

Managing with Mobile



Rail GIS Asset Management
with ArcGIS Online

Robust COTS solutions

2

ArcGIS Online Family of Products

Web Maps



Mobile Apps



Data Collector



Dashboard



Keys to Success

3

1. Involve subject matter experts
2. Develop systems and processes
3. Meet their technology needs

Project
Engineering

Property
Management

Bridge
Management

Operating
Railroad

Public Web Maps

<http://rail.vermont.gov>

The screenshot shows the homepage of the Vermont Rail Agency of Transportation. At the top, there is a navigation menu with links for Home, Freight, Passenger, Engineering, Property Management, Maps & Data, and Rail Council. A search bar is located in the top right corner. Below the navigation is a large banner image of a green and yellow locomotive pulling a train. To the right of the banner are 'Quick Links' and social media icons for Facebook, Twitter, and LinkedIn. A 'Vermont State Rail Program' logo is also visible.

Welcome to the Vermont State Rail Program

The Vermont Agency of Transportation Rail Program is the steward of the State's rail network, ensuring the safe, efficient movement of goods and passengers, and the management of associated assets throughout the state.

Rail Interactive Map Gallery

Below is a gallery featuring some of our most popular web maps. This is one of the best ways to become familiar with the way rail is organized within Vermont.

<p>Web Map</p> <p>Rail Asset Inventory</p> <p>Rail Asset Inventory</p>	<p>Web Map</p> <p>Rail Field Videos</p> <p>Rail Field Videos</p>
<p>Web Map</p> <p>2013 GARRC Inspection</p> <p>2013 GARRC Inspection and Rollcall</p>	<p>Web Map</p> <p>FY 15 Rail Program</p> <p>FY 2015 Rail Program</p>
<p>Web Map</p> <p>Rail VAIL Sheets</p> <p>Rail VAIL Sheet</p>	<p>Web Map</p> <p>Railroad Comparison</p> <p>Railroad Comparison</p>

« »

Contact Us

If you have any questions for the rail section, use the [contact form](#) and we'll do our best to provide an answer.

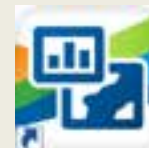
Mobile Maps

Web maps can be loaded on your mobile device.

You can also collect data in the field.



