AUTODESK UNIVERSITY 2013

Complex Lofting and Surfacing Inside Autodesk® Inventor®: Designing Fishing Lures

Stan Wile – IMAGINiT Technologies

MA3068 Complex Lofting and Surfacing Inside Autodesk® Inventor®: Designing Fishing Lures

Learning Objectives

At the end of this class, you will be able to:

- Confidently use the Loft command
- Use surfaces to get your desired results instead of fighting with feature failure
- Bring your ideas to life by modeling from hand-drawn sketches and model surfaces from hand-drawn sketches
- Confidently create organic shapes

About the Speaker

Stan Wile is a Solutions Consultant with IMAGINiT Technologies, specializing in manufacturing environments. He has implemented the Autodesk® manufacturing products with several industries including the extrusion, automotive, furniture, and custom machinery markets. He has extensive experience and a comprehensive understanding of the technical, practical business, and human dimensions of implementation. Stan is an ATC certified instructor and he provides training, support, and implementation for AutoCAD®, AutoCAD® Mechanical, AutoCAD® Electrical, Autodesk® Data Management, Showcase, Autodesk Inventor, and iLogic. He also maintains an AutoCAD Electrical dedicated blog at
http://myacade.blogspot.com/
swile@rand.com

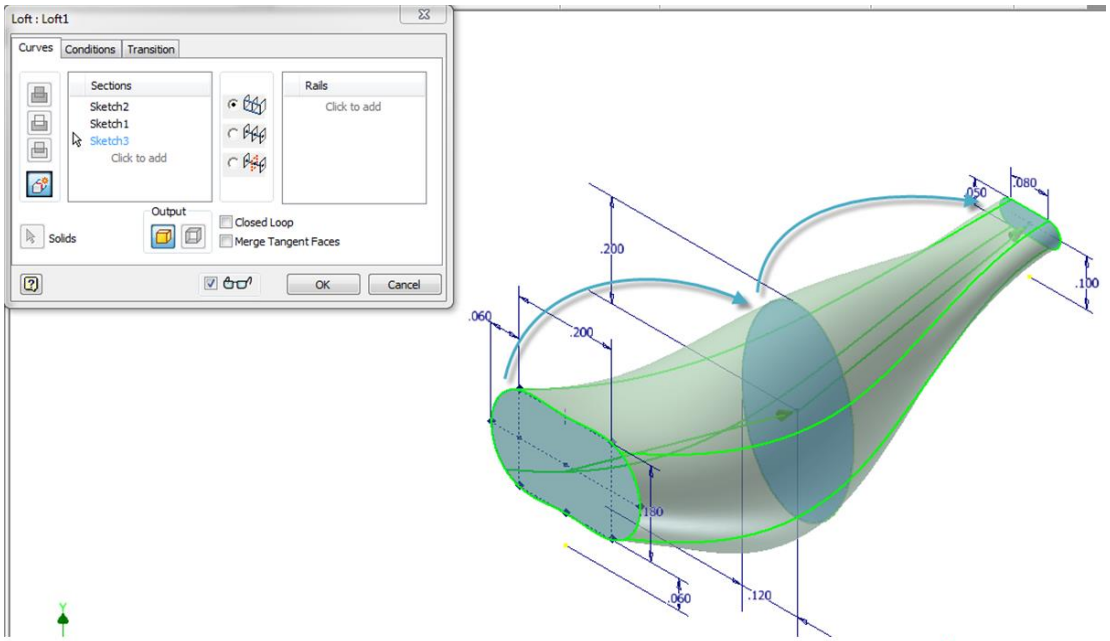
Fishing Flies and Lures?

Why design fly fishing beads? That was what I asked. Aren't all fly beads simply round? There's not much to "design." However I was working with a company that is driving fly fishing to new levels by taking a more scientific approach to the entire sport. From experimenting with materials to affect sink rate, to creating a bead that goes over the eye of the hook, Flymen Fishing Co. has continually looked to push past the way it has always been done, and create "the next generation" of fly fishing materials.

I was asked to create some fish, and insect, shaped fly beads. And in the process I learned a lot about Inventor. Are the designs a success? I would say three "Best of Show" awards are a pretty good sign.

The following are a number of tips and tricks I learned while designing a number of fly fishing beads. Hopefully you can learn from my frustration and cut some time out of a future design.

