

Build a Battle Axe in OpenFX

Carl E Schou

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Chop Down Modeling Costs With OpenFX

Need a bargain on a 3D Instrument of Persuasion for your next encounter with Orcs or Goblin Hordes? Try building it in OpenFX.

OpenFX is a suite of programs with modeling, animation, and rendering capabilities. It is the open-source version of the commercial product known as SoftF/X which is no longer available. You can download OpenFX for free using the links at the end of this tutorial.

The battle axe pictured above was modeled in OpenFX, grouped in Poser, and rendered in Bryce using procedural textures. Alternately, you can do the grouping in UVMapper, which is also a free utility.

Pros and Cons of OpenFX

The best thing about OpenFX is probably the price.

OpenFX lets you create models right at the nuts and bolts level. If you're just starting out, all of the hands-on experience you get working with OpenFX can be applied to 3D programs in general.

OpenFX is not the easiest, most intuitive program in the world. However, the learning curve isn't steep and OpenFX is what I use a lot to clean up models made by the easy, intuitive programs.

The F11 key toggles between an Open GL shaded view and a wireframe view. When you exit OpenFX, you will get an error message unless you're in wireframe mode.

OpenFX can import and export 3DS and DXF files. To get other formats, you need to use a file converter like Crossroads (also free).

OpenFX does not support grouping. To group an OpenFX model, you can use UVMapper (also free).

The OpenFX Designer Interface

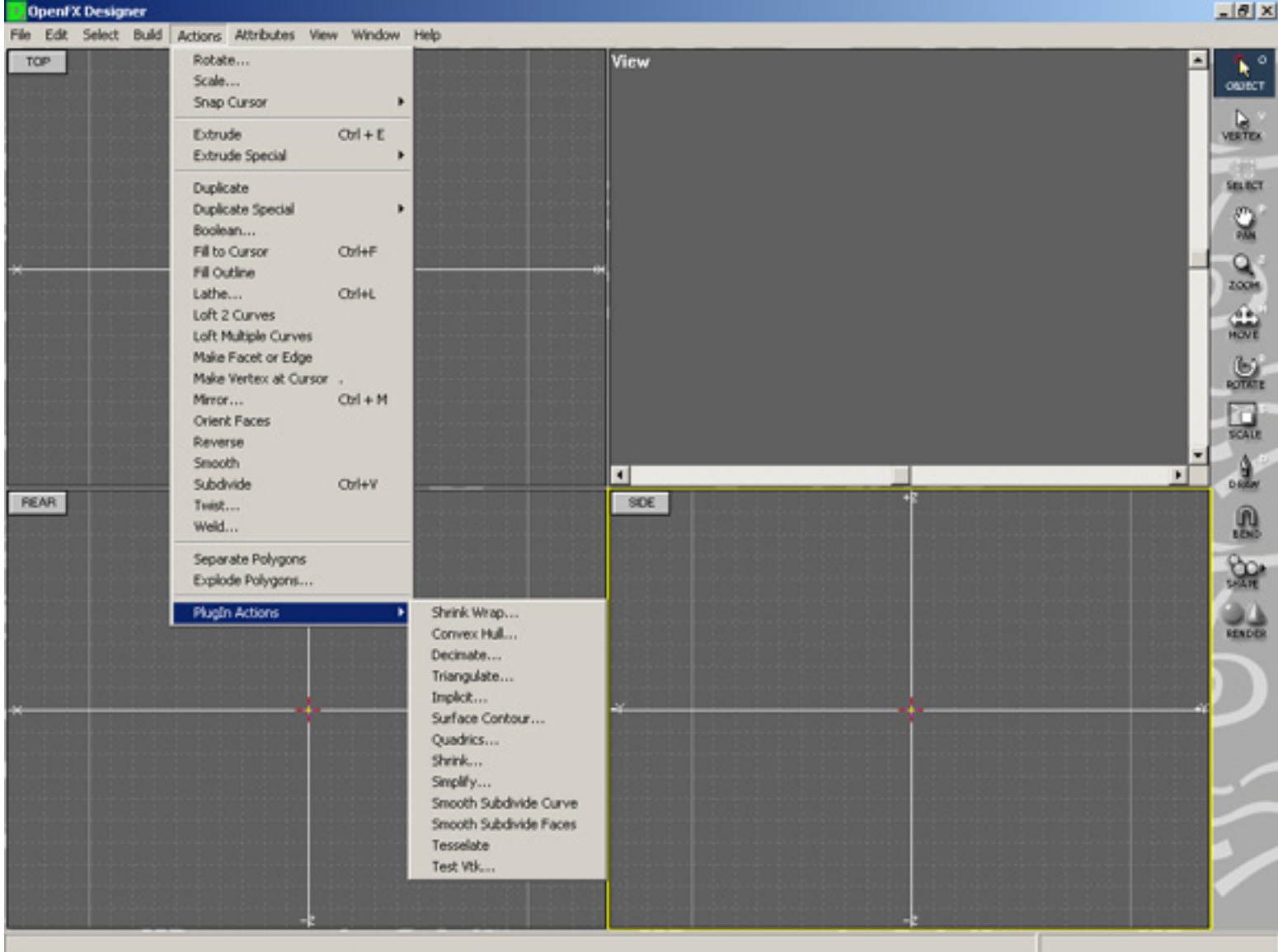
The OpenFX Interface is shown below with the Actions menu open. It's worth noting that some of the tools in the right hand toolbar have a second or expanded function which is activated when you double click on it.

Double clicking the Select tool turns it into a Deselect tool.

Double clicking the Bend tool turns it into a Form tool.

Double clicking the Draw tool turns it into a 3D Plot tool.

Double clicking the Move, Rotate and Scale tools opens popup windows allowing you enter numeric values for these parameters.



Modeling Strategy

Draw an outline of the Axe blade.

Extrude and Scale the outline to give it shape and depth on one side.

Insert a cylinder into the blade to fit the handle into.

Mirror the blade to produce the other side.

