

NIWA ADCP Traveller – Case Studies



Case study 1- Hand towing versus traveller towing comparison.

In this study a 22m wide channel was traversed multiple times using the tagline mounted traveler and then repeating the cross section by hand towing the float along the tagline with a person wading holding a line attached to the pulley on the tagline. Both traverses took the same time to complete (3-4 minutes), but the traveller traverse flow results had a lower coefficient of variation. Figure 1 shows a typical boat speed comparison between the two types of traverses.

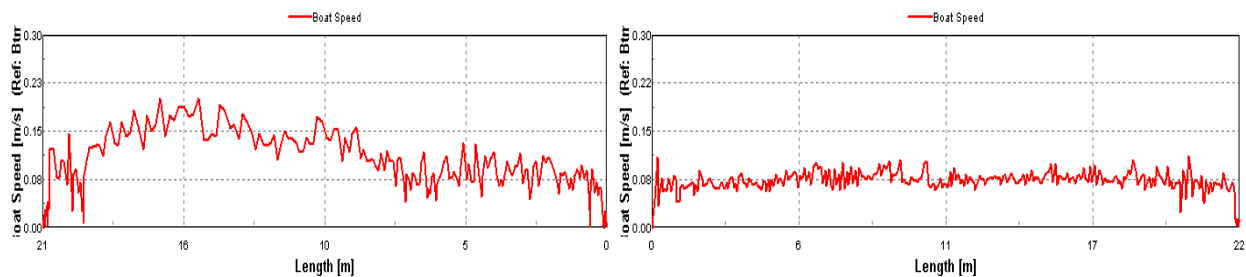


Figure 1: Boat speed plot showing the difference in boat speed between hand towing (left) and traveller (right) on different traverses of the same transect. Flow results from the traveller traverses have a lower coefficient of variation.

Case study 2- Low flow gauging (37 l/s) in a small channel

This flow measurement was made with a TRDI Streampro using the low velocity pulse coherent mode in a low velocity channel 2.6m wide with a maximum depth of 0.3m. Traverses were made with the NIWA traveler set at a speed of ~1cm/s to traverse the section in greater than 3 minutes. The flow result of 37 l/s (Table below) had a coefficient of variation of 2% which was very good compared to all prior gaugings at this site with the Streampro which typically varied by +/- 10% from the mean flow result.

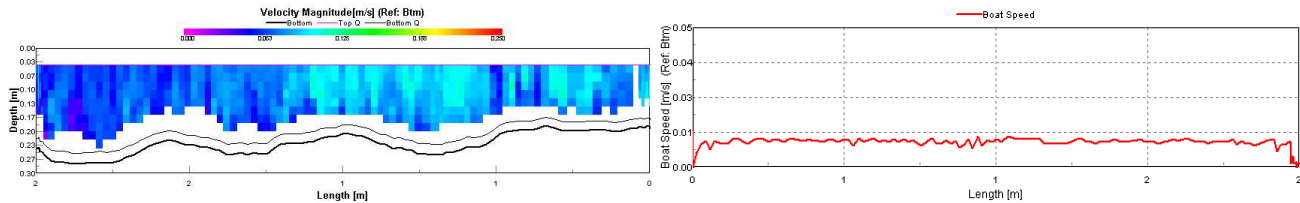


Figure 2: A velocity magnitude plot (left) and boat speed plot (right) from a traverse of the small channel.

Table 1: Flow results from 9 traverses of the small channel.

Traverse No.	Total Q [m ³ /s]	Total Area [m ²]	Width [m]	Boat Speed [m/s]	Flow Speed [m/s]	Duration [s]
1	0.037	0.55	2.6	0.008	0.072	308
2	0.036	0.57	2.68	0.011	0.067	210
3	0.036	0.57	2.66	0.013	0.069	188
4	0.037	0.55	2.62	0.01	0.072	226
5	0.036	0.56	2.65	0.009	0.069	292
6	0.038	0.59	2.76	0.008	0.068	326
7	0.036	0.56	2.66	0.008	0.068	300
8	0.036	0.56	2.68	0.008	0.068	312
9	0.037	0.55	2.61	0.008	0.07	302
Average	0.037	0.56	2.66	0.009	0.069	
Std. Dev.	0.001	0.01	0.05	0.002	0.002	
Std./ Avg. 	0.02	0.02	0.02	0.2	0.03	