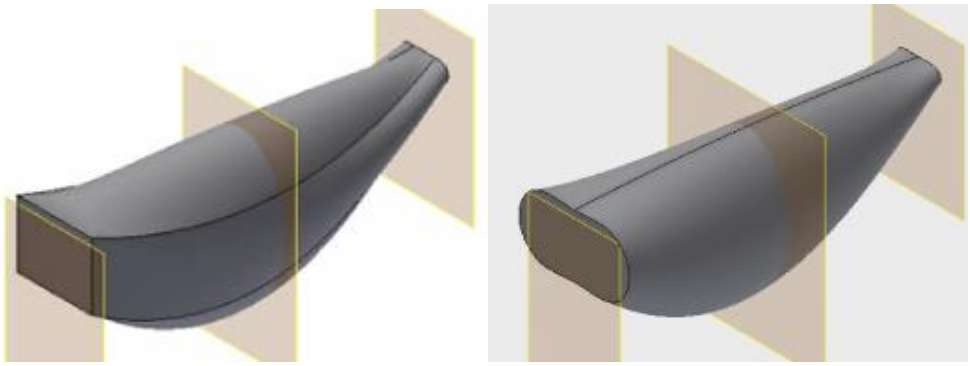
Confidently use the Loft command



The types of Lofts

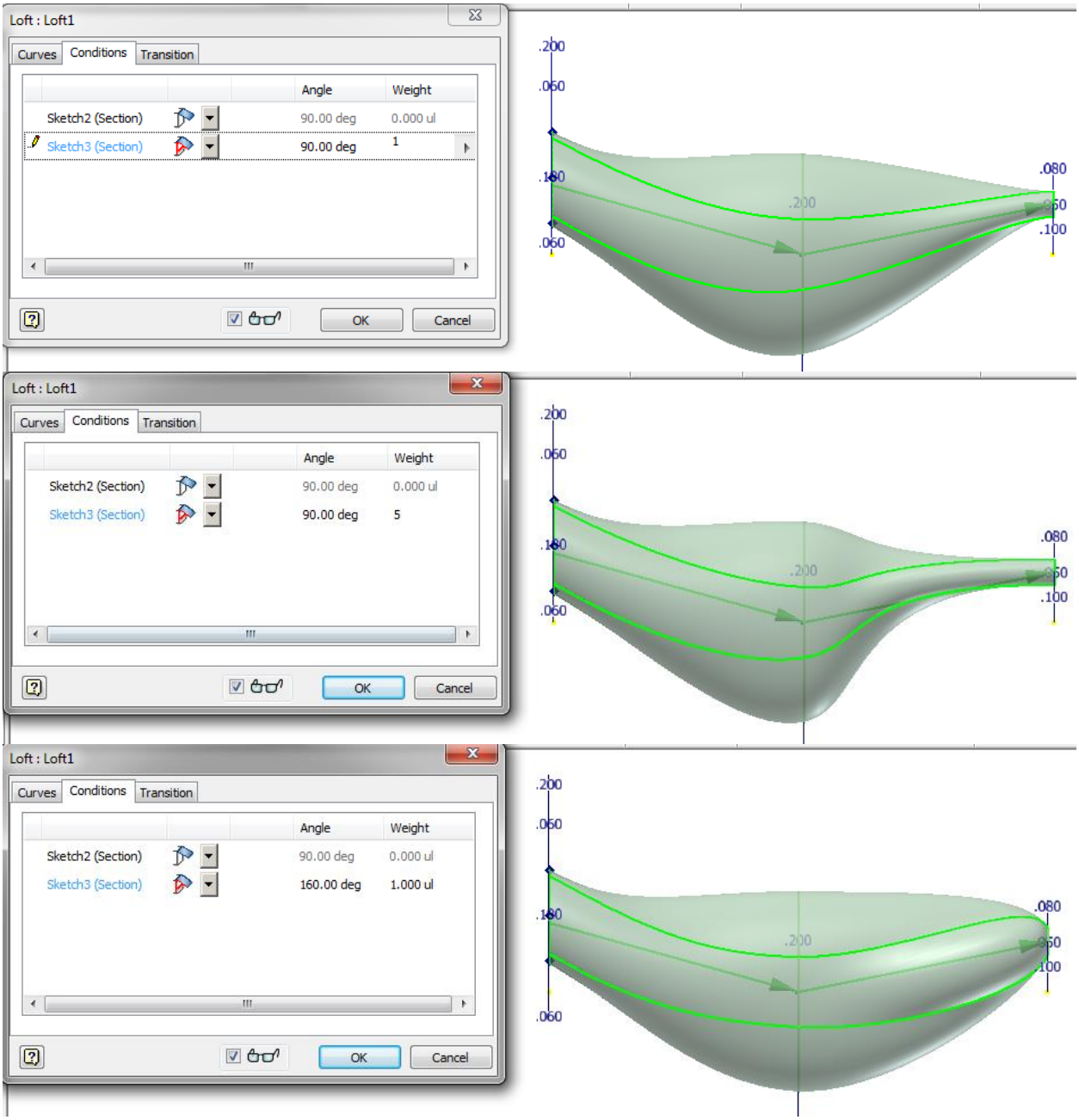
Basic

- Pick profiles in order
- Use a single profile in each sketch when possible. This will keep the loft feature from failing even if the profile was to drastically change. Use construction lines to eliminate unnecessary profiles.
- Don't mix profiles with hard edges (rectangle) with profiles with no hard edges (ellipse). The hard edges will carry on through many profiles. Notice the edges running through the profiles shown below.

