A Proactive Approach to Transmission Main Condition Assessment – City of Moncton

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Agenda

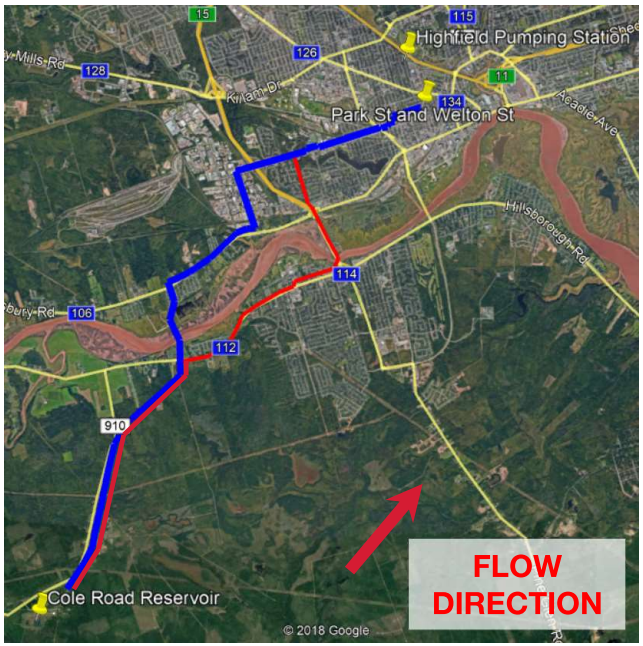
- Summary
- Proactive Condition Assessment
- Typical Process for Delivering Condition Assessment
- SmartBall™ Inspections
- PipeDiver™ Inspections
- Results
- Q&A

10:40 – 11:10 AM

Summary

- In 2019, the City of Moncton and Pure Technologies, a Xylem Brand conducted a non-destructive inspection and condition assessment on the twin 900-millimetre transmission mains.

- Background:
  - Length: ~26-kilometres
  - Material: C301-L (Prestressed Concrete Pressure Pipe, Steel-Cylinder Lined)
  - Pipe diameter: 900, 750, 600 -millimetre
  - Vintage: 1964 to 1986
  - Potable water supply to the tri-community (Moncton, Riverview, Dieppe)
  - Manganese is a known residual in pipe from prior to 1999
  - Several leaking joint repairs previously performed
- Purpose:
  - Enhance the level of service for potable water via the Capital Works program
- Scope:
  - In-line leak and gas pocket detection (98% complete)
  - In-line pre-stressing wire break detection (71% complete)
  - Transient pressure monitoring
  - Engineering analysis



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Proactive Condition Assessment

- Proactive approach may prioritize initiatives:
  - Work force – staffing during summer vacation season (mid August to September)
  - Water demand – inspections during peak demand when water quality is already low due to high flows
  - Concurrent work – water treatment plant maintenance, emergency watermain main breaks
  - Environmental factors – earlier 2019 legionnaires disease outbreak in the City of Moncton

- Planning and operational difficulties were handled mutually to ensure:
  - Value added work
  - Optimum on-site efficiency
  - Worker and system safety
  - Minimum customer service interruption
  - Regulatory compliance (Department of Health)

Typical Process for Delivering Condition Assessment

- Initiation (2 weeks)
  - Contract and scope review
- Planning (4-8 weeks)
  - Engage subcontractors (as required)
  - Conduct client kick off meeting
  - Develop Site visit plan
  - Conduct site visit
  - Review technical risk register (mitigation and avoidance strategies)
  - Develop planning document
  - Pre-inspection meeting
- Inspection (1-4 weeks)
  - Initiate mobilization
  - Pre-inspection meeting
  - Field work
  - Project debrief
  - Demobilize
- Reporting (24 hours to 10 weeks)
  - QA/QC deliverable
  - Review deliverable
- Closeout (2 weeks)
  - Lessons leaned summary

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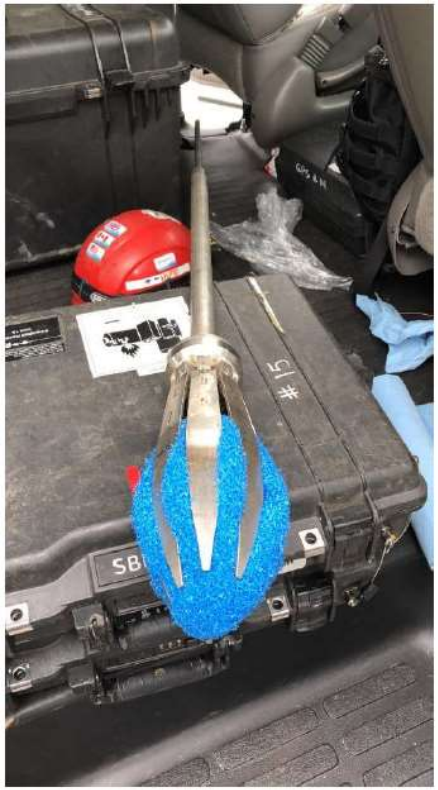
SmartBall™ Inspections