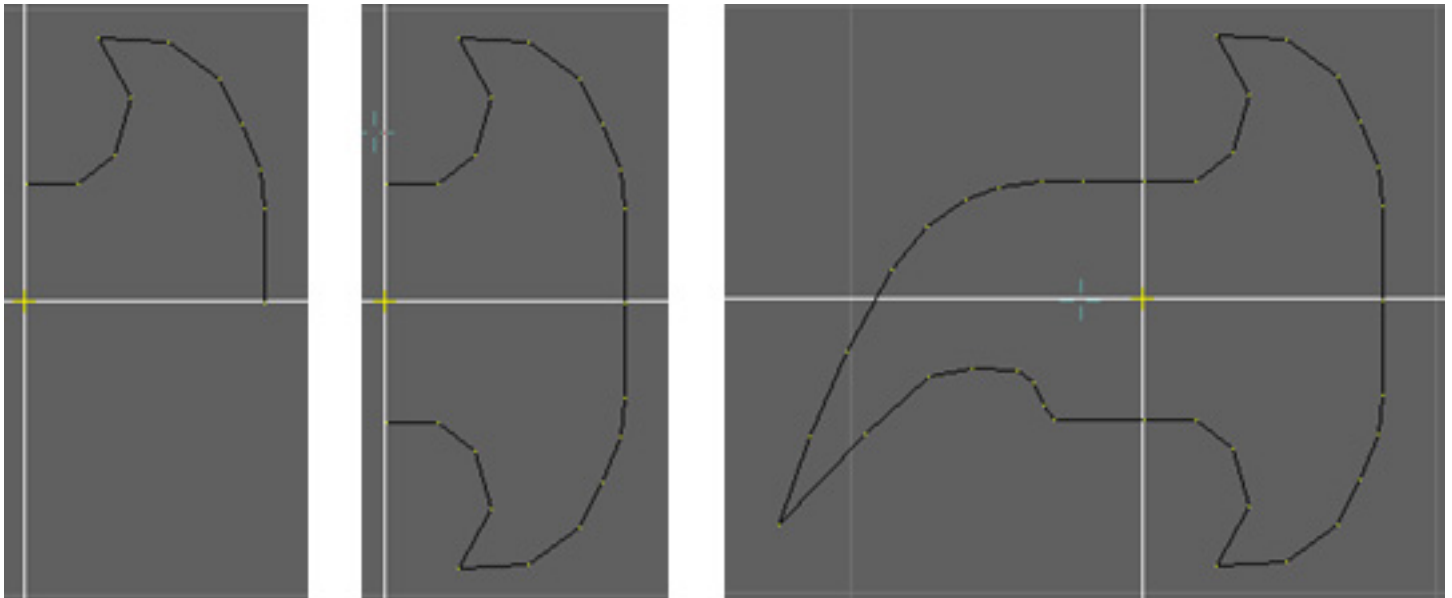
Build the handle.

Export the model for use by other applications.

Build the Blade Outline

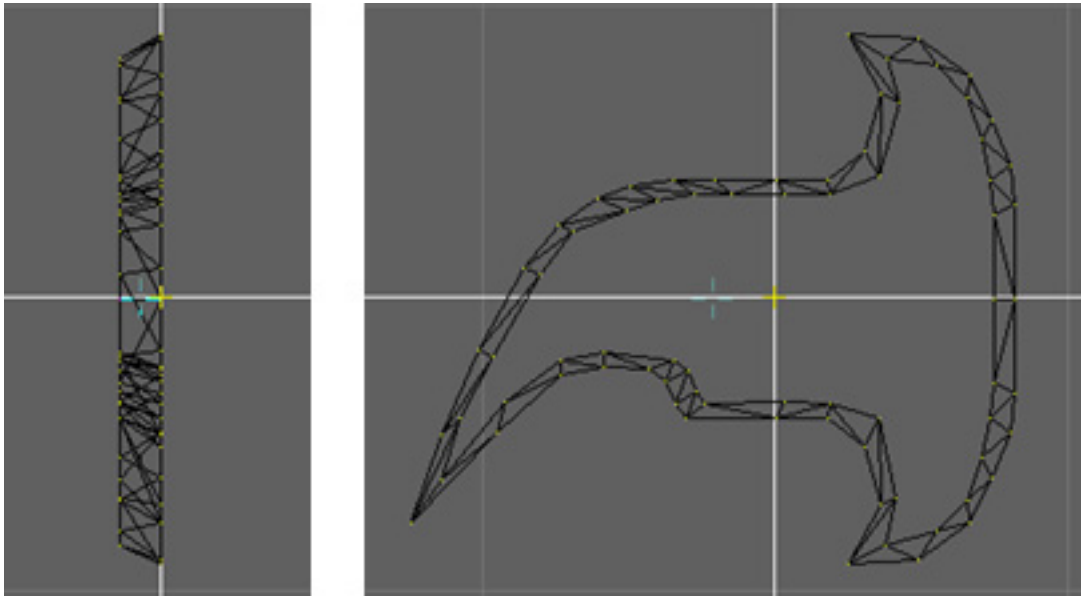
We're going to start by drawing the axe blade's outline in the side view window. We'll draw a quarter of the blade, reflect it to make another quarter, and draw the rest.

Click on the Draw tool in the right side toolbar and draw a quarter of the blade as shown at below left. Make sure all the points are selected and that the cursor is on the vertex you're going to reflect around. Click on Actions>Mirror. In the popup menu that opens, check the box to flip at the cursor "About a Horizontal Line" and select "Copy, Reflect and Weld". You should see something like the image at below center. If you don't, you can press CTRL+Z to undo so you can retry it. When you're satisfied with the mirroring, draw the rest of the blade outline. If you start drawing a new curve from a point on a pre-existing curve, you'll have 2 separate vertices very close together, one from each curve. To make a single unbroken curve, you'll need to weld these points together. Deselect everything by pressing CTRL+D, then use the Select Lasso from the right side toolbar to select only the overlapping points. Weld the points by selecting Actions>Weld. In the popup, type a small value (like 0.01) for the Threshold Radius and press "Weld".

