

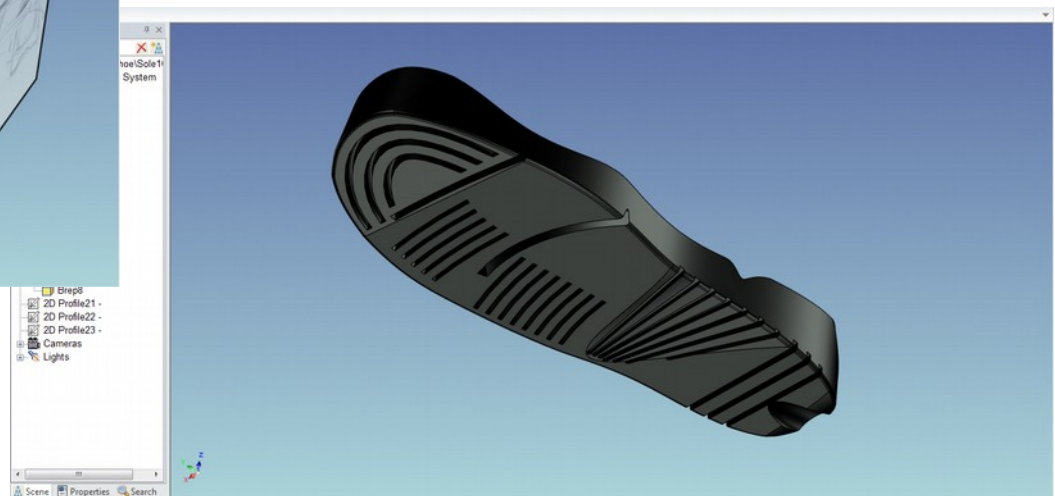
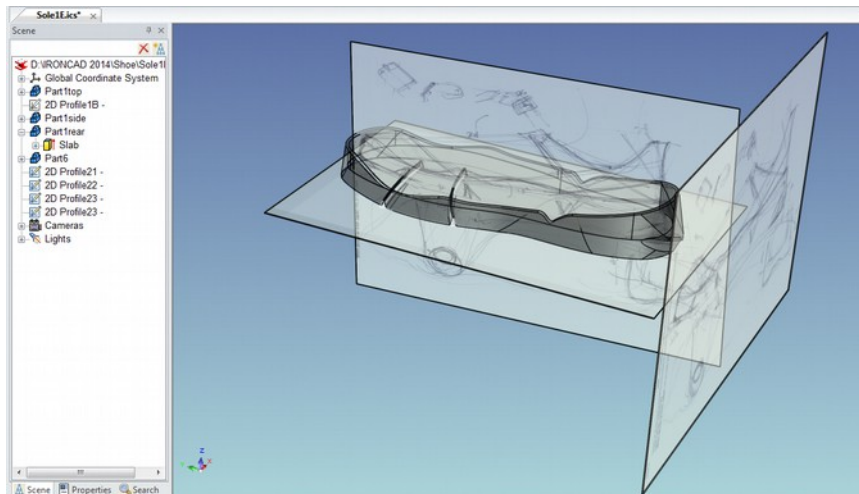


IRONCAD

Shoe Sole Modeling From Sketch

This tutorial or guide shows how to use concept sketches as a modeling guide inside the scene environment. Tools used are SmartPaint's Decal, Sketch, Extrude, Sweep, 3D Curve, Mesh Surface, Patch Surface and Extract Surface.

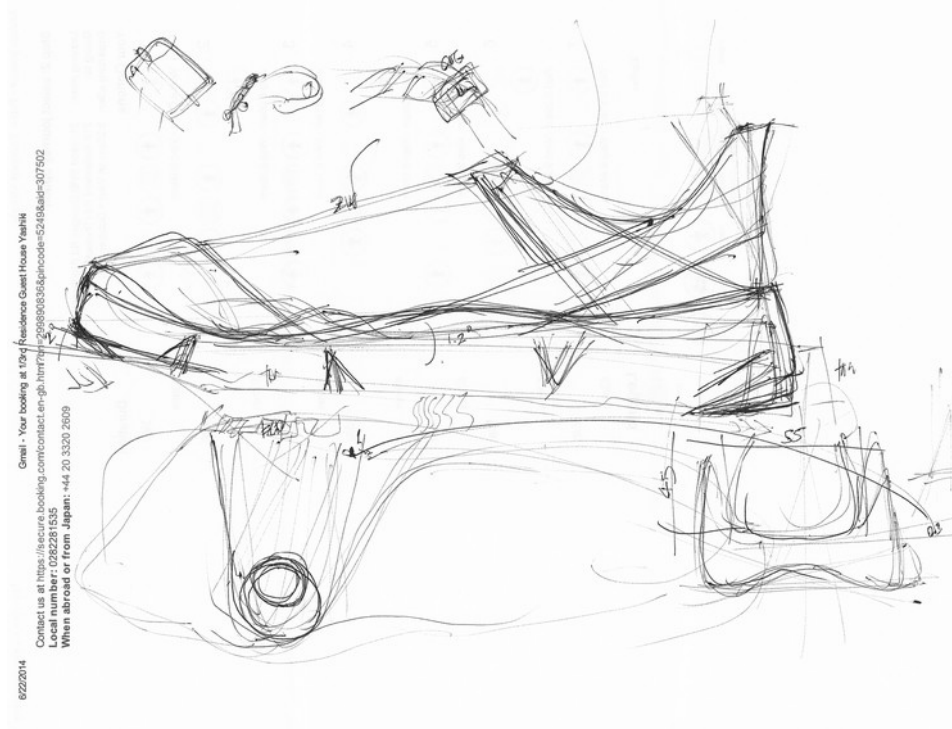
Note that SmartPaint decal applique variation between Part and IntelliShape surface. Decal wraps at both sides of the plane of a Part as a material surface and IntelliShape at the selected surface side of the plane.





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Start by having sketches done and scanned as .png images. Also note the dimension references you may need for the project as you have to scale the decals to match those desired dimensions.

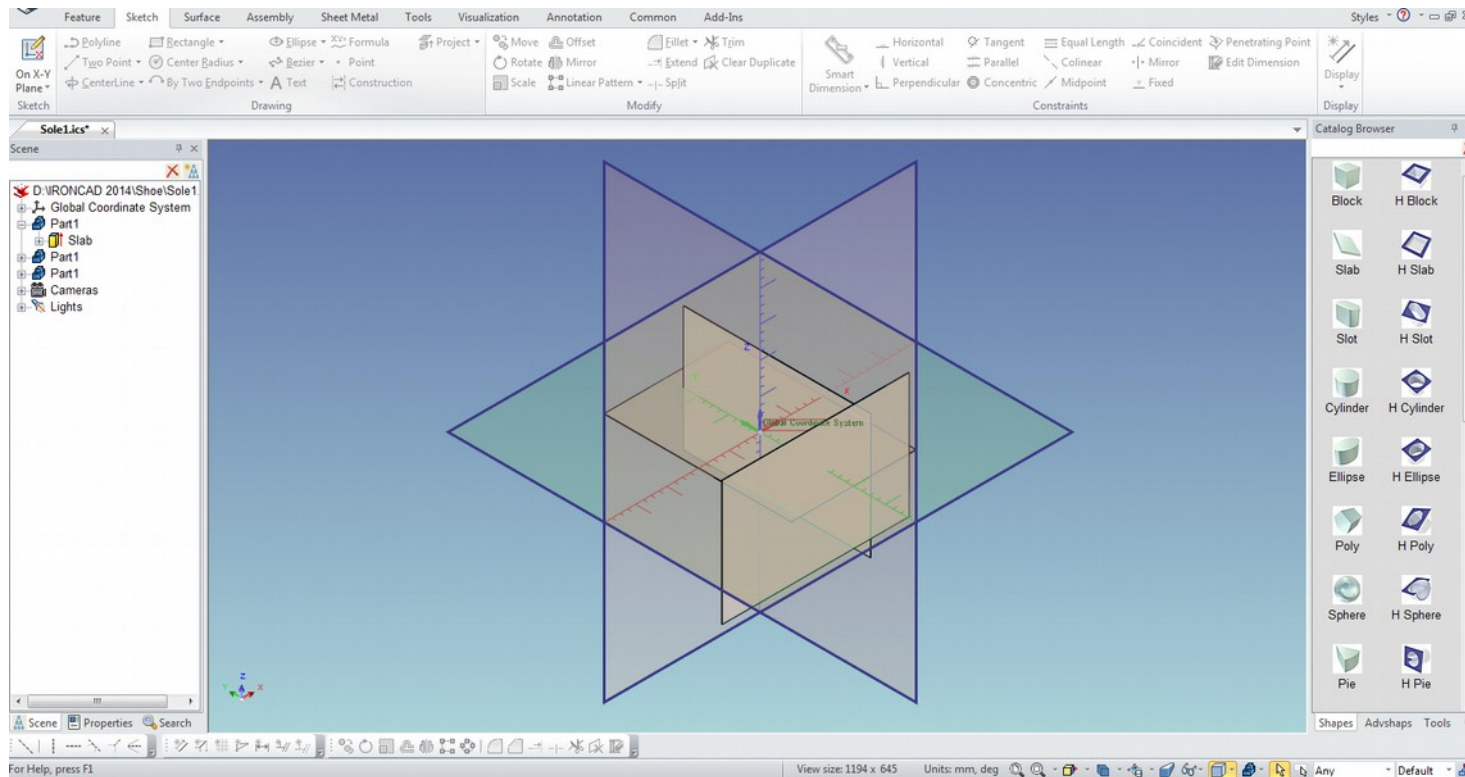
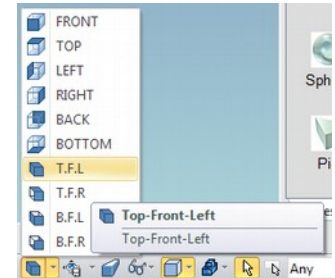




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Select a Metric Blue Datum Scene. Please note by default, the scene is set on a first angle view. To set this to the third angle view, LMB click on View button and select T.F.L and it set it on that orientation.

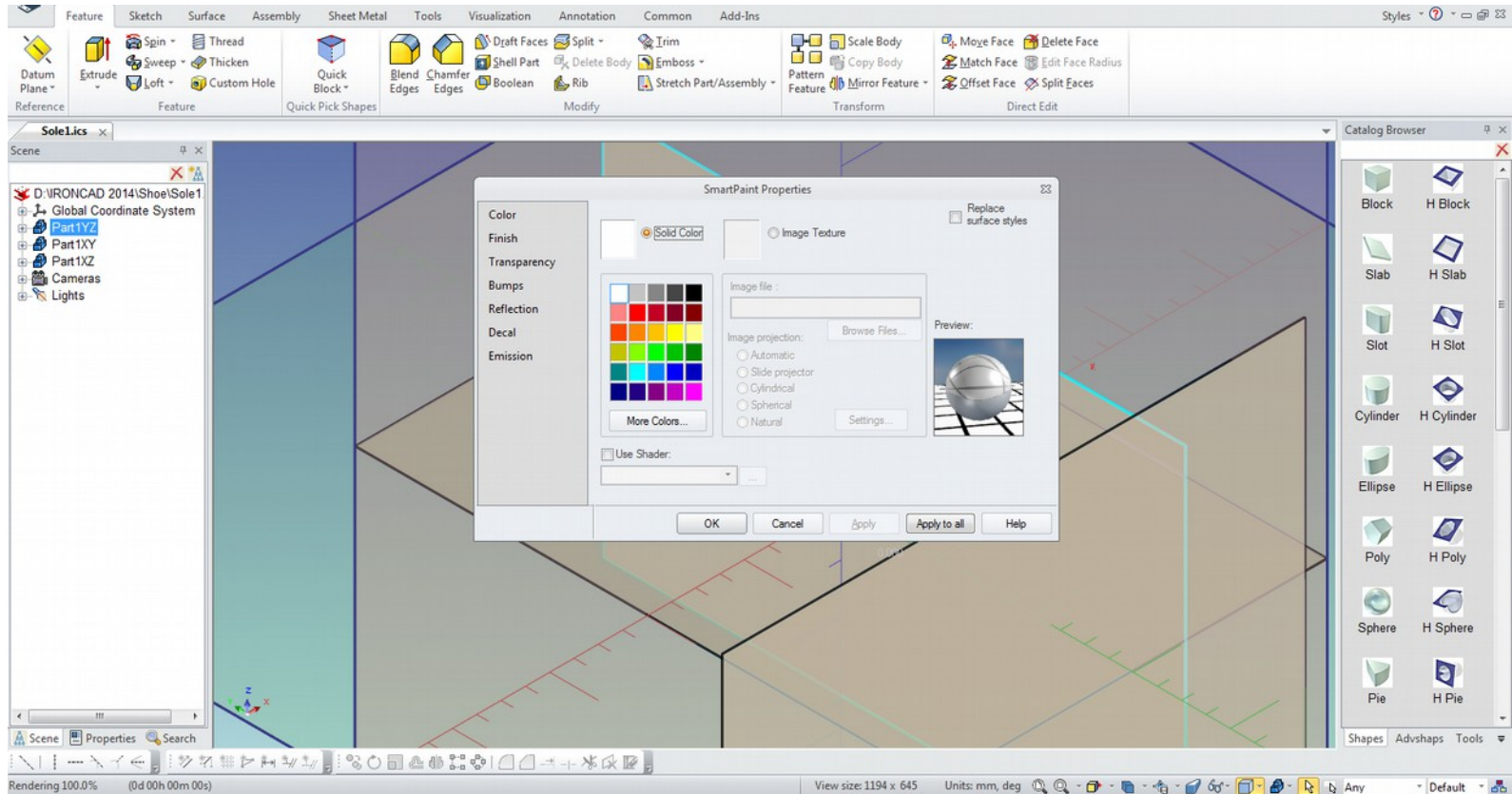
From the Shapes catalog, drag and drop slab catalog content and place it on the X-Y, Y-Z and Z-X planes.





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On the Scene browser, RMB click the first Part 1 or you can rename it as Part 1YZ and select SmartPaint. On the SmartPaint Properties dialog screen, set the following: Solid Color white, Transparency at 50

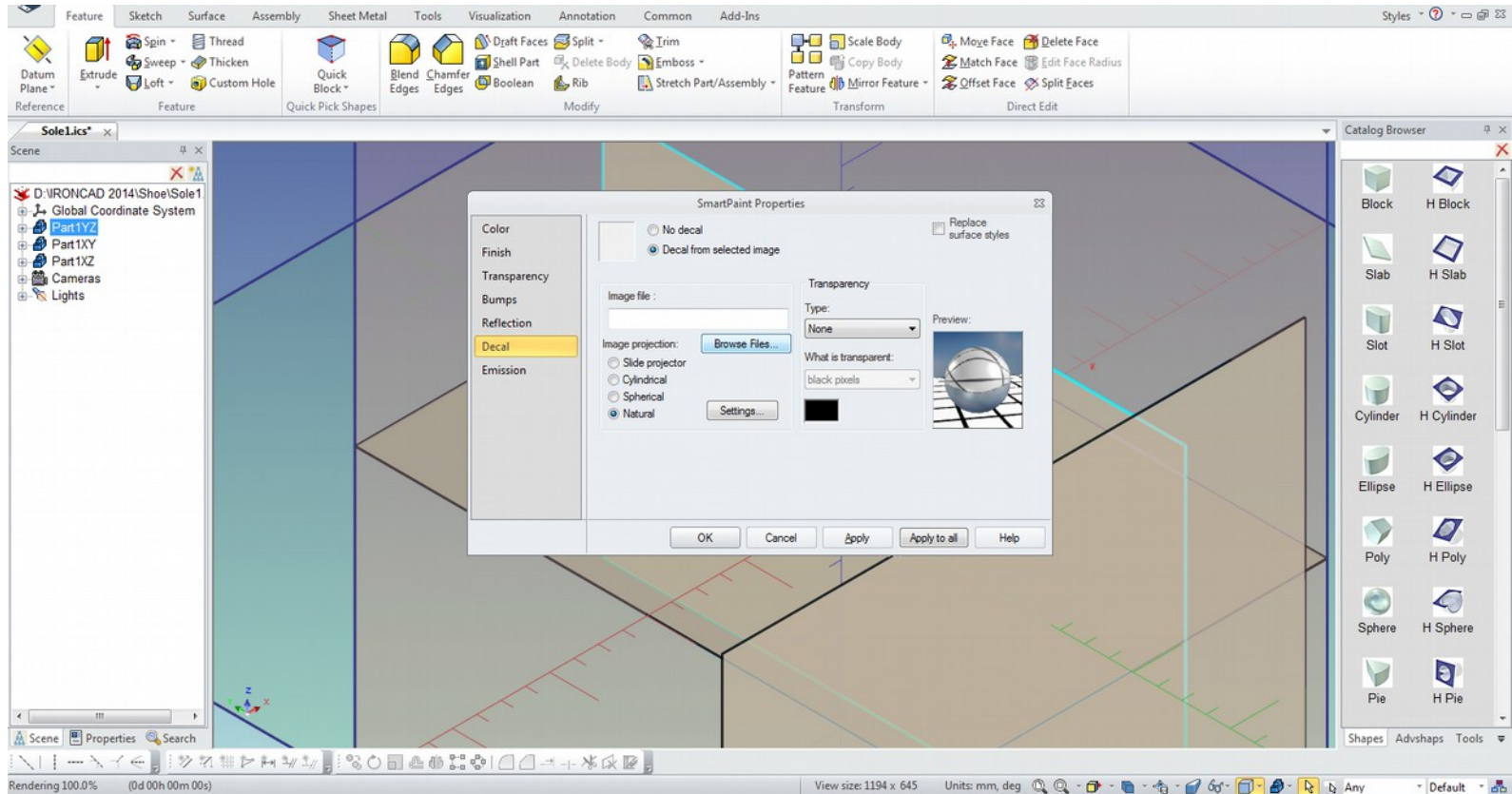




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Select Decal and set Image projection to Natural and browse for the image file. Tick Replace surface styles, LMB click Settings button and LMB click Apply Now.

