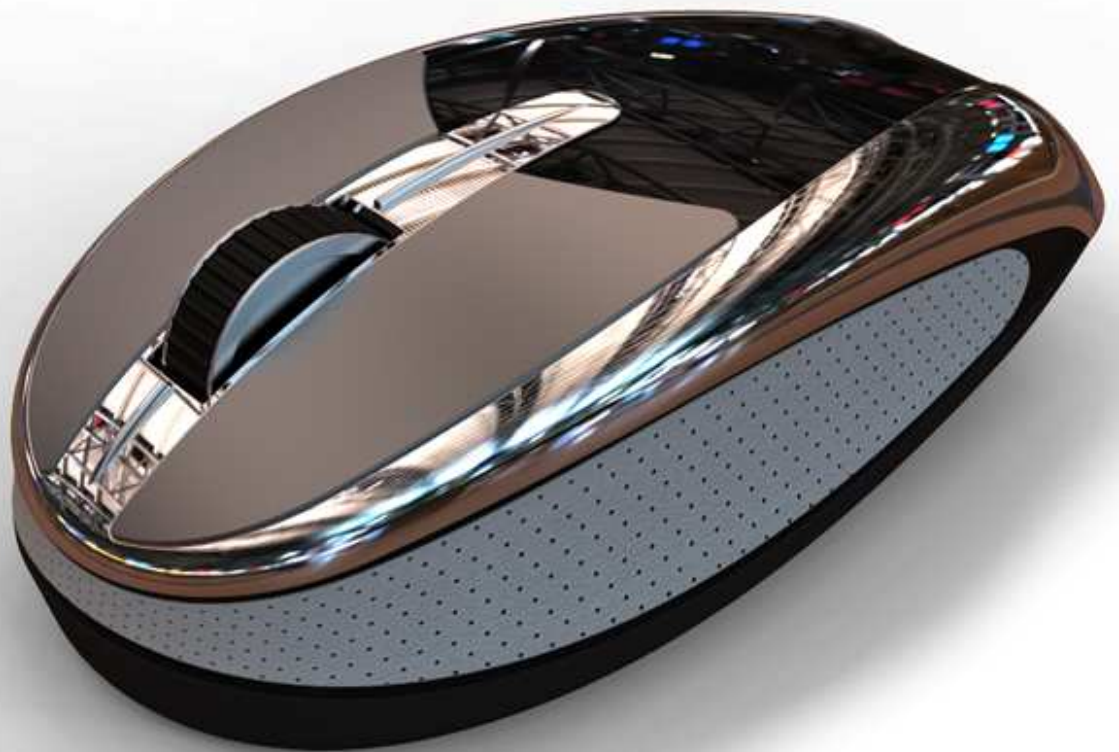




# Tips And Tricks



## Creating Cross Curves to Modify a Surface

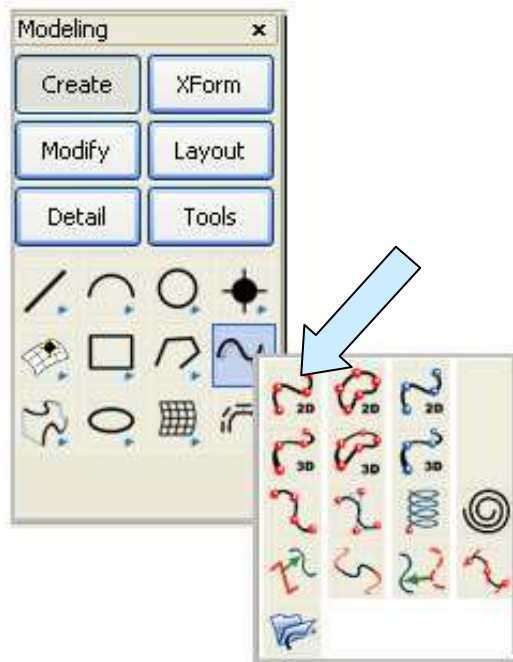
In this month's exercise, we're going to look at an easy way to quickly construct a cross curve that will be used to modify an existing surface. Since the surface can be one that is unstitched from a solid or an independent surface, this technique is equally useful for both pure surface modeling and hybrid modeling situations.

We'll begin by creating a simple surface that we can then modify

Start with a new file in View 5. (The Right View.)

