



Created with



Company Name	Pythons & Co	Project Title	A simple block of flats
Group/Team Name	Flying Circus	Subtitle	Abattoir
Designer	Mr. Wiggin	Job Number	1.1.3.3.2
Date	19 /06 /2017	Client	Mr. Tid

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)

145

Components**Column Section**

WB 450

Material

Fe 410

Beam Section

MB 350

Material

Fe 410

Hole

STD

Cleat Section

100 100 x 10

Thickness (mm)

10

Cleat Leg Size B (mm)

100

Cleat Leg Size A (mm)

100

Hole

STD

Bolts on Beam

Type

Bearing Bolt

Grade

4.6

Diameter (mm)

24

Bolt Numbers

4

Columns (Vertical Lines)

1

Bolts Per Column

4

Gauge (mm)

0

Pitch (mm)

60

End Distance (mm)

44

Edge Distance (mm)	44
Bolts on Column	
Type	Bearing Bolt
Grade	4.6
Diameter (mm)	24
Bolt Numbers	6
Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	60
End Distance (mm)	44
Edge Distance (mm)	74
Assembly	
Column-Beam Clearance (mm)	10.0



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Design Preferences

Bolt

Hole Type	Standard
Material Grade (MPa) (overwrite)	400.0
Slip factor	N/A

Detailing

Type of Edges	Sheared or hand flame cut
Minimum Edge-End Distance	1.7 times the hole diameter
Gap between beam & support (mm)	10.0
Are members exposed to corrosive influences?	No

Design

Design Method	Limit State Design
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Design Check: Secondary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((2 \times 400 \times 0.6126 \times 24 \times 24) / (\sqrt{3} \times 1.25 \times 1000)) = 130.435$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 8.1 \times 400) / (1.25 \times 1000) = 80.715$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 8.1 \times 410) / (1.25 \times 1000) = 82.733$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 10 \times 410) / (1.25 \times 1000) = 102.139$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (80.715, 82.733, 102.139) = 80.715	
Bolt capacity (kN)		Min (130.435, 80.715) = 80.715	
Critical bolt shear (kN)	≤ 80.715	27.214	Pass
No. of bolts		4	
No. of column(s)	≤ 2	1	
No. of bolts per column		4	
Bolt pitch (mm)	$\geq 2.5 \times 24 = 60, \leq \text{Min}(32 \times 8.1, 300) = 260$ [cl. 10.2.2]	60	Pass
Bolt gauge (mm)	$\geq 2.5 \times 24 = 60, \leq \text{Min}(32 \times 8.1, 300) = 260$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 26.0 = 44, \leq 12 \times 8.1 = 97.2$ [cl. 10.2.4]	44	Pass
Edge distance	$\geq 1.7 \times 26.0 = 44, \leq 12 \times 8.1 = 97.2$	44	Pass

(mm)	[cl. 10.2.4]		
Block shear capacity (kN)	≥ 145	$V_{db} = 149.247$ [cl. 6.4.1]	Pass
Cleat height (mm)	$\geq 0.6 \cdot 350.0 = 210.0, \leq 350.0 - 14.2 - 14.0 - 15.4 - 15.0 - 5 = 286.4$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	268	Pass
Cleat moment capacity (kNm)	$(2 \cdot 130.435 \cdot 60^2) / (60 \cdot 1000) = 4.06$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 215.472$ [cl. 8.2.1.2]	Pass



