ATSI Initiative

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Lisa Stabler

ASSOCIATION OF AMERICAN RAILROADS

TOMORROW. ARRIVING BY TRAIN.

ATSI – What Is It?

- ATSI is a predictive and proactive maintenance system
- Key focus of the initiative is to move from a reactive *"don't fix it 'til it's broke"* to a proactive, predictive approach.
- The reduction of stress on our rails will result in a stronger infrastructure and more efficient operations, benefiting all parties

ATSI – What Is It?

- By identifying and repairing equipment flaws before they become safety critical or detrimental to the infrastructure itself, we can look forward to:
  - Enhanced railroad safety
  - Decreased service interruptions
  - Improved network operating efficiency
  - Reduced overall system costs

ATSI – What Has Been Accomplished So Far?

- First phase of ATSI was implemented in October 2004.
- Four alert levels were established: *Window of Opportunity*, *Opportunistic Repair*, *AAR Condemnable* and *Final Alert*
  - The Window of Opportunity alerts the owner to perform maintenance before equipment causes damage to the rail infrastructure or the freight car itself.
  - Opportunistic Repair was added to the Interchange Rules to encourage wheel removal when a car is already in a shop or on a repair track
  - Final Alert level is the point at which a component or system places undue stress upon the physical plant and equipment.
    - Initially constructed to allow the handling carrier to correct and not be bound by regular AAR car repair billing rates
      - ARB opted not to implement this provision
      - Alert level was retained for notification and tracking purposes
- The "*guaranteed repair*" provision protects the car owner from a second repair bill due to failure of the repairing party to remove an alert in EHMS

ATSI – What Has Been Accomplished So Far?

- WILD detector calibration and validation procedure adopted January 1, 2005
- *Equipment Health Management System* (EHMS) was implemented October 1, 2004
  - AAR member roads funded 97% of the EHMS effort. That amounted to $582K for the 4Q 2004 start-up, $1.455M in 2005, and $1.33M in 2006.
  - Non-railroad car owners contributed 4¢ per car.
- Remediation Progress
  - Over 2,400,000 alerts have been assigned
  - 1st 8 months of 2006 shows removal/correction percentages ranging from 34% at the Window of Opportunity level to 100% at the AAR Condemnable and Final Alert level.
- A number of car owners have implemented predictive maintenance strategies
- Preliminary FRA derailment data does show a decline in broken rail and wheel derailments

