



Created with



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

Design Conclusion	
Cleat Angle	Pass
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)	140
Components	
Column Section	SC 250
Material	Fe 410
Beam Section	MB 400
Material	Fe 410
Hole	STD
Cleat Section	90 90 x 12
Thickness (mm)	12
Cleat Leg Size B (mm)	90
Cleat Leg Size A (mm)	90
Hole	STD
Bolts on Beam	
Type	Friction Grip Bolt
Grade	8.8
Diameter (mm)	20
Bolt Numbers	3
Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	50
End Distance (mm)	37

Edge Distance (mm)	70
Bolts on Column	
Type	Friction Grip Bolt
Grade	8.8
Diameter (mm)	20
Bolt Numbers	6
Columns (Vertical Lines)	1
Bolts Per Column	3
Gauge (mm)	0
Pitch (mm)	50
End Distance (mm)	37
Edge Distance (mm)	70.0
Assembly	
Column-Beam Clearance (mm)	10.0



Created with

Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

Design Preferences

Bolt

Hole Type	Standard
Material Grade (MPa) (overwrite)	800.0
Slip factor	0.48

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
---------------	--------------------



Created with



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

Design Check: Beam Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsf} = ((0.48 \times 2 \times 1.0 \times 137.2) / (1.25)) = 105.37$ [cl. 10.4.3]	
Bolt bearing capacity (kN)		N/A	
Bearing capacity of beam web (kN)		N/A	
Bearing capacity of cleat (kN)		N/A	
Bearing capacity (kN)		N/A	
Bolt capacity (kN)		105.37	
Critical bolt shear (kN)	≤ 105.37	43.828	Pass
No. of bolts		3	
No. of column(s)	≤ 2	1	
No. of bolts per column		3	
Bolt pitch (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	50	Pass
Bolt gauge (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 8.9, 300) = 285$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 22.0 = 37, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	37	Pass
Edge distance (mm)	$\geq 1.7 \times 22.0 = 37, \leq 12 \times 8.9 = 106.8$ [cl. 10.2.4]	70	Pass
Block shear capacity (kN)	≥ 140	$V_{db} = 150.362$ [cl. 6.4.1]	Pass
Cleat height (mm)	$\geq 0.6 \times 400.0 = 240.0, \leq 400.0 - 16.0 - 14.0 - 16.0 - 14.0 - 10 = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	240.0	Pass
		$M_d =$	

Cleat moment capacity (kNm)	$(2 \cdot 105.37 \cdot 50^2) / (50 \cdot 1000) = 3.71$	$(1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1) = 207.36$ [cl. 8.2.1.2]	Pass
------------------------------------	--	--	-------------



