

ATSI Initiative



ASSOCIATION OF
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TOMORROW. ARRIVING BY TRAIN.



Agenda

- ◆ ATSI Overview – Lisa Stabler, BNSF RR
- ◆ EHMS – Bill Coupe, Railinc
- ◆ InteRRIS – RB Wiley, TTCI



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ATSI Overview

Lisa Stabler



Agenda

- ◆ ATSI – Going Forward
- ◆ Activities Since Last Town Hall
- ◆ EHMS Alert Close Out
- ◆ Overview on Truck Performance Detectors
- ◆ EHMS System and Funding Update
- ◆ ATSI 5 Year Vision
- ◆ ATSI Statistics and Performance
 - ◆ **Wheel Impact**
 - ◆ **Truck Performance**
- ◆ Town Hall
- ◆ Questions/Comments



ATSI – Going Forward



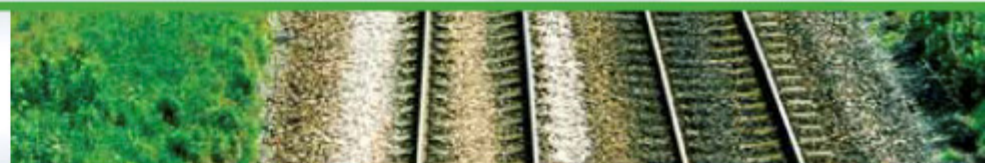
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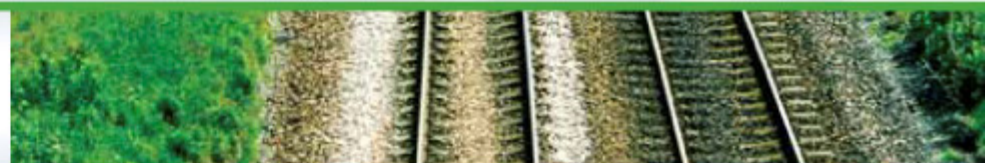
ATSI – Going Forward

- ◆ Condition after Major Shopping
 - ◆ During a major shopping event, the car owner has control over his equipment
 - ◆ Rule 88 currently lists expectations for car condition “At Any Time”, and after “Major Shopping”
 - ◆ Using wayside detector data and EHMS, car owners will be aware of the health of various car systems
 - ◆ We expect that some of these conditions will be considered for inclusion in Rule 88
 - ◆ Conditions likely to continue to degrade in a reasonable time in the future
 - ◆ Similar to RIP track “Opportunistic Repair”

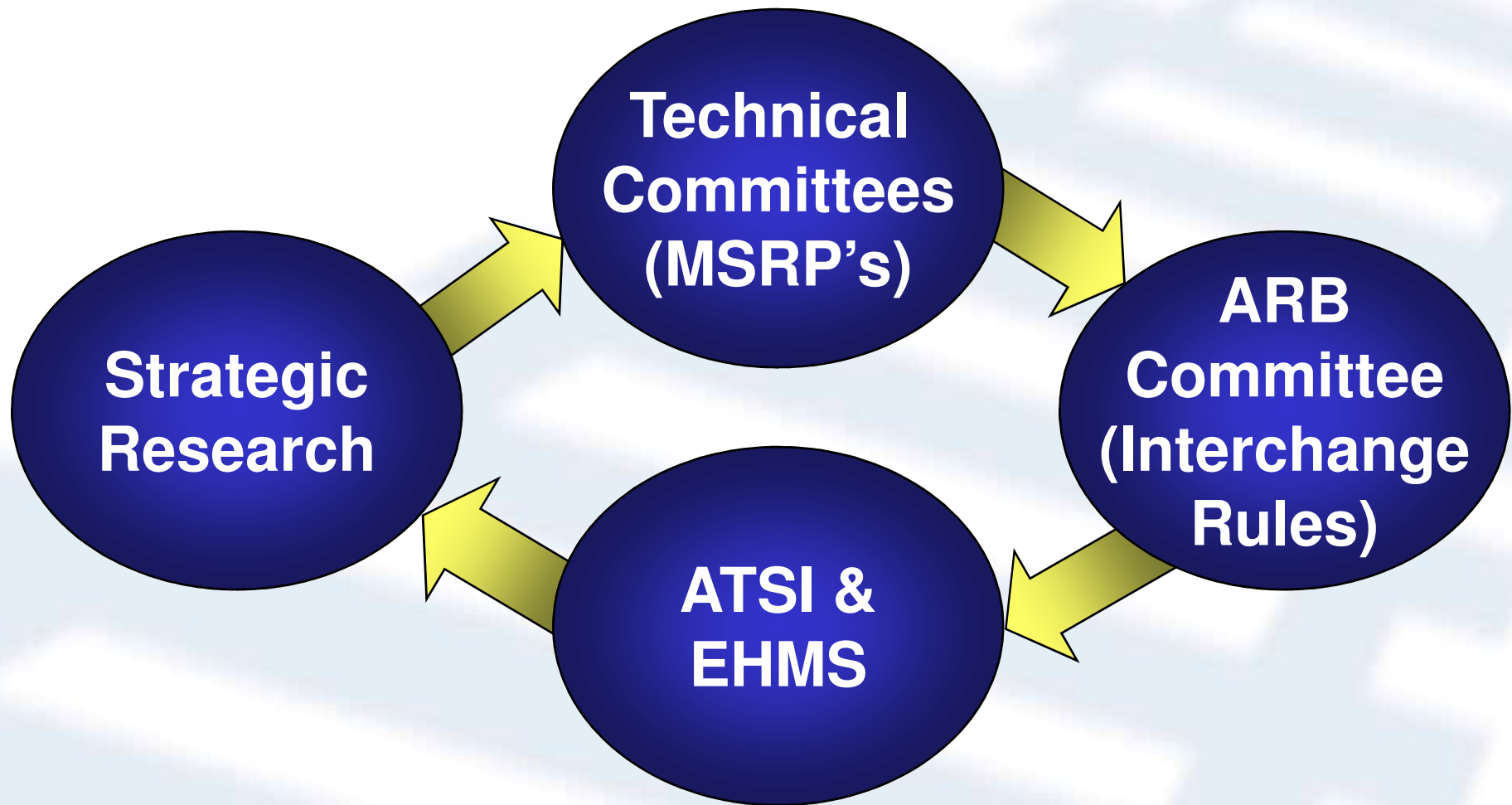


ATSI – Going Forward

- ◆ Home Shopping for Extensive Repairs
 - ◆ Railroads are constrained on the number of hours of work that can be performed
 - ◆ Using wayside detector data and EHMS, car owners will be aware of the health of various car systems
- ◆ We expect that some of these conditions that have historically required Home Shopping will be considered for inclusion various Field Manual rules
- ◆ EHMS will need to alert Railroads and Car Owners
 - ◆ Cars should be appropriately routed and repaired
 - ◆ Alert “closed-out” in EHMS



ATSI Interaction with Other Committees



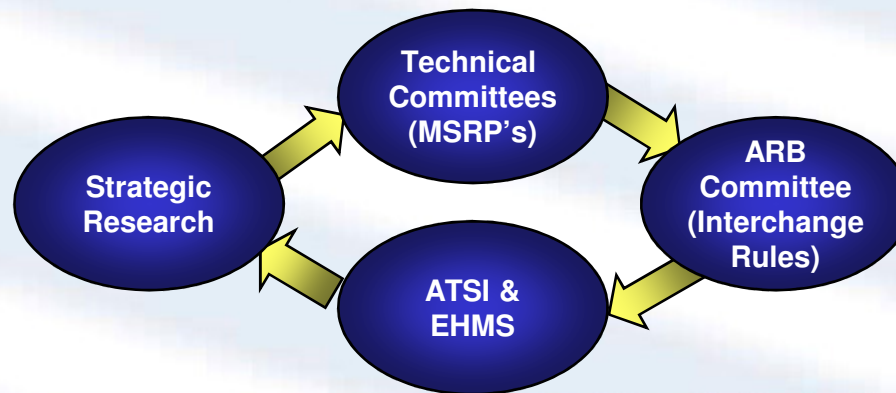
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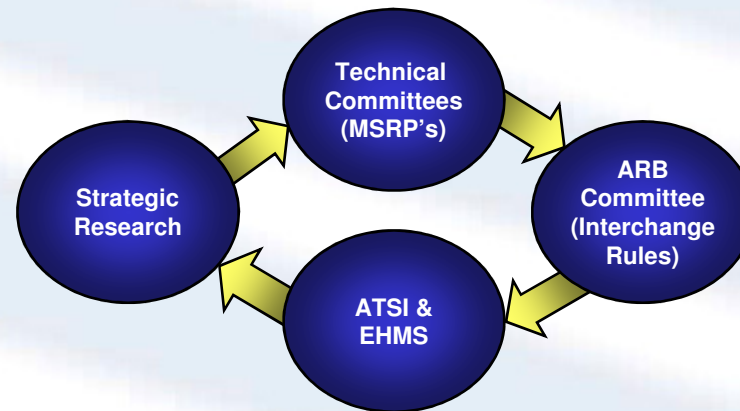
Actions Since Last Meeting