Esri ArcGIS

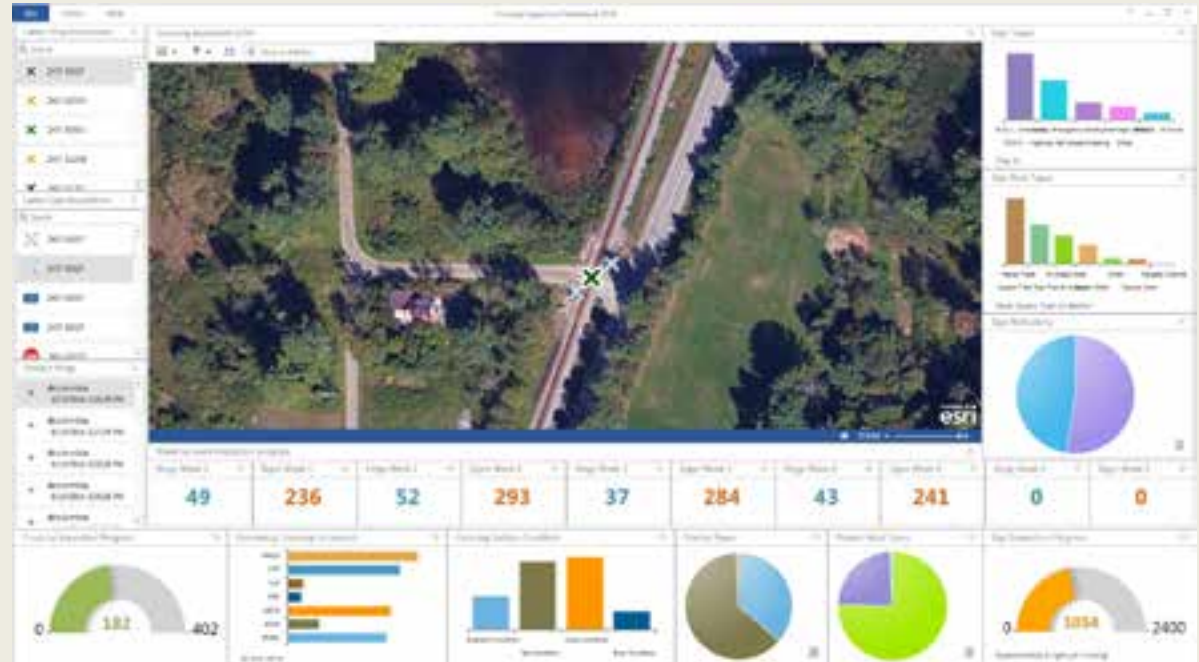


ArcGIS
Collector

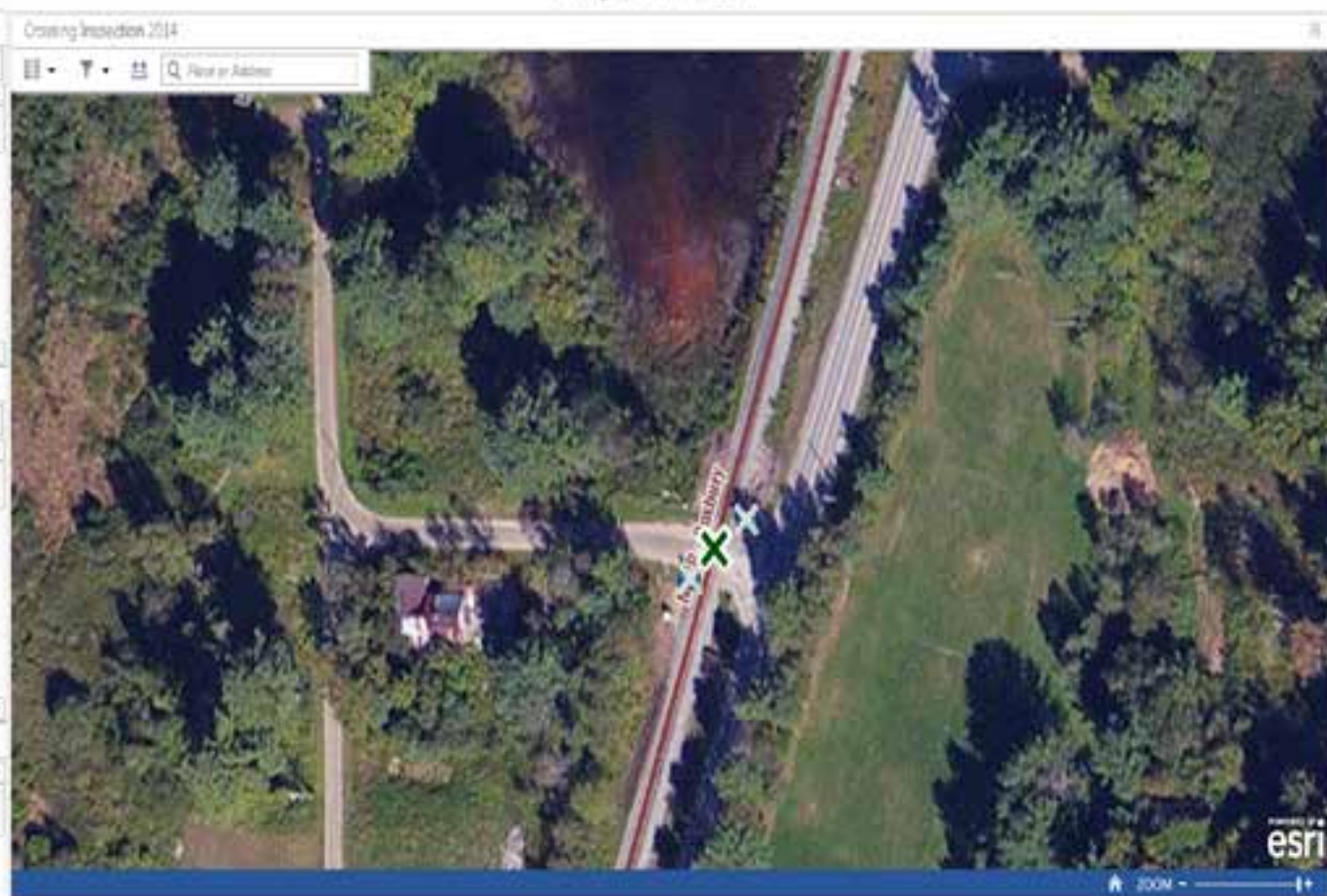


Live Performance Measures

Annual Crossing Inspection

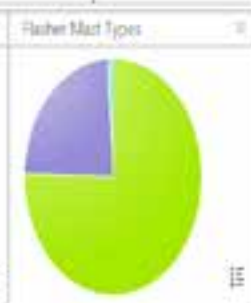
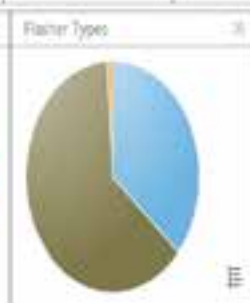
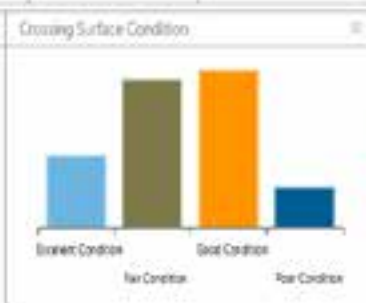
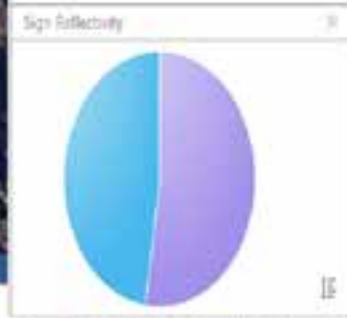
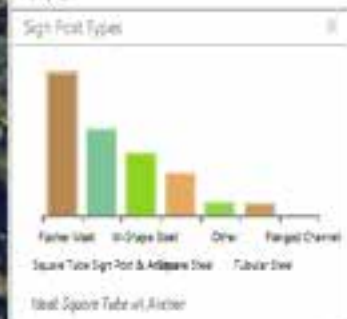
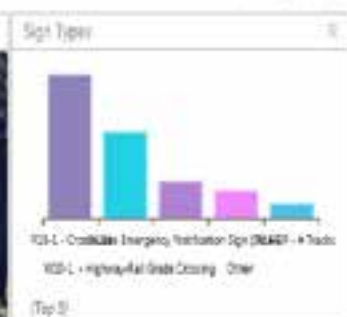


- Latest King Inspections
- 247-501P
 - 247-503D
 - 247-509U
 - 247-510N
 - 247-511W
- Latest Signs Inspections
- 247-501P
 - 247-501P
 - 247-501P
 - 247-501P
 - 247-501P
 - 247-501P
- Today's Plugs
- dcolombia 6/19/2014 2:28:28 PM
 - dcolombia 6/19/2014 2:27:20 PM
 - dcolombia 6/19/2014 2:26:25 PM
 - dcolombia 6/19/2014 2:25:26 PM
 - dcolombia



Week by week inspection progress

King's Week 1	Signs Week 1	King's Week 2	Signs Week 2	King's Week 3	Signs Week 3	King's Week 4	Signs Week 4	King's Week 5	Signs Week 5
49	236	52	293	37	284	43	241	0	0



Bridge Inspection Process

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Bridge Inspection Condition Form

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VT RAIL BRIDGE INSPECTION FORM Form Number: 1

Track: St. Num: Mile Post: Feature-Crossed:

Line Name: Branch: Superstructure: Substructure:

No. Spans: Strut: Left Span 1 Left No. Tracks: Tr. Built: Renewed:

Wk. Track Alignment: Term. Track Alignment: Gauge:

Deck Type: Inspection: Date Inspected: Date Filled Out:

General				Girders or Trusses				Stringers			
Cond.	Action	Cond.	Action	Cond.	Action	Cond.	Action	Cond.	Action	Cond.	Action
Action Under Load	<input type="checkbox"/>	Scour	<input type="checkbox"/>	Top Flange/Chord	<input type="checkbox"/>	Top Flanges	<input type="checkbox"/>	Bottom Flange/Chord	<input type="checkbox"/>	Bottom Flanges	<input type="checkbox"/>
Approach Track	<input type="checkbox"/>	Stress	<input type="checkbox"/>	Web or Diagonals	<input type="checkbox"/>	Stiffeners	<input type="checkbox"/>	Web or Diagonals	<input type="checkbox"/>	Stiffeners	<input type="checkbox"/>
Track on Bridge	<input type="checkbox"/>	Channel	<input type="checkbox"/>	Stiffeners or Verticals	<input type="checkbox"/>	Rivets/Bolts	<input type="checkbox"/>	Stiffeners or Verticals	<input type="checkbox"/>	Rivets/Bolts	<input type="checkbox"/>
Approach Ties	<input type="checkbox"/>	Catchalls	<input type="checkbox"/>	Pins	<input type="checkbox"/>	Welds	<input type="checkbox"/>	Pins	<input type="checkbox"/>	Welds	<input type="checkbox"/>
Deck Tie	<input type="checkbox"/>	Handrails	<input type="checkbox"/>	Rivets/Bolts	<input type="checkbox"/>	Welds	<input type="checkbox"/>	Rivets/Bolts	<input type="checkbox"/>	Welds	<input type="checkbox"/>

Micro-Inspection Notes

Other - Please Describe: Cond.: Action:

1.

2.

Substructure/Conditions				Columns			
Cond.	Action	Cond.	Action	Cond.	Action	Cond.	Action
Span Columns	<input type="checkbox"/>	Bottom Lateral Bracing	<input type="checkbox"/>	Deck	<input type="checkbox"/>	Deck Condition	<input type="checkbox"/>
Wingspills	<input type="checkbox"/>	Cross Frames	<input type="checkbox"/>	Substructure Cond.	<input type="checkbox"/>	Substructure Cond.	<input type="checkbox"/>
Scowalls	<input type="checkbox"/>	Bracing Struts	<input type="checkbox"/>	Overall Bridge Cond.	<input type="checkbox"/>	Overall Bridge Cond.	<input type="checkbox"/>
Scowalls	<input type="checkbox"/>	Diagonal Bracing - Top	<input type="checkbox"/>	Submit by Email	<input type="checkbox"/>		
Footwalls	<input type="checkbox"/>	Diagonal Bracing - Bot	<input type="checkbox"/>				
Bridge Seat	<input type="checkbox"/>	Rivets	<input type="checkbox"/>				
Bearings	<input type="checkbox"/>						
Parapet & Curbstones	<input type="checkbox"/>						
Painting	<input type="checkbox"/>						
Finishing	<input type="checkbox"/>						
Settlement	<input type="checkbox"/>						
Pins	<input type="checkbox"/>						
Post Protection	<input type="checkbox"/>						
Cap Beams	<input type="checkbox"/>						
Top of Retention	<input type="checkbox"/>						
Dr. Bracing	<input type="checkbox"/>						

VTrans Railroad Bridge Management Program

Rating Code Definitions

The purpose of the rating system is to ensure consistency in classifying structures with an appropriate code and to provide a corrective reaction for the identified condition. The rating system attempts to provide an overall understanding of a structure's condition and is based on an inspector applying appropriate condition rating codes. The following summarizes this relationship:

Condition Rating	Condition Description	Implied Reaction	Key
N	Not Applicable	—	—
9	Excellent	No Action	AA
8	Very Good	No Action	AA
7	Good	No Action	AA
6	Satisfactory	Improve Maintenance	BB
5	Fair	Periodic Maintenance	CC
4	Poor	Long Term Rehabilitation	DD
3	Serious	Intermediate Term Rehabilitation	EE
2	Critical	Short Term Rehabilitation	FF
1	Failure Imminent	Emergency Declaration	GG
0	Structural Failure	Replace Structure	HH