- For in-line leak and gas pocket detection
- Pressurized tool insertions and extractions from transmission main
- Multiple tool insertion and extraction locations per risk mitigation strategy

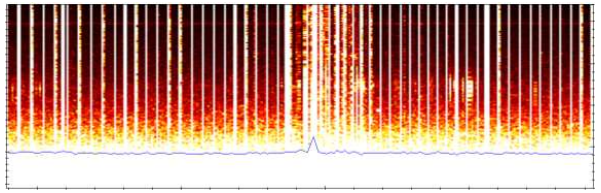


PipeDiver™ Inspections

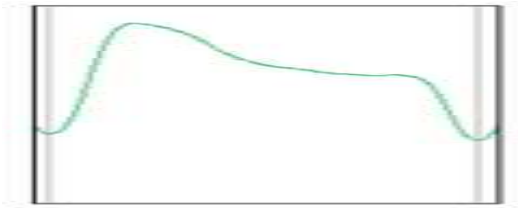
- For in-line pre-stressing wire break detection
- De-pressurized tool insertions and extractions from transmission main
- Multiple tool insertion and extraction locations per risk mitigation strategy

Results

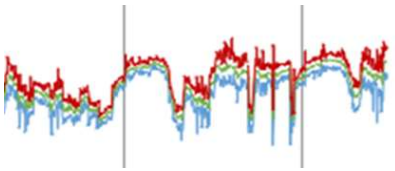
- In-line leak and gas pocket detection
  - Types of acoustic events and their locations to nearest features



- In-line pre-stressing wire break detection
  - Pipe list indicating electromagnetic analysis results for 2,930 pipes



- Transient pressure monitoring
  - High rate pressure data sampling over 30 days



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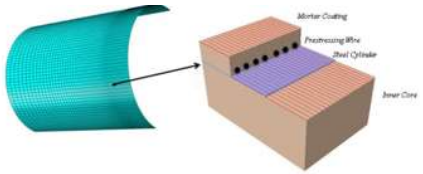
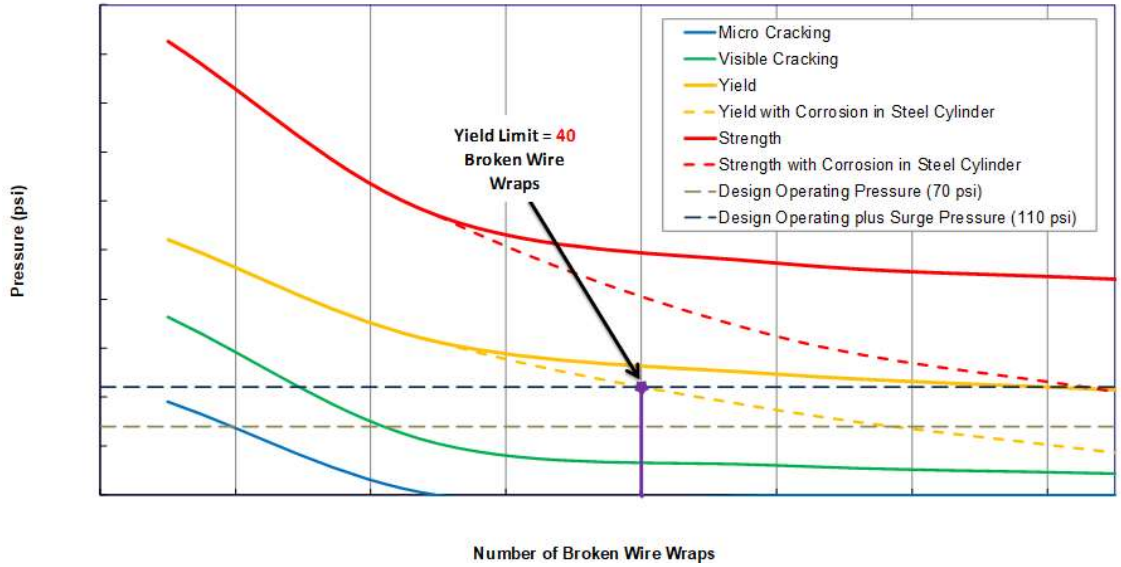
Results

- Engineering analysis
  - Based on:
    - Pipe structural condition (PipeDiver inspection)
    - Collected pressure data (TPM)
    - Measured pipe specification
    - Profile information
    - Engineering assumptions
  - Design check AWWA C301
  - Design check AWWA C304
  - Finite Element Analysis





Results

- Results from this work also strengthened the following:
  - Water supply and quality to customers
  - Ownership of assets (treatment versus distribution)
  - The valuation of assets
  - Measures to maintain and rehabilitate assets
  - Cross-functional, multi-disciplinary asset management alignment amongst the organization
  - Timing of future investment and work
  - Value of data and information