- ◆ Rule 88 – Condition after Major Shopping
 - ◆ Prioritized list of potential actions
 - ◆ Brake systems, bearings and wheels at top of list
 - ◆ Work progressing by appropriate Research, Technical and/or Rules Committees



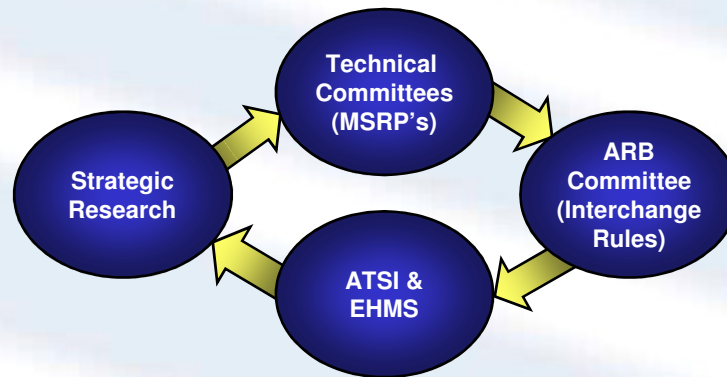
Actions Since Last Meeting

- ◆ Home Shopping for Extensive Repairs-Truck Hunting
 - ◆ Rule 46 – Truck System Performance implemented July 1, 2006
 - ◆ Initial levels - Two readings above 0.50 or single reading above 0.65
 - ◆ Estimated impact – 750 cars annually
 - ◆ Alarm levels lowered July 1, 2007
 - ◆ Two readings above 0.40 or single reading above 0.55
 - ◆ Estimated impact – 4700 cars annually

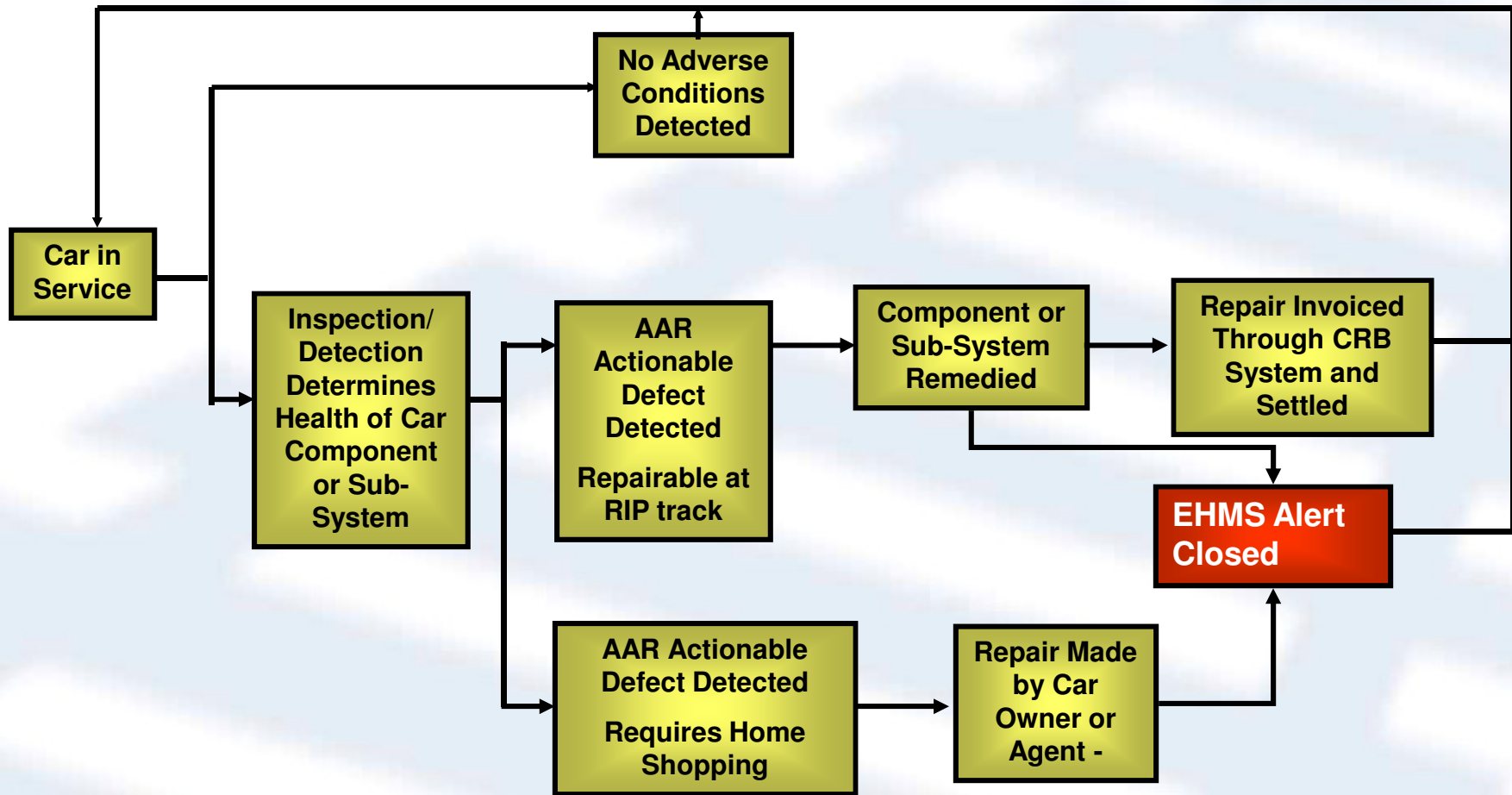


Actions Since Last Meeting

- ◆ Home Shopping for Extensive Repairs-Truck Hunting
 - ◆ EHMS Truck Hunting alarms generated beginning in January, 2007
 - ◆ 1,575 alerts issued since Jan 1, 2007
 - ◆ 1,281 since July 1st when thresholds were tightened
 - ◆ 294 Identified under the original thresholds
 - ◆ 100 remediated and closed through September 1st

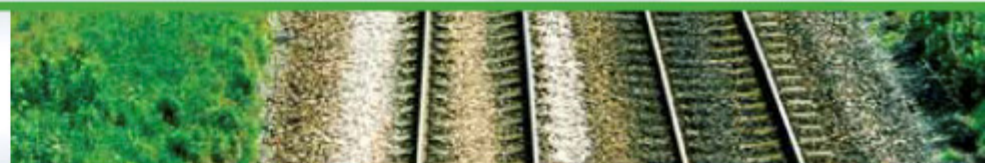
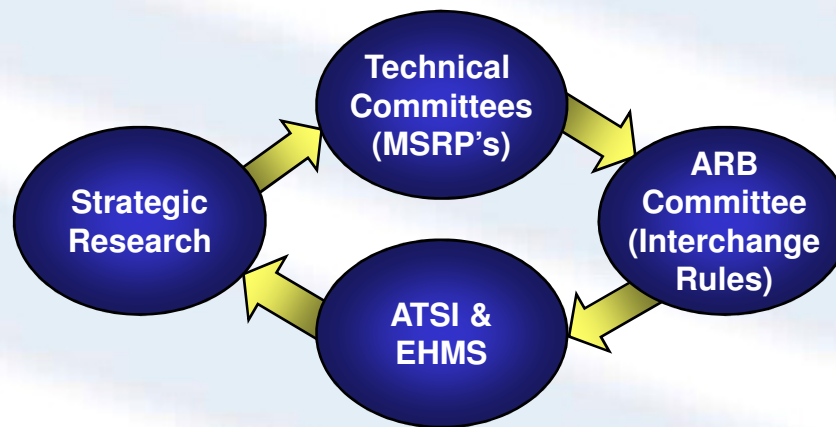


