



2017 RAIL INFRASTRUCTURE AND VEHICLE INSPECTION TECHNOLOGY CONFERENCE



Welcome!

June 20-21, 2017

University of Illinois at Urbana-Champaign



Safety Briefing

- **Emergency Exits** → Right and Left of room 2311
 - Reassemble on north side of Main Street (north of Yeh Student Center)
 - Use the buddy system, look out for your neighbor
- In the event of **severe weather** please take shelter in basement of Newmark Lab
 - Stairs located inside Newmark Civil Engineering Lab, on the northwest corner of the building (no basement under Yeh Center)
 - UIUC personnel will receive text alerts
- Who is **CPR Certified**?
- **AED** in Newmark Crane Bay (near center of lab)



Safety Briefing (continued)

- Newmark Crane Bay – Please use caution
- Please push in your chairs and note any tripping hazards
- No smoking anywhere on UIUC campus
- Campus Phone Emergency Number: 11911
 - For cell phone users, please dial 911
 - Assign designated callers
- Meeting Location:
**Newmark Civil Engineering Lab,
Yeh Student Center,
205 N. Mathews Ave, Urbana, IL**



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RIVIT

UIUC College of Engineering Welcome

Dr. Jennifer Bernhard

Associate Dean for Research
Professor, Electrical and Computer Engineering
University of Illinois at Urbana-Champaign



Welcome and Introduction to the Conference

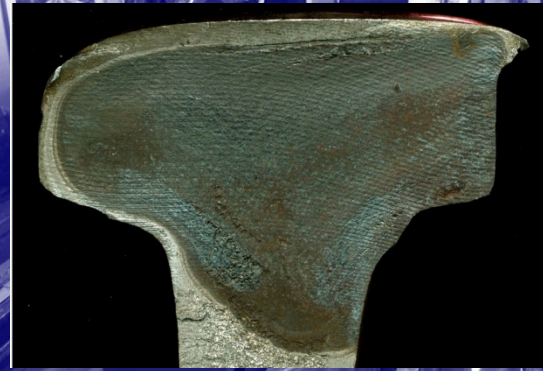
Dr. Christopher P.L. Barkan

Professor, Civil and Environmental Engineering
Executive Director - Rail Transportation and Engineering Center
(RailTEC)

University of Illinois at Urbana-Champaign



QUANTITATIVE ANALYSIS OF U.S. FREIGHT TRAIN DERAILMENT TRENDS & CAUSES



Chris Barkan & Brandon Wang

20 June 2017

University of Illinois at Urbana-Champaign



Visitors from the Future (and their vehicles)

