



Rolling Stock Asset Health

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MARTS
Omaha, NE - October 2016

Asset Health Strategy Committee

Reducing Mechanical Service Interruptions

Bad Actor Identification

Increasing Yard and Shop Efficiency

Electronic Inspection Reporting

Mechanical Defect Reporting

Component Tracking

Improving Inspection Quality

Detector Based Inspection

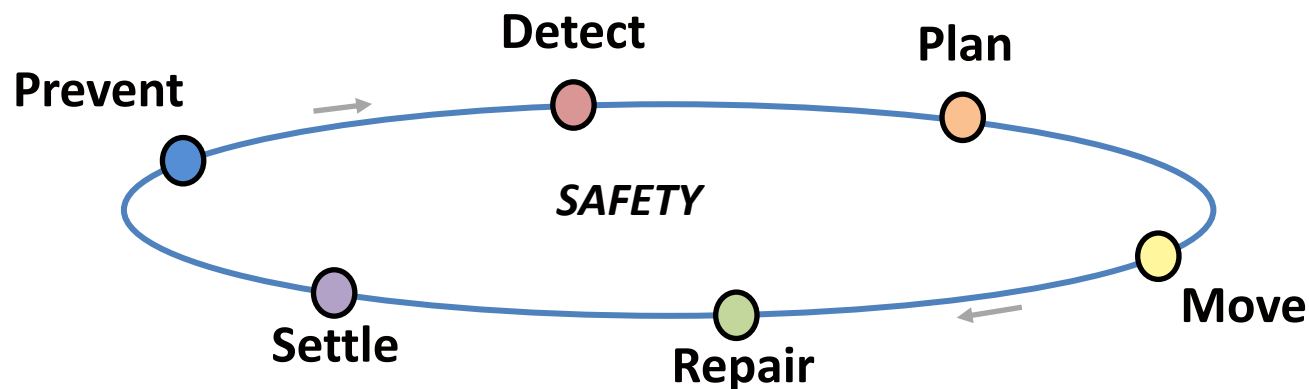


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ASSET HEALTH STRATEGY COMMITTEE

Asset Health Strategic Initiative (AHSI) Description

- **Multi-year strategy** for improvement of asset health driven by yearly industry **targets and measures** for improvement,
- Solves problems with rolling stock that need a **network view** of asset information and industry coordination,
- Applies **information technology** solutions and processes.



Asset Health Strategic Initiative Contributors

- Safety and Operations Management Committee (SOMC)
 - *Technical Services Working Committee (TSWC)*
 - *Asset Health Strategy Committee (AHSC)*
 - All 7 Class 1 Railroads
 - 4 Associate/Affiliate Members
 - TTX
 - Amtrak
 - *AHSC Staff Members*
 - AAR
 - Railinc
 - TTCI
- Additional Committees Engaged
 - EHMC, AEI, GIS, ARB, BSC, etc.

Asset Health Strategy Committee (AHSC)

| Member | Representing |
|-----------------|------------------|
| Rex Beck | UP, Chair |
| Pat Ameen | Amsted |
| Derek Maier | Amtrak |
| Steve Harris | BNSF |
| Darrell Iler | CN |
| Rodney Campbell | CP |
| Charlie King | CSX |
| Tom Mordock | GATX |
| Ryan Miller | KCS |
| Jamie Williams | NS, Vice-Chair |
| Mike Kelly | TTX |
| Rick Koenig | UTLX |
| Rick Grossman | Wells Fargo Rail |

Committee Focus:

- ▶ Continue to provide leadership to the work of the Asset Health Strategic Initiative.
- ▶ Coordinate work of a number of technical committees and champion prioritized initiatives that improve industry safety, reduce variability, streamline mechanical operations, and reduce or eliminate non-value added activities.
- ▶ Interface with FRA in promoting regulatory change.

AHSC 2016 SOMC Deliverables

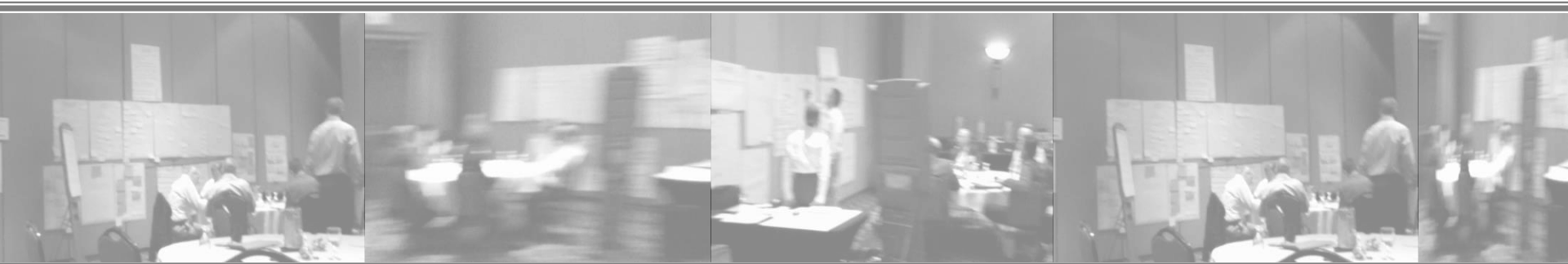
1. **Refine AHSI performance goals and measure results for prioritized metrics** in each of the three AHSI target categories.
2. **Execute the multi-year AHSI projects** to build upon the established foundation and move forward on “detector based brake effectiveness” and “bad-actor identification.”
3. Continue to **refine the AHSI roadmap** to confirm or revise priorities for future year activities.
4. Continue to **review and champion targeted asset health-related opportunities** that bridge across other AAR technical committees and other groups.

