



FREEFORM™
FEEL THE DIFFERENCE

FreeForm Modeling System Workflow Study Citrus Juicer



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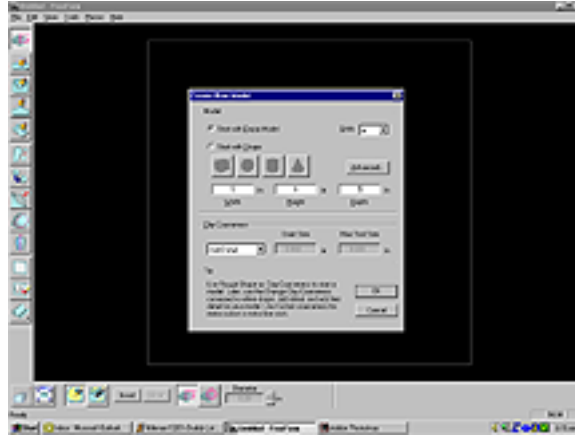
Description: This workflow details how to quickly create a citrus juicer in FreeForm v4.

Time: 2 hours.

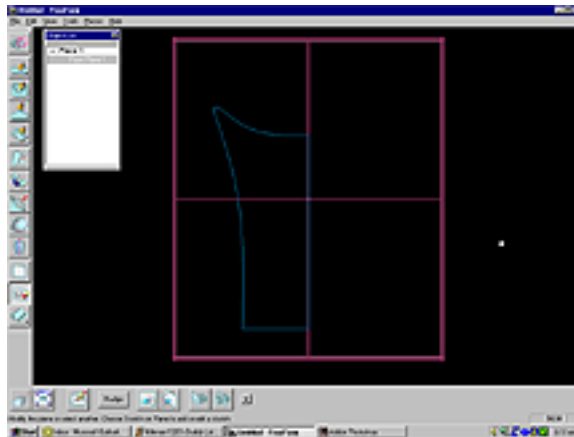
Software Version: FreeForm™ modeling system, Version 4.

Step 1) Setup

1. Create an empty workspace of 5" x 6" x 5" with the clay coarseness set at *Add Detail*.

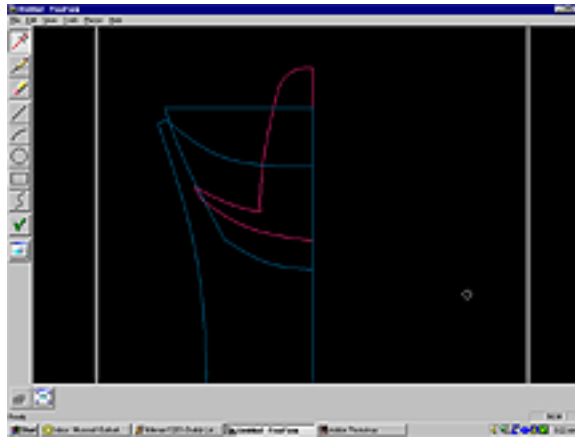


2. Turn on the **Object List** by pressing the **O** hotkey, or by choosing it from the **View** menu (**View→Object List**). You will notice that “Piece 1” is already active. Rename this piece by right-clicking on it in the Object List, or by clicking and holding the PHANTOM Mouse on the piece name in the Object List¹. Name this piece “Base.” Create a new plane on the front of the workspace, use the *Through Center* button on the Dynabar to position the plane in the center of the workspace, and enter **Sketch** (by clicking the icon on the Dynabar, or pressing the **k** hotkey). Sketch the profile of the base, and an axis to spin the profile about.

