

General cross-section editor



The esa.07 module contains the **General Cross-section** and the **Profile Editor** tools for cross-section modelling.

Highlights

The General Cross-section tool enables the input of arbitrary section shapes in a graphical way.

Cross-sections from multiple materials can be defined.

Cross-sectional characteristics are calculated automatically.

The Profile Editor serves for adding new profiles to the Profile Library or for editing existing profiles.

Any existing in-house section in SCIA Engineer is used as a template.

User-added or edited sections are handled in the same way as built-in sections in the analysis.

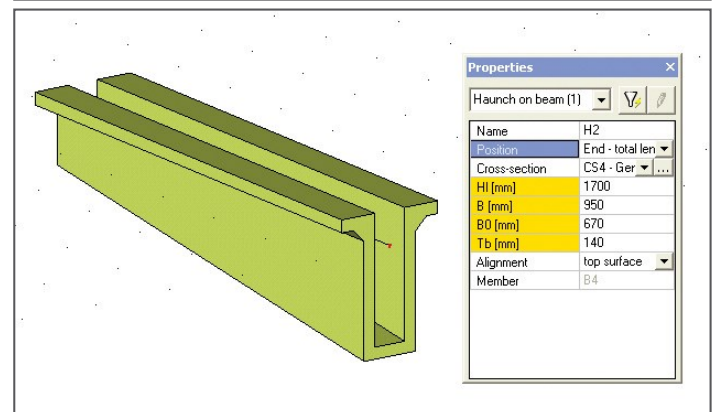
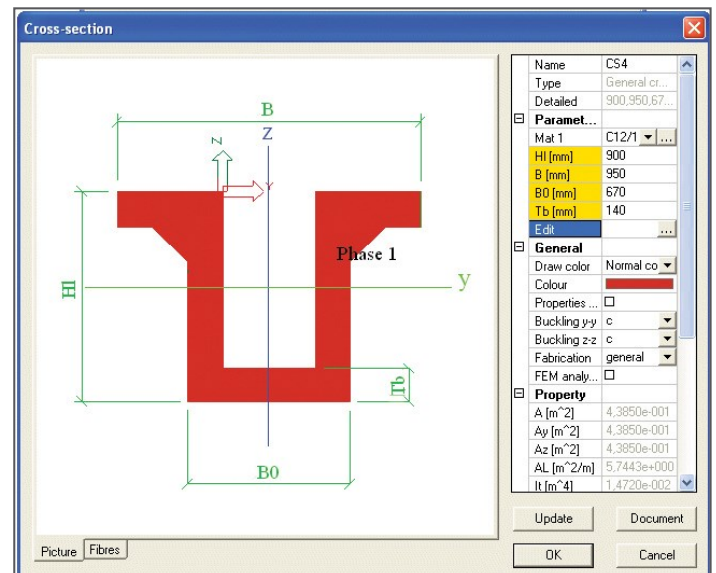
General Cross-sections

Definition of a new section

- The well-organised GUI allows the user to work with common graphical entities when defining a cross-section - lines, regular geometrical shapes, polygons, with or without multiple holes, etc.;
- Not only solid cross-sections, but thin-walled sections are drawn also. These are determined by a centreline and uniform thickness;
- Sections from the Profile Library can be inserted and combined with one another or with other shapes;
- DXF and DWG files can be imported;
- Separate parts of a general cross-section are defined using the different methods mentioned above; the parts can then be combined to form a single shape; parts may overlap;
- Different parts of a section may be assigned to construction stages;
- Parameters can be assigned to dimensions, thus creating a whole library of cross-sections of a certain shape, for which the real dimensions are defined when needed.