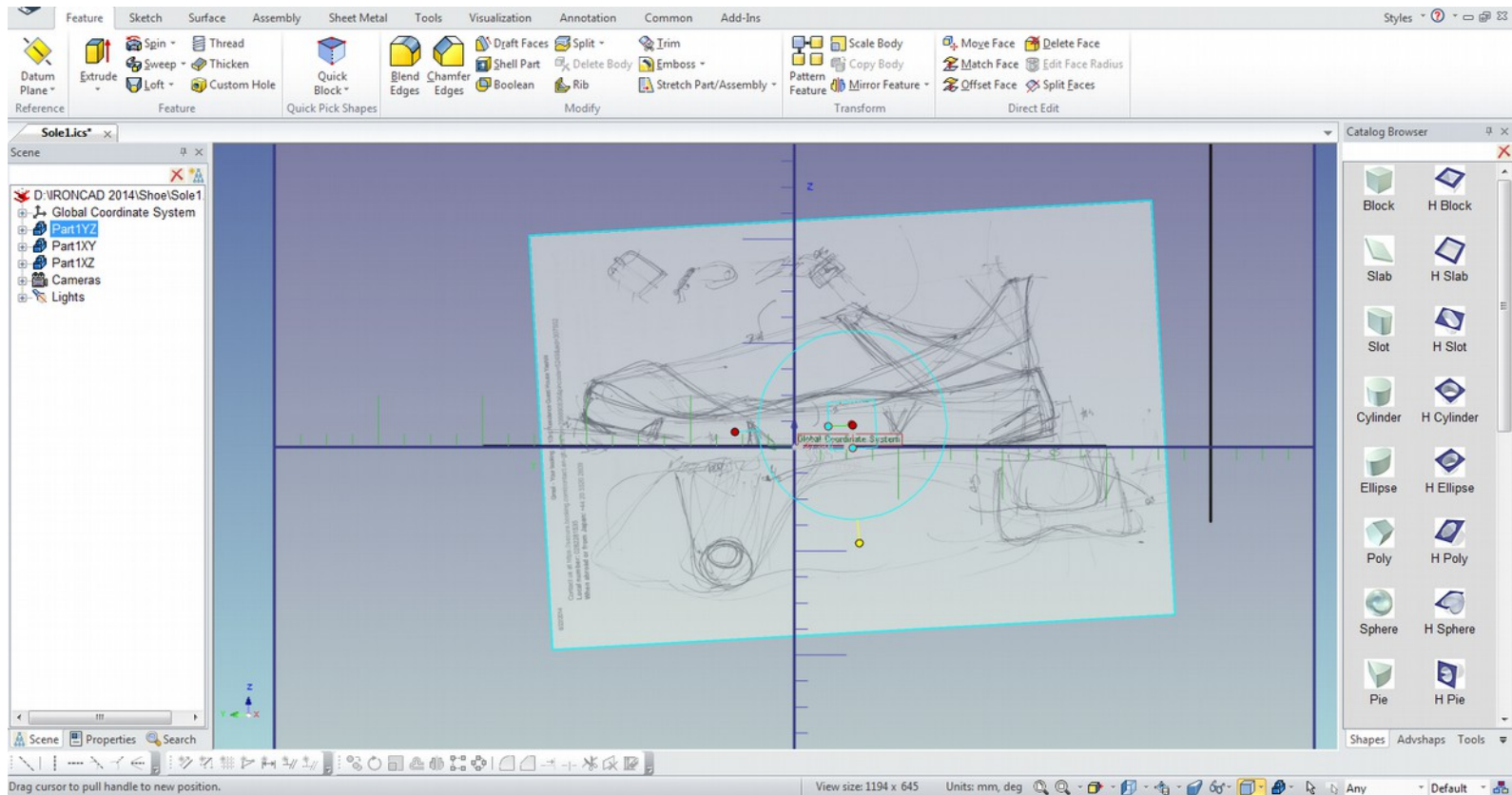
Note that Image scaling increases in size as it enters the decimal value $0.9 > 1$. Current position of the decal is set as 0, so if the image is placed vertical set to 270° as it rotate counter clockwise to the horizontal position.





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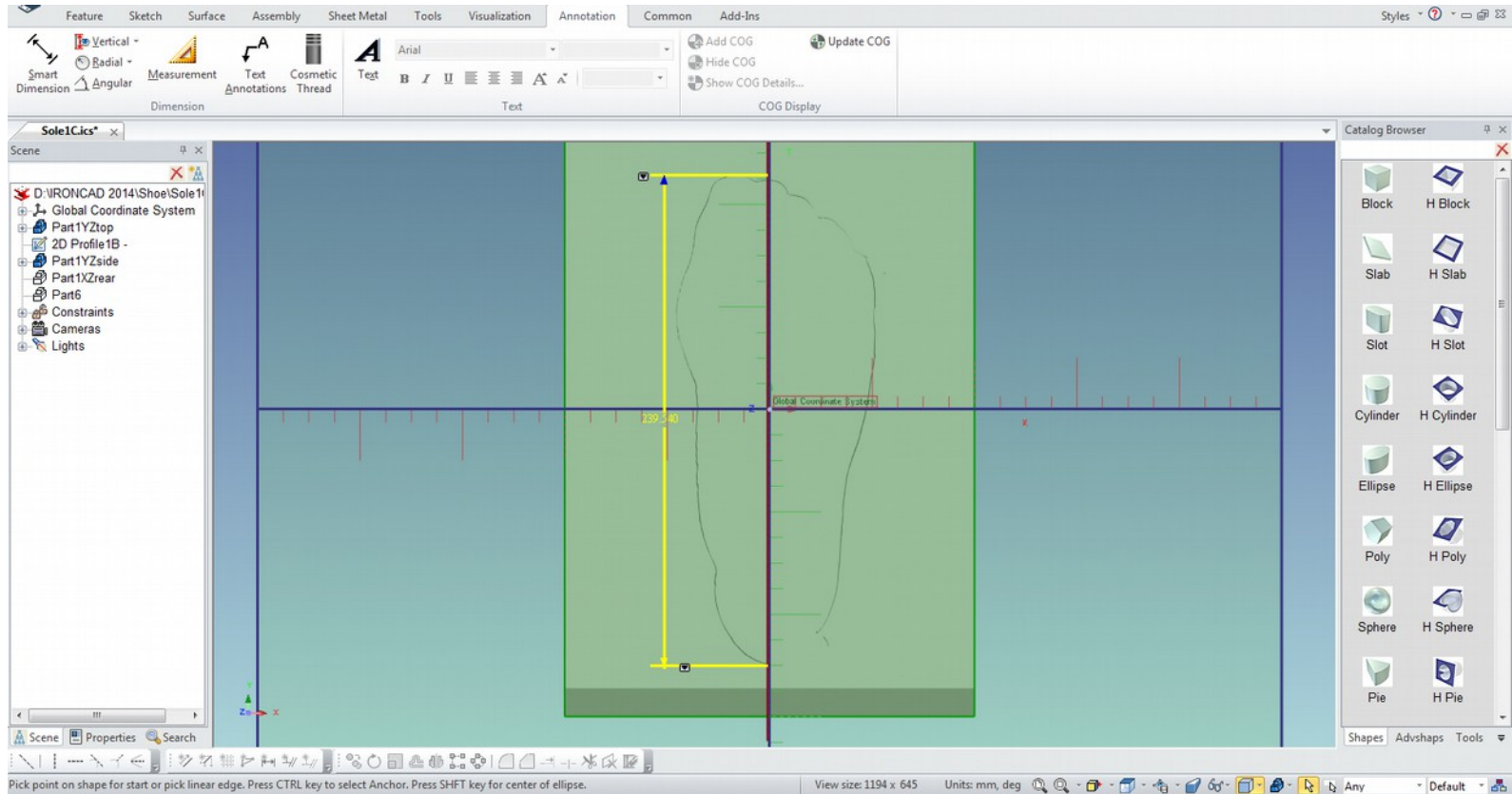
Set Scene View to Left and select Part1YZ and use the TriBall (F10) to rotate and position the sketch on the horizon. Apply the decals on Part1XY as Top View and Part1XZ as Back View.





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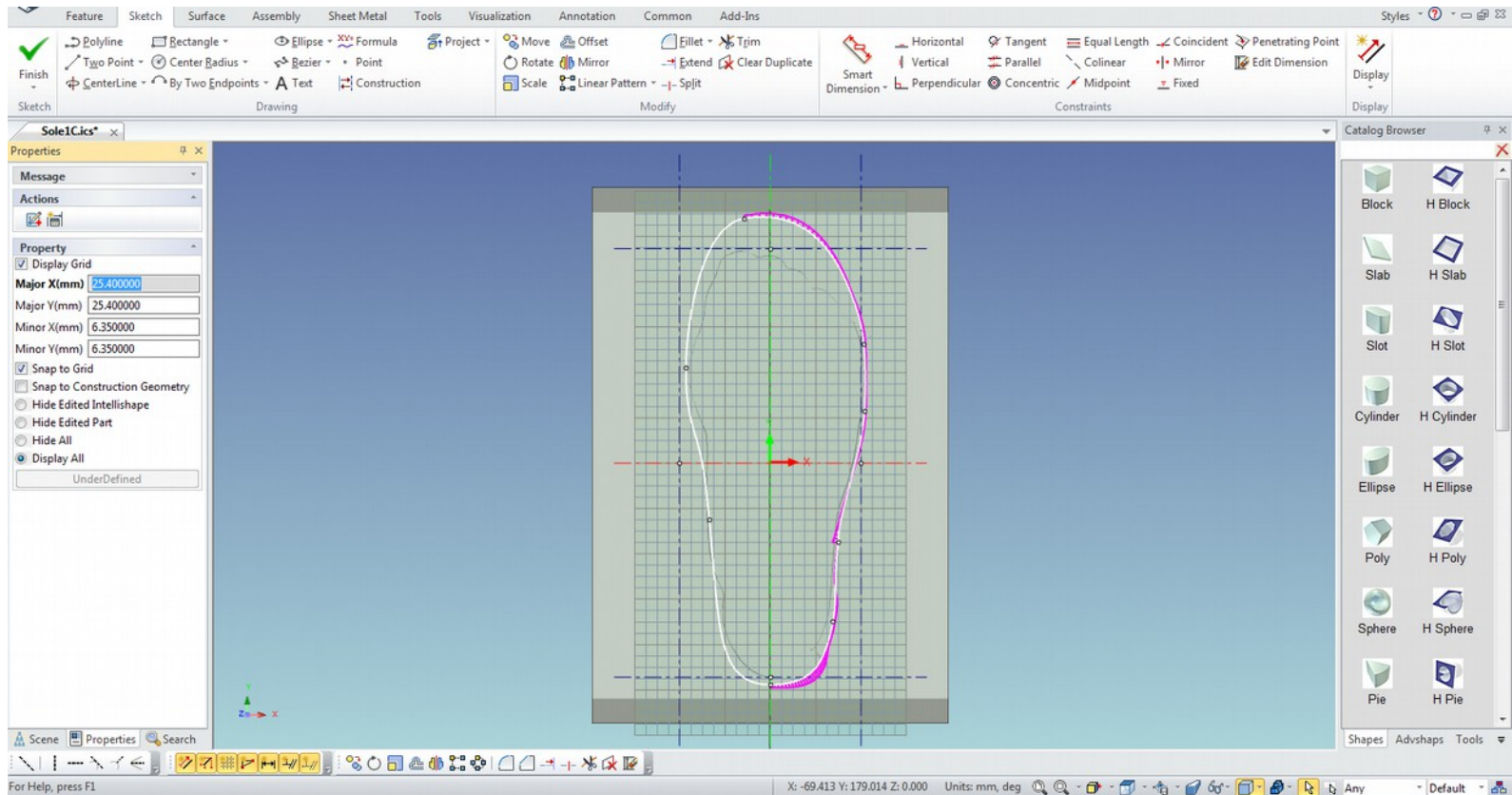
Select Top from View and measure the foot outline as it should scale from the source. This will allow the 2D Sketch an exact reference for sole.





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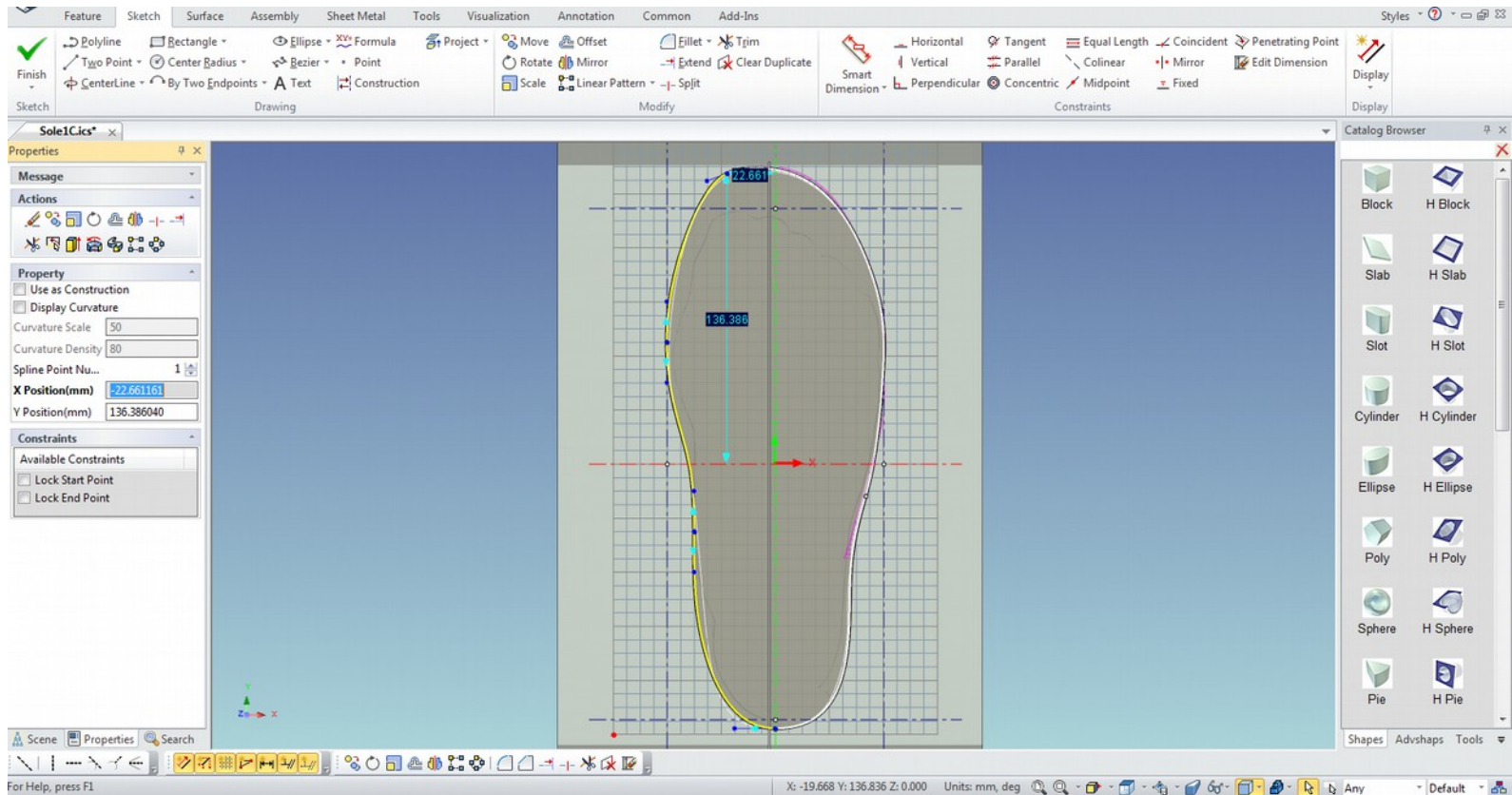
Select the Sketch tab > On X-Y Plane. Sketch a Bspline outline on the foot reference. You may opt first to go to View > Display Curvature so you can be guided. Display curvature only works with BSpline.





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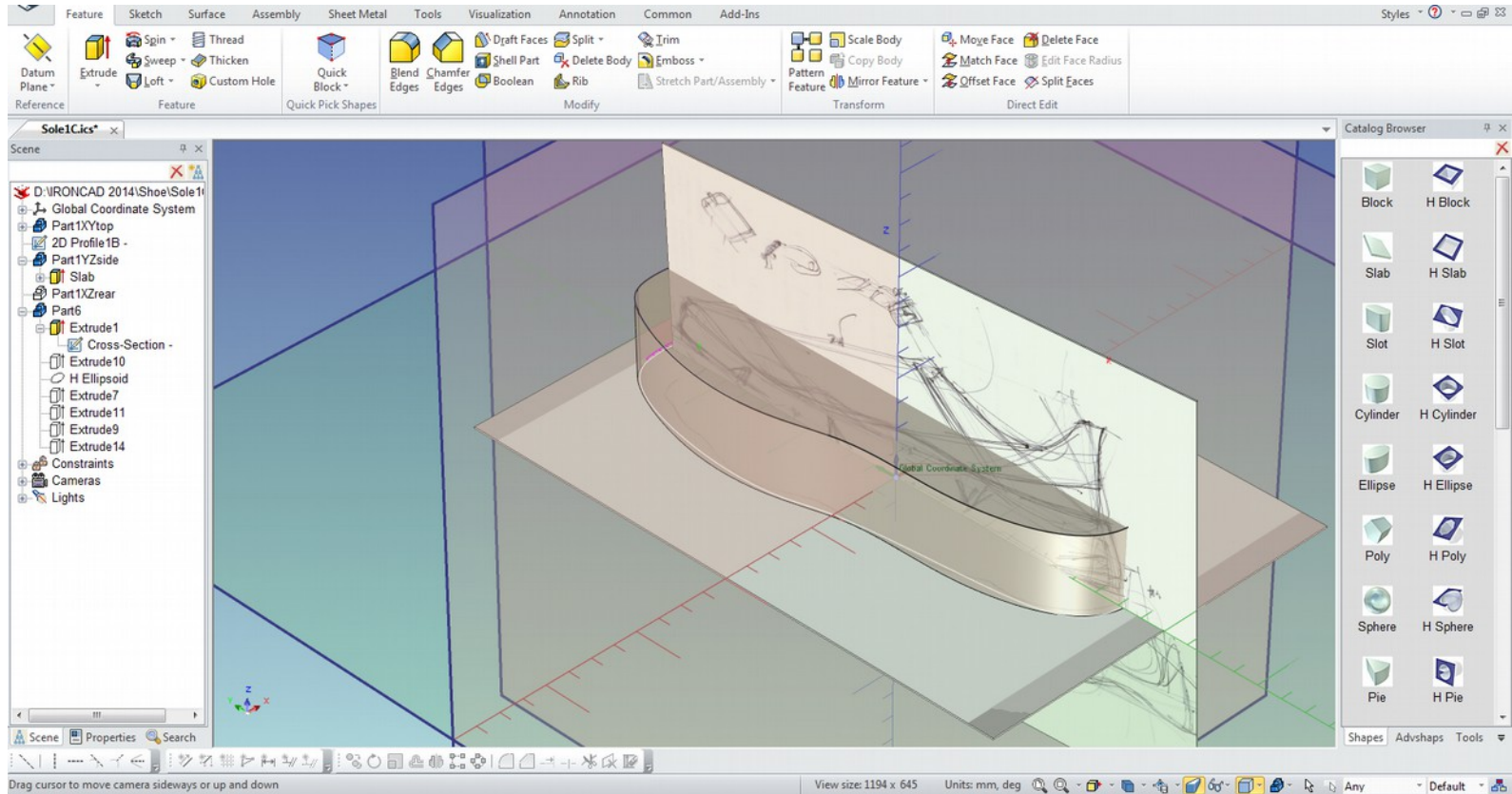
Whilst on the Top View, go to Feature > Extrude and on the grid use the Vertical and Horizontal Construction Line as a guide while you draw a Bspline over the initial sketch pattern made earlier. Position the points and handles to create the desired shape. LMB Click the check OK. The Extrude height is about 40.8 mm