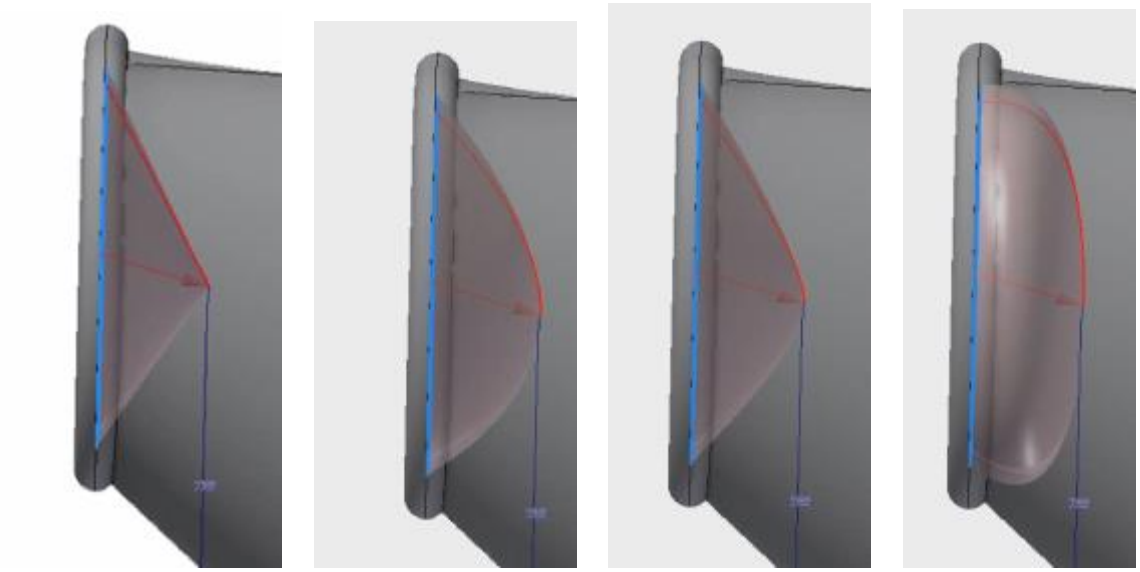


Conditions

Using conditions the same series of profiles can drastically change the shape of a loft.

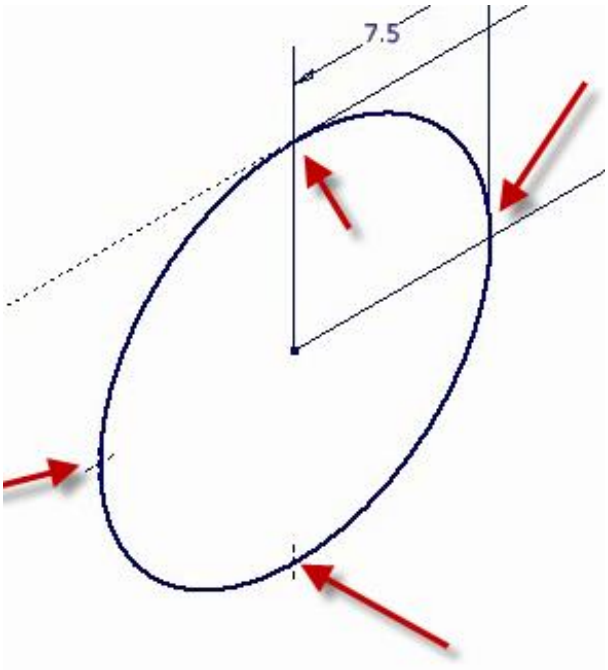


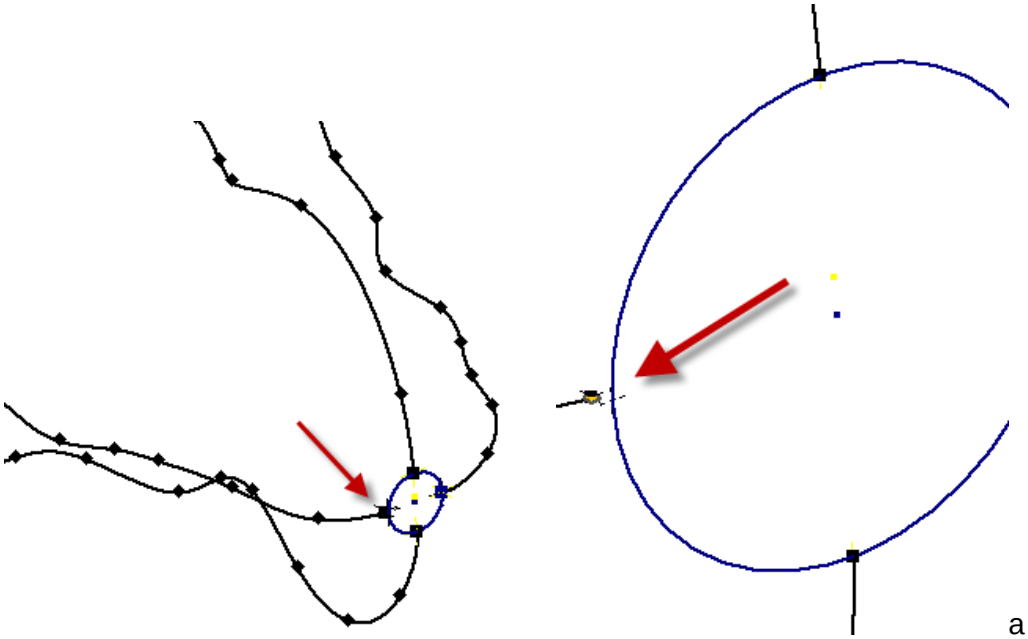
Remember when lofting to a point, starting and ending points have conditions as well. This is an extremely easy way to round off complex shapes.

