Current Meters
General Information

The Ben Meadows Co. offers a complete line of current/water velocity meters. There are many factors to consider when selecting the proper current measuring equipment for your application. In general, you should know if you will be measuring current from an overhead structure or while wading. It also helps to know the approximate speed of the water to be measured. (Of course if you already knew the exact speed, you wouldn't need the meter!) This is because there are specialty meters available for very slow currents, which are defined as having a velocity of less than 3.0 feet per second (fps).

Types

Current meters are available in two styles. The bucket wheel style looks very much like an anemometer which is used to measure air speed. Bucket wheel current meters are of stainless steel, brass, and bronze construction. The AA Current Meter #113009 is used for water velocities above 3.0 fps. The Mini Current Meter #113008 is used for slower water, and is slightly smaller in size. Bucket wheel meters have a tail fin to keep the meter pointed directly into the current. This style of meter produces a signal which can be used with headphones, or a digital counter.

The second type of meter uses a propeller/impeller which rotates as the water moves past the unit. There are several styles available which work on this principle. The Swoffer hand held current meters use a propeller which can be used in water ranging from 0.1 fps to 25 fps. A choice of rods and computer console displays is available. The Handheld Flowmeter with low speed impeller can measure current as slow as 2 cm/sec. A standard impeller is also available for current speeds above 10 cm/sec. These products are available as mechanical or electronic units.

The choice of style is often a matter of personal preference. One consideration is that the bucket wheel type is less likely to suffer interference from the bottom because it rotates on a vertical axis. Propeller/impeller types rotate horizontally and the blades could strike the bottom.

Support

Current testing is usually done in one of three ways. These are: 1) from an overhead structure such as a bridge, 2) from the deck of a boat, or 3) while wading in the water. The first two methods require a crane, reel, and weight. The meter is attached to the cable above a sounding weight, and raised and lowered with the crane and reel. The sounding weight holds the meter against the current. The correct weight can be determined by multiplying the estimated velocity in feet per second by the depth of the measurement in the water. The answer will be how many pounds the sounding weight needs to be.If wading to take a measurement, either a telescoping wand or a 6/10's wand is used to support the current meter. Most telescoping wands are not graduated with measurements. A 6/10's wand is graduated to determine the depth of water and the depth of sensor placement. At some point in history, the standard sensor placement became a point 6/10's of the depth of the stream. This type of wand allows the sensor to be moved along the wand and secured at the correct depth.

Counters

The signal from the sensors or current meter can be processed or read in one of several ways. The simplest set has a mechanical counter which tracks revolutions of the impeller. The counter begins as soon as the sensor meets the water and continues until the unit is lifted clear again. To determine velocity, a stopwatch is used in order to plot revolutions against time. A chart is then used to determine velocity. This is the least expensive set.

Other units use an audio signal sent to headphones. Each revolution produces a tone. The tones are counted and recorded against time as in the previous system to determine velocity.

The more advanced current meter systems include a digital counter or computer. These counters track the revolutions electronically. The best units will directly convert the revolutions to a velocity which is displayed on screen. Some will store minimum/maximum readings in memory. Some models are true data loggers which time stamp the data for downloading to a computer via RS-232 output.

Summary

There are many systems and components to choose from in order to have the equipment which best fits your application. If you opt for a less expensive system, you will have to make calculations manually. The important thing is to match your method of measuring (overhead vs. wading) and the approximate water speed (to determine if you require a low speed impeller) to the equipment to build a usable system.

