

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.

KEEPING YOUR FIELD MEASUREMENTS CURRENT: USING NASSCO'S PACP & MACP FOR RECORDING ASSET DATA

By NASSCO Members Laurie Perkins and Matthew Corbin of Wright-Pierce



The need for current and accurate asset data is as real in our industry as emojis are to American teenagers! For over a hundred reasons, owners, engineers, and contractors require accurate measurements of their collection system assets to properly manage and maintain them. This includes pipe inverts, pipe diameters, manhole depths, GPS coordinates, and pipe lengths. Reasons may include the desire to achieve greater than a 90% complete Geographic Information System (GIS), development of a hydraulic model, asset criticality and risk analysis, or for responding to emergency repairs.

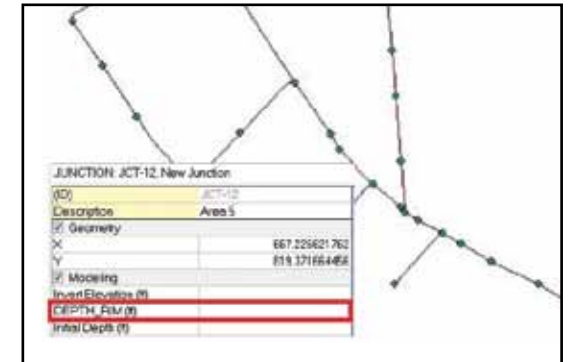
Whatever the reason, obtaining current field measurements is important and can be incorporated into most pipe and manhole inspection programs that utilize NASSCO's Pipeline Assessment and Certification Program (PACP) and Manhole Assessment and Certification Program (MACP) for data collection.

Of course, there is always the use of a record drawing, assuming it exists, can be located, and is legible. Even if it is legible, however, measurements like pipe inverts, pipe diameters, and rim elevations do change over time, and in some cases that time is upwards of 100 years! In other cases, when a municipality's first GIS was initially developed, some digitization may have been performed and data pulled from those record drawings outdated due to repairs or was entered incorrectly in the first place. Additionally, post-construction settlement caused by poor compaction or developing voids in the soil surrounding the pipe, over time, may alter original elevations shown on record drawings or road resurfacing and road reconstruction projects may raise surface elevations.

For example, a New England community installed a sewer line under a local highway in the early 1800s. The initial pavement deteriorated due to snow, ice, and continuous vehicular traffic on the highway. The community then repaved the highway three times in the last 20 years, each time raising the road elevation, thus requiring that sewer frames and covers be raised to the new elevation. In this case the manhole inverts are now deeper by several inches.

So, if you are a collection system owner updating or developing an accurate hydraulic model of your system, using GIS-based drawings for trenchless sewer rehabilitation, or assigning criticality to assets for prioritizing efforts, consider making the PACP and MACP fields that require these various "measurements" mandatory for your operators during CCTV work or routine opening of manholes to obtain current data in addition to the original purpose of the site visit.

There are several inexpensive tools on the market that can speed up the process for obtaining these measurements while providing great accuracy. The PACP standard recommends that a survey rod be used to measure depths (rim to invert, rim to grade, grade to invert, etc.), while a measuring wheel be used to determine the length between manholes (or other access points to the sewer). A measuring



OBTAINING ACCURATE FIELD MEASUREMENTS IS CRITICAL.

tape is too flexible and can introduce errors in measurements, therefore is not recommended.

For measuring accurate inverts and pipe diameters, a PIPE-MIC®II can be used and easily attached to the bottom of a survey rod, using an extension arm and vertical plumb rod for accurate measurements.

As mentioned previously, these practices are probably the most critical and beneficial when creating a hydraulic model. Hydraulic models are intricate and sensitive, using calculated slopes between manholes to calculate flow capacity. Many municipalities use hydraulic models to understand and predict the capacity of their systems. The first step in developing a hydraulic model is building a physical model network which includes pipes, manholes, catch basins, outfalls, and any pump stations. The data associated with these types of assets (depths, sizes, lengths, etc.) must be current and accurate so that the results can be used confidently to make key decisions on needed sewer system improvements such as storage, upsizing, or parallel sewers.

As a best practice, obtaining current field measurements for pipes, manholes, and other structures as part of a routine PACP/MACP assessment program will provide the necessary accuracy for proper management and maintenance of sewer collection systems in lieu of record drawings. Accurate measurements will also improve the use and validity of a hydraulic model and contribute to accurate contract documents and bid quantities which can ultimately result in fewer change orders.