

Created with

Company Name	D Y Patil College of Engineering Akurdi Pune	Project Title	Problem 4
Group/Team Name	DYPCOE	Subtitle	
Designer	Mr.S.J.Payghan	Job Number	Problem 4
Date	05 /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)	200
Components	
Column Section	ISSC 200
Material	Fe 410
Beam Section	ISMB 400
Material	Fe 410
Hole	STD
Plate Section	250X100X18
Thickness (mm)	18
Width (mm)	100
Depth (mm)	250
Hole	STD
Weld	
Type	Double Fillet
Size (mm)	15
Bolts	
Type	HSFG
Grade	8.8
Diameter (mm)	16
Bolt Numbers	4
Columns (Vertical Lines)	1
Bolts Per Column	4
Gauge (mm)	0
Pitch (mm)	63
End Distance (mm)	30
Edge Distance (mm)	30
Assembly	
Column-Beam Clearance (mm)	20

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Design Check

Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = (800*0.6126*16*16)/(\sqrt{3}*1.25*1000) = 58.012$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5*0.491*16*8.9*410)/(1.25*1000) = 57.333$ [cl. 10.3.4]	
Bolt capacity (kN)		Min (58.012, 57.333) = 57.333	
No. of bolts	200/57.333 = 3.5	4	Pass

No.of column(s)	≤ 2	1	
No. of bolts per column		4	
Bolt pitch (mm)	$\geq 2.5 * 16 = 40, \leq \text{Min}(32 * 8.9, 300) = 285$ [cl. 10.2.2]	63	Pass
Bolt gauge (mm)	$\geq 2.5 * 16 = 40, \leq \text{Min}(32 * 8.9, 300) = 285$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 * 18 = 30.6, \leq 12 * 8.9 = 106.8$ [cl. 10.2.4]	30	Pass
Edge distance (mm)	$\geq 1.7 * 18 = 30.6, \leq 12 * 8.9 = 106.8$ [cl. 10.2.4]	30	Pass
Block shear capacity (kN)	≥ 200	$V_{db} = 601$	Pass
Plate thickness (mm)	$(5 * 200 * 1000) / (250 * 250) = 16.0$ [Owens and Cheal, 1989]	18	Pass
Plate height (mm)	$\geq 0.6 * 400 = 240.0, \leq 400 - 16 - 14 - 10 = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	250	Pass
Plate width (mm)		100	
Plate moment capacity (kNm)	$(2 * 58.012 * 63^2) / (63 * 1000) = 14.735$	$M_d = (1.2 * 250 * Z) / (1000 * 1.1) = 51.14$ [cl. 8.2.1.2]	Pass
Effective weld length (mm)		$250 - 2 * 16 = 218$	
Weld strength (kN/mm)	$\sqrt{[(14735 * 6) / (2 * 218^2)]^2 + [200 / (2 * 218)]^2}$ $= 1.037$	$f_v = (0.7 * 15 * 410) / (\sqrt{3} * 1.25)$ $= 2.121$ [cl. 10.5.7]	Pass
Weld thickness (mm)	$\text{Max}((1.037 * 1000 * \sqrt{3} * 1.25) / (0.7 * 410), 18 * 0.8) = 14.4$ [cl. 10.5.7, Insdag Detailing Manual, 2002]	15	Pass

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Views

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Additional Comments