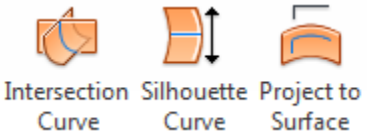


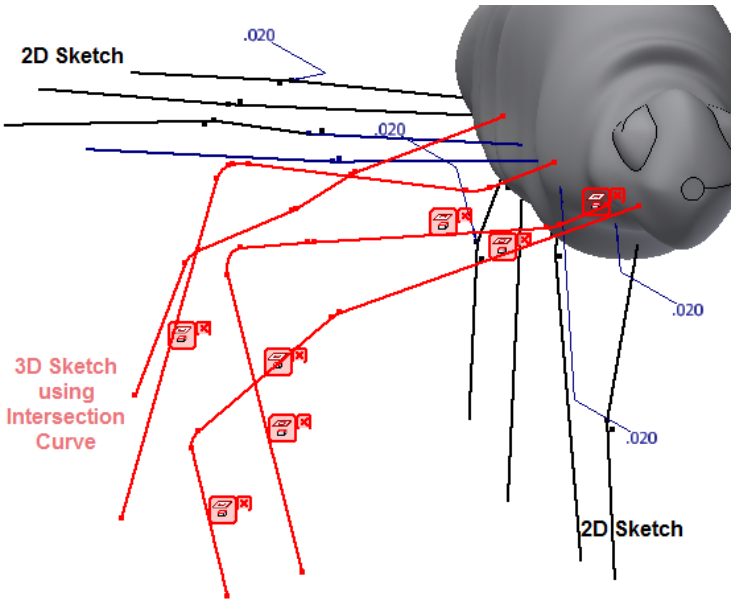
Rails Rails Rails

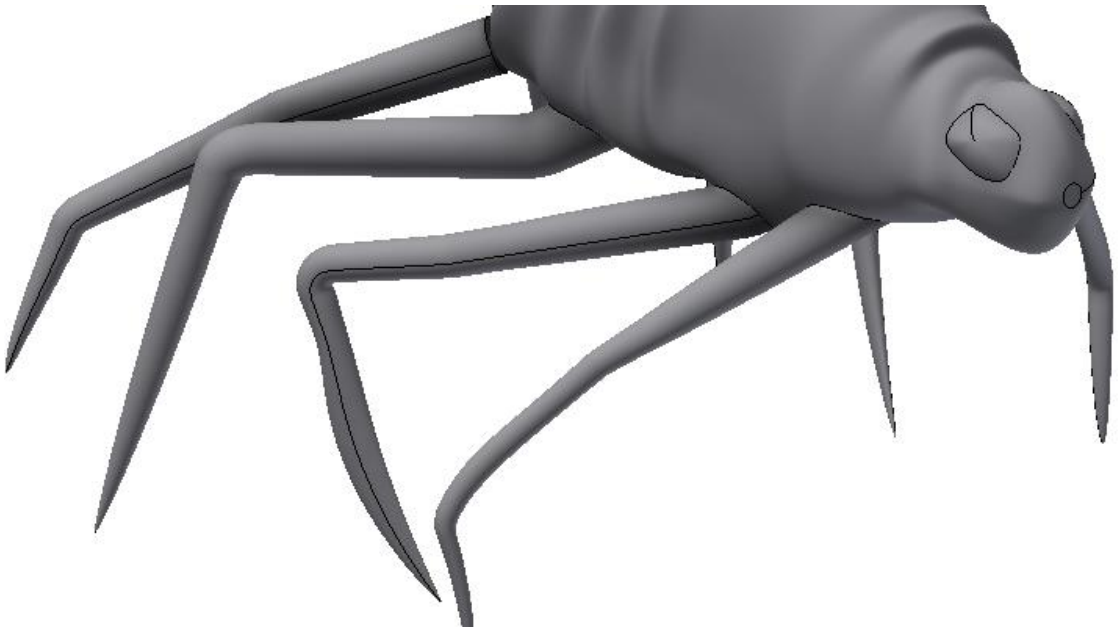
Rails seem to be the cause of most frustration when creating complex lofts. Use the following guidelines to eliminate many of the common issues people face.