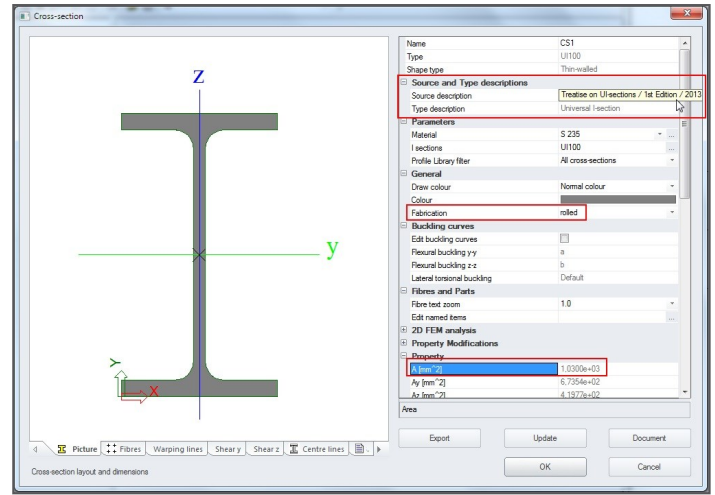
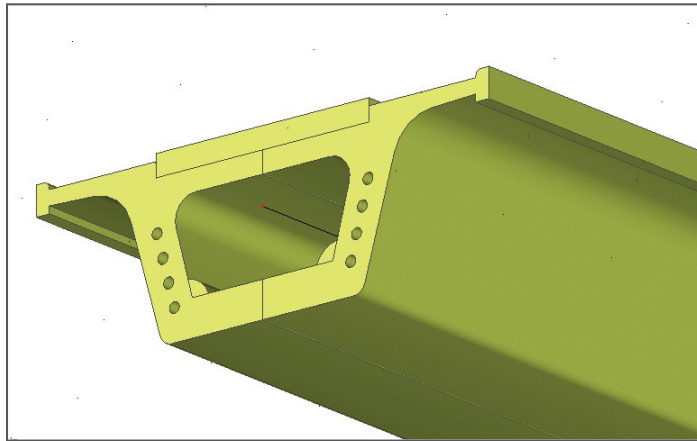
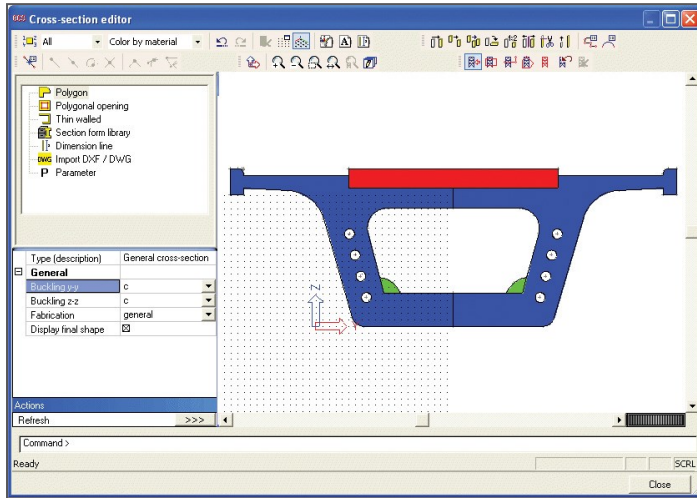
Parametrisation

- Node coordinates or dimensions are assigned to user-defined parameters;
- Parameters are either values or formulas, which means that various dependencies may be defined between the section dimensions;
- General cross-sections are allowed in members with variable cross-sections (haunches).
- The following picture shows a member with a variable profile, defined as a general cross-section.



Visualisation

- The section is displayed accurately in the General Cross-section editor and Cross-section Library;
- Colour settings are used to indicate the presence of multiple materials;
- The graphical editor allows for dimension lines to be inserted into the cross-section image.



	A	B	C	D	E	F	G	H
1		h	b	tf	tw	r	A	I _y
2		[mm]	[mm]	[mm]	[mm]	[mm]	5380	83560000
3	UI100	100	55	5,7	4,1			
4	UI200	200	100	8,5	5,6			
5	UI300	300	150	10,7	7,1			
6								
7								
8								
9								
10								

Due to the consistent use of form codes, new sections are handled as built-in sections in design checks:

- Plastic checks can be performed for added steel sections of class 1 and 2;
- Bow imperfections are derived in the same way as for existing profiles;
- Centrelines are automatically generated for newly-defined shapes.

Unlimited number of User libraries are supported. User libraries contain the same properties as the System library:

- User-defined fabrication method;
- User-defined library filters can limit the number of visible sections, in order to increase productivity;
- A simple ASCII import/export allows transfer of sections from one section library to another.

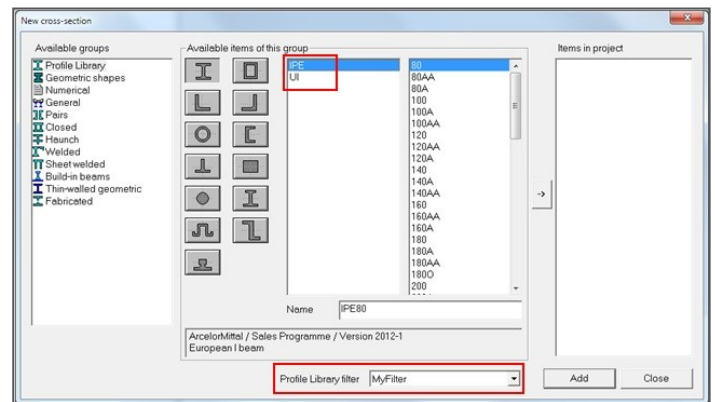
Calculation of section properties

- The geometric properties of the section are automatically calculated (e.g. area, drying surface, inertial and section moduli, torsion properties, etc.).
- Torsional properties determined using 1D or 2D FEM depending on whether the section is thin- or thick-walled.

Profile Editor

The Profile Editor allows editing the 'System' and 'User' cross-section libraries in SCIA Engineer. The following features are included:

- Table input for new cross-sections and section properties;
- Support of Copy-Paste from external databases;
- Use of existing profiles as templates for new shapes;
- Automatic calculation of section properties (including torsional) for new cross-sections;
- Option to manually overwrite any calculated cross-section property for both new and existing cross-sections;
- Checks of validity/consistency of user-defined data.



Additional source and description data are added per profile type:

- Stored in external files;
- Multiple languages for the additional data are supported;

The user is able to define buckling curves for each section - built-in or user-added.

Required modules

esa.00