Pierce County Asset Management

Pierce County Maintenance and Operations NPDES and Vegetation Programs

2018 AASHTO GIS-T
Little Rock, Arkansas

Bruce Wagner, Maintenance and Operations Division Manager
Bryan Chappell, Maintenance and Operations Superintendent
Pierce County Public Works and Utilities Department
Road Operations Division

$50M Annual Budget
217 FTEs
  • 24 Seasonal Employees
4 Facilities
11 Active Pit Sites (One Quarry)
250 Vehicles and Equipment

3,150 Lane Miles
21,600 Catch Basins
510 Miles of Pipe
Pierce County’s 8 Elements of Assessment Management

Large initial investment
Field and office resource activity
Work must integrate through hardware/software systems

Available Information
Primarily ADT, population info

Eight Elements of Asset Management

Condition Assessment
Usage Data
Cost Data
Level of Service (LOS)
Replacement Model
Risk Assessment
Performance Measures
Inventory

Procedures, metrics, business rules housed in your manuals and CMMS system
Putting the pieces together

**KPI’s (Key Performance Indicators)**
- Performance Reporting

**CMMS (Computerized Maintenance Management System)**
- Level-Of-Service Goals Planned vs. Actual
- Asset Condition Inspection Data

**RMS (Road Maintenance Management System)**
- Cost Accounting Data & Reporting
  - Supports: DOLFIN, DCIS, City Billing, FASTER
  - Houses Asset Data Including:
    - Asset Definitions
    - Asset LOS goals
    - Asset service history
    - Asset inventories
    - Asset cost history
    - Asset condition

**Work Through-put System**
- Work Executed In-Field

**Scheduling System**
- Weekly/Daily Work Schedules
  - Leaves Request System
  - Employee Resources
  - Equipment Maintenance System
  - Equipment Resources

**Legend**
- Core System
- Core Process
- Support System
- Core Output
- Support Activity
The way we have always done it

Everyone is Different
Supervisors with different backgrounds tend to see work that needs to be done with that eye

- Many different ways to maintain a ditch or grade a shoulder

"If you can't describe what you are doing as a process, you don't know what you're doing."
- W. Edwards Deming
Inventory

The first step in managing your assets is knowing what you have and where it’s located. If you maintain, operate, or preserve an asset, information about it should be in your inventory.
Inventory – Static Assets (Trimble)

Public Unincorporated Drainage Inventory

- 22,600 total number of catch basins and manholes
- 50,000 segments of pipe for 550 miles
- 39,000 segments of channel for 1,150 miles
- 144 total number of Bioswales
- Numerous vaults, Storm Filters, media filter drains, hydrodynamic separators, channel weirs, filter strips, rain gardens and catch basins with FROP-T’s and weirs
- Now includes ponds and levee’s
Roadside Mowing

Public Roadside Inventory

- Roadside mowing locations
- Roadside brush cutting locations
- Obstructions
- Owner will Maintain

Soon to come

- Sweeping
- Ditching

Advantages

- No longer driving every road
Inventory – Customer Service Response – 71PL
Inventory – Coupled with Technology
Condition Assessment

- Condition assessment provides a snapshot in time of the current physical state of an asset compared to the established LOS.
- Condition data over time tells a story about performance

Must be Measureable!!!

"You can’t manage what you don’t measure."

— W. Edwards Deming
ArcGIS Online (AGO)

- Edits and updates are pushed back in real-time
- Use Disconnected Offline Editing for out of service work areas
- Dashboards
- Using our rating system which gives us:
  - Remedy
  - Severity
  - Extent

- How we have a spatial location of the work to be performed that can be seen on a mobile device
Catch Basin Inspections consist of:

- Daily inspections with 4 teams of two
- Assigned work zones
- Forms filled out on IPAD
- Inspections performed with drainage manual criteria

All inspectors and vactor operators receive IDDE training before programs start and with the rest of the crew at their road shop.
Condition Assessment Tools

Associated image available in real-time from mobile device
Condition Assessment Tools – Rapid Damage Assessment
Condition Assessment Tools – Assessment Dashboard
Performance Measure Examples

- Total LM planned chip seal & fog seal
- Total LM completed chip & fog seal
- Total gallons of hot AC planned
- Total gallons of hot AC applied
- Total gallons fog emulsion planned
- Total gallons fog emulsion applied
- Total tons of cover stone planned
- Total tons of cover stone applied

Derived PMs from this data:
- Cover stone application rate
- Hot AC application rate
- Emulsion application rate
Risk Assessment
Risk is the uncertainty that impacts our operations. It can take the shape of Manpower, Funding, Weather, Materials, Policies, and Equipment.
Risk Assessment – the Basics

The risk management process should consist of four important parts:

• **Identifying** risks that could impact the Operations/Asset Management Plan
• **Assessing** the likelihood and impact of such variance
• **Responding** by developing plans for minimizing hazard and maximizing gain
• **Managing** the execution of those plans
Responding to Impacts of Risk

Responding to Impacts

After assessment of consequences, next step is an evaluation of strategies to minimize impacts

- **Avoid** - (Terminating the risk)
- **Transfer** - (Transferring the risk)
- **Reduce / Mitigate** - (Treating the risk)
- **Accept** - (Tolerating the risk)

