



Osdag[®]

Open steel design and graphics

where

V_{nsb}

= nominal shear capacity of the bolt, $V_{dsb} = V_{nsb} / \gamma_{mb}$

calculated as follows

Base Plate

File Edit Graphics Database Help

Input dock

Model Column Base Plate

Connecting Members

Connectivity: Moment Base Plate

End Condition: Fixed

Column Section: HB 450

Material: E 300 (Fe 440)

Factored Loads

Axial Compression (kN): 650

Axial Tension/Uplift (kN): 55

Shear Force (kN)

- Along major axis (z-z): 25

- Along minor axis (y-y): 0

Bending Moment (kNm)

- Major axis ($M_{z,z}$): 145

- Minor axis ($M_{y,y}$): 60

Anchor Bolt

Anchor Bolt Outside Column Flange

- Diameter(mm): All

- Property Class: Customized

Anchor Bolt Inside Column Flange

Reset Design

Output dock

Anchor Bolt - Outside Column Flange

Diameter (mm)	24
Property Class	8.8
No. of Anchors	4
Shear Capacity (kN)	135.33
Bearing Capacity (kN)	518.92
Bolt Capacity (kN)	135.33
Tension Demand (kN)	47.4
Tension Capacity (kN)	210.95
Combined Capacity (kN)	0.021
Anchor Length (mm)	436.5

Anchor Bolt - Inside Column Flange

Diameter (mm)	20
Property Class	8.8
No. of Anchors	4
Tension Demand (kN)	13.75
Tension Capacity (kN)	146.41
Anchor Length (mm)	379.5

Base Plate

Create Design Report

Save Output

2020-12-15 11:23:29 - Osdag - INFO - Increasing the thickness of the stiffener and re-checking against shear demand
2020-12-15 11:23:29 - Osdag - WARNING - [Shear Check - Stiffener] The stiffener along the web falls the shear check
2020-12-15 11:23:29 - Osdag - WARNING - The shear demand on the stiffener (274.75 kN) exceeds 60% of its capacity (215.4 kN)
2020-12-15 11:23:29 - Osdag - INFO - Increasing the thickness of the stiffener and re-checking against shear demand
2020-12-15 11:23:29 - Osdag - DEBUG - : Design Status :
2020-12-15 11:23:29 - Osdag - DEBUG - : Overall base plate connection design is SAFE
2020-12-15 11:23:29 - Osdag - DEBUG - : End Of Design :



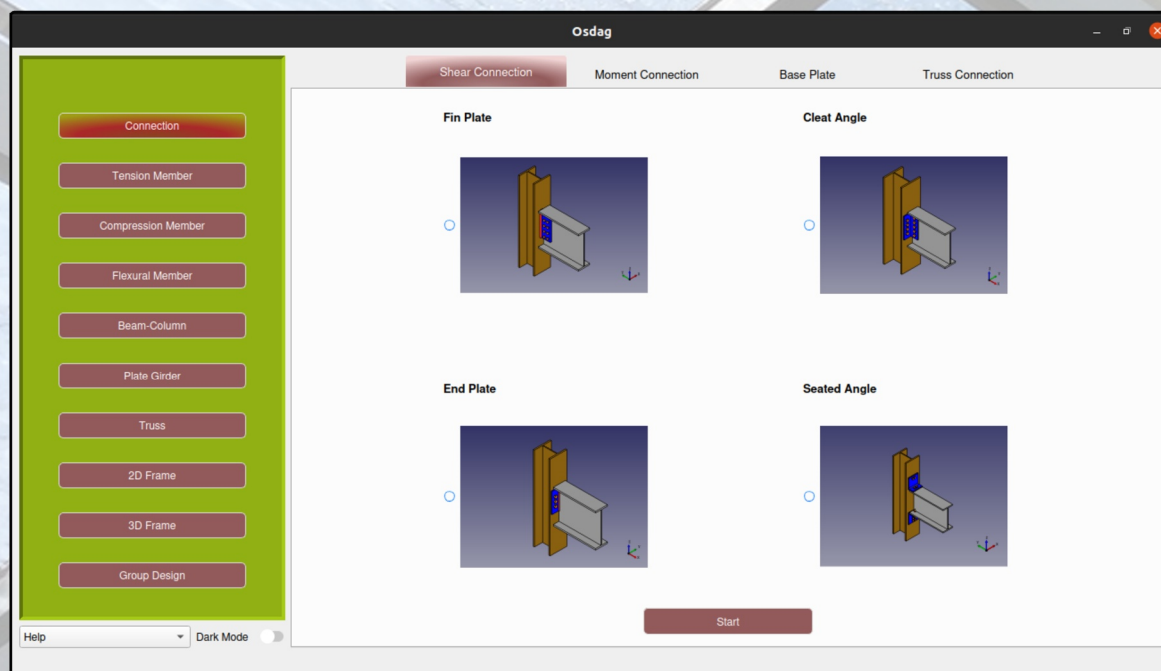
Indian Institute of Technology Bombay
भारतीय प्रौद्योगिकी संस्थान मुंबई