Use the CREATE ARC BY THREE POSITIONS Function to create an arc. We'll use the Keyin Option and type the following coordinates for the three positions:

First Position	0,0,0
Second Position	1.5,0.3,0
Third Position	3,0,0

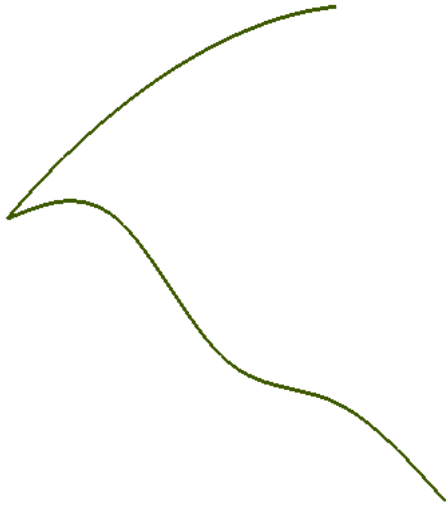


Next, switch to View 2. (The Front View.)

Click on the 2D OPEN CUBIC SPLINE Icon. Using the Keyin Option, enter the following values for five nodes of a spline.

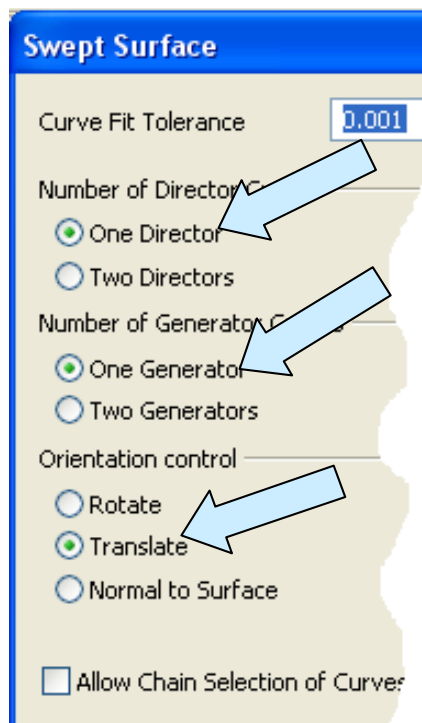
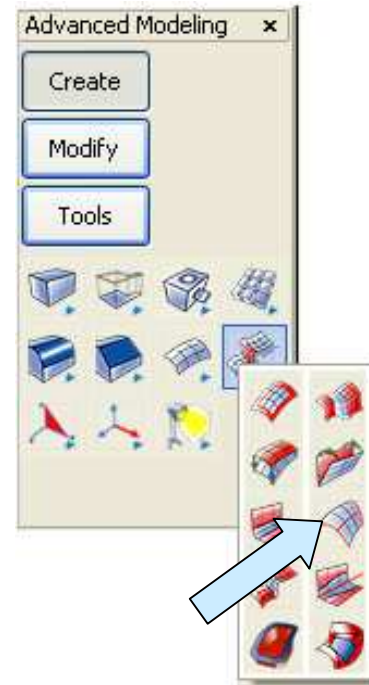
First Node	0,0,0
Second Node	1,0.5,0
Third Node	2,0,0
Fourth Node	3,0.2,0
Fifth Node	4,0,0

Now, switch to the Isometric View. (View 7.)



Your screen should look like this:

Now, click on the SWEPT SURFACE Icon.



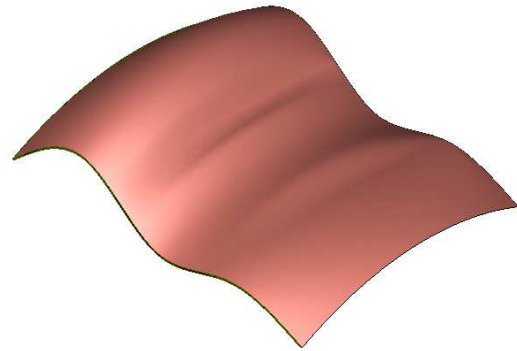
Select the One Director and One Generator Options in the Dialog Box that appears.

Click on the Translate Option and hit the ENTER Key.

Now, select the spline and then, using the EndEnt Option, click on the left end of the spline.

Then, select the three point curve and using the EndEnt Option, click on the front end of the curve.