ATSI – Recent Developments

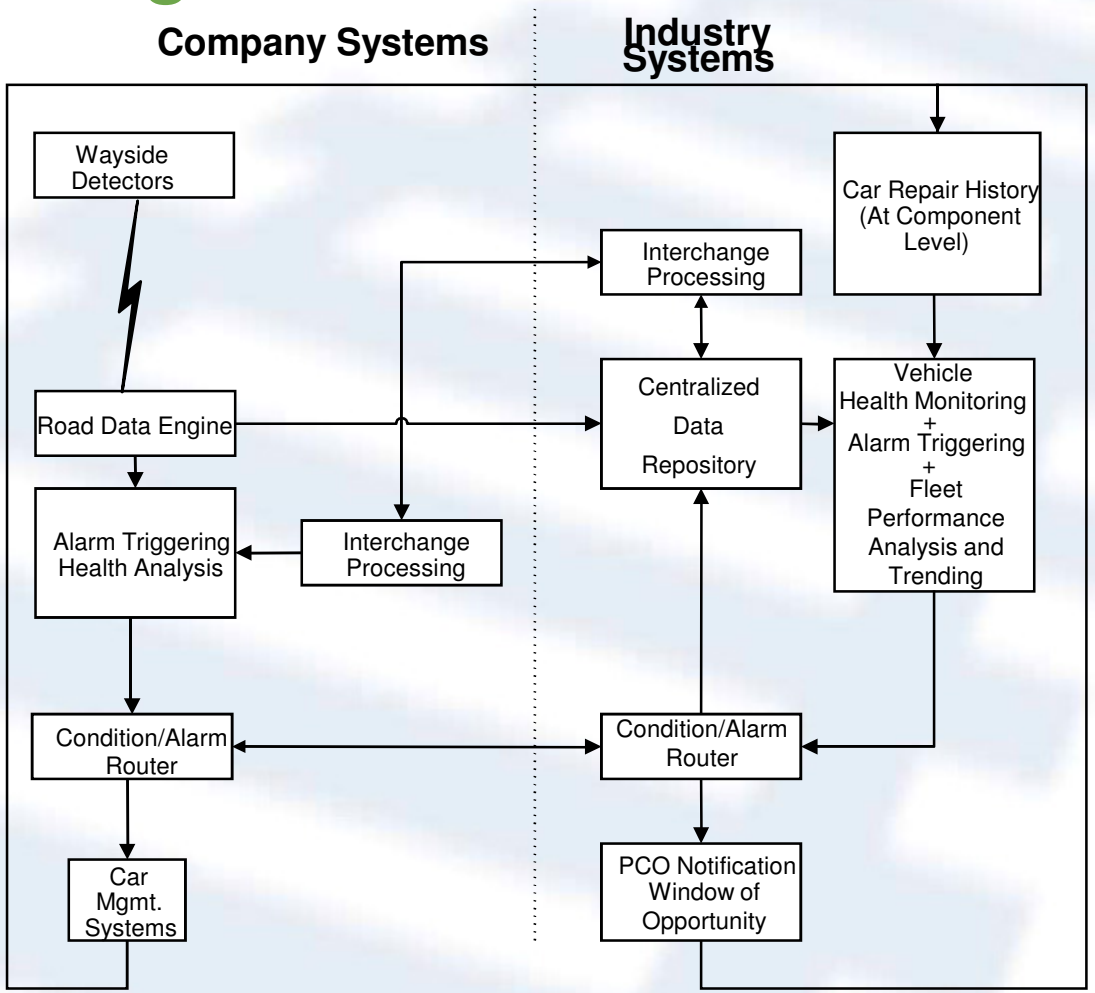
- Truck Hunting – lateral instability of the truck
  - Over half of existing WILD sites also equipped with Truck Hunting Detection
  - Cars identified with various degrees of truck hunting using existing detector data
  - TTCI testing confirmed both hunting conditions and condemnable defects
  - New AAR Interchange Rule
    - Condemnable limits implemented July 1, 2006
    - Initial limits should impact 750 cars per year
    - Two readings above 0.50 in a twelve month period
    - Single reading above 0.65
  - EHMS alarms targeted for January, 2007 implementation

ATSI – Recent Developments

- Service Interruption Cost Recovery
  - Rule changes proposed by ARB Committee
    - Circular Letter C-10293 released for public comment on April 4
  - Proposed Job Codes for train delay, car set-out & pick-up costs, and differential jacking charge
  - Service Interruption implementation to be discussed at October ARB Committee meeting

EHMS Long-Term Vision

- Both Company and Industry system
- Industry system vision
  - Centralized data repository
  - Alerts and vehicle condition available to car owner and maintenance provider
  - Car repair history used to remove alerts
  - Vehicle Health Monitoring (supports TDTI)
  - Fleet Performance Analysis and Trending



2006 EHMS Status

- Auto close alerts using subsequent detector readings and CRB
- Truck Hunting Alerts and “closing rules” for Truck Hunting Alerts
- Provide alternative for use of Early Warning system for alerts/closure
  - Parallel systems in 2007

Early Warning is NOT Going Away!