Key - Explanation of Double Letter Codes:

- AA - Continue to inspect structure on a one year cycle.
- BB - No rehabilitative measures are required for the next time the structure is to be inspected.
- CC - Structure's component(s) can be treated effectively or improved with accelerated maintenance procedures and/or replacement of structural component(s) to extend service life.
- DD - Structure listed in long term rehabilitation program for rehabilitation within the next five to ten year period.
- EE - Structure listed in intermediate term rehabilitation program for rehabilitation within the next two to five year period.
- FF - Structure listed in short term rehabilitation program for rehabilitation within the next two year period. Requires periodic monitoring of identified structural concern(s).
- GG - Immediate rehabilitation necessary.
- HH - Structure has failed and is to remain out of service pending reconstruction.

Development Timeline

Date	Action
2007	Consultant GIS pilot study
2011	GIS as foundation of asset management
Summer '12	First field crossing inspection (Excel)
August '12	Stephen (GIS) & Erin (Bridge) hired
August '12	FRA Bridge Mgmt program adopts GIS
Summer '13	2 nd field crossing inspection (GIS & Excel)
September '13	Project Management GIS begins
October '13	Superstorm Sandy response via GIS
October '13	Property Management GIS begins

Development Timeline

Date	Action
Spring '14	Massive Data Entry
Spring '14	Esri Special Achievement in GIS Award
Summer '14	Pure GIS Crossing Inspection
<i>Fall '14</i>	<i>Aviation Lease Management with GIS</i>
<i>Fall '14</i>	<i>Project Scheduling with GIS</i>
<i>Winter '14</i>	<i>FRA Crossing DB submission w/ GIS</i>
<i>2015</i>	<i>GIS Project Prioritization</i>
<i>2015</i>	<i>Mobile Asset Management GPS Tablet</i>
<i>2015</i>	<i>Survey-grade GPS asset inventory</i>

Asset Management Concept

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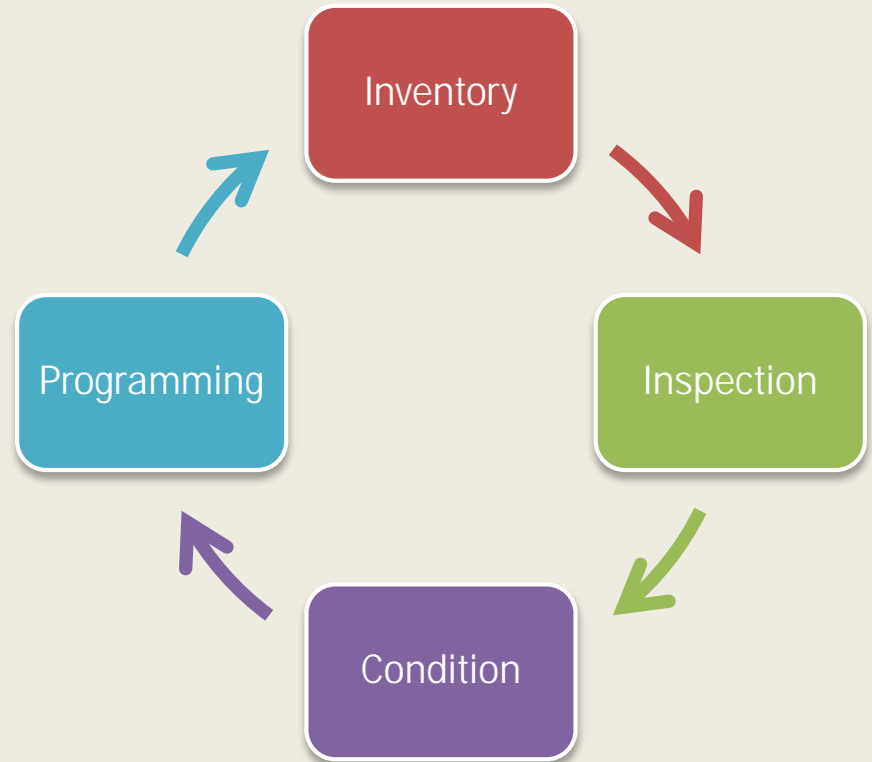
Applicable to

