

Void Detection with Pipe Penetrating Radar

Csaba Ekes

SewerVUE Technology Corp., 7993 Enterprise Street, Burnaby, BC, V5A 1V5, Canada;

Ph: 778 862 0707; email:info@sewervue.com

ABSTRACT

Pipe Penetrating Radar (PPR) is the underground in-pipe application of Ground Penetrating Radar (GPR), a non-destructive testing method that can detect defects and cavities within and outside non-ferrous (reinforced concrete, vitrified clay, PVC, HDPE, etc.) pipes. The key advantage of PPR is the unique ability to map pipe wall thickness and deterioration including voids outside the pipe, enabling accurate predictability of needed rehabilitation or the timing of replacement.

This paper presents recent advancements of PPR inspection technology and two selected case studies are discussed. The man-entry PPR inspection of a Reinforced Concrete Box Storm Culvert in Richmond, BC is discussed in detail. The no 2. Rd box culvert is 1.5m × 3.05m reinforced concrete culvert with a dual rebar layer. The total inspected length was ~200m. The objective of the PPR survey was to determine the location of voids outside the pipe. The pipe experienced sinkholes, and the municipality was concerned about building a new multi-use path over unstable ground. PPR results confirmed the location and development of several voids throughout the pilot section.

The Broadway Sewer Main in Everett, Washington is a sewer main comprised of 750mm Concrete and 900mm Brick Lined pipes. Over 1.3 Km of high resolution PPR line data were collected via robotic inspection. Due to the highly complex nature of the geophysical data, data processing and interpretation was a critical component of this project. PPR data revealed voids both outside and within the pipe wall and thus provided engineers the information needed to take the appropriate approach to rehabilitate the pipe.

With limited available funding and budget constraints becoming more prevalent, timing of rehabilitation and overall intelligent asset management is more critical than ever. PPR provides engineers and utility owners the information to accurately estimate the remaining life left in a pipeline, refine timing of repairs, and ultimately better allocate funding for asset management.