Introduction

Osdag is a cross-platform free and open-source software (GNU (LGPL) Version 3) for the design (and detailing) of steel structures, following the Indian Standard IS 800:2007. It allows the user to design steel connections, members and systems using a graphical user interface. The interactive GUI provides a 3D visualisation of the designed component and an option to export the CAD model to any drafting software for the creation of construction/fabrication drawings. The design is typically optimised

This software is expected to

- ◆ Provide hands-on design experience for college students, and thus creating tomorrow's designers familiar and confident with steel design
- ◆ Provide practical design experience for (new) practising engineers
- ◆ Work as a teaching tool helping technical/engineering college teachers teaching undergraduate and postgraduate courses on steel design
- ◆ Integrate easily with modern ICT-based teaching techniques and distant learning methods



Osdag Modules ☆

- ◆ Connection
- ◆ Tension Member
- ◆ Compression Member
- ◆ Flexural Member
- ◆ Beam-Column
- ◆ Plate Girder
- ◆ Truss
- ◆ 2D & 3D Frame
- ◆ Group Design

*All modules are not available in the current version of Osdag

Osdag is supported by:

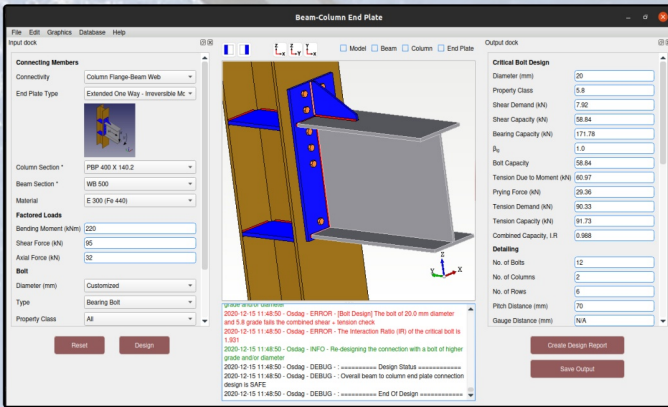


Ministry of Education
Govt. of India

Features

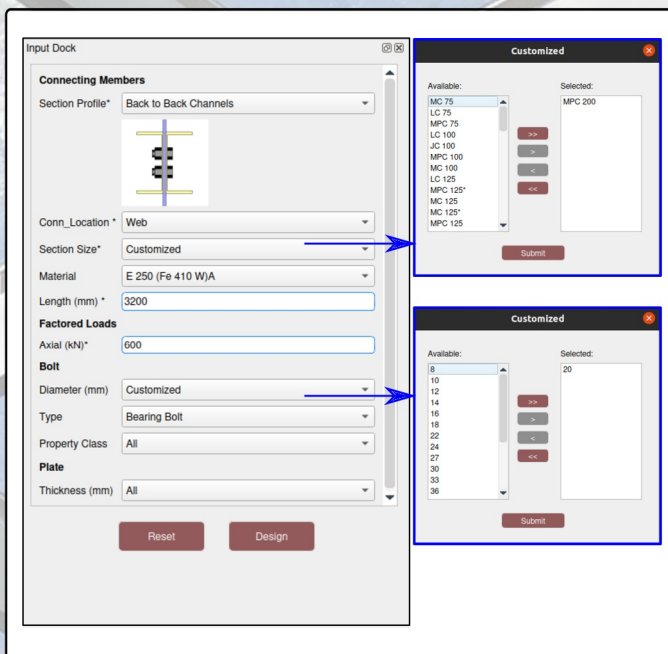
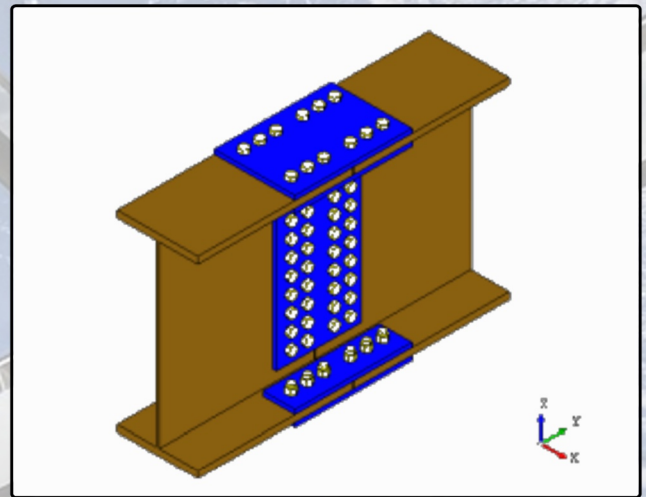
Osdag GUI

Osdag has an interactive graphical user interface with text-validated fields grouped according to the design flow. The design window GUI consists of 'Input dock', 'Output dock', 'CAD window' and 'Message window' along with a menu bar at the top.



