

ShapeDesigner 2

MechaTools Technologies

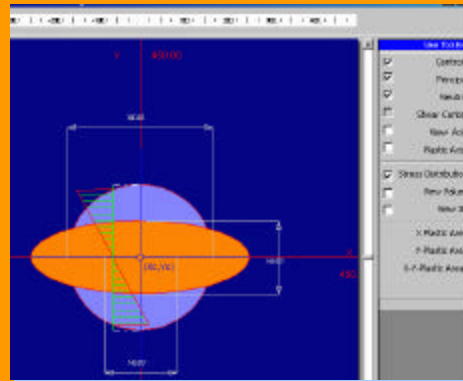
ShapeDesigner is an advanced general beam section calculator. **ShapeDesigner** calculates, the cross-sectional torsion and flexural structural properties, including torsion (J) and warping (Cw) constants, normal, warping and shear stresses. **ShapeDesigner** is a useful tool for structural engineers, design or analysis of steel, aluminum, and polymeric or composite materials sections. **ShapeDesigner** features:

- * Selection of materials and properties from a library
- * Multi-criterion Optimization for standards sections
- * Advanced Integrated CAD for sketching and drawing
- * Pan, rotate and zoom using the mouse or keyboard
- * Copy, paste and delete commands
- * Integrated automatic 2D mesh generator
- * Library of commonly used complex and standards sections
- * DXF import-export
- * Isocolour representation of the stresses
- * Stresses results are Normal, warping, shear, Von-Mises stresses, and principal stresses.
- * Professional output results
- * Integrated units converter
- * Adding dimensions and notes
- * Locate the plastic neutral axes of a composite section
- * View the transformed composite section with stress distributions
- * Residual stress state representation
- * Elastic-plastic bending analysis
- * Detailed user's manual with practical examples and references

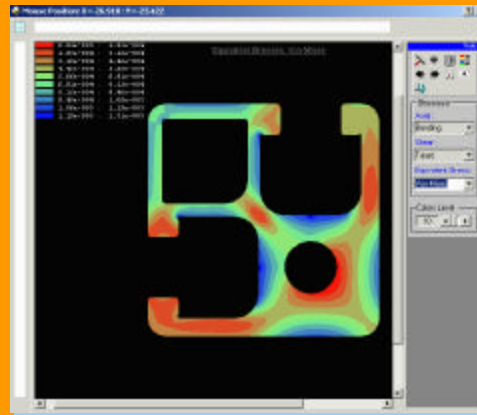
Warping and Torsion Properties

Shape Designer makes no assumptions or restrictions on the calculation of shear and torsion properties. Shape designer use an advanced and efficiently finite element approach to calculate these constants, for more complicate properties see user's manual. For more information, see our web site.

Case of composite section (Transformed composite section)



Visualization of the stress de la distribution



Viewing Properties

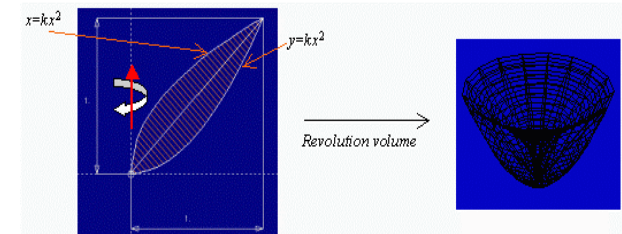
When you draw a shape and specify its material prop-erties, as each change is made the sectional properties are automatically recalculated. The properties calculated are as follows .

Masse	Masse de la section
Volume	Volume de la section
Aire	Aire de cross section
CMasse	Masse de la section composite transformée
Cvolume	Volume de la section composite transformée
CAire	Aire de la section composite transformée
Ixx	Moment d'inertie / axe x

Iyy	Moment d'inertie / axe y
Area	Area of cross section
CArea	Area of the transformed composite cross section
Ixx	Moment of inertia about x axis
Iyy	Moment of inertia about y axis
Ixy	Product of inertia about origin
Io	Polar moment of inertia about origin
rx	Radius of gyration about x axis
ry	Radius of gyration about y axis
Ixp	Moment of inertia about principal x axis
Iyp	Moment of inertia about principal y axis
Ixyp	Product of inertia about centroid (principal direction)
rxp	Radius of gyration about principal x axis
ryp	Radius of gyration about principal y axis
Iop	Polar moment about origin of the principal axes
?	Angle of orientation(direction) of the principal x axis
Imax	maximum magnitudes of principal moment of inertia
Imin	minimum magnitudes of principal moment of inertia
Ixc	Moment of inertia about x axis through centroid
Iyc	Moment of inertia about y axis through centroid
rxc	Radius of gyration about x axis through centroid
ryc	Radius of gyration about y axis through centroid
Ioc	Polar moment of inertia about the centroidal axes
J	Torsion constant
Cw	Constant of warping
Stopx	Elastic Modulus about x axis at top
Sbotx	Elastic Modulus about x axis at bottom
Stopy	Elastic Modulus about y axis at top
Sboty	Elastic Modulus about y axis at bottom
Spx	Plastic Modulus about y axis
Spy	Plastic Modulus about y axis
fx	shape factor in x(Plastic neutral) direction
fy	shape factor in y(plastic neutral) direction
Ø	Angle of orientation of the neutral axis
PNA	Position of the plastic neutral axis
xc	x location of centroid
yc	y location of centroid
xs	x location of shear center
ys	y location of shear center
Mpmax	Fully Plastic Moment
Memax	Maximum Elastic Moment.
	Gives also properties about custom axes

