Using Big Data to Support Asset Management Decision Making

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Why conduct transportation asset management (TAM)?

- Greater accountability in the effective use of federal funds
- An increased relationship between performance and funding
- More sustainable transportation solutions
Categories of Asset Management

- Bridges
- Barriers/Delineators
- Culverts
- Pavements
- Pavement Markings
- Signs
- Other
The 14 steps to TAM implementation:

1. Set agency goals and objectives.
2. Conduct self-assessment and TAM gap analysis.
3. Define the scope of TAM.
4. Develop the change strategy.
5. Integrate TAM into the organizational culture.
6. Integrate TAM into business processes.
7. Establish asset management roles.
9. Develop a TAM plan.
10. Strengthen enabling processes-service planning.
11. Strengthen enabling processes-life-cycle management.
13. Strengthen information systems.
14. Strengthen data
A Practical Implementation of a TAM

The process of TAM can have the following aspects:

- A baseline of existing assets
  - Installation Date
  - Condition
- A process to update records that account for:
  - New infrastructure
  - Infrastructure replacement
Linking Databases

- Asset Inventory (Data Collection)
- Work Order System (Data Update)
- Procurement (Data Update)
- Predictive Tools (Optimize Expenditures)
Data Collection

- **Mobile LiDAR**
  - 1.4 million points of data per second
  - State of Utah had 27 TB of points for its roadway system
  - 5,860 centerline miles
Output Data

- Pavement
  - Cracks, rutting, and roughness
  - Pavement markings
- Signs
  - Type, condition, and size
- Bridges
  - Deflection and Cracking
- Other Assets
  - Reflectors
  - Guardrail
  - Medians
  - Rumble Strips
GIS Integration

http://uplan.maps.arcgis.com/home/webmap/viewer.html?webmap=20bb46fd15394165ab847ef7b2a051cf

Legend

MilePosts
- Tenth Mile Posts

Signs
- All Signs

Signs by Condition
- Poor
- Fair
- Good

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UPLAN

A collaborative information site brought to you by UDOT

UDOT Pavement Management Map
Maintenance Station Information
Utah’s Unified Transportation Plan Map
2011 Daily Traffic Map - AADT
This dataset contains sign faces located along Utah state highways. Descriptive information
Challenges

- Post processing of data
- Keeping maps up to date
- “Snapshot in time”
- Updating data
- Predictive analysis
Taking the Next Step

- Optimizing asset management investment
  - Understanding degradation of infrastructure
  - Forecasting the useful life of the infrastructure
  - Avoiding blanket replacement and replacement during large projects
Conclusions

- Era of big data is upon us in transportation
- Data analytics can help
- Collection, maintenance, and analytics are important
- Innovation is possible
- “Real-time” analytics
Thank you!

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