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Company Name	**El Mystico & Janet**	**Project Title**	**Twenty-five story blocks**
Group/Team Name	**Design by Hypnosis**	**Subtitle**	**Something completely different**
Designer	**El Mystico**	**Job Number**	**1.1.3.2.2**
Date	**20 /06 /2018**	**Client**	**Mr. Clement Onan**

Design Conclusion	
Cleat Angle	**Fail**
Cleat Angle	
Connection Properties	
Connection	
Connection Title	Double Angle Web Cleat
Connection Type	Shear Connection
Connection Category	
Connectivity	Column web-Beam web
Beam Connection	Bolted
Column Connection	Bolted
Loading (Factored Load)	
Shear Force (kN)	80
Components	
Column Section	UC 305 x 305 x 118
Material	Fe 410
Beam Section	MB 200
Material	Fe 410
Hole	STD
Cleat Section	110 110 X 16
Thickness (mm)	16
Cleat Leg Size B (mm)	110
Cleat Leg Size A (mm)	110
Hole	STD
Bolts on Beam	
Type	Bearing Bolt
Grade	6.8
Diameter (mm)	12
Bolt Numbers	10
Columns (Vertical Lines)	2
Bolts Per Column	5
Gauge (mm)	30
Pitch (mm)	30
End Distance (mm)	22

Edge Distance (mm)	22
Bolts on Column	
Type	Bearing Bolt
Grade	6.8
Diameter (mm)	12
Bolt Numbers	16
Columns (Vertical Lines)	2
Bolts Per Column	4
Gauge (mm)	30
Pitch (mm)	30
End Distance (mm)	22
Edge Distance (mm)	37
Assembly	
Column-Beam Clearance (mm)	10.0

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Design Preferences	
Bolt	
Hole Type	Standard
Material Grade (MPa) (overwrite)	600.0
Slip factor	N/A
Detailing	
Type of Edges	Sheared or hand flame cut
Minimum Edge-End Distance	1.7 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*600*0.6126*12*12)/(√3*1.25*1000)) = 46.835 [cl. 10.3.3]	
Bolt bearing capacity (kN)		V_{dpb} = (2.5*0.519*12*5.7*600)/(1.25*1000) = 42.6 [cl. 10.3.4]	
Bearing capacity of beam web (kN)		V_{dpb} = (2.5*0.519*12*5.7*410)/(1.25*1000) = 29.11 [cl. 10.3.4]	
Bearing capacity of cleat (kN)		V_{dpb} = (2.5*0.519*12*16*410)/(1.25*1000) = 81.711 [cl. 10.3.4]	
Bearing capacity (kN)		Min (42.6, 29.11, 81.711) = 29.11	
Bolt capacity (kN)		Min (46.835, 29.11) = 29.11	
Critical bolt shear (kN)	≤ 29.11	10.811	**Pass**
No. of bolts		10	
No.of column(s)	≤ 2	2	
No. of bolts per column		5	
Bolt pitch (mm)	≥ 2.5* 12 = 30, ≤ Min(32*5.7, 300) = 183 [cl. 10.2.2]	30	**Pass**
Bolt gauge (mm)	≥ 2.5*12 = 30, ≤ Min(32*5.7, 300) = 183 [cl. 10.2.2]	30	**Pass**
End distance (mm)	≥ 1.7*13.0 = 22, ≤ 12*5.7 = 68.4 [cl. 10.2.4]	22	**Pass**
Edge distance	≥ 1.7*13.0 = 22, ≤ 12*5.7 = 68.4	22	**Pass**

(mm)	[cl. 10.2.4]		
Block shear capacity (kN)	≥ 80	V_{db} = 324.077 [cl. 6.4.1]	**Pass**
Cleat height (mm)	≥ 0.6*200.0=120.0, ≤ 200.0-10.0-11.0-10.0-11.0- 10=148.0 [cl. 10.2.4, Insdag Detailing Manual, 2002]	164.0	**Fail**
Cleat moment capacity (kNm)	$(2*46.835*30^2)/(30*1000)$ = 2.92	$M_d = (1.2*250*Z)/(1000*1.1)$ = 129.101 [cl. 8.2.1.2]	**Pass**

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Design Check: Column Connectivity			
Check	**Required**	**Provided**	**Remark**
Bolt shear capacity (kN)		V_{dsb} = ((600*0.6126*12*12)/(√3*1.25*1000)) = 23.418 [cl. 10.3.3]	
Bolt bearing capacity (kN)		V_{dpb} = (2.5*0.519*12*12.0*600)/(1.25*1000) = 89.683 [cl. 10.3.4]	
Bearing capacity of column flange (kN)		V_{dpb} = (2.5*0.519*12*12.0*410)/(1.25*1000) = 61.284 [cl. 10.3.4]	
Bearing capacity of cleat (kN)		V_{dpb} = (2.5*0.519*12*16*410)/(1.25*1000) = 81.711 [cl. 10.3.4]	
Bearing capacity (kN)		Min (89.683, 61.284, 61.284) = 61.284	
Bolt capacity (kN)		Min (23.418, 61.284) = 23.418	
Critical bolt shear (kN)	≤ 23.418	15.643	**Pass**
No. of bolts		16	
No.of column(s) per angle	≤ 2	2	
No. of bolts per column per angle		4	
Bolt pitch (mm)	≥ 2.5* 12 = 30, ≤ Min(32*12.0, 300) = 300 [cl. 10.2.2]	30	**Pass**
Bolt gauge (mm)	≥ 2.5*12 = 30, ≤ Min(32*12.0, 300) = 300 [cl. 10.2.2]	30	**Pass**
End distance (mm)	≥ 1.7*13.0 = 22, ≤ 12*12.0 = 144.0 [cl. 10.2.4]	22	**Pass**
Edge distance	≥ 1.7*13.0 = 22, ≤12*12.0 = 144.0	37	**Pass**

(mm)	[cl. 10.2.4]		
Block shear capacity (kN)	≥80	V_{db} = 324.077 [cl. 6.4.1]	**Pass**
Cleat height (mm)	≥ 0.6*200.0=120.0, ≤ 200.02*(10.0+11.0+5)=148.0 [cl. 10.2.4, Insdag Detailing Manual, 2002]	164.0	**Fail**
Cleat moment capacity (kNm)	(2*23.418*30^2)/(30*1000) = 3.034	M_d = (1.2*250*Z)/(1000*1.1) = 129.101 [cl. 8.2.1.2]	**Pass**

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Views

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Additional Comments	