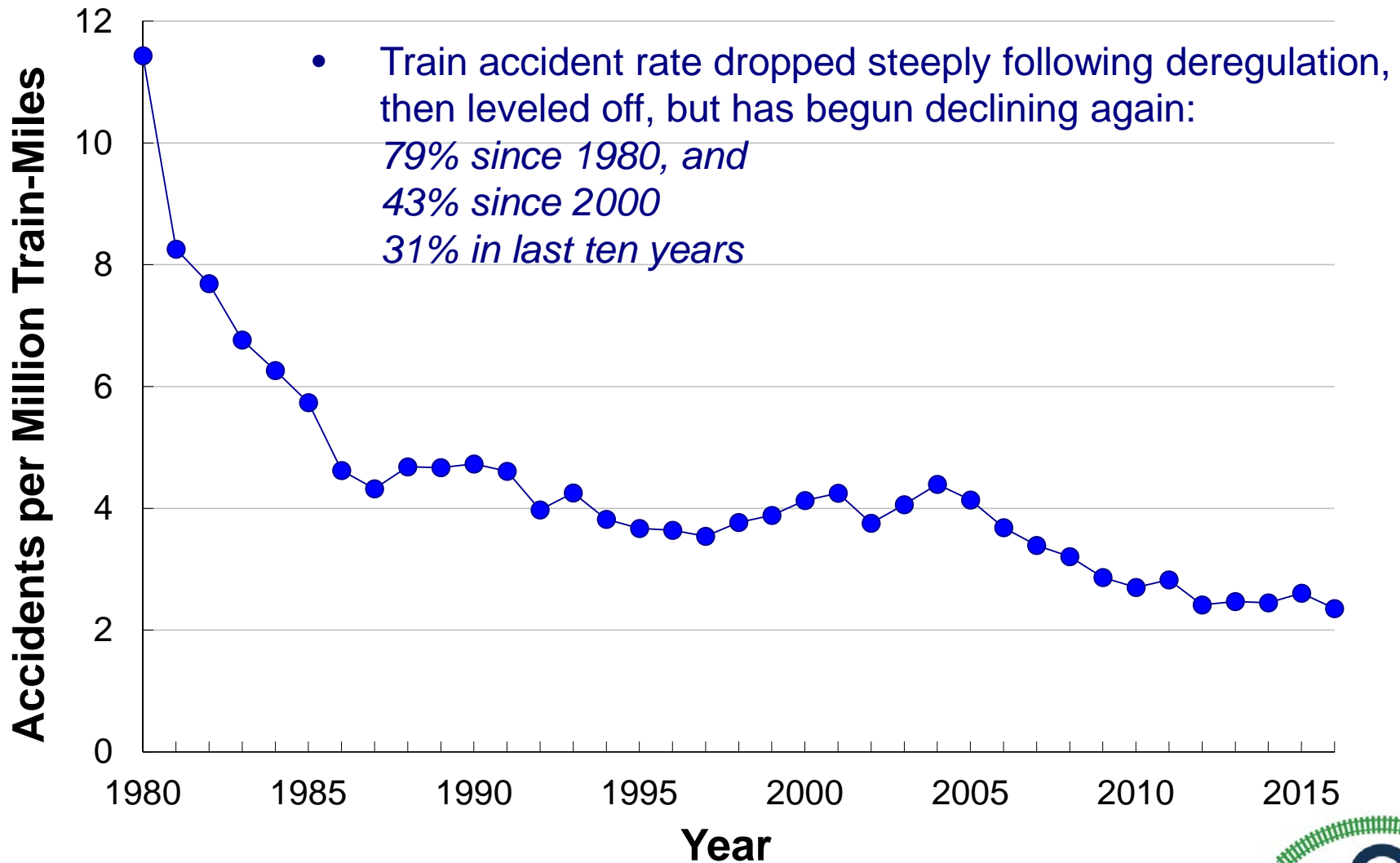


Introduction

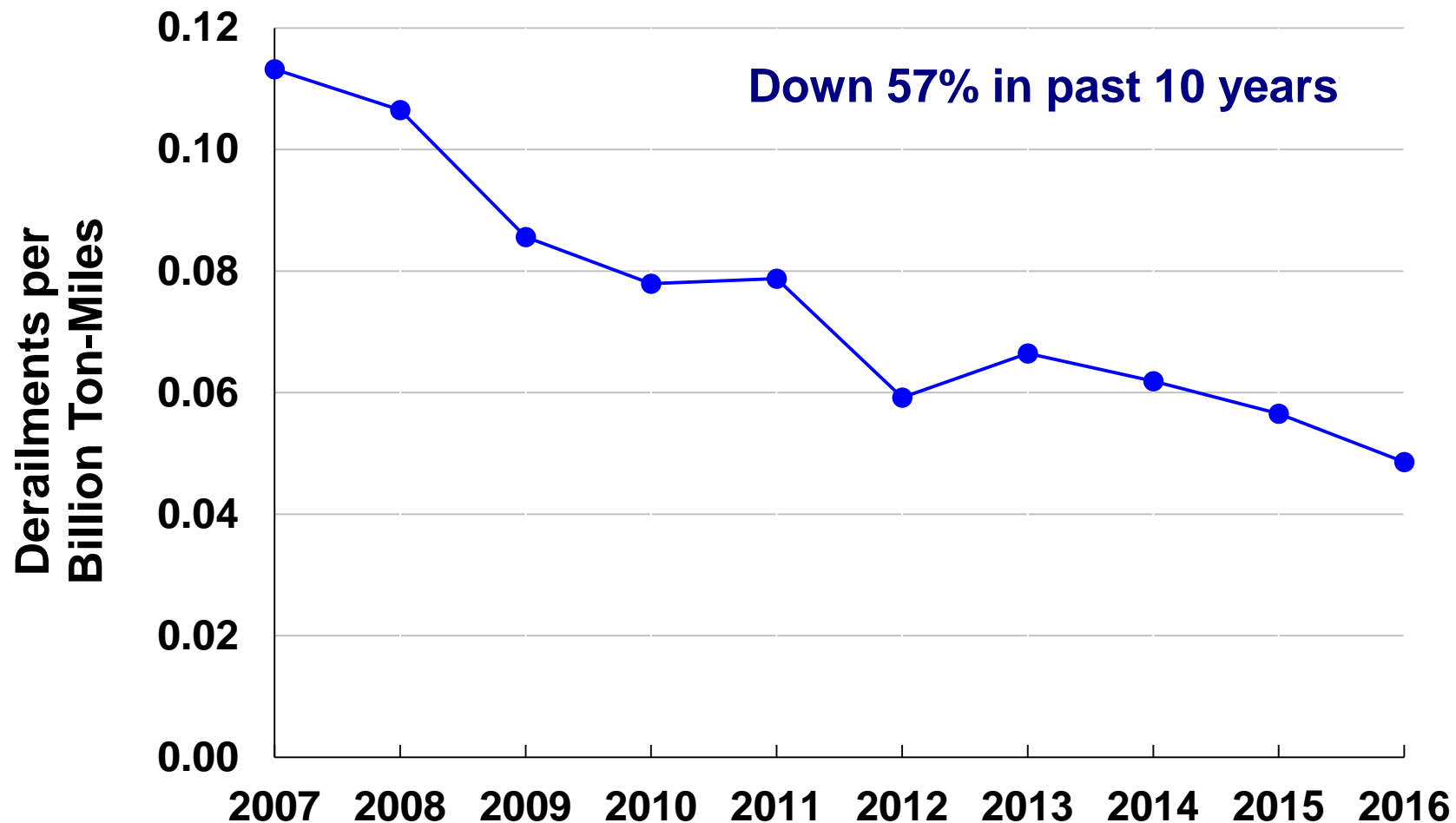
- Improvement in railroad train safety is an ongoing priority
- Need to understand what has improved the most, and what are greatest opportunities for further improvement
- Critical for most effective investment in safety improvement measures
- Of particular significance in terms of development and implementation of new railway inspection technologies



