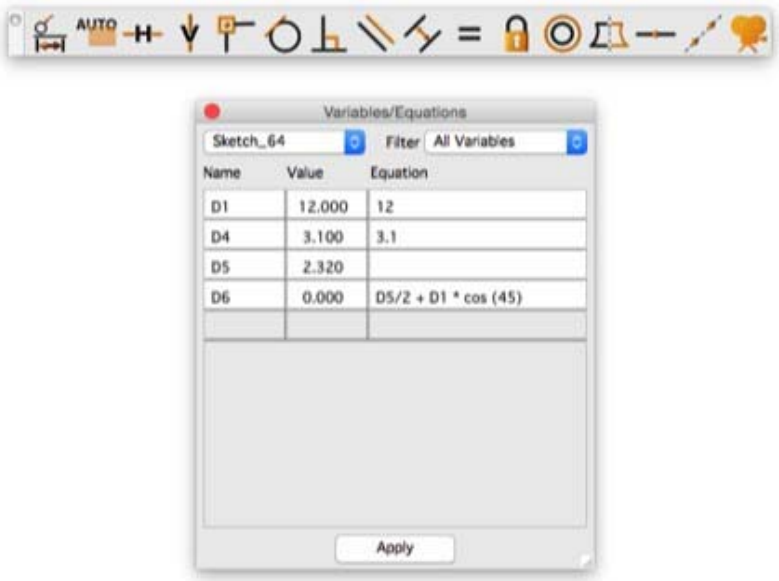
SharkCAD v11 New Features Overview

1- 2D Dimension and Constraints

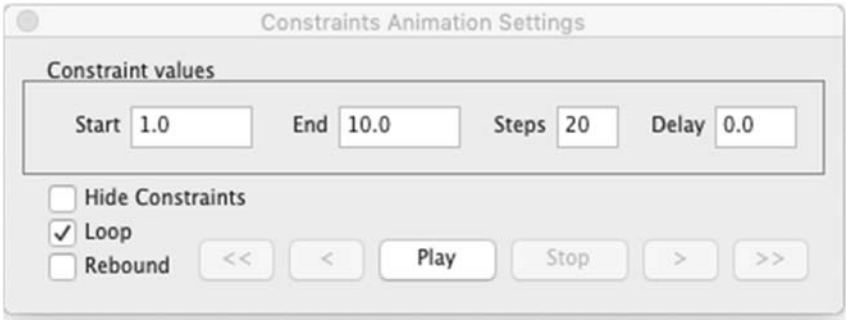
Dimension and constraint tools are now available to manage the geometric relationships between 2D shapes.

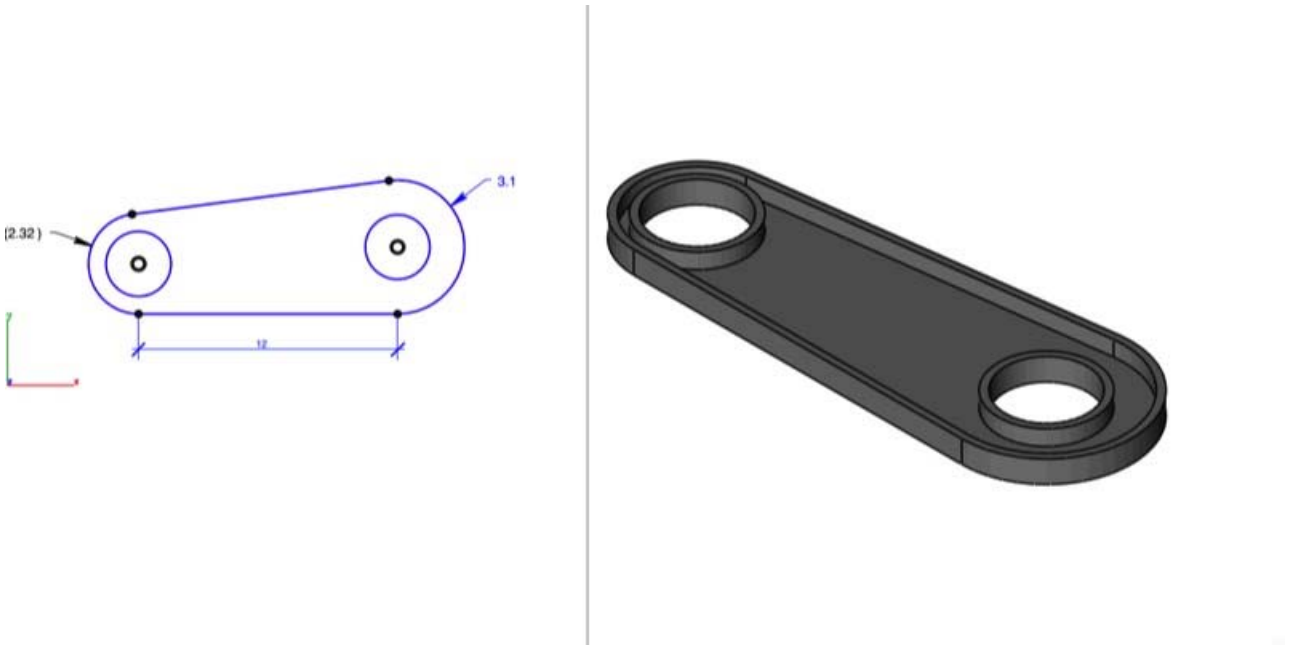
Feature Highlights:

- Thirteen Geometric Constraints
- Dimension Constraints
- Variable and Equations
- Constraint Animation
- Auto Constrain
- Animate Dimension and Constraints



