



Volumes by Reporting Zones

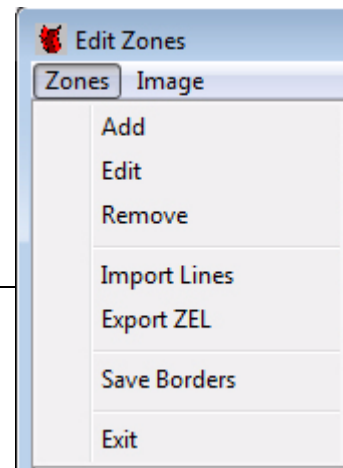
By Pat Sanders

Both the CROSS SECTIONS AND VOLUMES program and the TIN MODEL have had new routines developed to report volume quantities in user defined reporting zones.

1. **Use ADVANCED CHANNEL DESIGN (ACD) to construct a 3-dimensional model of your channel and turning basins.** It's assumed that you know how to do this step.
2. **Define your reporting zones.** Open up the Edit Zones window of ACD. The graphic will display your channel with a cross-hatched pattern. Click the Zones – Add menu item and define each reporting zone. Give each zone a name and assign it a different display color by clicking in the color box and selecting a color.

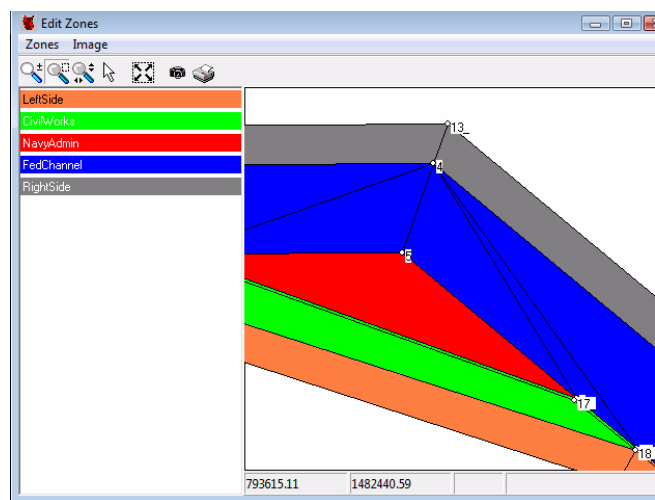
For this example, we create five zones:

- Left Side Slope
- Civil Works
- Navy Basin
- Federal Channel
- Right Side Slope



Note: It is best to divide the left and right side slopes into two separate zones. (Instead of having just one 'Side Slope' zone). Although CROSS SECTIONS and VOLUMES should be able to handle one zone containing both side slopes, TIN MODEL will sub-divide them into separate polygons, calling them Side Slope and Side Slope1.

FIGURE 1. Sample Zones

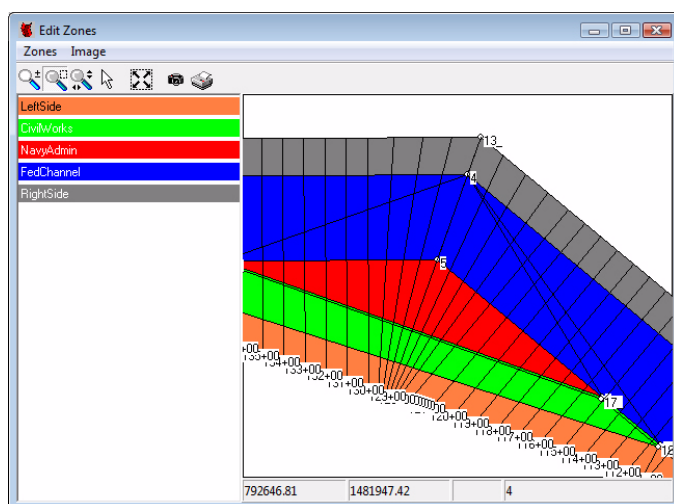


3. **Assign each triangle (polygon) to a zone.** Using the arrow tool, click on the zone name to select the target zone. Then click on each triangle (polygon) that belongs to that zone.

ACD will paint the triangles with the zone color as you click on each one. Make sure that every triangle (polygon) has been assigned to a zone. **Be sure to save your CHN file before exiting ACD.**

4. **CROSS SECTIONS AND VOLUMES [CSV] Users:** If you plan to compute volumes in CSV, then you will need to import your lines into the Edit Zones window and export a Zone Edge Listing (ZEL) file. Click the Import Lines menu item under the Zones menu. Your planned lines will be superimposed on top of the channel model (as shown in the screen capture to the right). Select your LNW file and then click the Export ZEL menu item. You'll be asked for to provide a name for your ZEL file.

FIGURE 2. *Planned lines in your ZEL file*



The ZEL file is an ASCII text file that contains a listing for each line of where it crosses each zone boundary and each inflection point of the model within a zone boundary. CSV has been modified to be able to read a ZEL file for the template information and to generate volume quantities based on that listing.

VOLUMES IN CSV

Select either 'Zone Listing PreDredge' for a single survey or 'Zone Listing PostDredge' to compare a Pre-Dredge versus a Post-Dredge survey.