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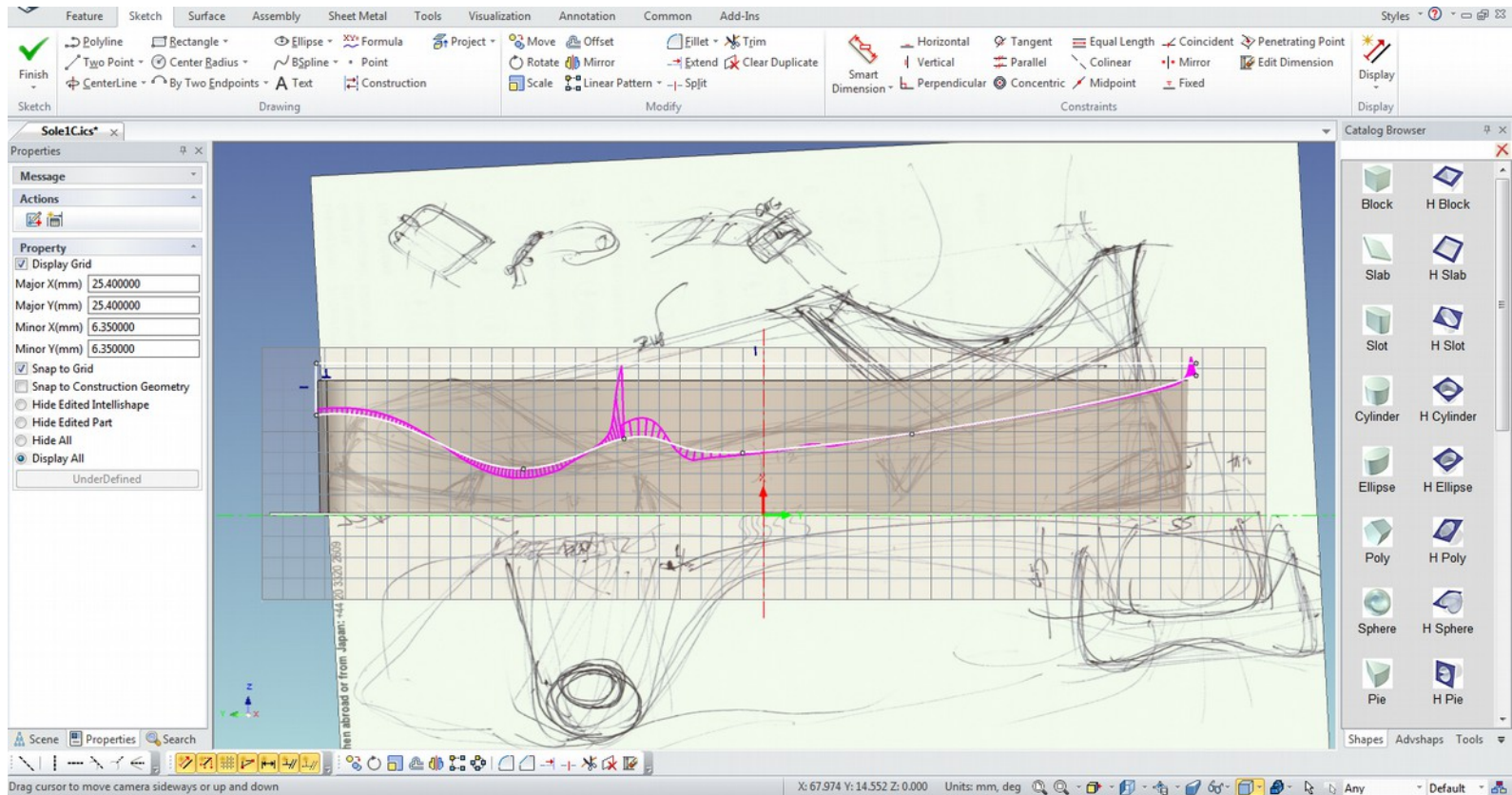
Extruded sole solid model.





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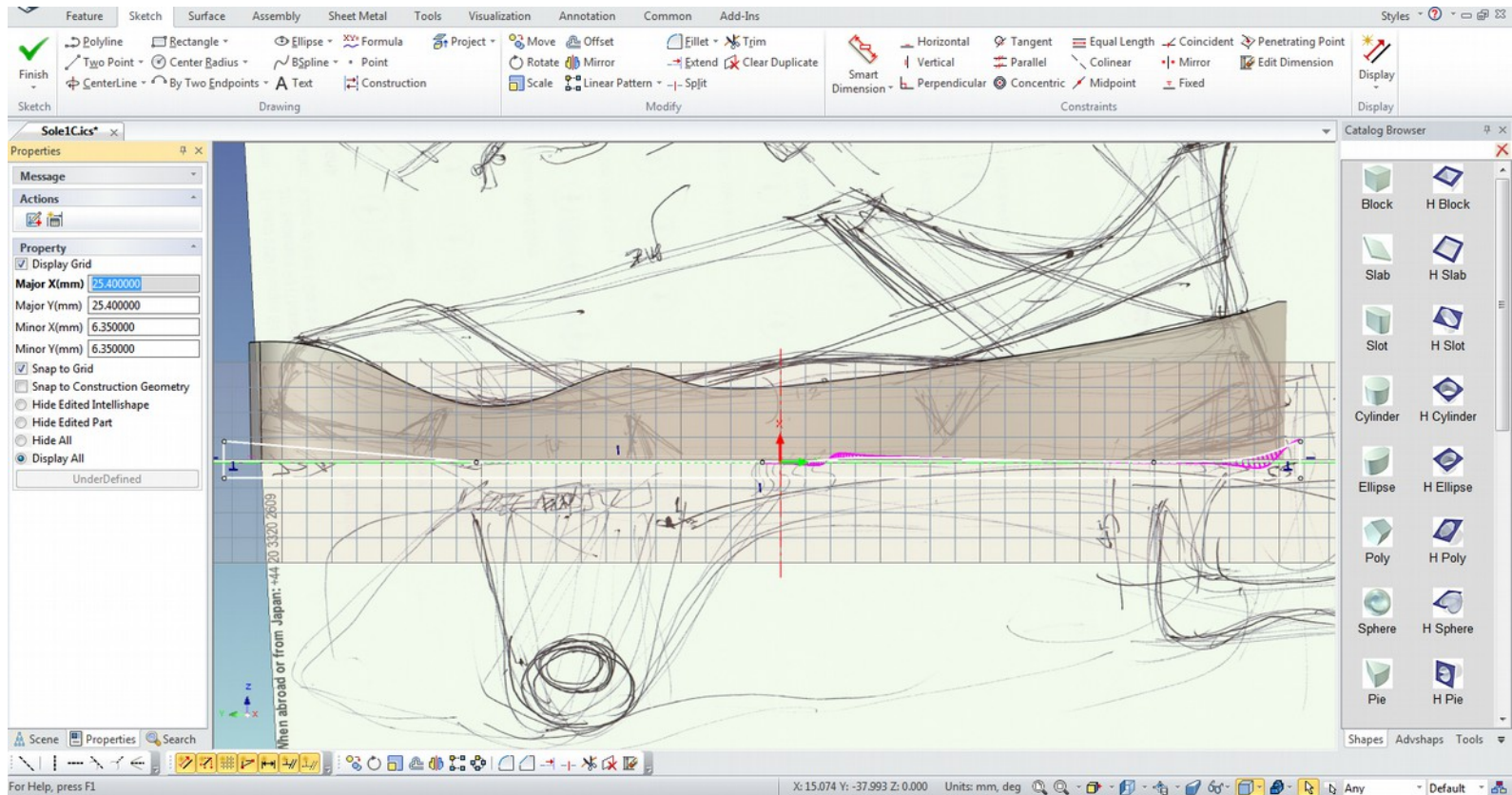
Switch view to Left and create a remove material Extrude. Your screen will orient vertical XY and just LMB click Left from View so it displays in the right horizontal view. The line used is a combination of Polyline and B spline. Display Curvature is activated.





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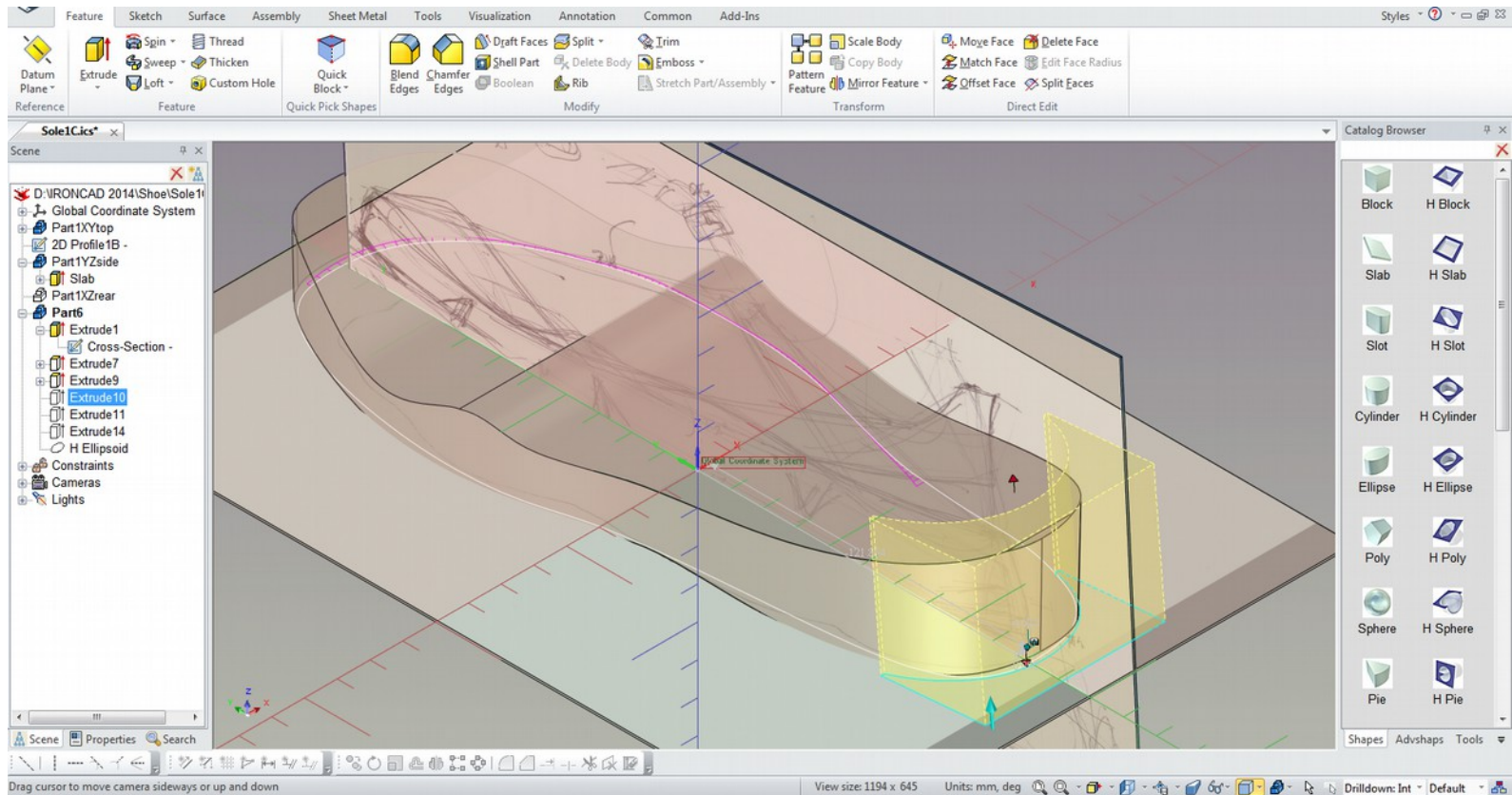
Same process is done to sculpt base of the sole. Surface Reshaping using Taper on the Side at a Tilt angle of -0.800 for support opposite the the foot arch. This process also sculpt a low arch.





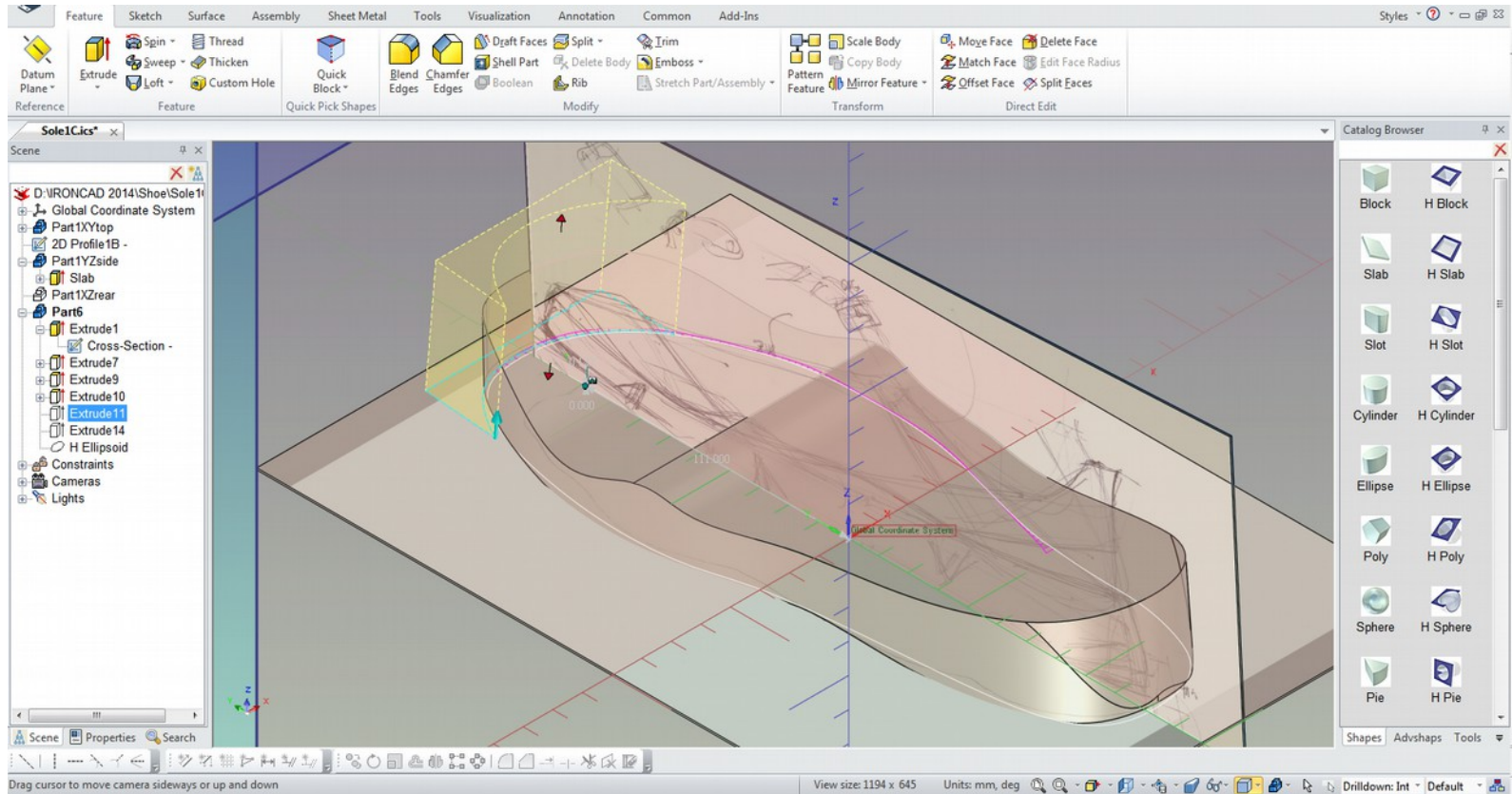
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Same process is done to sculpt base for the heel and toe of sole. Note the TribBall was used to tilt the profile on both Remove Material Extrude.





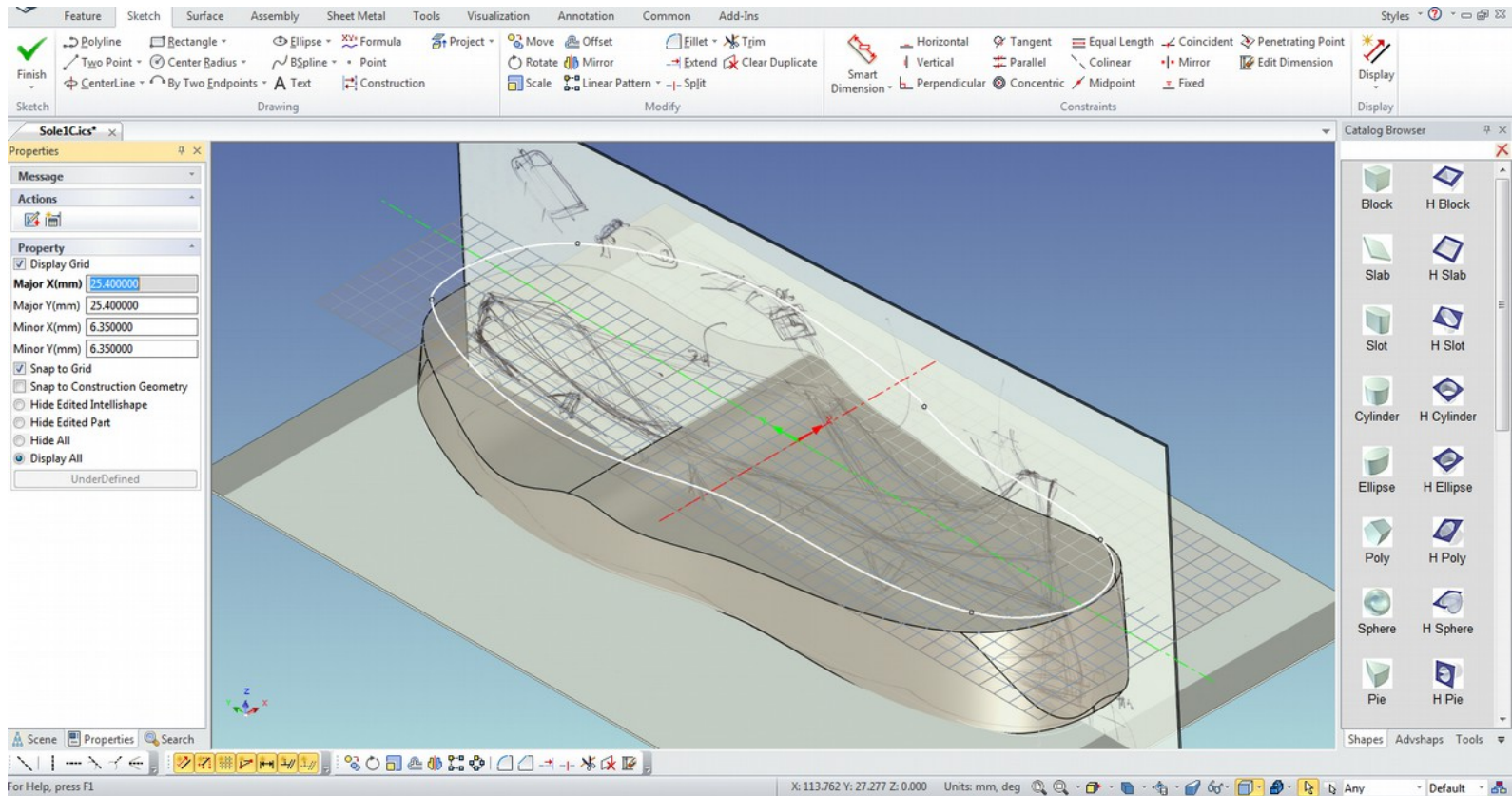
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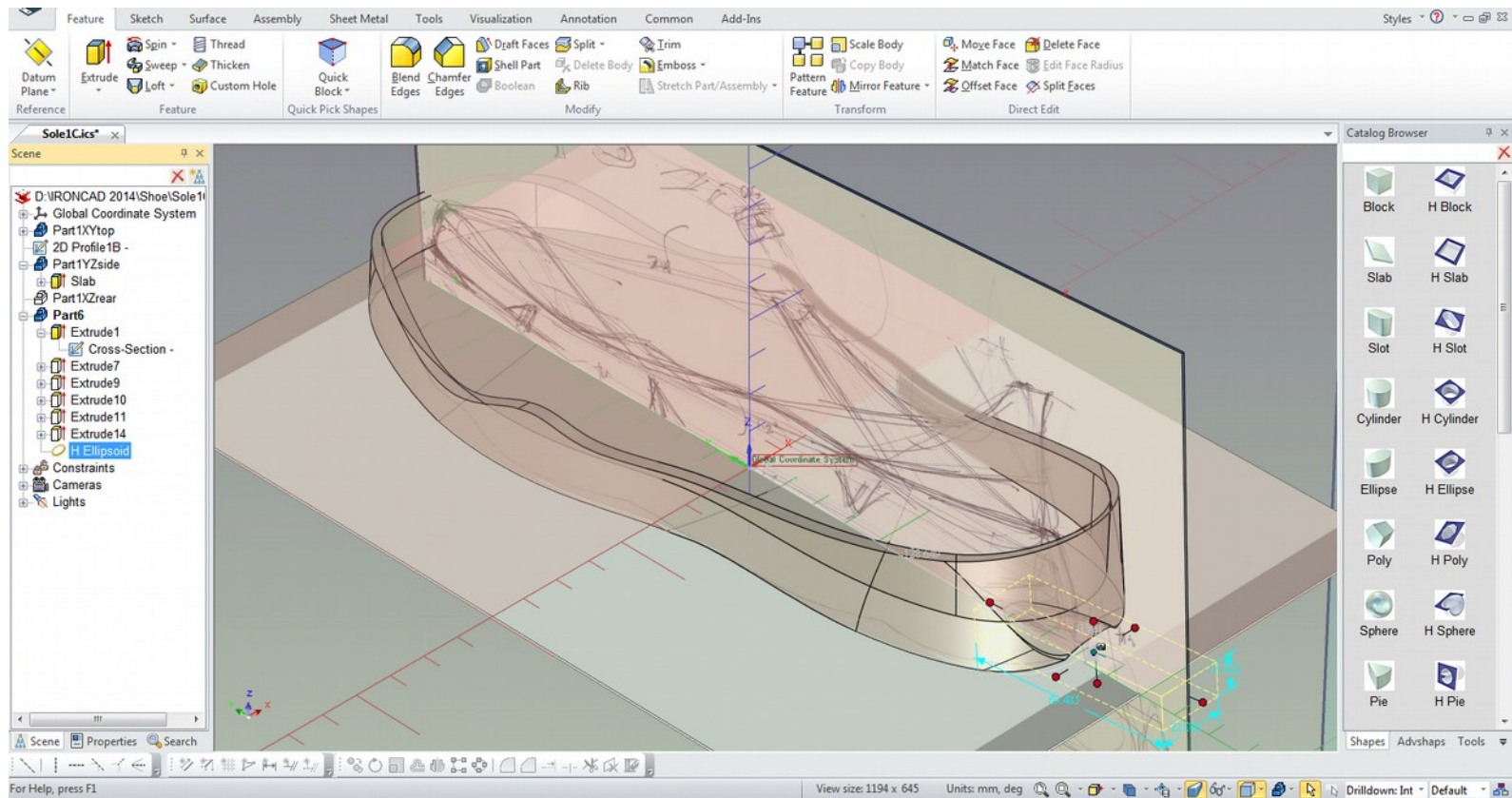
Remove Material Extrude was done with the aid of the Project Tool. The reduction on the profile was done using Offset Tool.