Constraint Tool Palette and Variables Dialog

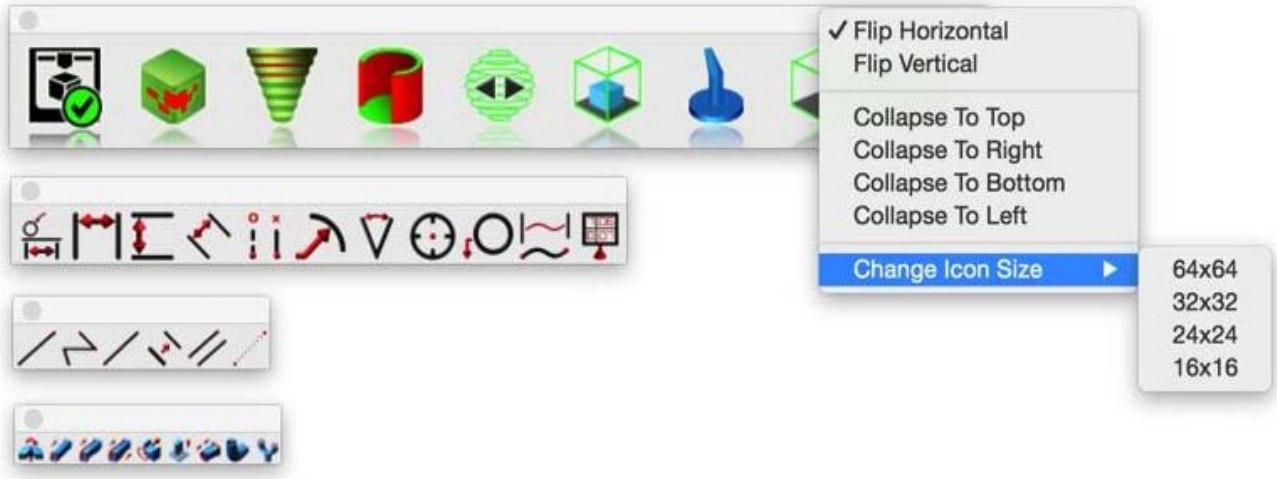

Constraints Animation Settings
Constraint values
Start 1.0
End 10.0
Steps 20
Delay 0.0
Hide Constraints
Loop
Rebound
<<
<
Play
Stop
>
>>



Left Figure: Constrained Profile with Dimensions
Right Figure: Extruded Part from Constrained Profile with Shell Features
Arc Radius Animated between 3- and 5-inches preserving design constraints such as tangency, concentricity, and length

2- Tool Icon Sizing

You can now modify a tool palette to use larger or smaller icons. Right click on the tool bar header to display a popup menu for “Change Icon Size”. This menu now provides options for 64,32,24 and 16-pixel sized icons. The default icon size is 32x32.