EHMS Alert Close Out



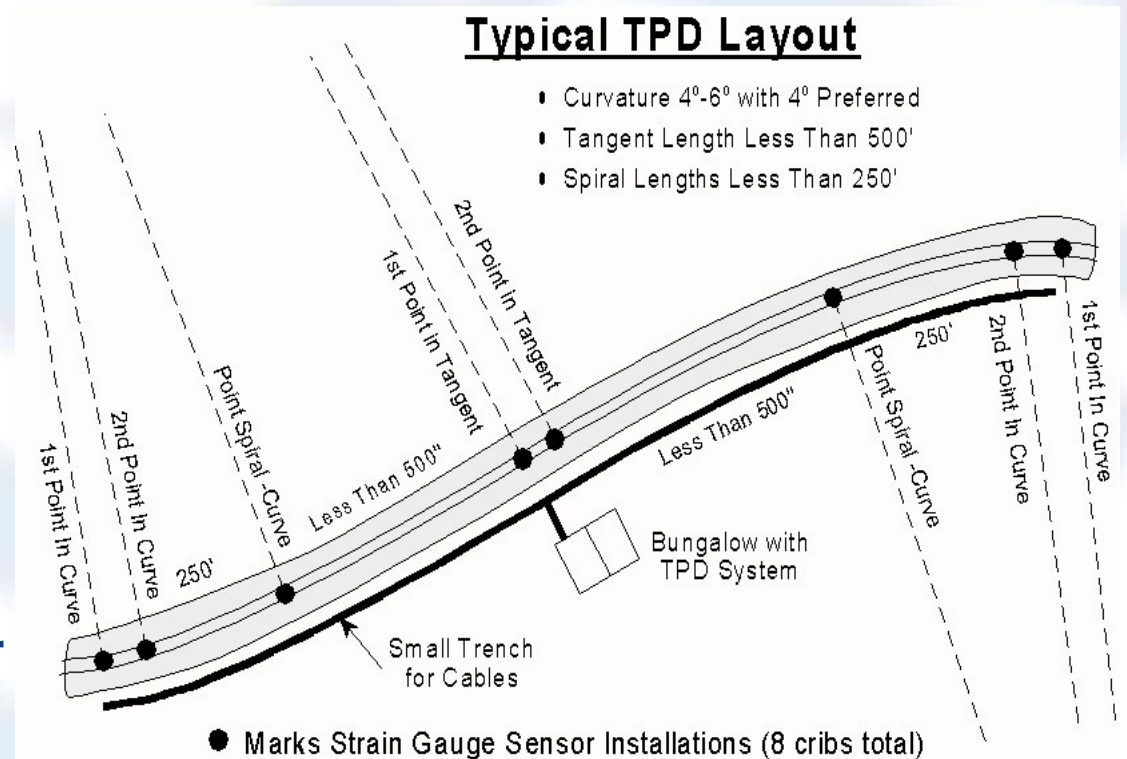
Potential Future Actions

- ◆ Potential Rule 46 addition - Truck Performance
 - ◆ EEC proposing consideration of initial Truck Performance Detector condemning levels to ARB
 - ◆ Estimated impact – 100 cars annually



What is a Truck Performance Detector?

- ◆ Most TPDs in service consist of strain gauges placed at eight different locations (cribs) throughout an “S” curve in the track. These gauges measure the lateral and vertical forces experienced by the track at each crib.
- ◆ Data is collected on every car that passes a TPD site (12 in use).



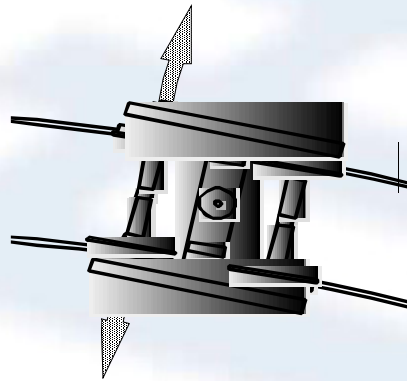
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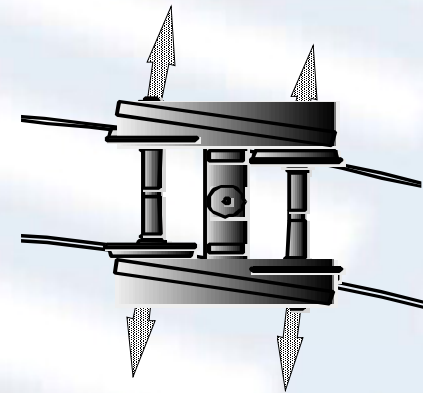
What Does a TPD Measure?

- ◆ TPDs measure

- ◆ Lateral forces at each wheel
- ◆ Vertical forces at each wheel



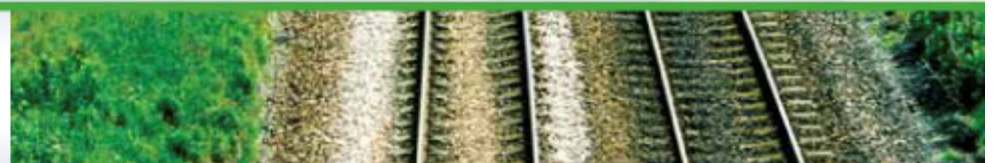
Normal Truck



Warped Truck

- ◆ TPDs calculate

- ◆ L/V ratios for wheels, trucks and cars
- ◆ Imbalanced loading

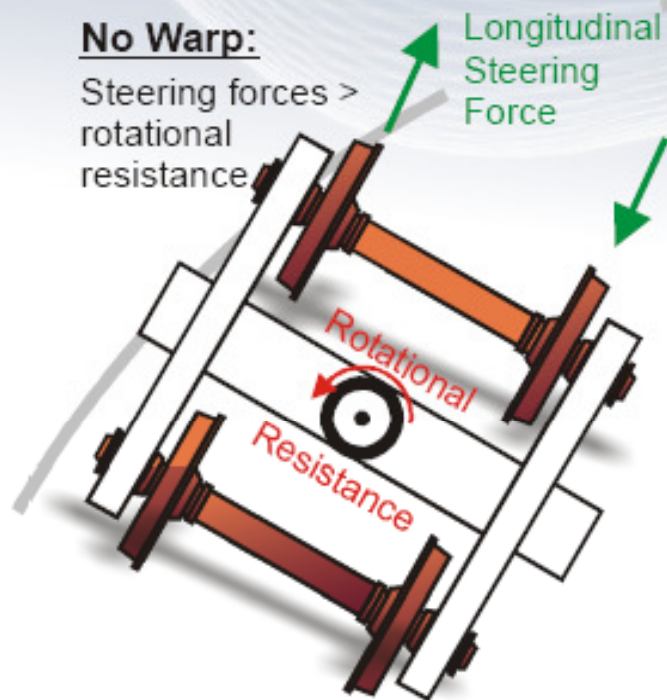


TPD Area of Interest – Truck Warp

◆ What is Warp? At one critical moment on curve entry:

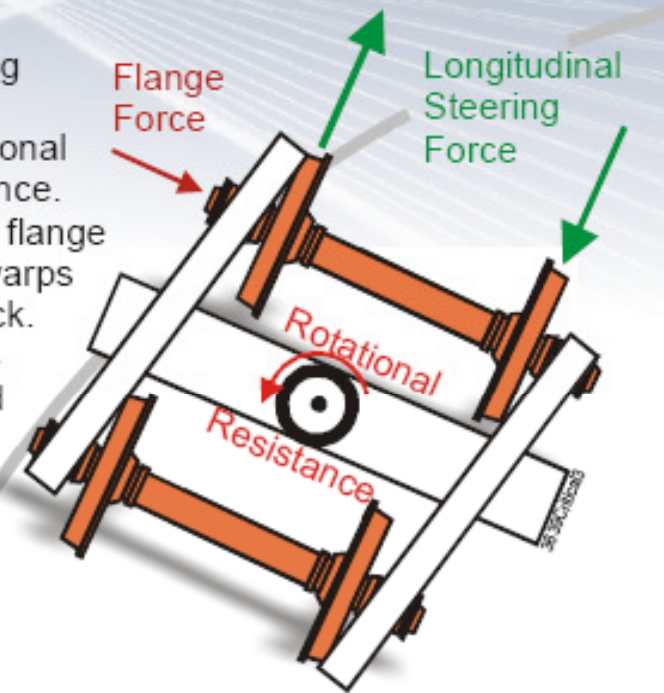
No Warp:

Steering forces > rotational resistance



Warp:

Steering forces < rotational resistance. Lateral flange force warps the truck. It stays warped until curve exit.



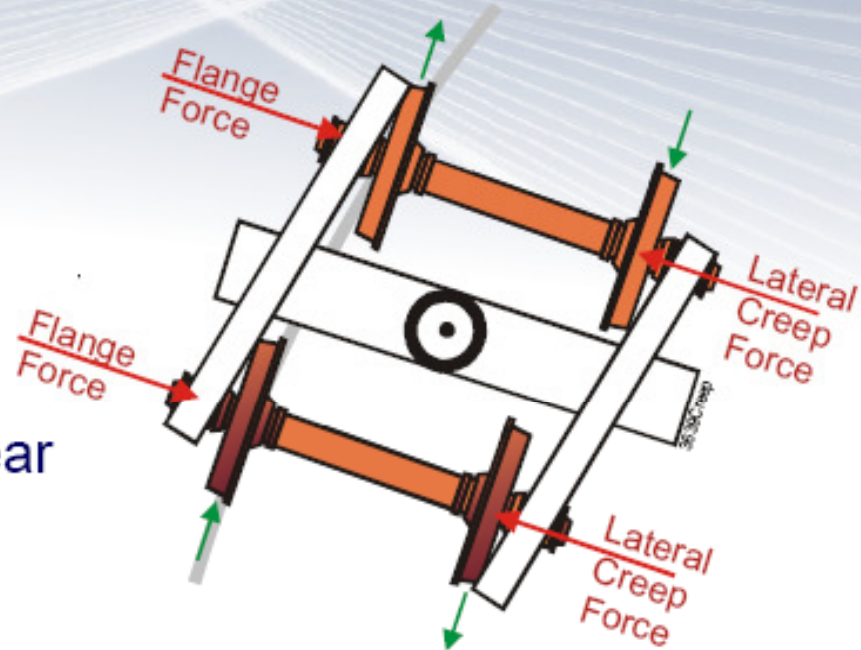
◆ TPD measures warped state *after* this critical moment



Why Control Warp?