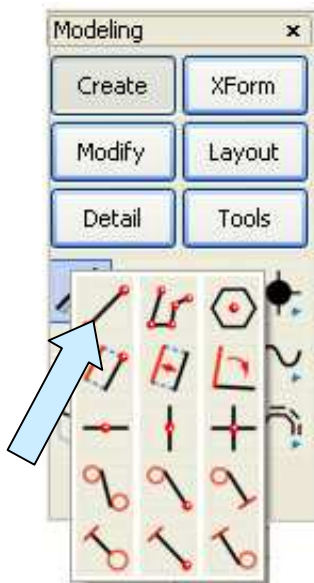
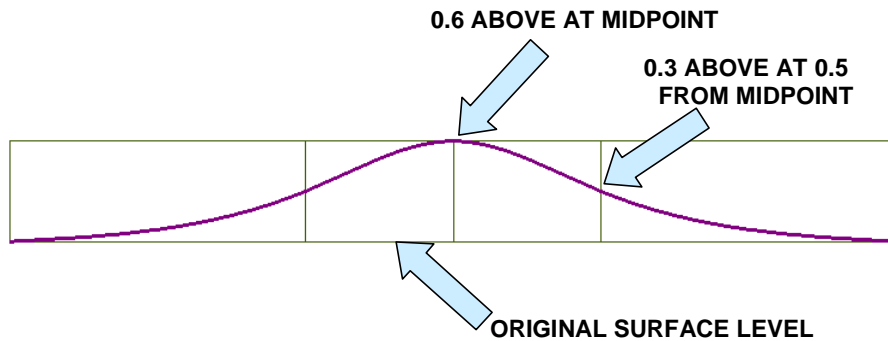
You will now have a simple surface that looks like this:



Let's suppose that you want to create a rise at the midpoint of the surface that peaks at 0.6 inches above the current surface level.

For this example, we might also want to control the shape of the rise so that at 0.5 inches on either side of center, the surface rise is 0.3 inches above the original surface.

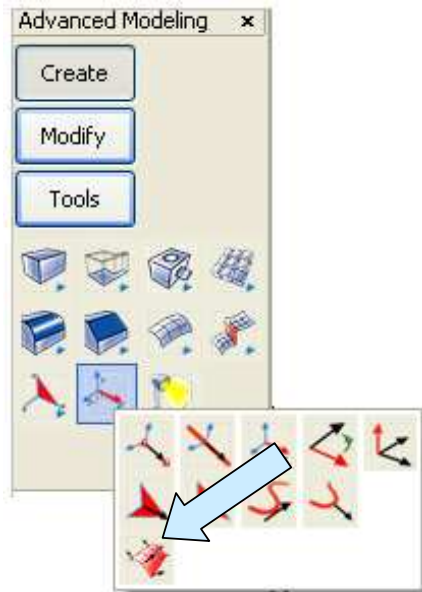
I've illustrated these conditions below.



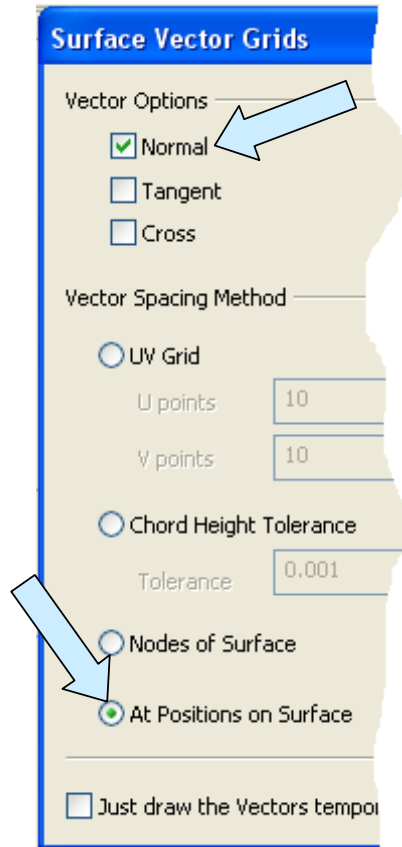
Now accurately creating a curve that defines these conditions is easy if you use a few tricks.

First, click on the LINE BY END POSITIONS Icon.

Create a line that connects the midpoints of the front and back surface edges.



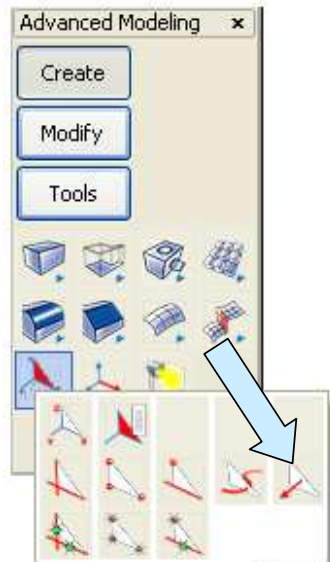
Next, click on the SURFACE GRID VECTOR Icon.



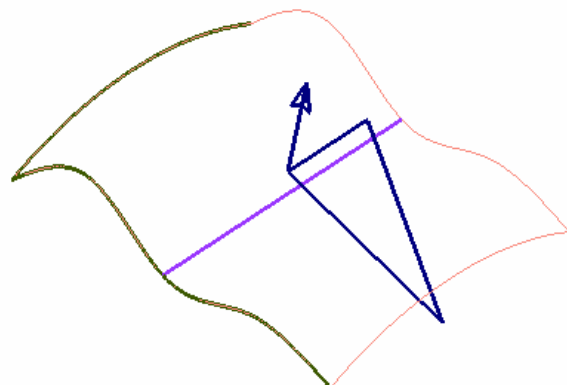
A Dialog Box appears.