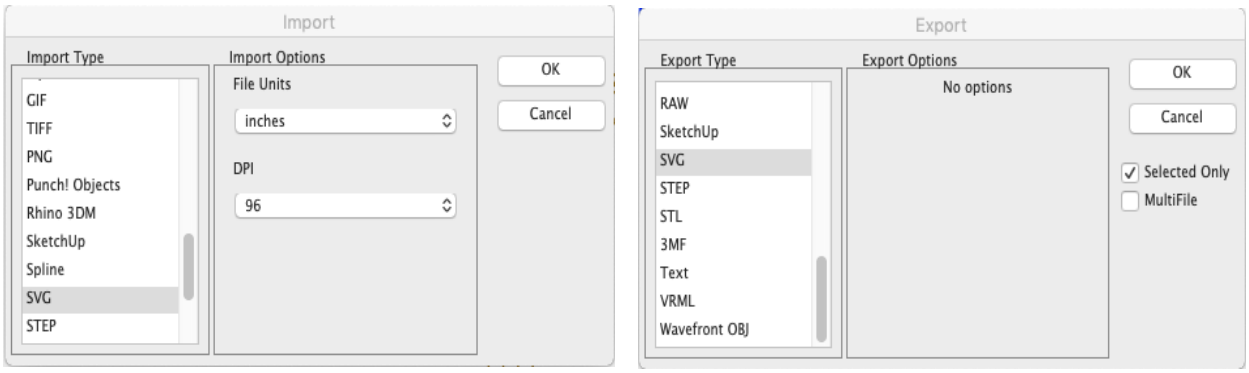


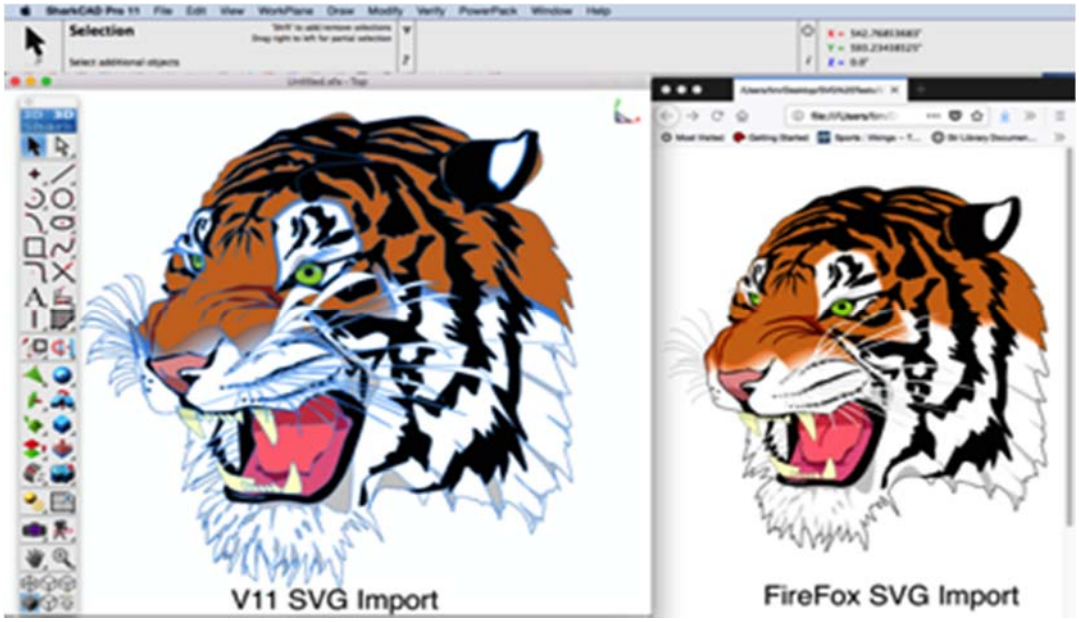
3- SVG Import and Export

Scalable Vector Graphics (**SVG**) is an XML-based vector image format for two-dimensional graphics with support for interactivity and animation. V11 now supports importing and exporting to this new format.

The new SVG Import/Export provides an alternative to using the Adobe Illustrator format for sharing vector based (scalable) graphics.

Note: For importing SVG files from Adobe Illustrator use a unit setting of mm (or inch) and a DPI setting of 72 to get the correct scale.





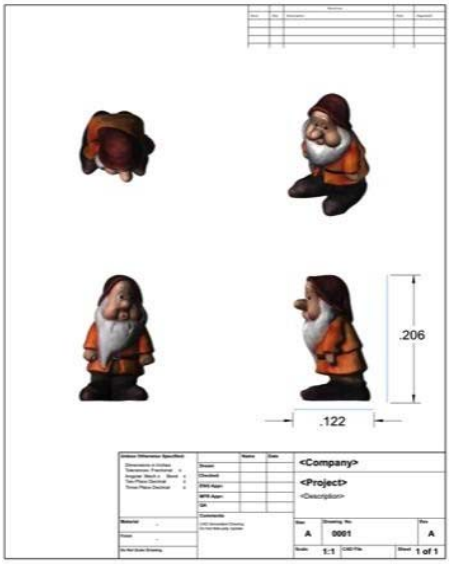
4- PhotoRendering & Textures

The PhotoRendering features provided by Lightworks in the ViaCAD Pro and SharkCAD Pro now supports rendering texture images imported from OBJ, 3MF, SketchUP, and 3DS file formats.

Lightworks Rendering of a 3MF File

5- High Resolution Printing for Objects with Textures

Prints involving objects with textures now internally use Lightworks to generate the image for the printer, providing a high-resolution output.

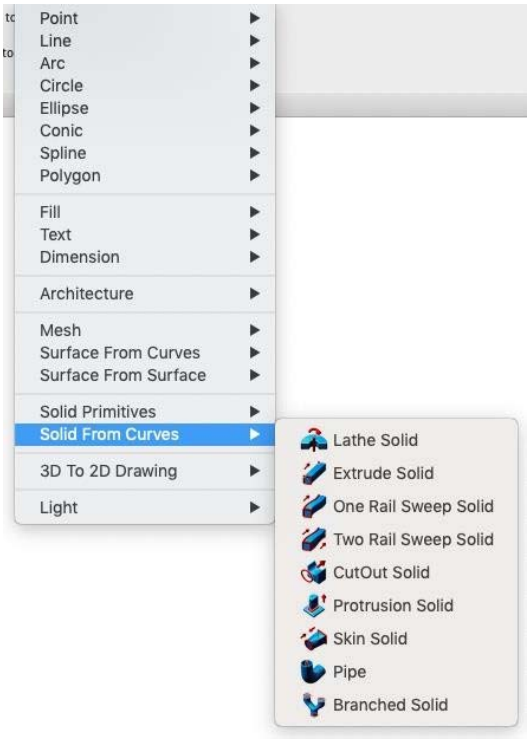


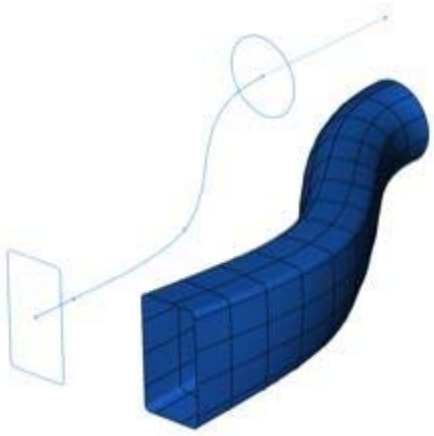
6- Skinning with Center Line Path

Skinning is the process of constructing a NURB surface between sections. Skins in SharkCAD can be open resulting in a NURB Surface or closed creating a Solid.

V11 introduces the ability to specify a path. The path defines the flow of the surface between the sections. Specifying a path means you may be able to define less sections which may produce a more overall smooth surface.

Restrictions
—Path must be one G2 smooth curve
—Path must be perpendicular at a section intersection





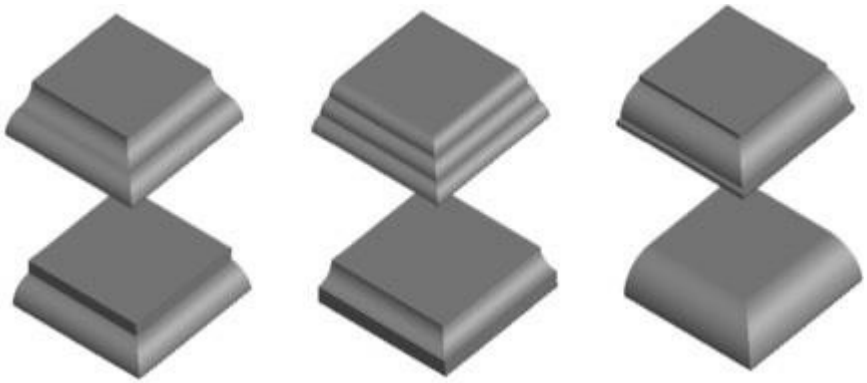
Example Skin
Rectangle to Circle along a Path

7- Edge Features

Edge features introduced in V11 provide a means to rapidly define parametric edges used in wood, marble, or granite designs.

