



Showing the Difference

By Roy Goyette

Recently I was asked to assist one of our customers with presenting data showing the changes to the bottom from one survey to another. The customer had two surveys and needed a way to show where the bottom had shoaled during the past year and what areas had actually gained material in the past year. The problem with just assigning a different color to each data set then overlaying them is that the two data sets tend to cancel each other out. You never see one of the data sets because the other data set is on top of it and blocking your view.

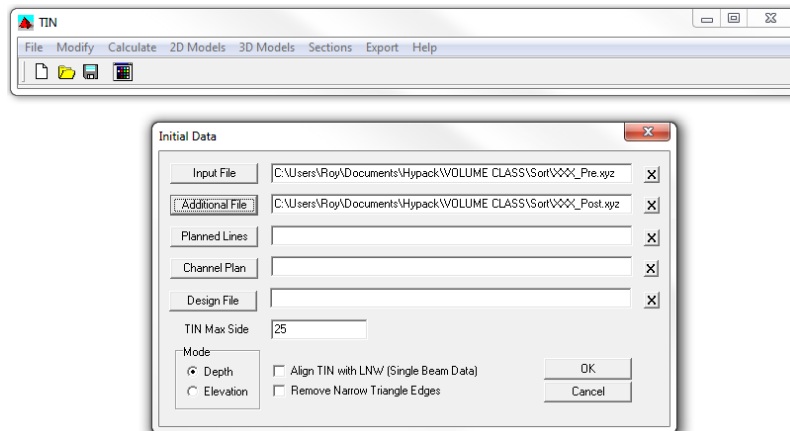
A better solution would be to create a difference file in the TIN MODEL program.

A difference file is used to show the differences between two data sets. For example it will show you where you have lost material, where you have gained material and whether there has been a net loss or gain between the two surveys.

OUR FIRST STEP IS TO CREATE THE DIFFERENCE FILE.

1. **Open the TIN MODEL program, enter your data files and click [OK]** to create your TIN Model.
 - The input file is where you would load the earlier survey.
 - Load the later survey file in the Additional File field.
 - Give your TIN Model a TIN Max Side

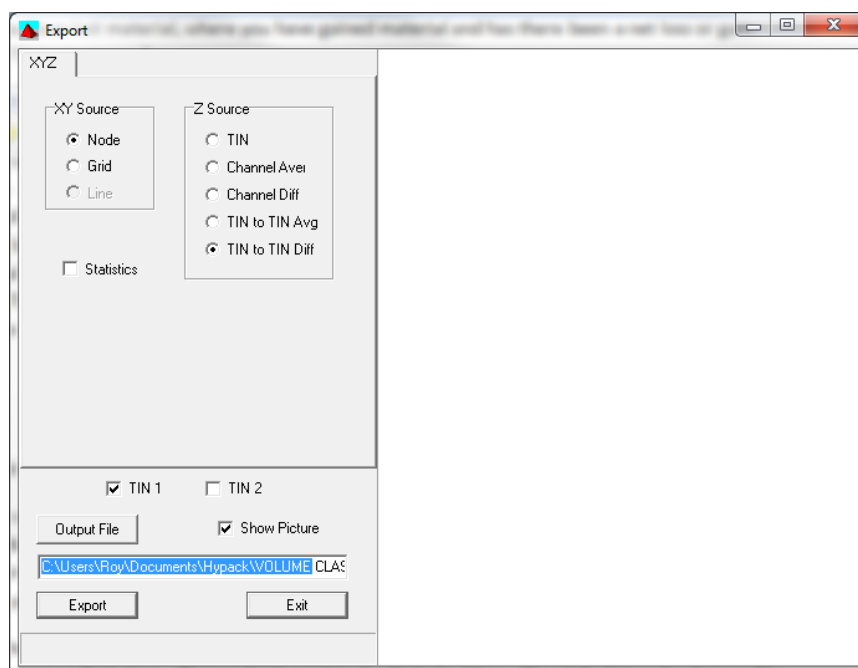
FIGURE 1. Creating your TIN Model



2. **Select EXPORT-XYZ** and the XYZ Export dialog will appear.
3. **Choose your XY Source.** You have some choices to make here.
 - If you choose Node, the resulting Difference file will have a difference value or point at each node in each data set.
 - If you choose Grid here the difference file will have and X, Y, difference point at a user-defined interval.

The choice is yours. I'm going to use node.

FIGURE 2. Export XYZ Dialog



4. **Select the TIN to TIN Difference option.**
5. **Place a check mark in the TIN1 check box.**
6. **Click [Output File].** In the resulting Save dialog, give your file a name and save it to folder where you can locate it again. If you do not choose a folder HYPACK® will place the difference file in your project's Sort folder.
7. **Choose whether to view a picture tracking the export process** in the right side of this dialog.

Note: Viewing the picture slows processing.

8. **Click [Export]** to create your difference.

