

Stilling Well Step Test

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During analysis of flow data collected in the fall of 1999, some concerns regarding the precision of the digital encoders. Dr. Capece decided it necessary to test the response of each encoder to a rise in water level. The goal of this test is to be sure the response is linear and that one rotation of the encoder wheel is equal to one foot.

The first step is to fill the stilling well with water and allow that water to run out the well. This is necessary for finding the appropriate zero reading. Once the water stops flowing out take a manual measurement of the water level in the stilling well. This is done by first marking a measuring point at the top of the well. (This is important, as the top of the well may not be perfectly level.) Next, lower a metal measuring tape down into the well, and measure the depth at which the tape first touches the surface of the water. Looking for ripples in the water can do this. Finally, the encoder's reading should be noted as it is seen in the CR10X.

The second step is to plug the port in the flume. Dr. Capece devised a small inflatable plug that serves this purpose rather nicely. (The plug need only be pumped to 20psi.) Once plug is inflated, leave pump connected to the plug. Pour clean water (as opposed to ditch water) into the stilling well, being careful not to douse the encoder itself. I used a 5-gallon bucket full of water. Now retake the manual measurement from the same point previously marked at the top of the well. Also note the encoder's reading as it is seen in the CR10X.

Finally, to remove the plug, simply release the pump's lock. The plug will quickly deflate. Hold the plug in the port to slow the flow of the water. Quick changes in the water level may affect the encoder precision or affect the position of the tape on the spool.

The results of this test were inconclusive (*see Page 2*). I did not use enough water to raise the level in the well by a foot. This is important for reducing the affect of human error in the manual readings (*0.125"/5" is much greater than 0.125"/12"*). A return trip is being scheduled for all sites with an error greater than

Site	Change in Upstream Stilling Well				Change in Downstream Stilling Well			
	CR10x (ft.)	CR10x (in.)	Manual (in.)	Error (in.)	CR10x (ft.)	CR10x (in.)	Manual (in.)	Error (in.)
w1	0.52	6.24	6.38	0.14	0.44	5.28	5.36	0.09
w2	0.67	8.04	8.06	0.02	0.65	7.80	7.75	-0.06
w3	1.19	14.28	14.50	0.22	1.32	15.84	16.13	0.29
w4	0.44	5.28	5.31	0.03	0.46	5.52	5.38	-0.15
w5	0.46	5.52	5.63	0.11	0.40	4.80	4.75	-0.05
w6	0.47	5.64	5.69	0.05	0.46	5.52	5.56	0.04
w7	0.51	6.12	6.25	0.13	0.56	6.72	6.38	-0.35
w8	0.81	9.72	9.75	0.03	0.49	5.88	10.13	4.25
s1	0.49	5.88	6.00	0.12	0.55	6.60	6.69	0.09
s2	0.62	7.44	7.75	0.31	0.62	7.44	7.63	0.19
s3	0.33	3.96	1.13	-2.84	<i>Downstream well was not ready.</i>			
s4	0.56	6.72	6.94	0.22	0.57	6.84	6.94	0.10
s5	0.51	6.12	6.44	0.32	0.58	6.96	7.25	0.29
s6	0.47	5.64	5.50	-0.14	0.31	3.72	3.25	-0.47
s7	0.50	6.00	6.13	0.13	0.50	6.00	5.44	-0.56
s8	0.48	5.76	5.75	-0.01	0.72	8.64	8.50	-0.14

***Numbers in Red represent Encoders that will be re-tested**

JORGE, change all values to FEET.

JORGE list FTP site where the raw data XLS file is located