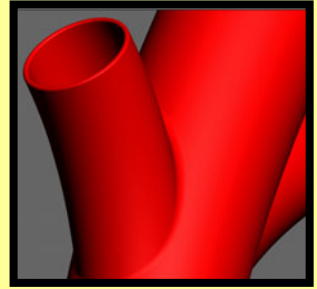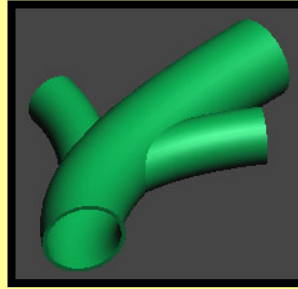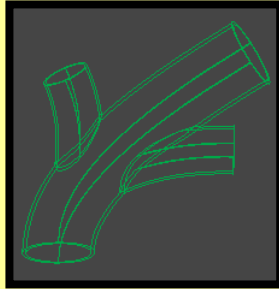# Power Tube Tool

In this tutorial, you will learn how to create a Power Tube and be shown how to:

- Edit Control Points and Handles.
- Use the "Radius From Deriv. Surface" option.
- Use the "Swap Center and Rail" option.
- Use "Cap Ends" options and adjust "Wall Thickness %" setting.
- Use Boolean Union.
- Adjust tube radius along different positions along length of tube object.

Tool Used In This Tutorial

This tutorial will be accomplished with the following tools:

 Power Tube tool **(Pwr_Tube).**

 Power Sketch Tool **(Pwr_Sketch).**

Creating Power Tubes

In this section we will discuss:

    A) Options and Settings
   B) Control Points and Handles.

A) Options and Settings

The Power Tube tool provides a convenient way to create objects which consist of one or more tubes of variable radius. It can be used to create objects that look like a tree with branches or veins in body.

1) To use the Power Tube, the user typically must create a frame work using the "Sketch Curves" tool.
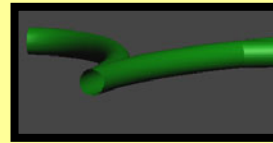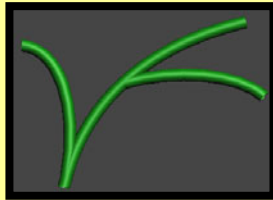
Start by accessing the Power Sketch Tool .

Draw a series of sketch curves connecting the lines to form a resemblance of a "Tree Branch". Make sure the snap setting is set to "Edge". This will ensure a good connection between the sketch curves.
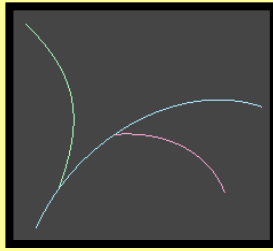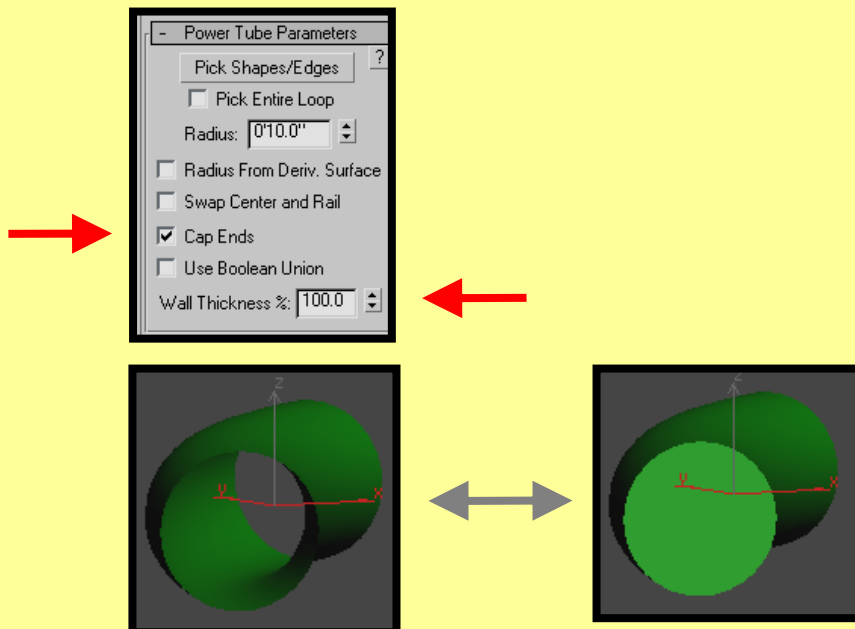
2) Access the Power Tube tool .

In the top view port click the Power Sketch curves one by one. You now have a series of connected tubes.

