g') (mm)	138.9
Pitch Distance (p) (mm)	
Pitch 2-3	248.0



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Design Preferences

Bolt

Hole Type	Over-sized
Hole Clearance (mm)	8.0
Ultimate Strength (f_u) (MPa)	300.0
Slip factor	N/A
Beta (β)(non pre-tensioned)	2

Weld

Type of Weld	Shop weld
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Detailing

Type of Edges	Sheared or hand flame cut
Minimum Edge and End Distance	1.7 times the hole diameter
Are members exposed to corrosive influences?	No

Design

Design Method	Limit State Design
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Design Check			
Check	Required	Provided	Remark
Bolt Checks			
Tension capacity of critical bolt (kN)	Tension in bolt due to external factored moment & external factored axial load + Prying force = $61.17 + 58.347 = 119.517$ [cl. 10.4.7]	Tension capacity = $(0.9 \times 300 \times 561) / (1.25 \times 1000) = 121.176$ [cl. 10.4.5]	Pass
Bolt shear capacity (kN)	Factored shear force / Number of bolts = $12.0 / 6 = 2.0$	$V_{dsb} = (300 \times 1 \times 0.6126 \times 30 \times 30) / (\sqrt{3} \times 1.25 \times 1000) = 77.7$ [cl. 10.3.3]	Pass
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.408 \times 30 \times 32.0 \times 410.0) / (1.25 \times 1000) = 321.1$ [cl. 10.3.4]	
Bolt capacity (kN)	min (77.7, 321.1)	77.7	
Combined shear and tension capacity of bolt	≤ 1.0	$(V_{sb}/V_{db})^2 + (T_b/T_{db})^2 = (2.0/77.7)^2 + (119.517/121.176)^2 = 0.973$ [cl. 10.3.6]	Pass
No. of bolts		6.0	
No. of column(s)		2	
No. of row(s)		3	
Bolt gauge (mm)	$\geq 2.5 \times d = 75.0, \leq \min(32 \times t, 300) = 300.0$ [cl. 10.2.2 & cl. 10.2.3]	75	Pass
Bolt pitch (mm)	$\geq 2.5 \times d = 75.0, \leq \min(32 \times t, 300) = 300.0$ [cl. 10.2.2 & cl. 10.2.3]	75	Pass
End distance (mm)	$\geq 1.7 d_o = 64.6, \leq 12 \times t \times \epsilon = 195.0$ [cl. 10.2.4]	65	Pass

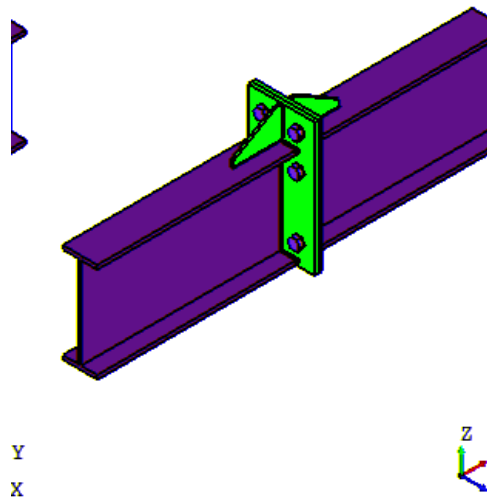
Edge distance (mm)	$\geq 1.7 d_o = 64.6, \leq 12 \cdot t \cdot \epsilon = 195.0$ [cl. 10.2.4]	65	Pass
Plate Checks			
Plate thickness (mm)	$\left(\frac{4 \cdot 1.10 \cdot 1696.1 \cdot 1000}{250.0 \cdot 70.0} \right)^{0.5} = 14.901$ [Design of Steel Structures - N. Subramanian, 2014]	16.0	Pass
Plate height (mm)	Based on detailing requirements	535.0	
Plate width (mm)		268.9	
Plate moment capacity (kNm)	Moment demand (M_d) = $\left(\frac{14.901^2 \cdot 250.0 \cdot 70.0}{4.4} \right) \cdot 10^{-3} = 1696.1$ [Design of Steel Structures - N. Subramanian, 2014]	Moment capacity (M_c) = $\left(\frac{16.0^2 \cdot 250.0 \cdot 70.0}{4.4} \right) \cdot 10^{-3} = 1955.636$ [Design of Steel Structures - N. Subramanian, 2014]	Pass
Weld Checks			
Size of Butt Weld (mm)		16.0	
Stiffener Checks			
Height (mm)		125.0	
Thickness (mm)		10.0	
WeldSize (mm)		10.0	
MomentCapacity (KN-m)	≥ 7.34	22.501	Pass