VIEWING THE DIFFERENCE

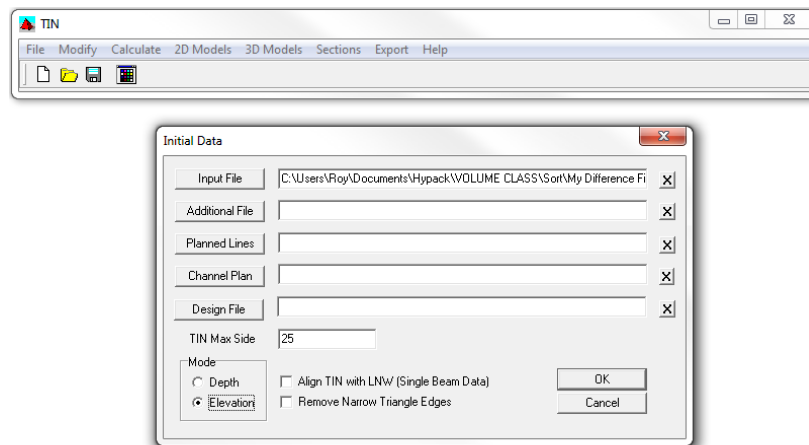
Now here's the tricky part.

Let's say that the earlier survey showed you a depth of 15 feet at a point and the later survey showed a depth of 12 feet at the same location. The difference file will show a value of +3.0 feet indicating that you gained 3 ft. of material since the first survey. Since we checked this area, we know that can't be right what is going on?

Well in HYPACK® a positive value goes downward in the water column and a negative value goes upward. Since this is the case, in order for our difference file to make sense we must change from Depth Mode to Elevation Mode. You do this when you build your next TIN model.

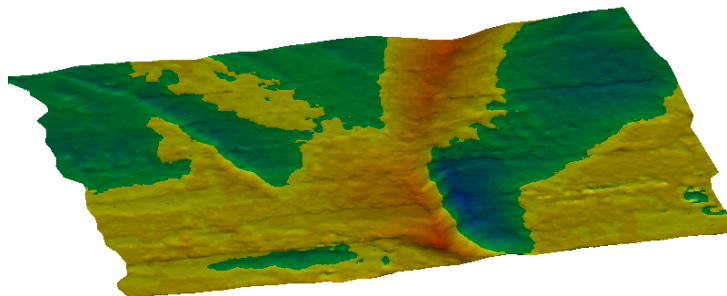
1. In the **TIN MODEL** program, select **FILE-NEW** and the Initial Data dialog will appear.
2. Enter your build parameters.
 - Click [Input File], navigate to your difference file and open it.
 - Enter an appropriate **TIN Max Side**.
 - Select **Elevation mode** to tell the TIN MODEL program that you are in Elevation mode when loading the difference file. Again, this is because HYPACK® values are positive downward and negative upward.

FIGURE 3. TIN Difference Model Parameters



3. Click [OK] to build the TIN model.
4. Set your color dialog to show the differences. In my example, I've set the color ranges so that -15 to 0.0 are shades of red/yellow and 0.0 to +15 are in shades of green/blue.

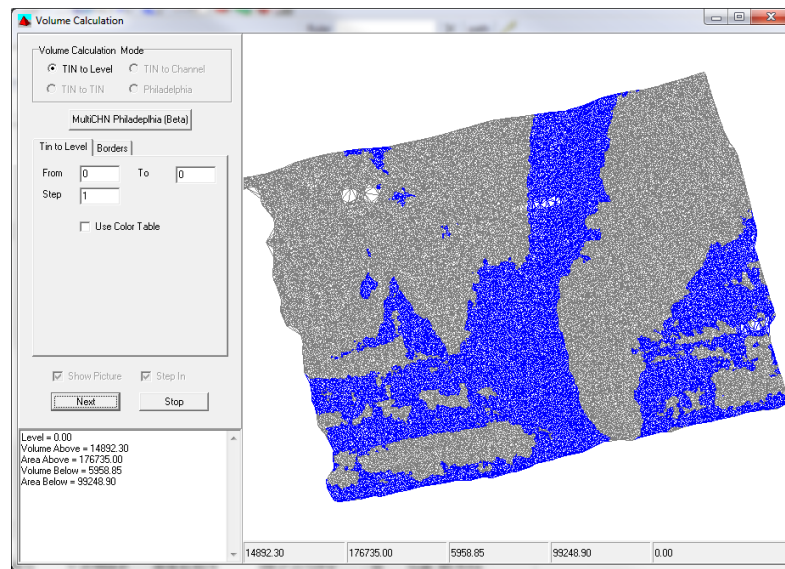
FIGURE 4. The TIN Difference Model shows areas with accumulations in green/blue and areas with losses in yellow/red.



To graphically show the accumulations or losses, you can also do a TIN-to-Level volume calculation.

1. Select **CALCULATE-VOLUME**.
2. Set your To and From levels to 0 and your step to 1.
3. Click [Calculate]. Areas of lost material are shown in blue and areas where we have gained material are shown in grey. This example was done in depth mode.

FIGURE 5. Calculating TIN-to-Level Volumes



Our report shows that the Volume Above is equal to 14892 and the Volume Below 5958 with a Net gain of material totaling 8934. (Because our Geodesy is set to US Survey Foot these totals are in cubic yards.) The Volume Above represents areas where we have gained material and the Volume Below represents areas where we have lost material.