Leveraging Asset Management Data for Improved Water Infrastructure Planning

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Agenda

- The Context
- Study Methodology
- Survey Results
- Case Study: City of Guelph
- Discussion & Questions
The Context

60% of Canada’s public infrastructure is owned by municipal governments.

$1.1 Trillion. The total value of core municipal infrastructure assets.

$80K That’s the shared value of the same assets between households.

35% of municipal assets are in need of attention.
Asset Management in Canada

- **PSAB 3150 (Canada)**: 2009
- **1st AMP deadline (ON)**: 2012
- **Building Together Guide (ON)**
- **Infrastructure for Jobs and Prosperity Act (ON)**: 2013
- **Ontario Community Infrastructure Fund (ON)**: 2014
- **2nd AMP deadline (ON)**: 2015
- **Federal Gas Tax Agreements (Canada)**: 2016
- **FCM Municipal Asset Management Program Funding (Canada)**: 2017
- **O. Reg. 588/17 (ON)**: 2018
- **Phase 1 AMP (NB)**
Study Methodology

Project Partners

Purpose: To better understand current asset data collection and analysis in Canada for water, wastewater, and stormwater systems and to identify strategies to improve operations and planning outcomes.
Study Methodology

1) Part 1: National Survey
   ▪ 59 municipalities/utilities
   ▪ 53% of Canadian population
   ▪ 23 questions

<table>
<thead>
<tr>
<th>Serviced Population Range</th>
<th># of Respondents</th>
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<tbody>
<tr>
<td>&lt;10,000</td>
<td>15</td>
</tr>
<tr>
<td>10,000-80,000</td>
<td>18</td>
</tr>
<tr>
<td>80,000-500,000</td>
<td>14</td>
</tr>
<tr>
<td>500,000+</td>
<td>12</td>
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2) Part 2: Case Studies
   ▪ Halifax Water
   ▪ City of Guelph
Survey Results

Progress, despite limited capacity

- Small & large utilities are increasingly employing asset management practices
- Smaller municipalities consistently reported fewer dedicated resources for implementation

50% Respondents with a formal asset management plan

32% Respondents with a dedicated asset management team
Survey Results

Outcomes Achieved with Asset Data

- Managing assets to optimize asset life cycle: 55%
- Sustaining performance, optimizing costs, reducing risks: 65%
- Optimizing capital investments and plans for sustainability: 51%
- Developing strategic long term goals for organization: 49%
Survey Results

Let’s get proactive

- Both large & small utilities rely more heavily on reactive asset interventions than proactive interventions

39%

Respondents reporting that more than 50% of interventions are reactive
Where’s the data?

- When asked what data would be most important to reduce reactive maintenance, inform planned maintenance activities, and support long-term infrastructure planning:

Assessed Condition

28%

Respondents that have assessed condition for more than 75% of linear assets
Survey Results

Percentage of assets with assessed condition data

For linear assets (pipes)  For vertical assets (facilities)

<table>
<thead>
<tr>
<th>Percentage of condition data</th>
<th>% of respondents</th>
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</thead>
<tbody>
<tr>
<td>Less than 50%</td>
<td>50%</td>
</tr>
<tr>
<td>51-75%</td>
<td>10%</td>
</tr>
<tr>
<td>More than 75%</td>
<td>20%</td>
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<tr>
<td>No condition data</td>
<td>10%</td>
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</table>
EXPERT INSIGHT

“It’s not cost-effective to strive for gap-free asset data registers, or arguably for 100% coverage of CCTV inspection of gravity sewers, but utilities certainly need enough data to make good decisions and avoid interventions too early or too late. How much is enough, when you consider that collecting and troubleshooting data costs lots of money?”

- Colwyn Sunderland, Specialist in Asset and Demand Management, Kerr, Wood and Leidal
Survey Results

Is the data up-to-date?

Some utilities are developing data governance standards to ensure more accurate and updated data

50%

Respondents that have updated their asset data within the last 6 months
Survey Results

Prioritization of asset investments
Top 3 approaches for prioritizing asset investments:

1) Risk-based approach (financial, regulatory and technical risks) – 83%
2) Fiscal approach (government taxes and expenditures) – 66%
3) Asset lifecycle costing approach – 52%
Survey Results

Prioritization of asset investments

*Political priorities* was listed more frequently among smaller municipalities

22%  
Respondents using a completely reactive approach to asset investment decisions

EXPERT INSIGHT

“22 percent of respondents relying on a reactive approach was a definite surprise. It is evident from the report that it is crucial to obtain clear and concise data to better enable future planning. Condition data is an ongoing practice and a plan to review and update conditions should be part of the original plan.”

- Darren Row, City Engineer, City of Miramichi
Survey Results

Accessing the data

Majority of respondents (90%) reported using specialized software to facilitate various asset management functions

- **67%** Collection & analysis of TCA data
- **53%** Track asset maintenance work orders
- **48%** Capital planning & analysis
Survey Results

Accessing the data

Most municipalities/utilities have cross-departmental access to asset databases using GIS or asset management software, which indicate potential for greater corporate-wide collaboration in asset management.
Survey Results

Summary
Municipalities recognize the importance of having reliable asset data to prioritize investments and make the right decision, to the right asset, at the right time. As staff resourcing and capacity increase and new approaches and technologies for data acquisition find more broad scale application, asset management becomes a very effective and useful tool for prioritization and decision-making.
What’s Next?