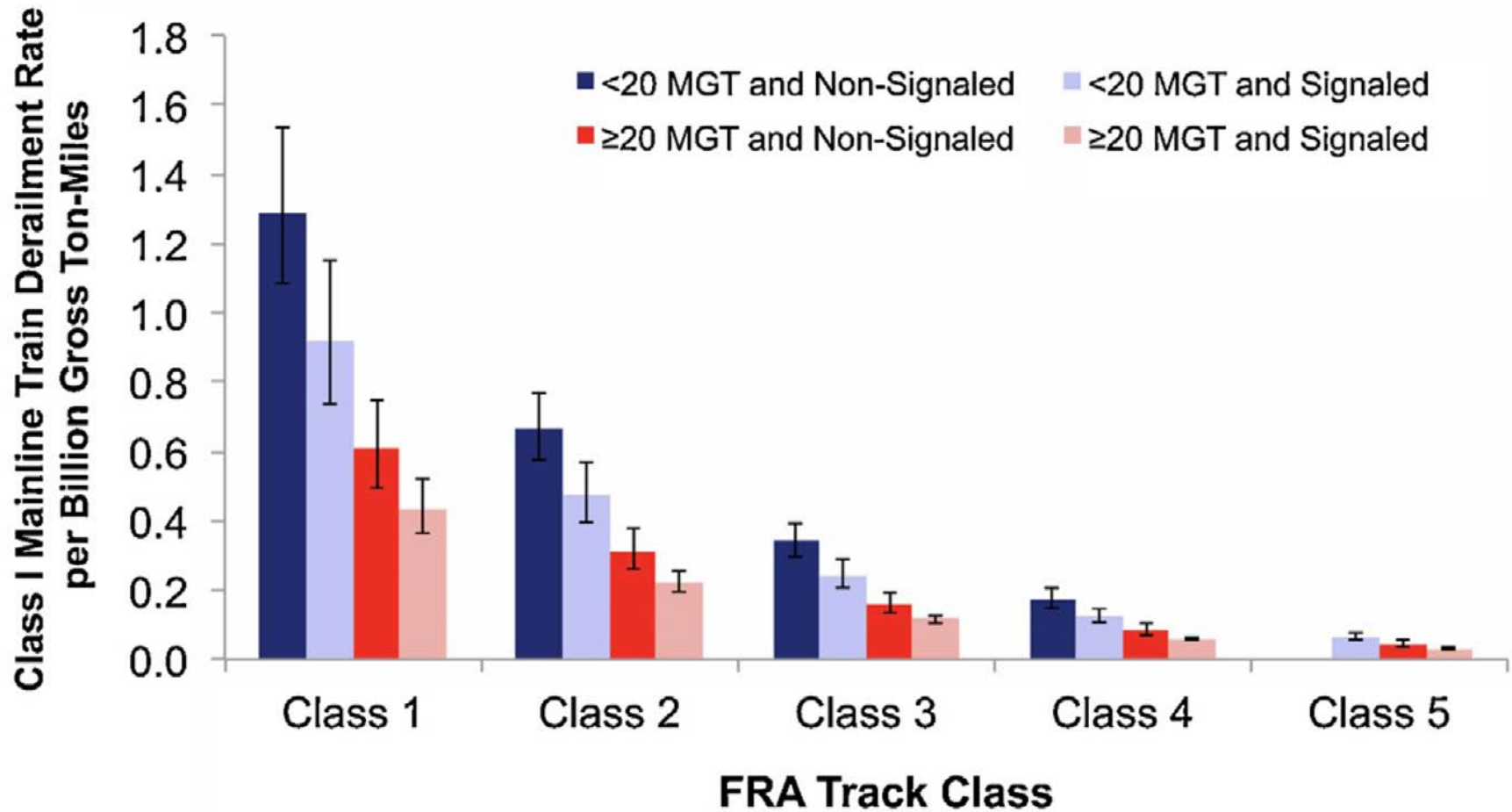
More Than Three Decades of Improving Train Safety