- Turn any points that will be the connection points into Center Points so they are easier to project.
  - 

- All starting and ending rail points MUST be connected to each profile in the loft. Remember the line STARTS when you lift the mouse button. It's easy to click ON the point but move the mouse before lifting the mouse button.
  - 
    a
- Watch out for splines with funky ending handles.
  - In the following images the spline curves around past the profile. While this may not cause the loft to fail it will create an unwanted lip extending beyond the profile. Use handles and rotate the curve more normal to the profile.
  -
- Rails can be a combination of interconnected 2D sketches. However each sketch used must be connected via projected geometry.

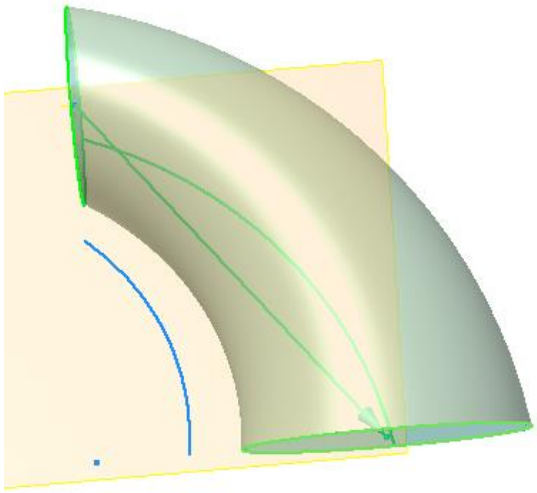
- If a complex 3D rail is needed, try to reference the 3D geometry to a series of 2D sketches or existing geometry.
- Remember the tools on the 3D sketch ribbon
  - 

  - 

  - 

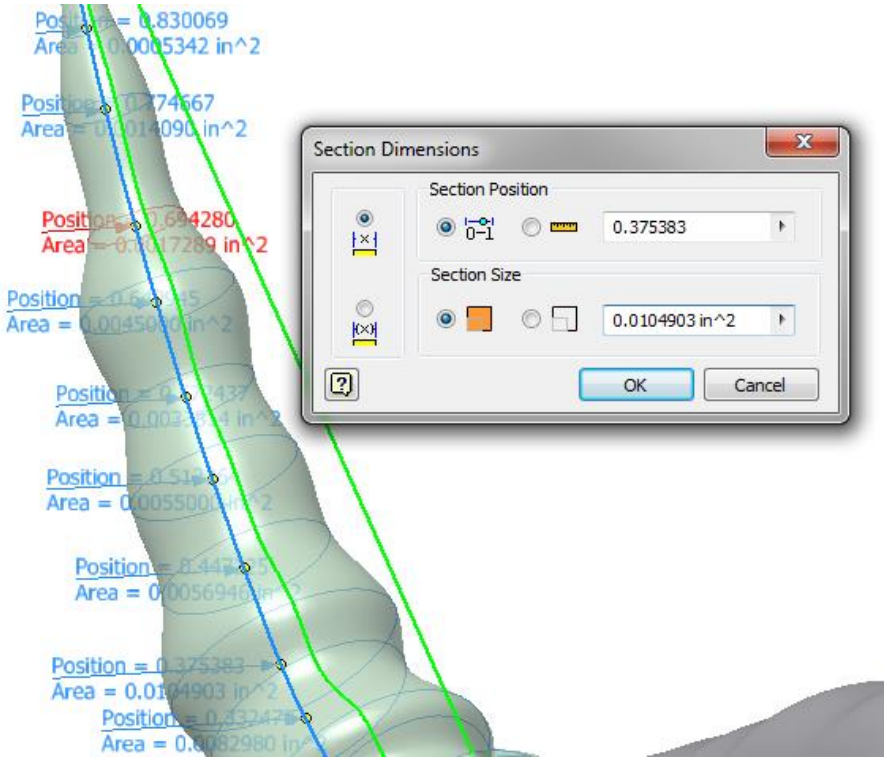
Centerlines

- The centerline rail does not have to be inside the profile. Only connected to the sketch plane.



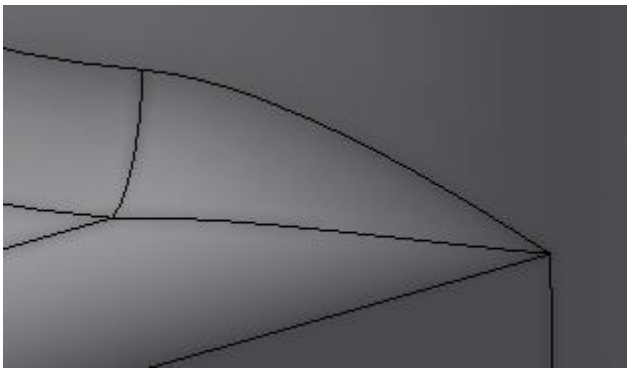
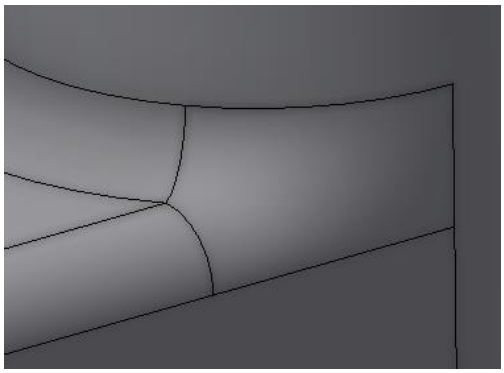
Area

