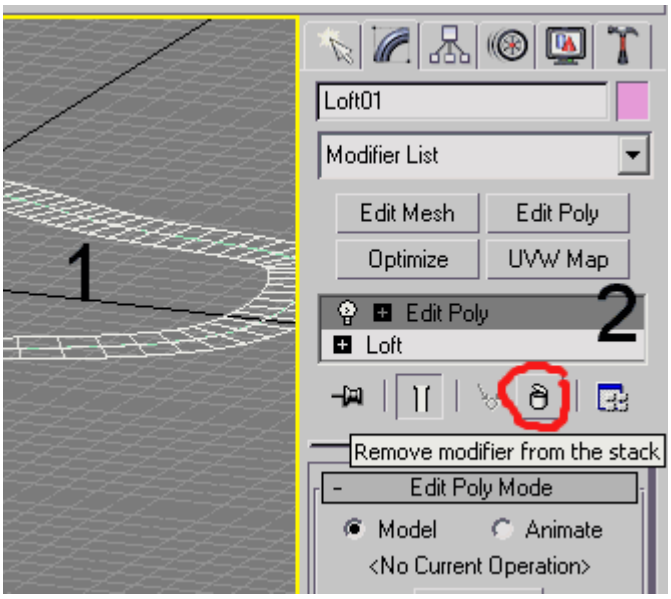
3ds Max Tutorial 2: Elevation and Banking

This tutorial shows how to add elevation changes and banking to your track, and a few extra tips added in. I suggest reading the previous "3dsmax Track Making" tutorial before going through this one.

You can either start with a new track or where the previous tutorial left off. However, adding banking/elevation to your track after terrain has been created can make for a lot of extra work... So I suggest that, if planning on adding it, you do the banking and elevation to your track before creating terrain when possible.