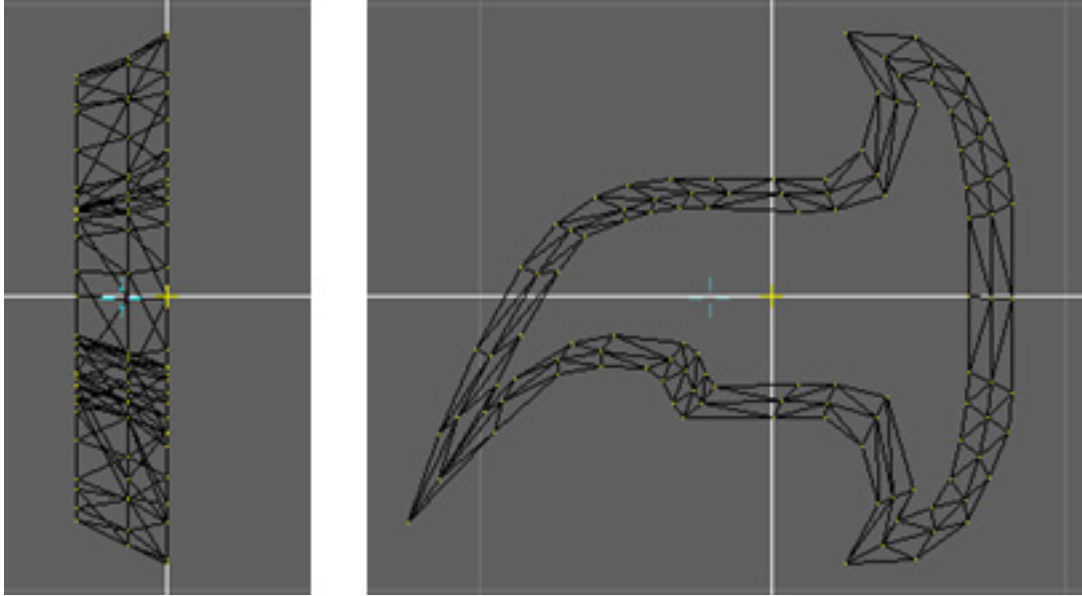


Extrude and Scale the Blade

Now we're going to start giving the blade a bit of depth by extruding a surface. Click in the Rear View window to make that view active. Select everything using CTRL+A and then click on Actions>Extrude. Start tapping the left arrow key and you'll see a new set of points moving away from the originals. Now, select the Scale tool in the right side toolbar and shrink the new extruded curve down a bit. You'll need to adjust the positions of the individual vertices to get the new set to fit completely within the original outline. When you're done, you should have something that looks like the rear view at below left and the side view at below right. Don't worry if the blade looks too thick - we'll sharpen it later.

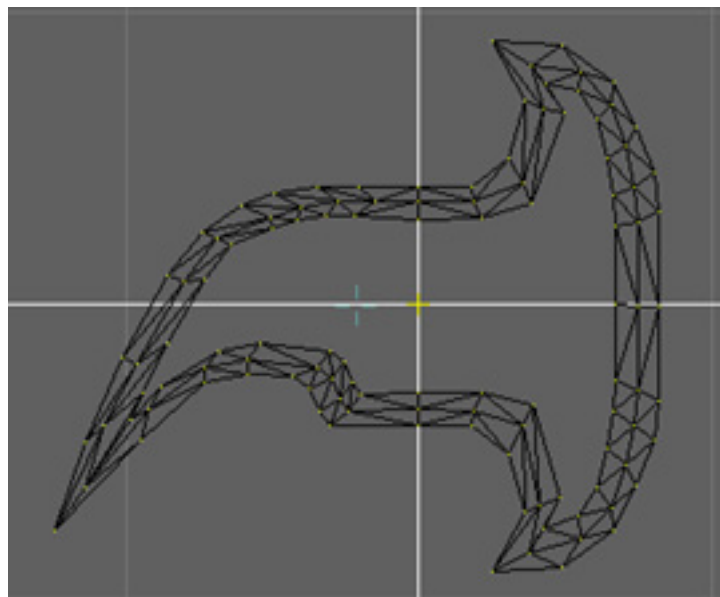


Repeat the above procedure to produce a second level as shown below.



Straighten the Blade's Centerline

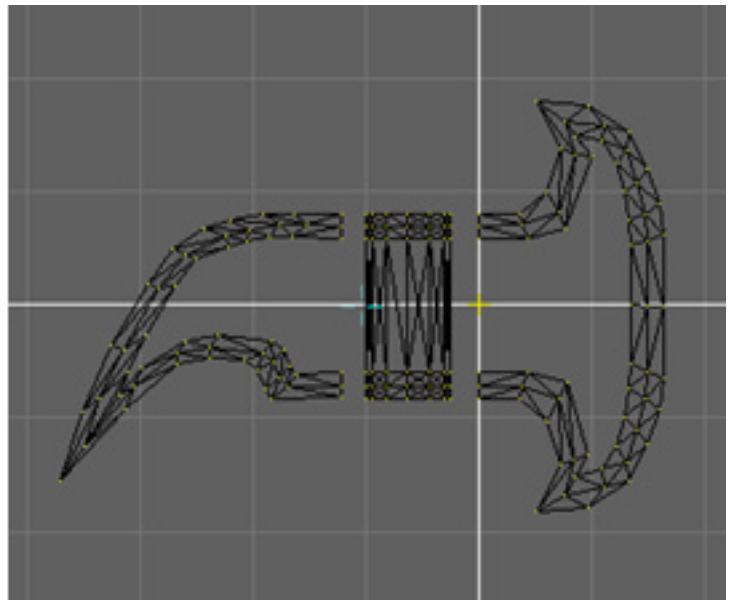
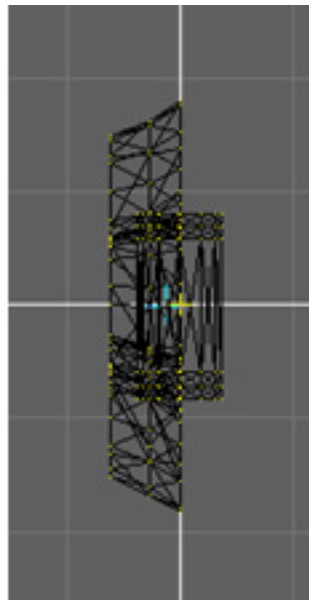
We need a straight line in the middle of our blade where we'll split it and insert the shaft later. The scaling and moving have skewed things a bit, so now we get to straighten things out. Make the side view active. In the middle of the blade where the shaft will go, the 2 vertices on the original outer curve are sitting on the vertical axis which is fine. Select the same 2 vertices on the middle curve and move them to the vertical axis. Do this with the inner curve and you should have something like the image below.



