

Low Flow Conditions - Low Profile Area Velocity Monitoring

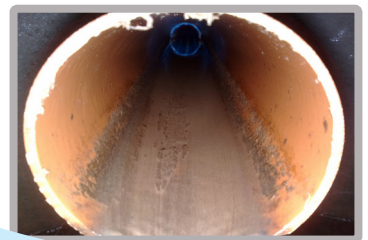
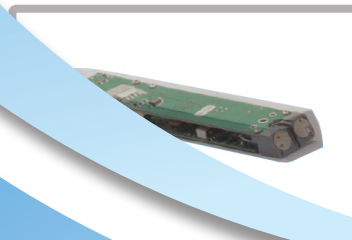
Abstract

When looking at the monitoring of flows in many piped and open channel situations the issue has always been the monitoring of flows at low levels. RS Hydro were asked to install a meter to monitor flows in a 4" pipe, where levels were dropping to less than 50mm.

Equipment Used

The ISCO 2150 area velocity flow meter with low profile area velocity sensor and customised 4" spring ring.

Flow - Level - Water Quality
Groundwater - Meteorology - Telemetry



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Background

Since the first forms of open channel flow meter emerged, the problem has always been the monitoring of flows at low water levels. Although many methods exist to combat this problem resulting issues still occur. Piped flows have always been one of the hardest to monitor especially during low flow conditions, because many flowmeters need full pipe conditions to ensure their function.

In many circumstances the best method of flow monitoring is one where the flow meter can be installed and removed quickly for both installation and maintenance requirements and one where costs are kept to a minimum, with a large emphasis placed on time from initial selection of the equipment to an installed flow meter.

In channel sensors have been seen to emerge in recent times as a solution to resolve this issue in particular, the ISCO 2150, with its low profile area velocity sensor. The 2150 works using Doppler technology. This transmits a frequency which reflects off particles in the water, this then is received by the the sensor. Here any change in frequency shows the velocity and the direction of this.



fig1. The installation.

Where the 2150 has many advantages over other such units on the market is the fact that the

unit is able to measure velocity down to 25mm. This makes the flowmeter ideal for monitoring of low flow conditions, where most in channel sensors would not be suitable, as many operate in the region of 75mm to 100mm. This can mean that low flows can go unnoticed.



fig2. ISCO 2150 open channel flow meter.

When RS Hydro were asked to measure flow in a 4" pipe, where water levels were generally low, it was the ISCO 2150 which was chosen based on its reputation to monitor under such unique conditions.

The 2150 sensor was installed on a 4" mounting ring, which was modified to cope with potential flows which may occur when water levels may drop below 25mm . The sensor was installed very quickly with this only taking around 2 minutes to achieve. The flowmeter was then programmed to the dimensions of the pipe and data storage setup to record level, velocity, flow rate and total flow. With the unit being battery powered this was located near the chamber lid for easy access and maintenance. With the whole installation taking only 60 minutes the method can be said as a quick easy, and reliable resolve to the problem of low flows and ultimately one of the most accurate ways of measuring low flows in a scenario where most flow meters would fail.