A Suggested Framework for the Condition Assessment of Pressure Pipelines

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Abstract:
Water mains and other conduits in pressure service in municipal settings present very unique challenges for the condition assessment process. While advanced condition assessment tools with near continuous measurement capability have emerged into the marketplace, the cost of securing condition information is usually very high, often a significant portion of or approaching the replacement cost of some assets. Further, the tools and techniques available vary considerably in terms of the degree of coverage obtained and the certainty of the observations and are not without risk to deploy.

While all assets benefit from the use of traditional risk based approach as an overall framework, pressure pipes are a unique class of asset that need a very focused approach to minimize risk exposure in a cost effective manner.

The foundation of the condition assessment process needs to be based on a clear understanding of the fundamental processes of material degradation and failure overlaid with an acute awareness of failure consequence. With this foundation, one can review the wide range of established and emerging tools at one’s disposal and develop a condition assessment process that may vary considerably across an inventory but that is generally commensurate with the consequences of failure and continuously improves our understanding of the system’s vulnerabilities overall. Understanding failure and material degradation thoroughly also provides considerable context for material selection going forward to maximize design life in the most cost effective manner.

The presentation provides an overview of a range of condition assessment tools and techniques that are available for condition assessment of water and force main infrastructure in pressure service; ranging from visual observations and sound root cause failure analysis to the intelligent use of advanced electromagnetic tools such as remote field eddy current (RFEC), magnetic flux leakage (MFL), and remote field transformer coupling (RFTC) technologies. A framework for mapping these technologies back to a
water or force main inventory is presented in both conceptual terms and through real case study examples.

**Bio:**
Mr. Chris Macey is the North American Practice Leader for AECOM in North America for Condition Assessment and Rehabilitation of Underground Infrastructure. With over 35 years of experience Chris has considerable expertise in material failure assessment for pipelines in both gravity and pressure service. He has extensive knowledge of pipeline materials, pipe/soil interaction, pipeline deterioration processes, material limit states, and state of the art rehabilitation technologies. Chris graduated from University of Manitoba in Canada in 1977 and has been working with AECOM since March 1st of 1978.