Created with



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

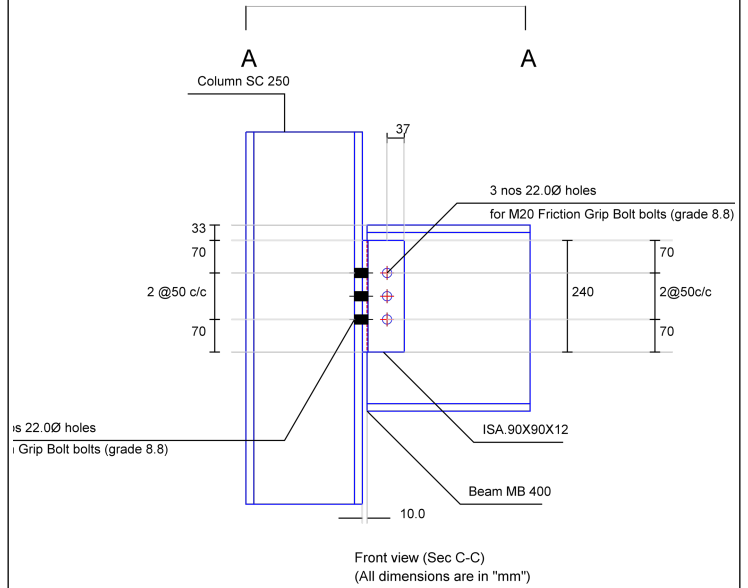
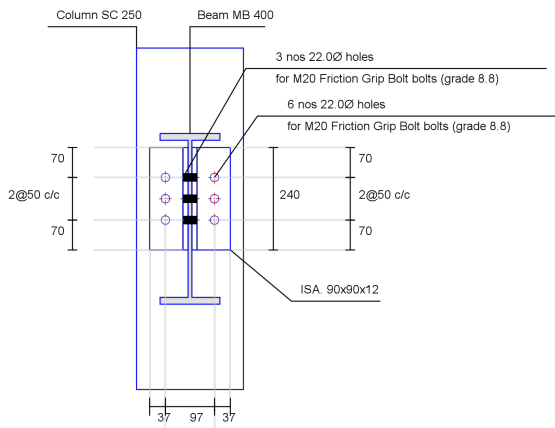
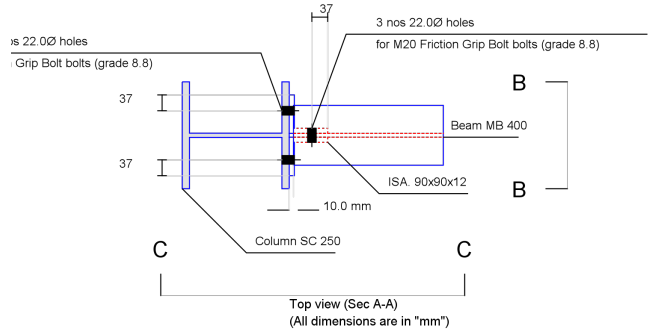
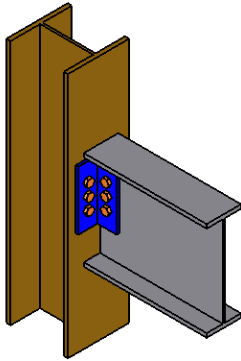
Design Check: Column Connectivity			
Check	Required	Provided	Remark
Bolt shear capacity (kN)		$V_{dsf} = ((0.48 \times 1 \times 1.0 \times 137.2) / (1.25)) = 52.685$ [cl. 10.4.3]	
Bolt bearing capacity (kN)		N/A	
Bolt bearing capacity (kN)		N/A	
Bolt bearing capacity (kN)		N/A	
Bolt bearing capacity (kN)		N/A	
Bolt capacity (kN)		52.685	
Critical bolt shear (kN)	≤ 52.685	46.494	Pass
No. of bolts		6	
No. of column(s) per angle	≤ 2	1	
No. of bolts per column per angle		3	
Bolt pitch (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 12.0, 300) = 300$ [cl. 10.2.2]	50	Pass
Bolt gauge (mm)	$\geq 2.5 \times 20 = 50, \leq \text{Min}(32 \times 12.0, 300) = 300$ [cl. 10.2.2]	0	
End distance (mm)	$\geq 1.7 \times 22.0 = 37, \leq 12 \times 12.0 = 144.0$ [cl. 10.2.4]	37	Pass
Edge distance (mm)	$\geq 1.7 \times 22.0 = 37, \leq 12 \times 12.0 = 144.0$ [cl. 10.2.4]	70.0	Pass
Block shear capacity (kN)	≥ 140	$V_{db} = 150.362$ [cl. 6.4.1]	Pass
Cleat height (mm)	$\geq 0.6 \times 400.0 = 240.0, \leq 400.02 \times (16.0 + 14.0 + 5) = 330.0$ [cl. 10.2.4, Insdag Detailing Manual, 2002]	240.0	Pass

Cleat moment capacity (kNm)	$(2 \cdot 52.685 \cdot 50^2) / (50 \cdot 1000) = 4.021$	$M_d = (1.2 \cdot 250 \cdot Z) / (1000 \cdot 1.1)$ $= 207.36$ [cl. 8.2.1.2]	Pass
------------------------------------	---	---	-------------



Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

Views





IIT Bombay



Created with

Company Name	IIT Bombay	Project Title	Connection Design Examples
Group/Team Name	Osdrag	Subtitle	Cleat Angle Shear Connection
Designer	Engineer #1	Job Number	1.1.3.1.1
Date	20 /06 /2018	Client	Yogesh D Pisal, Aker Powergas Ltd, Pune

Additional Comments	
----------------------------	--