◆ What are the results of warp?

- Accelerated rail wear (side and crown)
- Accelerated tie and fixture degradation resulting from high gauge spread forces
- Accelerated wheel wear (flange & tread)
- Eccentric wheel wear (wheel & tread)
- Derailment



What is the Difference Between a THD and a TPD?

- ◆ THD measures truck hunting
 - ◆ **Hunting trucks generally steer well in curves**
- ◆ TPD measures truck performance (steering)
 - ◆ **A truck with steering issues generally does not hunt**



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What Causes Warp?

◆ What causes Warp?

- Warp Resistance \geq Rotational Restraint \rightarrow No Warp
- Warp Resistance $<$ Rotational Restraint \rightarrow Warp

◆ What produces low warp resistance?

- Old design narrow wedge trucks
- High wedges

◆ What produces high rotational resistance?

- Primarily, side wall contact in center plate (introduces a second source of friction)
 - ▼ Doubles (at least) rotational resistance
 - ▼ Can be exacerbated by car body twist



Warp Remediation

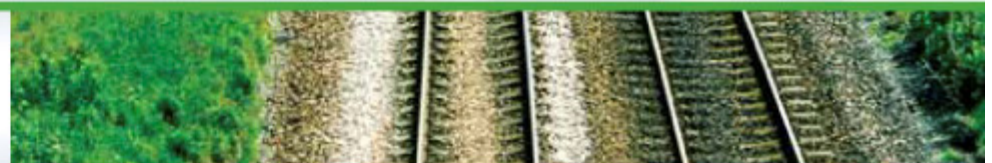
◆ How to “fix” a warping truck or a car with a warping truck?

● Currently:

- ▼ M-214 rebuild (or a minimum of new wedges)
- ▼ Side Bearer Clearances (& car body twist)
- ▼ Polymer Center Plate Liner
- ▼ Center Plate Lube

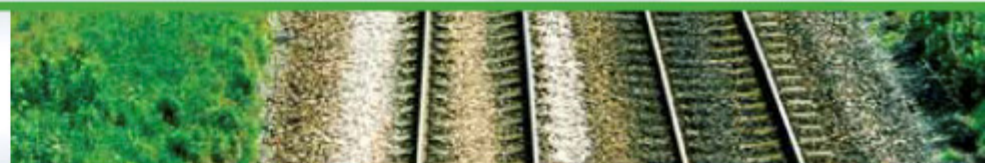
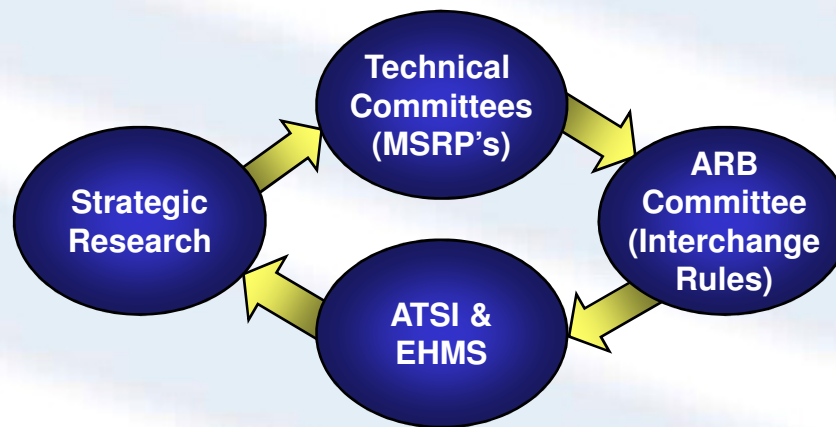
● Future:

- ▼ M-214 & Side Bearers (& car body twist)
- ▼ New center plate liner & side wall liner?



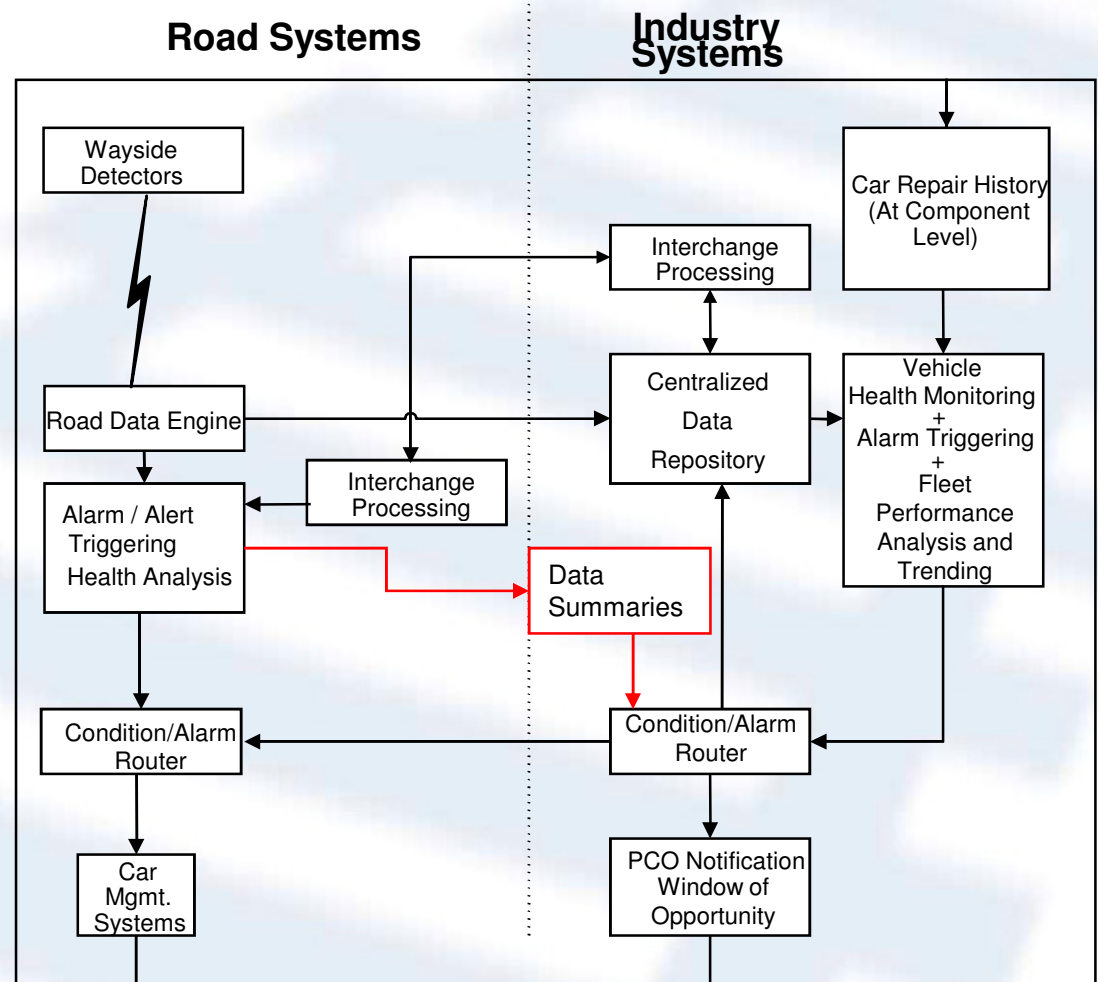
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EHMS Long-Term Vision

- ◆ Both Road and Industry system
- ◆ Industry system vision
 - ◆ Centralized data repository
 - ◆ Alerts and vehicle condition available to car owner and maintenance provider
- ◆ Revisions
 - ◆ Proposal to augment system with “Data Summaries”
 - ◆ Planned for 2008



ATSI / EHMS Funding

- ◆ 2008 EHMS funding at carry-over 2007 levels
 - ◆ TTCI transferred \$400k to SRI budget for 2008
 - ◆ **SRI Budget is funded by AAR Member Roads**
- ◆ Committee recommended that Railinc invoice Class I Roads for remainder using current 2005-2007 metric of revenue ton-miles
- ◆ Committee recommends that Railinc invoice Private Car Owners for 3% of EHMS cost using stencil mark vs. owner mark
 - ◆ Simplicity of Invoice



EHMS Status

- ◆ 2007 Enhancements
 - ◆ Complete migration away from use of EW
 - ◆ Rewrite and automation of statistical reports
 - ◆ Re-engineering to support rapid detector deployment
 - ◆ Query Improvements
- ◆ 2008 – Data Summary
 - ◆ Presented as adjunct to, not replacement for InteRRIS
 - ◆ Identifies “cars of interest”
 - ◆ Remediation per AAR rules
 - ◆ Assists in evaluation of future potential rule changes



ATSI/EHMS 5 Year Technology Roadmap

- ◆ **Strategy to consider technology for ATSI when**
 - ◆ **Data available in InteRRIS**
 - ◆ **Sufficient research has proven technology as capable**
- ◆ **ATSI Roadmap based on information from Research, Rules and Technical committees**
- ◆ **Current Roadmap**
 - ◆ **2007 – Acoustic Bearing Detection, Bearing Temperature Trending**
 - ◆ **2008 – Truck Performance, Wheel Profile, Imbalanced/ Overloading of Cars**
 - ◆ **2009 - Hot/Cold Wheel Detection, Cracked Wheel, 2010 – Vision Systems, Cracked Axle**
 - ◆ **2011 – Other TDTI Systems**



How Can I Learn More?

