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Data Management Technology as a Means to Optimizing Grade Crossing Improvements on Transportation Infrastructure

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Introduction

Why is technology important as a means of communicating?

Conservation of Institutional Knowledge

Secure and Maintain Funding

Maximizing Information Technology Infrastructure

Maximizing Information Transportation Infrastructure
The NPRM states: “in order for the Crossing Inventory to serve as an effective database, States and railroads need to exchange information with each other and promptly update the crossing data records as changes occur.”

Docket No. FRA–2011–0007, National Highway-Rail Crossing Inventory Reporting Requirements

**Three Sides of Hosted Web-based Solutions**

I. **Data Service**

II. **Data Collection**

III. **Analytical Tools**
Three Sides of Hosted Web-based Solutions

I. Data Service
II. Data Collection
III. Analytical Tools
DATA SERVICE
• Cuyahoga River Waterfront Structure Database
• Searchable report of bulkhead data including:
  – Attribute data
  – GIS parcel data
  – Inspection photos
  – Underwater point cloud imagery
• Underwater point cloud images display the condition of the structures below the waterline
• Condition and structure notes are highlighted
• Future versions could include an interactive 3D model
DATA COLLECTION
Understanding our Capabilities
Understanding our Capabilities
Understanding our Capabilities
Understanding our Capabilities

Approved Inventories for 816772S — Tavla Solutions

1. 816772S Public At Grade Changed
   Ames Ave - Near Omaha, NE
   1976-07-11
   FRA - Unknown - July 1, 1976, midnight

2. 816772S Public At Grade Changed
   Ames Ave - Near Omaha, NE
   1982-08-11
   FRA - Unknown - Aug. 11, 1982, midnight

3. 816772S Public At Grade Changed
   Ames Ave Nr 11th - Near Omaha, NE
   1983-08-24
   FRA - Unknown - Aug. 24, 1983, midnight

4. 816772S Public At Grade Changed
   Ames Ave N - Near Omaha, NE
   2010-01-01
   FRA - Foreign Files - Dec. 3, 2010, midnight

5. 816772S Public At Grade Changed
   Ames Ave N - Near Omaha, NE
   2012-08-07
   NDOR Mainframe import - Feb. 5, 2013, 6:51 p.m.

Flag Issue — state_agent2

Target:

Shared With Other Agency (Railroad)

Subject:

Passenger Service Example Flag

Message:

This may be a case where a state knows about a passenger service, but the field is marked as none by the railroad.

Flag "Type of Passenger Service" Field
ANALYTICAL TOOLS
• Cost Based Screening uses the expected cost of a crash at an at-grade-crossing that has three components:

\[
\text{Expected crash cost} = \text{crash probability} \times (\text{primary effect costs} + \text{secondary effect costs})
\]

• Cost Based Screening is a data intensive process
  – Rail infrastructure inventory;
  – Crash history;
  – Traffic volumes;

• While not necessary in the screening process, GIS platforms can significantly improve the initial steps of the safety improvement process;
• Identify potentially high risk crossing based on the expected crash costs;
• This approach can help in identifying potentially high-reward (crossings with most improvements) crossings for future investigations;
• Additional elements need to be included in order to estimate a full-blown cost benefit ratio.
Transportation Infrastructure – Project Prioritization

Additional funding sources and Strategies

Grade crossing projects included within highway projects

Benefit / Cost Justification

Infrastructure Report Card

Funding Validation
Project Approach:

- Analysis of current data systems
- Analyze current prioritization processes
- Recommend improvement to processes
Method of Implementation:

- Develop B/C models
- Design Web based application
CONCLUSIONS:

• Emphasis on electronic communication requirements/capabilities
  – Federal Railroad Administration
  – Railroads
  – State Agencies

• Update economic factors for Cost/Benefit approaches
  – Prioritization Models
  – Corridor Approach
  – Infrastructure management

• Spatial Analysis and Data Integration
  – GIS Rail and Highway LRS
  – Scenario based modeling
QUESTIONS/DISCUSSION...?

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