Split Blade and Insert Center Cylinder

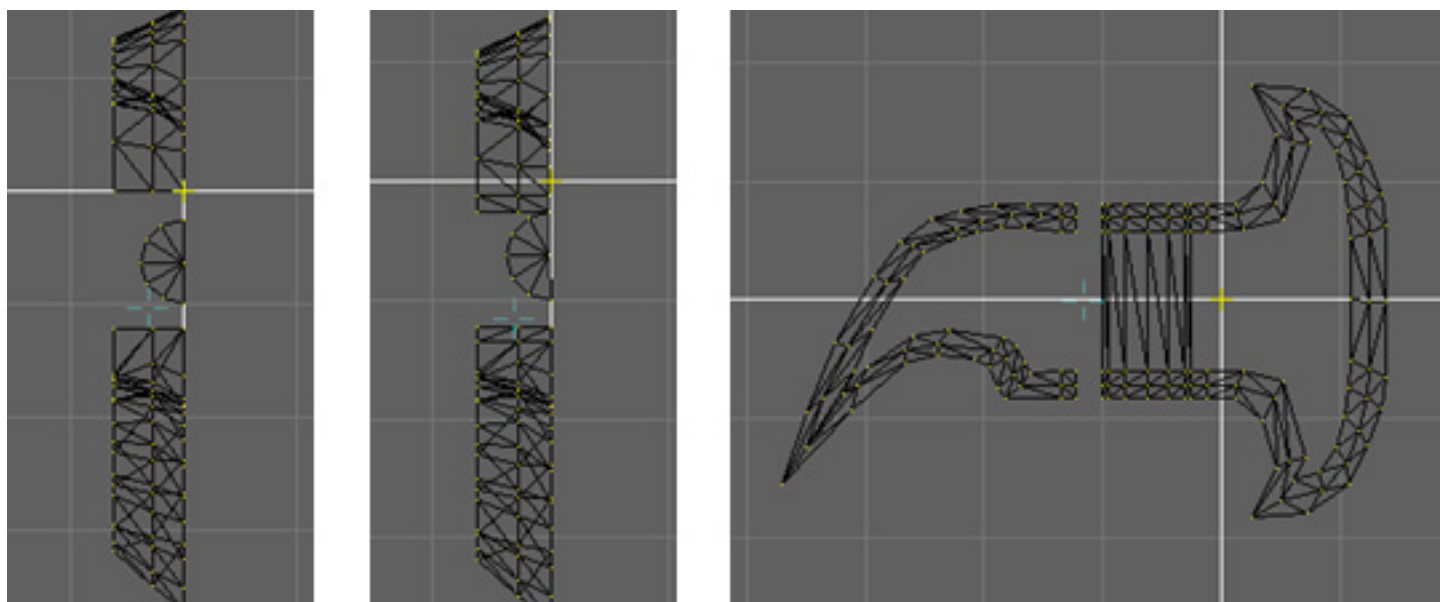
Now we're going to split the blade in half and insert a cylinder through which the handle will pass. Still in the side view, select all the vertices from the back of the blade to the middle, including the ones you just straightened. Duplicate the back of the blade by clicking **Actions>Duplicate** and use the **Move** tool to move the new vertices completely clear of the original. Deselect everything, then select the back of the original, up to but not including the centerline vertices. Delete the selected vertices and you should be left with the blade cut cleanly in half.

Next, make the top view active, and create a cylinder by clicking **Build>BuildPrimitives** and selecting **cylinder**. Adjust the size and position of the cylinder so that it's similar to the image below. Deselect everything, then select the ring of vertices at the top of the cylinder. Extrude twice, moving the new vertices up each time. Repeat this with the bottom of the cylinder, then adjust the positions of the rings to match up with the layers of the blade as shown below in top, rear, and side views.

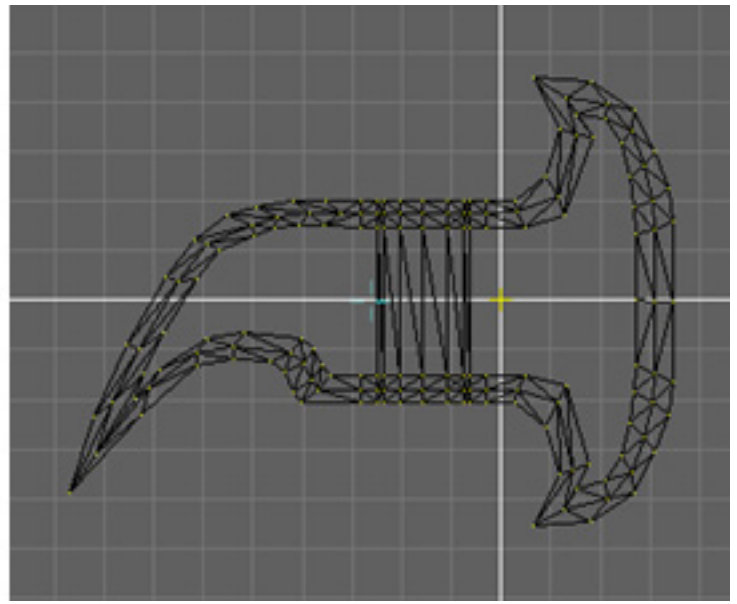
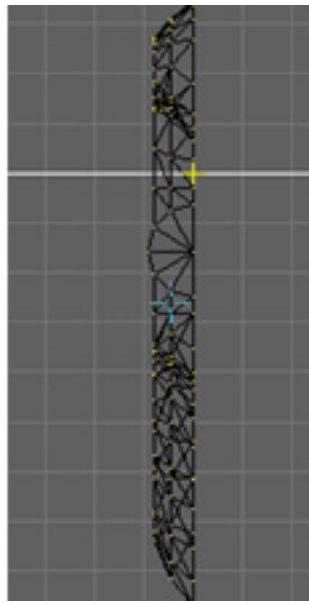


Attach Blade to Center Cylinder

Now we're going to cut away one side of the cylinder, since we're going to mirror the whole blade later on. With the top view active, select the cylinder vertices to the right of the centerline and delete them, as shown at below left. Next, select the vertices on the blade front that are facing the cylinder and extrude them toward the cylinder a little bit. Then select the whole blade front and move it to the cylinder until the 2 end vertices of the outer blade outline are touching the corresponding vertices of the cylinder. Weld the top pair of touching vertices together, then do the same with the bottom pair. At this point, you should see something like the top view (below center) and the side view (below right).