AHSI Project work is providing value

| Capability Developed | Initial Release | Benefit | Value Begins | Status September 2016 |
|--|-----------------|--|--------------|---|
| Identification of “Bad Actor” equipment through network level analysis | 2014 | Reduction of Line of Road Failures in the ‘UDE No Cause Found’ category | 2014 | More than 2,000 Line of Road Failures prevented to-date via MA-0146 study. Rule-making proposals being advanced. |
| Improved and enhanced health information available to Class I Railroads and car owners | 2014 | More detailed equipment level analysis based on available health indicators | 2014 | Line of Road Data Failure data summaries established for UDE-no-cause-found and air hose separation events. |
| Sharing of Class I, IA, and Extended Haul inspection data | 2015 | Reduction in duplicate or non-required inspections between railroads | 2015 | 5 railroads sending electronic mechanical conducted Class 1 Air Slips; Work is underway to leverage electronic inspections. |
| Determination of Brake Effectiveness for a Consist (via wheel temperature detector data) | 2014 | Higher quality inspection data and future reduction of manual Class IA inspections | 2015 | FRA Public Hearing recently conducted to review proposed waiver request. |

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BAD ACTOR IDENTIFICATION

Approximately 921 line-of-road failures have been reduced to date in 2016. Focused effort will be required to achieve the reduction target of ~2,800.

MA-0146 (UDE-No Cause Found) results through August 8, 2016

| Test | Yes | No | N/A | Total | % Fail |
|----------------------------|-----|-----|-----|-------|--------|
| Other Brake Related Issue? | 267 | 202 | 4 | 393 | 57% |
| Failed SCABT? | 100 | 353 | 20 | 377 | 22% |
| Either Issue? | 307 | 166 | 0 | 396 | 65% |

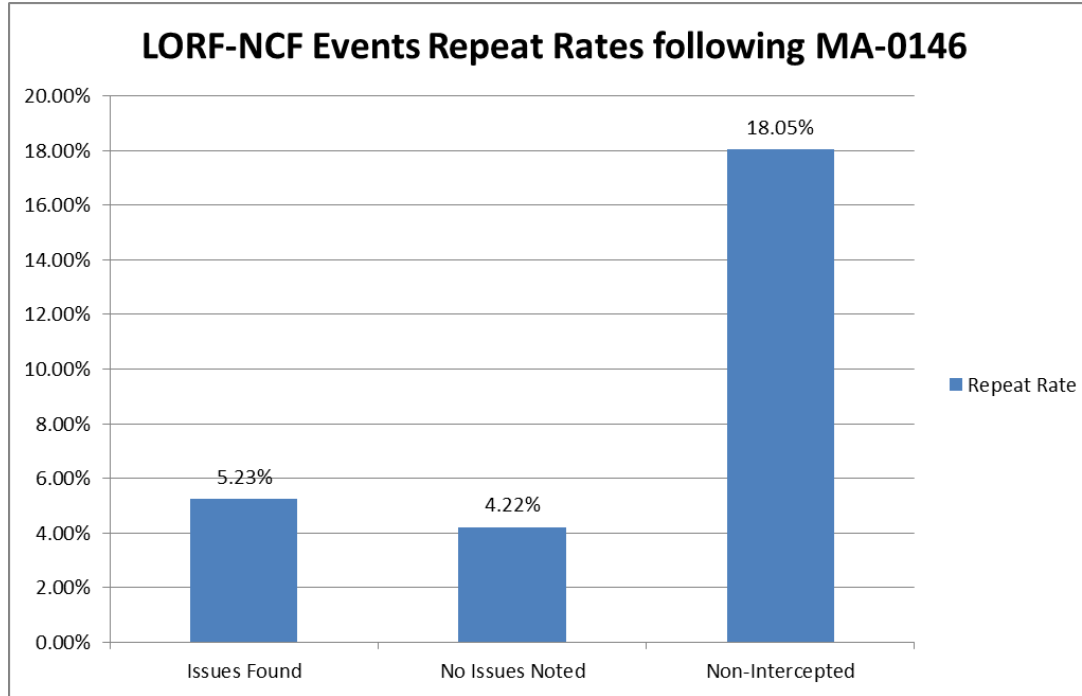
Current Opportunities:

- Worksheets from complete repairs remain outstanding.
- 944 potential bad actors are on the MA as of 8/17/16

***Caveats, Assumptions, and Notes:**

- Only includes data contributed by Class I railroads and participating PCO's.
- Only includes equipment with a score of 5 or higher
- Only includes equipment added after our initial add on 7/7/15
- Results subject to change as data quality and analysis methodology improve.
- Data quality varies between carriers, which may result in under-reporting of incidents.
- Likely understated due to a lack of automated reporting by all carriers.
- Lack of consistency of reporting impacts accuracy of metric.