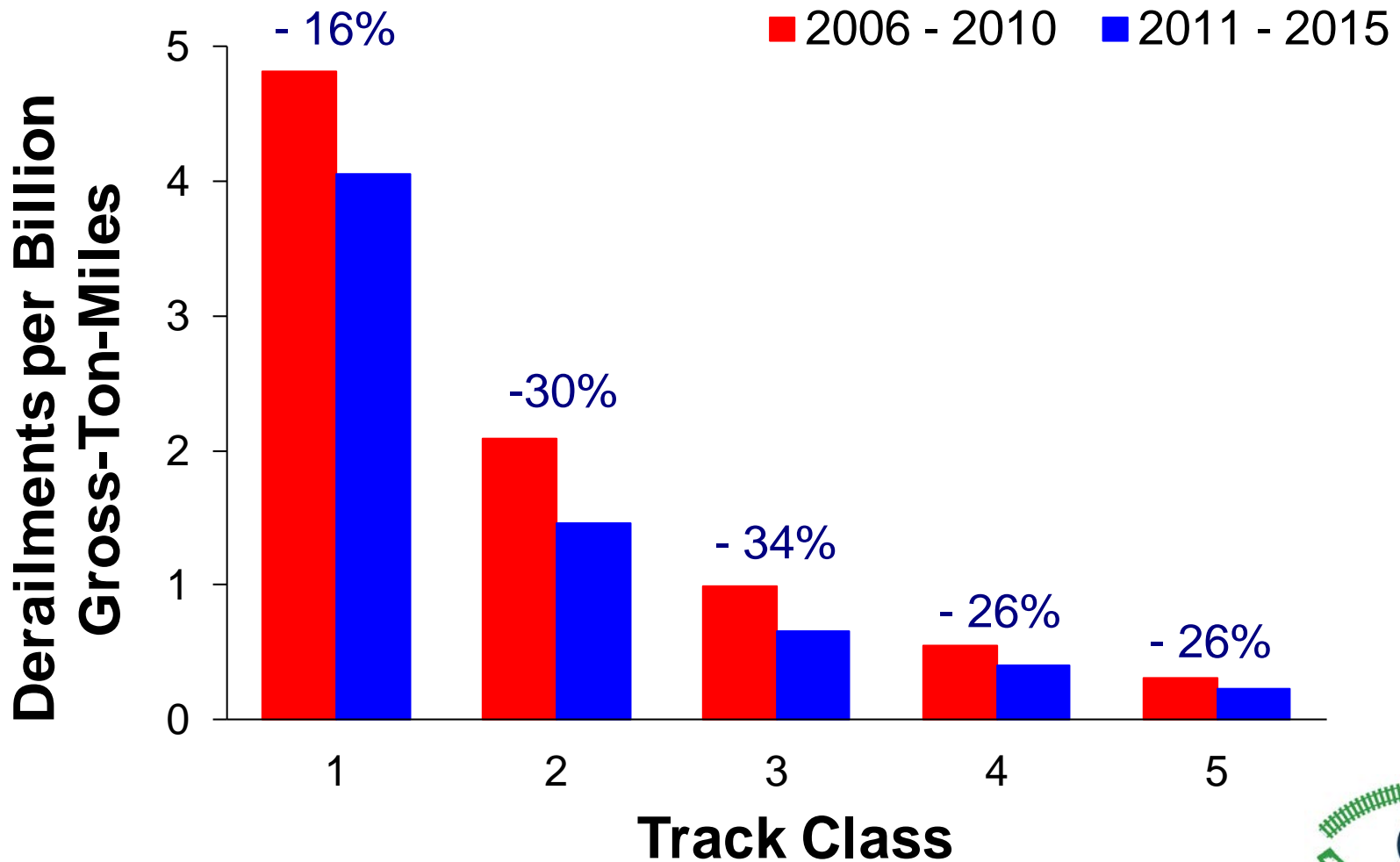
Class 1 Railroad Mainline Derailment Rate