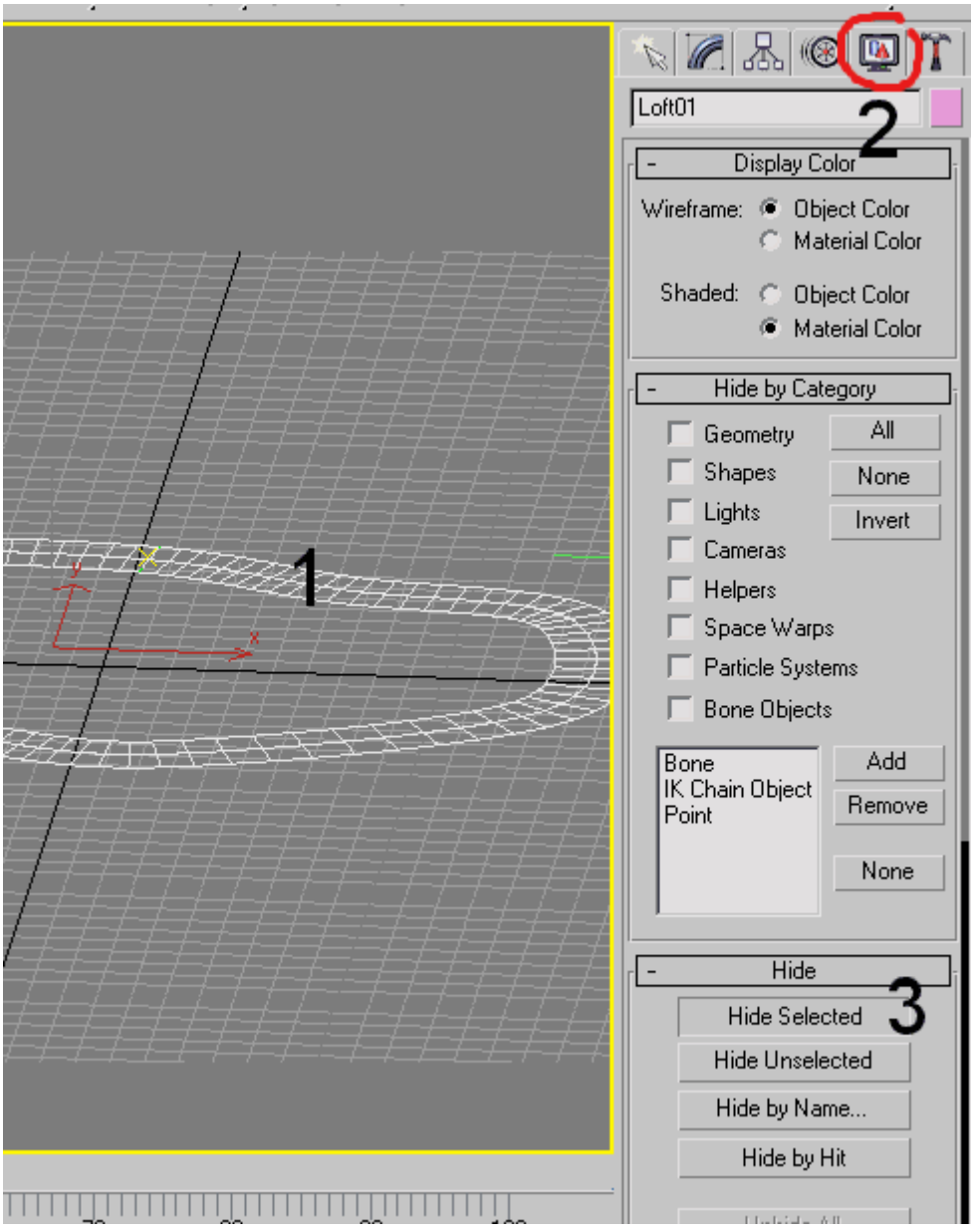
Adding Elevation

First off, select the track loft (**step 1**). I need to be sure there's no extra modifiers added to my track loft. These may cause havoc and mayhem when I try adding elevation change to the track surface. In this case, I have an Edit Poly modifier in the "modifier stack"... I'll get rid of that by selecting it from the stack and clicking the (circled) "Remove modifier..." button (**step 2**). Now all that's left is "Loft".