Select the Normal Option and the At Positions on Surface Option and hit the ENTER Key.

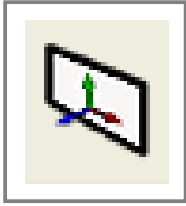
Next, select the surface. Then, using the CtrMid Option, click on the line that you just constructed. A vector is created normal to the surface positioned above the center of the line.



Next, click on the PLANE NORMAL TO VECTOR Icon. Click on the vector that you just made and a plane marker appears.



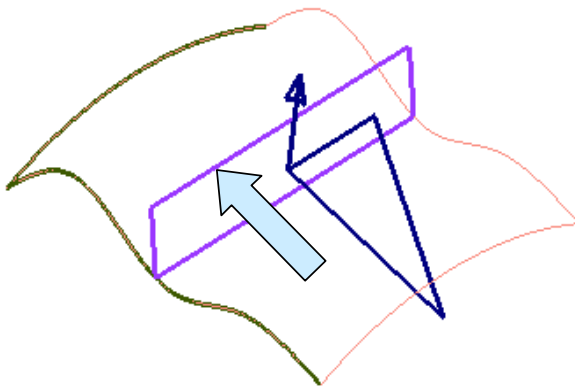
Your screen should look like this:



Now, click on the CONSTRUCTION PLANE Icon and then on the plane marker.

Now, click on the XFORM DELTA JOIN Icon.

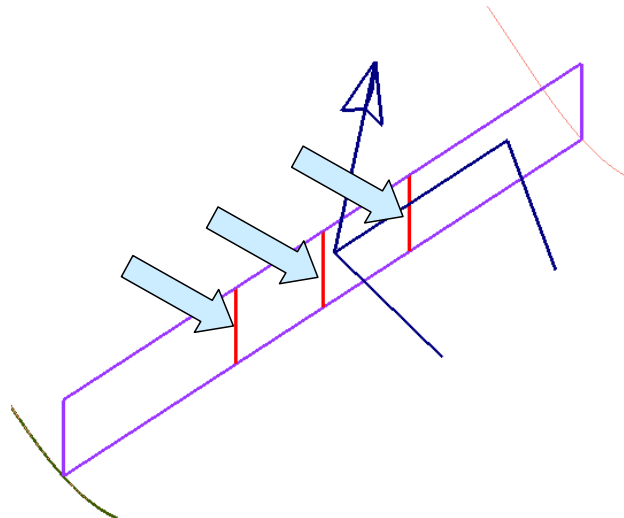
Select the line and hit the ENTER Key. Type 1 for the number of copies. Hit the ENTER Key twice, type 0.6 for the dZ value, and hit the ENTER Key.



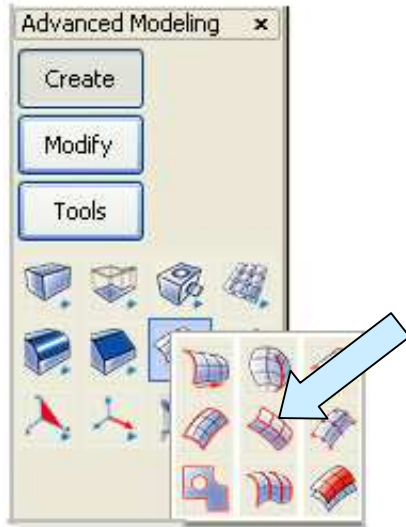
This creates a rectangle that forms a perfect spatial grid on which you can digitize your cross curve.

In a situation like this, I like to create a vertical line at the center of the rectangle and then a vertical line parallel to it on either side 0.5 inches away. (I would establish a Construction Plane on the rectangle for this.)

I can then quickly create a new spline on the plane defined by the rectangle using the lines and the AlongE Option to digitize the position.



I'll let you construct the new spline on your own.



For the final step, click on the CURVE MESH SURFACE Icon.

A small Dialog Box appears. We'll use the default tolerance so just hit the ENTER key.

Click on the front end of the left edge of the original surface.

Next, click on the front end of the new spline you just made.

Then, click on the front end of the right edge of the surface. Hit the ENTER Key to indicate you are done selecting primary curves.

Now, click on the left end of the front edge of the surface and then on the left end of the back edge of the surface. Hit the ENTER Key.

You can now see the defined rise in the new surface (Light blue) compared to the original surface.

You will find that micro manipulation of curves to create specific surface contours is easy if you use tricks like the ones we used in this exercise.