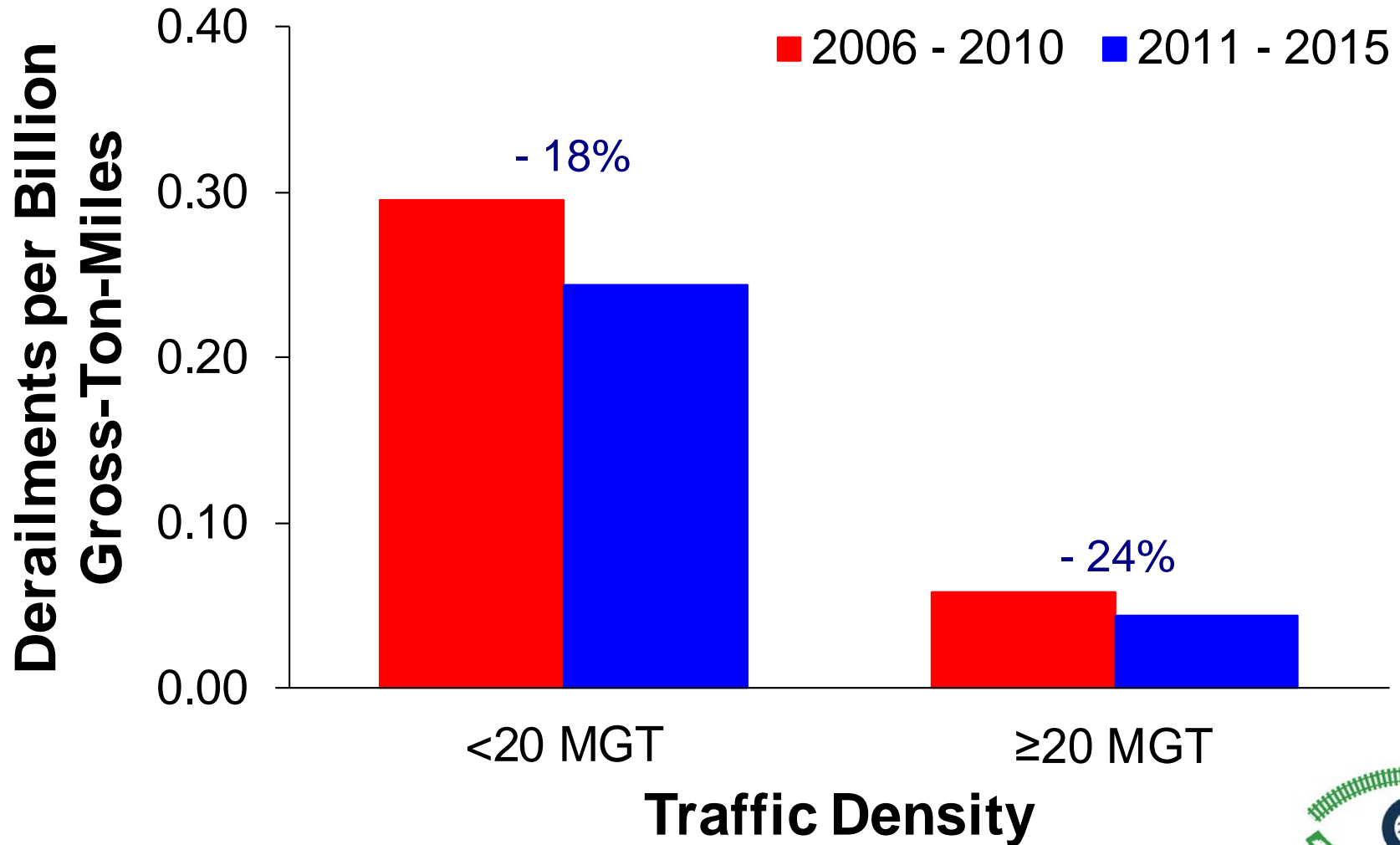
Three-Factor Derailment Rate Estimation: 2005 – 2009



