

# TECH TIPS

FROM NASSCO

TECH TIPS BY NASSCO IS A BI-MONTHLY ARTICLE ON TRENDS, BEST PRACTICES AND INDUSTRY ADVICE FROM NASSCO'S TRENCHLESS TECHNOLOGY MEMBERSHIP PROFESSIONALS.

## FLOW MONITORING

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With the proper application of sensor technology and attention to detail by the installation team, flow monitoring can provide valuable information for any utility. There are many uses of flow monitoring information, and some of the most common include: Inflow and Infiltration identification and quantification; Sewer overflow quantification; Billing between multiple jurisdictions; Cost allocation; and Hydraulic model calibration.

There are a many aspects to the proper installation and maintenance of an area velocity flow monitor installed in the harsh environment of a sewer pipe. The key areas of concern when preparing to install a flow monitor are:

- » access to the manhole or monitoring point;
- » hydraulics present at and surrounding the monitoring point;
- » technical proficiency required to install the area-velocity sensors; and
- » the calibration procedure following installation.

### ACCESS

First, it is critical to remember that the flow monitoring sensors typically utilized for collection system monitoring in the industry today require confined space entry to properly install or calibrate the sensors. This requires proper training and certification to ensure the safety of the entire flow monitoring installation crew. In addition to the confined space concerns, the site location needs to be evaluated from an access perspective. For example, can the same data be acquired from a site that is in the turning lane to a busy parking lot, compared to one that is located a with a mile trek into the wooded or swampy area? In other words, the easier the site is to access, the more likely the monitor will be maintained and calibrated as required to ensure usable and accurate data.

### HYDRAULICS

There is a variety of flow monitoring technologies and manufacturers in the industry today. Each sensor that is manufactured has a "sweet spot" of applications. Some are designed for a very specific purpose like shallow depth, high velocity and complex hydraulics like CSO outfall structures. Others are designed to be utilized in the majority of pipe applications ranging from 8" to 120" in diameter. Selecting the proper technology for any given site is important.

### TECHNICAL PROFICIENCY

Meter manufacturers will provide a customer with the proper user manual that discusses the specific installation procedures for each sensor type. In general, it is important to make sure that any wetted pressure depth and/or velocity sensor is installed under the surface of the flow for the duration of the day. The lowest flows are typically experienced in the middle of the night (hopefully not the time you are installing the sensor). During installation, pay particular attention to rotate the sensor as close to the 6 o'clock position as physically possible to ensure the sensor will remain under the surface of the flow but above any debris or silt that may be present. Ultrasonic depth sensors are typically installed in

the crown of the pipe or the downstream manhole. Either configuration requires the installer to confirm the sensor is installed level in both directions, left to right and front to back, to ensure accurate depth measurements.

### SENSOR CALIBRATION

Each of the sensors installed at a specific monitoring location are typically calibrated during initial installation and removal at a minimum. This requires an accurate field measurement for both depth and velocity with most industry standard flow monitors. This can be done with an "off the shelf" carpenter's ruler, a yard stick or a customer caliber system of some type. There can be profound variations in velocity and depth within a manhole and the adjacent pipes, so it is important to get the measurement at the same point in the flow that the monitor is operating. If the sensors are installed in the incoming pipe, it is important to acquire the calibration measurements at the point where the sensors are taking the measurements; up the pipe and not in the manhole "because it is easier". The velocity point calibrations can be performed with a hand-held submersible velocity sensor, a hand-held (non-submersible) radar velocity sensor, or a ping pong ball and stopwatch for a ballpark estimate.

Again, it is important to acquire the readings at the monitoring point where the sensors are reading to ensure an accurate comparison with the monitor readings. Both of these readings should be recorded inside the monitoring software or on a field form with the specific date and time for future reference.

There are several different meter technologies, and each meter must be installed in accordance with the manufacturers' instructions. However, following these basic guidelines can help increase accuracy and efficiency in your flow monitoring program.

For more information, please visit NASSCO's website at [www.nassco.org](http://www.nassco.org).