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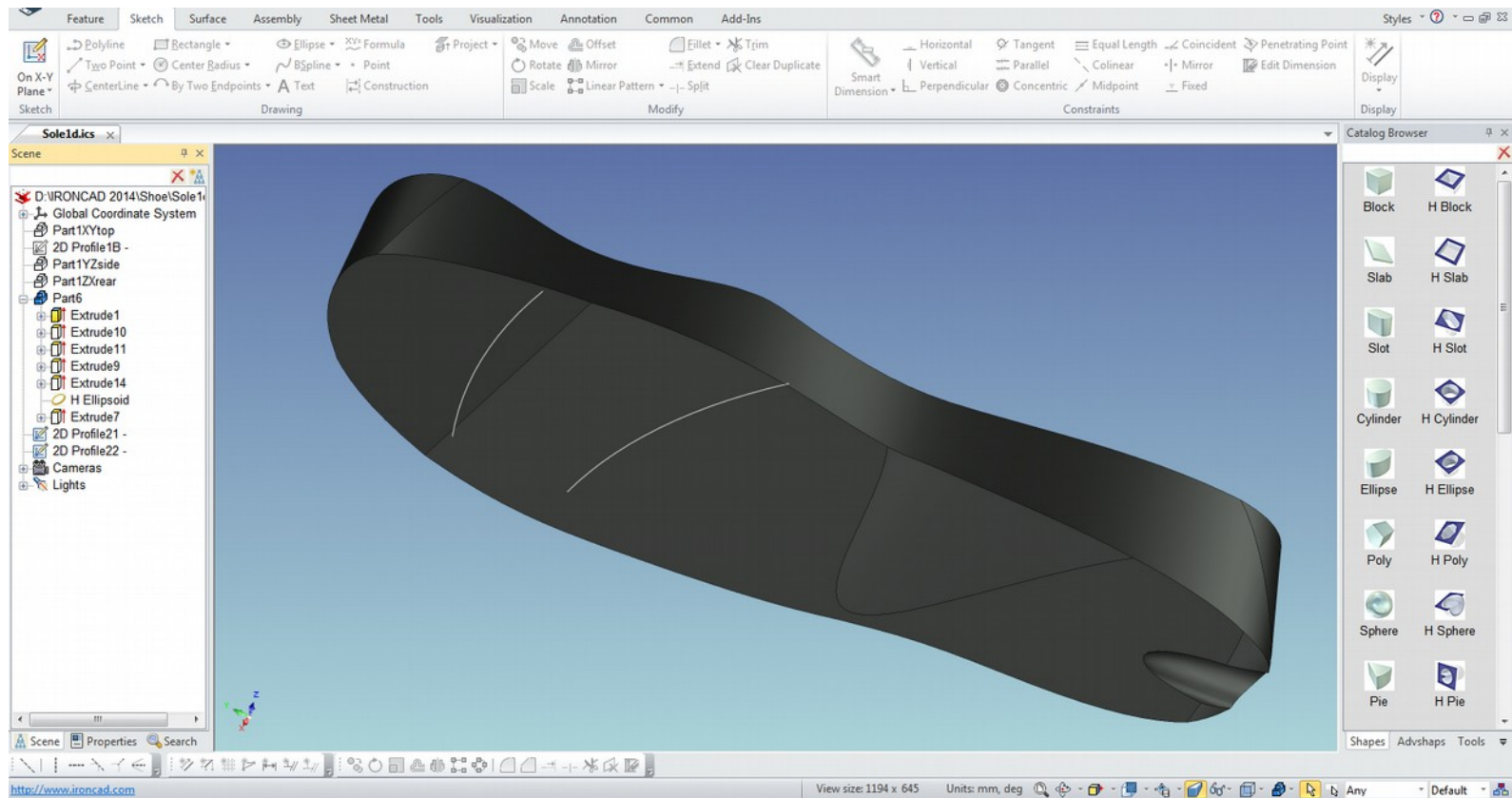
A H Ellipsoid was placed on the rear of the heel to allow water to seep out on a wet surface and expansion on compression.





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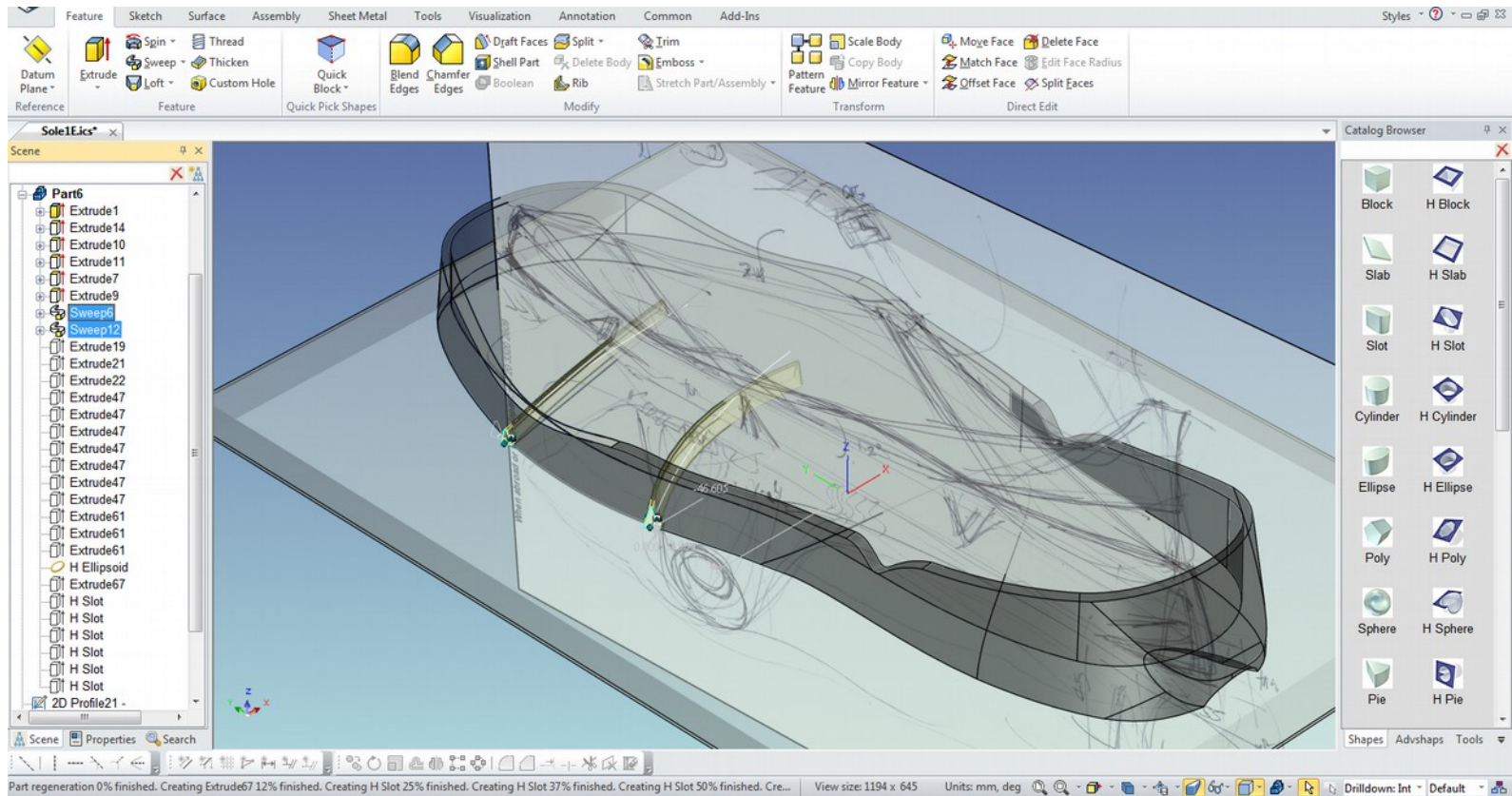
This shows the sole contact surface result from the Remove Material Extrude process. Next step is to Part6





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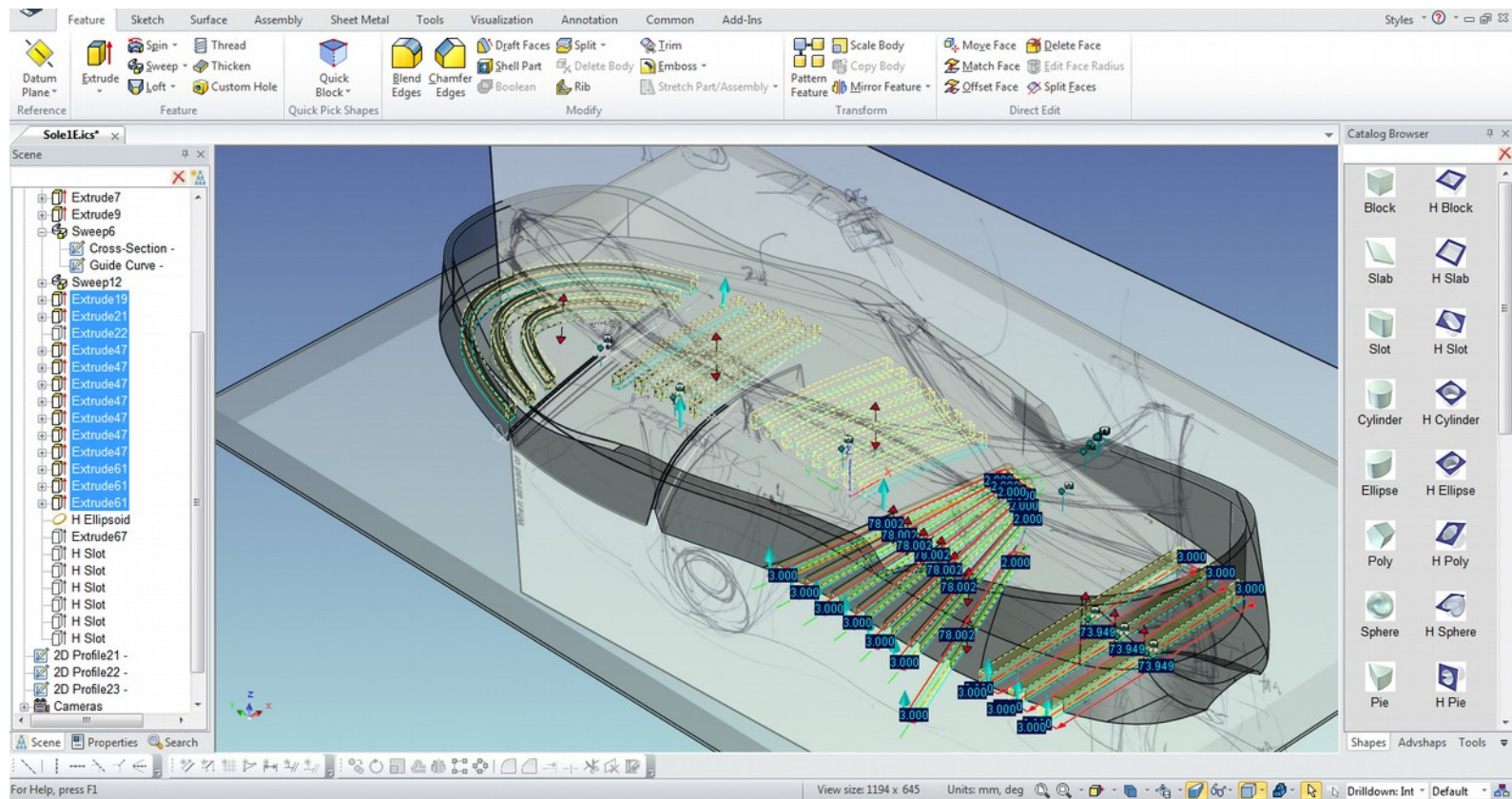
A 2D Profile and Guide curves was used to create these V cuts on the sole to provide flex points for the inner big toe mound.





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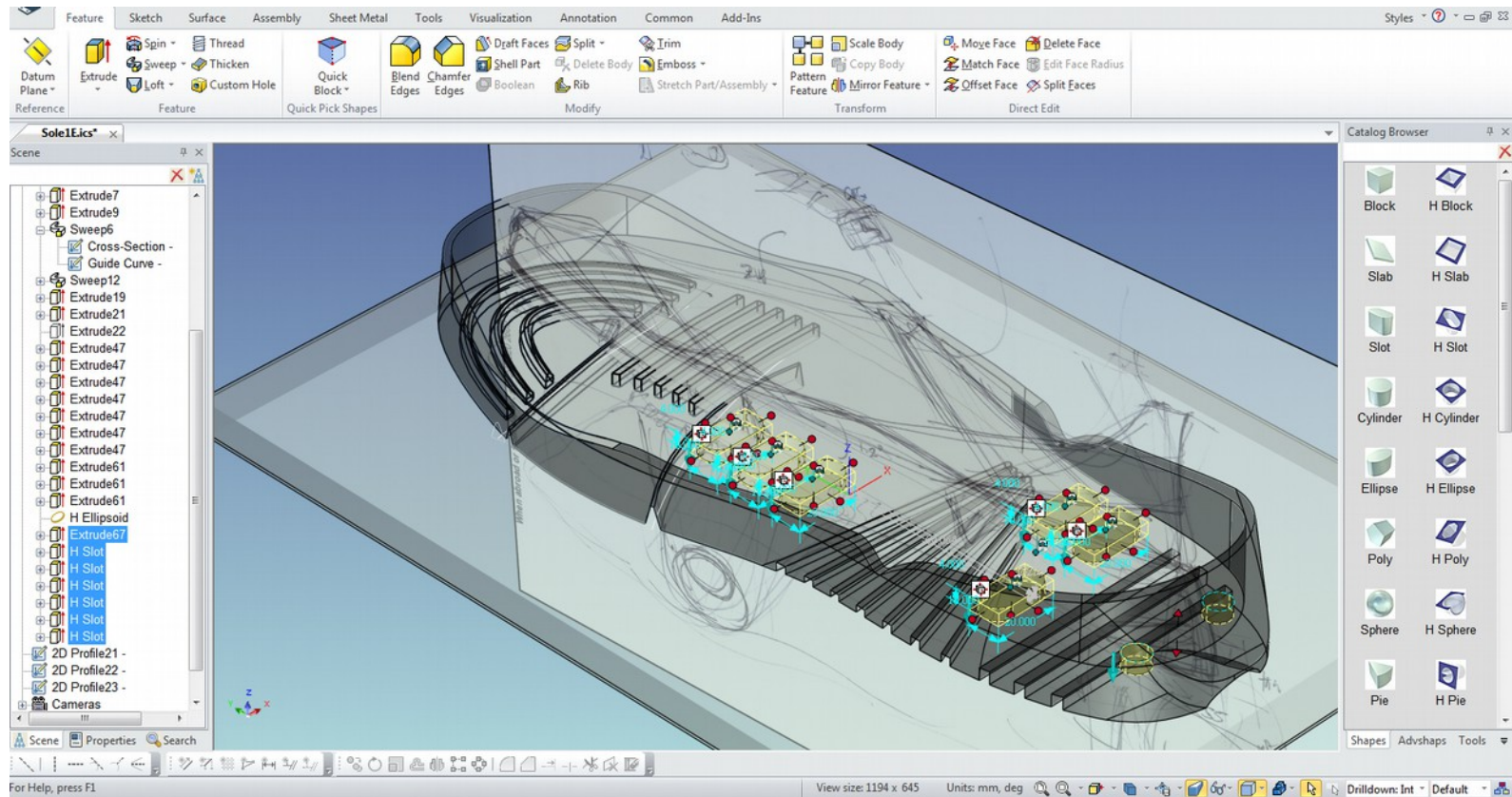
Grooves were added for grip and impact absorption.