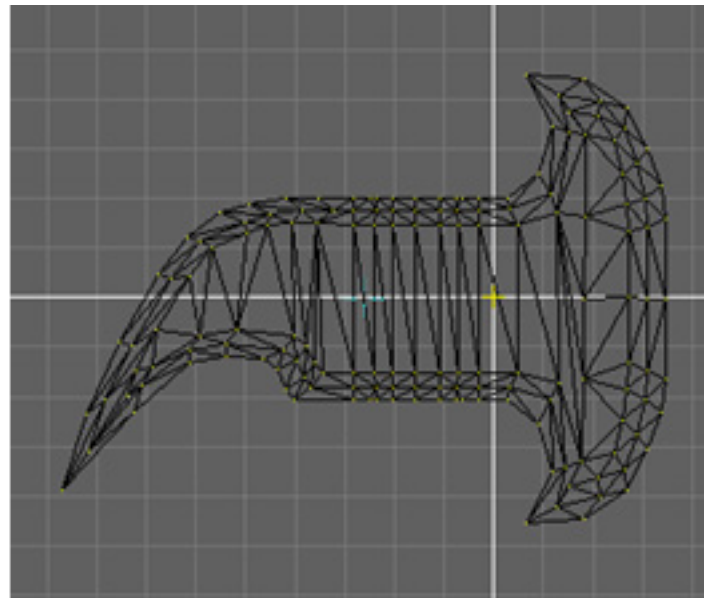
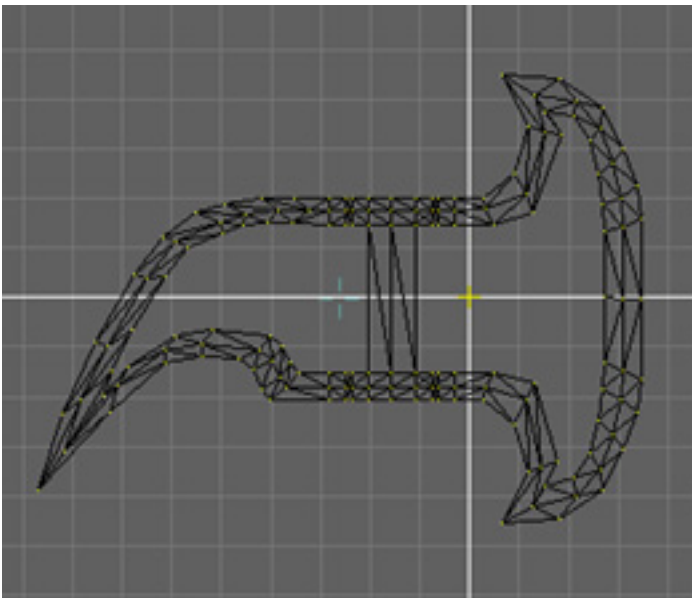


Now we're going to move the middle and inner blade front outlines so they line up with the vertices on the cylinder and weld them as we did with the outer outline. With the top view active, select the whole center outline of the blade front. Click on the Move tool and start tapping the right arrow key to line up the middle outline with the corresponding vertices (the ones at the 11 o'clock position) on the cylinder. When you're lined up, deselect everything except the 2 end vertices of the center outline and move them down until they are touching the corresponding vertices of the cylinder. Attach the touching vertices by welding. Repeat this process for the inner blade front outline. When you're done, the top view should look like the image at below left. Repeat the process for the blade rear and you'll have something that looks like the top view (below center) and side view (below right).



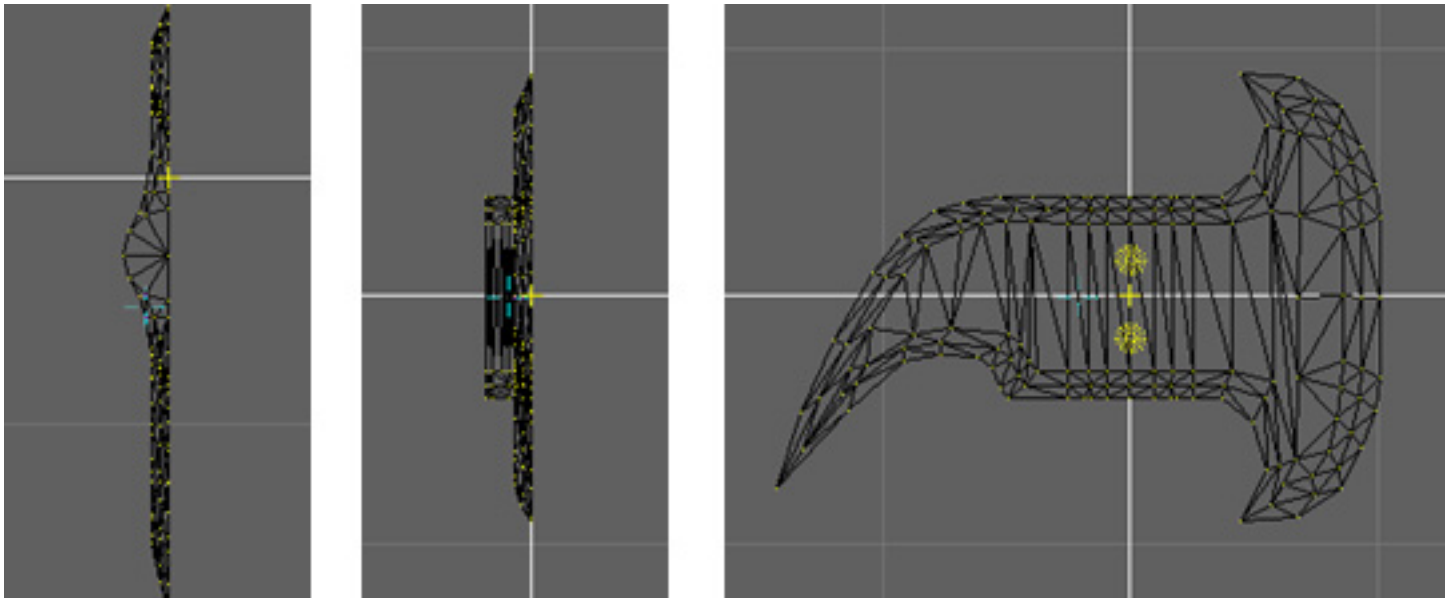
Remove Extra Cylinder Parts, Fill Surface

Since we'll be producing the other half of the blade by mirroring, we need to remove the vertices that would produce polygons inside the blade when it's complete. This is shown in the side view at lower left. When that's done, fill the inner outline with polygons by connecting the appropriate vertices with edges as shown at below right. This is done by selecting a pair of vertices to connect, then clicking `Actions>MakeFaceOrEdge`. You can also use the Fill command, but I can't guarantee you'll get the polygon arrangement you'll need.