Some predefined edge treatments include:

- Cove
- Rounds
- Rounds with Beaded Offset
- Full, Half, and Beaded Ogee
- Waves
- Bullnose, Half Bullnose
- Custom Edge



Example Edge Features

10. Stopped Chamfer

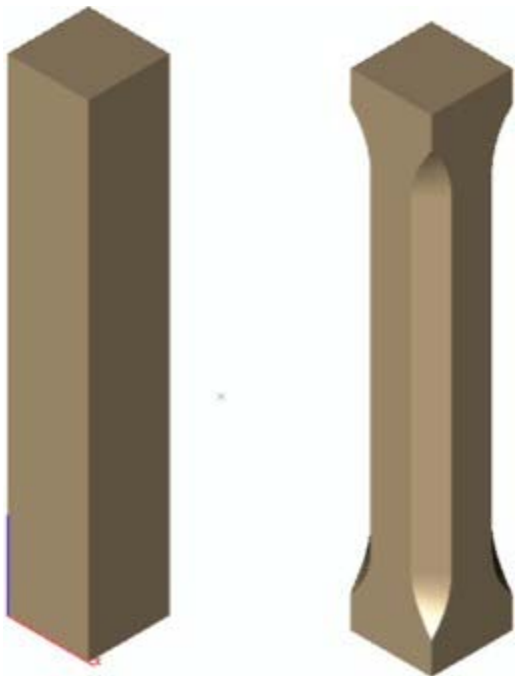
Stopped Chamfers are a new solid modelling feature in V11. A Stopped Chamfer replaces an edge with a bevel, typically for decorative purpose. The bevel starts and ends by a user specified value.

Parameters used to define a Stopped Chamfer are;

- Chamfer Length
- Distance from Start
- Distances from End

The transition rolls off using a smooth arc simulating the path of a router bit.

As with other features, the user can modify any of these parameters during the design process to explore alternative shapes quickly.



Railing with Four Stopped Chamfers

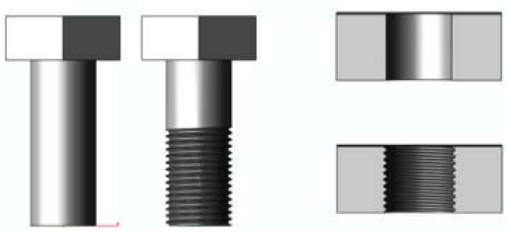
11.Threads (Precise & Cosmetic)

Threads are a common feature used in fasteners. Threads in SharkCAD are defined with the following parameters.

- Inner Thread
- Outer Thread
- Pitch
- Length
- Starting location

Precise Threads
Accurately modelled threads via helix on ACIS models.

Cosmetic Threads
Lightweight visual threads using OpenGL Textures.



12. Surface from Laws

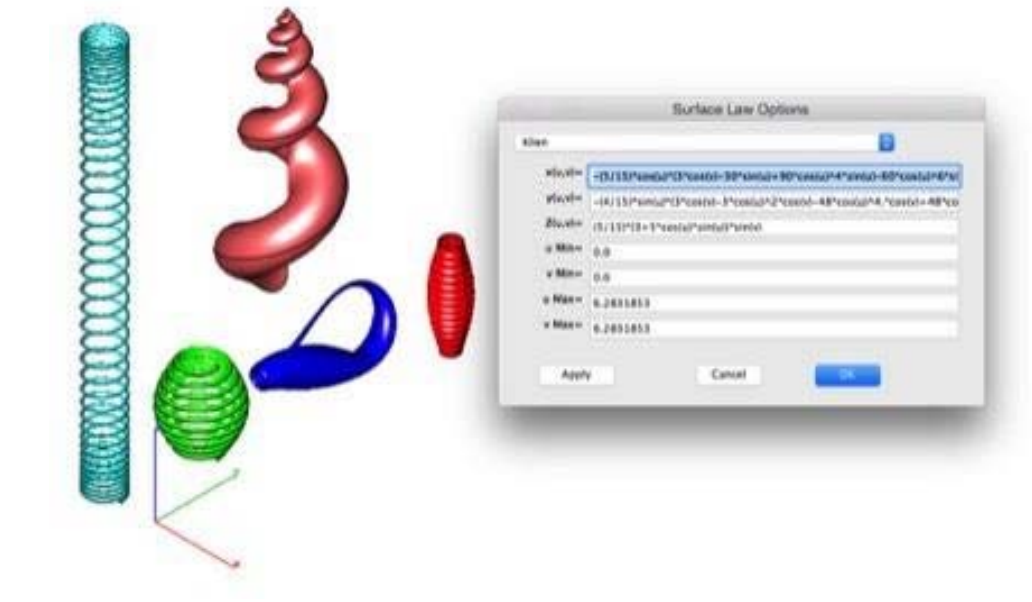
V11 introduces the ability to use parametric formulas to design NURB shapes.

