This tutorial shows how I make a chimney.

The first step is to make a line drawing of the chimney's side elevation cross section. Click on **Create, Shapes, Line, Corner** and **Keyboard entry**. Select the **Right** viewport

Enter the X and Y co-ordinates of the first point of your cross section and then click on **Add Point**. Repeat for all the other points. When you have entered them all click on **Close**.
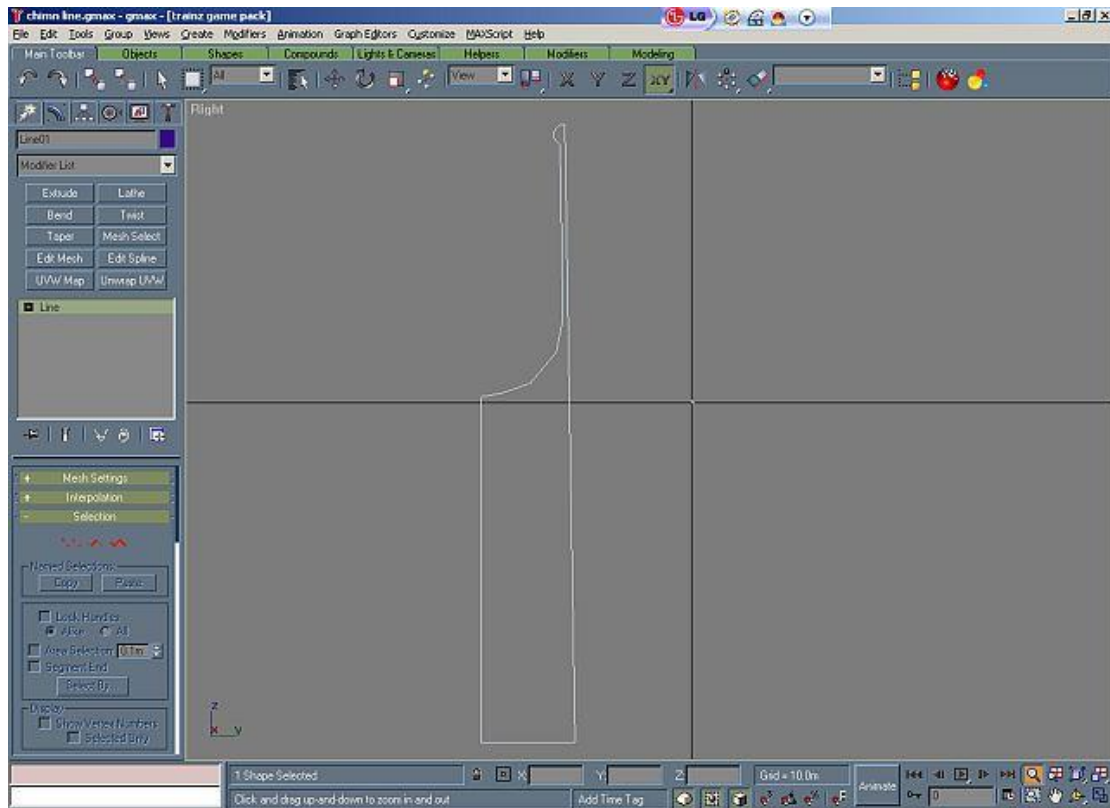
The following are the X and Y co-ords for my J class chimney cross section (when using the Right viewport):

X	Y
-0.433	0.012
-0.390	0.019
-0.331	0.040
-0.278	0.103
-0.264	0.172
-0.270	0.530
-0.282	0.544
-0.283	0.558
-0.272	0.572
-0.260	0.572
-0.239	-0.700
-0.433	-0.700

Examine the result and if necessary edit the line to your satisfaction. To do this Right click in the Right viewport and select **Convert to Editable Spline** and then click on the **Vertices** icon, the **Select and Move** icon (near the top of the screen) and then move any selected vertex either by dragging or by keyboard entry in the Y and Z boxes at the bottom of the screen.
Now select the Hierachy icon in the drop down menu on the left (a square with three small squares underneath) and then click on **Affect Pivot Only**; move the pivot to 0,0,0. Save your cross section as **chimney line.gmax**.

Note: The cross section extends well below the skirt in this example so as to be able to use the correct dimensions for the internal diameter at both the top and at the throat of the chimney, thus obtaining the correct taper of the chimney. If you are working from an undimensioned drawing you could reduce this extension, but leave enough for the moulding of the skirt to the smokebox contour.