CAD Model

The interactive 'CAD window' displays a 3D CAD model, which provides a clear visualisation of the designed component. You can pan, zoom and rotate the model or view each of the sub-components separately. The created CAD model can be saved into various formats such as IGS, STL, STEP, and BREP.



Optimized Design

Users can obtain the optimum design for a given scenario, from a suite of available options in terms of steel sections (e.g., different channel sizes and plate thicknesses) and connectors (e.g., bolts of different grades and diameters). The optimum design is selected based on the total volume of material and this design solution is detailed in the output dock and design report.

Alternatively, one can perform a design check with a specific set of single inputs/selections in the 'Customized' option. In this case, Osdag will inform if the design checks are satisfied and suggest changes otherwise.

Features



Message Log

```

2020-12-15 12:07:44 - Osdag - INFO - The Load(s) defined is/are less than the minimum
recommended value [Ref. IS 800:2007, Cl.10.7].
2020-12-15 12:07:44 - Osdag - INFO - The value of load(s) is/are set at minimum recommended
value as per IS 800:2007, Cl.10.7.
2020-12-15 12:07:44 - Osdag - ERROR - : The flange plate thickness is less than the flange
thickness of the section.
2020-12-15 12:07:44 - Osdag - WARNING - : The flange plate thickness should be greater than
the thickness of the flange of the section, i.e. 16.0 mm.
2020-12-15 12:07:44 - Osdag - ERROR - : Design is unsafe.
2020-12-15 12:07:44 - Osdag - DEBUG - :=====End Of design=====
    
```

A text window for message display provides the status of the design, but more importantly it also suggests necessary changes if a trial design is found unsafe. This part of the GUI displays colour-coded error/warning messages and also suggests possible rectifications, all of which can be saved for a design session.

Design Report

		Created with  Osdag®	
Company Name	IIT Bombay	Project Title	Sample Connection Design
Group/Team Name	Osdag	Subtitle	Beam-Column End Plate
Designer	Engineer #1	Job Number	1.2.2.1.1.1.1
Date	18 /12 /2020	Client	Somnath Mukherjee, MN Dastur, Kolkata

2.6 Detailing

Check	Required	Provided	Remarks
Min. Pitch Distance (mm)	$p_{min} = 2.5 d$ $= 2.5 \times 24.0$ $= 60.0$	80	Pass
	[Ref. IS 800 : 2007, Cl. 10.2.2]		
Max. Pitch Distance (mm)	$p_{max} = \min(32 t, 300 \text{ mm})$ $= \min(32 \times 25.0, 300 \text{ mm})$ $= \min(800.0, 300 \text{ mm})$ $= 300$	80	Pass
	Where, $t = \min(25.0, 25.0)$		
	[Ref. IS 800 : 2007, Cl. 10.2.3]		
Min. End Distance (mm)	$e_{min} = 1.5 d_0$ $= 1.5 \times 26.0$ $= 39.0$	40	Pass
	[Ref. IS 800 : 2007, Cl. 10.2.4.2]		
Max. End Distance (mm)	$e_{max} = 12 t \epsilon$; $\epsilon = \sqrt{\frac{250}{f_y}}$ $e_1 = 12 \times 25.0 \times \sqrt{\frac{250}{290}} = 278.54$ $e_2 = 12 \times 25.0 \times \sqrt{\frac{250}{290}} = 278.54$ $e_{max} = \min(e_1, e_2) = 278.54$	40	Pass

