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	20 /06 /2018	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
Bolts on Column	
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
Assembly	
Column-Beam Clearance (mm)	10.0

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Design Preferences	
Bolt	
Hole Type	Standard
Material Grade (MPa) (overwrite)	800.0
Slip factor	N/A
Detailing	
Type of Edges	Rolled, machine-flame cut, sawn and planed
Minimum Edge-End Distance	1.5 times the hole diamter
Gap between beam & support (mm)	10.0
Are members exposed to corrosive influences?	Yes
Design	
Design Method	Limit State Design

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

(mm)	[cl. 10.2.4]		
Block shear capacity (kN)	≥ 170	V_{db} = 326.308 [cl. 6.4.1]	**Pass**
Cleat height (mm)	≥ 0.6*350.0=210.0, ≤ 350.0-14.2-14.0-14.2-14.0- 10=283.6 [cl. 10.2.4, Insdag Detailing Manual, 2002]	260.0	**Pass**
Cleat moment capacity (kNm)	$(2*58.012*40^2)/(40*1000)$ = 4.25	$M_d = (1.2*250*Z)/(1000*1.1)$ = 243.36 [cl. 8.2.1.2]	**Pass**

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Design Check: Column Connectivity			
Check	**Required**	**Provided**	**Remark**
Bolt shear capacity (kN)		V_{dsb} = ((400*0.6126*16*16)/(√3*1.25*1000)) = 29.006 [cl. 10.3.3]	
Bolt bearing capacity (kN)		V_{dpb} = (2.5*0.491*16*10.6*400)/(1.25*1000) = 66.619 [cl. 10.3.4]	
Bearing capacity of beam web (kN)		V_{dpb} = (2.5*0.491*16*7.6*410)/(1.25*1000) = 68.284 [cl. 10.3.4]	
Bearing capacity of cleat (kN)		V_{dpb} = (2.5*0.491*16*12*410)/(1.25*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)	≤ 29.006	25.539	**Pass**
No. of bolts		12	
No.of column(s) per angle	≤ 2	1	
No. of bolts per column per angle		6	
Bolt pitch (mm)	≥ 2.5* 16 = 40, ≤ Min(32*10.6, 300) = 300 [cl. 10.2.2]	40	**Pass**
Bolt gauge (mm)	≥ 2.5*16 = 40, ≤ Min(32*10.6, 300) = 300 [cl. 10.2.2]	0	
End distance (mm)	≥ 1.5*18.0 = 27, ≤ 12*10.6 = 127.2 [cl. 10.2.4]	34.05	**Pass**
Edge distance	≥ 1.5*18.0 = 27, ≤12*10.6 = 127.2	30	**Pass**

(mm)	[cl. 10.2.4]		
Block shear capacity (kN)	≥170	V_{db} = 142.352 [cl. 6.4.1]	**Fail**
Cleat height (mm)	≥ 0.6*350.0=210.0, ≤ 350.02*(14.2+14.0+5)=283.6 [cl. 10.2.4, Insdag Detailing Manual, 2002]	260.0	**Pass**
Cleat moment capacity (kNm)	$(2*29.006*40^2)/(40*1000)$ = 5.95	M_d = (1.2*250*Z)/(1000*1.1) = 243.36 [cl. 8.2.1.2]	**Pass**

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Views

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Additional Comments	