Area lofts are a great way to control lofts without creating many profiles. This is a type of centerline loft so be sure to create a centerline. All defined areas can be modified after the loft is created.



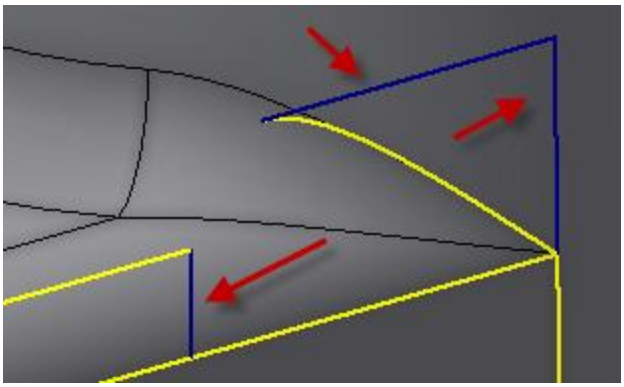
Use surfaces to get your desired results instead of fighting with feature failure

There are times when it would be much quicker, cleaner, and give better results to simply switch to surfacing. Create the surface needed and then stitch it back into a solid. In the example below the fillet command leaves a hard point that the designer would rather not have. With conventional modeling tools this would be quite time consuming to eliminate. However with surfaces its quite quick and simple.

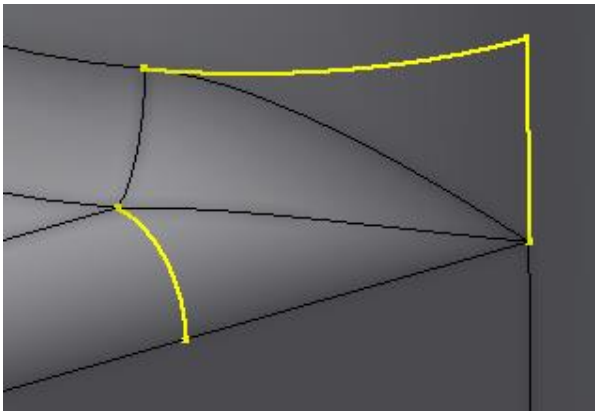



There are many way to tackle surfacing. I am only demonstrating what is possible. Each users approach and knowledge of the tools will change how each problem is confronted.

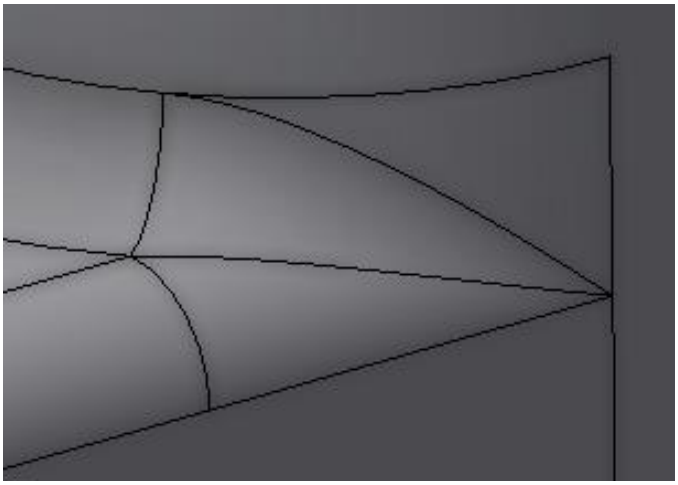
1. Create a 2D sketch and draw some cutting lines.