1. **Load the base survey** in the Surveys tab as normal.
2. **Click in the 'Template' column of the first file, then the File Open icon and select your ZEL file** created in Step 4.
3. **Fill the column** so that the ZEL filename is used for every file.

FIGURE 3. Sample Volumes Setup

Lines	OVDDepth	Objects	Template	Base Survey
1	2	CanaveralC.zel	01+00.TIN	
2	2	CanaveralC.zel	02+00.TIN	
3	2	CanaveralC.zel	03+00.TIN	
4	2	CanaveralC.zel	04+00.TIN	
5	2	CanaveralC.zel	05+00.TIN	
6	2	CanaveralC.zel	06+00.TIN	
7	2	CanaveralC.zel	07+00.TIN	
8	2	CanaveralC.zel	08+00.TIN	
9	2	CanaveralC.zel	09+00.TIN	
10	2	CanaveralC.zel	10+00.TIN	
11	2	CanaveralC.zel	11+00.TIN	
12	2	CanaveralC.zel	12+00.TIN	
13	2	CanaveralC.zel	13+00.TIN	
14	2	CanaveralC.zel	14+00.TIN	
15	2	CanaveralC.zel	15+00.TIN	
16	2	CanaveralC.zel	16+00.TIN	
17	2	CanaveralC.zel	17+00.TIN	
18	2	CanaveralC.zel	18+00.TIN	
19	2	CanaveralC.zel	19+00.TIN	
20	2	CanaveralC.zel	20+00.TIN	

You can then click the View tab to review the profiles and the Volume tab to view and print the quantities.

FIGURE 4. Sample Zone Volumes Report

The only trouble we have encountered is if the line names in the ZEL file (taken from the LNW file) do not match the line names in the data files. This will result in an error (Invalid Template) when you click the View Tab.

CSV lists the totals for each design area (top) in the summary. It provides both the Overdepth and the Contour Overdepth quantities. It then lists the area, volume and accumulated volume for the different materials throughout the report.

	Design	Overdepth	Contour OD	OD
0	4010.2	11962.3	6269.0	
1	9484.0	35006.8	17612.8	
2	401.5	18152.0	3478.0	
3	17459.1	363058.1	91000.6	
4	3960.2	17080.6	8577.9	
Totals	35315.0	445259.7	126938.4	

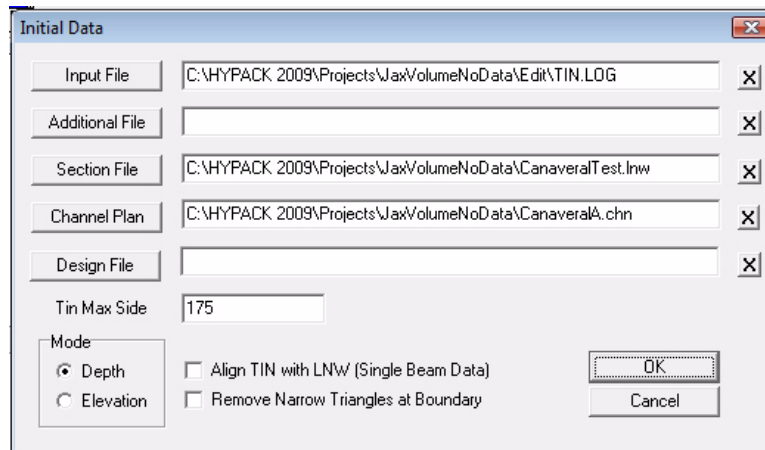
	0	1	2	3	4
Design Area	0.0	0.0	0.0	2.6	0.0
Overdepth Area	7.8	0.0	0.0	514.0	7.9
Contour Overdepth Area	0.4	0.0	0.0	56.4	0.0

	0	1	2	3	4
Distance	100.0	100.0	100.0	100.0	100.0
Design Area	0.0	0.0	0.0	0.2	0.0
Volume	0.0	0.0	0.0	5.2	0.0
Acc Volume	0.0	0.0	0.0	5.2	0.0

VOLUMES IN TIN MODEL

When entering your files, you will need to enter both a Section File (LNW) and a Channel Plan File (CHN), as shown in the screen capture below.

FIGURE 5. Building a TIN Model for TIN-to-Channel Volumes

The 'Initial Data' dialog box contains several input fields and checkboxes. The 'Input File' field is set to 'C:\HYPACK 2009\Projects\JaxVolumeNoData\Edit\TIN.LOG'. The 'Section File' field is set to 'C:\HYPACK 2009\Projects\JaxVolumeNoData\CanaveraITest.lnw'. The 'Channel Plan' field is set to 'C:\HYPACK 2009\Projects\JaxVolumeNoData\CanaveraIA.chn'. The 'Tin Max Side' field is set to '175'. Under the 'Mode' section, the 'Depth' radio button is selected. There are two checkboxes: 'Align TIN with LNW (Single Beam Data)' and 'Remove Narrow Triangles at Boundary', both of which are currently unchecked. 'OK' and 'Cancel' buttons are at the bottom right.