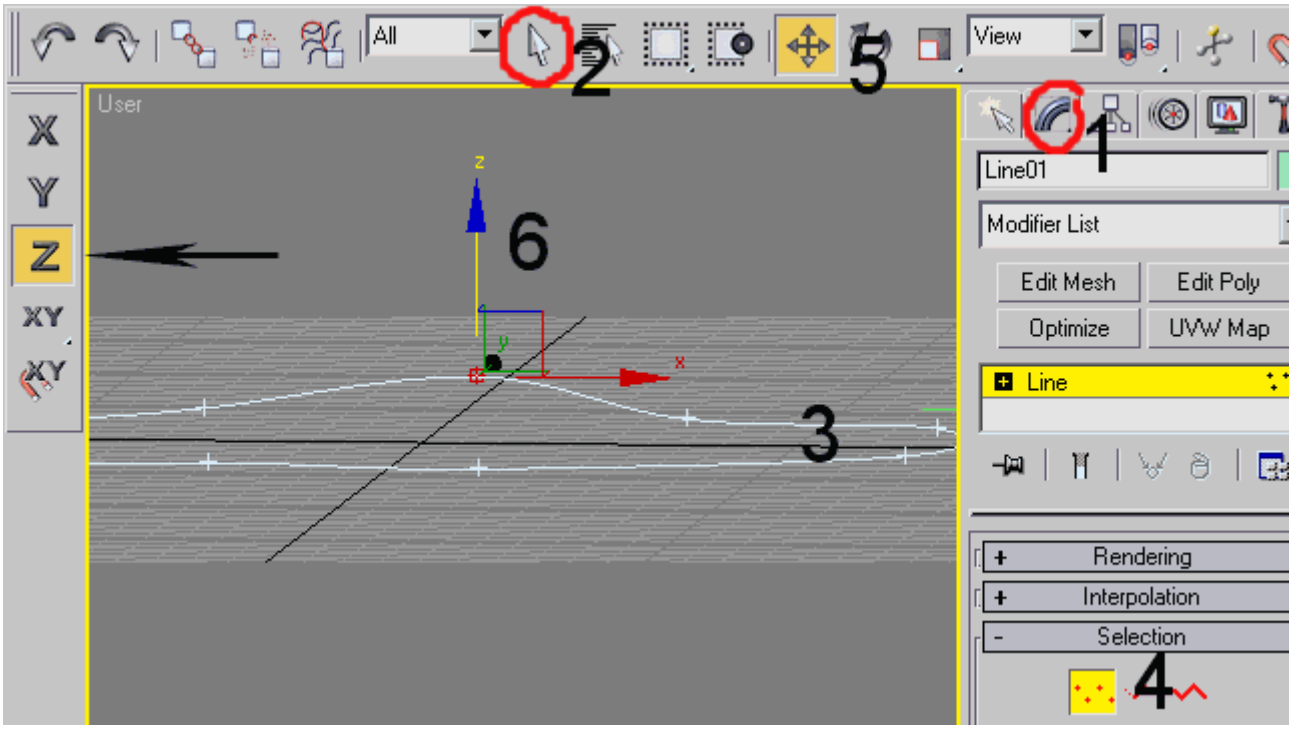


Now, I want to hide the track loft and terrain, if there is any. This is only so that it will be easier to see the loft "path" line. Be sure not to hide the "path" line.

Step 1: Select the track loft. **Step 2:** Select the "Display" tab as indicated. **Step 3:** Click the button labeled "Hide Selected". (Do the same for terrain if needed)



Now, I will select and drag 1 or more vertices up or down along the Z-axis to create elevation change on the loft "path" line. **Step 1**: Select Modify tab. **Step 2**: Click "Select Object" button. **Step 3:** Select the loft "path" line. **Step 4**: Click the "Vertex" button. **Step 5:** Click the "Select and Move" button. (At this point, I suggest using more of a side view by rotating it in the viewport) **Step 6:** Select and drag a vertex up or down, using the blue Z-axis arrow as shown. This creates a vertical bend in the line. You'll also notice that the "Z" button on the left is depressed when you do this. This is a way to be sure that you're not accidentally moving a vertex along a different axis, which can be problematic and not always obvious.