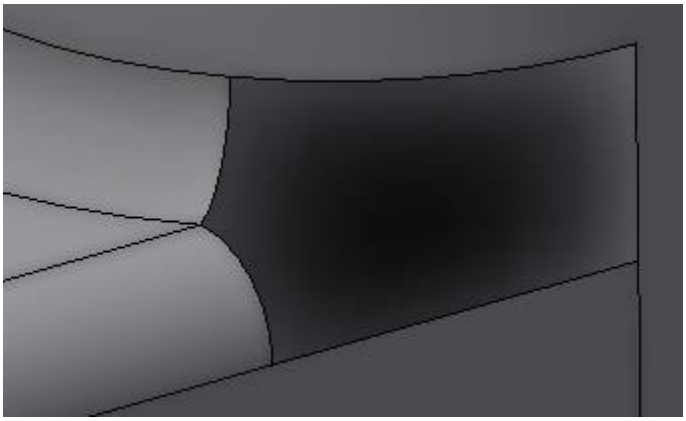
2. Create a 3D sketch and project the 2D lines onto the surfaces



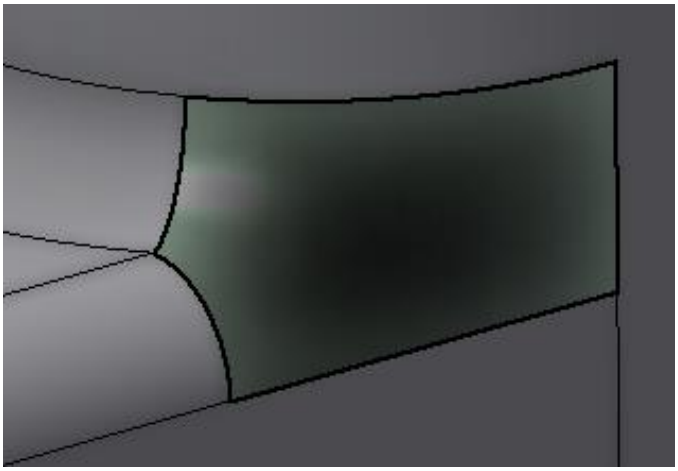
3. Cut the surface using the 3D geometry with the Split command.



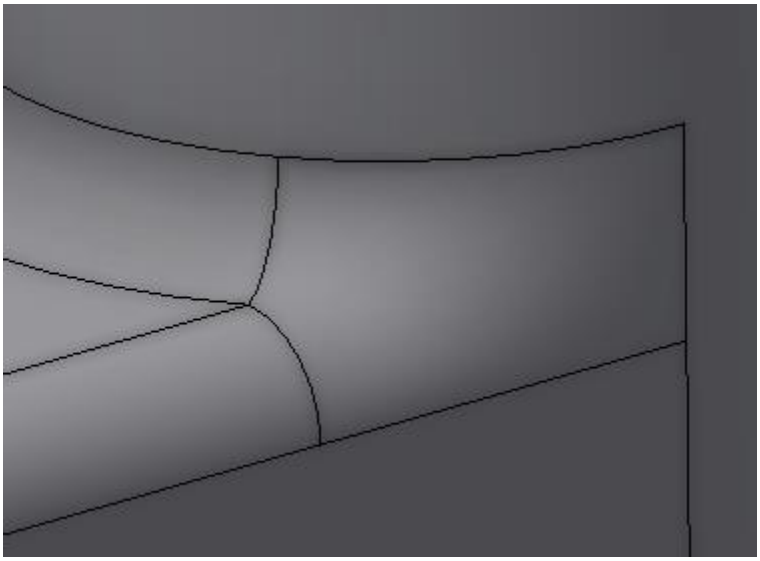
4. Delete the unwanted faces.



5. Create a boundary patch and use the tangent option

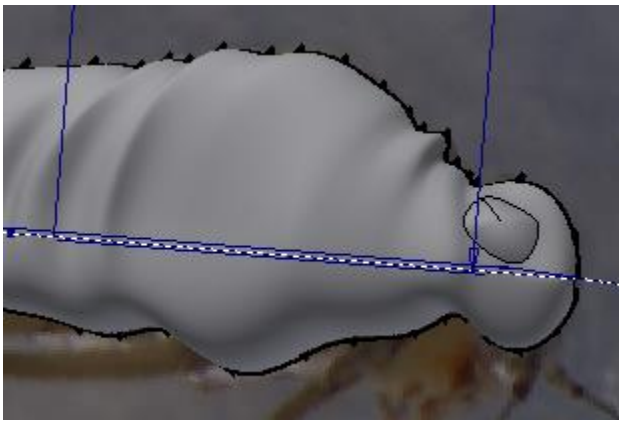


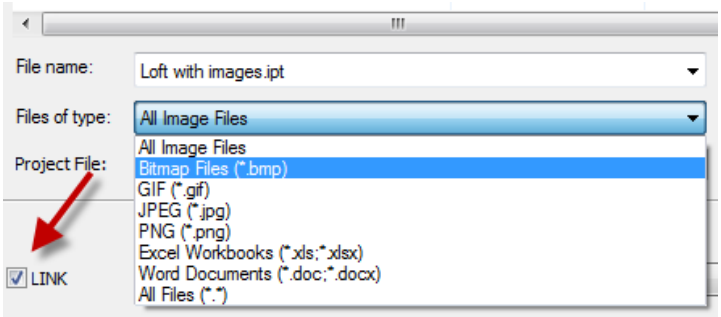
6. Stich or Sculpt the surfaces back into a solid.



