



Referencing a Channel Center Line and using the Kingfisher Volume Method

By Christian Shaw

I am happy to announce that the Galveston District Corps of Engineers, Navigation Division has become one of our newest HYPACK® users! We have been working with them extensively as they transition to the HYPACK® software package from a custom package they have been using for years. Welcome to HYPACK®!

One thing we had to tackle was to use HYPACK® in a way that would provide a smooth transition from their old software package to HYPACK® with regards to channel design and volumes. The HYPACK® Kingfisher Method was developed, some years ago, for the private contractor providing the district deliverables, so we just needed to teach the district how to utilize the Kingfisher Volume Method and reference the channel center line. I thought this was a snap.

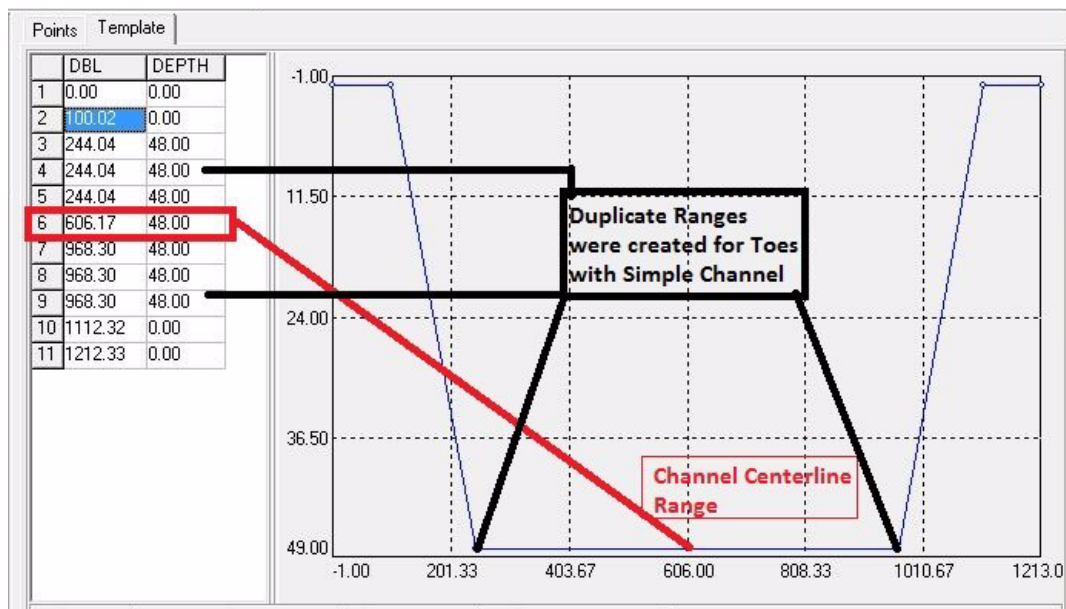
I will first talk about the center line reference then dive into the Kingfisher method a bit.

KINGFISHER METHOD

It is necessary to find and plot a reference to a center line for the basis of offsets in the CROSS SECTIONS AND VOLUMES program. DBL value offsets can reference the center line that you established in the CHANNEL DESIGN program or by your manual template entry in the LINE EDITOR program for each section line. This makes references to the ranges left of the center line negative values and right of the center line positive.

In the following example, I have a line file that was created in CHANNEL DESIGN. Since this is a simple channel, the toe ranges have been duplicated and the center line is point #6 in our template. This #6 value will be recalculated as 0 DBL and the toe and top-of-bank ranges will be measured from this center line reference in the CROSS SECTIONS AND VOLUMES program. To quickly check the math, we divide the line length by 2 to see that the center line range is in fact a value of 606 off the HYPACK® default start of line 0 DBL that we see in the following figure.

FIGURE 1. Template Inflection Points in a Simple Template



CROSS SECTIONS – SETUP AND REVIEW

To set the reference to center line ranges in the CROSS SECTIONS AND VOLUMES program, use the Labeling Tab in the Graph Options to choose your reference.