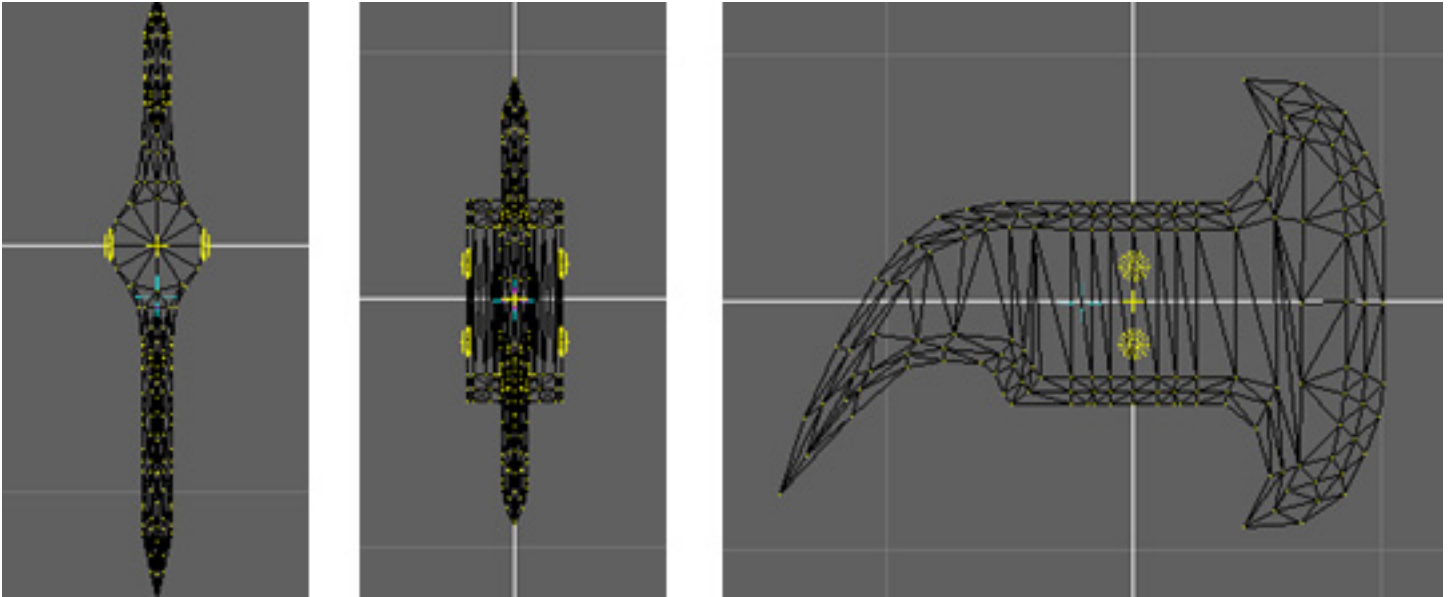
Reduce Blade Thickness, Add Bolts

With the top view active, select the middle outline of the blade front and move it toward the centerline. Deselect the vertices closest to the cylinder and move the remaining selected vertices closer to the centerline. This will make the blade thinner and give it a gradual curve. Do the same with the inner outline of the blade front. Repeat the process for the blade rear to get something like the top view at below left and rear view at below center. Next, we add a pair of bolts. With the side view active, create a Lat Sphere with the BuildPrimitives popup. Shrink it down, then flatten it out by double clicking Actions>Scale and setting Left/Right to 0.5. Move it into position so it's slightly inset into the axe head, then duplicate it. Arrange the 2 bolts as shown below right.



