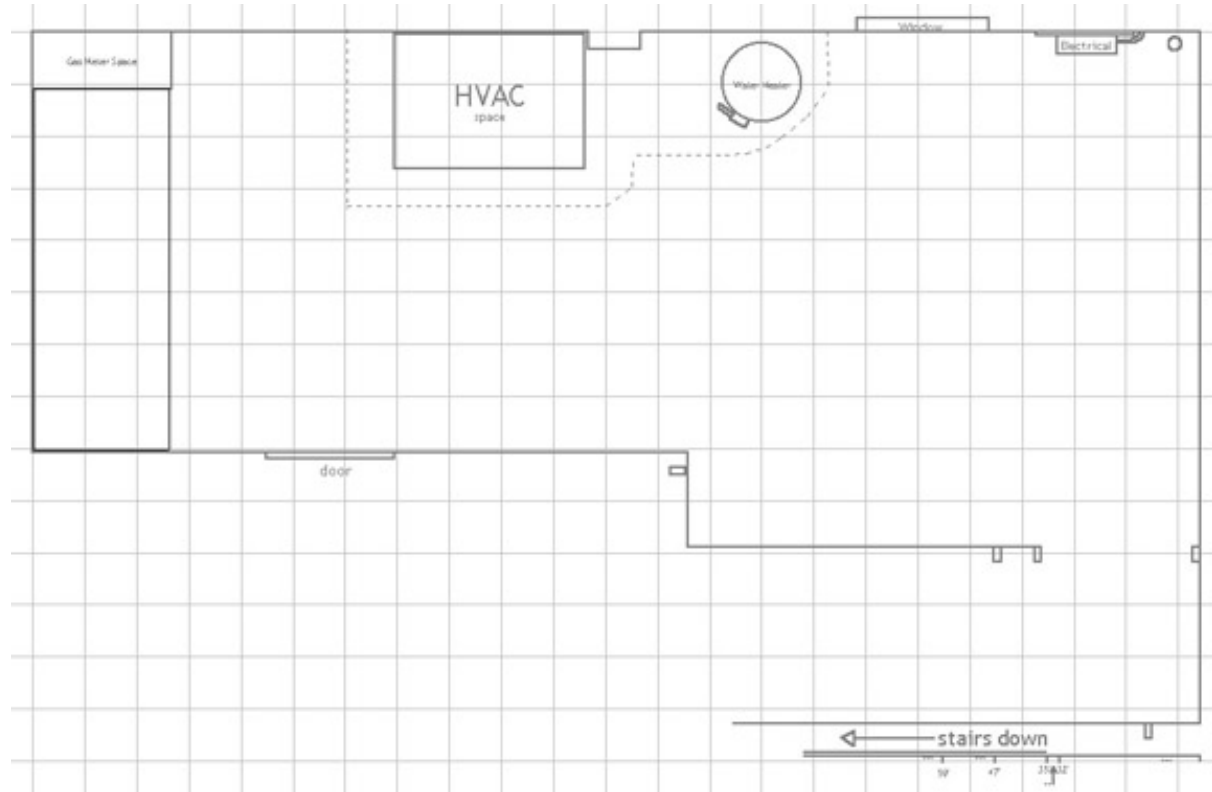


# How I Modeled a Helix Using Cadrail 7.11

by Ben Sullivan

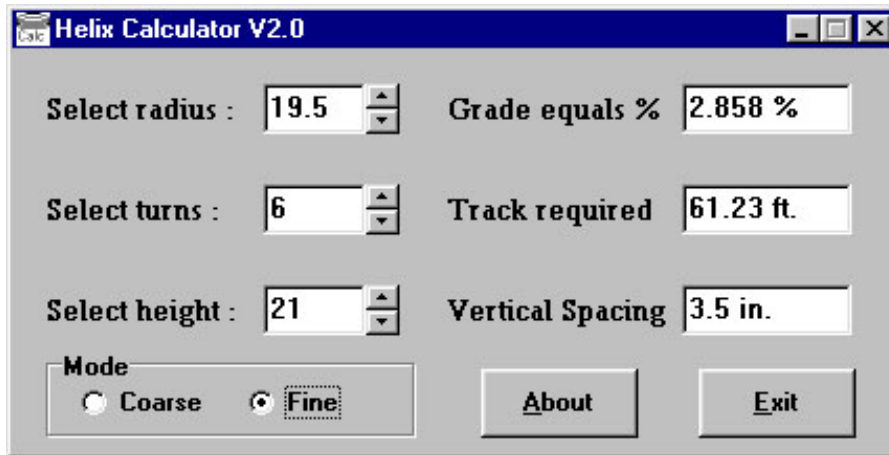
[http://bsulliva.oozy.ws/rr/georgetown\\_branch/index.html](http://bsulliva.oozy.ws/rr/georgetown_branch/index.html)