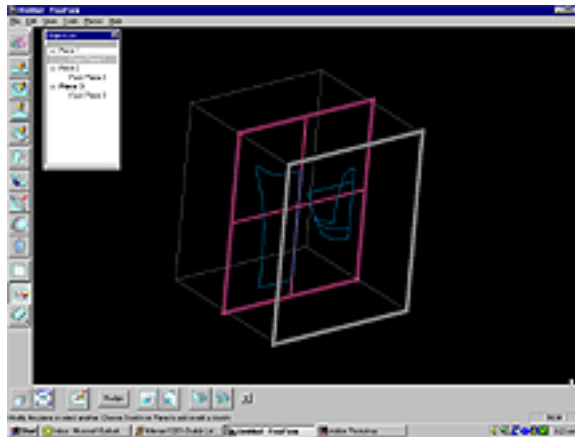


3. Now, create a second piece by choosing **New Piece** from the **Pieces** menu (**Pieces→New Piece**). Rename “Piece 2” as “Plug.” Again, create a new plane on the front of the workspace, enter **Sketch**, and draw the profile of the hollow space that will become a funnel. Leave the first drawing plane visible as a reference.
4. Repeat the same procedure again, this time to create the “Strainer” piece. Remember, as Spin will be used to create these pieces, you need only sketch the profile.

¹ Whenever right-clicking in the Object List is mentioned, clicking and holding the stylus using the PHANTOM Mouse will achieve the same functionality.

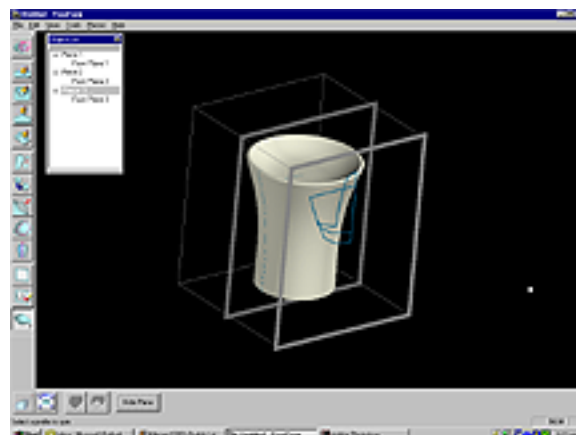


5. Activate “Base” by clicking on it in the Object List. Right-click on the associated front plane, and choose Edit from the menu. Center the plane in the workspace by choosing the **Center Plane** icon from the dynabar.

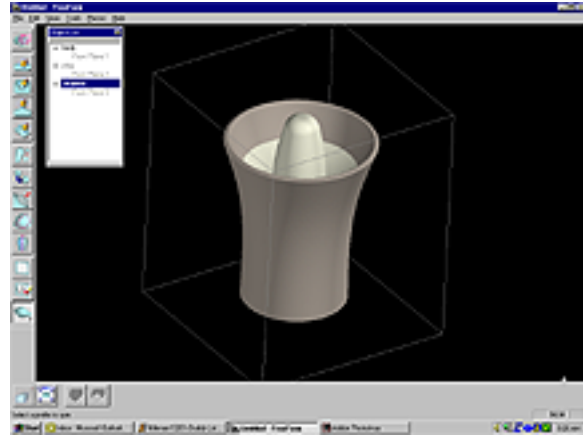
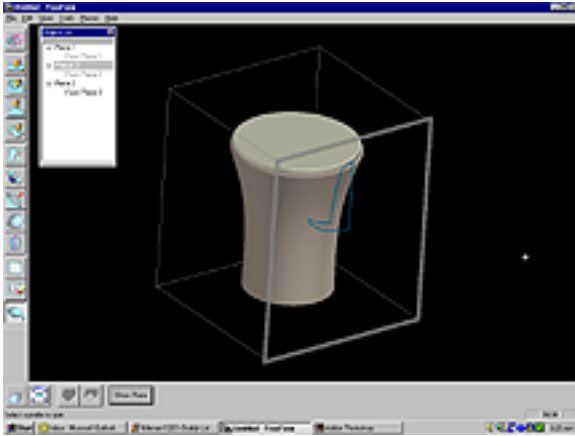


