Objective Decision Making Using Multi-Sensor Internal Diameter Measurements

Large diameter pipes, particularly storm water and wastewater systems, are most commonly inspected using CCTV if they are inspected at all. CCTV, however, does not provide the detailed, quantitative data needed to make intelligent decisions for the long term management of critical pipe infrastructure. With newly developed multi-sensor inspection (MSI) technologies, it is now possible to quantify the shape and size of pipes, and defects within them, in 3 dimensions. Advancements in MSI methods allow for measurement of remaining wall thickness, detection of voids developing outside the pipe, and the creation of 3-D digital point clouds with millimeter accuracy. Data of this quality allows for accurate estimates of remaining service life, and the creation of predictive models as well. This Multi-Sensor Inspection Technology will provide asset owners with the quantifiable information they need to make better decisions about the timing of replacement or rehabilitations, which will translate in better decisions and help designing a long-term asset management plan.

This paper will illustrate recent advancements in MSI technologies including 3-D LiDAR, sonar, and pipe penetrating radar (PPR), and how these technologies can be combined to collect comprehensive, quantitative data from large diameter pipes. Case studies of recent MSI projects will be used to demonstrate the qualities of the technology.