My model of the B&O's Georgetown Branch is still in the R&D and Planning phase. I've gathered tons of data making myself a semi-expert on this little branch line. My track planning has advanced through several iterations and I'm at the point now where I'm ready to start building in the train room. Since I have such an odd-shaped room I had to make several allowances.

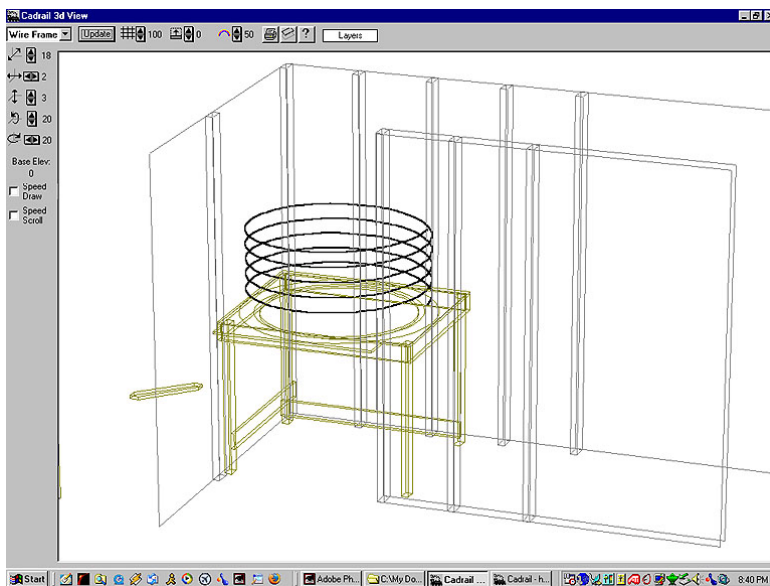


The layout is double deck shelf style, around the room. Top height is 57" and bottom height is 36". I am 67" tall. A helix is needed to connect the two levels and the perfect spot is below the landing to the stairs going from the first floor down to the basement. There is a 3' square area below the landing, completely open. (The lower right-hand corner of the diagram above) Since I'm modeling a branch line which never ran anything larger than a 2-8-2 Mikado or a GP38, I can get away with a tight radius curve in this small space.

I downloaded HelixCalc v2.0 (<http://www.fortunecity.com/westwood/beautiful/819/HeliCal.htm>) and punched in some numbers. This is the best arrangement I could come up with based on the tight space:



Since I was already familiar with Cadrail, I decided to use it to design the helix. I'd never done any 3D stuff with Cadrail, so this would be a learning experience. I scoured the internet and the online manual for instructions or tutorials, but could only find some very basic instruction, some of which is very difficult to decode. After sifting through bits and pieces and trying many many different approaches, I came up with one that works. Here is the final result:



Here is a basic step by step, from memory:

- 1) Draw the outline of the room. Walls, studs, etc, and group it together.
- 2) Click on the Figure Palette / Pop Up. Define a base and a top (0" in my case (the floor) and 84" (the ceiling)).
- 3) Hit Ctrl-D to switch to 3D view. Click Update. Make sure the walls look similar to the above image, as they should be standing up now.
- 4) Draw the maximum size circle that can fit in the space. This will be the outer edge of the roadbed for the Helix. Consider in HO that you will need 3" of clearance on the curve. (varies from scale to scale, check [www.nmra.org](http://www.nmra.org) for info)
- 5) Subtract 3" and draw another circle. In my case the outer circle is 21" and the inner is 18". Again, radius of the Helix is 19.5".
- 6) Now, take and move the Helix track away, to a clear area of the drawing to give yourself some room.
- 7) Click on the Edit palette / Divide Into Segments. Click on your circle and enter "2". This will divide the circle into 2 equal parts. (\* You can also draw the semi circles using the Circle palette / PC to Radius and defining

the angle at 180°)