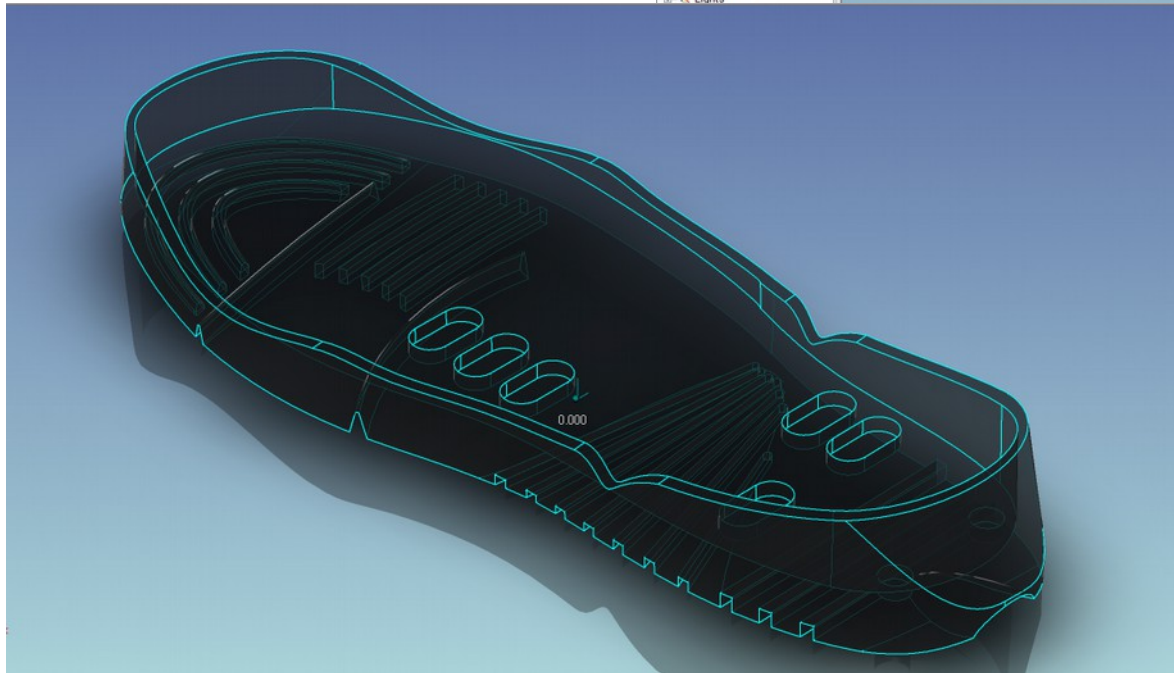
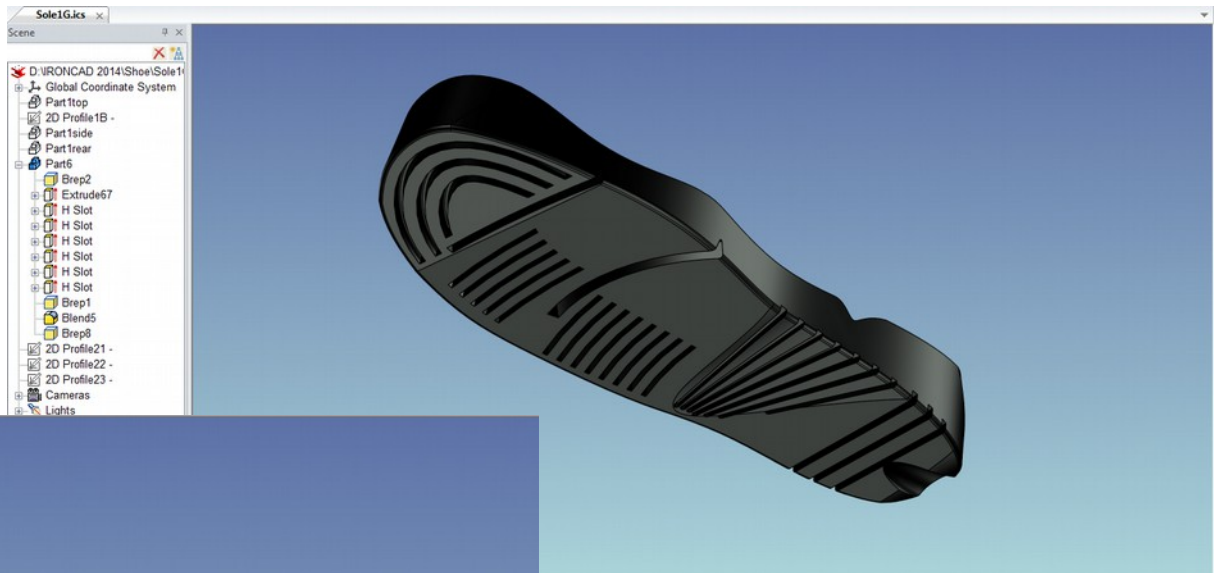
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Pattern pockets for material reduction and flex along the length of the sole.





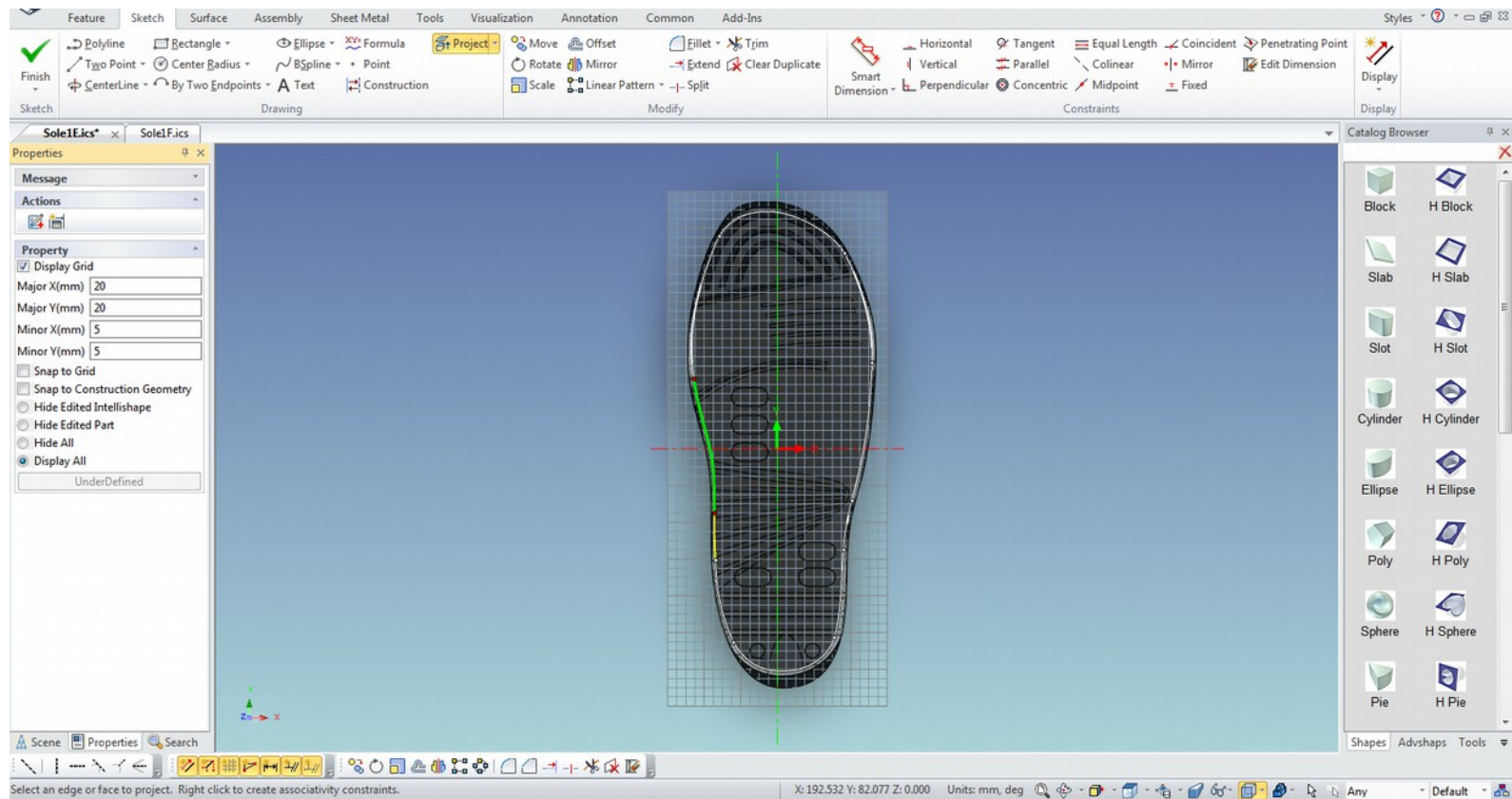
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Creating a surface for the sole liner. Select Sketch On X-Y Plane and select Project to copy the removed material profile.

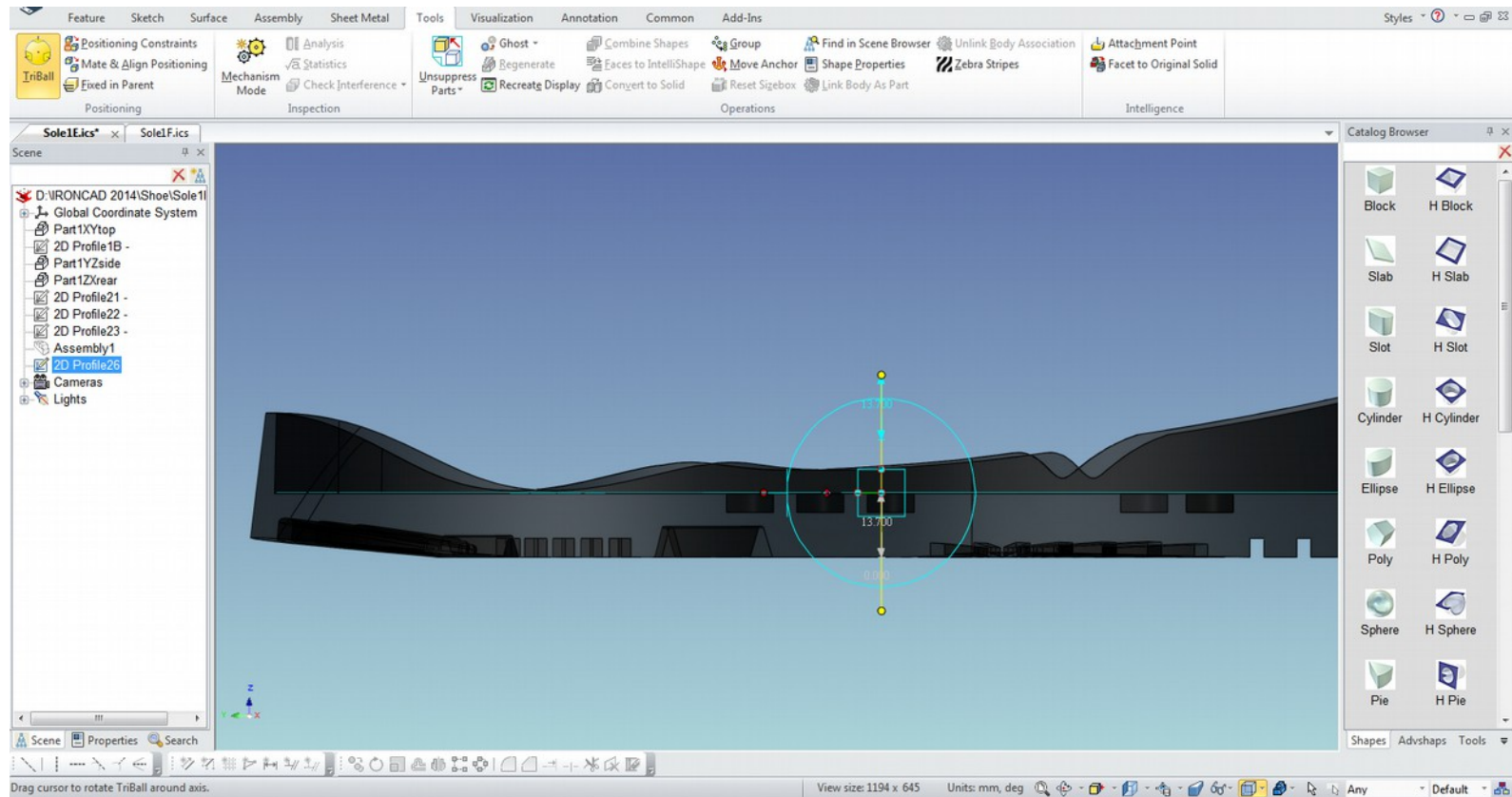


Note: Extract Curve from a 2D profile or from a projected profile may produce unnecessary nodes.



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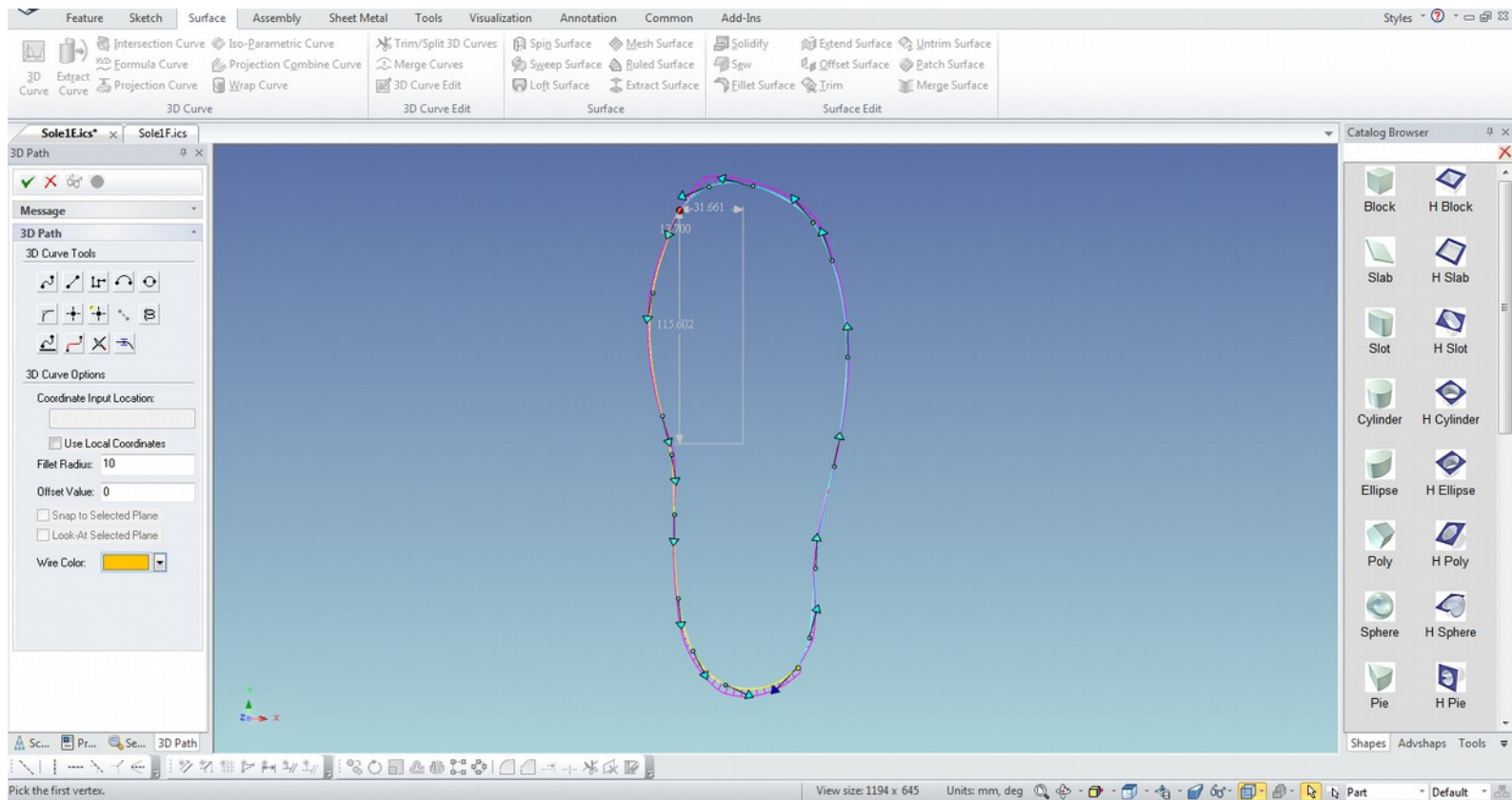
Set the View to Left and in the Scene browser, select the 2D profile and use the function key F10 to activate the TriBall. On the vertical handle RMB click and move 13.7 mm so it displays just above the surface of the sole thickness. Select and set the Parts6(Sole) as an Assembly1. Go to the Tools tab and Ghost the assembly.





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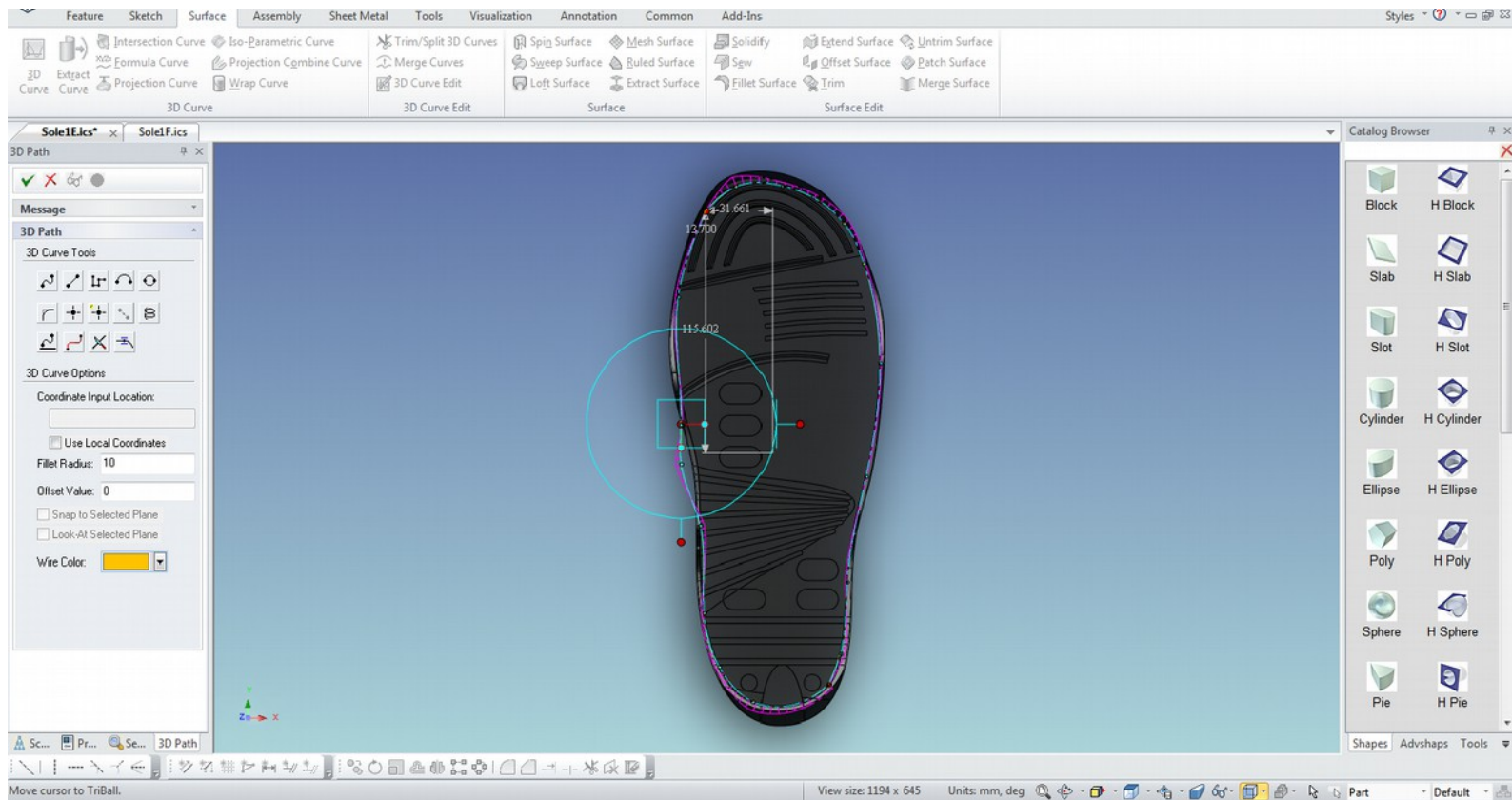
Select and RMB click Assembly1 and suppress. Set View to Top. Create a 3D Curve from the Surface tab and use Spline and Create Smoothly Connected Curves following the 2D Profile as guide. As the Spline traces the path when it turns green and select the points to follow the shape. LMB click the check Apply and Exit when done.