To compute volumes, set your options in the Volumes Calculation dialog.

FIGURE 6. TIN Volumes Calculation Dialog

1. **Select the TIN-TO-CHANNEL option.**
2. **Click the option box to 'Use Channel Zones'** (middle of window). The Channel Zones are embedded in the CHN file and no other file is needed.

TIN MODEL then generates volume quantities for each reporting zone, based on polygons created between each planned line. The report is shown below. The 'totals' for each reporting area are written at the bottom of the report. For each pair of lines, it reports the selected quantities (click the 'Report Options' button to select the reported quantities).

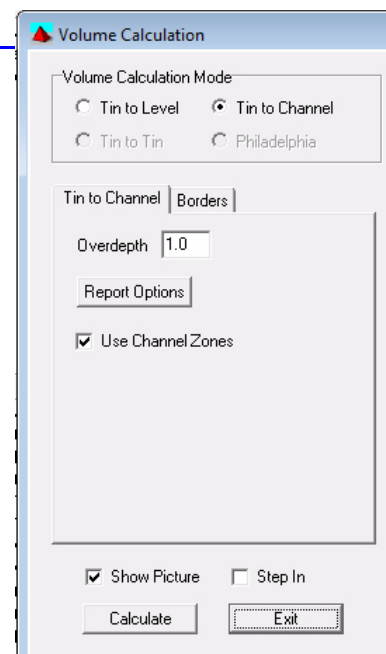
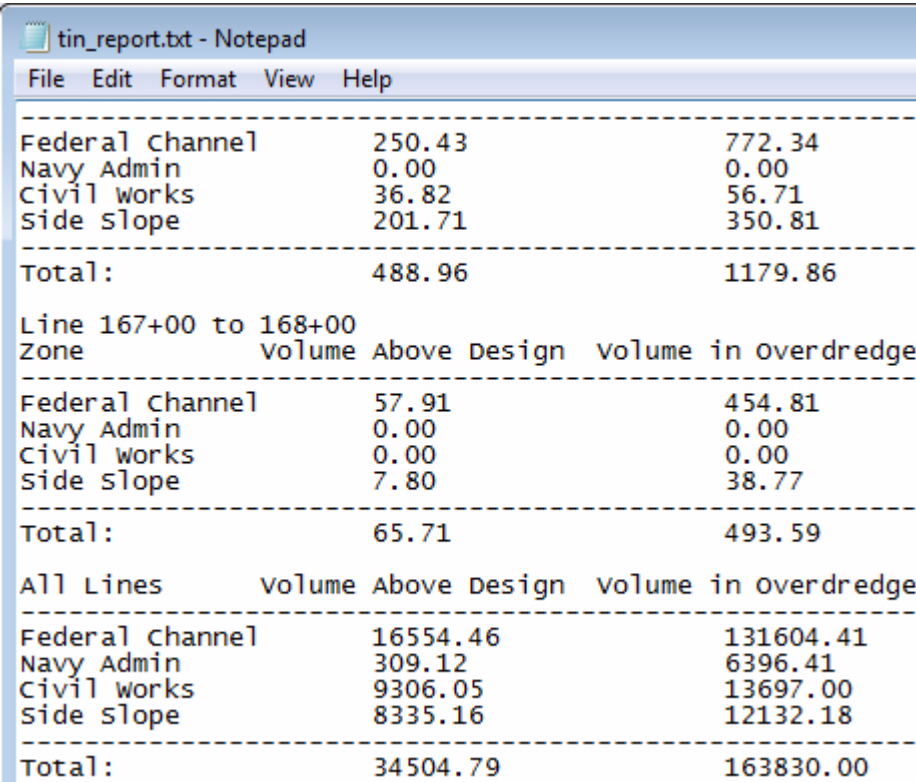
The 'Volume Calculation' dialog box has a 'Volume Calculation Mode' section with four radio buttons: 'Tin to Level', 'Tin to Channel' (selected), 'Tin to Tin', and 'Philadelphia'. Below this is a 'Tin to Channel' section with a 'Borders' tab and an 'Overdepth' field set to '1.0'. There is a 'Report Options' button. A checkbox labeled 'Use Channel Zones' is checked. At the bottom, there are checkboxes for 'Show Picture' (checked) and 'Step In' (unchecked), along with 'Calculate' and 'Exit' buttons.

FIGURE 7. TIN Zone Volumes Report



tin_report.txt - Notepad		
File Edit Format View Help		
Federal channel	250.43	772.34
Navy Admin	0.00	0.00
Civil works	36.82	56.71
Side slope	201.71	350.81

Total:	488.96	1179.86
Line 167+00 to 168+00		
Zone	volume Above Design	volume in overdredge

Federal channel	57.91	454.81
Navy Admin	0.00	0.00
Civil works	0.00	0.00
Side slope	7.80	38.77

Total:	65.71	493.59
All Lines		
	volume Above Design	volume in overdredge

Federal channel	16554.46	131604.41
Navy Admin	309.12	6396.41
Civil works	9306.05	13697.00
Side slope	8335.16	12132.18

Total:	34504.79	163830.00