3) Lets look at the "Cap Ends" option and "Wall Thickness %" spinner.

Select the "Cap Ends" option. By default the, the "Wall Thickness %" setting is set to 100%. This allows for the tubes to have a solid cap on the ends.
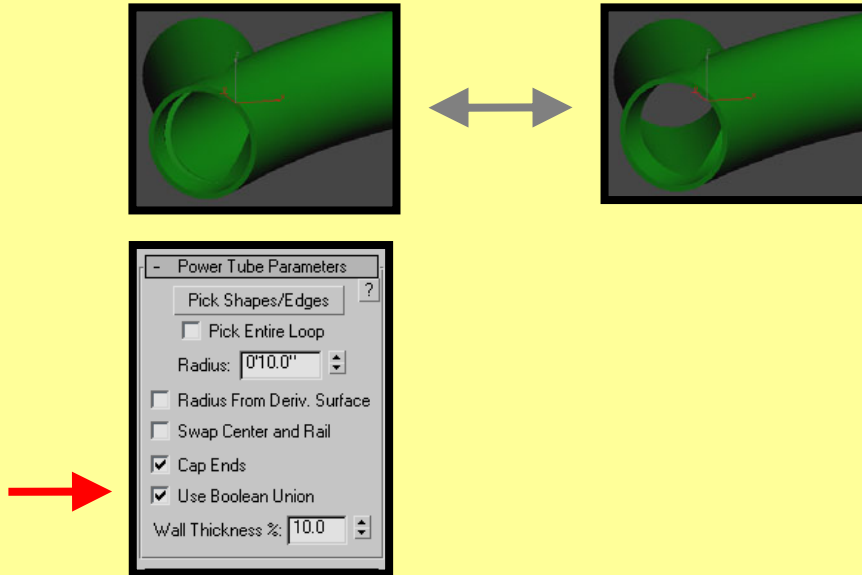

4) If we change the "Wall Thickness %" setting to 10, we get a tube with thickness to the walls of 10%.
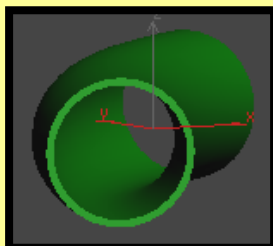
5) Lets take a look at the "Use Boolean Union" option.
Select you tube object and select the "Use Boolean Union" option. The Boolean union allows a connection between tubes to occur.

6) Next is the "Radius From Deriv. Surface" option. When selected, the radiuses of the tubes will correspond to the derivative surface size of the corresponding curves.
Make sure the Tube object is selected and turn on the "Radius From Deriv. Surface" option. The radiuses of the tube object vary in size depending on the derivative sizes of the tube surfaces.
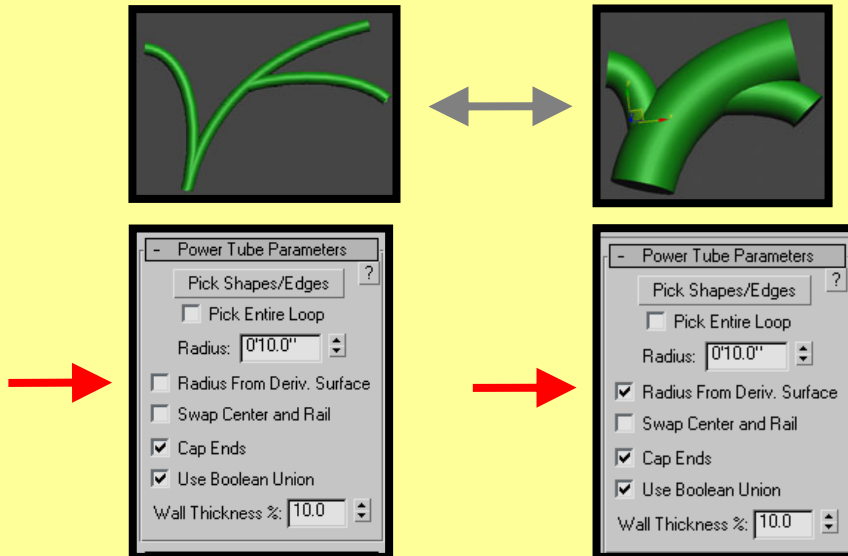

7) "Swap Center and Rail": this setting enables us to create a shape like a snake lying on a table by using the given curves to define points along outer edge of the tube instead of the center of the tube.