We now have to convert the cross section into a solid object; in order to reduce work we will only make a quarter chimney at this stage.

Select the **Modify** icon and then click on **Lathe**. Set **Degrees** to 90, **Segments** to 5, untick **Cap Start** and **Cap End**, click on Y in the **Direction** box and tick **Generate Mapping Coords**. Now go to the perspective viewport and rotate the object to show the underside. Right click and select **Convert to Editable Mesh** and select the **Polygon** Icon (a red square). Back to Perspective viewport and click on the bottom face of the object and then press the Delete key; repeat till all five segments of the bottom face have been deleted.

We will now mould the chimney's skirt to fit the shape of the smokebox. Go to front view and click on the **Select and Move** icon and move the object to Z = 0.873, this being the radius of the J class smokebox. Now in Front view create a cylinder with Height of 1.0 and radius of 0.873 and 22 segments (the same as the smoke box).

In Front view select the ¼ chimney and **Convert to Editable Mesh**. Click on the **Vertex** icon in the drop down menu.
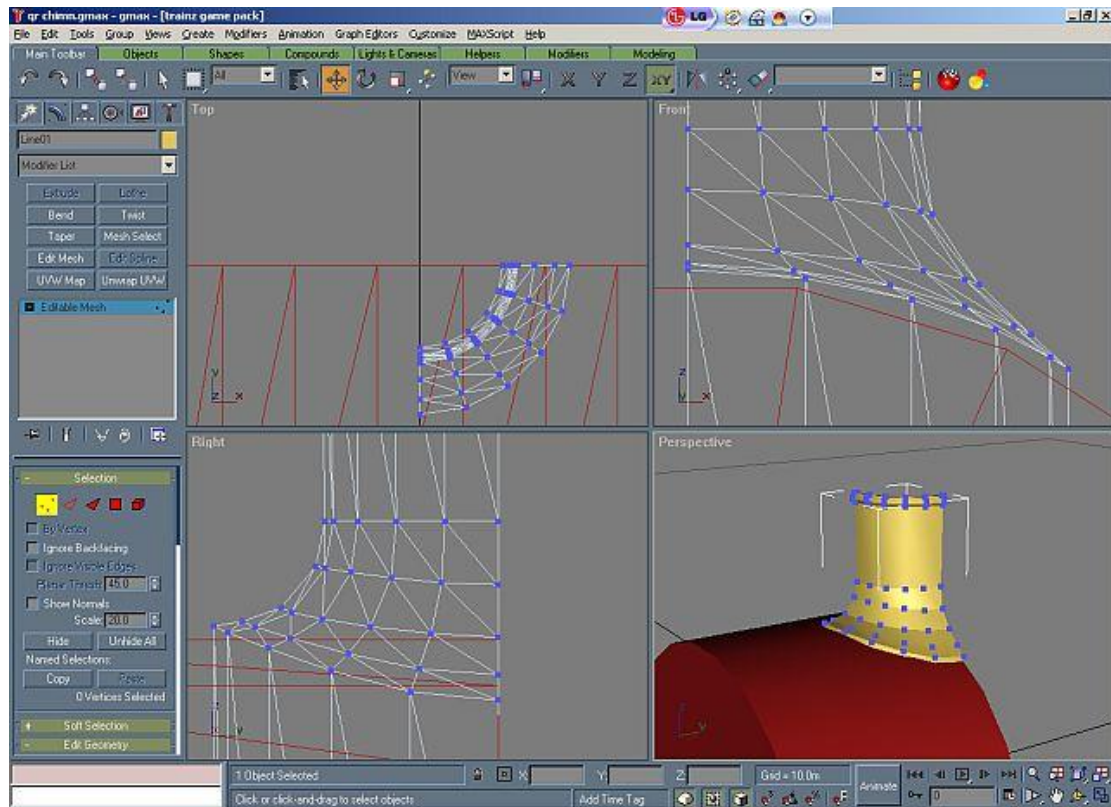
If we consider the lowest horizontal line as line 0 and the next as line 1 and so on, we now are going to edit lines 1 – 4. You will note that line 1 is .012 (1/2 inch) above the cylinder. Edit all the points except the 1st **by changing Z only** so that they are all approximately .012 above the circle.

Make sure that they form a nice smooth curve when viewed in both front and Right views.

Now edit line 2 so that it also forms a smooth curve which diverges slightly from line 1 and the same for lines 3 and 4. Some back and forth editing will be required to get ALL lines (including the vertical lines) in both views to be smooth curves. **Only edit the Z co-ordinates and do not move the 1st point of any line**.