<table>
<thead>
<tr>
<th>Avoid</th>
<th>Use standard machine/equipment part</th>
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</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>Use insurance to mitigate warranty costs</td>
</tr>
<tr>
<td>Mitigate</td>
<td>Inspect all parts to lift quality levels/reduce the breakdown rate</td>
</tr>
<tr>
<td>Accept</td>
<td>Take the chance that no problems will arise</td>
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Types of Risk
Short Term Risk Examples

Programmatic - Project

Seasonal
Long Term Risk Examples

Funding

Down Stream Effect
Focus on Short Term Risk

Programmatic - Project

Seasonal
Roadside – Risk Treatment

Treatment Prior to 2015:

Added Water Trucks – Accepted
  • Increased Cost for the Program
Shortened Working Hours – Accepted
  • Stop work by 1pm and be on fire watch
Rented ADDTL Tractors if available – Accepted
  • Supplement Down Equipment
    ➢ Increased Cost for the Program
  • Finish Program more quickly
    ➢ Increased Cost for the Program

Examples of Risk:

• Fire Danger
• Equipment Breakdown
• Early, Late or Extended Growing Season
Roadside – Risk Treatment

**Current:**

This Dynamic “Inventory” has changed our IVM Program by:

- Slight Initial Increased Cost for the Program – **Accepted**
- Dramatic decrease in time to complete one cut cycle (months) – **Reduced**
  - Completed two passes in the time it took to complete one pass
- Identify areas for brush cutting vs mowing to maximize equipment – **Mitigated**
- Show Owner Will Maintain Location to reduce citizen complaints – **Mitigated**

**Examples of Risk:**

- Fire Danger
- Equipment Breakdown
- Early, Late or Extended Growing Season
Roadside – Risk Treatment

**Current:**

Utilize AGO to create an “Inventory” of where we need to cut and where we have obstructions to the IVM program

- In the winter we put a crew together to remove the obstructions that can be removed – **Reduced**
  - Vegetation crew can now see where the remaining obstructions are so we reduce the risk of damaged equipment

**Examples of Risk:**

- Fire Danger
- Equipment Breakdown
- Early, Late or Extended Growing Season
2014 SAG Award Winner

Pierce County Public Works Road Operations and Pierce County Applications and Geographic Information Services

Project Goal

Pierce County Public Works Road Operations and GIS Applications built and Asset Management and GIS System to facilitate the multi-division coordinated effort for data collection, quality control, and field inspection of storm drainage infrastructure assets to responsibly manage the municipal stormwater NPDES permit. Efforts include data collection of new infrastructure by internal Public Works staff, IT-GIS application staff manage the system, network, and provide server support. Public Works Road Operations internal staff placed field assets on an annual basis using ArcGIS Online with mobile devices. Key staff from Road Operations built a dynamic inspection program using ArcGIS Online and ArcGIS for Server to provide real-time inspection data to servicing crews in the form of work orders.

2014 ESRI Award

Learn more about our application: Dev / Test

Business Problem Solved

- The ability to provide interactive access to County staff using iOS mobile devices is an invaluable resource to Public Works and Utilities Road Operations staff. Crews are able to meet and exceed USG goals and uses mobiles reduce work efficiently. The Damage Assessment Transitioning program has had a cost reduction of 25% annually using ESRI programs and applications for our Maintenance and Operations with labor, equipment, and materials.

Technology Implemented

ArcGIS for Server, ArcGIS, ArcGIS for Desktop, ArcGIS Online, Collector for ArcGIS (iOS), Maintenance Connection

Development Team Biography

- authenticated, published, and mentioned in ArcNews, GeoConnection, CE NEWS, American City County, GeoWorld and in the ESRI GIS Innovation Alternatives section above.
- Michael Isen, Eng Tech PW/Road Operations–Asset Management, Database Management. IS/IT/Work Orders, Johns, ESRI World Biography
- Brian Chapelle, Water Quality Supervisor PW/Road Operations–Superintendent of the Asset Management Program and MPDES P1 Compliance, ITT AAS CDQ Design
- Chuck Buzzard, DOP/ Senior GIS Programmer/Eng Application Developer, IT Applications–GIS Services, Field Data ESRI, PW GIS Design.
## Team Achievement Award

<table>
<thead>
<tr>
<th>LEADER</th>
<th>TEAM ACHIEVEMENT</th>
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<tr>
<td><strong>WINNER</strong></td>
<td>A team including representatives from six UK local authorities is helping the whole West Yorkshire Combined Authority to transform its asset management practice consistently and at the same time. This combined authority is responsible for 4% of England’s total road network, with the management of highway assets vital to the region’s economy. This team project aimed to implement and embed asset management best practice across the six member authorities to maximise government funding. The region’s Asset Management Board brought together skills from across all member authorities to consolidate strategies, requiring strong communication and collaboration. The work has since been used in the discipline as a best practice case study. (Award collected by Andrew Molynieux, Leeds City Council)</td>
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<td><strong>SHORTLISTED</strong></td>
<td>A team of four reduced localised flooding along Pierce County’s roadways by improving vegetation management processes, without requiring extra resources, while complying with national water pollution regulation. Pierce County Public Works Lead: Bryan Chappell</td>
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<tr>
<td><strong>SHORTLISTED</strong></td>
<td>An Amey team seconded to Tube Lines used historical knowledge and data to improve the whole-lifecycle value of wheels on Piccadilly Line underground trains in London. Amey Lead: George Mackintosh</td>
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Questions?

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