1) In this Example, we are going to Adjust the radius along different parts of a Tube.
Start by creating a single sketch curve Tube. Make sure your view port is in wireframe mode.
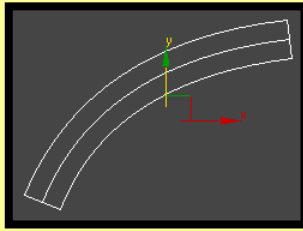

2) While your object is selected, turn on the "Radius From Deriv. Surface" option. This option allows
the tube section corresponding to the selected Sub object "Tangent Handles" to increase or decrease
in diameter when moved.
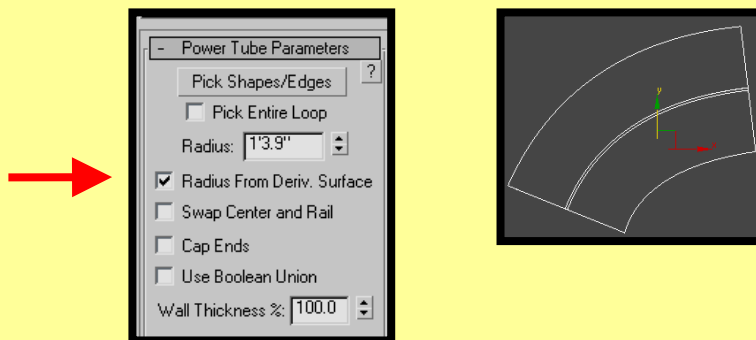
3) Go into the "Sub Obj. Tangent" sub object mode. You will see one set of Tangent Handle
associated with your object.
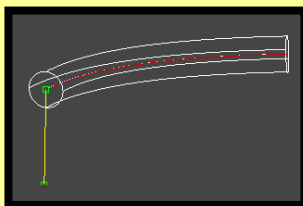
4) Highlight the control handle. While holding down the shift key, move the selected handle about half
way along the object using the Z-axis constraint gizmo. This will create a 2nd Control Handle. Continue
to "shift / move" to create one more Control Handle at the end of the tube.
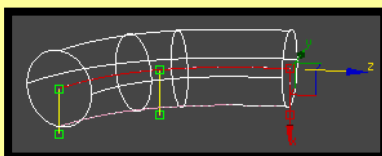
5) While the object is still selected and the "Radius From Deriv. Surface" option is on, highlight the middle control handles, use the X-axis gizmo and drag upwards to decrease the diameter of the tube. Highlight the control handles at the end of the tube and drag outward to increase the diameter at this point.
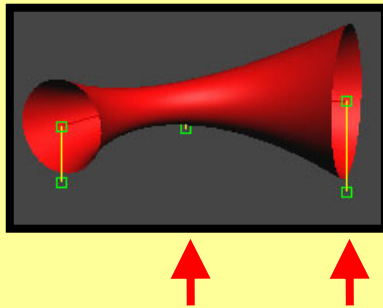
6) You can also select the "Sub Obj. Points" mode of your tube to drag and alter the shape.
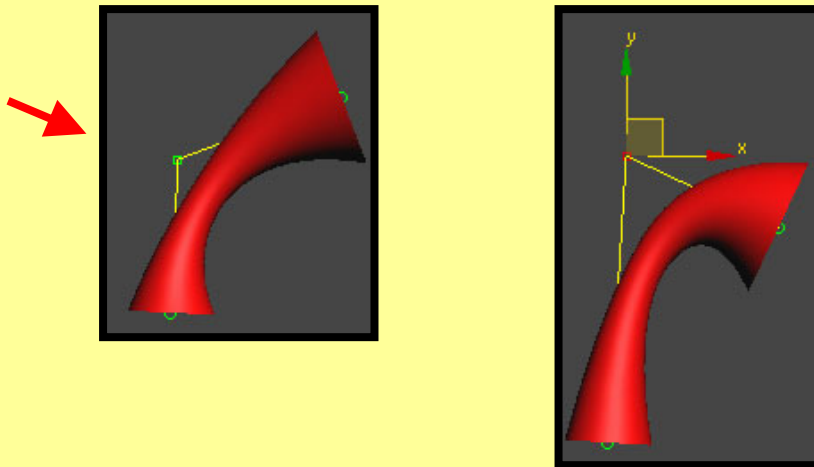
Summary

In this tutorial, you were shown how to create a Power Tube using:

- Edit Control Points and Handles.
- Use the "Radius From Deriv. Surface" option.
- Use the "Swap Center and Rail" option.
- Use "Cap Ends" options and adjust "Wall Thickness %" setting
- Use Boolean Union.
- Adjust tube radius along different positions along length of tube object.

 Power Tube tool **(Pwr_Tube).**