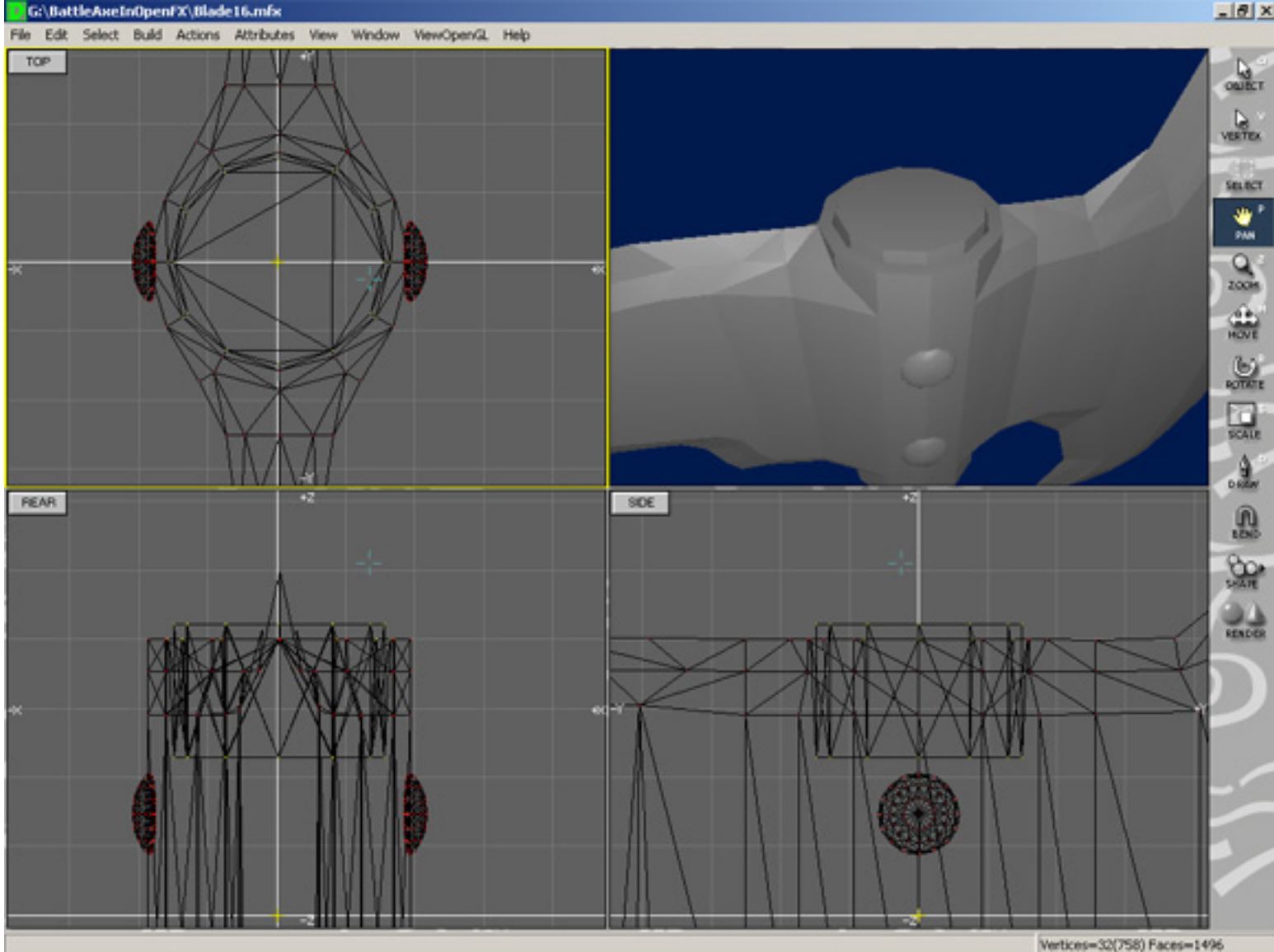
Mirror the Other Half of the Blade

If you haven't saved already, do so before performing the next step. With the top view active, select everything. Make sure the cursor is on the centerline, then click Actions>Mirror. In the popup menu, check the box to flip at the cursor "About a Vertical Line" and select "Copy, Reflect and Weld". You should see something like the top, rear and side images below.



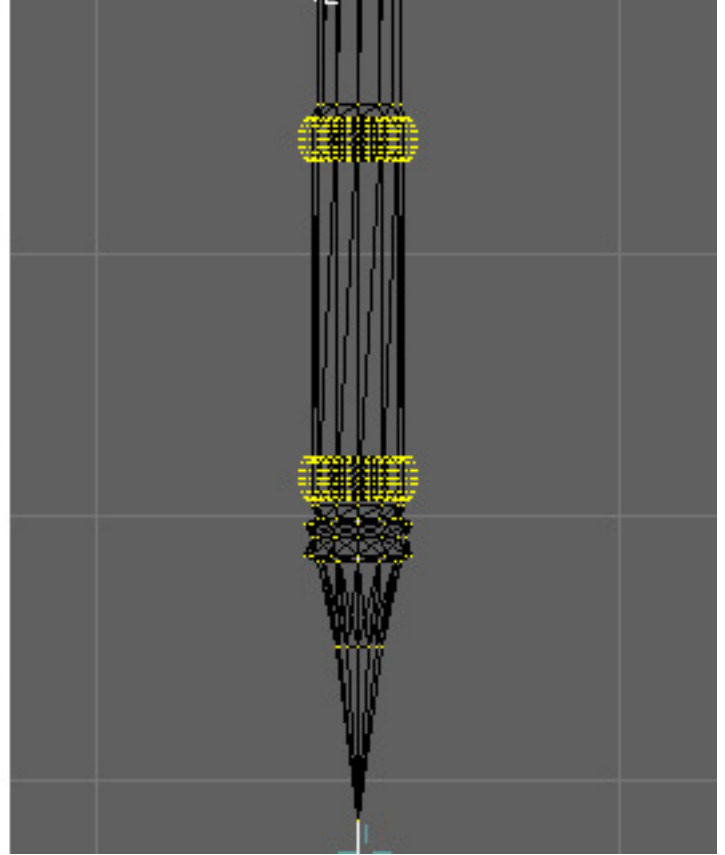
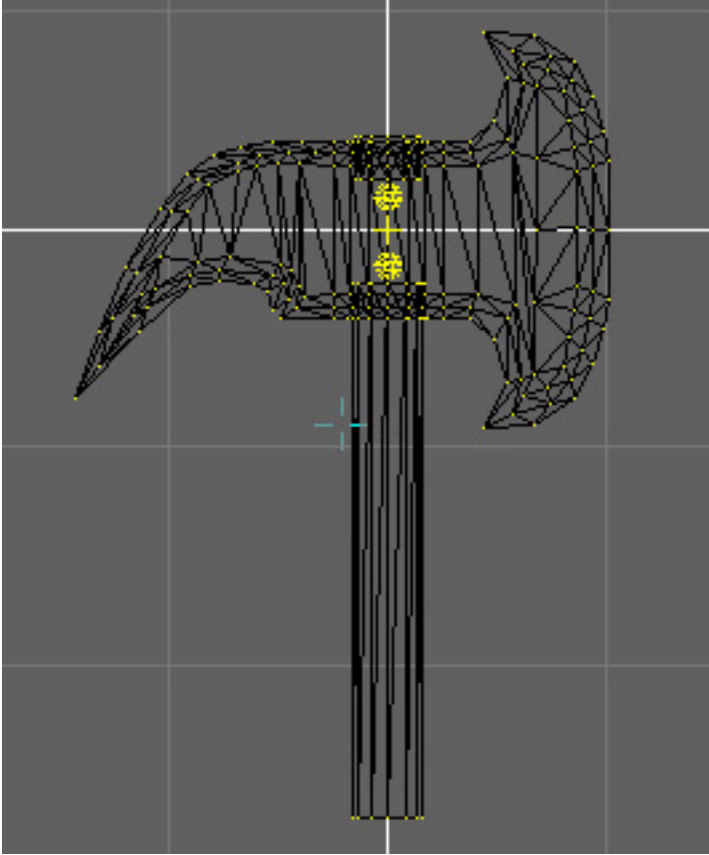
Add the Top of the Shaft

Now we're going to make the top of the shaft which is set into the axe head and protruding from it a bit. Delete the center vertice in the cylinder at the center of the axe head. Select the top vertices around the edge of the cylinder. Make sure everything else is deselected. Place the cursor where the center vertice was and click Actions>Extrude. Without moving any vertices, select the scale tool and shrink the selection a little. Extrude again and move down into the axe head, then extrude and shrink again. Extrude one more time and move up so the wooden shaft extends a little bit beyond the metal blade. Finally, click on Actions>FillOutline to close the top as shown below.