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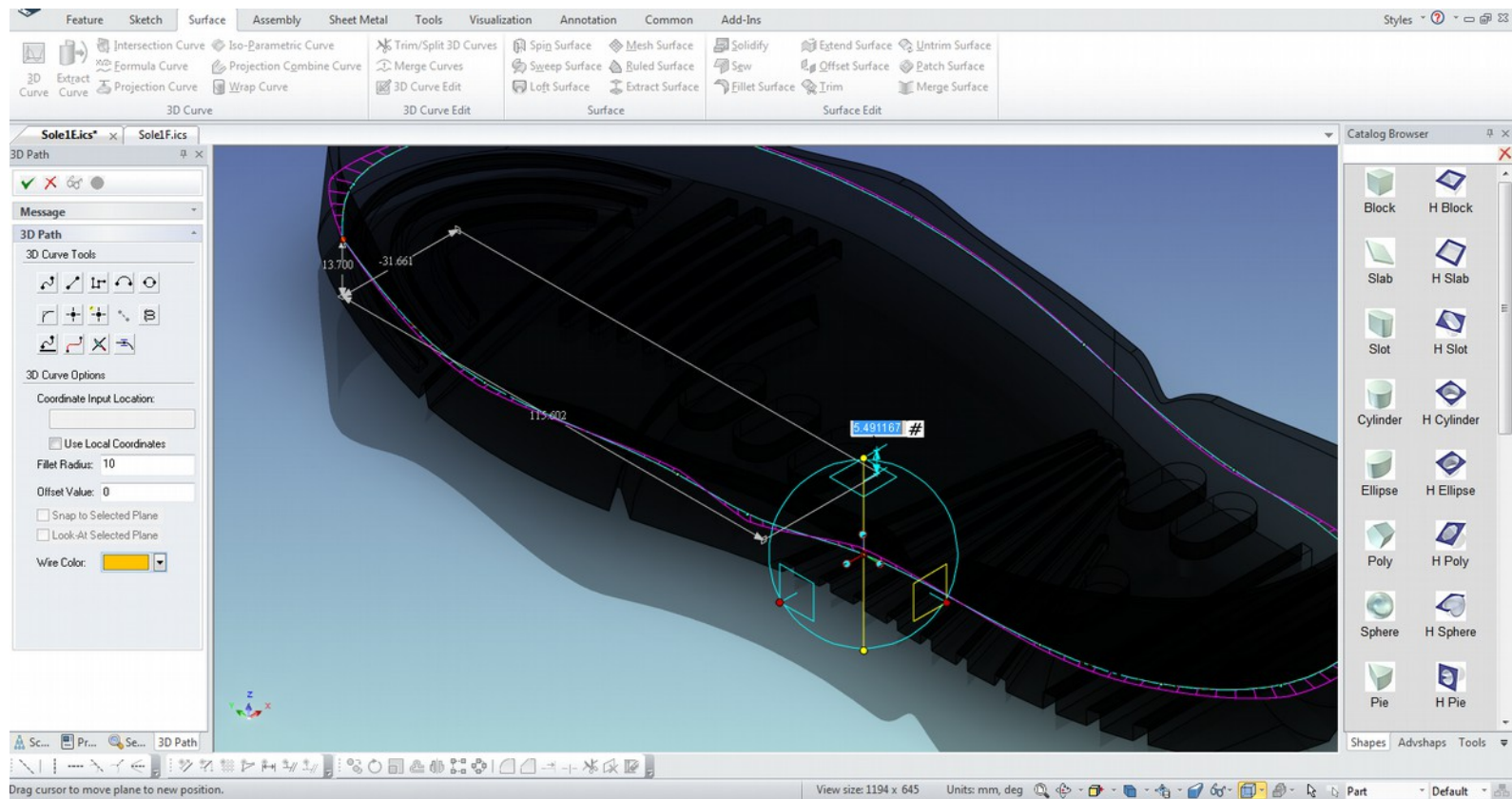
RMB click Assembly1 from the Scene browser and select unsuppress. While selected, go to Tools and select Ghost to the assembly. RMB click the 3D Curve Part8 and select Edit. Select the vertex/point for the foot arch and with F10, activate the TriBall and plot the position of vertices/points.





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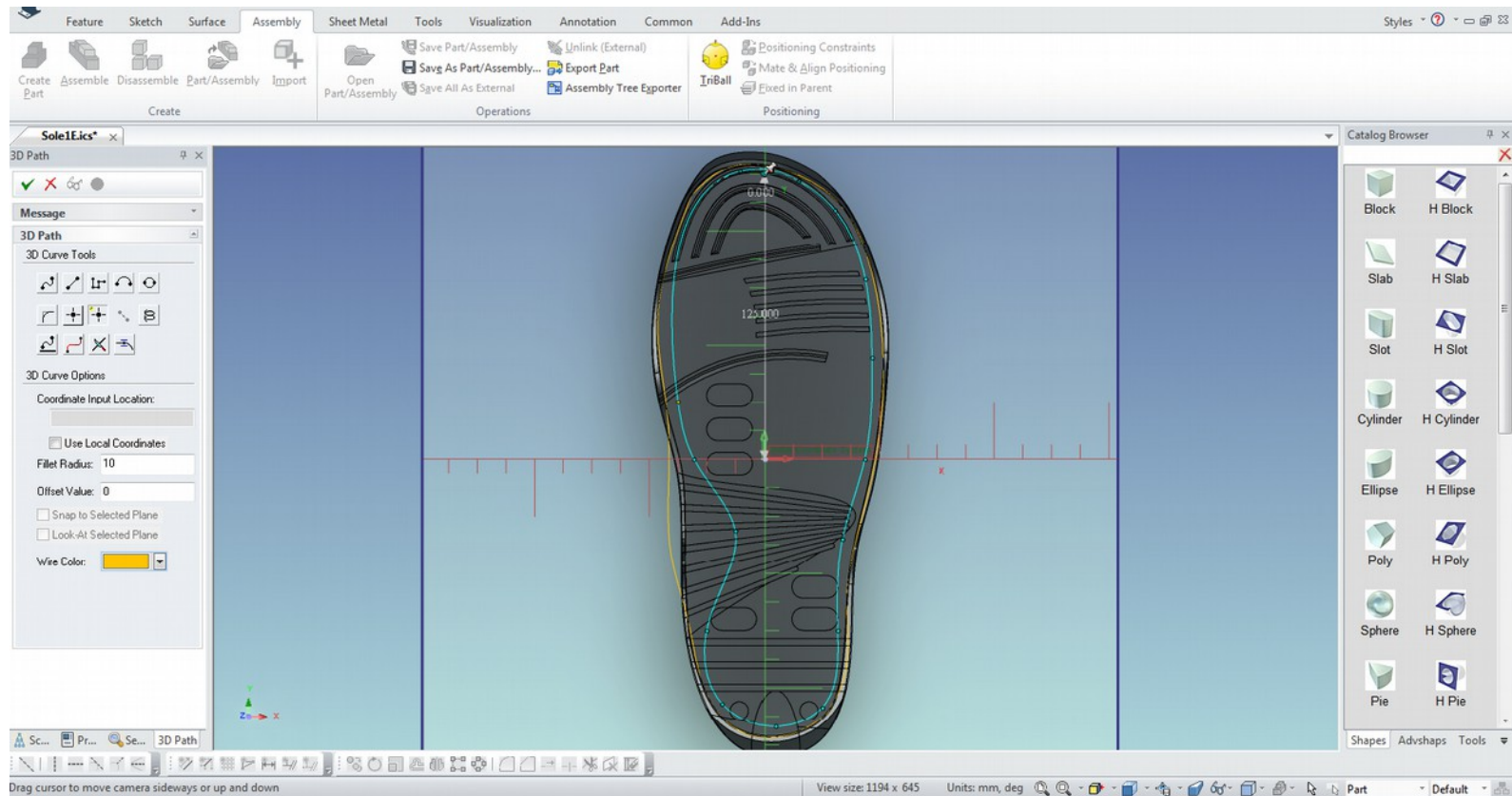
Select the views from the Camera picker to further place vertex 3D position with the TriBall.





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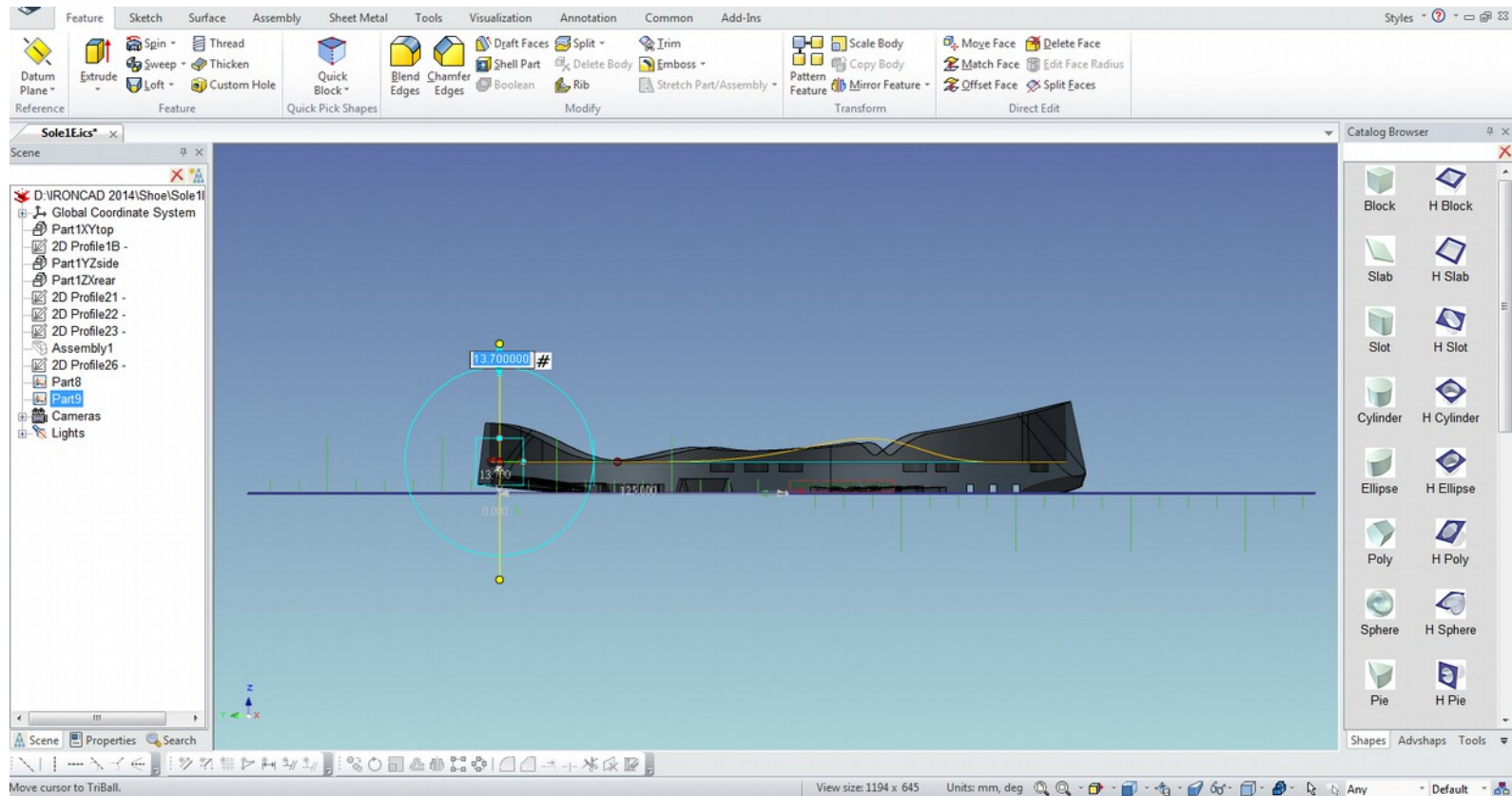
Create another 3D Curve to outline the flat surface of the sole liner. Key Z to show the XY Plane and draw the Spline.





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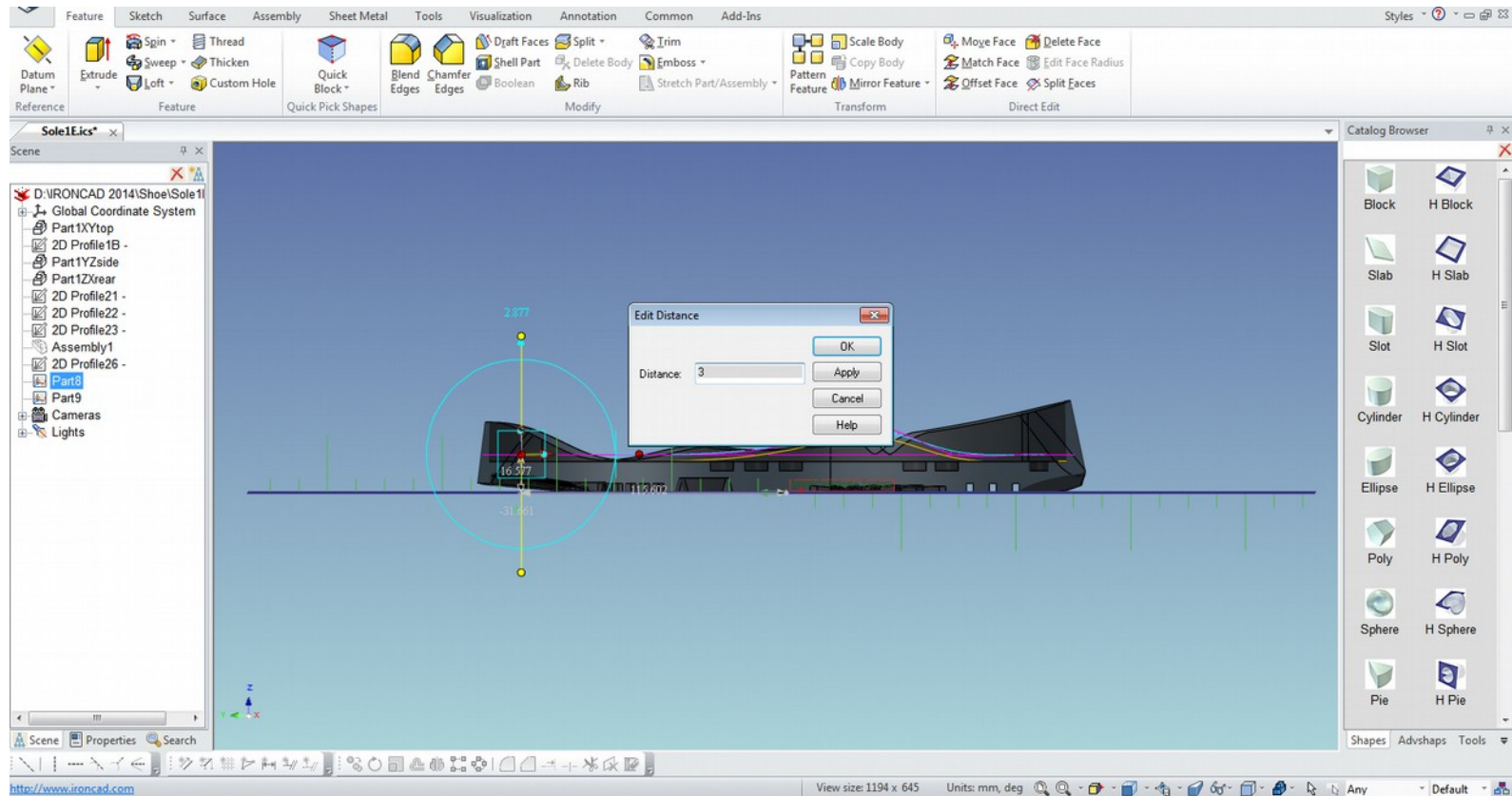
Set Camera View to the Left and LMB select the 3D Curve Part9 from the browser. It positioned on the XY Plane and with the RMB click on the TriBall vertical handle, move upwards to 13.7 mm, at the same position as Part8.