Early results show that equipment intercepted and repaired has a lower re-incidence rate (5.23%) than equipment not intercepted at all (18.05%).



| WS Result | No | Yes | Repeat Rate |
|-----------------|-----|-----|-------------|
| Issues Found | 290 | 16 | 5.23% |
| No Issues Noted | 159 | 7 | 4.22% |
| Non-Intercepted | 277 | 61 | 18.05% |

***Caveats, Assumptions, and Notes:**

- Current sample size is too small to come to any definitive conclusions
- As more “clean” data comes in we will be able to better test our hypothesis.
- Multiple failures on the same trip may only be counted once.
- Equipment must fail with at least 2 distinct groups be labeled a “repeat”
- Data quality varies between carriers, which may result in under-reporting of incidents.
- Likely understated due to a lack of automated reporting by all carriers.
- Lack of consistency of reporting impacts accuracy of metric.
- Results subject to change as data quality and analysis methodology improve

LORF-NCF Data Summary Example

Data Summary Details

Equipment ID: TBOX0000667206 Location: BASE Data Summary: LORF NCF Dat

Note: all times are Eastern Standard Time (EST)

| Name | Aggregation |
|---|------------------|
| Open Date | 09-07-2014 01:00 |
| Last Event Date | 03-30-2015 09:34 |
| Count of DS Creators | 3 |
| Score | 2.0 |
| Raw Count | 2 |
| Train Count | 2 |
| Road Count | 1 |
| Automated Group Count | 2 |
| Manual Group Count | 0 |
| Loaded Count | 2 |
| Empty Count | 0 |
| Manual Count | 0 |
| Automated Count | 2 |
| Last Event Timestamp | 03-30-2015 09:34 |
| Last Event Load/Empty Indicator | L |
| Last Event Manual/Download Indicator | AUTOMATED |
| 2nd to Last Event Timestamp | 03-27-2015 18:00 |
| 2nd to Last Event Load/Empty Indicator | L |
| 2nd to Last Event Manual/Download Indicator | AUTOMATED |

Line of Road Failure (LORF), Progression to Industry Rule

Initiate

Identify and Gather Data

Identify and Prioritize Problems to Address

Standardize and Stabilize Data (quality and quantity)



Pilot / Validate

Execute Pilot Process to Address Identified Problems

Analyze Results, Adjust, Repeat

Review with Appropriate Subject Matter Experts / Committees



Identify Method for Industry Implementation

Determine Methods to Share Information (e.g., Data Summaries)

As applicable: Propose Rule Changes, Provide CBA, Communicate Timelines, Update Training, Establish Alerts, etc.

Monitor Results

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ELECTRONIC INSPECTION REPORTING

Electronic Class 1 Air Slips have been developed by the AIR/E-Train TAG.

Opportunity:

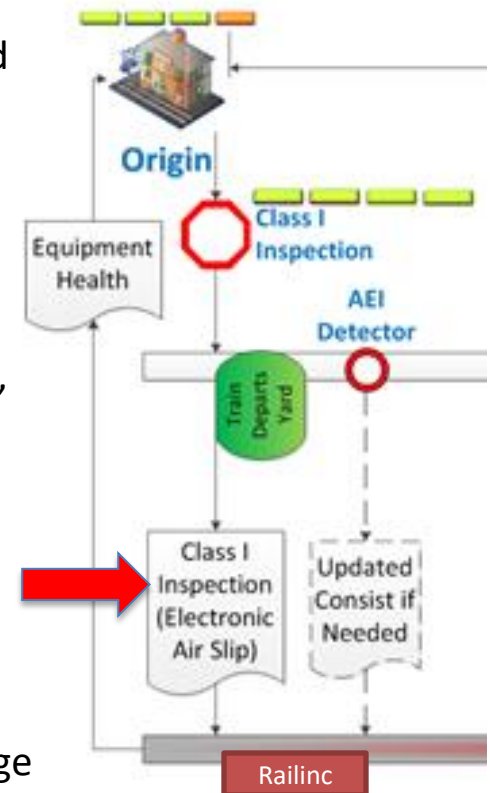
- ▶ Generate an electronic version of the Class 1 air slip for each train,
- ▶ Capture and store a record of each Class 1 inspection at the car level, and
- ▶ Submit a record of each car receiving the inspection to Railinc.

Benefits:

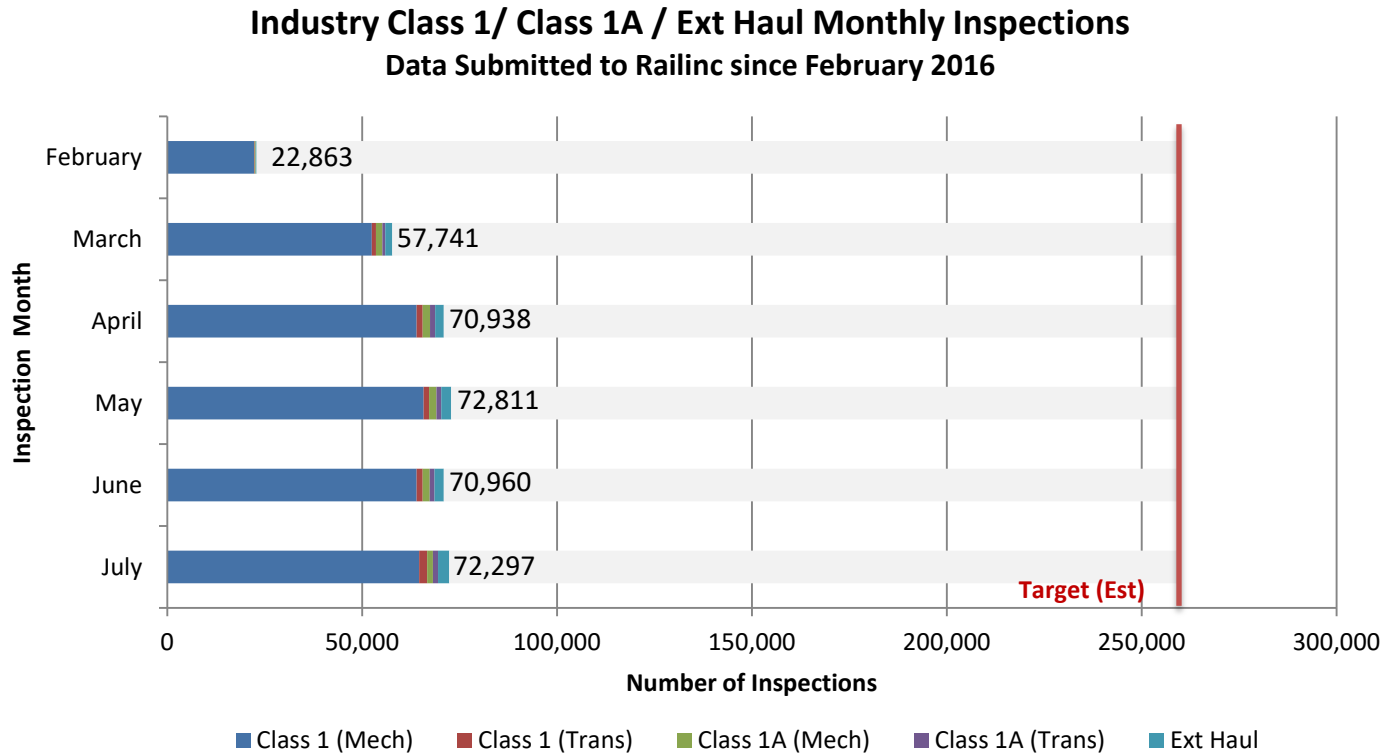
- ▶ Enables replacement air slips to be generated on demand when a paper slip is lost,
- ▶ Facilitates sharing of 215 inspection with Canadian roads at interchange,
- ▶ Supports methodology for calculating brake effectiveness at the car level,
- ▶ Provides increased local visibility to inspection performance.

Actions / Next Steps:

- ▶ Railroads finalizing changes to capture, submit, and retrieve inspections conducted by mechanical personnel,
- ▶ Railroads adjusting processes to capture Class 1 inspections that are conducted by Transportation personnel,
- ▶ Evaluation underway to determine waiver opportunities to extend mileage on Class 1 and Extended Haul inspections based on electronic records.



Reported Electronic Inspections in 2016



Caveats, Assumptions, and Notes:

- Only includes inspection in 2016
- Results subject to change as data quality and analysis methodology improve.
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MECHANICAL DEFECT REPORTING

Objectives of the Mechanical Defect Initiative

- ▶ **Current:**
 - ▶ Wheel, Axle, Bearing, and Casting data is collected from faxed and manually input online forms.
- ▶ **Future:**
 - ▶ Increase the reporting compliance of MD reports by enabling automated reporting from proprietary systems.
 - ▶ Increase the quality of the data by validating input.
 - ▶ Provide Metrics to measure completeness and quality.

Need for more complete, accurate, and timely reporting for derailment prevention.

Automated MD reporting will increase the quality and completeness of the MD data (MD-115 September 2016)

MD-115: Wheel Specs

*Disclaimer-MD-115 Form

Instructions: This report is to cover wheels which are removed for defects, represented by the following WHY MADE CODES 66, 68, 69, 71, 83 and 85 (see Field Manual of AAR Interchange Rules, Rule 41). All items should be completed. If the number or letters are illegible, please use "XX" where applicable.

CONTACT INFORMATION

EQUIPMENT DETAILS

WHEEL SPECS

BRAKE/DEFECT DETAILS

ATTACHMENTS

* Indicates required field

Wheel Set CID:

Narrow Flange Finger Reading: *

Journal Size: *

Wheel Type: *

DefectType: *

Front Discoloration Measurement *

Rim Thickness: *

Class of Heat Treatment: *

Wheel Diameter: *

[Click for sample Picture](#)

Back Discoloration Measurement *

If Discoloration is not available for Front or Back, please enter XX

MD-115 Communications Plan helps stakeholders understand and benefit from new reporting capabilities*

- ▶ Railinc User Interface and Web Services deployed to production on September 22nd
 - ▶ Industry shop systems can begin integrating with the MD-115 Web Service
- ▶ Plan is in place to transition from legacy TTCl web site
 - ▶ Proposed cutover from TTCl to Railinc MD reporting interface July 1, 2017
 - ▶ Advertise change on current TTCl site
 - ▶ Update Field Manual & MSRP's
- ▶ Instruction and assistance on setting up SSO ID's

* AHSC/WABL members are requested to drive adoption of MD reporting

MD Forms Moving to www.Railinc.com

- ▶ Current:
 - ▶ MD-115 – Wheels

- ▶ 2017 - 2018:
 - ▶ MD-11 – Roller Bearings
 - ▶ MD-12 – Axle
 - ▶ MD-500 – Side Frame and Bolsters