- ◆ Town Hall

- ◆ October 24th, Chicago O'Hare Marriott

- ◆ Agenda

- ◆ Emphasis on EHMS systems

- ◆ New information available to assist car owner

- ◆ **Current - Truck Hunting Alerts**

- ◆ **Future - Acoustic Bearing Alerts**



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EHMS

Bill Coupe - Railinc



EHMS 2007 Deliverables recap

- ◆ Complete migration away from use of EW
- ◆ Rewrite and automation of statistical reports
- ◆ Re-engineering to support rapid detector deployment
- ◆ Completion of EHMS message “push”
- ◆ Query Improvements
 - ◆ Extension of query capabilities to include non-alert level data
 - ◆ Facility for downloading data
- ◆ Introduction of EHMS data “pull”



Deployment Plan

- ◆ **November 2007 – System testing**
 - ◆ Infrastructure
 - ◆ Query enhancements, full TPCI data inclusion
 - ◆ Statistics
 - ◆ EW migration
 - ◆ Rapid deployment capabilities
- ◆ **December 2, 2007**
 - ◆ Deploy 2007 project work
 - ◆ ABD alerts to follow
- ◆ **December 3, 2007**
 - ◆ Removal of WILD from Early Warning
- ◆ **December 31, 2007**
 - ◆ ABD implemented (pilot/proof of concept)

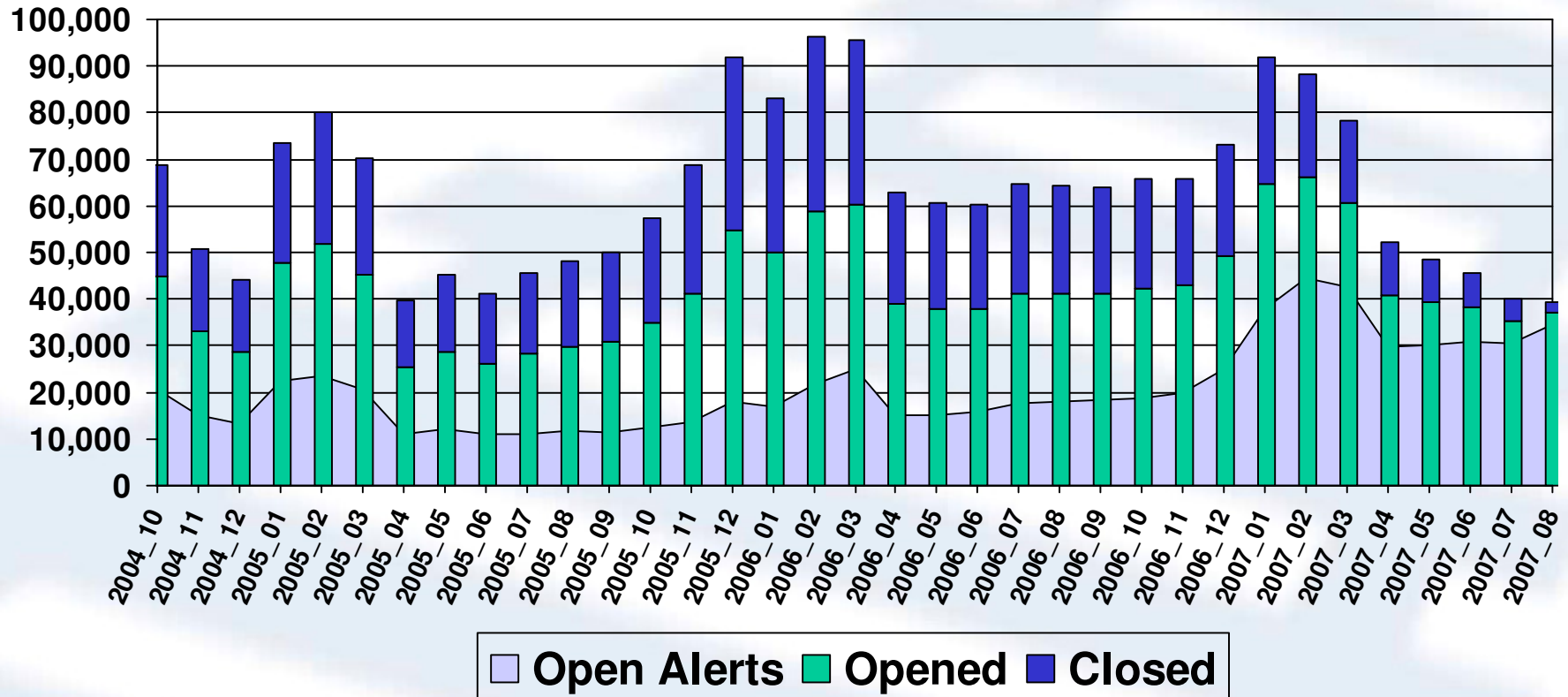


Important Point about EHMS and EW

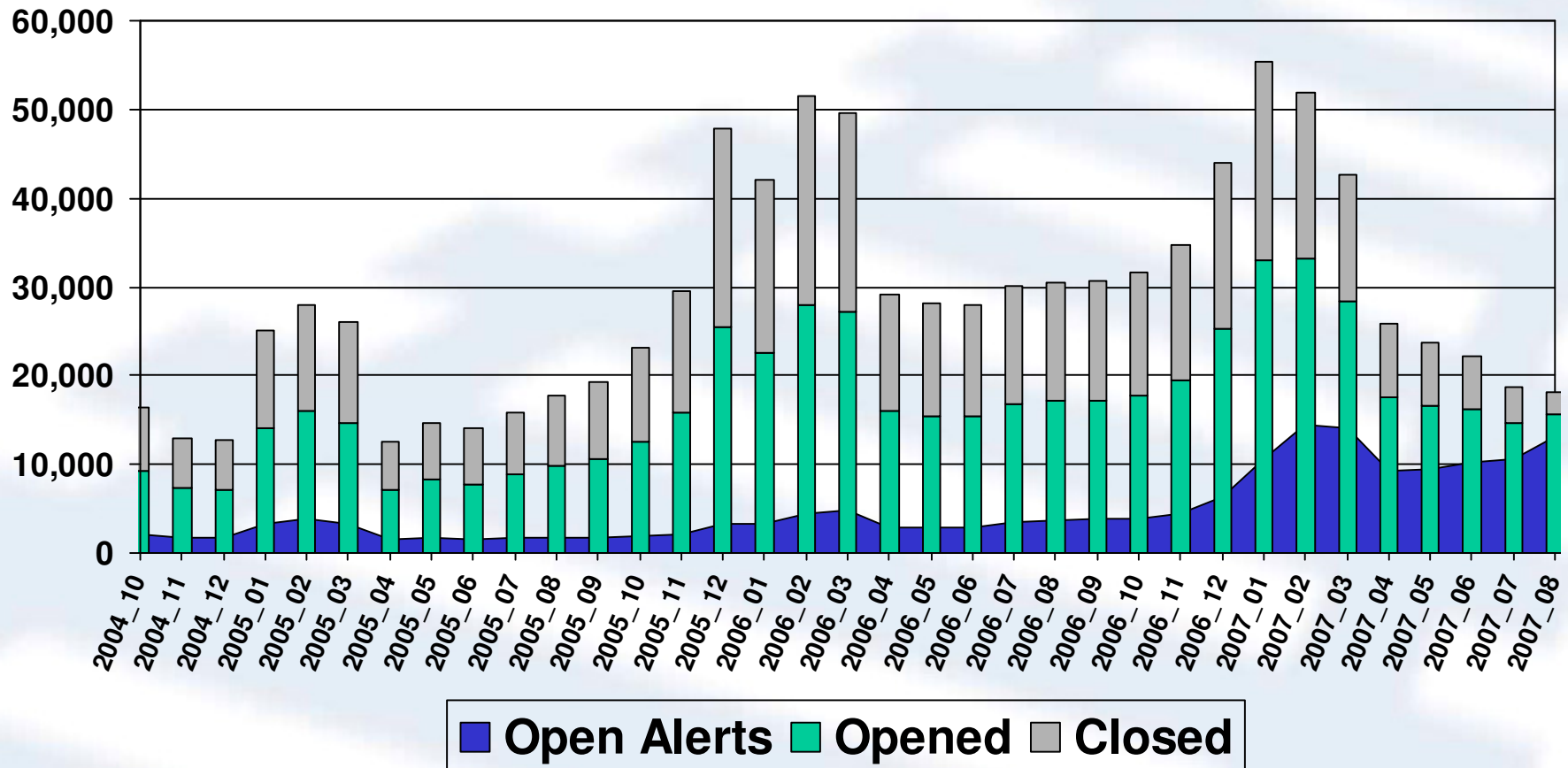
- ◆ **As of Dec 3, 2007, EW will NO LONGER be used for WILD alerts**
- ◆ **The EW system is NOT going away!**
 - ◆ We will continue to use EW for other industry equipment alerts and advisories
- ◆ **All WILD, THD, ABD and other future alerts from wayside detectors will ONLY be available in EHMS!**
- ◆ **Training will be available in the use of EHMS**
 - ◆ Contact Bill Coupe at bill.coupe@railinc.com