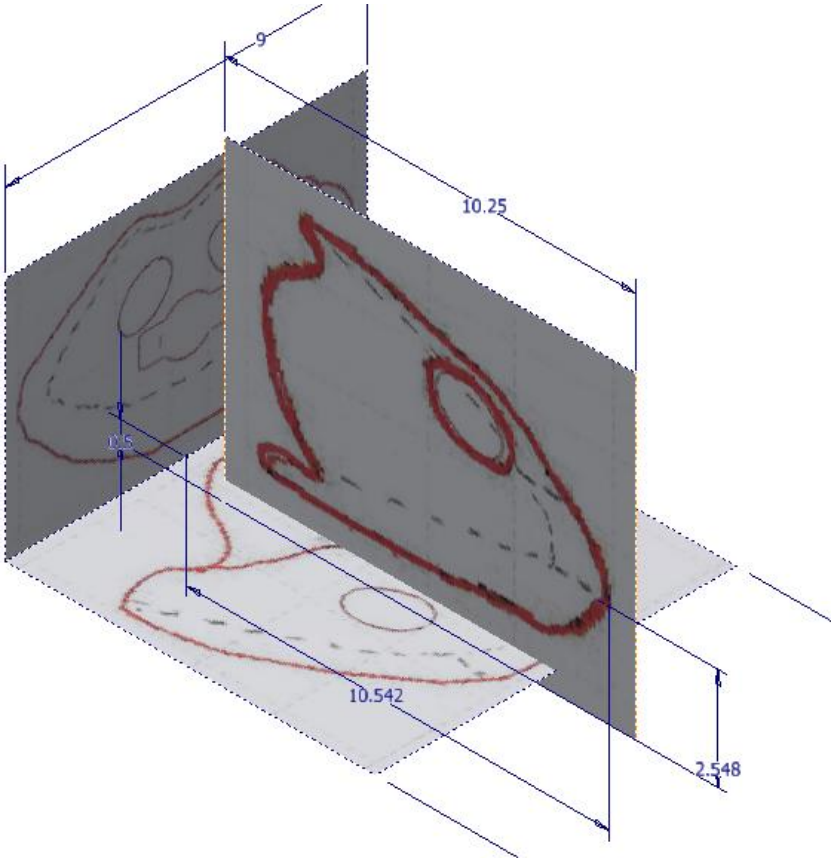
Bring your ideas to life by modeling from hand-drawn sketches and model surfaces from hand-drawn sketches

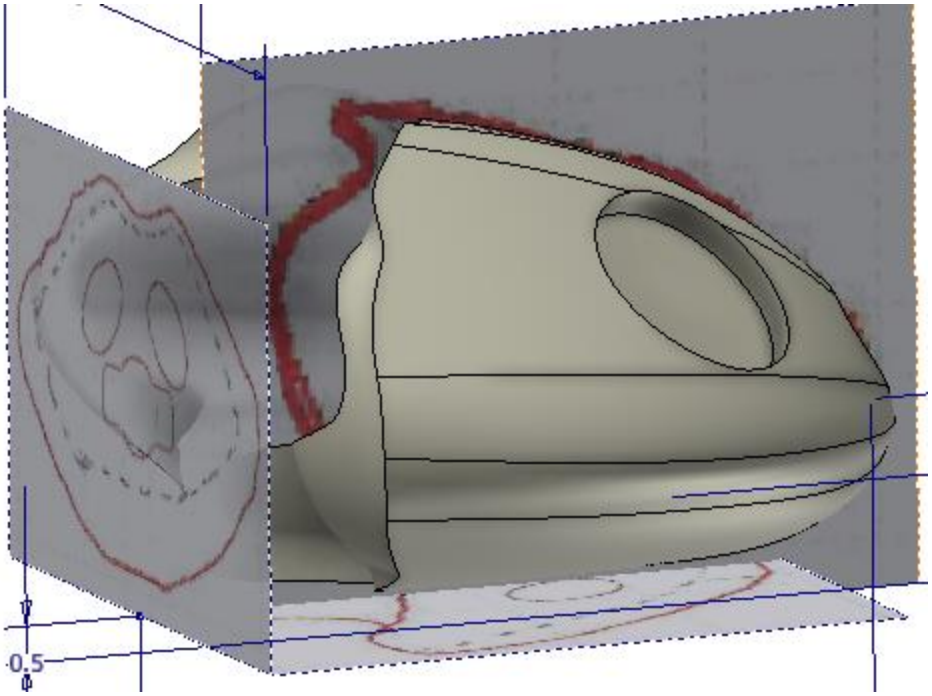
Use images or hand drawn sketches as a quick reference in models by placing them on sketches and drawing over them.



- Be sure to uncheck the Link open when inserting. There is little reason for this relationship.
  - 

- Be sure to fully constrain the images on the sketch or they can be moved by accident.





Confidently create organic shapes

Rusty shows how easy lofts are to work with in this video. “The Weeping Angel modeled with Autodesk Inventor.”

http://www.youtube.com/watch?v=nz40y954pxs