Project Engineering

- Bridges
- Crossings
- Culverts
- Track
- Switches

Property Management

- Rail Trails
- Buildings
- Excess Property
- License Agreements



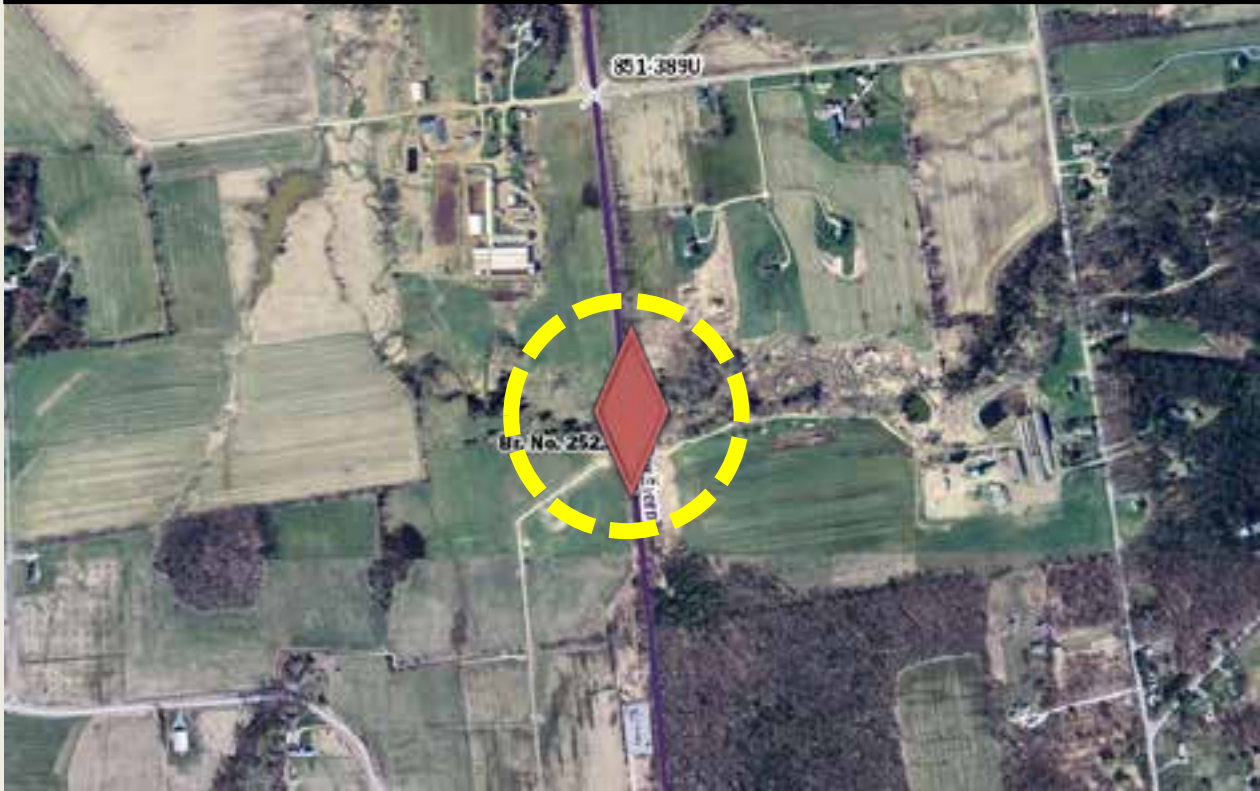
Inventory

Inspection

Condition

Programming

Bridge Num	Feature Crossed	Railroad Mile Post	Line Name	Town	Super-structure	Deck
252.3	Kimball Brook	106.6	VTR	Burlington	Thru Truss	Ballast



