ATSI Initiative

September, 2006

Lisa Stabler
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
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
  - Condensible 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
Implementation of Performance Limits for Hunting Detectors (with Recommended Corrective Action)
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:
  - $|HI| \text{ of } 0.65$ indicates poor performance
  - $|HI| \text{ of } 0.10$ 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 $|HI| \geq 0.25$ 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 |
|------------|-------------|-------------------------|
| $|HI| \geq 0.65$ | At least 1 | 300 |
| $|HI| \geq 0.45$ | At least 2 | 1500 |
| $|HI| \geq 0.30$ | At least 3 | 4700 |
| $|HI| \geq 0.25$ | 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:
  - \(|HI| \geq 0.65\) (anticipate 300 cars identified in 1 year)
  - \(|HI| \geq 0.50\) 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