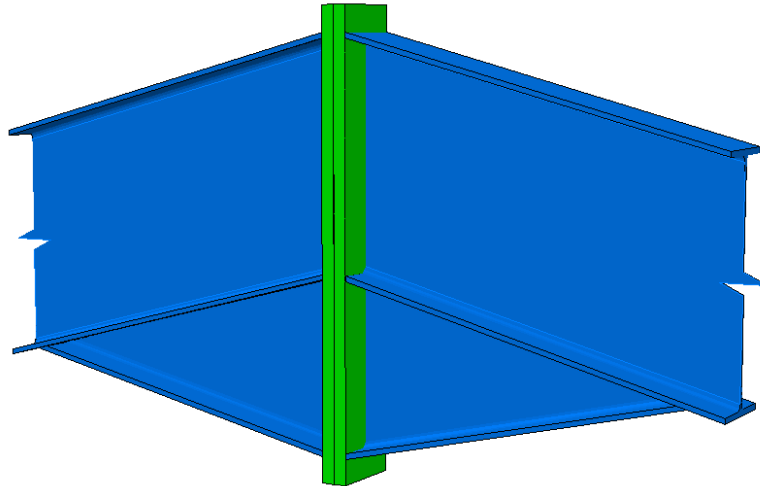




Summary

Apex is used to design the moment connection at the apex of a portal frame. The module considers vertical shear, axial compression or tension, and in-plane moment. It facilitates the design of bolted or welded connections and can include haunches.



What makes this module special?

- Optimise apex connections
- Detailed calculations
- View the connections in 3D or 2D and save the pictures as CAD drawings

Detailed Description

Apex supports all I and H-sections (universal columns and beams) available in the **Section Database**. The module includes an optimisation function which assists in determining a suitable layout, e.g., end plate size and thickness, bolt/weld sizes and spacing. The design table lists all the variable dimensions and parameters of the connection. A value for any property in the table can be calculated using the optimise function. Values for any individual property can also be fixed selectively to suit the user's preferences.

Detailed Equations are included within a Calcsheet, where all relevant design checks can be reviewed.



Check 4 : Shear and Tension Capacity of the Bolts

The worst load is encountered for Load Case : DL

The factor must be less than or equal to 1.4 :

$$F_{actor} = \frac{V_u}{V_r} + \frac{T_u}{T_r}$$

$$= \frac{30.619}{63.114} + \frac{86.557}{105.19}$$

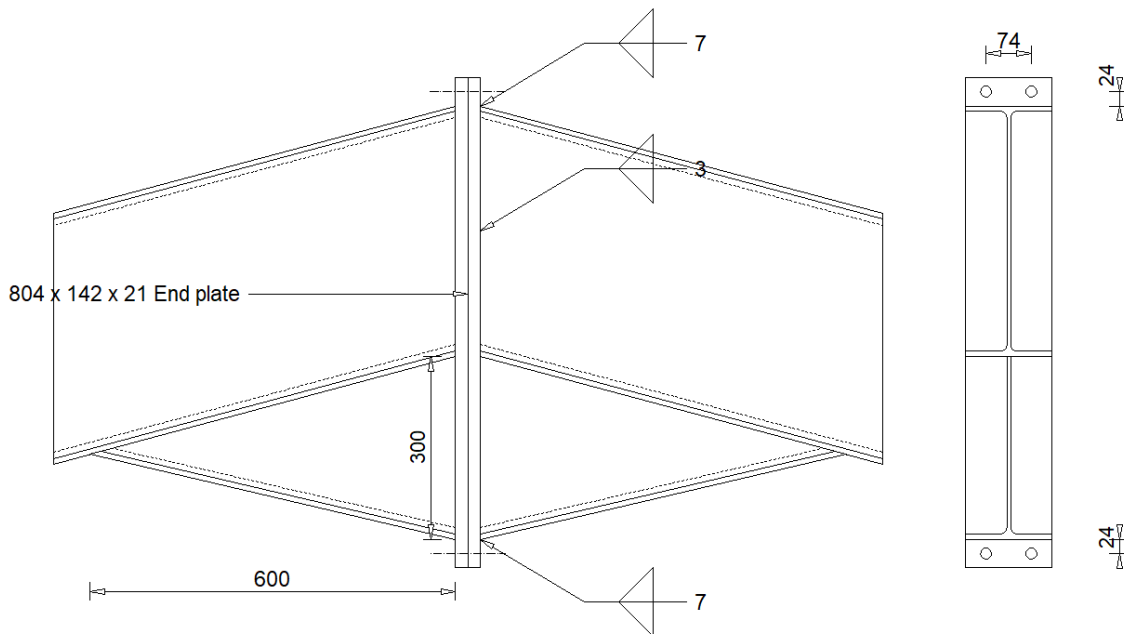
$$= 1.308$$

Bolt shear and tension is safe

Options		Errors	
End Plate	Width	(mm)	Optimise
	Extent Above Beam Flange	(mm)	Optimise
	Extent Below Beam Flange	(mm)	Optimise
	Thickness	(mm)	Optimise
Bolts	Diameter	(mm)	Optimise
	Above Top Flange		Optimise
	Below Top Flange		Optimise
	Above Bottom Flange		Optimise
	Below Bottom Flange		Optimise
Bolt Offsets	Row Spacing	(mm)	Optimise
	Web	(mm)	Optimise
	Flange	(mm)	Optimise
	Above Haunch	(mm)	Optimise
Weld Sizes	Beam Flanges	(mm)	Optimise
	Beam Web	(mm)	Optimise

Workflow

Apex can be used as stand-alone module, but the strength lies with the ability to use the design links in **Sumo** and import the necessary information. A drawing of the final design can be saved in either a **Padds** or a DXF format for final fabrication drawings.





APEX

STEEL APEX MOMENT CONNECTION
DESIGN | DETAILING | **S13**

Supported Design Codes

Design Codes

- AISC - 1999 LRFD
- AISC 360-16 LRFD
- BS 5950 - 1990
- CAN/CSA-S16.1-94
- Eurocode 3 - 2005
- SABS 0162 - 1984
- SABS 0162 - 1993
- SANS 10162 - 2005
- SANS 10162-1:2011



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