Using Better Data to Identify Climate Change-related Asset Vulnerabilities in Canadian Municipalities & Utilities

- What sources of information are municipalities and utilities using to help identify and assess their unique asset vulnerabilities?
- What investments in capacity, tools or training need to be made to enable municipalities/utilities to gather and make use of the data needed for improved asset vulnerability assessment?
Discussion

Capacity

What steps can organizations take to build asset management capacity with limited internal resources?

With impending AMP deadlines in several jurisdictions in Canada, how can municipalities/utilities ensure that the AMP exercise is meaningful?
Discussion

Reactive Asset Intervention
What steps can a municipality/utility take immediately to reduce the percentage of reactive asset interventions for water/wastewater assets?

How important is the development of current and desired levels of service by staff/council to help direct the public works team in asset interventions?
Discussion

Data-informed Asset Management

Why is assessed condition data missing from the asset inventories of so many municipalities/utilities?

As the most sought after data, what first steps should a municipality/utility take to start building a funnel for the intake of high quality/relevant condition data?

What factors should municipalities/utilities consider when deciding how best to organize, access, and share asset data for improved decision-making?
Discussion

Asset Investment Prioritization

What advice do you have for municipalities/utilities looking to decrease the percentage of asset investment decisions that are made reactively for water/wastewater systems?

With elections on the horizon in jurisdictions across Canada, what can municipalities/utilities do to ensure that asset investment decisions are made primarily according to data-driven planning, rather than political priorities?
Upcoming Webinars

The Asset Management RoadMap: From Planning to Implementation
Thursday May 24\textsuperscript{th}

Asset Management Grant Funding Opportunities for Canadian Municipalities
Thursday June 7\textsuperscript{th}
Leveraging Asset Management Data for Improved Water Infrastructure Planning

By Daryush Esmaili

May 23, 2018
About Guelph

Introductions

- Single-tier municipality 100 km west of Toronto.
- Population of approximately 130,000.
- Approximately $4.1 billion of assets.
- Created a dedicated Corporate Asset Management division in March 2016.
A Key Challenge
Impact of Data Confidence

52% Data Confidence
Leveraging Asset Management Data for Improved Water Infrastructure Planning

Key Decision Pillars
Understanding the Impacts

Making the Best Possible Decisions About Assets

- What are the impacts to levels of service?
- What is the risk exposure?
- What are the Impacts to lifecycle costs?
Pieces of the Puzzle
Existing Data Consolidation

Capacity
- Master plans
- Operational studies
- Operator knowledge

Condition Assessments
- Water Leak Detection
- Wastewater CCTV Inspections
- Stormwater CCTV Inspections
- Roads – Roughness and Distress Assessments
- Visual Assessments

Failures / Problem Areas
- Water Breaks, pressure and freezing issues
- Wastewater Backups / Blockages
- Stormwater Surcharging / Blockages
- Roads frequency of spot repairs and patches
- Signal failures
Risk Exposure

Focusing Efforts

- Understand the highest risk assets, and develop targeted inspection programs.

- **Likelihood** of failure *x Consequence of failure*

- Risk events are events which may compromise the delivery of the organization's objectives.
Risk Exposure
Targeted Inspections

- Risk Scatter
- Rank by Length (km)
- Rank by Material
- Rank by Diameter
- Unknown by Material
- Unknown by Diameter
Leveraging Asset Management Data for Improved Water Infrastructure Planning

Visualizing Performance Over Time

Predictive Analysis

Annual Distribution of Performance

Percentage of Assets

Year

Very Poor  Poor  Fair  Good  Excellent
Visualizing the Impacts

Predictive Analysis

Annual Distribution of Performance

Year

Percentage of Assets

Very Poor Poor Fair Good Excellent
Budget Analysis

Funding Planning

Annual Cost ($ Millions)

Year

Current Capital Forecast

Performance Based on Current Budget
Harmonizing Investments for Greater ROI
Harmonizing Investments for Greater ROI
Harmonizing Investments for Greater ROI

- Watermain Upsizing Required
- Wastewater Sewer Condition – 5 (Very Poor)
- Traffic Signal Replacement Required
- Storm Sewer Condition – 5 (Very Poor)
- Road PCI of 14 (Very Poor)
- Roadway Operations Regular Call-Outs
- Increasing Watermain Break Trend
Resource Analysis

Budget Planning
Closing Remarks
Leveraging Asset Data

- Data and knowledge are key to enable the best possible decisions to be made regarding our assets.
- Supports evidence-based business cases for budgets and long term financial forecasts.
- Risk evaluation can be a good way to direct inspection efforts to the most critical assets.
- Data collection is useful, but data visualization and communication help generate the most value.
Thank you
Questions and Discussion

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