After 2007, Early Warning Will Continue To Be Used

For Early Warnings and Non-WILD Maintenance Advisories

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Implementation of Performance Limits for Hunting Detectors

(with Recommended Corrective Action)

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Introduction

- **Joint project by:**
  - **AAR Advanced Technology Safety Initiative**
  - **Accelerated project under AAR Strategic Research Program**
  - **EEC Truck Hunting TAG**
- **Objective:**
  - **Develop performance limits for wayside hunting detectors**
  - **Inspection and maintenance procedures for identified cars**

Source Data

- Data from Salient Hunting Truck Detectors available in InteRRIS®
- Data in the form of a Hunting Index (HI). Typically:
  - |HI| of 0.65 indicates poor performance
  - |HI| of 0.10 indicates acceptable performance
- Associated data:
  - Detector Site / Time / Date / Train
  - Car and Truck ID
  - Lead End / Direction of Travel
  - Speed / Car and Truck Load

Development Process

- InteRRIS® data with |HI| ≥ 0.25 inspected for 1 year period (early ’04 to early ’05)
- Performance criteria proposed based on |HI| and number of passes:

|HI| Value	No of Passes	App. No Cars Identified
|HI| ≥ 0.65	At least 1	300
|HI| ≥ 0.45	At least 2	1500
|HI| ≥ 0.30	At least 3	4700
|HI| ≥ 0.25	At least 3	5200

- Representative cars at each performance level sent to Transportation Technology Center (TTC) for inspection, test, teardown and repair

Inspection & Test Results

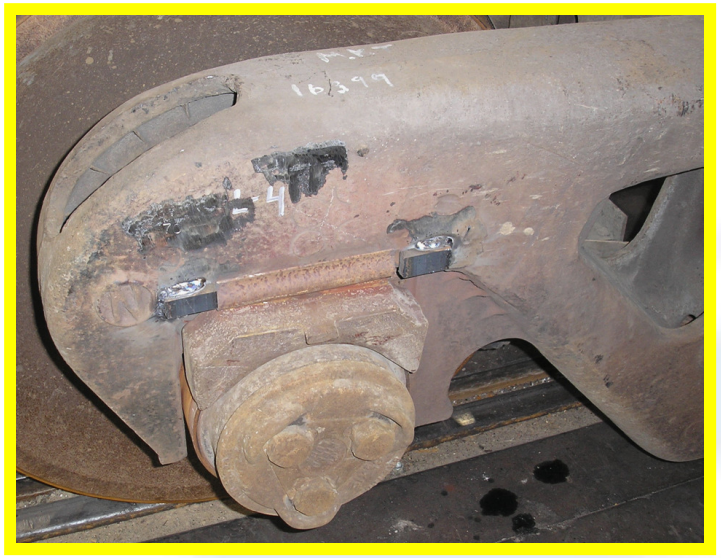
- **All cars identified showed signs of hunting**

  (worn: truck components, couplers & coupler carrier plates, door mechanisms etc)

- **All cars hunted at speeds between 35 and 50 mph**

- **All cars showed signs of either (or both):**
  - Low truck warp restraint (high / worn wedges / column wear liners)
  - Low truck / car body rotational constraint (no constant contact side bearings (CCSBs), no CCSB pre-load, melted or damaged CCSBs

Repair Results



- ***Fitting / replacement of CCSBs:***
  Improved onset of hunting by approximately 15 mph
- ***Truck rebuild (including new wedges, column wear plates & side springs):***
  Improved onset of hunting by approximately 15 mph
- ***Both of the above:***
  Improved onset of hunting by more than 2 x 15 mph and appears to guarantee 50 mph in medium term

Recommendations

- **Car condemnable at any time:**
  - **|HI| ≥ 0.65 (anticipate 300 cars identified in 1 year)**
  - **|HI| ≥ 0.50 twice in 12 months (anticipate 450 additional cars identified in 1 year)**

  (Cumulative total of 750 cars identified in 1 year)
- **Correct repairs:**
  - **Trucks qualified and/or repaired to AAR M-214**
  - **Condemnable friction wedges to be replaced**
  - **If equipped with CCSBs, springs or resilient elements to be replaced**
  - **Roller or block side bearings to be replaced with AAR M-948 approved steel-capped long travel CCSBs**