Step 2) Creating the Juicer

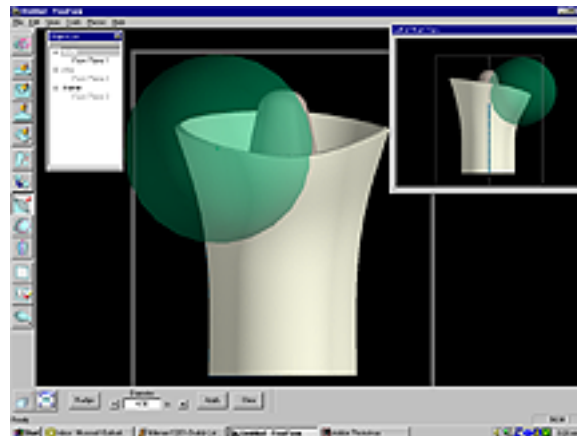
1. With the “Base” plane centered, use **Spin** to create the material. To use Spin, you choose the profile to spin, and the axis to spin the profile around. In this case, the profile and axis should both be on the “Base” plane that was set through the center of the workspace.



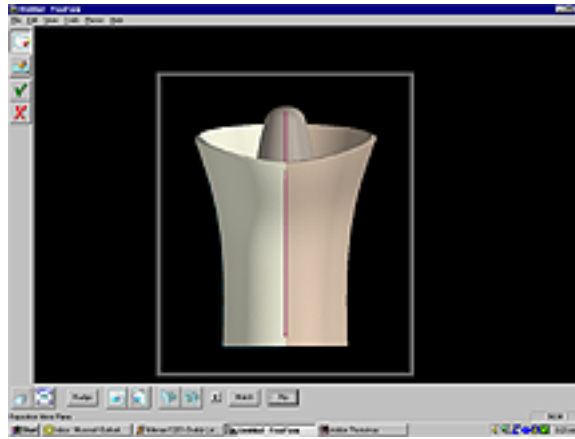
2. Follow the same steps to flesh out the “Plug” and “Funnel” pieces.



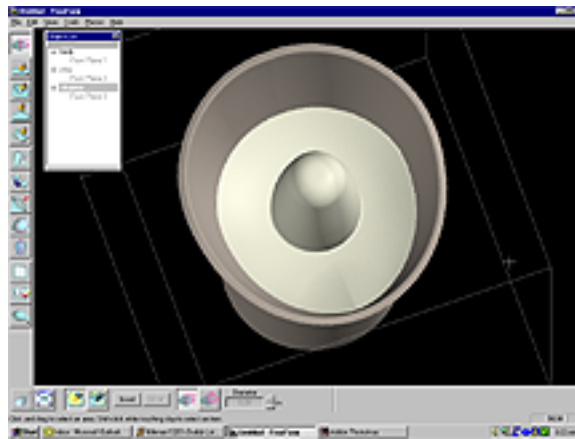
3. Right-click on “Plug” in the Object List and choose to **Remove Clay From** “Base.” Again, right-click on the “Plug” piece, and this time choose to **Delete**. This will create a hollow area inside the “Base.”
4. Use the **Tug** function to slightly deform the ridge of the “Base” to create a spout.



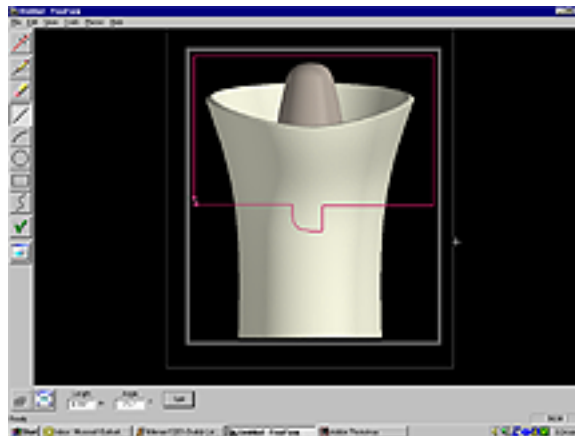
5. **Mirror** the “Base.”