FIGURE 2. Graph Options - Labeling Tab

File Help

Surveys **Graph Options** View Print Volume

Labeling Data Volume

Depth Labels

☒ Plot Depth Labels

☐ Plot Depth Lines

Depth Label Increment 5.00

Depth Tic Increment 1.00

Strike Depth

☐ Plot Strike Depth

Strike Depth 20.00

Labels

Decimal Places 2

Report Field Width 10

Font

Horizontal Labels

☒ Plot Horizontal Labels ☐ Label Toes and Center

Horizontal Label Increment 200.00

Horizontal Tic Increment 50.00

Horizontal Label Reference Center Line

Label Offset 0.00

Annotation

☒ Inflection Points

☐ Distance 100.00

☒ Plot Area Legend

☐ Draw Event Marks

☒ Include Template Info in Printout

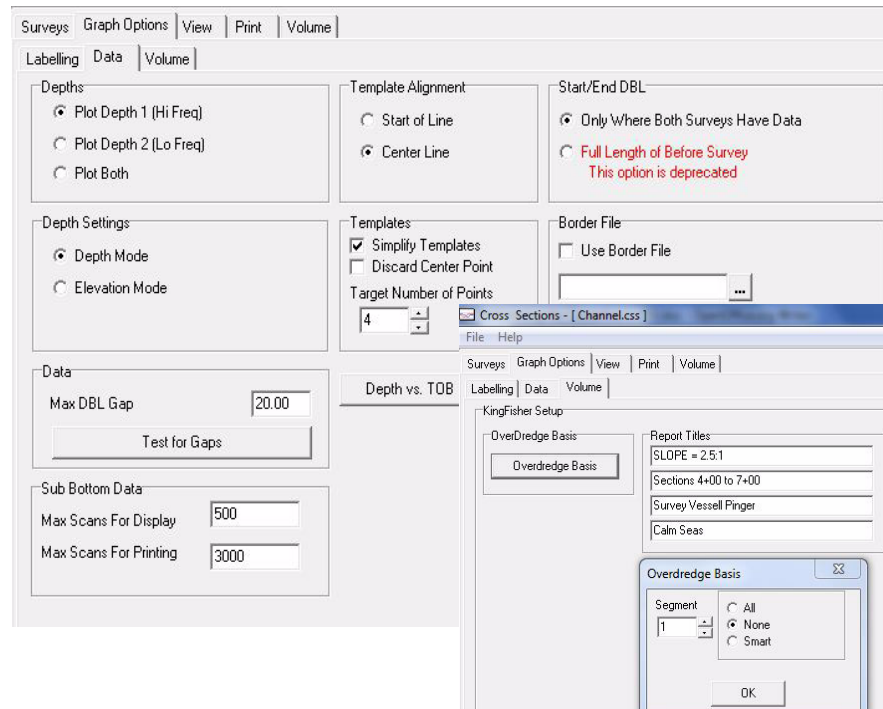
☐ Swap Coordinate Labels

Since the Galveston District does not want to calculate Overdepth for the side slope, we must omit calculations for these areas. This is done by segments. Since this is a simple channel and know we have three segments in our template: segment 1 is the left slope, segment 2 is center of the channel, and segment 3 is the right slope.

In the Graph Options-Volume Tab, click [Overdredge Basis] and set each segment as follows (See Figure 3):