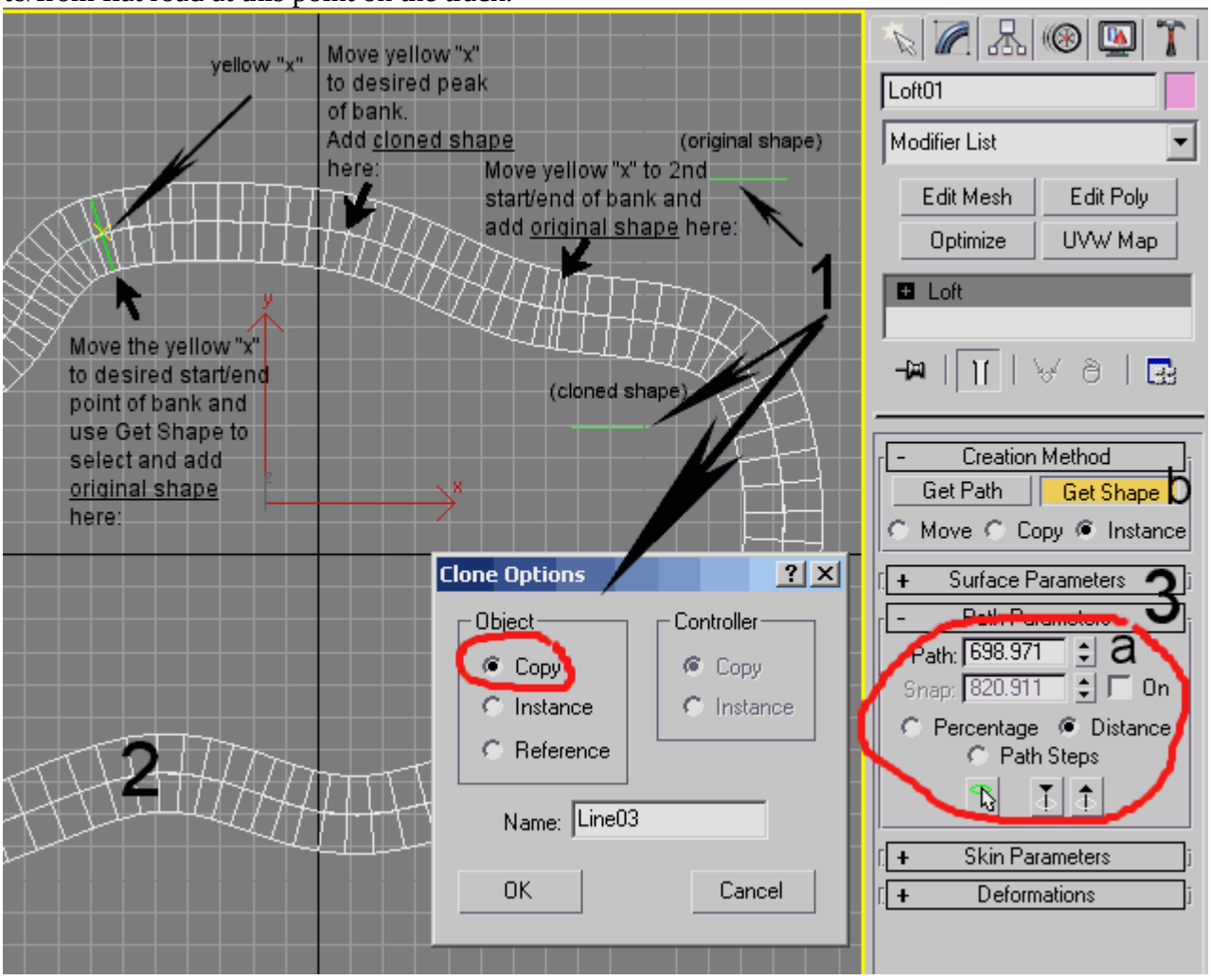


That's it. You'll probably find that a little elevation change goes a long way when you try it out in the game, so don't over do it. Once you get that figured out, you might want to do some fine tuning by right-clicking on a path vertex and selecting the “Bezier with Handles” option. This lets you twist the path up, down, or to the sides of the vertex, using the “Select and Move” function and by dragging the handle bars along different axes.

Adding Banking

Now I'm going to add a bank to that same section of track. You can add it wherever you choose. If you still have the track loft selected, go back under the "Display" tab and deselect the loft. **Step 1**: Select the original "shape" line used as the cross-section shape in your track loft. From the menu bar, select Edit / Clone or hit Ctrl-V. Select "Copy"