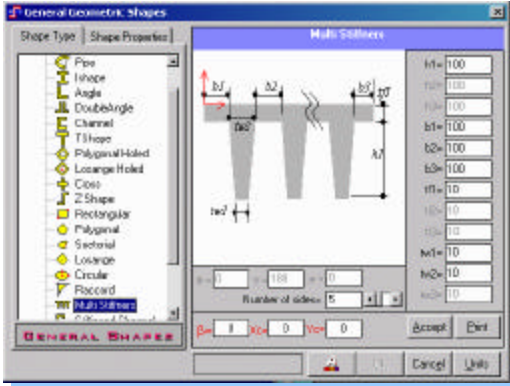
Mass moment of inertia and Axi-Symmetric bodies

With shape designer you can also perform calculation of mass moment of inertia for non-homogenous, extruded solid and axi-symmetric bodies. Geometric properties computed by shape designer are: Area, volume, center of gravity and mass moment of inertia about x-axis and y-axis (polar mass).



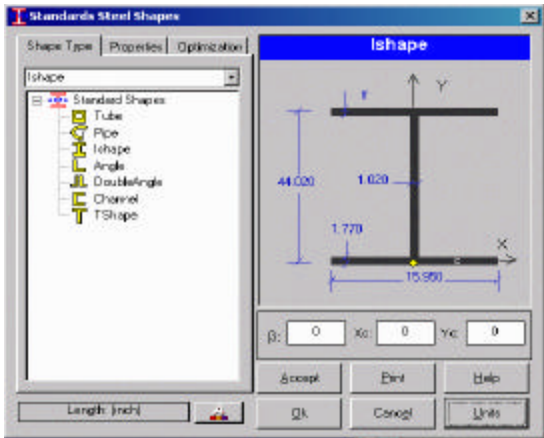
General Geometric Shapes

This component give you the possibilities to sketch a predefined shape with custom dimensions and custom rotate angle β , it give you the fast way to draw very easy a more complex shapes with precision and the corresponding geometric properties.



Standards Shapes

This component give you the possibilities to sketch a predefined Standard shape (AISC) with custom rotate angle β , it give you the fast way to draw very easy a more complex shapes with high precision.

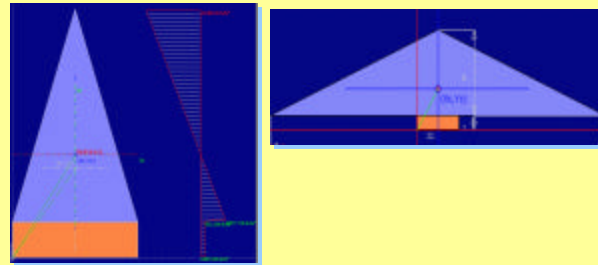


Shape Optimization

Optimization, give you many possibilities, the principal one is, that you can get one shape or more, by giving some constraints. Constraints can be applied to all the parameters and properties of the shape, to applied constrain to a parameter (ex. Area), you must input the upper and lower values

Axial Stress Distribution (Bending moment effects)

You can get the stress distribution, you just move a mouse over the section and select the position of the axis that you want see the stress distribution. The axis move also dynamically. This is applicable for the original and transformed composite sections.

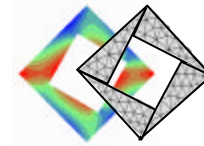


And More... See user's manual for more informations.

How to Reach Us?

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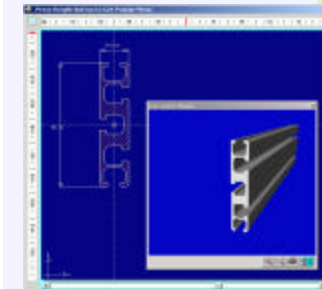
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*Finite Element and Numerical Simulation Software
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ShapeDesigner 2

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