Formulas are defined by users specifying how x, y, and z relate to a parameterized equation (UV). For example, a simple Paraboloid NURB surface is defined by U and V through the three parametric formulas:

f(x) = U*cos(V)
f(y) = U*sin(V)
f(z) = 0.2*U^2

Some predefined formulas available from a drop down for the designer include:

- Sine Wave
- Paraboloids
- Moebius strip
- Kline Bottle
- Double Spring
- Barrel Spring
- Hour Glass Spring
- Sine or Twisted Tubes



`

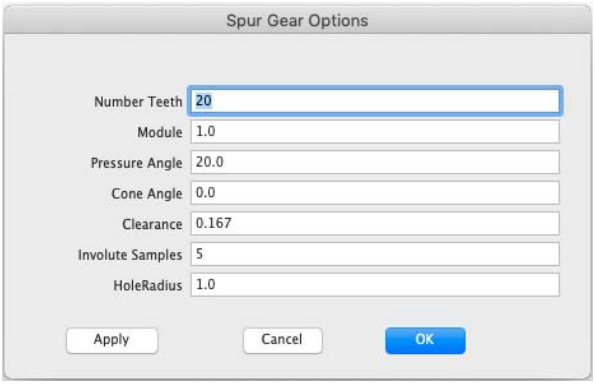
Example Surfaces from Laws

13.PowerPack: SPUR Gear Creation

This feature is available in Optional Powerpack Module. The spur gear teeth in SharkCAD use an involute curve. The involute curve is the curve traced by a point on a straight line with rolls without slipping.

Spur Gears in SharkCAD are defined with the following parameters.

- Number of Teeth
- Module
- Pressure Angle
- Cone Angle
- Clearance
- Involute Samples
- Inner Hole Diameter
- Thickness

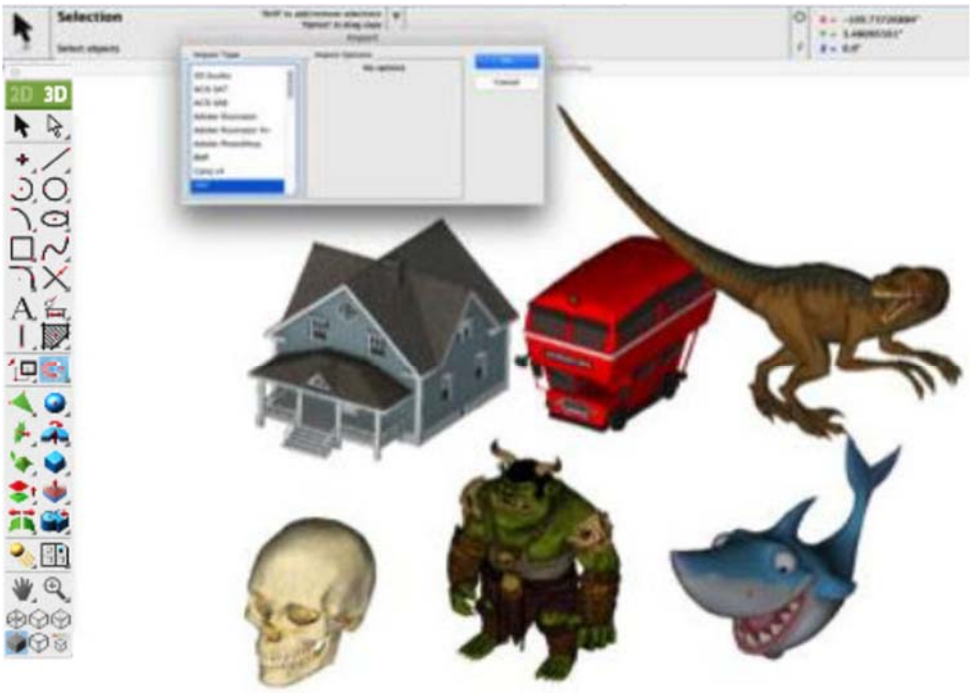


14. 3MF Import & Export

The 3D Manufacturing Format (3MF) is a 3D printing format that allows design applications to send full-fidelity 3D models to other applications, platforms, services, and printers.

Highlights of the SharkCAD implementation are listed below:

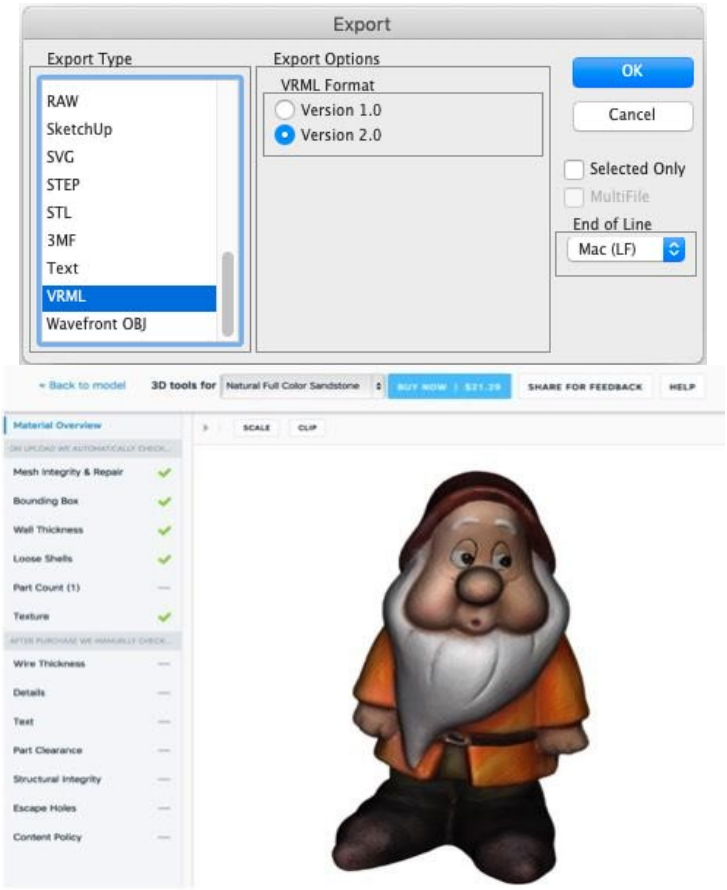
- Supports UNIT description flag
- Color Attributes
- Textures (PNG, JPG) & UV Coordinates
- Support for full color 3D Printing