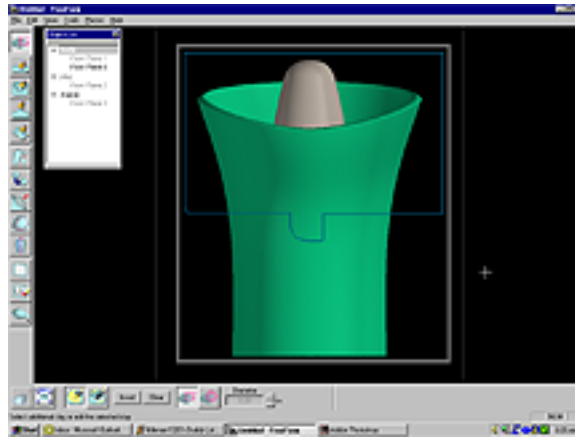
6. To fit the “Strainer” to the newly deformed “Base” piece, again use **Tug** and **Mirror**.



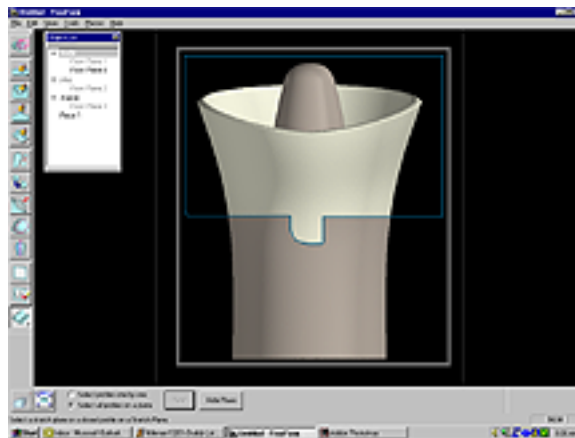
7. Activate the “Base” piece, create a new plane, and draw a profile to separate the base into two separate parts.



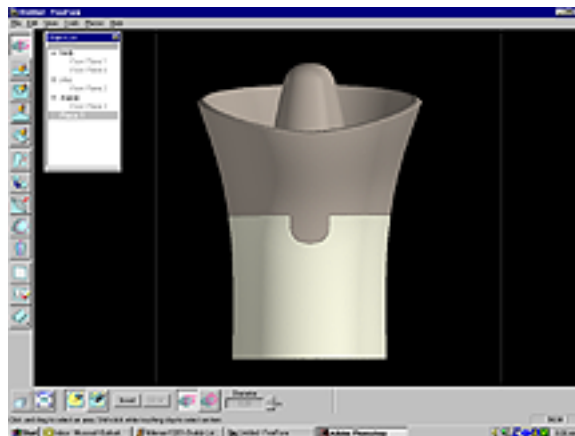
8. Enter **Select with Ball**, choose *Select All* from the dynabar, and then choose to *Copy* the selected clay. From the **Pieces** menu, select **Paste as New Piece (Pieces→Paste as New Piece)** and paste the clay back in as a new piece, directly on top of the old piece.



9. Use **Wire Cut**, with the previously drawn profile, and choose to *Cut Inside*. Switch to the “Base” piece, and again use **Wire Cut** on the most recent profile, this time choosing to *Cut Outside*. This will leave two mating parts.

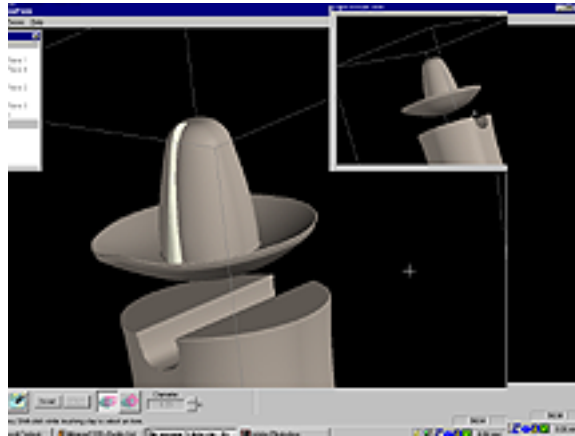


10. **Mirror** both parts to maintain their symmetry. Rename the most recently created piece as “Funnel.”