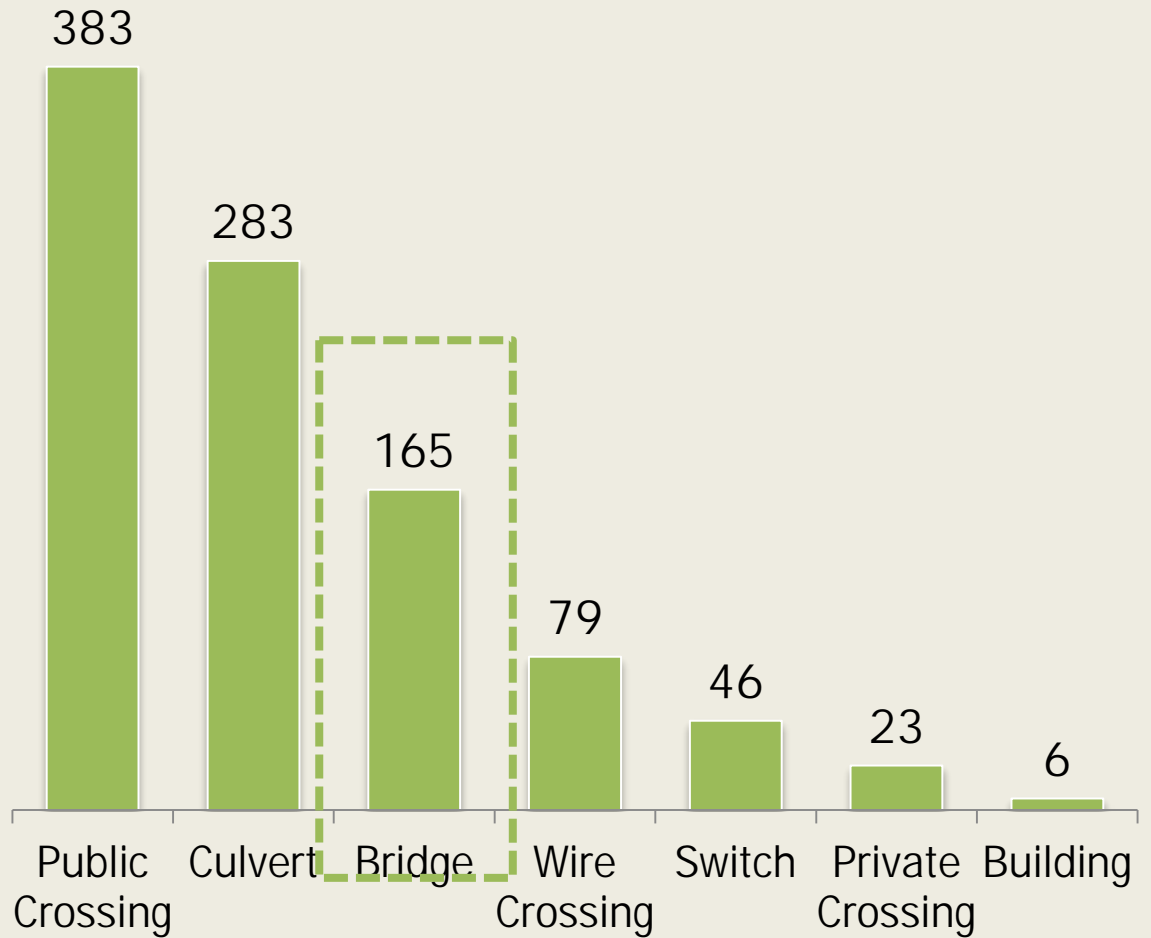
Inventory

Inspection

Condition

Programming

Assets Inspected in 2013



Inventory

Inspection

Condition

Programming



Inventory

Inspection

Condition

Programming

- Programming prioritization based on
 - i Data
 - ÷ Inventory, inspection, and condition
 - i Policy & Planning
 - ÷ State rail program
 - ÷ Railroad operator needs
 - ÷ RPC & Town needs
 - ÷ Budget constraints
- For Example:
 - i After inspecting a bridge, it could become:
 - ÷ A major project
 - ÷ A maintenance project
 - ÷ Or nothing