Variety of 3MF Imports from Paint 3D

15. VRML 2.0 Texture Support

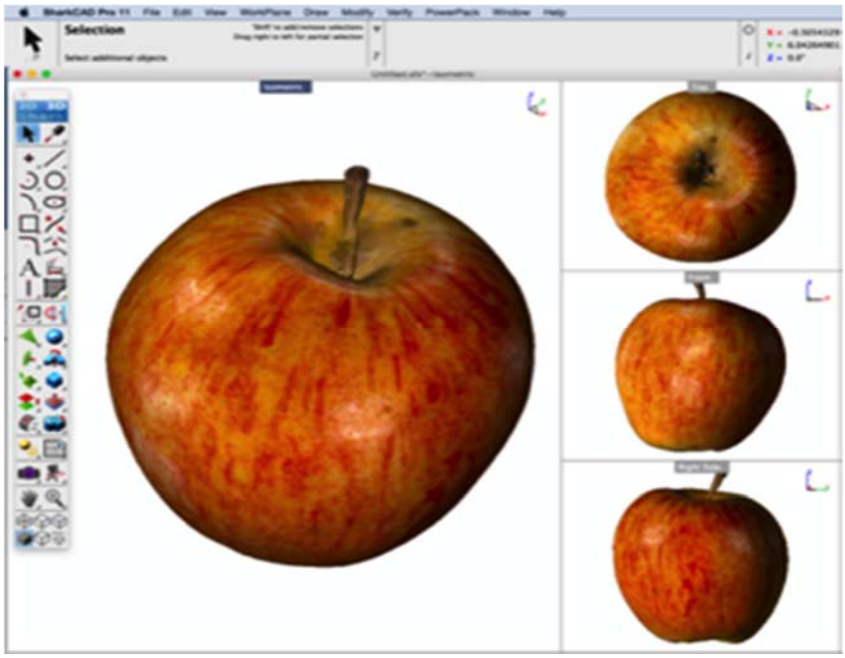
VRML (Virtual Reality Modelling Language) is a file format used to describe 3D interactive graphics for the world wide web. SharkCAD supports VRML Export.



SharkCAD VRML with Textures Exported to Shape ways

16. 3DS/OBJ/SketchUp import with Texture

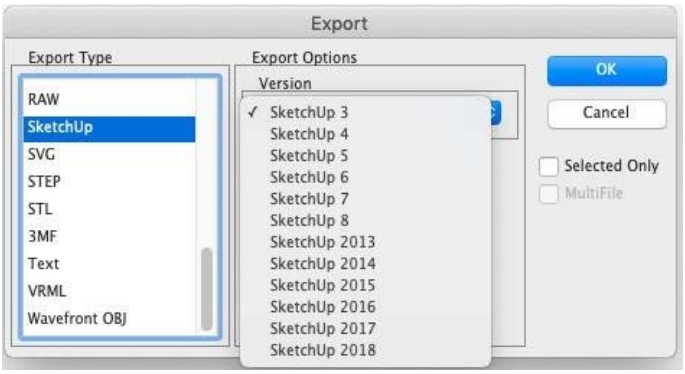
THE OBJ file format was updated to supporting reading and displaying textures.



OBJ Import with Textures

17. SketchUp 2018/2019 Import/Export

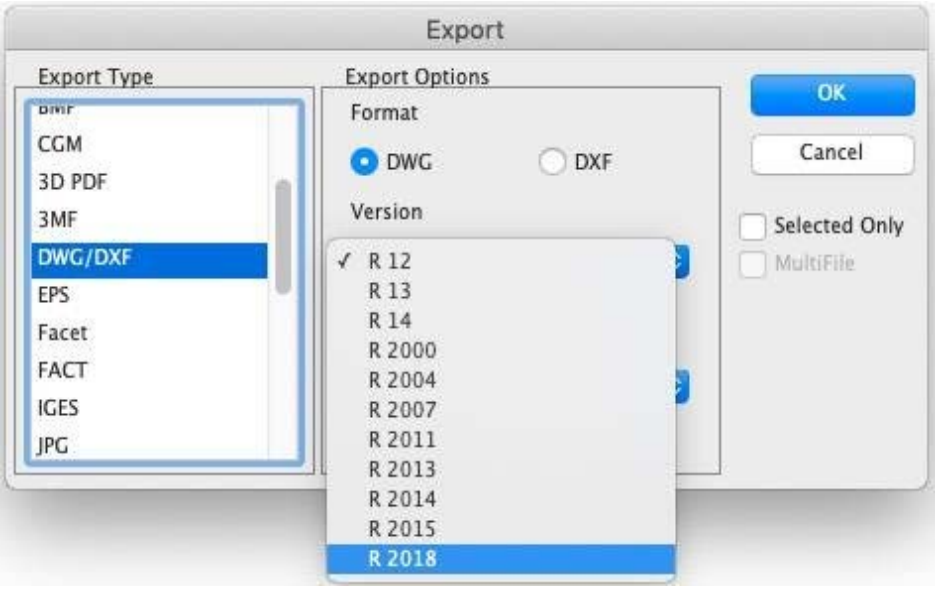
SketchUp (TM) has introduced a new file format starting with their 2018 products. V11 has been updated to support the new format as well as supporting textures.