- 8) Move the two semicircles away from each other slightly, just so you can see that there are two there.
- 9) Click on the Edit palette / Copy Object. Select each semi circle and make as many copies as you need to make turns. (In my example I did 5 turns, so I made a total of 10 semi circles, 5 for each side.
- 10) Now that you have all of your semi circles lined up, move again to a clearer area of the work space so that you can still see the edges of the semi circles.
- 11) Turn on "Auto-Alignment". It's the little button next to the "Current Layer" display box.
- 12) Select one semi circle, and move it into the clear area.
- 13) Click on Figure palette / Create Figure.
- 14) Click on the semi circle you just laid down. It now becomes the first piece in the figure that will become the Helix.
- 15) Click back on the arrow tool, or "Edit - Simple" tool.
- 16) Select another semi circle and align it with the one you just laid out. Align it so that it forms a circle.
- 17) Click on Figure palette / Add Objects To.
- 18) Click on the semi circle you just added to the first one.
- 19) Now, your figure has two parts, and it looks like a circle.
- 20) Click back on the arrow tool, or "Edit - Simple" tool.
- 21) Next you want to grab another semi circle, this one the opposite side as the one you previously grabbed. (I went top - bottom - top - bottom - etc, etc.)
- 22) Lay it down on the figure and get it to align so that it lays atop the circle figure.
- 23) Click on Figure palette / Add Objects To.
- 24) Click on the semi circle you just added to the first one. This can get a little tricky as they're all stacked up on top of one another and Cadrail gets a little finicky when it comes to this. Keep trying and experimenting and you'll get it to work. If you ever wonder whether or not the semi circle you just added was actually grouped into the figure definition, just move the figure away for a moment. If you see the figure you just added is still there, then hit Ctrl-Z and try again. If the figure moved and nothing was left behind, then the piece was added. Also hit Ctrl-Z to move the figure back to your working area.
- 25) Continue doing this until you have added all the pieces of your helix. Your final figure should look like a circle (from above).
- 26) Now you have to define a grade for your Helix. This is where the info above comes in handy.
- 27) Click on your Helix figure and then click on the Object Editor (the little icon looks like dog tags).
- 28) In the Object Editor is the Elevations box. Click the check box next to "Assign New Grade". Now, as far as I understand it, Z1 and Z2 are the beginning and end of the line you are editing. If you wanted your helix to begin at elevation 0" and rise to 36" you would type in 0 in Z1 and 36 in Z2 (\* make sure you are using "Inches" as your unit of measurement - it's in View / View Settings / Drawing Units). For my Helix, I wanted it to begin at 57" from the floor and descend to 36" from the floor. So, I clicked on Z2, defined it as 57". Using the data that I gained from HelixCalc v2.0 I plugged in 2.9 for Grade (%). Cadrail then automatically calculated the Z1 value as 36.69. Almost perfect!
- 29) Hit OK and that *should* do it! Now, switch to 3D view (Ctrl-D) and click Update. Take a look and see if your Helix looks like a Helix! If it does, WOO HOO! If not, you may need to go back and try again. A problem that I ran into was not adding the figures in the correct order. Make sure you add them one at a time in alternating order. Think of it as you're doing it in a 3D manner, like Snap-Track!
- 30) For the rest of my drawing, I simply made shapes, and clicked on the Figure palette / Pop-up tool and defined each piece. For example, there are several 1x4's in my drawing. I just drew a rectangle, created a figure out of all 4 lines, clicked the Pop-up tool and gave it a base height and a top height. Then, view it in the 3D editor.

I hope this helps and isn't too confusing. I figured all of this out in an afternoon and feel tremendously confident that I could do much more with it. I'd like to explore more on how to make the roadbed for the Helix, but I think that this will be a little more complex.

Please email me if you have any comments/questions/etc.: [cpl\\_clegg -at- yahoo dot com](mailto:cpl_clegg@yahoo.com) (remove the spaces, replace " -at- " with "@" and replace " dot " with ".") *I do this to reduce spam*