SCIA scientific software

SCIA • ESA PT

Engineering Structural Applications Professional Technology

Datasheet

General cross-section

esa.07 General section

Graphical input of sections with an arbitrary shape and consisting of different materials. Within a simple and useful graphical interface, the user can set up the following sections: polygons, whether or not with one or multiple holes, thin-walled sections, a composition of the available sections from the library, sections imported in DXF or DWG format. The properties of the section (e.g. surface, inertial and section modulus, torsion properties...) will be calculated. For the calculation modules using phases for the calculation (such as prestressing), the user can indicate which part of the section will be activated in which phase. Finally, parameters can be assigned to each point of the section, thus enabling setting-up a complete library of forms.

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General cross-section

esa.07

Required module: Base Modeller (esa.00).

SCIA•ESA PT enables the cross-section of beam members of any shape or shapes to be defined, in various materials. A graphical editor environment is available to make the required shape. This environment is very similar to the graphic user interface for structure definition and contains all input and editing, such as drag-and-drop editing as well as numerical editing of co-ordinates of vertexes, copy, rotate, mirror, fillet etc.
Both thin-walled and solid profiles can be defined. Also, any profile from SCIA•ESA PT library can be inserted as part(s) of the whole cross-section. They can be combined together with manually defined shapes.

Output and display

To produce clear documentation, the graphical editor enables the insertion of dimension lines into the cross-section image. Labels for dimension lines are editable, and can contain either the distance or additional text or a description.

Overlapping of cross-section parts

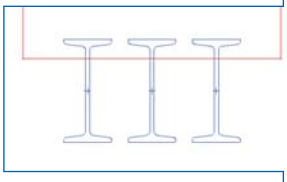
ESA enables the definition of mixed cross-sections like steel-concrete or concrete-concrete, where a part is inside or partly inside a casted part. Therefore, each partial shape has a parameter "Priority value", determining which part should be taken in which place, where one or more cross-sectional parts overlap each other.

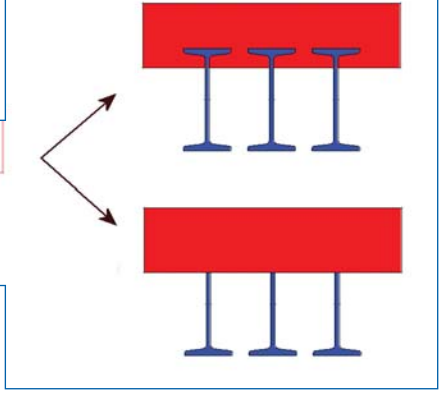
Parameterisation

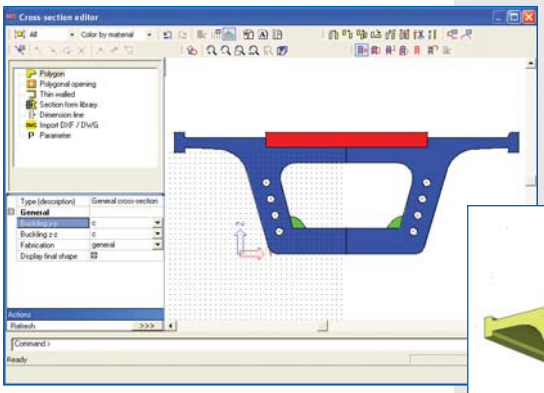
Any node co-ordinate can be assigned to a value of a certain user-defined parameter. Because parameters can be either of type, of value or formula, it is possible to easily make shapes with various dependencies. Selected parameters are adjustable from the normal edit dialog of the cross-section, in the same way as dimension setting of any cross-section from SCIA•ESA PT catalogue. They are also adjustable from any other points of ESA, like haunch parameters etc. Because general cross-sections are also allowed in members with variable cross-sections (haunches), there are no limitations in the creation of any 3D beams. See the following picture with a member with a variable profile, defined as a general cross-section.

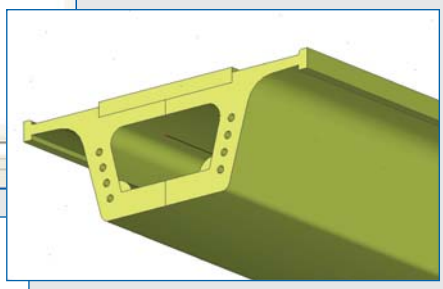
DXF/DWG import

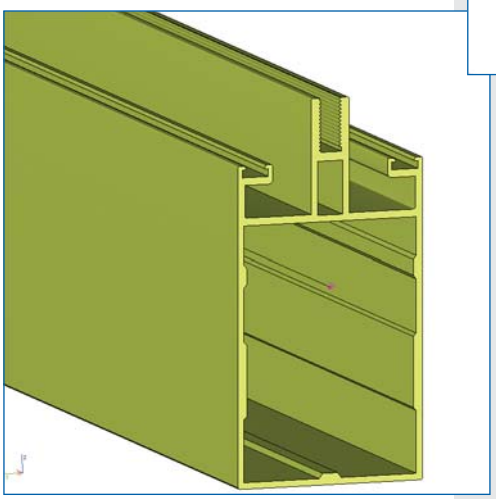
Shapes can be imported from DWG and DXF format. Line and polyline entities are supported. Manual control of input enables adjustment of how certain imported entity will be taken into account (part of thin-walled section, solid polygon, and opening), with the potential for the automatic connection of selected single lines into closed polygon(s).

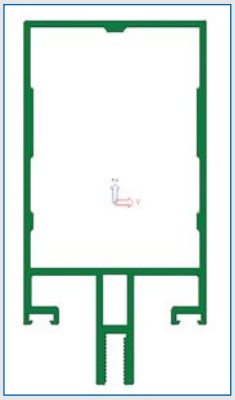


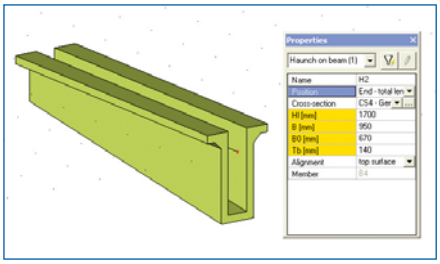












Highlights

- Advanced graphical input of any cross-section shape.
- Cross-sections composed of arbitrary number of parts.
- Automatic calculation of sectional characteristics.
- Parameterised cross-sections.
- Import of cross-sections shape through DXF/DWG format.