

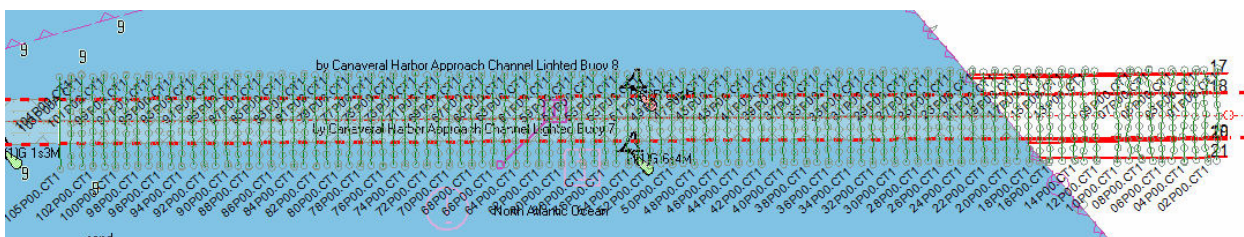


The Effects of Smoothing Soundings on AEA Volume Computations

By Pat Sanders

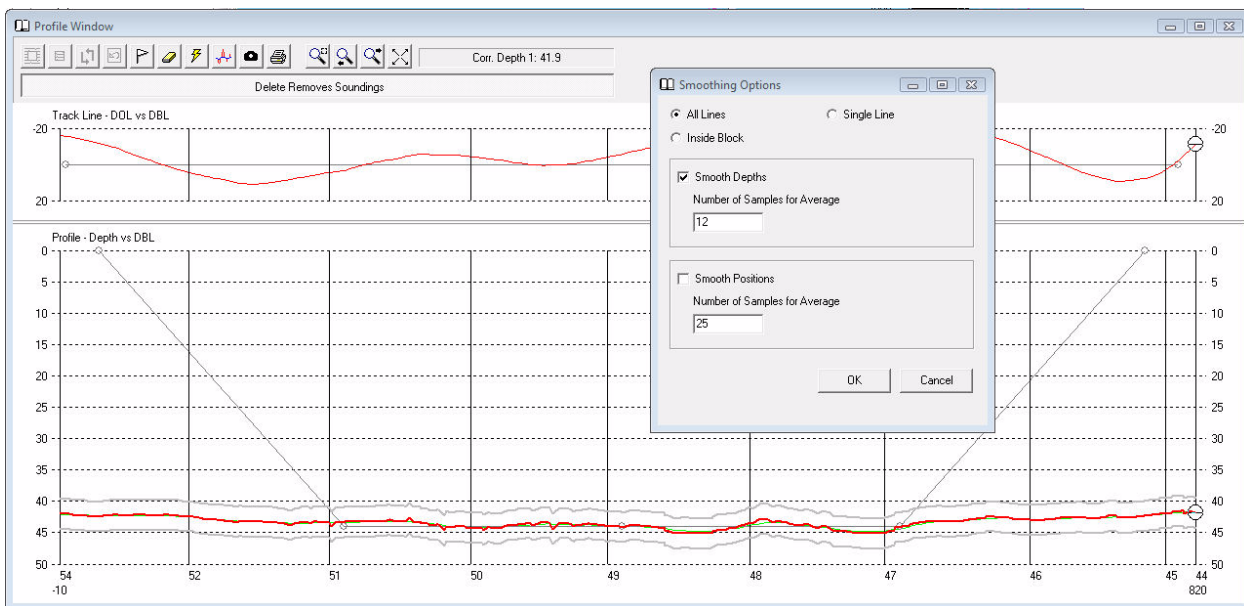
HYPACK® users should be aware that volume quantities can be affected by smoothing the depths before computation. As an illustration, I took a data set of single beam data collected across a defined channel and side slopes.

FIGURE 1. Sample Single Beam Data



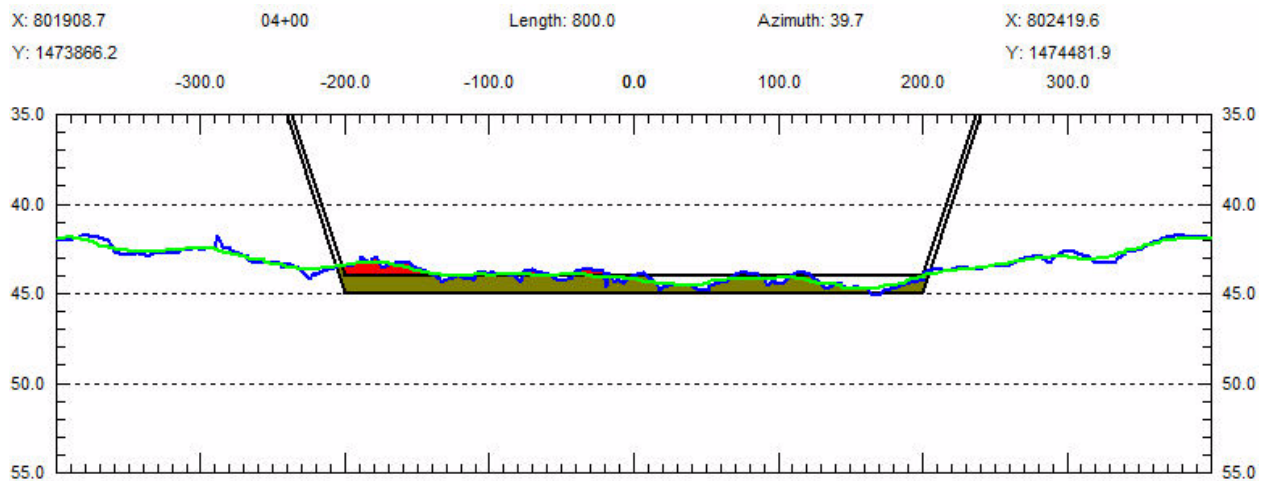
In order to smooth the data, I took the Edtied EDT files back into the SINGLE BEAM EDITOR and used the Smooth Data feature available in the Profile Window. Each sounding was updated with the moving average z-value using six soundings to the left and six soundings to the right.