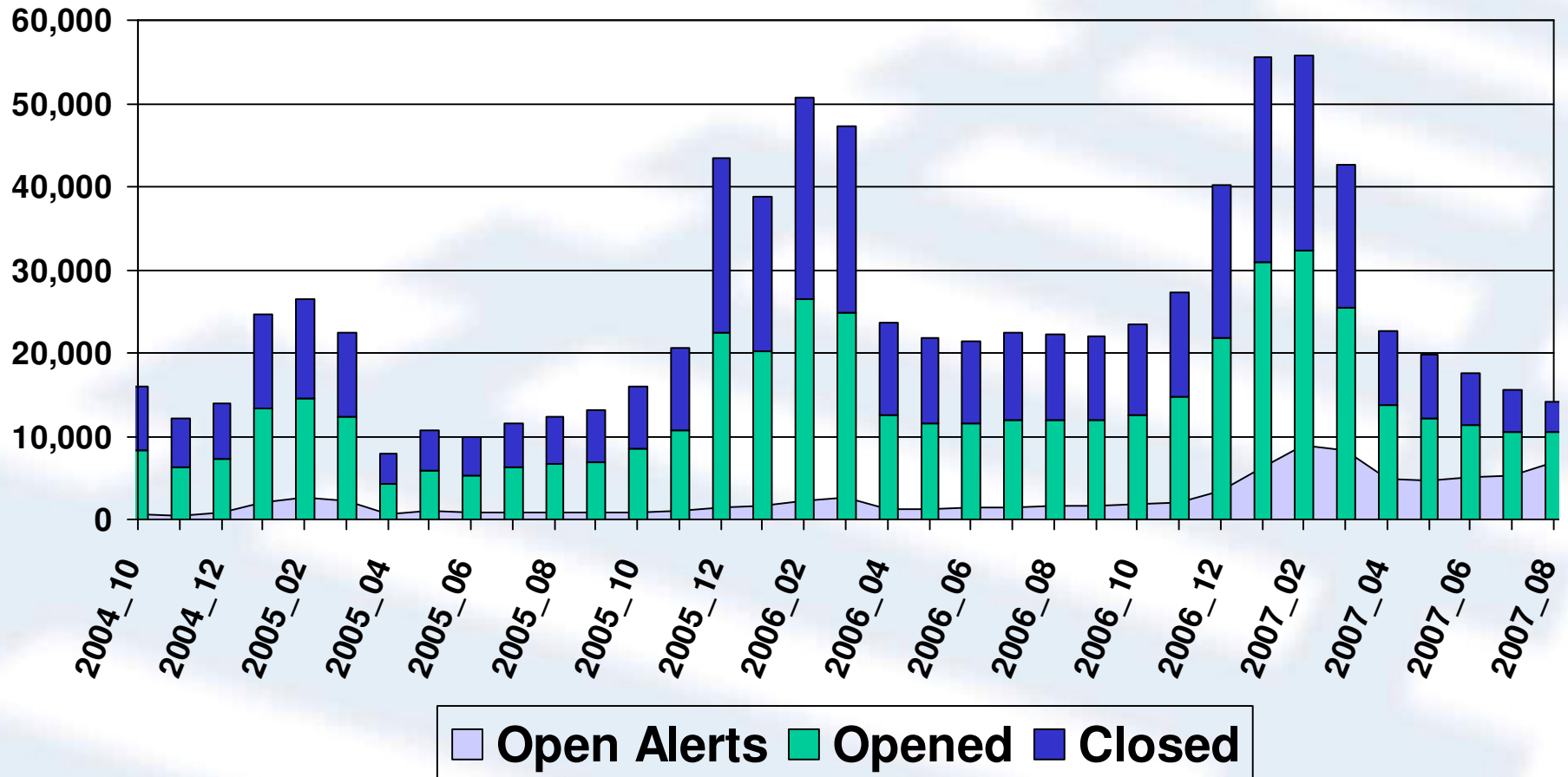
Window of Opportunity



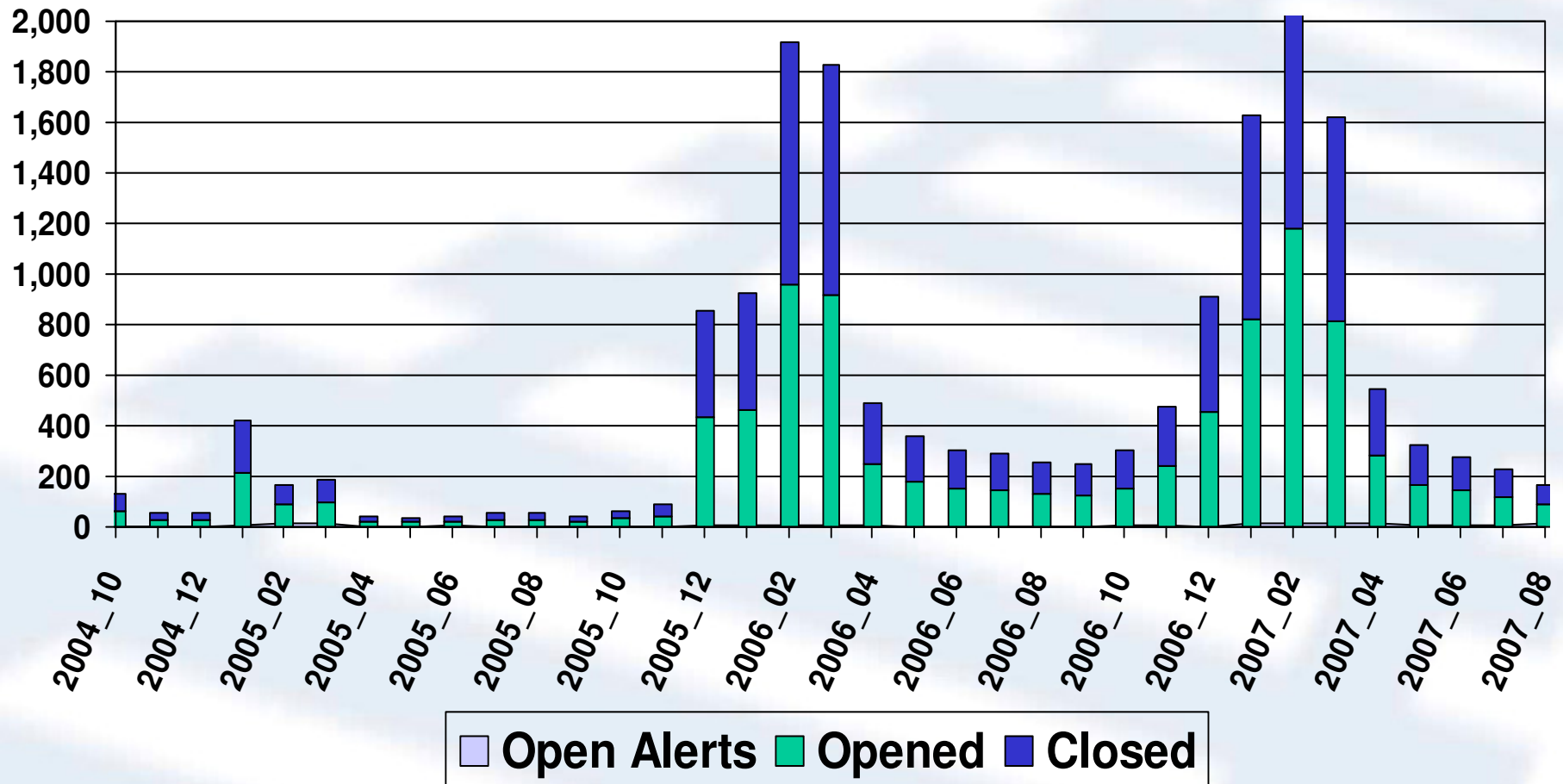
Opportunistic Repair



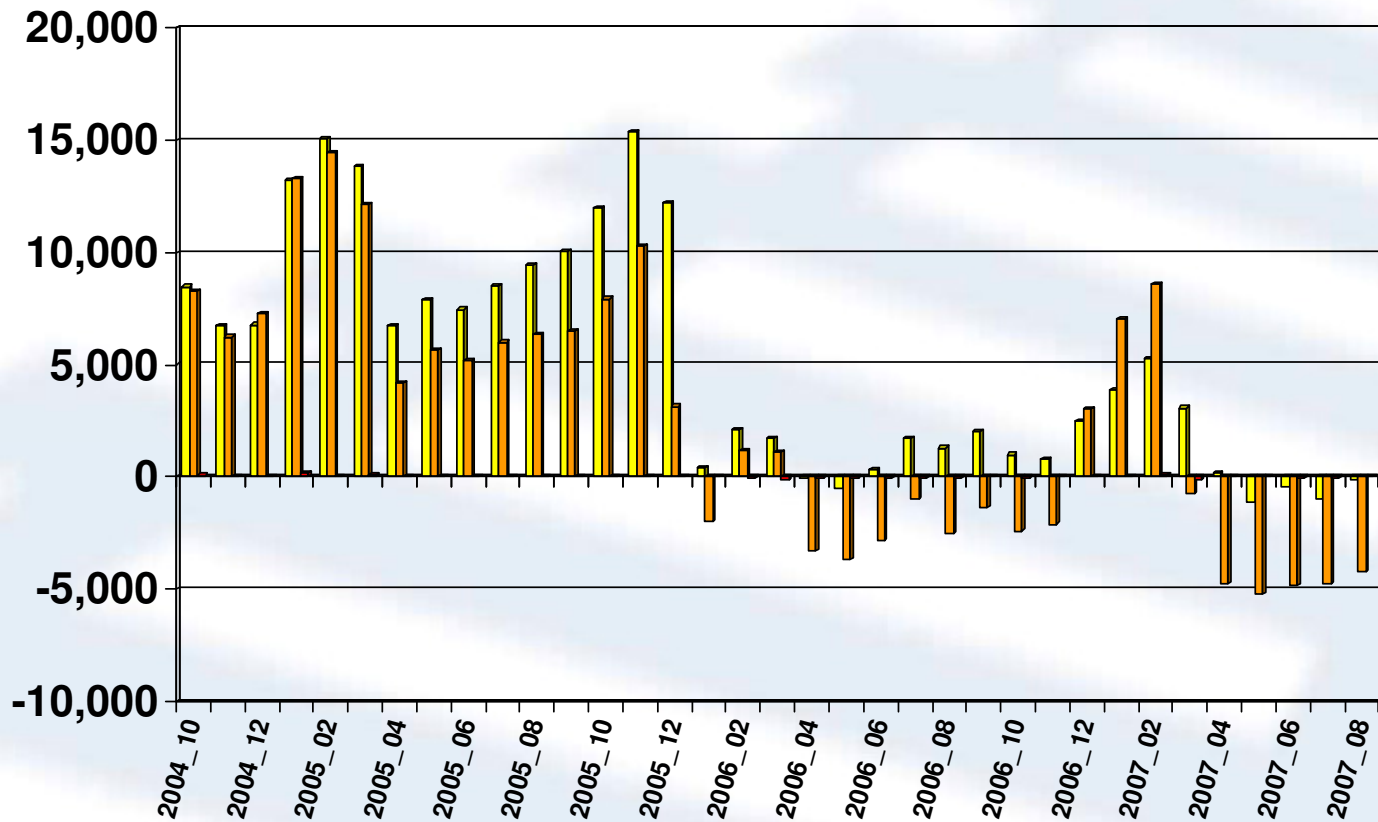
AAR Condemnable