Growing Pains

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Developing robust systems

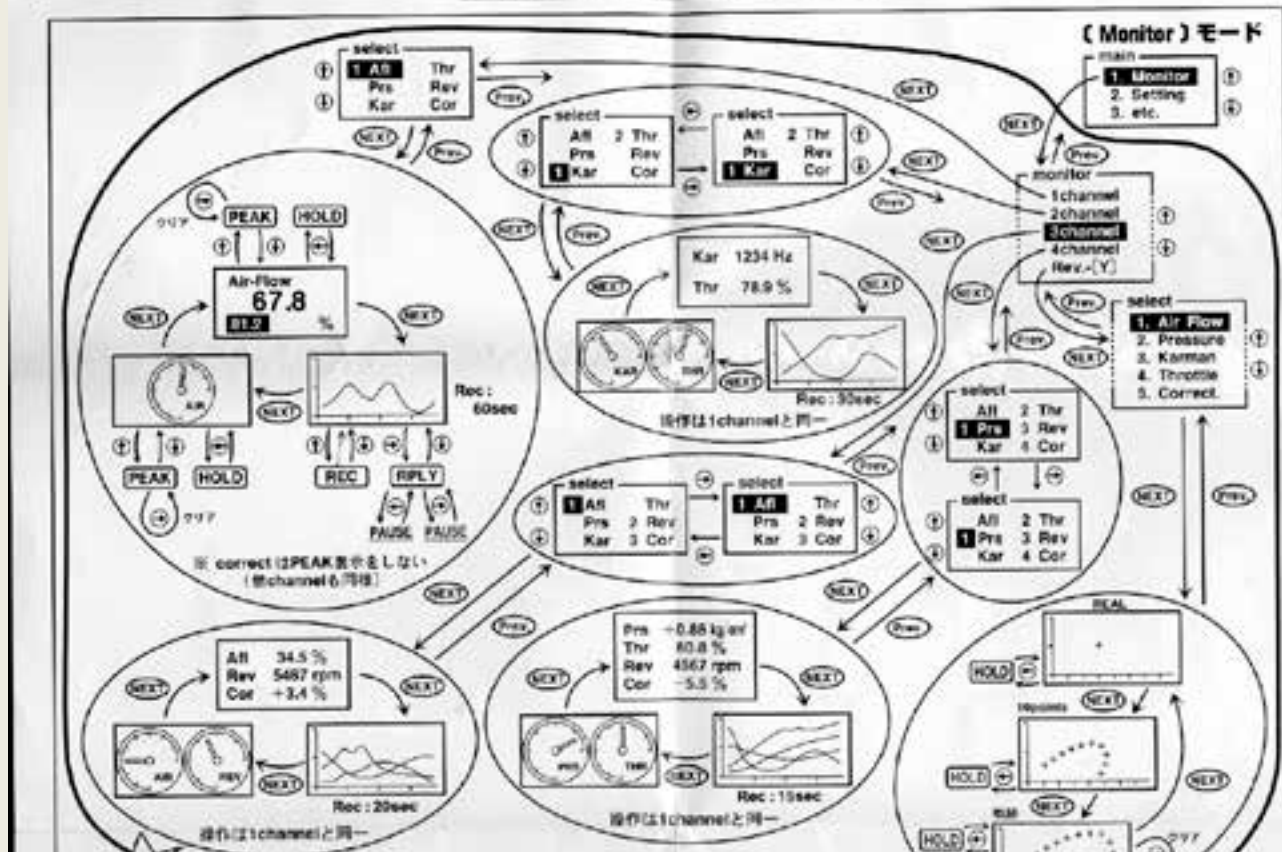
Data entry

Data QC

Developing a system

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Super AFC 操作図



Quality Control

20

- When is a crossing not a crossing?
- How long is that bridge, again?
- Location, location, location
- We don't always get the data right...
 - i ...but inaccurate data is better than no data

Thank You

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Questions?

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