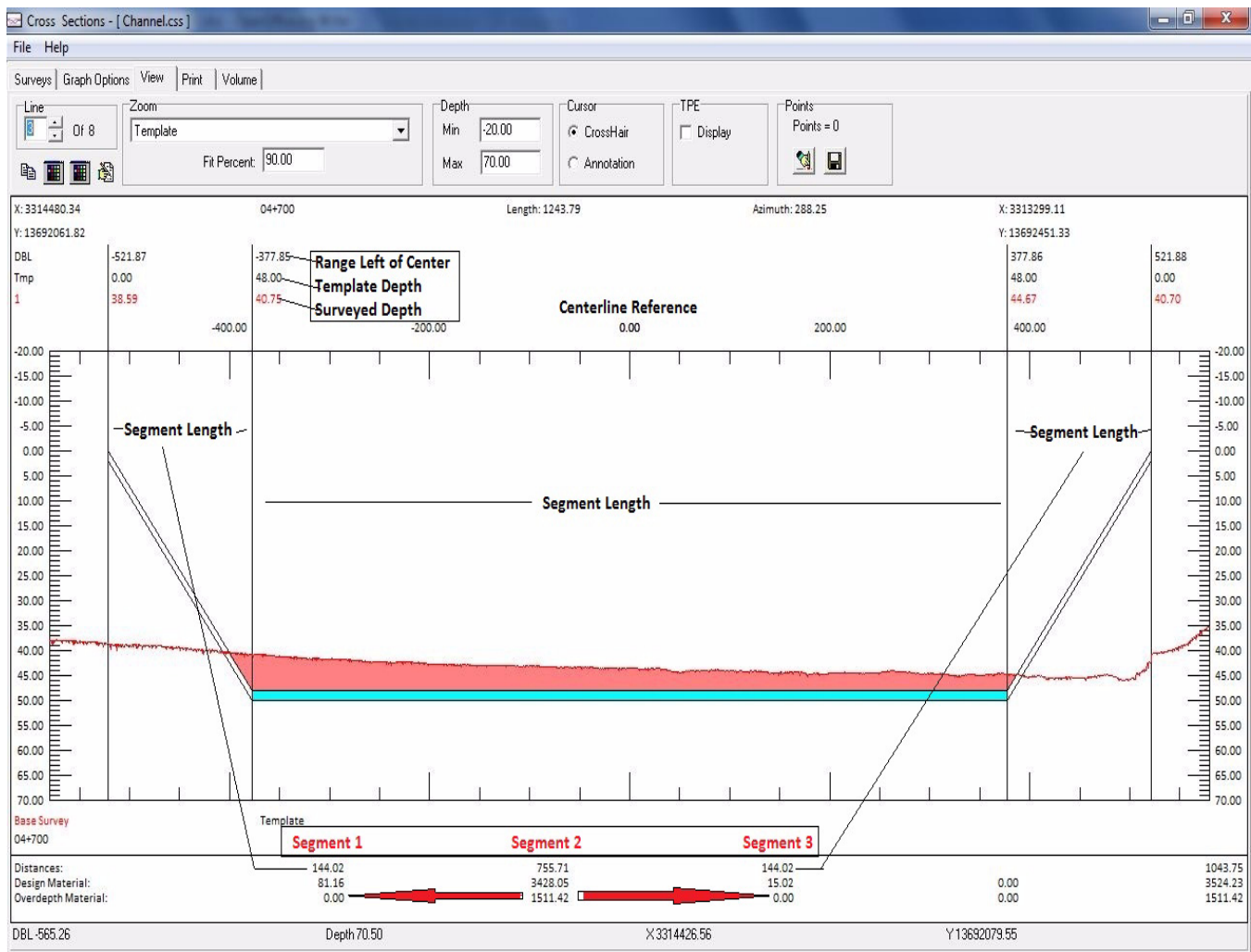
Segment	Overdredge Basis
1	None
2	All
3	None

FIGURE 3. Graph Options



In the View Tab (Figure 5) and in the area legend we see that the Kingfisher method will calculate design slope and design prism volume and over depth volume which excludes the over depth on the side slopes. The best way to tell if the program is excluding this volume, is to see if there is coloration in the area between your design prism and your overdepth prism line. You can change the colors to any that you prefer with the color palette in the View Tab.

FIGURE 4. View Tab



VOLUME REPORT

The volume report is pretty self-explanatory. It gives section distances, area, volume, file date information and a header that is pulled in from the Graph Options/Volume Tab. Two things to note are that the date of the survey is from the first ALL Format file loaded in your session and that the units for volume measurements are taken from the units you establish in HYPACK® Geodesy.

FIGURE 5. Kingfisher Volume Report

Cross Sections - [Channel.css]									
File Help									
Surveys Graph Options View Print Volume									
 									
RUN DATE: 3/31/2010 RUN TIME: 3:24:10 PM SLOPE = 2.5:1 Sections 4+00 to 7+00 Survey Vessell Pinger Calm Seas									
DREDGE VOLUME CALCULATIONS									
LINE	DIST	***** REMAINING DEPTH *****			***** OVERDEPTH *****			TOTAL	
STATION	INTERVAL	END AREA	INT VOL	TOT VOL	END AREA	INT VOL	TOT VOL	PAY VOL	
NUMBER	(FT)	(SF)	(CY)	(CY)	(SF)	(CY)	(CY)	(CY)	

DATE SURVEYED: 03/10/2010									

04+500	0.00	3,627.03	0.00	0.00	1,525.40	0.00	0.00	0.00	
04+600	100.00	3,610.88	13,403.69	13,403.69	1,518.40	5,636.74	5,636.74	19,040.43	
04+700	99.99	3,524.23	13,212.48	26,616.17	1,511.42	5,610.49	11,247.23	37,863.40	
04+800	100.00	3,608.39	13,209.13	39,825.31	1,504.42	5,585.13	16,832.36	56,657.67	
04+900	100.00	3,502.09	13,167.70	52,993.01	1,497.44	5,559.07	22,391.43	75,384.44	
05+000	100.00	3,538.58	13,038.21	66,031.22	1,490.44	5,533.09	27,924.52	93,955.74	
05+100	99.99	3,463.35	12,965.86	78,997.09	1,483.46	5,506.94	33,431.46	112,428.55	
05+200	100.00	3,416.14	12,740.35	91,737.44	1,476.48	5,481.61	38,913.07	130,650.51	

***** TOTAL PAY VOLUME			130,650.51						