Created with Osdag

Company Name	**IIT Bombay**	**Project Title**	**Connection Design Examples**
Group/Team Name	**Osdag**	**Subtitle**	**Seated angle shear connection**
Designer	**Engineer #1**	**Job Number**	**1.1.4.2.2**
Date	**20 /06 /2018**	**Client**	**Yogesh D Pisal, Aker Powergas Ltd, Pune**

Design Conclusion	
Seated Angle	**Fail**
Seated Angle	
Connection Properties	
Connection	
Connection Title	Seated Angle
Connection Type	Shear Connection
Connection Category	
Connectivity	Column web-Beam flange
Beam Connection	Bolted
Column Connection	Bolted
Loading (Factored Load)	
Shear Force (kN)	140.0
Components	
Column Section	HB 200
Material	Fe 410
Hole	Over-sized
Beam Section	WPB 140x140x24.7
Material	Fe 410
Hole	Over-sized
Seated Angle Section	150 150 X 15
Material	Fe 410
Hole	Over-sized
Top Angle Section	90 90 x 10
Material	Fe 410
Hole	Over-sized
Bolts	
Type	Bearing Bolt
Grade	5.8
Diameter (mm)	12
Bolts - Required	8
Bolts - Provided	8
Rows	2
Columns	4

Gauge (mm)	30
Pitch (mm)	31.0
End Distance (mm)	70
Edge Distance (mm)	25
Assembly	
Column-Beam Clearance (mm)	5.0

		Created with Osdag	
Company Name	**IIT Bombay**	**Project Title**	**Connection Design Examples**
Group/Team Name	**Osdag**	**Subtitle**	**Seated angle shear connection**
Designer	**Engineer #1**	**Job Number**	**1.1.4.2.2**
Date	**20 /06 /2018**	**Client**	**Yogesh D Pisal, Aker Powergas Ltd, Pune**

Design Preferences	
Bolt	
Hole Type	Over-sized Hole
Material Grade Fu (MPa) (overwrite)	800
Detailing	
Type of Edge	Rolled, machine-flame cut, sawn and planed
Minimum Edge Distance check multiplier	1.5 * bolt_hole_diameter
Are members exposed to corrosive influences?	No
Gap between Beam and Column (mm)	5.0
Design	
Design Method	Limit State Design

Created with Osdag

Company Name	**IIT Bombay**	**Project Title**	**Connection Design Examples**
Group/Team Name	**Osdag**	**Subtitle**	**Seated angle shear connection**
Designer	**Engineer #1**	**Job Number**	**1.1.4.2.2**
Date	**20 /06 /2018**	**Client**	**Yogesh D Pisal, Aker Powergas Ltd, Pune**

Design Check			
Check	**Required**	**Provided**	**Remark**
Bolt Checks			
Bolt shear capacity (kN)	V_{dsb} = bolt_fu* (pi*0.78/4)*bolt_diameter^2/(√3)/$gamma_{mb}$ [cl. 10.3.3]	V_{dsb} = 500* (0.6126)*12^2/(√3)/1.25/1000 = 19.5	
Bolt bearing capacity (kN)	V_{dpb}: [Cl. 10.3.4]	V_{dpb} = 2.5*0.417*12*5.5*410/1.25/1000) = 36.9 kN	
Bolt capacity (kN)	min (bolt_shear_capacity, bolt_bearing_capacity)	min (19.5, 36.9) = 19.5	
No. of bolts	140.0/19.5 = 8.0	8	**Pass**
No. of columns		4	
No. of row(s)	≤ 2	2	
Bolt pitch (mm)	≥ 2.5* 12 = 30, ≤ min(32*9.0, 300) = 288.0 [cl. 10.2.2]	31.0	**Pass**
Bolt gauge (mm)	≥ 2.5*12 = 30, ≤ min(32*9.0, 300) = 288.0 [cl. 10.2.2]	30	**Pass**
End distance (mm)	≥1.5*15 = 23	70	**Pass**
Edge distance (mm)	≥1.5*15 = 23 [cl. 10.2.4.2] ≤ 12*9.0sqrt(250/250) = 108.0[Cl 10.2.4.3]	25	**Pass**
Seated Angle 150 150 X 15			
Length (mm)	= min(140.0, 200.0 - 2*9.0 - 2*9.0 - 18.0)	140	
Outstanding leg length (mm)	[Cl. 8.7.4] = (140.0*1000*1.1/(250*5.5)) + 5.0	150	**Pass**
Shear	V_{dp} ≥ V		

capacity of outstanding leg (kN)	V_{dp} ≥ 140.0kN [Cl. 8.4.1]	= (140*15.0)*250/ (√ 3 *1.1) = 333.4	**Pass**
Moment capacity of outstanding leg (kN-mm)	As V ≤ 0.6 V_d, [Cl 8.2.1.2] is applicable M_d ≥ Moment at root of angle M_d ≥ 3983.6	M_d = min(beta$_b$$Z_e$$f_y$/gamma$_{m0}$, 1.5$Z_e$$f_y$/gamma$_{m0}$) = min(1.0* 140* (15.0^2/6)*250/1.1, 1.5*140* (15.0^2/6)*250/1.1) = 1193.2	**Fail**
Top Angle			
Section	Recommended size (based on stability only): 35 35 X 4	User selected size: 90 90 x 10	
End distance (mm)	≥1.5*bolt_hole_diameter [cl. 10.2.4.2] ≥1.5*15 = 23	on leg connected to Beam: 35 on leg connected to Column: 35	**Pass**

		Created with Osdag	
Company Name	**IIT Bombay**	**Project Title**	**Connection Design Examples**
Group/Team Name	**Osdag**	**Subtitle**	**Seated angle shear connection**
Designer	**Engineer #1**	**Job Number**	**1.1.4.2.2**
Date	**20 /06 /2018**	**Client**	**Yogesh D Pisal, Aker Powergas Ltd, Pune**

Views

		Created with Osdag	
Company Name	**IIT Bombay**	**Project Title**	**Connection Design Examples**
Group/Team Name	**Osdag**	**Subtitle**	**Seated angle shear connection**
Designer	**Engineer #1**	**Job Number**	**1.1.4.2.2**
Date	**20 /06 /2018**	**Client**	**Yogesh D Pisal, Aker Powergas Ltd, Pune**

Additional Comments	