Calculating Overdredged Material in TIN MODEL and CROSS SECTIONS AND VOLUMES

by Pat Sanders

Overdredged Material: Material removed beneath the Allowable Overdepth template.

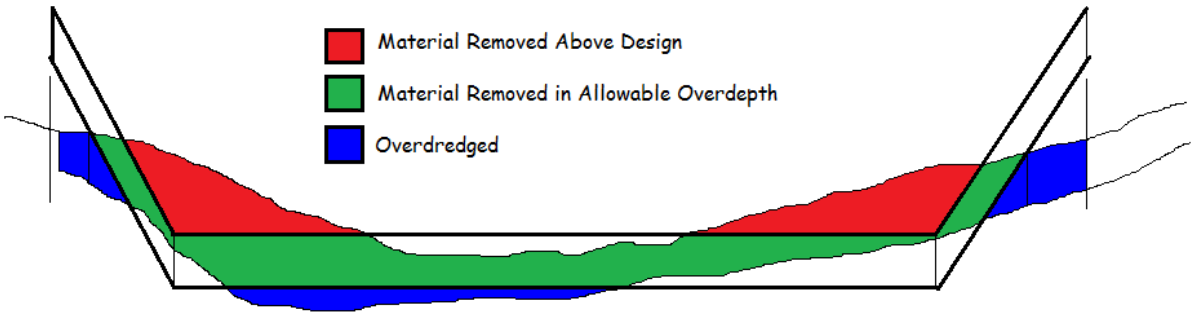
More and more dredging projects require the computation of Overdredged Material. The primary reason is that it's difficult to obtain a disposal area and contracting authorities don't want the disposal area being filled with excess material dredged beneath the allowable overdepth template. I have heard, in a few cases, that there are actual penalty clauses in contracts for Overdredged Material!

Overdredged Material can be computed in the HYPACK® TIN MODEL using the Philadelphia Method, and in CROSS SECTIONS AND VOLUMES (CSV) programs using the Philadelphia Postdredge method.

Note: The TIN MODEL program will only compute the Philadelphia method if you have a simple channel (no turning basins or multiple side slopes).

As a default, both methods will compute the Overdredged Material as shown in Figure 1:

FIGURE 1. *Calculating Overdredged Material*



The Blue areas show where material has been removed beneath the Allowable Overdepth template. In both programs, the calculation of Overdredged Material stops at the top-of-bank of the template. They also only compute Overdredged Material where the two surveys overlap. If you examine the left side slope, the After Dredge profile does not extend all the way across the top-of-bank line, so the computation of material stops where the data stops.

This is somewhat different than my original understanding. I had thought the program would include all of the material removed beneath the allowable overdepth template, including the material outside the top-of-bank limits. If the idea is to compute the amount of unnecessary material that is filling the disposal area, then I think that material should be included. But, it is not. I'm going to talk to several contracting agencies and contractors to get their opinion on how this should be treated.

To verify the computation of Overdredged Material, I checked out the following section in both programs.