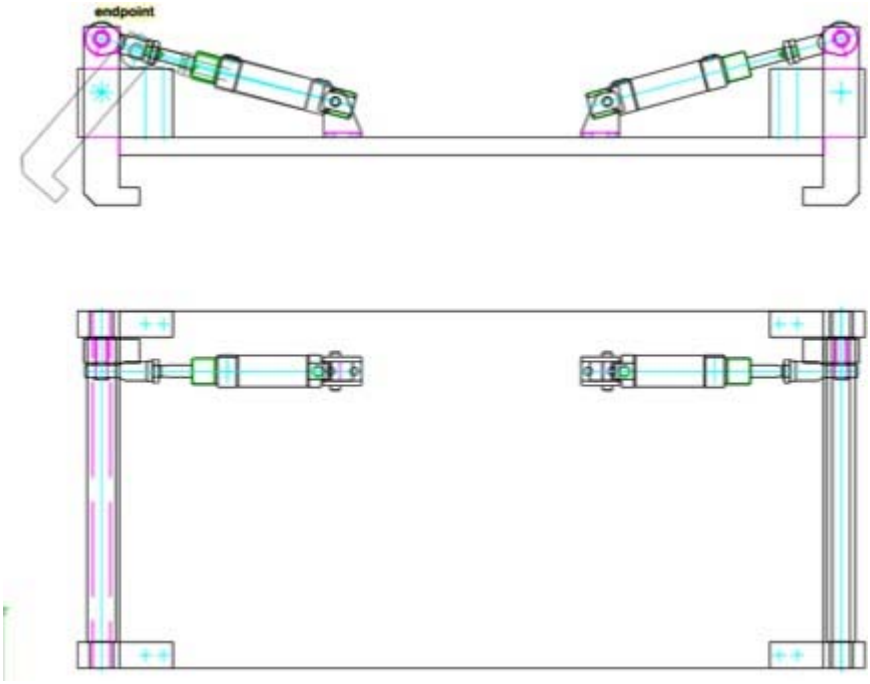


18. DXF/DWG 2018 Import/Export

This optional add-on extends in SharkCAD Pro. Autodesk (TM) has updated the DXF/DWG format with the release of AutoCAD 2018. V11 has been updated to support the new format.

Note: AutoCAD 2019 uses the same format as AutoCAD 2018.



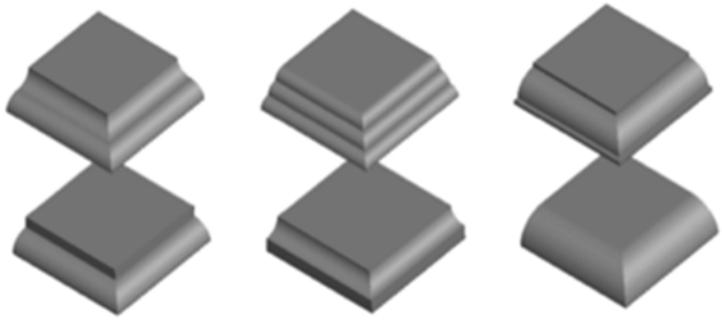


19.Feature Based Edge Treatments

Furniture or counter top designers often need to add an edge to their designs for either decorative or functional purposes. Adding these edges can be time consuming especially if the underlying length, width, or height is changed.

Edge features introduced in V11 provide a means to rapidly define parametric edges used in wood, marble, or granite designs.

Some predefined edge treatments include:
- Cove
- Rounds
- Rounds with Beaded Offset
- Full, Half, and Beaded Ogee
- Waves
- Bullnose, Half Bullnose
- Custom Edge



20. Modeling Kernal Updates

The PunchCAD family of products are powered by Dassault Systems (creators of CATIA & SolidWorks) ACIS modeling engine.

Enhancements to ACIS since v10 include:
- Improved Booleans (add, subtract, intersect)
- Blending, Shelling
- Local Face Operations (powers PunchCAD's push/pull and direct face tools)
- SAT, SAB, SData Translators

21. Direct Translators

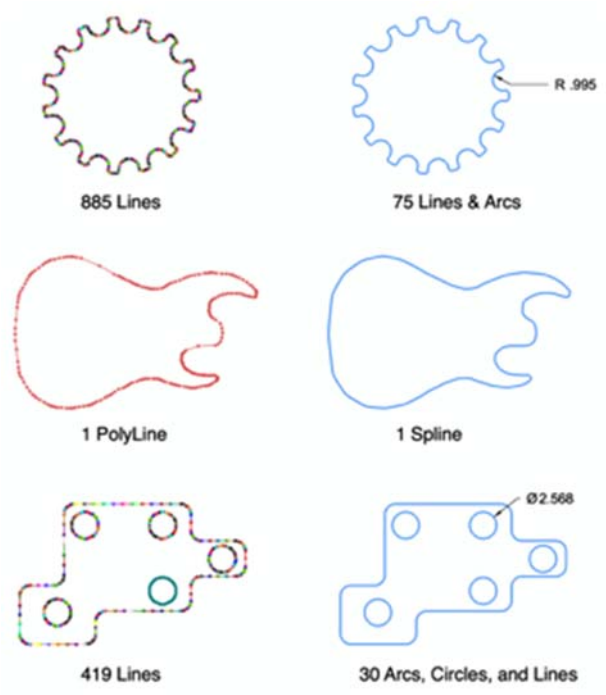
In addition to an updated modeling kernel, all native translators were updated that include:

- SolidWorks
- SolidEdge
- Parasolids
- NX
- CATIA v4, CATIA v5
- STEP, IGES
- ProE

22. Simplify Curves

Some design tasks prefer higher order curves such as arcs, circles, and/or ellipses over lines. For example, sharing data with a plasma or water jet cutting CNC system or extruding a profile into a solid and later adding edge treatments. V11 introduces the Simplify Curve tool to assist in this task.