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COMPONENT TRACKING

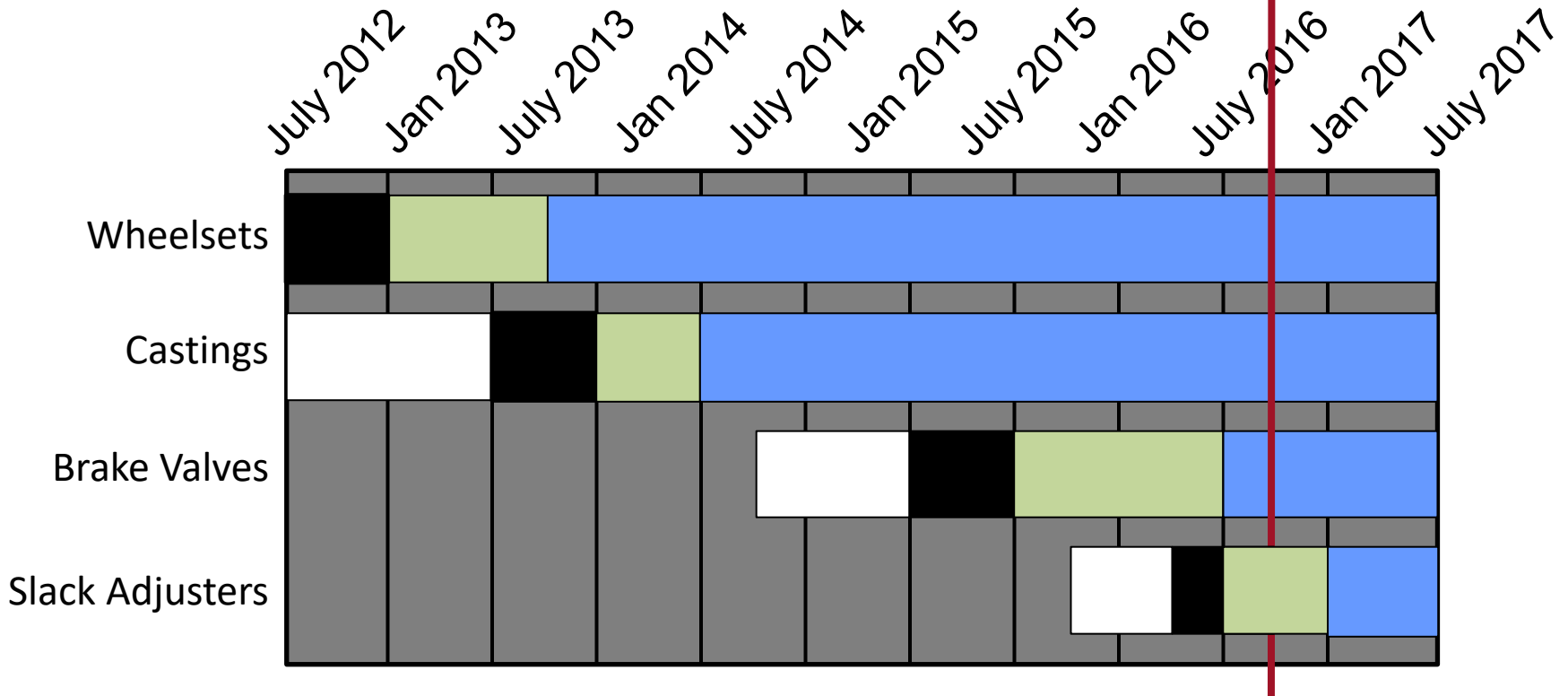
Objectives of the Component Tracking Initiative

1. **Visibility** into rail equipment health and performance
2. **Increase the safety** of the rail industry by supporting recall
3. **Reduce the cost** of a recall by enabling targeted recalls and efficient industry response strategies



