



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	1.1.3.1.2
Date	19 /06 /2017	Client	Mr. Tid

**Design Conclusion****Cleat Angle****Fail****Cleat Angle****Connection Properties****Connection**

Connection Title

Double Angle Web Cleat

Connection Type

Shear Connection

**Connection Category**

Connectivity

Column flange-Beam web

Beam Connection

Bolted

Column Connection

Bolted

**Loading (Factored Load)**

Shear Force (kN)

170

**Components****Column Section**

HB 300\*

Material

Fe 410

**Beam Section**

MB 350

Material

Fe 410

Hole

STD

**Cleat Section**

100 100x 12

Thickness (mm)

12

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)

16

Bolt Numbers

8

Columns (Vertical Lines)

2

Bolts Per Column

4

Gauge (mm)

40

Pitch (mm)

40

End Distance (mm)

30

Edge Distance (mm)	70
<b>Bolts on Column</b>	
Type	Bearing Bolt
Grade	4.6
Diameter (mm)	16
Bolt Numbers	12
Columns (Vertical Lines)	1
Bolts Per Column	6
Gauge (mm)	0
Pitch (mm)	40
End Distance (mm)	34.05
Edge Distance (mm)	30
<b>Assembly</b>	
Column-Beam Clearance (mm)	5.0



<b>Company Name</b>	<b>Pythons &amp; Co</b>	<b>Project Title</b>	<b>A simple block of flats</b>
<b>Group/Team Name</b>	<b>Flying Circus</b>	<b>Subtitle</b>	<b>Abattoir</b>
<b>Designer</b>	<b>Mr. Wiggin</b>	<b>Job Number</b>	<b>1.1.3.1.2</b>
<b>Date</b>	<b>19 /06 /2017</b>	<b>Client</b>	<b>Mr. Tid</b>

### Design Preferences

#### Bolt

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

#### Detailing

Type of Edges	Rolled, machine-flame cut, sawn and planed
Minimum Edge-End Distance	1.5 times the hole diameter
Gap between beam & support (mm)	5.0
Are members exposed to corrosive influences?	No

#### Design

Design Method	Limit State Design
---------------	--------------------



Company Name	Pythons & Co	Project Title	A simple block of flats
Group/Team Name	Flying Circus	Subtitle	Abattoir
Designer	Mr. Wiggin	Job Number	1.1.3.1.2
Date	19 /06 /2017	Client	Mr. Tid

Design Check: Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((2 \times 400 \times 0.6126 \times 16 \times 16) / (\sqrt{3} \times 1.25 \times 1000)) = 58.012$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 8.1 \times 400) / (1.25 \times 1000) = 50.907$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 8.1 \times 410) / (1.25 \times 1000) = 52.18$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 12 \times 410) / (1.25 \times 1000) = 77.303$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (50.907, 52.18, 77.303) = 50.907	
Bolt capacity (kN)		Min (58.012, 50.907) = 50.907	
Critical bolt shear (kN)	$\leq 50.907$	20.074	Pass
No. of bolts		8	
No. of column(s)	$\leq 2$	2	
No. of bolts per column		4	
Bolt pitch (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 8.1, 300) = 260$ [cl. 10.2.2]	40	Pass
Bolt gauge (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 8.1, 300) = 260$ [cl. 10.2.2]	40	Pass
End distance (mm)	$\geq 1.5 \times 18.0 = 27, \leq 12 \times 8.1 = 97.2$ [cl. 10.2.4]	30	Pass
Edge distance	$\geq 1.5 \times 18.0 = 27, \leq 12 \times 8.1 = 97.2$	70	Pass

(mm)	[cl. 10.2.4]		
<b>Block shear capacity (kN)</b>	$\geq 170$	$V_{db} = 326.308$ [cl. 6.4.1]	<b>Pass</b>
<b>Cleat height (mm)</b>	$\geq 0.6 \cdot 350.0 = 210.0, \leq 350.0 - 14.2 - 14.0 - 14.2 - 14.0 - 10 = 283.6$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	260	<b>Pass</b>
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 58.012 \cdot 40^2) / (40 \cdot 1000) = 4.25$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 243.36$ [cl. 8.2.1.2]	<b>Pass</b>



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	1.1.3.1.2
Date	19 /06 /2017	Client	Mr. Tid

Design Check: Column Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsb} = ((400 \times 0.6126 \times 16 \times 16) / (\sqrt{3} \times 1.25 \times 1000))$ $= 29.006$ [cl. 10.3.3]	
Bolt bearing capacity (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 10.6 \times 400) / (1.25 \times 1000)$ $= 66.619$ [cl. 10.3.4]	
Bearing capacity of beam web (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 9.4 \times 410) / (1.25 \times 1000)$ $= 68.284$ [cl. 10.3.4]	
Bearing capacity of cleat (kN)		$V_{dpb} = (2.5 \times 0.491 \times 16 \times 12 \times 410) / (1.25 \times 1000) = 77.303$ [cl. 10.3.4]	
Bearing capacity (kN)		Min (66.619, 68.284, 66.619) = 66.619	
Bolt capacity (kN)		Min (29.006, 66.619) = 29.006	
Critical bolt shear (kN)	$\leq 29.006$	25.539	Pass
No. of bolts		12	
No. of column(s) per angle	$\leq 2$	1	
No. of bolts per column per angle		6	
Bolt pitch (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 10.6, 300) = 300$ [cl. 10.2.2]	40	Pass
Bolt gauge (mm)	$\geq 2.5 \times 16 = 40, \leq \text{Min}(32 \times 10.6, 300) = 300$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.5 \times 18.0 = 27, \leq 12 \times 10.6 = 127.2$ [cl. 10.2.4]	34.05	Pass
Edge distance	$\geq 1.5 \times 18.0 = 27, \leq 12 \times 10.6 = 127.2$	30	Pass

(mm)	[cl. 10.2.4]		
<b>Block shear capacity (kN)</b>	$\geq 170$	$V_{db} = 142.352$ [cl. 6.4.1]	<b>Fail</b>
<b>Cleat height (mm)</b>	$\geq 0.6 \cdot 350.0 = 210.0, \leq 350.02 \cdot (14.2 + 14.0 + 5) = 283.6$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	260	<b>Pass</b>
<b>Cleat moment capacity (kNm)</b>	$(2 \cdot 29.006 \cdot 40^2) / (40 \cdot 1000) = 5.95$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 243.36$ [cl. 8.2.1.2]	<b>Pass</b>



<b>Company Name</b>	<b>Pythons &amp; Co</b>	<b>Project Title</b>	<b>A simple block of flats</b>
<b>Group/Team Name</b>	<b>Flying Circus</b>	<b>Subtitle</b>	<b>Abattoir</b>
<b>Designer</b>	<b>Mr. Wiggin</b>	<b>Job Number</b>	<b>1.1.3.1.2</b>
<b>Date</b>	<b>19 /06 /2017</b>	<b>Client</b>	<b>Mr. Tid</b>

**Views**



<b>Company Name</b>	<b>Pythons &amp; Co</b>	<b>Project Title</b>	<b>A simple block of flats</b>
<b>Group/Team Name</b>	<b>Flying Circus</b>	<b>Subtitle</b>	<b>Abattoir</b>
<b>Designer</b>	<b>Mr. Wiggin</b>	<b>Job Number</b>	<b>1.1.3.1.2</b>
<b>Date</b>	<b>19 /06 /2017</b>	<b>Client</b>	<b>Mr. Tid</b>

<b>Additional Comments</b>	
----------------------------	--