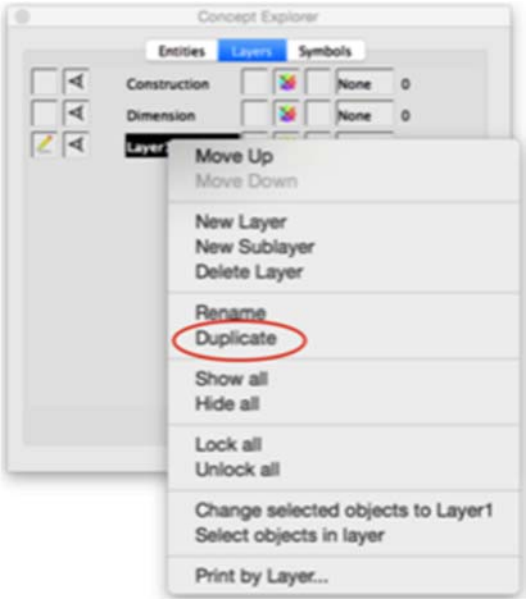
Covert Lines or Polylines into:
- Arcs
- Circles
- Ellipses
- Splines



23.Layer Duplicate

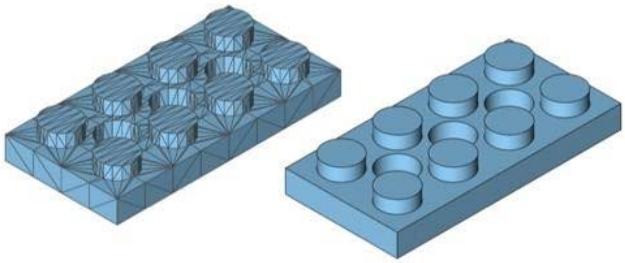
A new command to duplicate a layer and all the objects in that layer is now available through Concept Explorer. To access this command, place your cursor over the layer you want to duplicate, right click, and select the Duplicate command.

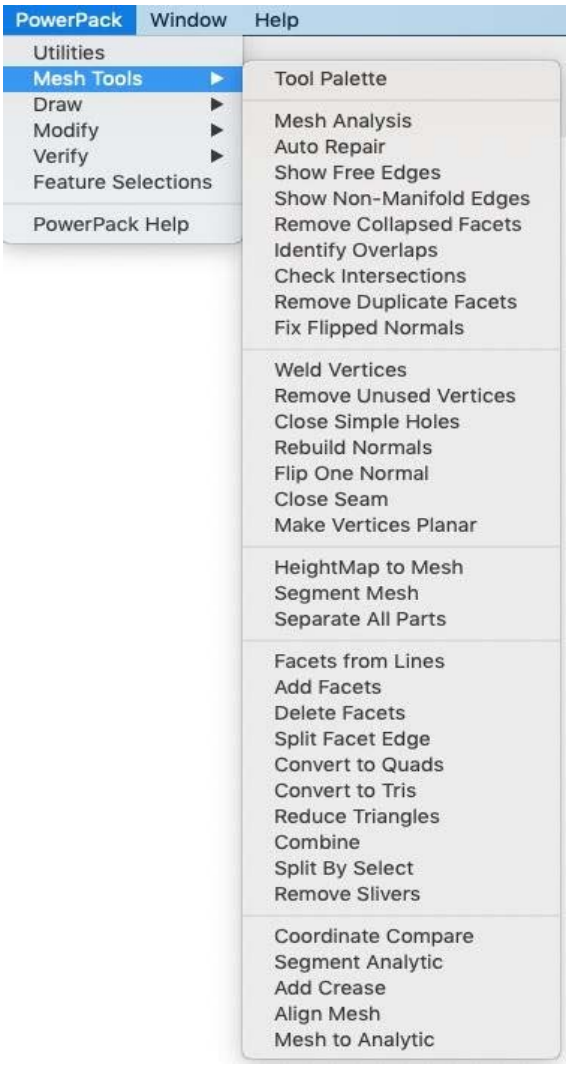
If you Duplicate a sub layer, the new duplicated layer is promoted to a first level layer.



PowerPack V11

Powerpack extends the feature set of SharkCAD with 70+ additional tools for Entity Management, 3DPrinting Editing/Repair, and Advanced Modelling. V11 adds the Mesh to Analytic tool to convert mesh data (STL, SketchUp) into precise solids.




PowerPack
Window
Help
Utilities
Mesh Tools
Draw
Modify
Verify
Feature Selections
PowerPack Help
Tool Palette
Mesh Analysis
Auto Repair
Show Free Edges
Show Non-Manifold Edges
Remove Collapsed Facets
Identify Overlaps
Check Intersections
Remove Duplicate Facets
Fix Flipped Normals
Weld Vertices
Remove Unused Vertices
Close Simple Holes
Rebuild Normals
Flip One Normal
Close Seam
Make Vertices Planar
HeightMap to Mesh
Segment Mesh
Separate All Parts
Facets from Lines
Add Facets
Delete Facets
Split Facet Edge
Convert to Quads
Convert to Tris
Reduce Triangles
Combine
Split By Select
Remove Slivers
Coordinate Compare
Segment Analytic
Add Crease
Align Mesh
Mesh to Analytic


Repair Profile
Simplify Profile
Create Outline
Remove Duplicates
Remove Zero Length Curves
Convert To Spline Surface
Simplify Solid
Part Repair
Solid Divide
Thread


Line Bisector
Line Best Fit
Line Normal to Surface
Line Perpendicular 2 Curves
Line Perpendicular From Location
Circle Best Fit
Circle Normal to Curve
Average Curve
Curve From Two Views
Plane Best Fit
Surface Grid
Shadow Projection
Unroll Surface
Gear