Final Alert



Net Change in Alerts by Period

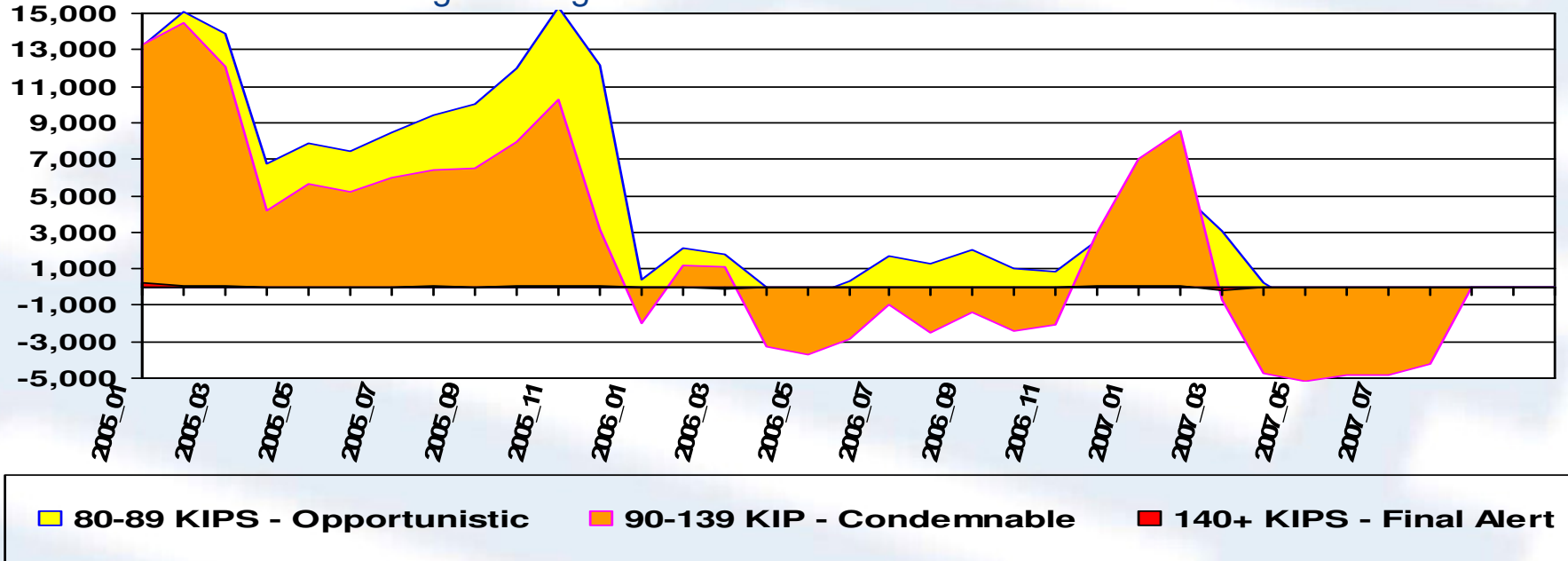


■ 80-89 KIPS - Opportunistic
 ■ 90-139 KIP - Condemnable
 ■ 140+ KIPS - Final Alert

