Railroad Crossing Inventory
A Modern Approach

Mid-Continent Transportation Research Symposium, Ames, Iowa
Session 2: Technology – Asset Management
Wednesday, 16 August 2017, 1:00pm – 3:00pm
Background

- Paper-based inventory
  - Entire state
  - Workflow
    - Record on paper
    - Input into spreadsheet
    - Email spreadsheet
    - Input into database

Time consuming, Inaccurate, Expensive
Implications

- An accurate, comprehensive inventory of highway-rail crossings is critical in order to:
  - Advise highway authorities of the relative risk associated with crossings
  - Calculate a benefit/cost to prioritize applications for approximately $4-5 million in annual federal funding for crossing improvements
  - Allows department personnel to better understand the interaction of vehicles and trains at crossings and the operations of the rail system in Iowa
Planning

- **Coordination**
  - The Iowa DOT worked extensively with each railroad to allow access to their right-of-way (ROW). This was accomplished through approval of the office’s thorough and extensive safety and rail industry specific training the interns received.

- **Safety**
  - Equipment includes amber lights, reflective vests, head gear, ear/eye protection, boots.
  - A mandatory safety briefing was conducted each day prior to beginning work in the ROW.

- **Training**
  - Manuals on inventory criteria
  - Railroad knowledge training
  - Fulcrum App training
  - Used a testing group in the spring to validate
2016

Esri’s Collector App
- Hosted in ArcGIS Online
- Part of license agreement
- Easy to add layers

Feedback from the field
- Lacked control of the forms
- Limited validation
- Offline work with caveats

Authors:
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2017

Fulcrum

- Fulcrum App
  - Hosted in the cloud
  - Per user pricing
  - Couldn’t easily add layers

- Applied lessons learned
  - Better control of the forms
  - Customizable validation
  - Work offline at any time
Equipment

Hardware

- iPad Tablet
- Cell Plan
- Otterbox
- Accessory kit
- Garmin
- Power inverter
- External battery

Other Equipment

- Laser range finder
- Digital measuring wheel
2016 – Collector App
- 1,770 verified
- 63 closed
- 22 new crossing
- 13 construction

1,868 total crossings

2017 – Fulcrum App
- 2,061 verified
- 58 closed
- 30 new crossing
- 27 construction

2,176 total crossings

5,324 total records
1,309 left that are unverified
**Costs**

**Costs per year (based on 2017)**
- $24,000 payroll
  - Includes $8,000 expenses
- $1,200 vehicle expenses
- $640 app expenses

$25,840

**Total Costs (estimate over 3 years)**
- $62,000 payroll
  - $20,000 expenses
- $3,100 vehicle expenses
- $1,920 app expenses

$67,020

$11.76 / crossing
Includes travel time

Does not include staff time (QA/QC)
Data Management

- Federal Railroad Administration (FRA) database
  - Railroads & DOTs update
- Rail data from FRA
  - Iowa DOT’s RAMS database
  - Roadway Asset Management System
- Office quality checks
  - Comparing multiple databases
  - 10 minutes per crossing
- Future
  - Photos will be connected to RAMS
  - More automation between field collection and RAMS
  - Collecting data that cannot be obtained from a physical inventory

Highway-Rail Crossing Inventory includes physical environment (gates, lights, signage, etc.) and highway features at the crossing (roadway type, VMT, etc.)

Operational Data includes information about the crossing only available from railroads (train speed, number of daily trains, etc.)
Collect Data Anywhere, Anytime

Create iOS & Android mobile forms in just minutes for fast, easy data collection anywhere, anytime!

Railroad Crossing Inventory

LIVE version of the Iowa DOT Railroad Crossing Inventory. The intent is to use the Fulcrum App in order to validate, add, delete, update crossing information in the field and capture photographs. The project is continuous and helps satisfies FRA requirements to inventory crossings. An exception to policy was approved by FRA and allows the Iowa DOT to collect in the same quadrant as our traffic counts which collects on the entire state in a 4-year cycle.

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THANK YOU
FOR YOUR ATTENTION

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