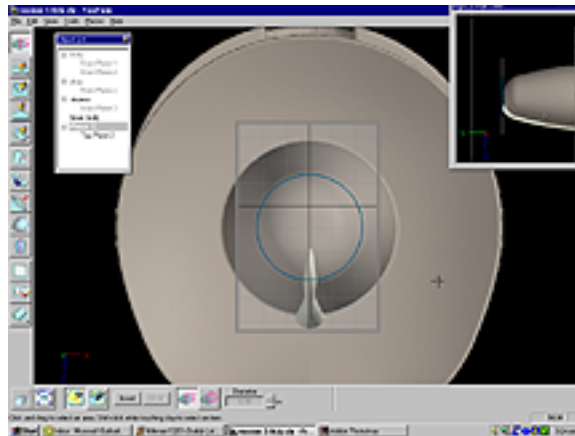


Step 3) Finishing Touches

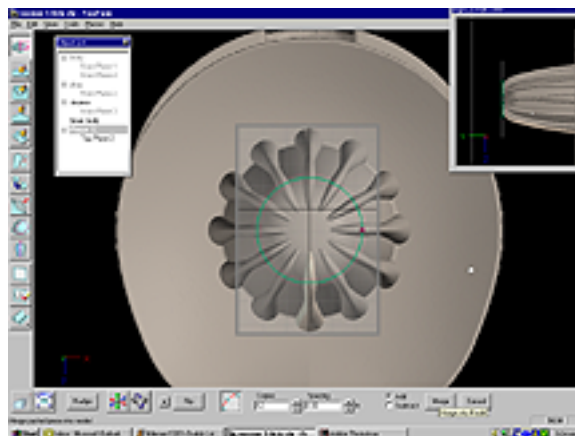
1. Right-click on the “Funnel” piece in the Object List and choose **Hide**. Create a new piece (**Pieces**→**New Piece**) at *Add Detail* clay coarseness. Rename this piece “Ribs.” Use the **Add Clay** function to establish a rib. With **Tug**, shape the rib accordingly.



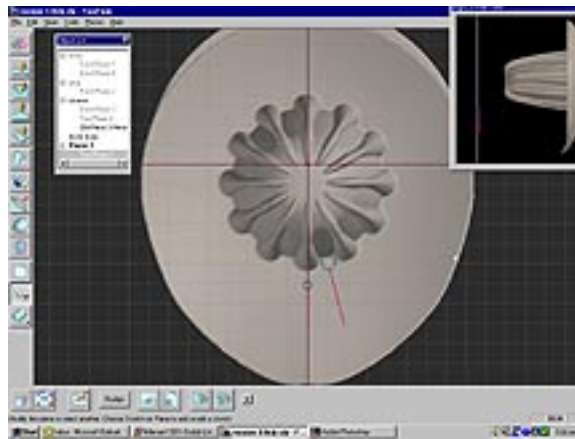
2. Change to the top view (by hitting **F5** or choosing **View**→**Standard Views**→**Top** from the menu), and create a new plane. Enter **Sketch** and draw a circle around the center of the plane.



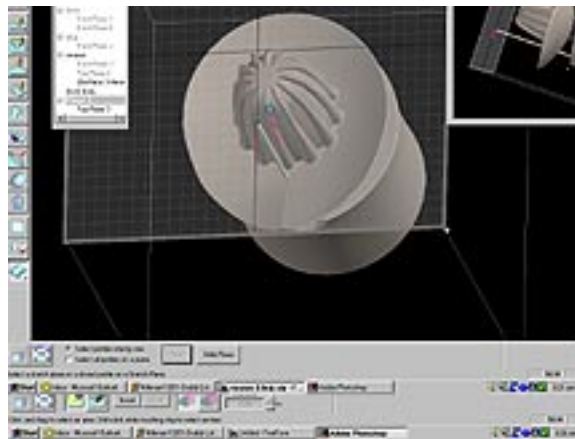
3. Change to **Select with Ball** and choose *Select All* from the dynabar. The rib created in step 3.1 should be selected. Choose to *Copy* the selected clay. Next, choose the *Paste* option from the dynabar. A new dynabar will appear. Hit the *Paste Pattern* button. Select the circle just drawn as the pattern to paste along, and create 12 copies of the rib.