The following are Z values obtained by me for the J class chimney:

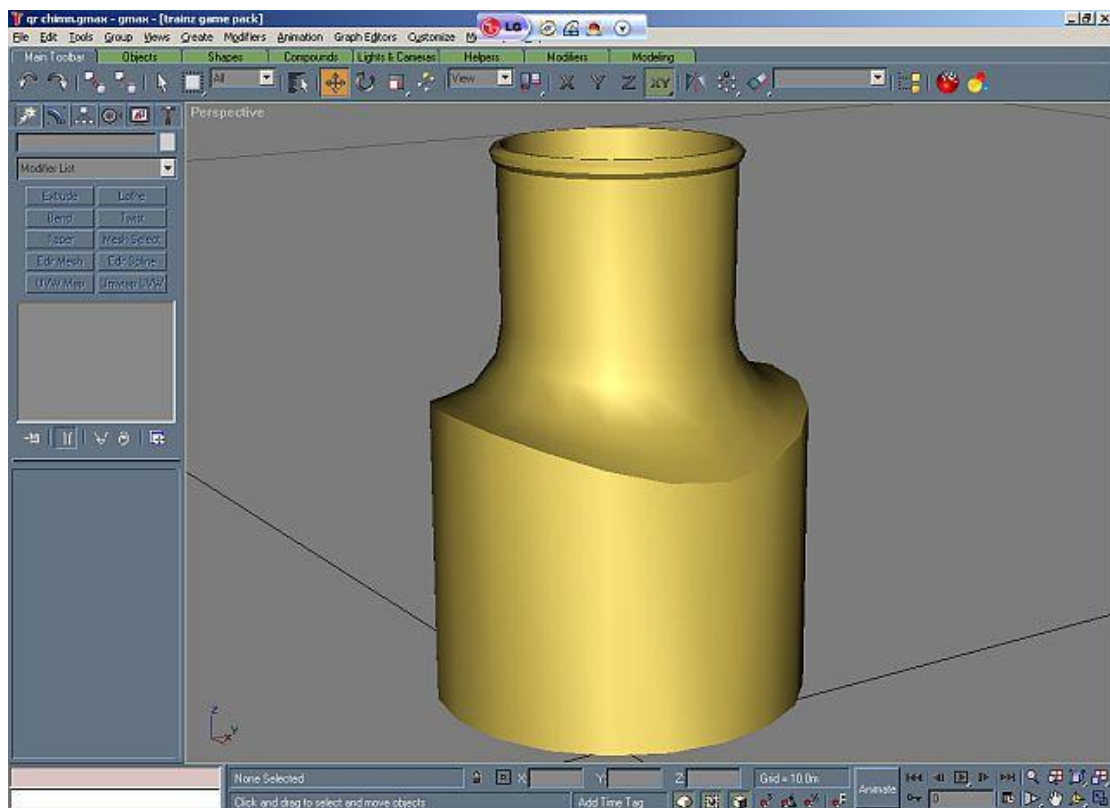| Line 1:	**.885**	.875	.851	.817	.785	.772
Line 2:	**.892**	.884	.867	.843	.820	.811
Line 3:	**.913**	.906	.896	.884	.874	.868
Line 4:	**.976**	.973	.967	.959	.951	.948

Once you are happy with the result of your editing go to User or Perspective view and select the cylinder/smokebox and delete it. Re-select the ¼ chimney.

Now select the **Mirror Selected Objects** icon (near the top of screen) and then select **X**, **Copy** and **OK**. Right click and select **Convert to Editable Mesh** and in the drop down menu on the left select **Attach**. In User/Perspective view click on the original ¼ chimney to form a ½ chimney. Back to the drop down menu and click on the **Vertex** icon. In Front view drag a box around all the vertices on the Z axis. In the drop

down menu note that it says "24 Vertices Selected". Go down until you see the **Weld** box, and in the box to the right of **Selected** set the value to .005, ie we are about to weld all selected vertices that are within 5 mm of each other. Now click on **Selected** to do the welding and check the message, which now should say "12 Vertices Selected".

Back to User/Perspective and do another **Mirror**, this time about Y and attach as before to form the complete chimney. Do another **Weld**, this time using Right view.

Click on the **Create** icon, then the **Modify** icon and on **Modifier List**. In the list find and click on **Smooth** and then click on **Auto Smooth**.

Return to Perspective and admire your completed chimney.

SAVE IT !