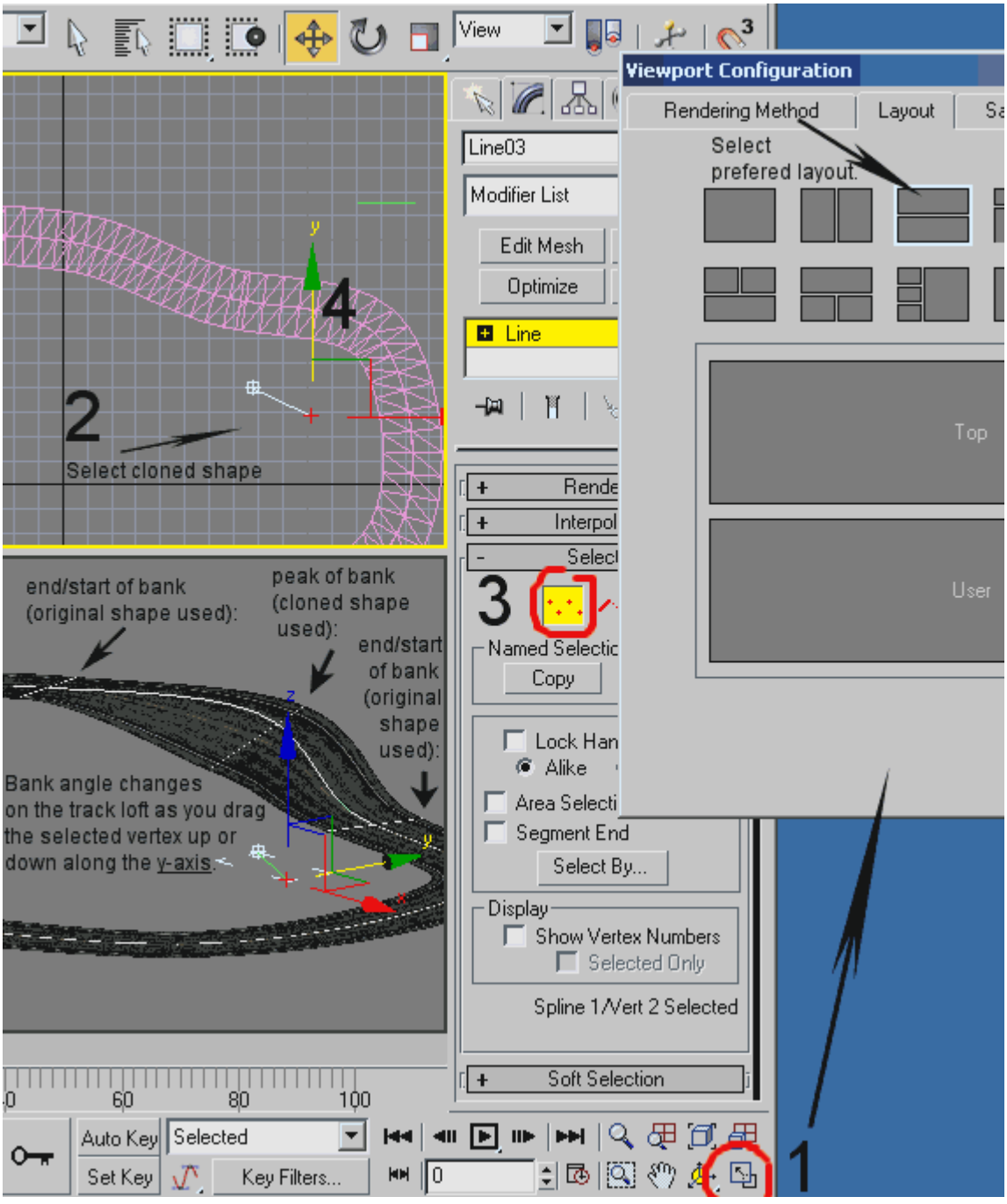
from the Cone Options window that pops up and hit "OK". The cloned shape will be automatically selected and placed directly over the original, so you just have to (click the "Select and Move" button) drag the cloned shape to an adjacent area in order to see both of them. I forgot to show this in the picture, but I'm using "Top" view and moving the cloned line along the X-Y axis, not the Z axis. Whew! That was a mouthful. **Step 2:** Select track loft. **Step 3 - (a):** Back under the "Modify" tab... and "Path Parameters", cycle the up/down arrows next to "Path". If you keep the up arrow button depressed for a while, you'll notice a yellow "x" moving along the center of your track loft (Top View / Wireframe suggested). You may also select "Percentage", "Path Steps", or "Distance". I've mostly used "Path Steps", but "Distance" may be a better choice. (Checking the "On" box may also help if the "x" moves really slowly) Cycle up until the yellow "x" gets to a spot where you'd like banking to begin. **Step 3 - (b):** Now click the "Get Shape" button. Then click on the original shape. This is so that the banking will be converged back *to* or *from* flat road at this point on the track. Now cycle the up arrow to move the yellow "x" to where you'd like banking to be most dramatic or at its peak. Be sure "Get Shape" button is still depressed and click on the cloned shape - the one you just cloned. Finally, cycle up again until the yellow "x" reaches the spot where you'd like banking to end and click on the original shape. Again, this is so that the banking will be converged back to/from flat road at this point on the track.



Ok, now it's time to manipulate that cloned shape. Right now, it's still *identical* to the original shape, but when we manipulate or ***tilt*** the cloned shape, it will reflect in the track loft and show up as a ***tilt*** in the track surface – banking. But first, I'm going to change my viewport layout so that I can get 2 different views of the same section of track I'm working on - a Top view and a view rotated to the side…

… (Pictured Below) **Step 1:** Right-click the "Maximize Viewport Toggle" button in the bottom right. The Viewport Configuration window will pop up. Select the "Layout" tab and select a layout that has 2 views. Click "OK". You may need to adjust your views now by rotating, zooming, etc. Here, I've set one as Top view with "Wireframe" and the other as a rotated side view with "Smooth + Highlights". (Select these by right-clicking the word in the top-left of the viewport and checking them from the drop-down menu.)