FIGURE 2. Smoothing Options in the SINGLE BEAM EDITOR



I then saved the 'smoothed' data out to separate EDT files. It was then very simple to load the data into CROSS SECTIONS AND VOLUMES and take a look at the quantities computed for each data set. In a perfect world, you wouldn't expect much difference.

FIGURE 3. Smoothed Data in Cross Sections and Volumes



In Figure 3, the blue line represents the original z-values, while the green line represents the smoothed data. Smoothing has eliminated the rough edges and sharp transitions seen in the original data set. This data is collected at about 45', so there is a little more variability in the z-values than from data that is shoaler.

When I looked at the final volume numbers, the results were very interesting (to me).

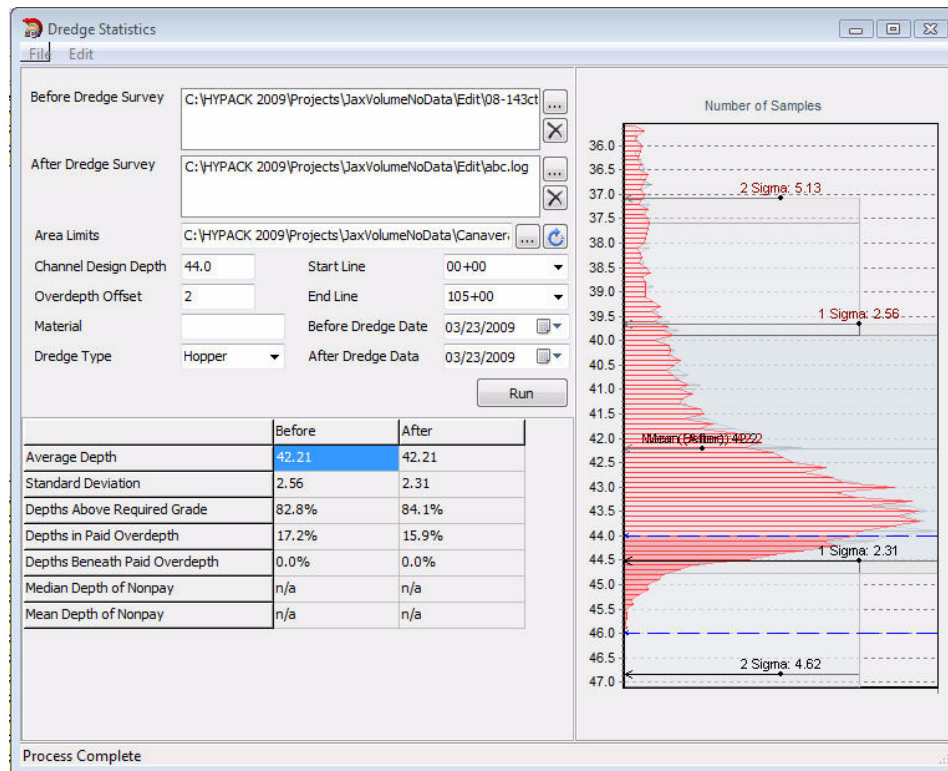
TABLE 1. Comparing AEA1 Volumes of the Original Data vs Smoothed Data

Data Set	Design Material (cy)	Overdepth Material (cy)	Total Material (cy)
Original Data	78,598	139,806	218,404
Smoothed Data	77,603	143,996	221,996
Difference	-995	+4,190	+3,195

So, by simply smoothing the z-values, I can claim that I removed over 3,000 more yards! I show this example not to teach you how to massage your volume quantities, but to educate you to keep an eye out so that others don't use this practice.

To make sure the smoothing function in SBMAX is not bugged, I spot checked a couple of points and they came out exactly. I also ran the data through the new DREDGE STATS program and the mean depth for the two data sets was equal, so we haven't biased the data upwards or downwards!

FIGURE 4. Dredge Statistics



I'm at a loss to explain why this happens. But, it is repeatable in the difference data sets that I have examined. You won't always get more material or less material, but the total material can be influenced by smoothing the z-values.