Component Registry Timelines

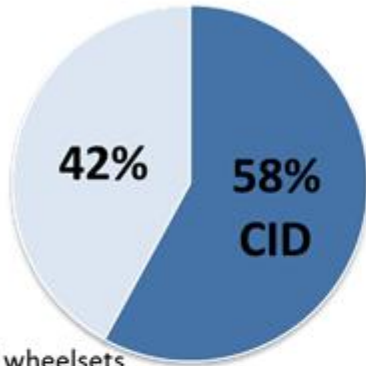
Current Date: October 2016



Serialized Component Coverage

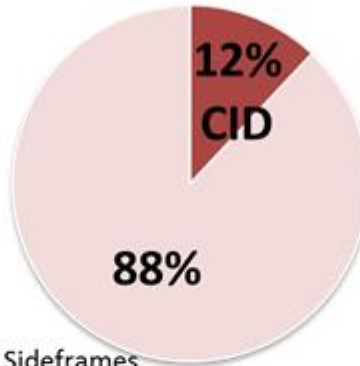
August 15, 2016

Wheelsets



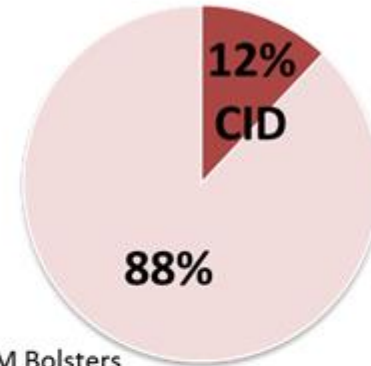
7.1M wheelsets

Sideframes



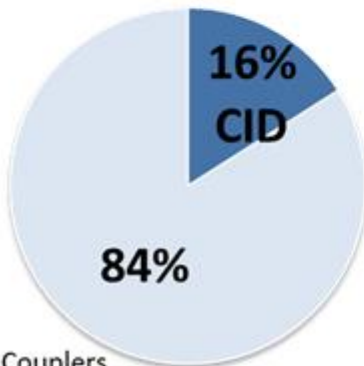
7.1M Sideframes

Bolsters



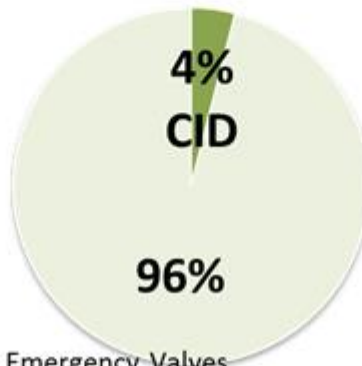
3.5M Bolsters

Couplers



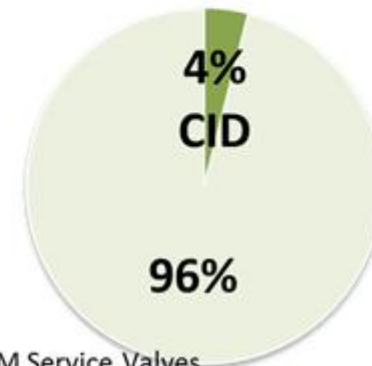
3.4M Couplers

Emergency Valves



1.7M Emergency Valves

Service Valves



1.7M Service Valves

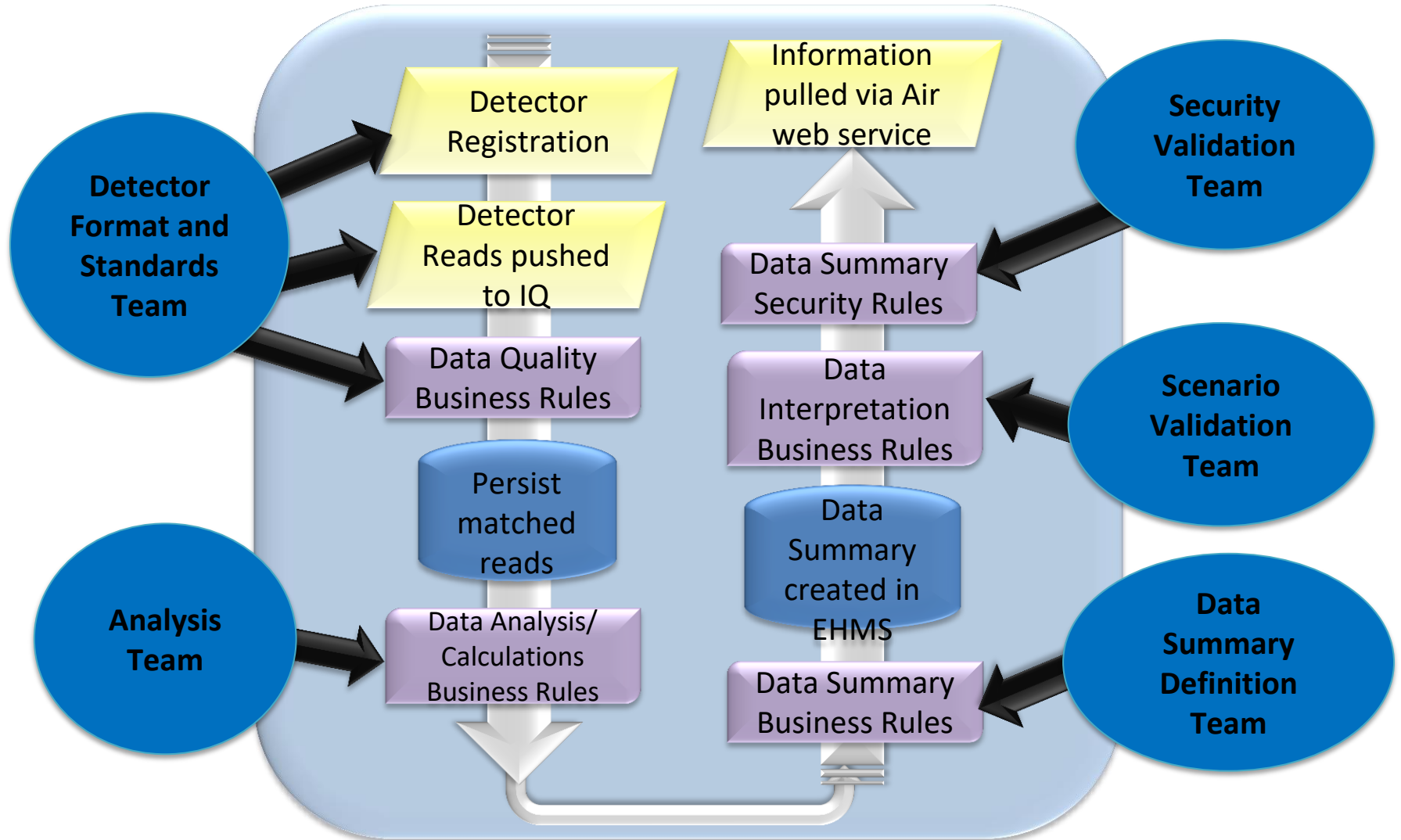
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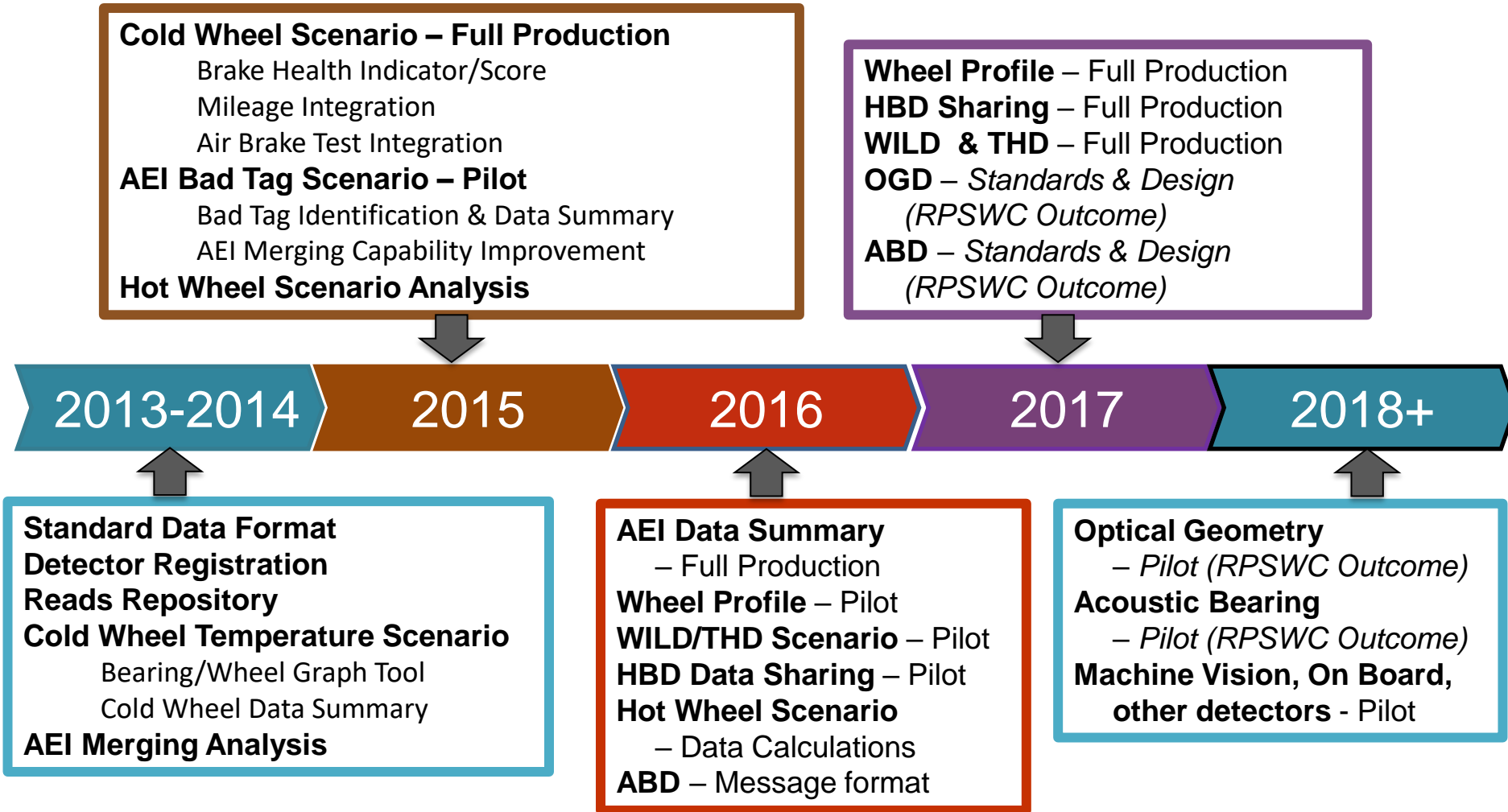
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DETECTOR BASED INSPECTION