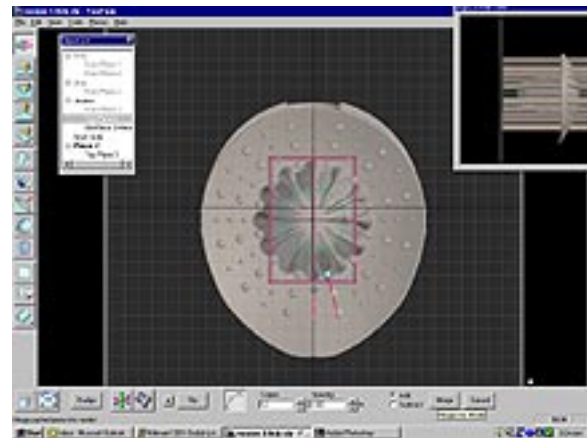
4. Create another new piece (**Pieces**→**New Piece**, at *Add Detail* coarseness) and rename it “Holes.” Create a new plane, on top of the workspace, for this piece. Enter **Sketch** and draw the circles that will become the holes through which the juice will pour.



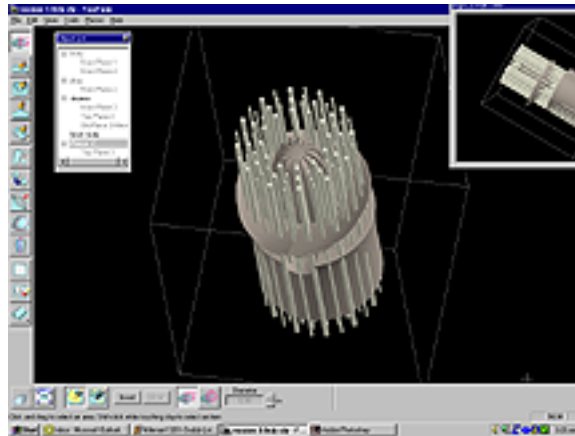
5. Enter **Wire Cut**, and extrude the circles one at a time, making sure that each circle passes through the top and bottom of the “Strainer.”



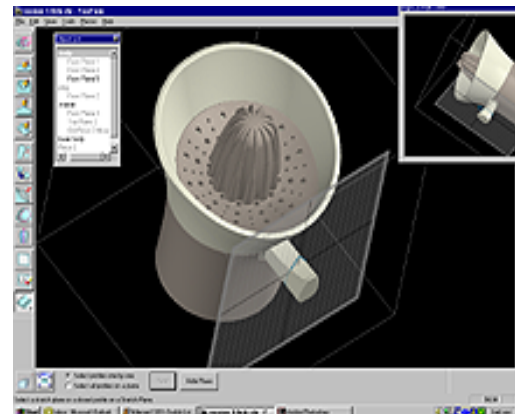
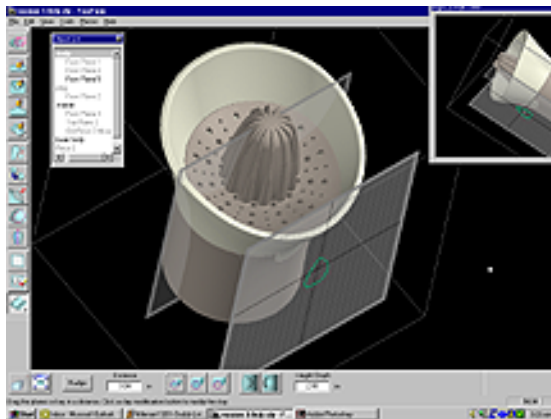
6. Again, use the **Select**, **Copy**, and **Paste Pattern** functions to replicate the holes in rows of three. Use the same circle profile used to replicate the ribs to maintain the same center location.



