Measuring Flow of Food Processing Effluent Under Harsh Conditions

TELEDYNE ISCO
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Application Note
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Food Processing – Fish and Shrimp

Food processing naturally creates waste that requires disposal. Prime examples are fish and shrimp processing plants, where viscera and other waste is separated from finished food products.

A company may need to measure the effluent flow for a variety of reasons. Two examples with two different goals are good examples. In one instance, an industrial fish-processing customer needed to measure the amount of post-production wastewater they were discharging in order to verify sewer service costs. In another, a shrimp processor needed to document compliance with government regulations. In both instances, Teledyne ISCO provided the solution to their needs.

Situations

A fish processor thought they were being overcharged by the sewer service provider. As is common, the sewer service billing was based on a percentage of the incoming water to the facility. However, the processor thought the calculation was in error. They wanted to measure the effluent flow to determine if those calculations were correct.

At the shrimp processing plant, they needed to measure the amount of wastewater going into a river. (This was not a biohazard in and of itself; in fact, the fish living in the river considered the remains a delicacy.) At issue was the need to monitor and document compliance with regulations governing the impact of the wastewater on Biological Oxygen Demand. The higher the BOD, the more oxygen in the water is being consumed.

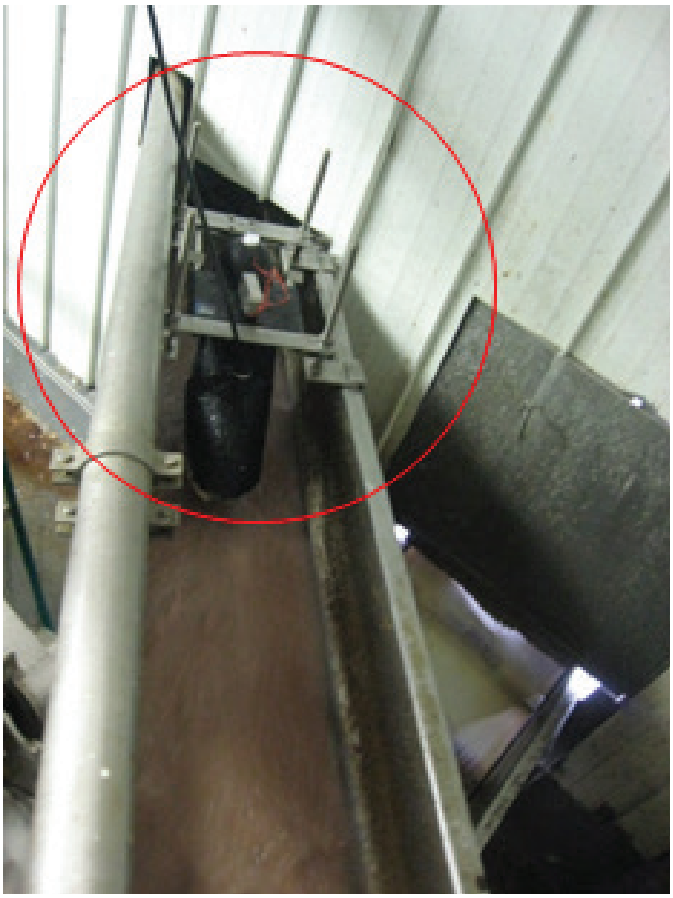
Challenges

At the fish processor, the effluent contained a mixture of fluids, fish-processing solids and fats in an open, rectangular channel of stainless-steel construction (A traditional flume could not be used due to the high flow-velocity and fats that would build up on the flume walls). The company tried an area velocity sensor on the bottom of the channel, but solids and fats quickly covered the sensor and left it unable to read velocity. Frequent, costly plant shutdowns were required in order to clean it.

The shrimp processor needed to compute the BOD, which involved measuring the amount of effluent flowing into the river. The effluent traveled through a closed pipe for health and safety reasons. Again, an in-stream flow sensor would be gummed up by the effluent.

The LaserFlow®/Signature® solution

The LaserFlow sensor provides a low cost, low maintenance solution in a challenging environment. The only non-contact flow measurement device to read below the surface, LaserFlow solved the issue of solids and fats in the effluent because it is a non-contact sensor mounted above the flow.



At the fish processor, the LaserFlow velocity sensor remotely measured flow in the open channel with non-contact Laser Doppler Velocity technology and non-contact Ultrasonic Level technology. The sensor measured velocity with a laser beam below the surface of the wastewater stream.

The ultrasonic sensor read the water depth to calculate the wetted area, and the laser was used to read the velocity of the water in the channel.

At the shrimp processor, the simple solution was to cut a small notch in the pipe and mount a LaserFlow above the opening. The LaserFlow measured the flow in the same way it did at the fishery.

In both cases, a Signature flowmeter captured the data and provided accurate, verifiable daily flow volume reports. Plant managers at the fish plant used the information for planning purposes, and the shrimp processor used it to verify compliance with BOD parameters and satisfy government regulators.

Learn more

For details on the Signature flowmeter, LaserFlow sensor, Flowlink data management software, automated water and wastewater samplers, communication tools (including wireless and cellular options), and other Teledyne ISCO technologies, visit www.teledyneisco.com.

LaserFlow®

The TIENet 360 LaserFlow sensor is an area-velocity flow and water-level measurement device that remotely senses flows in open channels using non-contact Laser Doppler Velocity Sensing and non-contact Ultrasonic Level Sensing technologies. The sensor uses advanced technology to measure velocity with a laser beam directed at single or multiple points below the surface of the wastewater stream. Therefore, unlike radar technology, it does not require the creation of ripples on the surface of the stream.

- Zero deadband from measurement point in non-contact level and velocity measurements Continuous measurements in submerged conditions
- Advanced velocity diagnostics for data quality evaluation and analysis
- Bidirectional velocity measurement
- Low level velocity measurement

Signature® Flowmeter

The Signature flowmeter from Teledyne ISCO, designed for open channel flow monitoring, supports flow measurement methods including bubbler, non-contact laser area velocity, ultrasonic, and submerged Doppler ultrasonic area velocity.

With the ability to connect up to 9 sensors, the Signature flowmeter provides a broad range of I/O and communications options:

- pH and temperature
- SDI-12
- RS485

The Signature flowmeter 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.

Teledyne ISCO
P.O. Box 82531, Lincoln, Nebraska, 68501 USA
Toll-free: (800) 228-4373 • Phone: (402) 464-0231 • Fax: (402) 465-3091

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