Inspection Quality Reusable Process (The "U")



Inspection Quality Platform Work Timeline



AEI Bad Tag Identification

AEI Bad Tag Identification Benefits

- Identify AEI Tag issues that can cause defect misidentification
- Identify data quality issues through business rules

Industry Data Request:

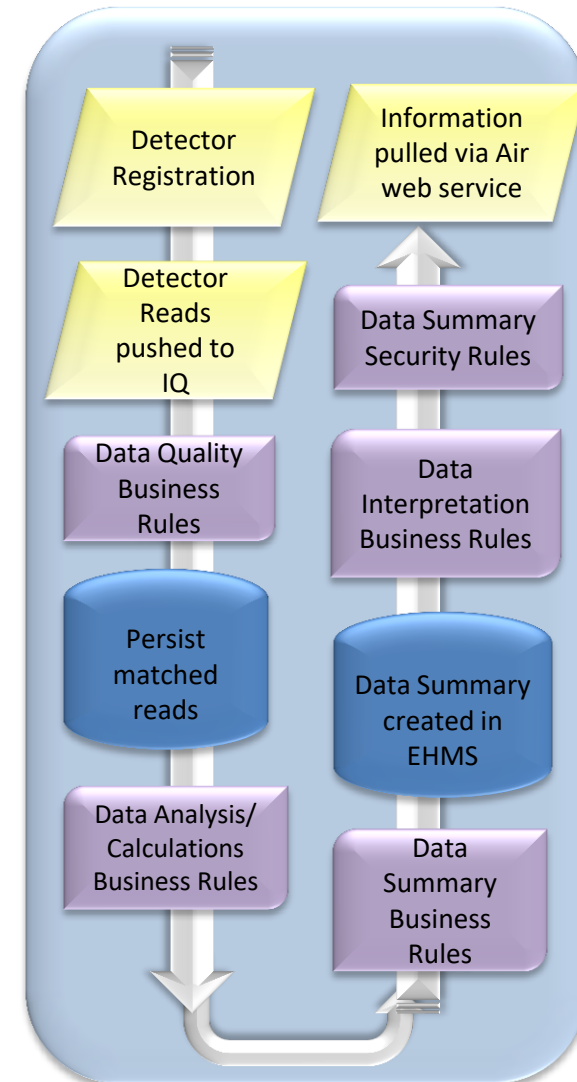
- AEI data in Wayside Message Format (xml) for co-located defect detectors to support the industry merge process and detector quality monitoring
- S9203 data for identifying AEI tag issues and AEI committee metrics