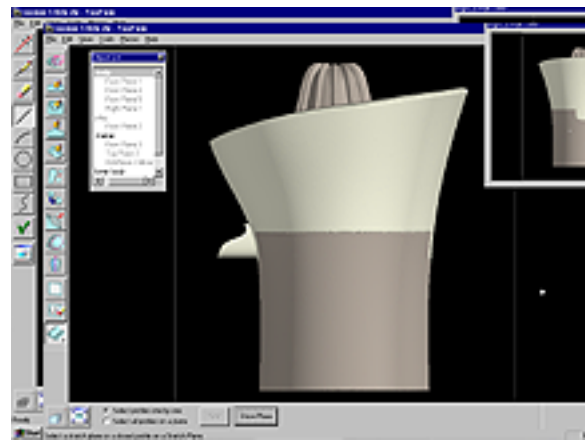
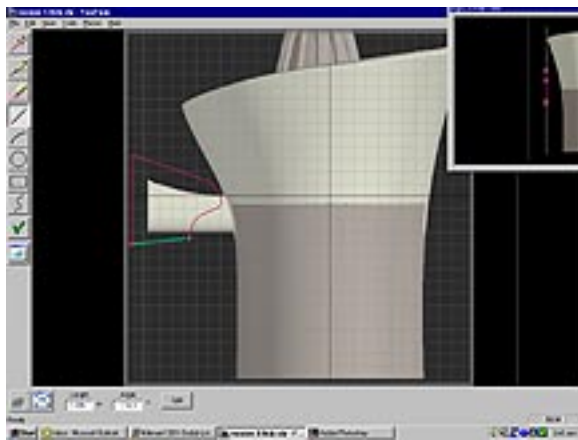
- Right-click on “Holes” in the Object List and choose to **Remove Overlapping Clay From** the “Funnel” piece. Delete the piece “Holes.”



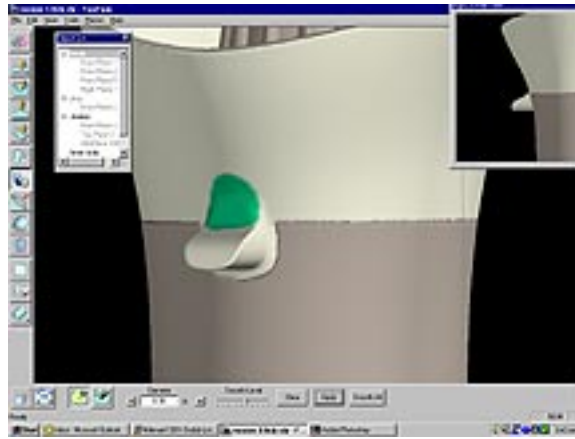
- To create the spout, activate “Base” and create a plane in the front view (**F2** or **Views→Standard Views→Front**). Draw a profile curve in the shape of the spout. Start **Wire Cut** and choose to emboss the curve to a distance of 2 inches.



- Enter the right side view (**F3** or **Views→Standard Views→Right**), create a new plane, and draw a profile to trim the spout. Use **Wire Cut** to cut away the clay inside the profile, by choosing *Cut Inside* from the dynabar.



- Choose **Smooth Area** from the Toolbar (on the **Smooth** flyout), and smooth the transitions from the juicer to the spout.



11. Switch to the front view (**F2** or **Views**→**Standard Views**→**Front**), create a new plane, enter **Sketch**, and draw a profile for hollowing out the spout. Enter **Wire Cut**, adjust the back plane so the cut will only hollow out the spout (and not create a hole through the back of the juicer), and then choose to *Cut Inside*.