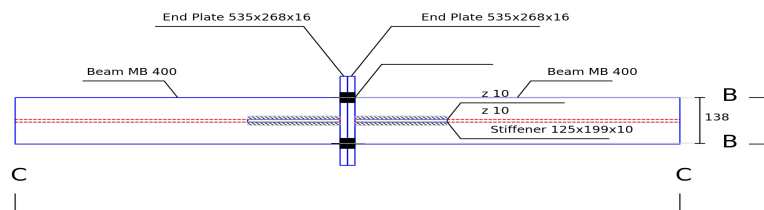
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Fabrication Drawings

3D Cad Model

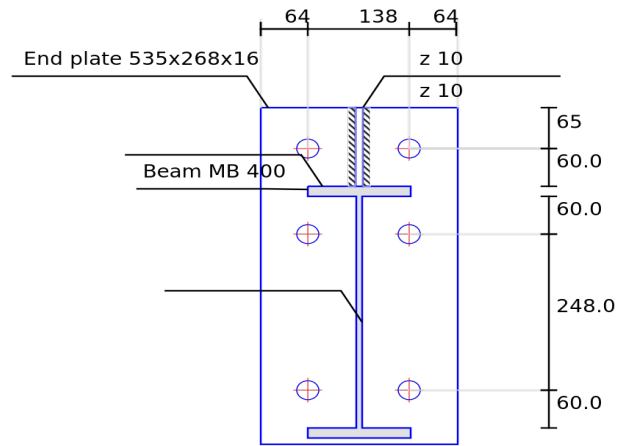


Top View



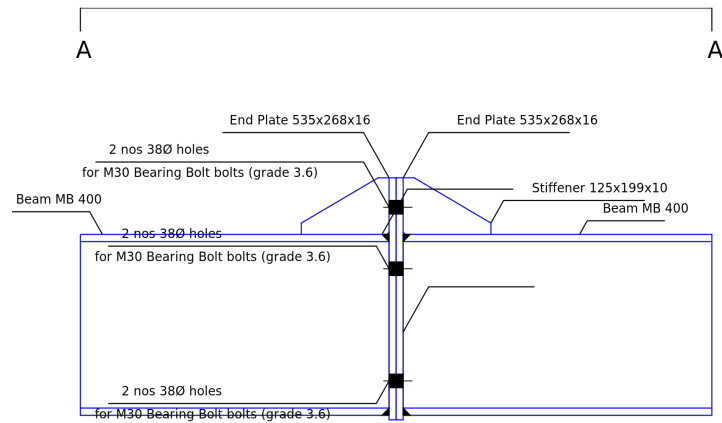
Top view (Sec A-A)
(All dimensions are in "mm")

Side View



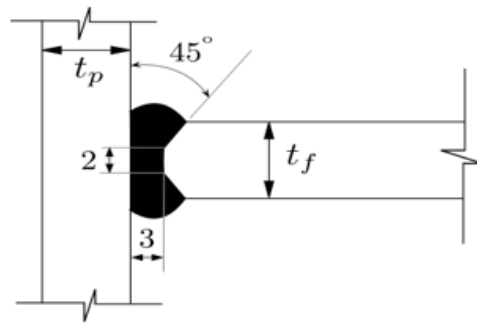
Side view (Sec B-B)
(All dimensions are in "mm")

Front View

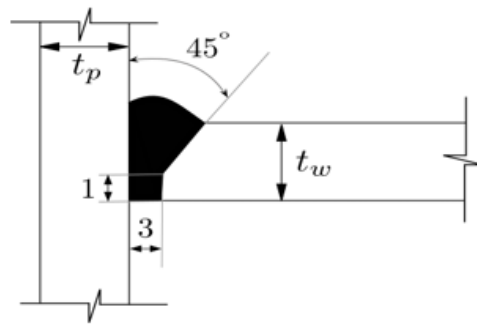


Front view (Sec C-C)
(All dimensions are in "mm")

Weld Detailing

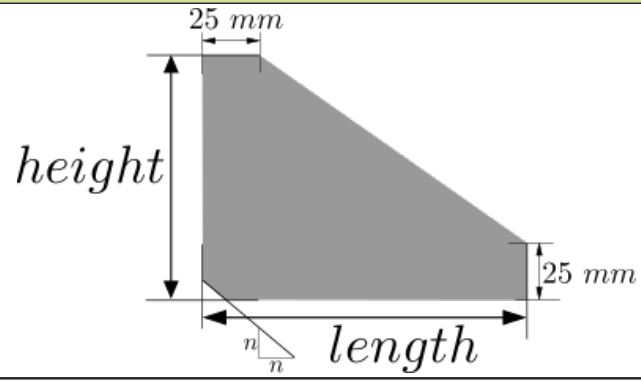


Note :- As flange thickness, t_f (16.0mm) \geq 12mm, double bevel butt welding is provided
[Reference: IS 9595: 1996] (All dimensions are in mm)



Note :- As web thickness, t_w (8.9mm) \leq 12mm, single bevel butt welding is provided
[Reference: IS 9595: 1996] (All dimensions are in mm)

Stiffener Details





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Additional Comments	
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