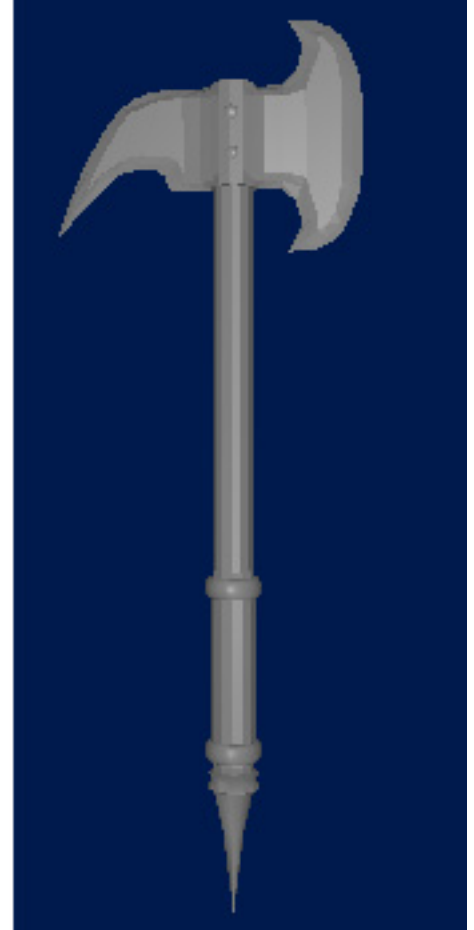
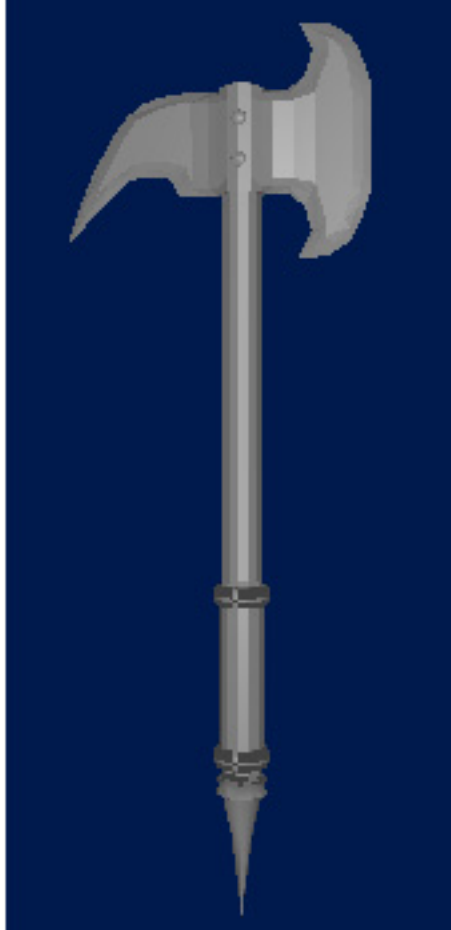
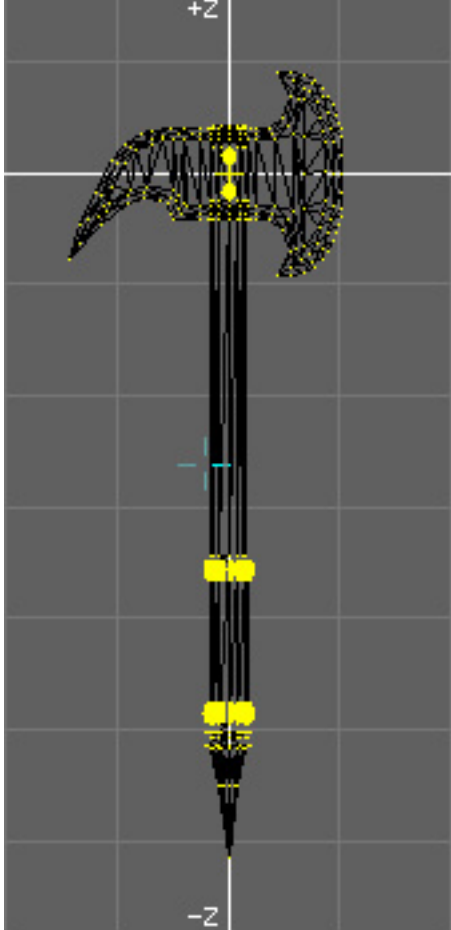
Add the Handle

Repeat the above process to produce the inset shaft protruding from the bottom of the axe head as shown at below left. Continue extruding, varying the scale as you go to produce the handle and spike end. Weld the vertices at the tip of the spike. Finally, add a pair of toruses from the BuildPrimitives popup menu to form a couple of iron rings as shown in the image at below right.



Fix Reversed Normals

The finished wireframe model is shown in the image at below left. The Open GL shaded view at below center shows a few areas that appear black. The normals of these polygons are reversed; they are facing the wrong way and most rendering engines only render one side of a polygon to cut computation time. To fix the reversed normals, select everything, then click on Actions>OrientFaces. This should get most of the polygons into alignment. If everything now looks black, then click Actions>Reverse to reverse the orientation of all the polygons. To correct any stray polygons, select the vertices where you need to reverse orientation, then click Actions>Reverse. Your image in OpenFX should now look something like the image at below right. If you're satisfied with the model, and want to use it with other programs, you'll need to export it. Click on File>Export and select the format you want to use, usually DXF or 3DS.



Where Do We Go From Here? A Few Options:

Option 1: Keep it in OpenFX. OpenFX has some texturing and rendering capabilities.

Option 2: Paint the model in an external application. To do this, export the model from OpenFX as a 3DS or DXF file, then convert it to OBJ format using Crossroads (free), run it through UVMapper (free) to get UV coordinates and a template to paint over in the 2D painting application of your choice. You can also use UVMapper to break the model into groups. Render in Bryce, Vue, Poser or whatever.

Option 3: Group the model and apply procedural textures by group. To do this, export the model from OpenFX as a 3DS or DXF file, then convert it to OBJ format using Crossroads (free), and import it into UVMapper to split the model into groups. Alternatively, you can import the OBJ file into Poser and use the Grouping tool to split the model into groups. Next, import the model into Bryce and apply procedural textures to the different groups. This is how the picture at the top of this tutorial was produced.

Option 4, 5, 6, 7, 8, : anything else you can think of.

Wrapping Up

That's it for this one. Good luck modeling and enjoy the program.

Until next time, Chop Chop!

Related Links

[OpenFX - Open Source 3D Modeling](#)

[OpenFX Site History](#)

[Crossroads](#)

[UVMapper](#)

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