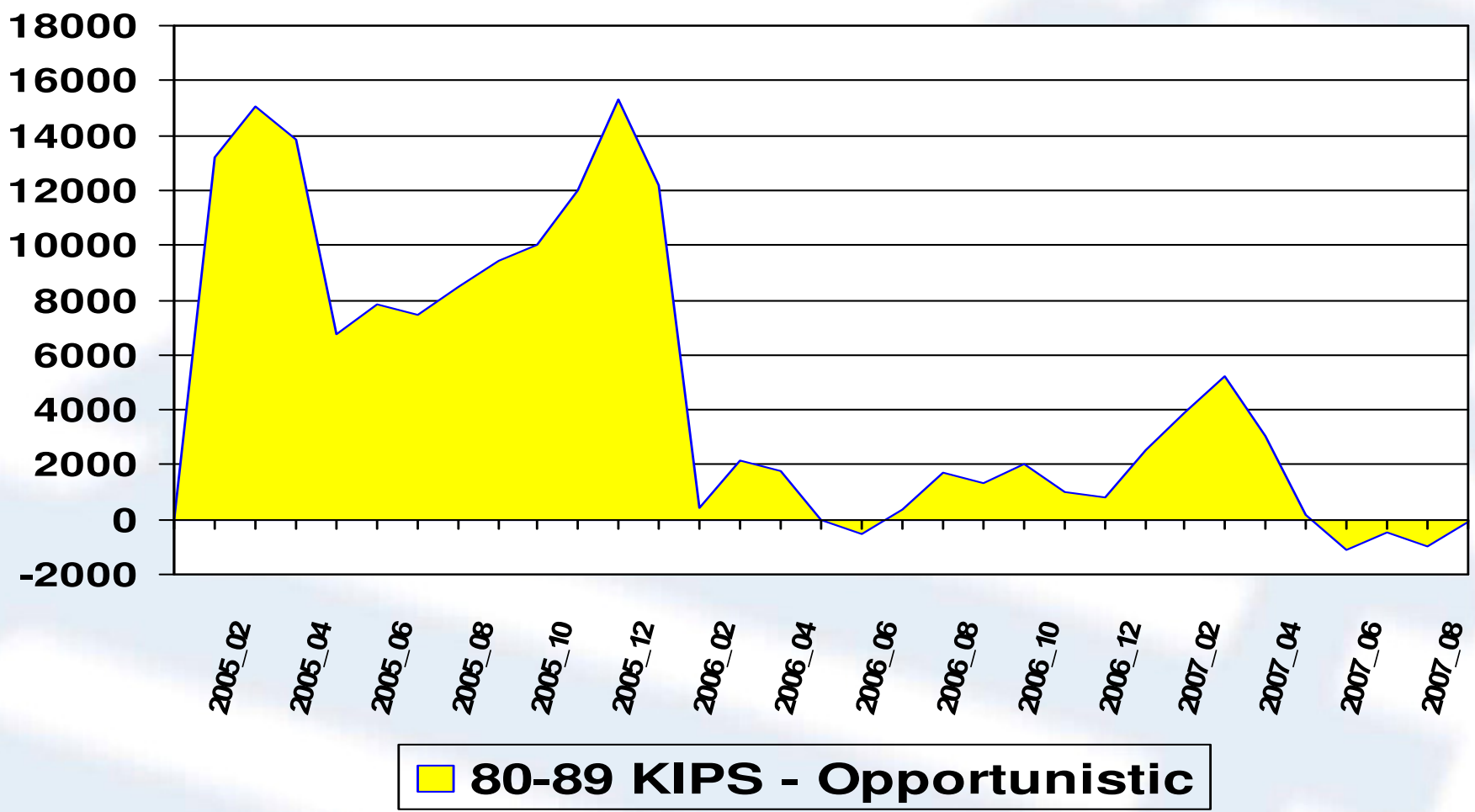


Net Change 2005-2007

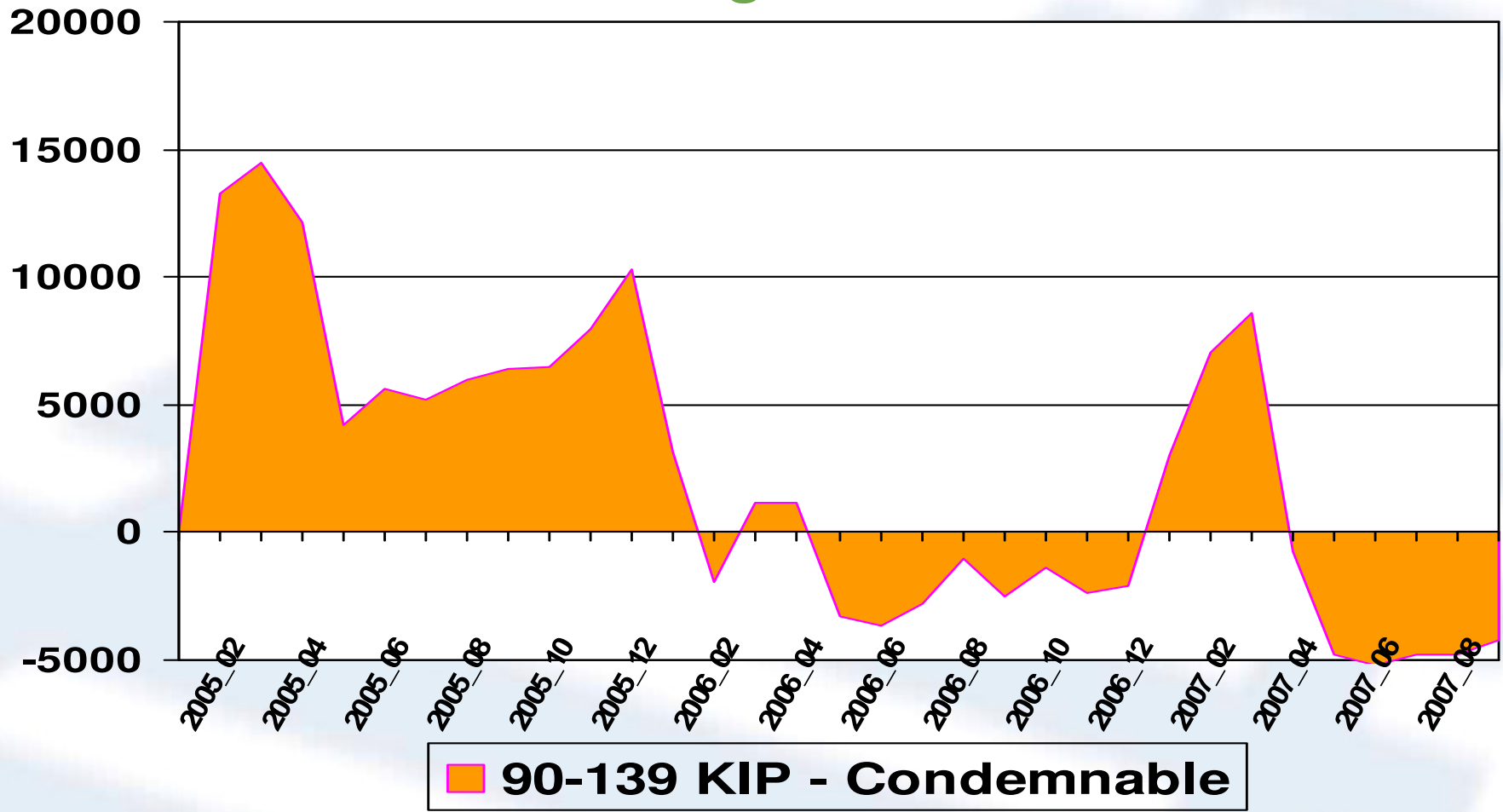
- ◆ Reductions in Condemnable Alerts is overwhelming the creation of Opportunistic Alerts
 - ◆ Open Above 90 KIP's Alerts are declining
 - ◆ 140 KIP Alerts have declined where open alerts have significantly decreased
 - ◆ 90-140's KIPS show greatest gain in closure rates



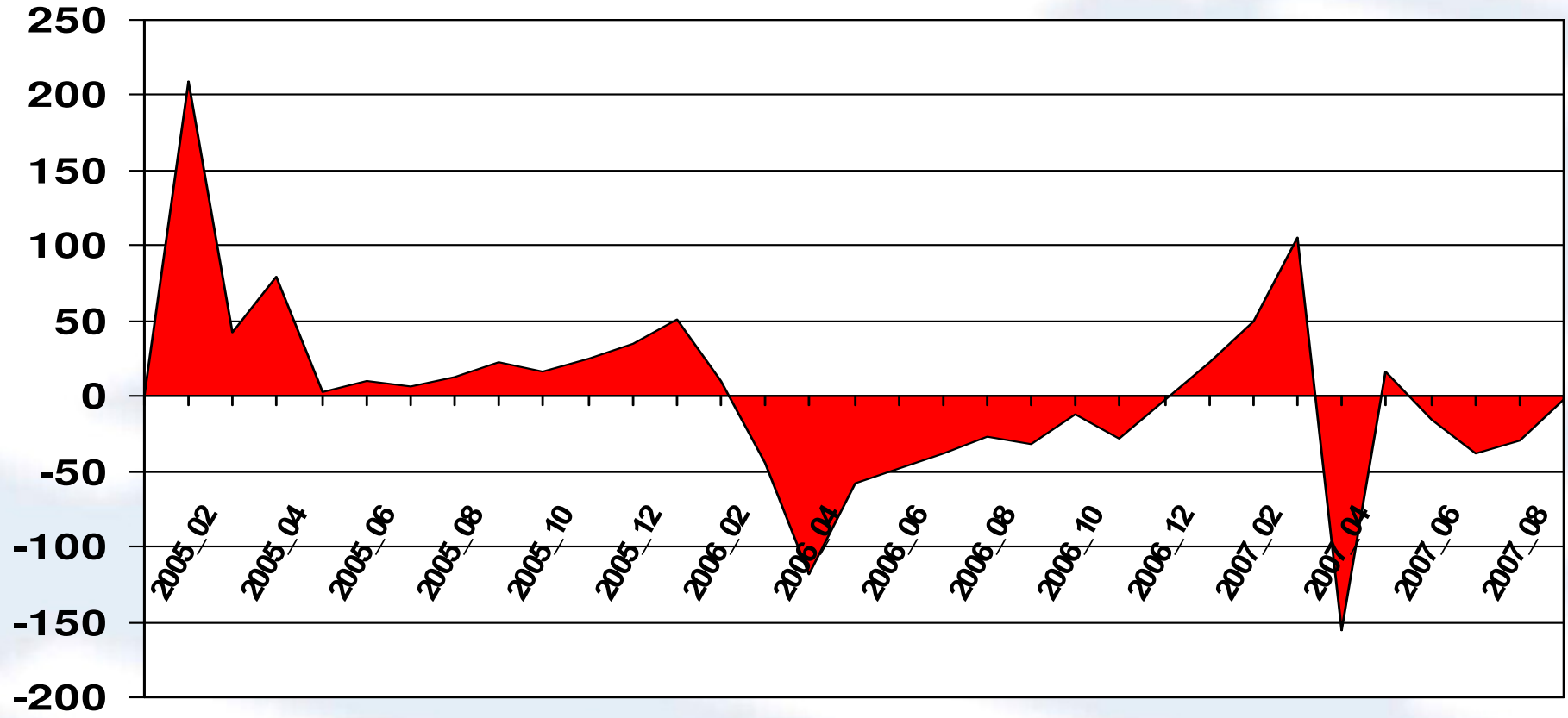
Net Change 2005-2007



Net Change 2005/2007



Net Change 2005-2007



■ 140+ KIPS - Final Alert



Alerts Open > 200 Days

- ◆ 'Auto Clear' process came on line in December 2006 & has provided closure of approximately 25,000 alerts through August of 2007
- ◆ Umler process is clearly closing alerts, a detailed clearing will take place in September of any 'orphaned' alerts
- ◆ TTCI and Railinc continuing to review alert and closure data for all alert types.



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THD Performance YTD

- ◆ 44 THD's in service in North America
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Questions?



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