Railinc Value Additions:

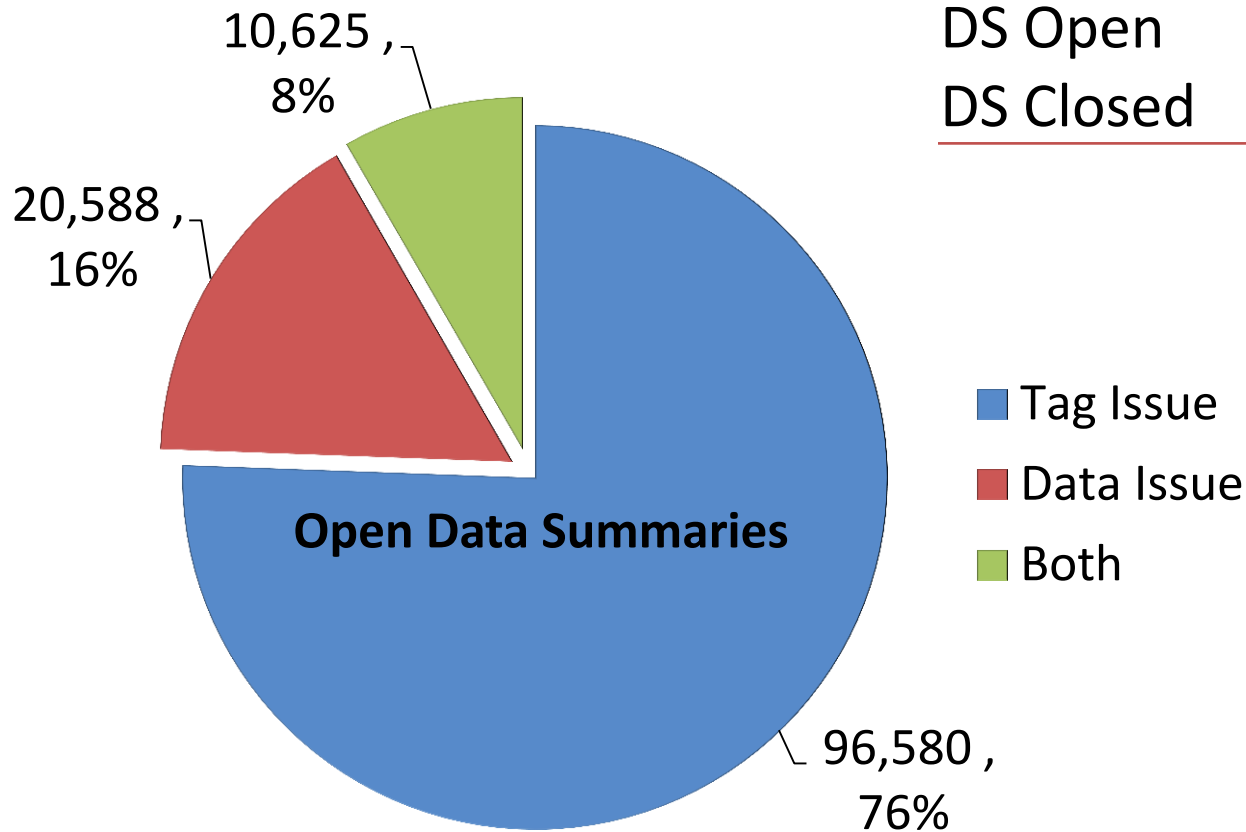
- Consistent AEI business rule validations across the industry to eliminate corrupt data and create a clean, mergeable file
- Umler data validation and flagging

Data Output for Consumption:

- AEI Bad Tag data summary
- Industry alert supporting cause for attention (future)



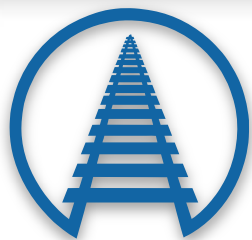
AEI Bad Tag Data Summary



| | |
|--------------------|-----------|
| Distinct Equipment | 1,274,419 |
| DS Created | 284,714 |
| DS Open | 127,793 |
| DS Closed | 156,921 |

New EHMC Alerts and Notifications

- ▶ *Progressive Plan for new Line of Road Failure (LORF) industry alert*
- ▶ *Process will apply to new AHSI technologies*
 - ▶ *Investigation*
 - ▶ *Data Summary*
 - ▶ *Window Open Alerts*
 - ▶ *Mandatory Alerts*
- ▶ *Future: New alert levels; composite data summaries; composite rules*



Rolling Stock Asset Health Questions?

MARTS
Omaha, NE - October 2016