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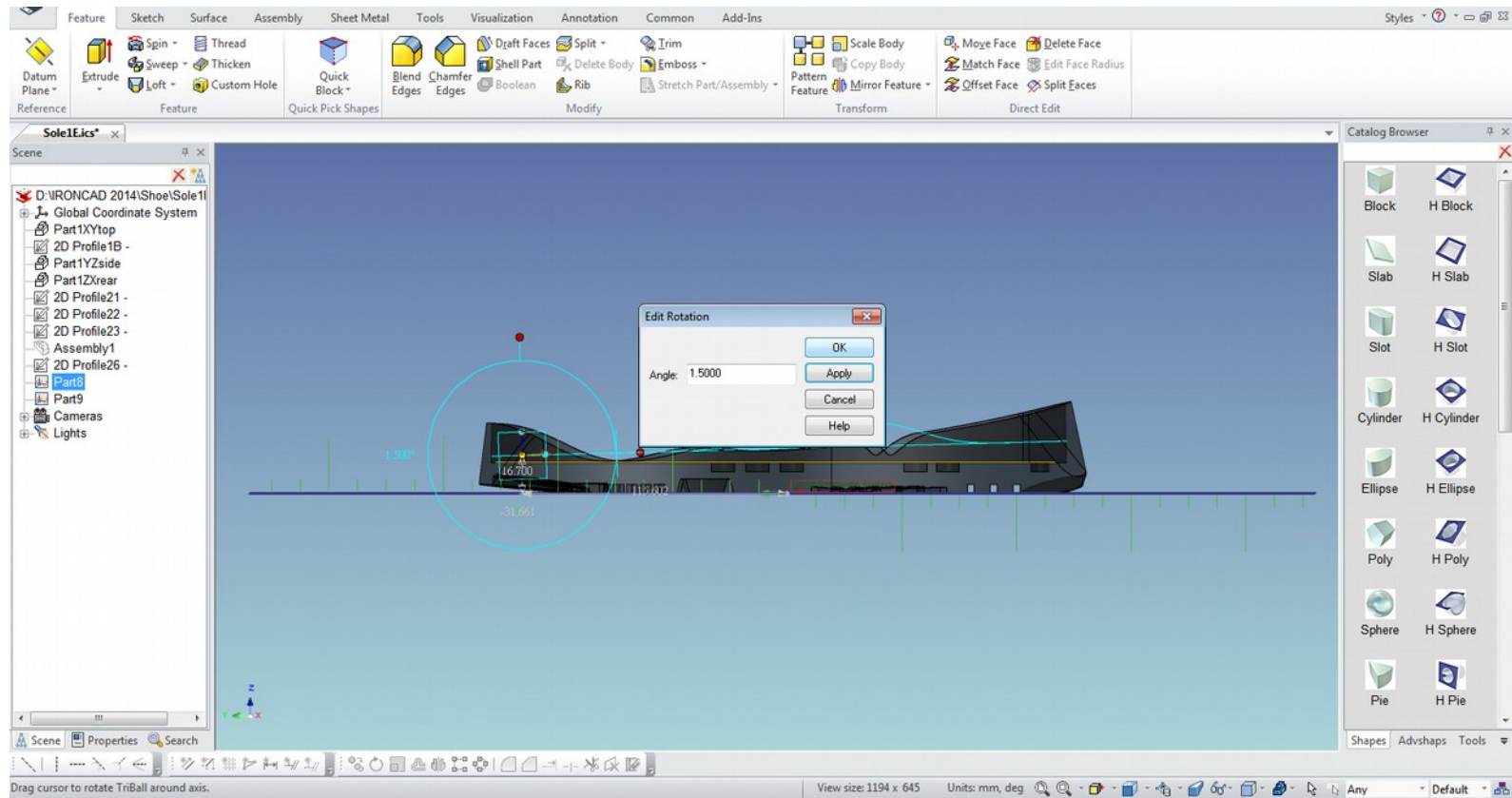
LMB click select the 3D Curve Part8 from the browser and with the RMB click on the TriBall vertical handle, move upwards to 3 mm and set apply and click OK.





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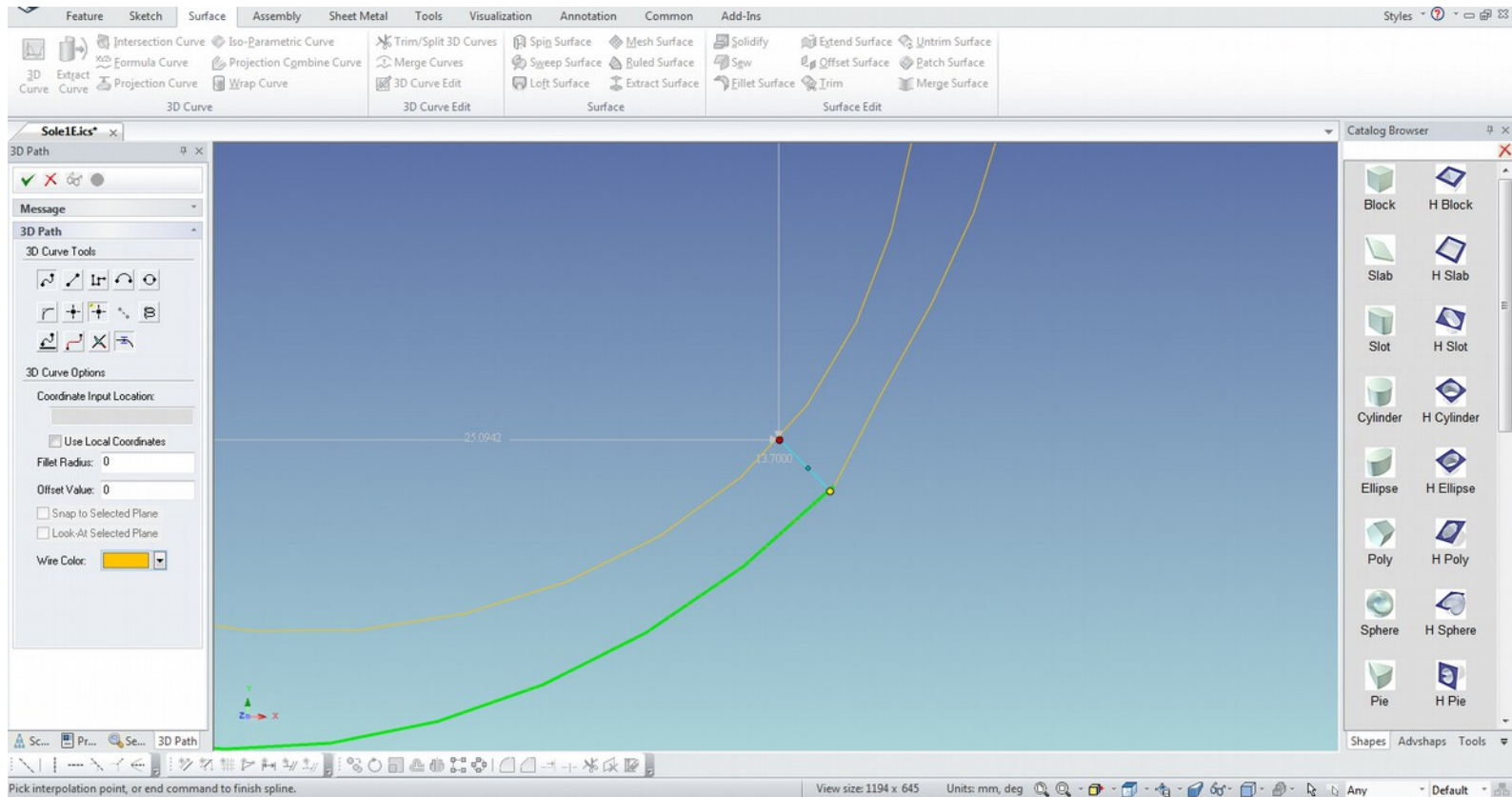
LMB click the TriBall Center handle and tilt Part8 at about 1.5°





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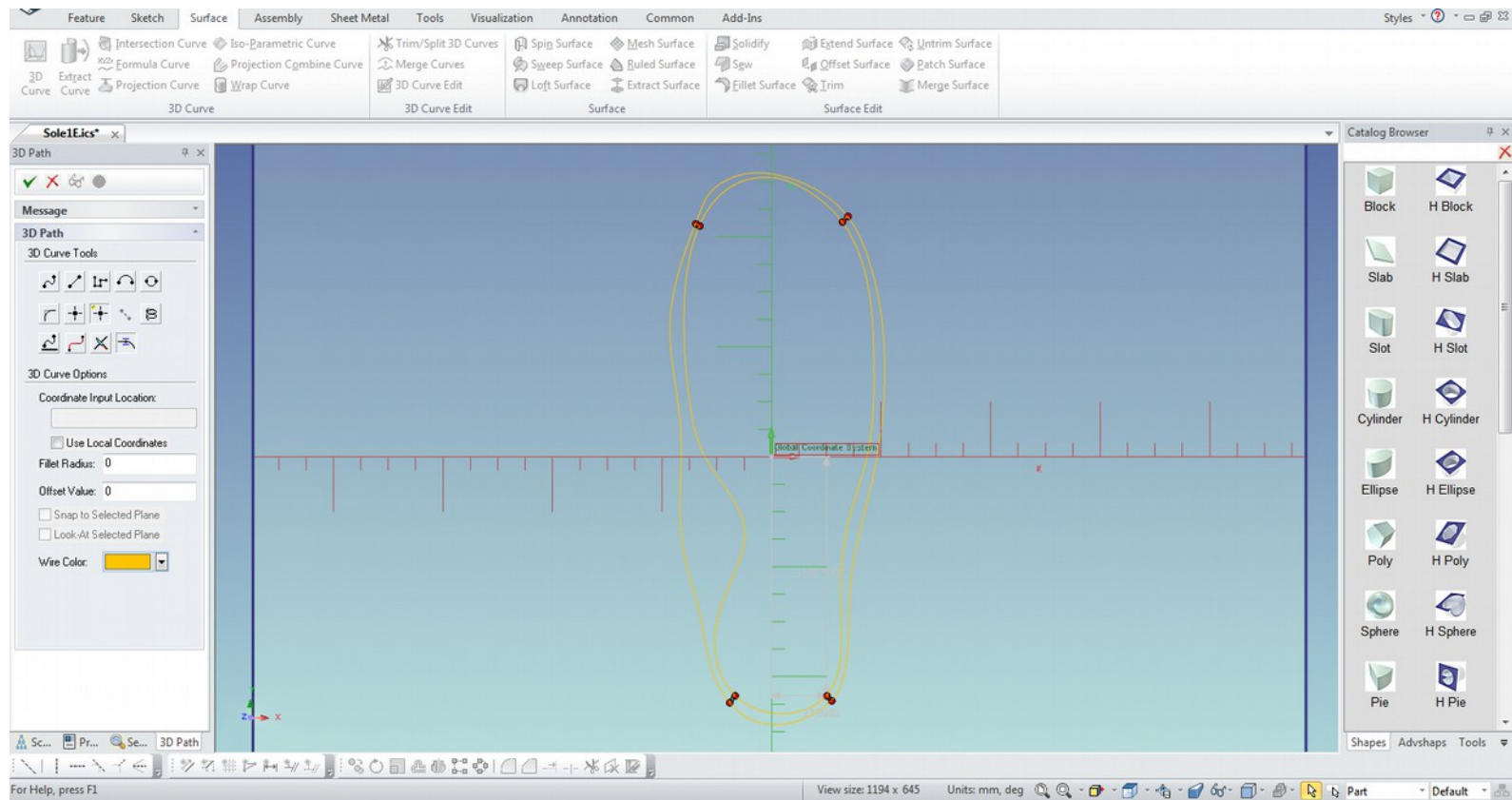
Select from the Scene browser Assembly1>Unghost>Suppress. Select Top from Camera View. Switch off the XY Plane (key Z) and draw a new 3D Curve to add a Spline connection. Make sure to set Fillet Radius to 0 before you draw. Draw a total of 4 Spline connections.





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Key Z to activate XY Plane to check the vertices of the Spline on the heel.

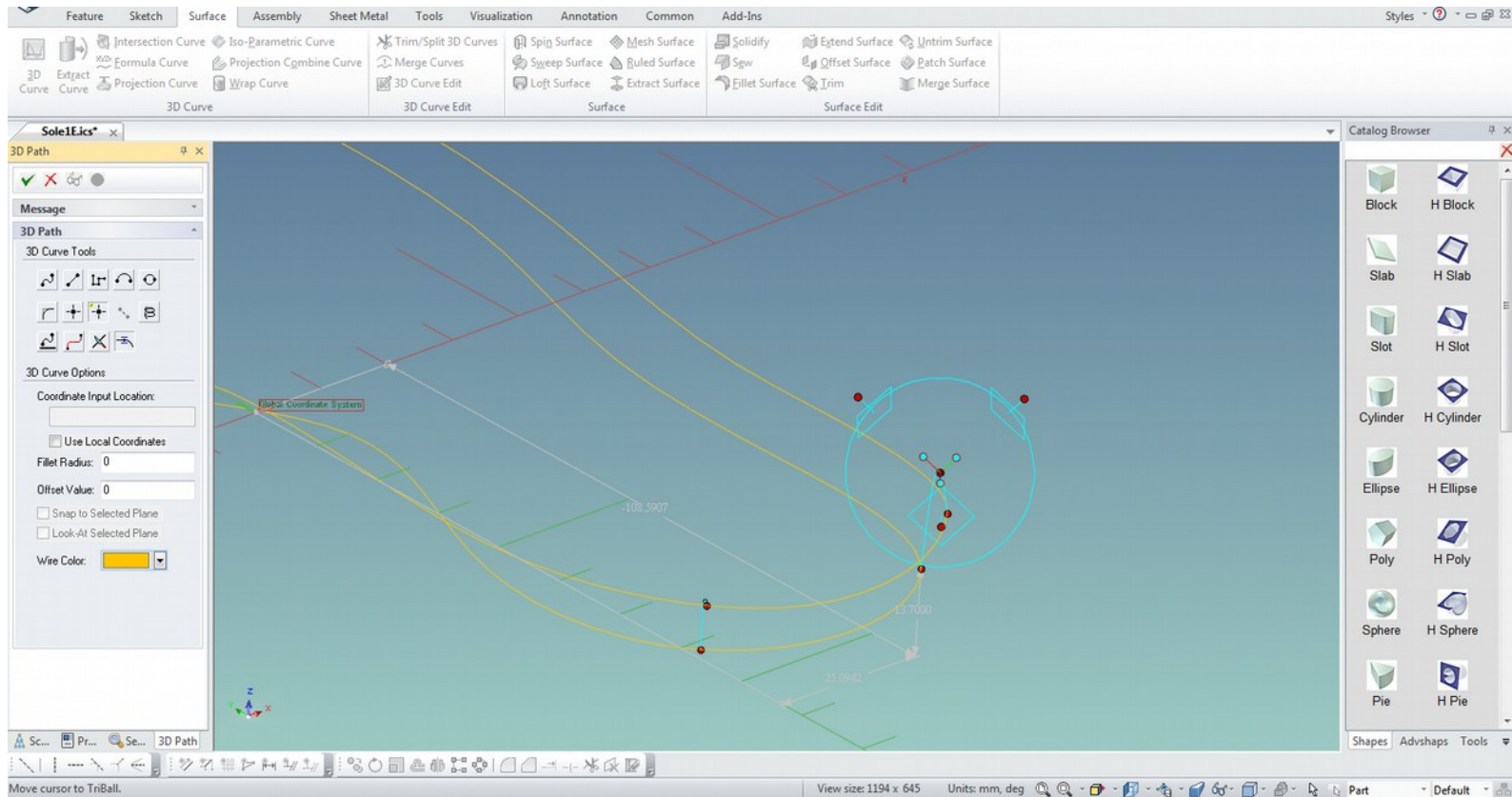




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Change the Camera View to the Left. Use the mouse scroll wheel to zoom to connecting Spline on the heel. The vertices should be placed in position using the Triball. Key F3 and orbit (rotate) the scene on the 3D space.

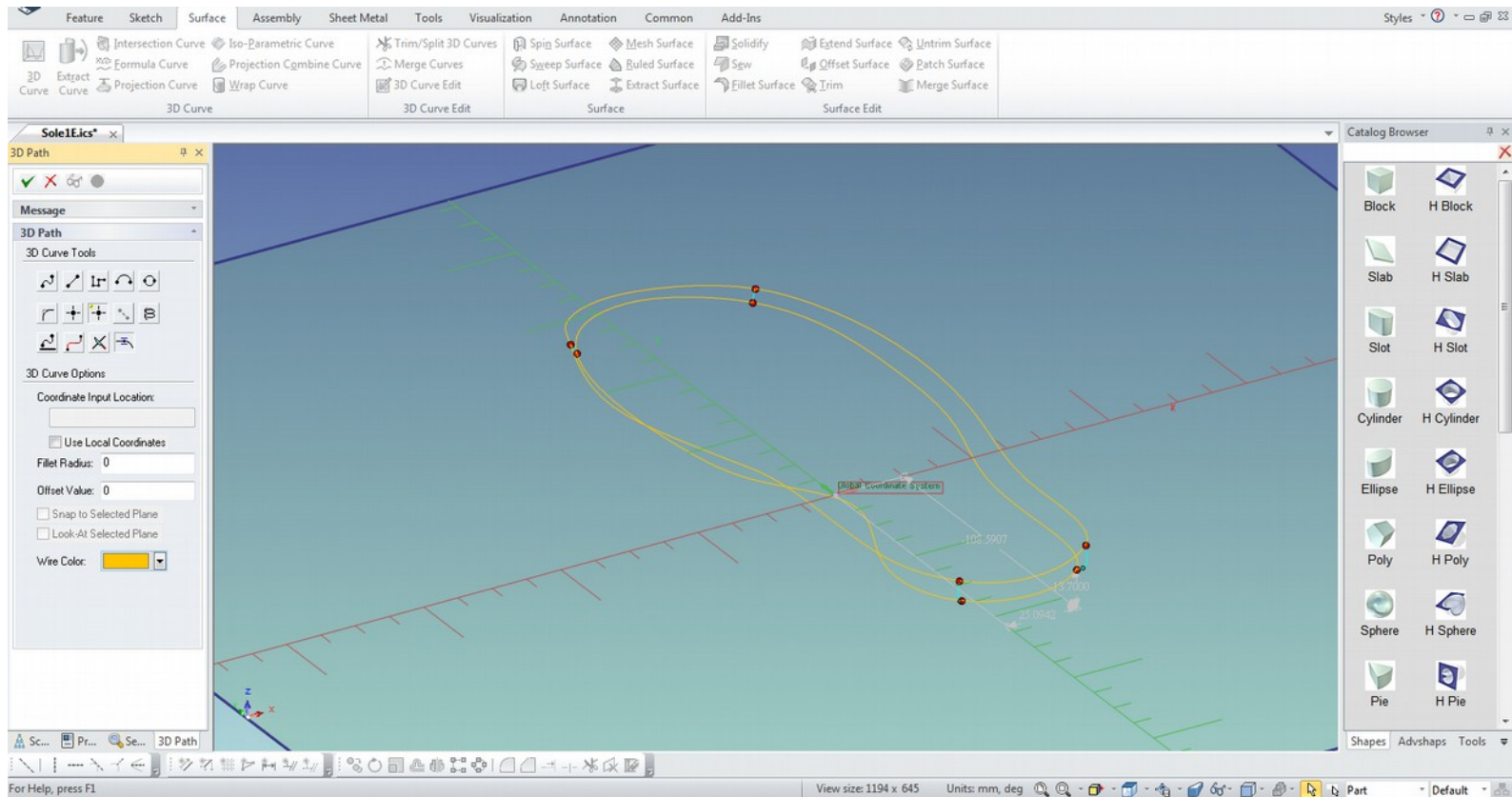
Note that if the XY Plane is not activated, the vertices may drop along the scene.