FIGURE 2. *Test Section from CSV*

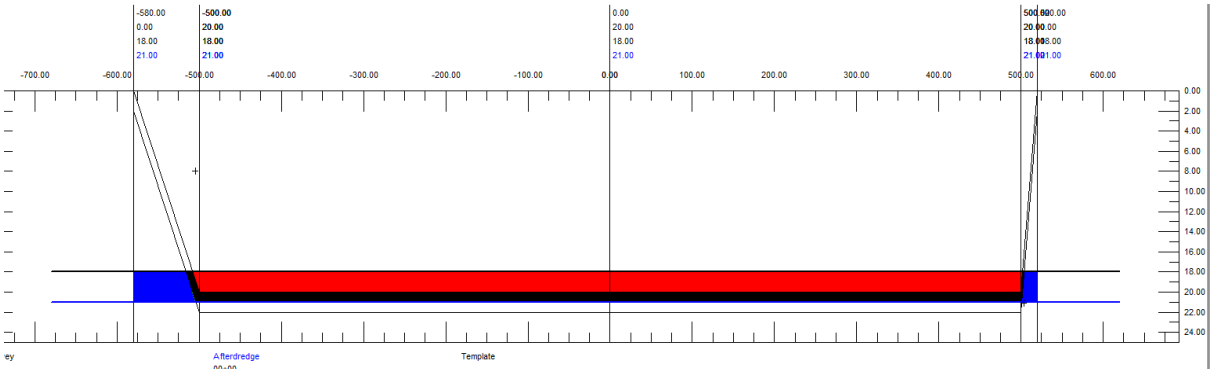
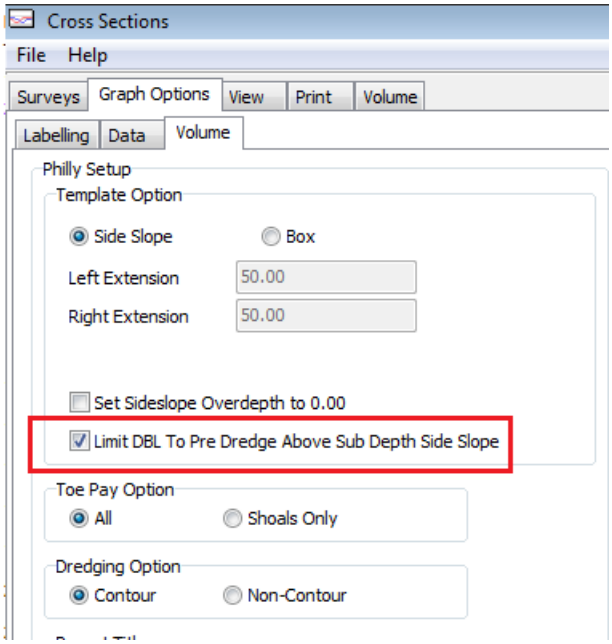


Figure 2 is from CROSS SECTIONS AND VOLUMES. I added the blue fill, as CSV doesn't know how to highlight the Overdredged Material. Both the TIN MODEL and CSV programs computed 262,500m^3, which matched my manual calculation.

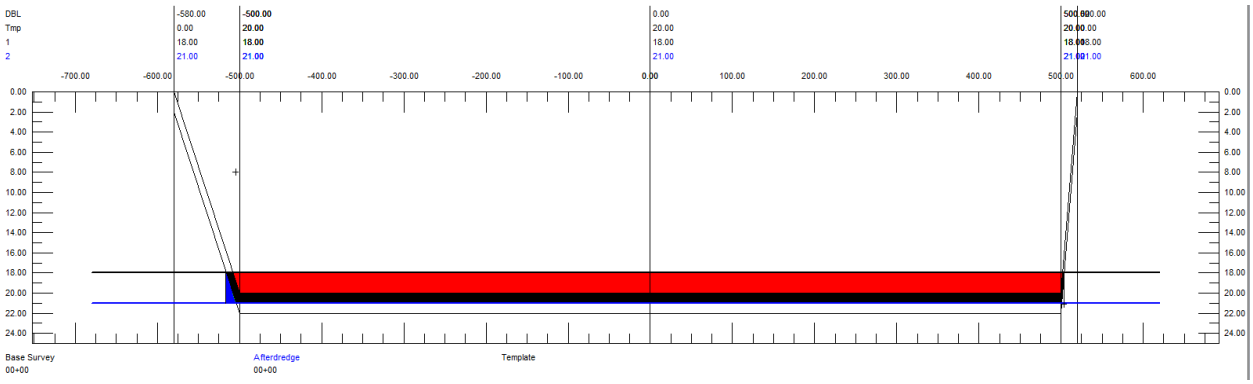
In CSV, there is one setting under the Graph Options – Volume tab that can drastically change the Overdredged amounts.

FIGURE 3. *CSV Graph Options—Volume Tab*



The **Limit DBL to Pre Dredge Above Sub Depth Side Slope** option limits the computation of Overdredged Material to where the Before Dredge survey passes through the Allowable Overdepth template. When you enable this option,It will not include material that has been removed outside these limits, as shown in Figure 4; the computed Overdredged Material is greatly reduced.

FIGURE 4. *Limited to where the Before-Dredge Data Passes through the Allowable Overdepth Template*



CSV now reports 22,500m3, which matches my hand calculation. That's a difference of 240,000m3 in my example. It can really add up to a lot of material!