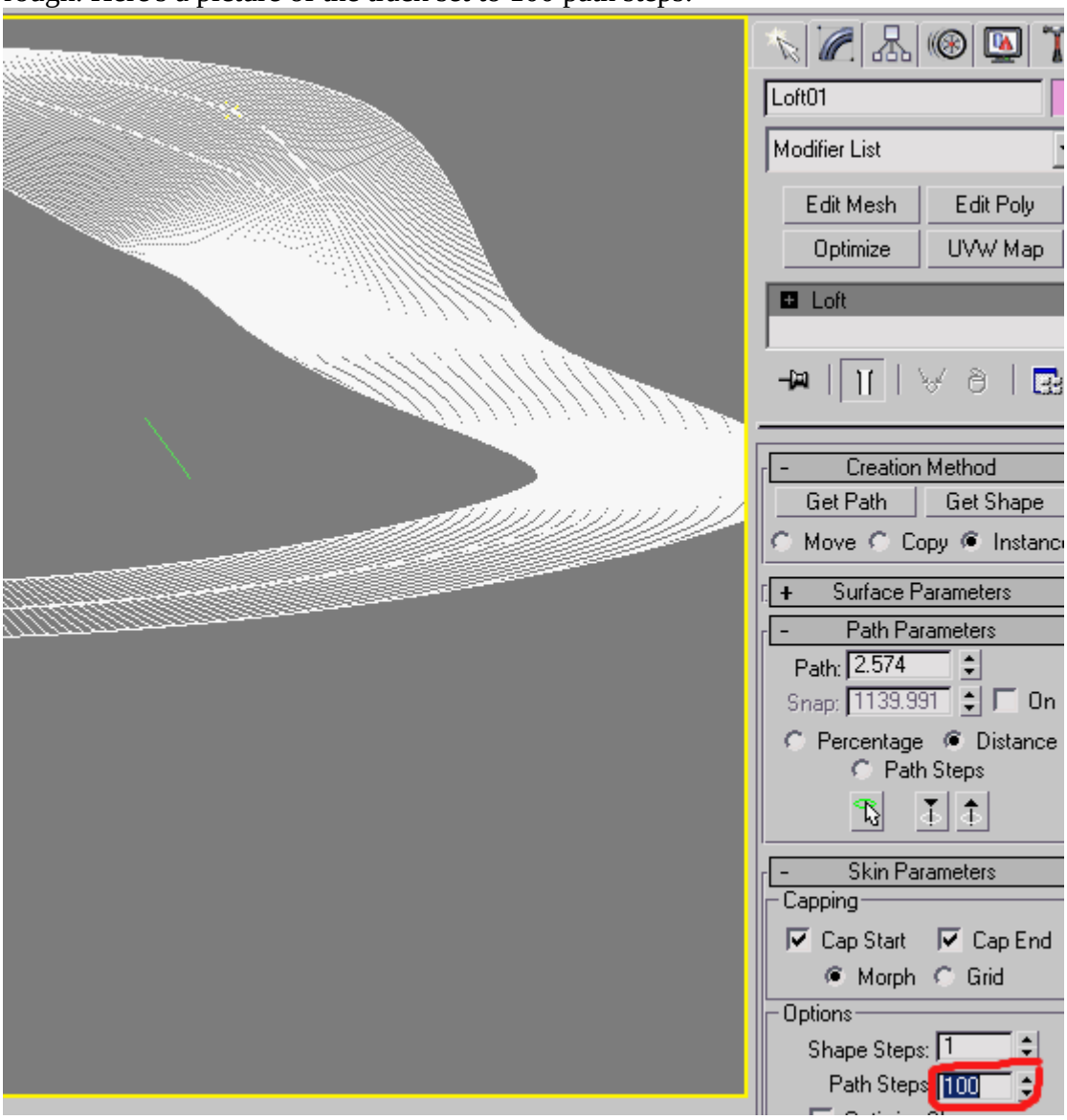
Step 2: Select the cloned shape. **Step 3:** Click the "Vertex" button. **Step 4:** Select one of the vertices on the cloned shape (line) and drag it up or down using the **Y**-axis arrow. This should be done from the Top view. Zoom in from your second viewport and notice how the section of track now begins to twist as you manipulate the cloned shape! Like Magic ;). Don't touch the original shape. That one stays level to keep the rest of the road flat.



Wow, done with that... Hopefully, you now know how to add banking to any part of a track.

