

Airport Uses Teledyne ISCO Water Products to Improve Flow Measurement Accuracy Across Surface Water Ponds

Application Note: W-AN25



Industry

Commercial Airports

Application

Run-Off from Airport Holding Ponds

Application

An international airport operates several surface water attenuation ponds that require accurate measurement of discharge flows to ensure compliance with environmental and operational requirements.

At one of the airport's ponds, an area velocity flows meter was installed to measure discharge rates. However, airport operators suspected that the flow meter was not capturing the true peak flows experienced during high rainfall events.

Challenge

Operational knowledge and historical observations suggested that flows could reach approximately 350 l/s during peak conditions. Despite this, the installed flow meter consistently reported significantly lower values.

Velocity readings were rarely exceeding 2.5 m/s, which meant the system was under-reporting peak discharge events. The manufacturer of the installed flows meter attributed the discrepancy to poor flows hydraulics within the channel and maintained that area velocity technology wasn't suitable for measuring flow in this channel.

Site Review and Equipment Trial

To investigate the issue, a Teledyne ISCO Waterflow measurement expert conducted a site review of the measurement location. The Teledyne ISCO expert did not identify any hydraulic conditions that would justify the low velocity measurements being recorded.



Discharge channel

The Teledyne ISCO consultant offered a short trial using Teledyne ISCO Water's submersible TIENet® (Teledyne ISCO Environmental Network) 350 Ex area velocity sensor. The 350 Ex continuously transmits an ultrasonic signal into the flows stream.



Teledyne ISCO's Signature flow meter is installed above the discharge channel and receives data from the 350Ex sensor.

Trial Results

During the trial period, velocities above 3m/s were recorded and the airport's expected peak flows of more than 350 l/s were reported. This confirmed that the drainage channel could produce the expected flows and validated that peak flows of over 350 l/s were indeed occurring. This demonstrated that the limitation was the incumbent sensor, not the application itself.



Teledyne ISCO's TIENet 350 Ex area velocity sensor installed in a discharge channel.

Solution

Following the successful trial, airport management selected a permanent solution consisting of:

- Teledyne ISCO Water's TIENet 350 Ex area velocity sensor
- Teledyne ISCO Water's Signature flow meter

The TIENet 350 Ex and Signature flows meter delivered accurate and reliable flow measurements across the airport's drainage infrastructure. Following the successful evaluation, the airport replaced the existing unit at one pond and installed new Teledyne ISCO Water systems at two others.

With the superior measurement solution in place, the airport now benefits from:

- Accurate measurement of high-velocity flows and peak discharge flow rates exceeding 350 l/s
- Improved confidence in environmental compliance reporting
- Reliable monitoring across multiple drainage assets

The implementation provided a robust, field-proven flow measurement solution capable of accurately measuring

high flow conditions within the airport's drainage network.

The team

Initial investigation and recommendations came from a Teledyne ISCO Water flows measurement expert. The instrumentation was supplied by Teledyne ISCO Water to Process Instrument Solutions, based in Bury Saint Edmunds, England. Process Instrument Solutions also carried out Installation and commissioning.

Signature® Flow Meter

The Signature flow meter from Teledyne ISCO, designed for open channel flow metering, supports flow measurement methods including bubbler, non-contact laser area velocity, ultrasonic, and submerged Doppler ultrasonic area velocity. Up to nine sensors can be connected to the Signature, providing a broad range of I/O and communications options:

- pH and temperature
- SDI-12
- RS485

The Signature flow meter is rugged (IP 66) even if the cover of the lid is open. It performs data logging with variable rate data storage and data integrity verification and has the ability to connect a USB drive for data/report retrieval and programming.



TIENet® 350Ex Area Velocity Sensor

The 350 Ex sensor continuously transmits an ultrasonic signal into the flow stream. The signals are reflected off bubbles and solids and return to the sensor with a frequency shift (Doppler effect) which is translated into velocity. A differential pressure transducer in the sensor measures liquid depth to determine the wetted area.

Flow rate is then calculated by multiplying the wetted area of the flow stream by its average velocity. Certified to MCERTS when paired with a Signature flow meter.