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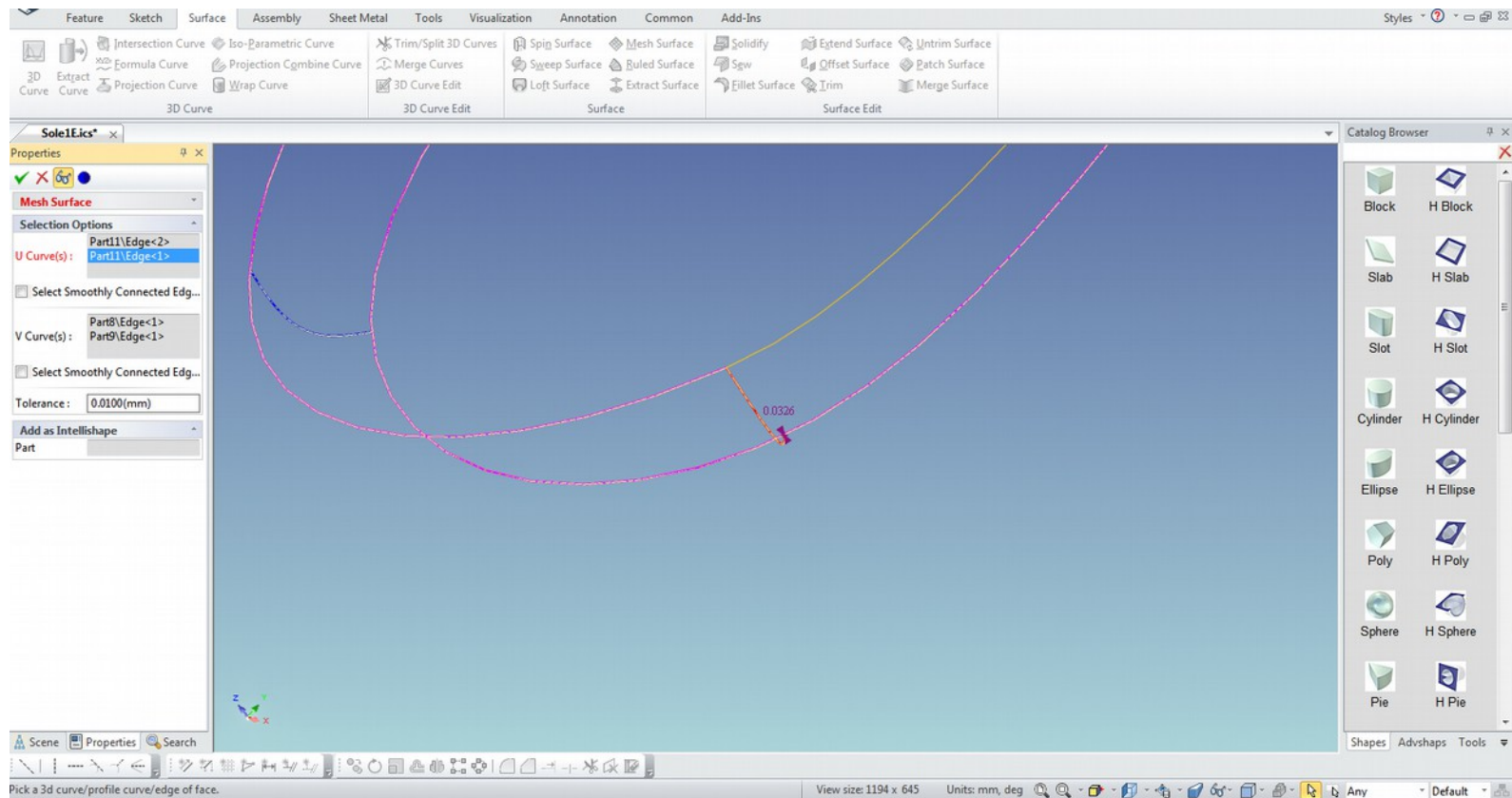
Spline connection vertices are in position by the use of the TriBall. LMB click check to Apply and Exit.





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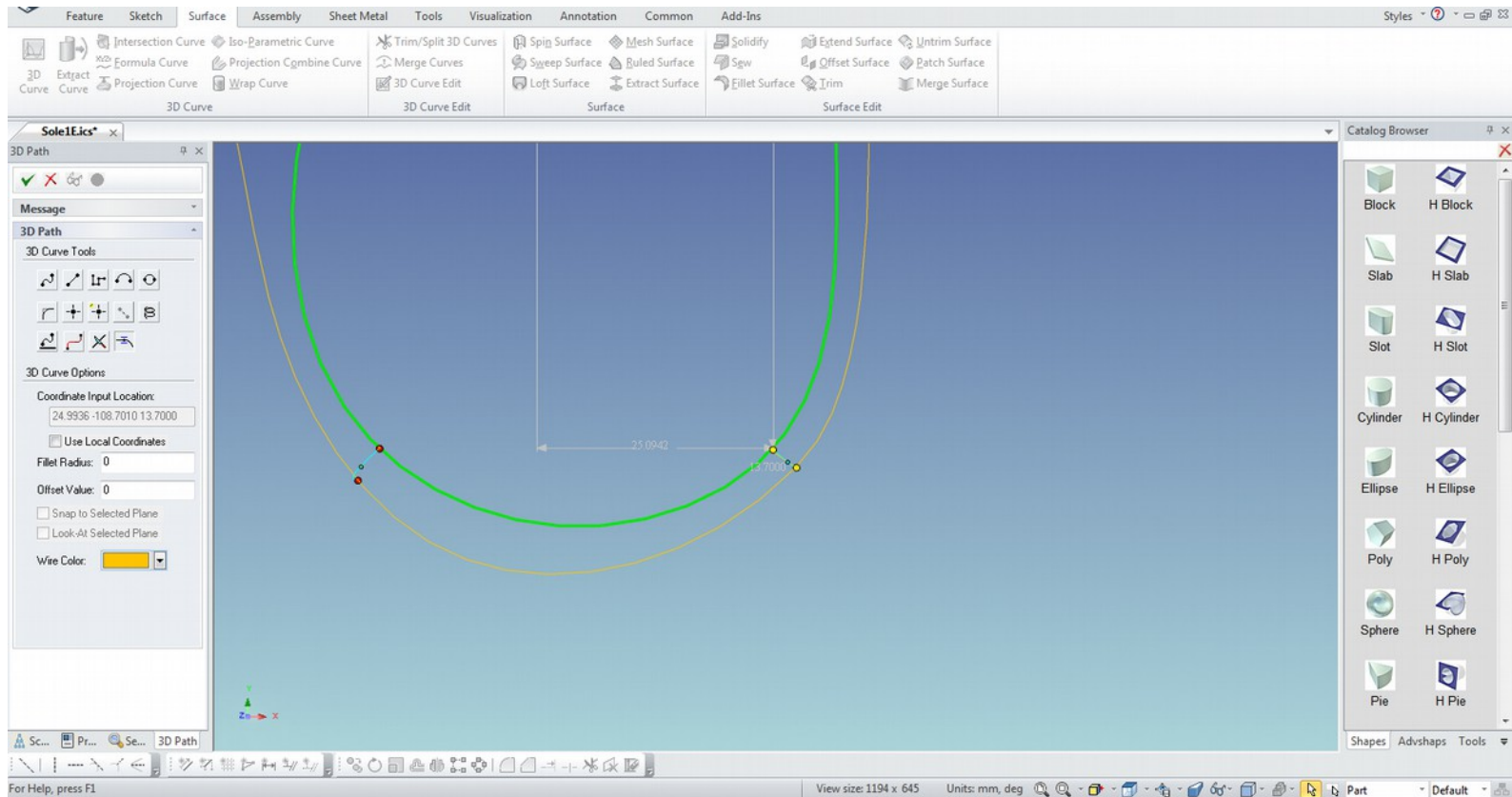
Select Mesh Surface from the Surface Tab. For the U Curve(s), select the the heel connectors and for the V Curve(s) Parts 8 & 9 3D curves. The preview did not show the surface as Part11\Edge<1> did not connect with a gap of 0.0326. LMB click X to Cancel operation. This should be edited and connected.





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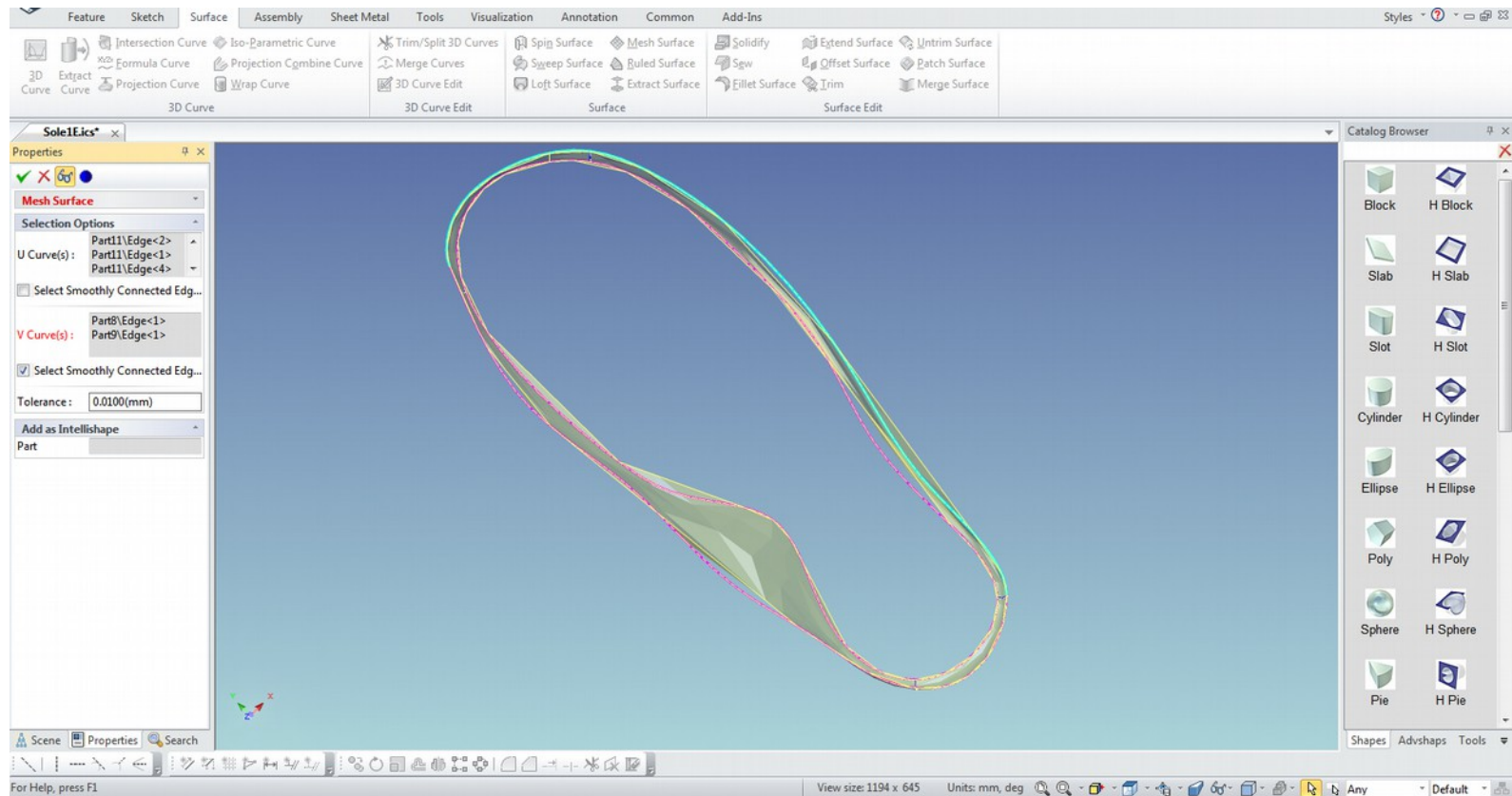
On Edit, reconnect the Spline to Part9. Orbit (F3) to inspect connection and vertex position. Apply and Exit.





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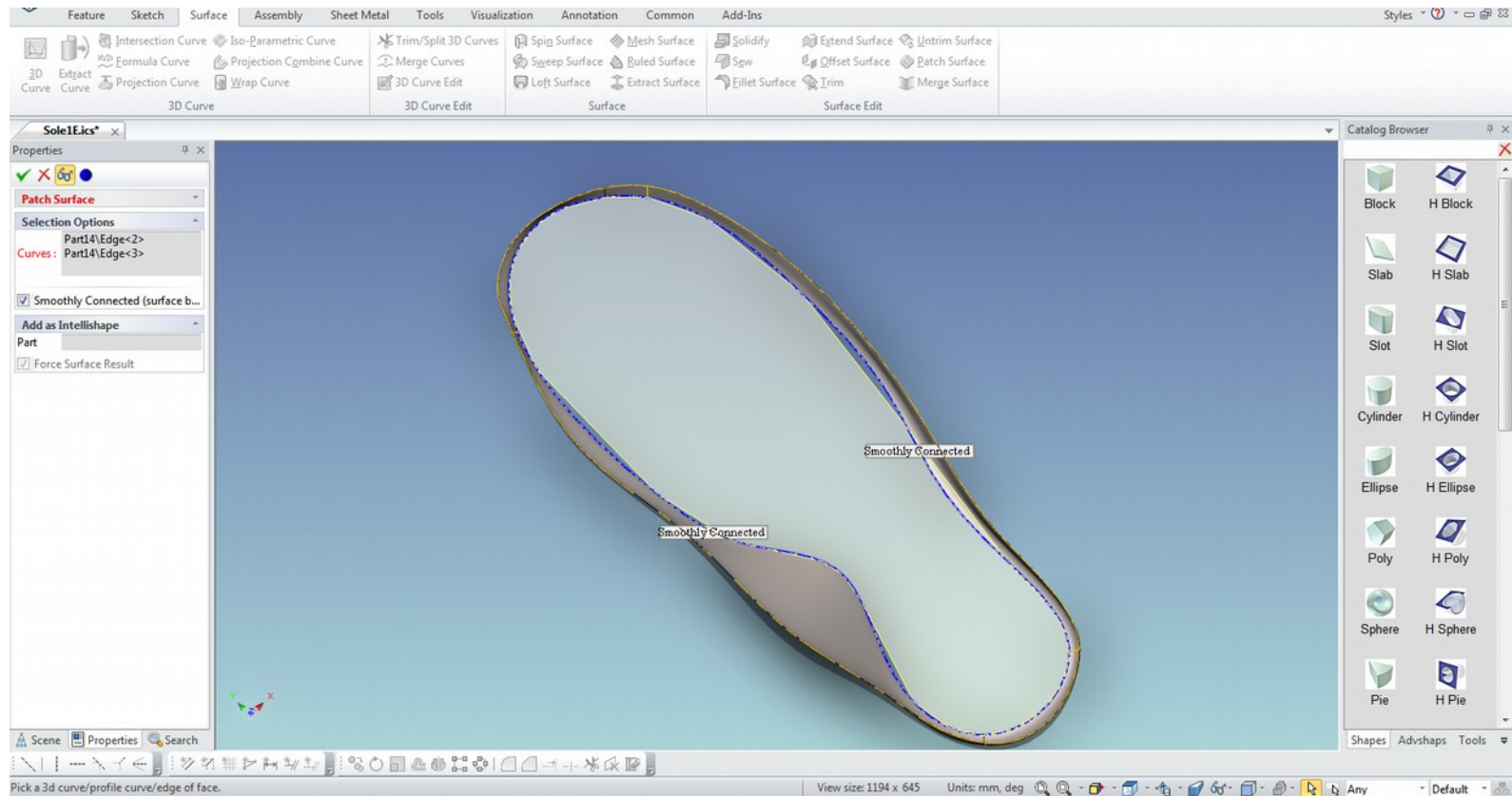
Select Mesh Surface and select the U, V Curves. Preview displays the surface, LMB click check Apply and Exit.





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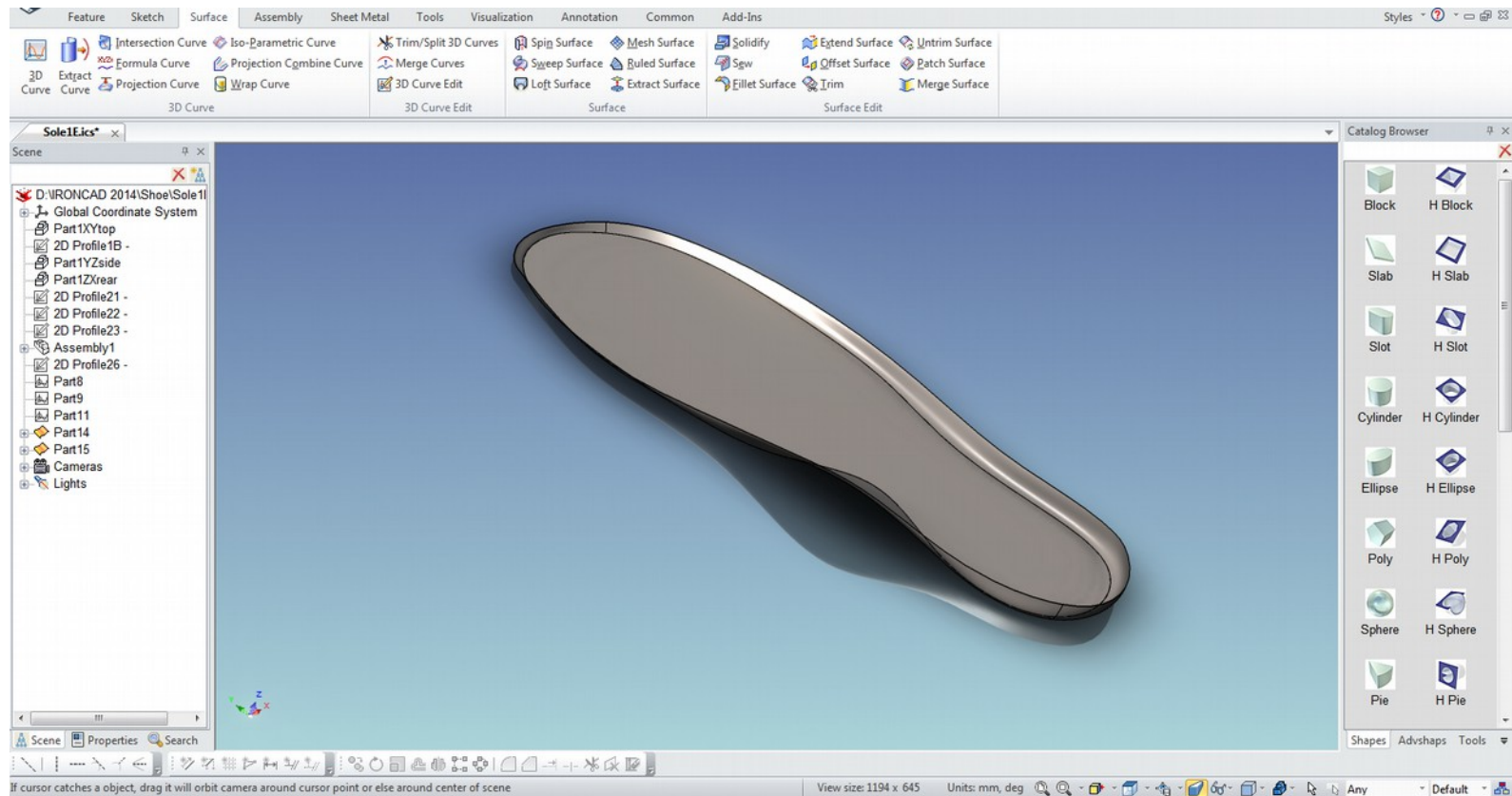
Select Patch Surface and select the Curves. Preview displays the surface, LMB click check Apply and Exit.





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Suppress Parts 8, 9 and 11 to display the inner sole liner without outlines of suppressed parts.





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Sole and inner sole liner.

Model file is available at grabcad.com/library/shoe-sole-and-liner-1 for download