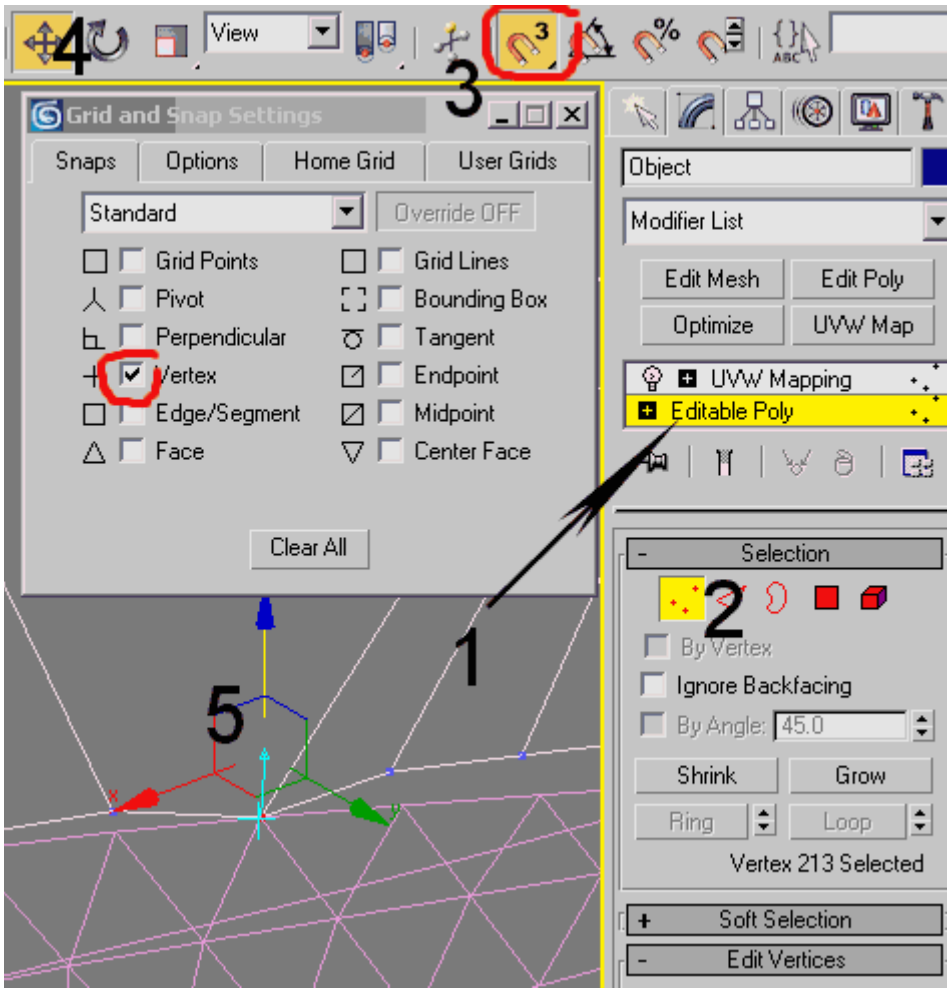
Extra Tips

If you mess around with elevation and banking, you will invariably find that the track surface needs to be smoother when you test it out. The surest way to make it smoother, aside from reducing the elevation changes and banking, is to add more path steps to your track loft. You can add up to 100 per section of "path" line between vertices. But generally, this puts you over the quantity limit of polygons in Viper Racing, so you'll need to balance it out. See how low you can get away with without making the track too rough. Here's a picture of the track set to 100 path steps:



Most of the time, if you add banking or elevation after having already made a terrain, you'll probably just want to make the terrain over again. This is because the terrain won't match the edges of the track anymore and I don't know of an easy way to re-match them. There is one way that is helpful for small jobs, however, or if you simply must do it that way…

With this method, I want to match the edges of the terrain to the edge of the road, so I'm going to select the terrain (**step 1**). Be sure that UVW Mapping modifier is not currently selected in the "stack", rather Edit Poly or Edit Mesh, etc. **Step 2:** Select "Vertex" button. **Step 3:** Right-click the "Snaps Toggle" button. Check "Vertex" on the popup and click "OK". This will allow you to snap a vertex from the terrain to a vertex of another object, like the track. Now make sure the "Snaps Toggle" button is depressed. **Step 4:** Click the "Select and Move" button. **Step 5:** Select a vertex on the edge of the terrain that you want to snap to an adjacent vertex on the track edge. Drag the vertex down toward the other one and it should automatically snap to that vertex. You may have to play around with it a bit to get the idea.



by Charles
cnummelin@yahoo.com