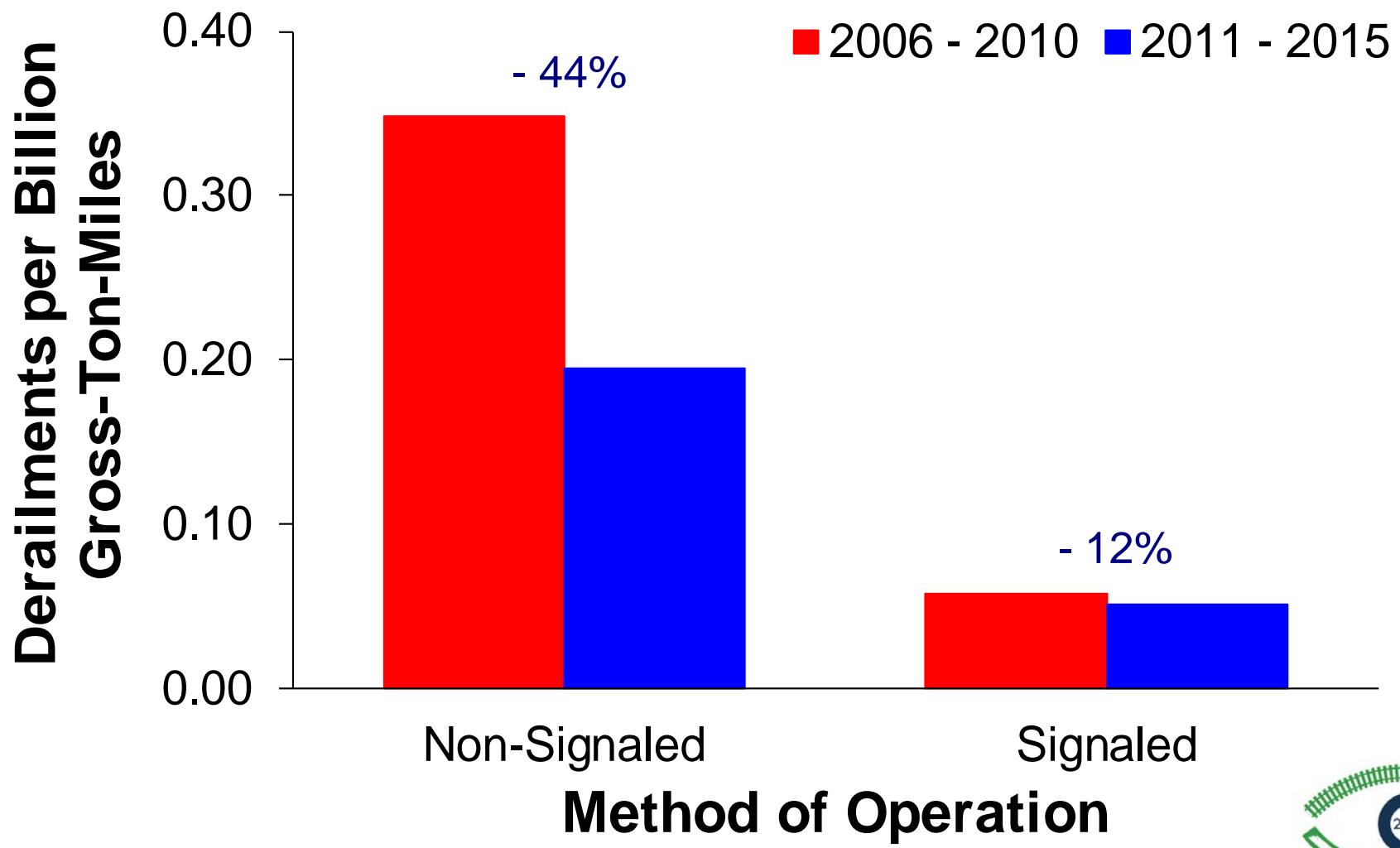
Change in Estimated Derailment Rate by FRA Track Class