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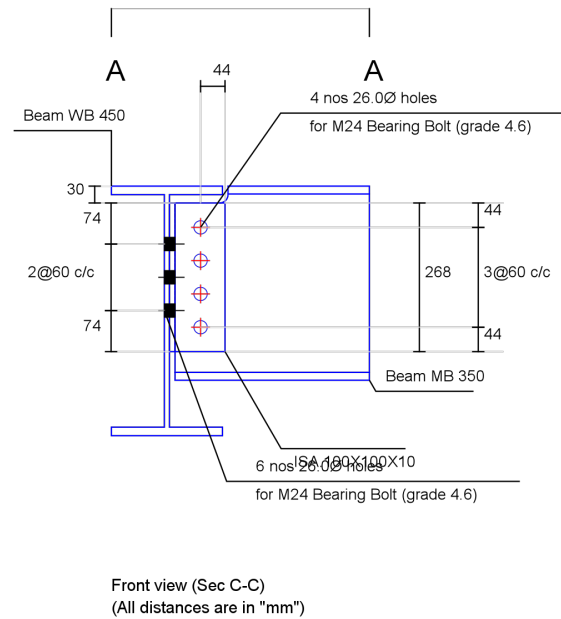
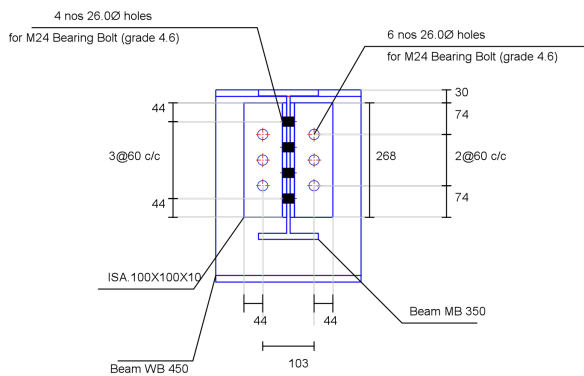
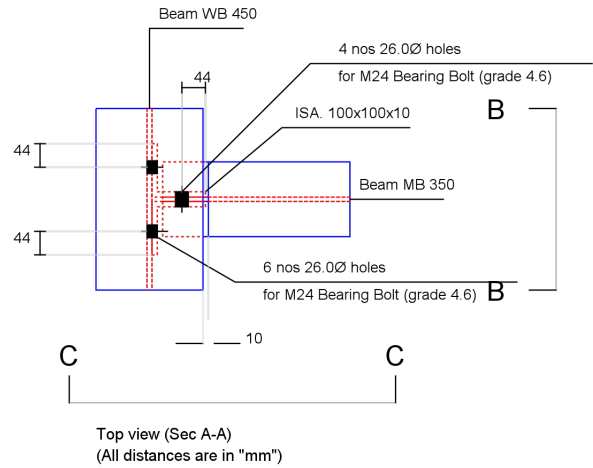
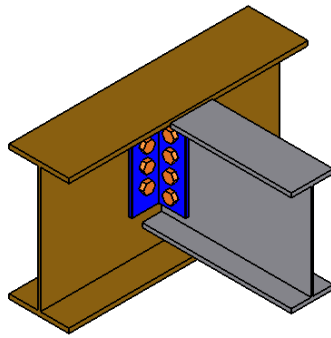
Design Check: Primary Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400 \times 0.6126 \times 24 \times 24) / (\sqrt{3} \times 1.25 \times 1000)) = 65.218$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 9.2 \times 400) / (1.25 \times 1000) = 91.676$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 9.2 \times 410) / (1.25 \times 1000) = 93.968$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.519 \times 24 \times 10 \times 410) / (1.25 \times 1000) = 102.139$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (91.676, 93.968, 102.139) = 91.676	
Bolt capacity (kN)		Min (65.218, 91.676) = 65.218	
Critical bolt shear (kN)	≤ 65.218	43.592	Pass
No. of bolts		6	
No. of column(s) per angle	≤ 2	1	
No. of bolts per column per angle		3	
Bolt pitch (mm)	$\geq 2.5 \times 24 = 60, \leq \text{Min}(32 \times 9.2, 300) = 295$ [cl. 10.2.2]	60	Pass
Bolt gauge (mm)	$\geq 2.5 \times 24 = 60, \leq \text{Min}(32 \times 9.2, 300) = 295$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 26.0 = 44, \leq 12 \times 9.2 = 110.4$ [cl. 10.2.4]	44	Pass
	$\geq 1.7 \times 26.0 = 44, \leq 12 \times 9.2 =$		

Edge distance (mm)	110.4 [cl. 10.2.4]	74	Pass
Block shear capacity (kN)	≥145	$V_{db} = 149.247$ [cl. 6.4.1]	Pass
Cleat height (mm)	≥ 0.6*350.0=210.0, ≤ 350.0-14.2-14.0-15.4-15.0- 5=286.4 [cl. 10.2.4, Insdag Detailing Manual, 2002]	268	Pass
Cleat moment capacity (kNm)	$(2*65.218*60^2)/(60*1000) = 4.354$	$M_d = (1.2*250*Z)/(1000*1.1) = 215.472$ [cl. 8.2.1.2]	Pass



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Views





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Additional Comments	
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