

Influent Flow Monitoring at Wastewater Treatment Plant

Milan, Italy

Environmental Case Study
Expertise in Flow

Overview

Four Signature® Flow Meters, each configured with 360 LaserFlow™ sensors, were installed at the inlet of Nosedo Wastewater Treatment Plant (WWTP) in Milan, Italy. This flow monitoring technology provided a unique solution for the challenging flow conditions at this site. Non-contact Doppler laser technology was chosen by the user for their continuous and maintenance free flow monitoring.



Nosedo Wastewater Treatment Plant, Milan

Location

The Nosedo Wastewater Treatment Plant is the city's oldest and one of the largest European wastewater treatment facilities. Located in the South-East of Milan, this site covers an area of 40,000 m². The plant collects wastewater from the central and eastern part of Milan. It has a processing capacity of 1,250,000 population equivalent and a sewage treatment capacity equal to 432,000m³/day. Inlet flow rates range up to 15m³/second in wet weather conditions.

Inlet Section Overview

Flow monitoring in the wastewater treatment process is key for verifying performance of the plant as a whole, as well as its individual processing sections. Due to the enormity of the plant's processing capacity sewage streams are transferred to the plant through different main sewers, which merge into four rectangular inlet channels, each with a width of 1.5 m. At this location, the Signature flow meters and their non-contact LaserFlow sensors were installed over each of four inlet channels and sheltered in all-weather enclosures (Figure1).



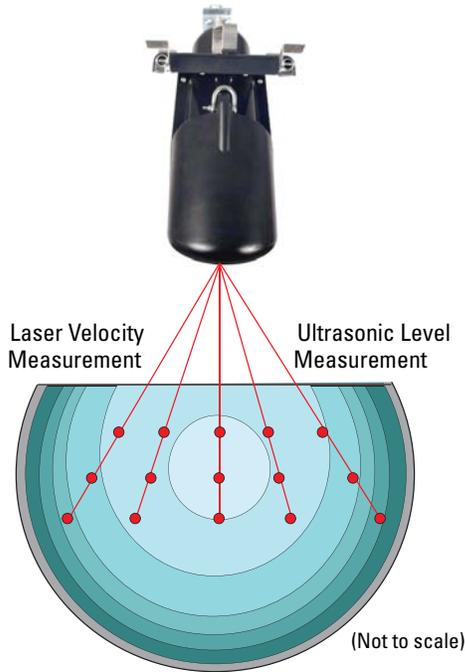
Figure 1: Signature flow meter with LaserFlow sensor sheltered in weather enclosure

Site Challenges

Sludge buildup at the bottom of the channels and high sediment concentration in the flow streams were the major problems for continuous flow rate measurement. The performance of submersible, continuous wave Doppler sensors, previously installed at the site, had been adversely affected by site conditions and required costly maintenance.

Finding the Solution with LaserFlow

RT ENVIRONMENT S.R.L., the Teledyne Isco distributor in Italy, recommended using the non-contact LaserFlow sensor at the site. The conditions at the bottom of the channels were less than ideal for traditional flow monitoring. Being placed over the channel LaserFlow overcomes this. First, the unit's built-in ultrasonic level transducer determines the stream's level. This is done by emitting an ultrasonic pulse and measuring the time it takes for the echo to return from the stream's surface. By using ultrasonic level measurement the sensor can calculate a subsurface point at which to focus an optical laser. The frequency shift (Doppler shifting) of the returned light from the laser is proportionate to the water's velocity. LaserFlow is able to measure velocities at up to fifteen points below the water's surface. Being able to measure at multiple points minimizes the effects of turbulence and eliminates the need for manual profiling. Above average results are achieved by producing a level measurement and an exceptionally accurate mean velocity reading.



The end-user, VEOLIA WATER SOLUTIONS & TECHNOLOGIES ITALIA S.R.L., was able to reduce costs of service by limiting site visits to periodic inspections of the LaserFlow without the need for stopping flow, entering into the manhole and/or cleaning the sensors.

For more information on the Teledyne Isco TIENet 360 LaserFlow sensor and the Signature Flow Meter please visit our website: www.isco.com.

Figure 2: Multi-point/Multi-depth velocity method

Measuring Results and Feedback

Thanks to its non-contact technology for velocity and level measurement, the Signature configured with a LaserFlow was capable of providing consistent and continuous flow rate results (Figure 3).

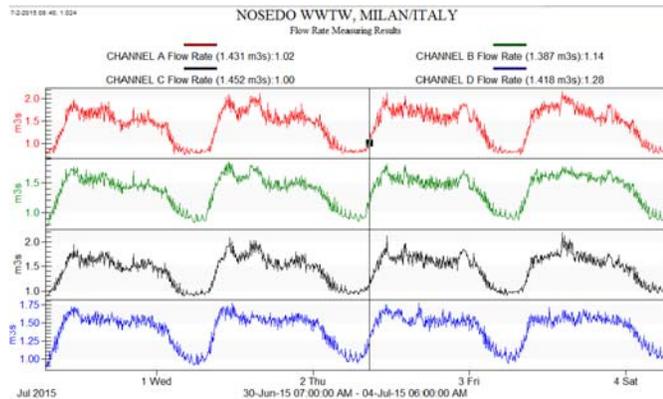


Figure 3: Flow Rate Measuring Results for four inlet channels in dry weather conditions

Note
The values in brackets represent average flow rates in a recorded time span.

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