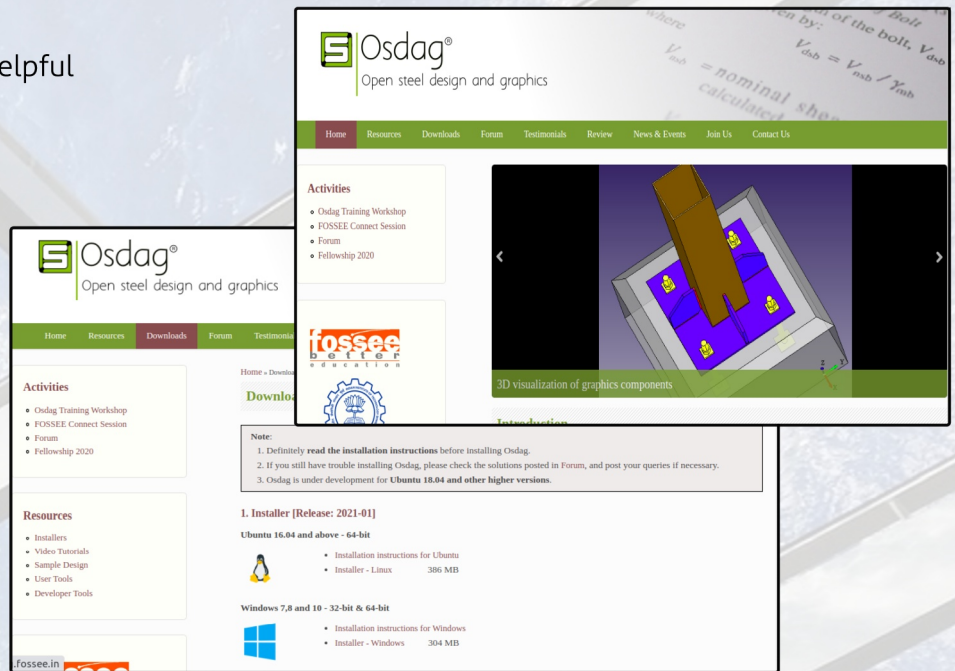
Osdag creates a professional design report with

- ◆ Design and detailing checks as per IS 800:2007
- ◆ Overall design summary
- ◆ Standard views
- ◆ Customisable header
- ◆ Designer's remarks
- ◆ Details of the section pertaining to its geometric and mechanical properties
- ◆ Selected design preference(s)
- ◆ Log messages

Osdag website

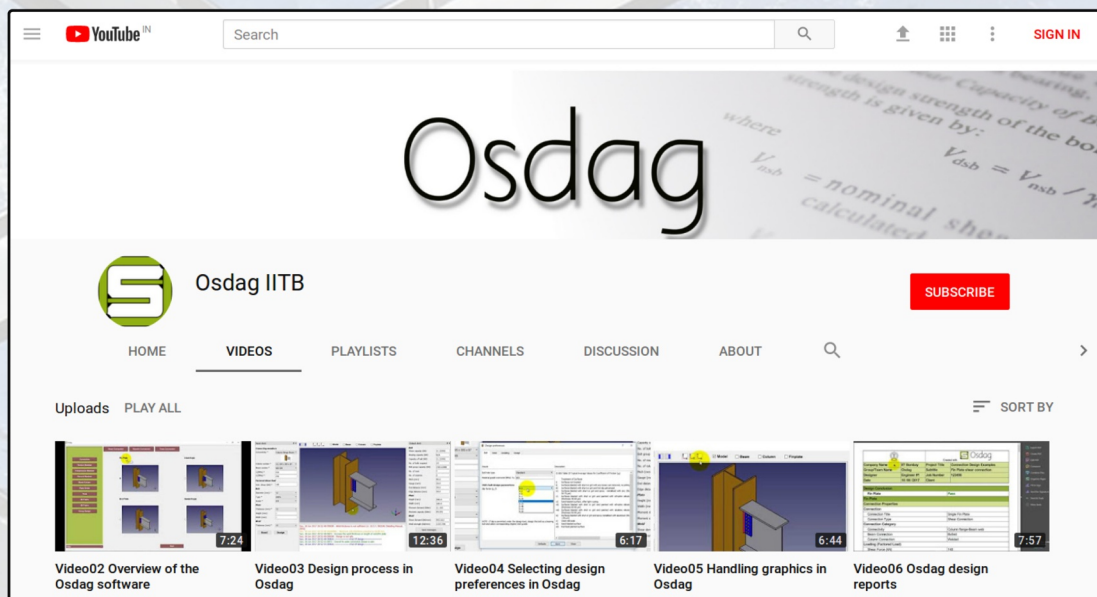
The Osdag website contains helpful resources for the user

- ◆ Installers
- ◆ Video Tutorials
- ◆ Sample Design Problems
- ◆ User Tools
- ◆ Developer Tools

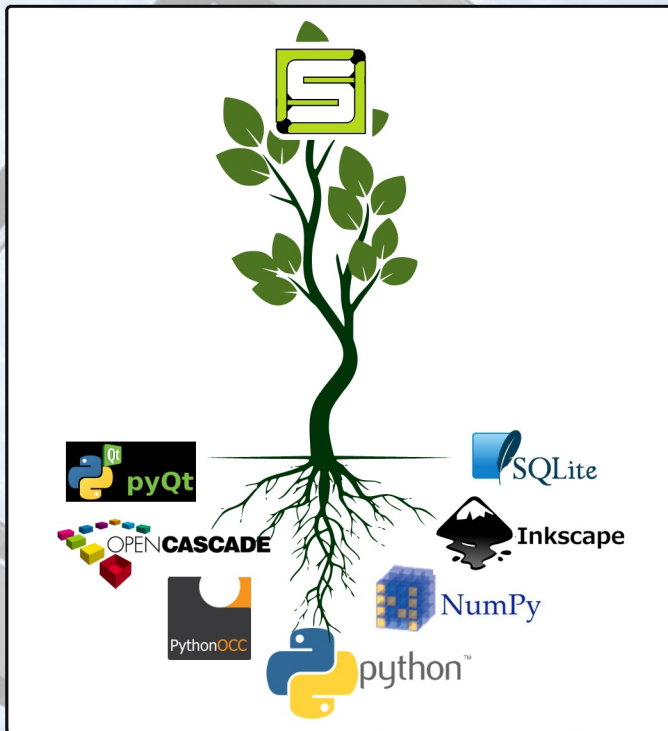


Osdag YouTube channel

Osdag's YouTube channel provides video tutorials, for multimedia-based self-learning.



Dependencies



Osdag is primarily built upon Python and other Python-based FOSS tools

- ◆ PyQt
- ◆ OpenCascade
- ◆ PythonOCC
- ◆ Svgwrite
- ◆ SQLite

Expert Reviewers

A team of expert reviewers review the design and detailing process implemented into each and every Osdag module. The review process relies heavily on the expertise of our review panel, both in the theoretical and practical aspects of steel design, detailing and construction best practices.



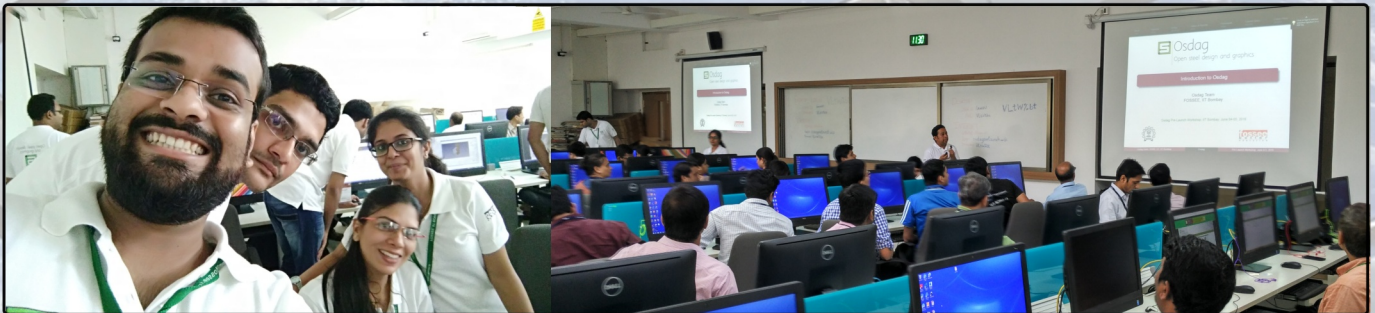
Outreach and Dissemination



Launch of Osdag beta version by Mr. Sushim Banerjee, Director General, INSDAG. June 2017

The Osdag team reaches out to prospective users by

- ◆ Conducting training workshops
- ◆ Presenting at conferences and workshops
- ◆ Presenting to professional societies, industry professionals, students and teachers
- ◆ Postal campaign
- ◆ Conducting FOSSEE Connect sessions
- ◆ FOSSEE Summer Fellowship



Some past events

- ◆ The Institution of Engineers • Mumbai • July 2016
- ◆ Steel Construction Summit • Mumbai • September 2016
- ◆ Tribhuvan University • Nepal • October 2016
- ◆ Osdag Beta-Launch • Mumbai • June 2017
- ◆ SASTRA Deemed University Workshop • Thanjavur • February 2018
- ◆ IIT Madras • Chennai • April 2018
- ◆ O. P. Jindal University • Chhattisgarh • October 2018
- ◆ CoAST Conference • NIT Silchar • February 2019
- ◆ Osdag Expert Committee Planning Meeting • Mumbai • June 2019
- ◆ Osdag Training Program on Steel Connection Design • Mumbai • June 2019

Contact us

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