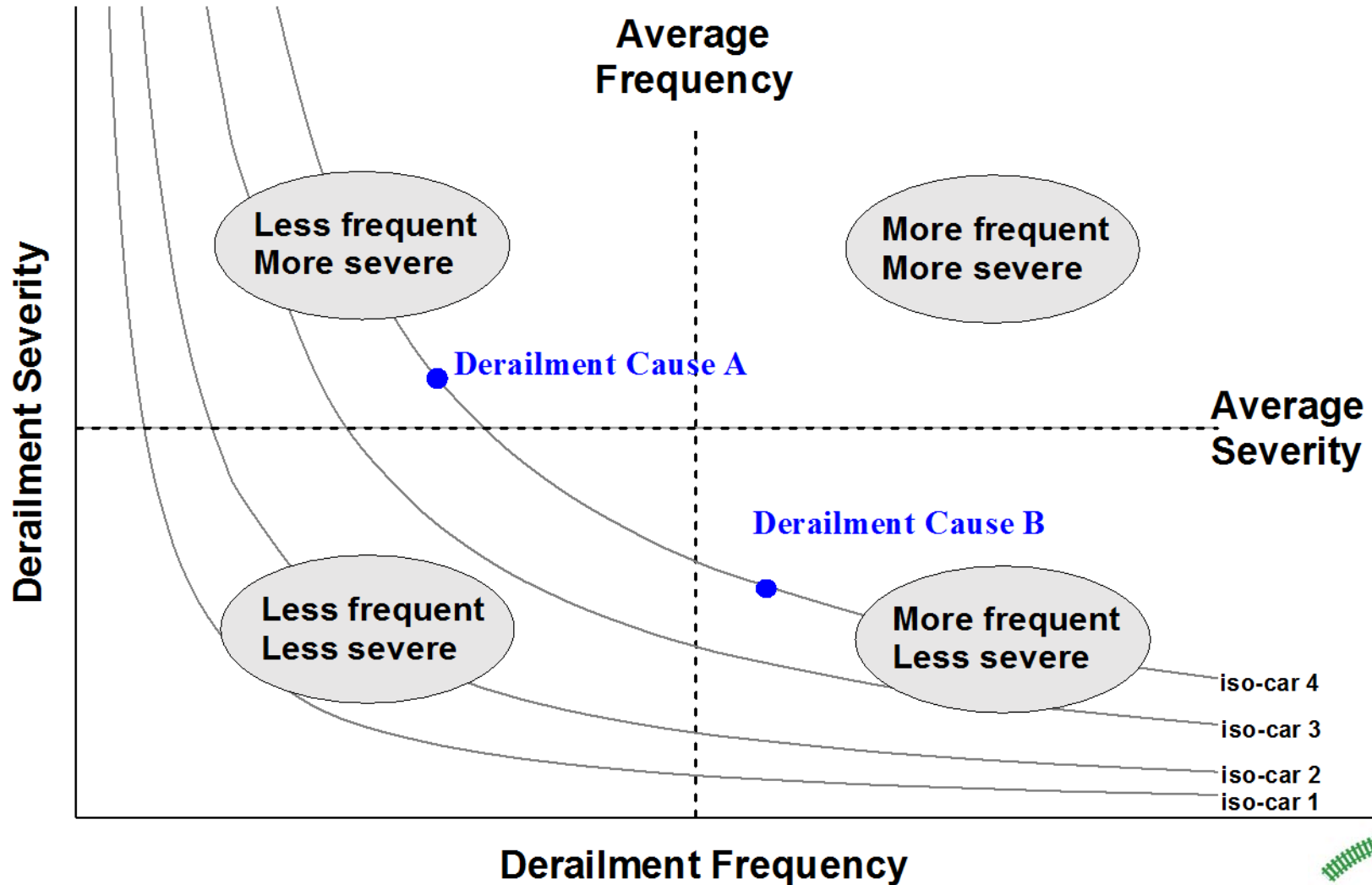
Change in Estimated Derailment Rate by Traffic Density



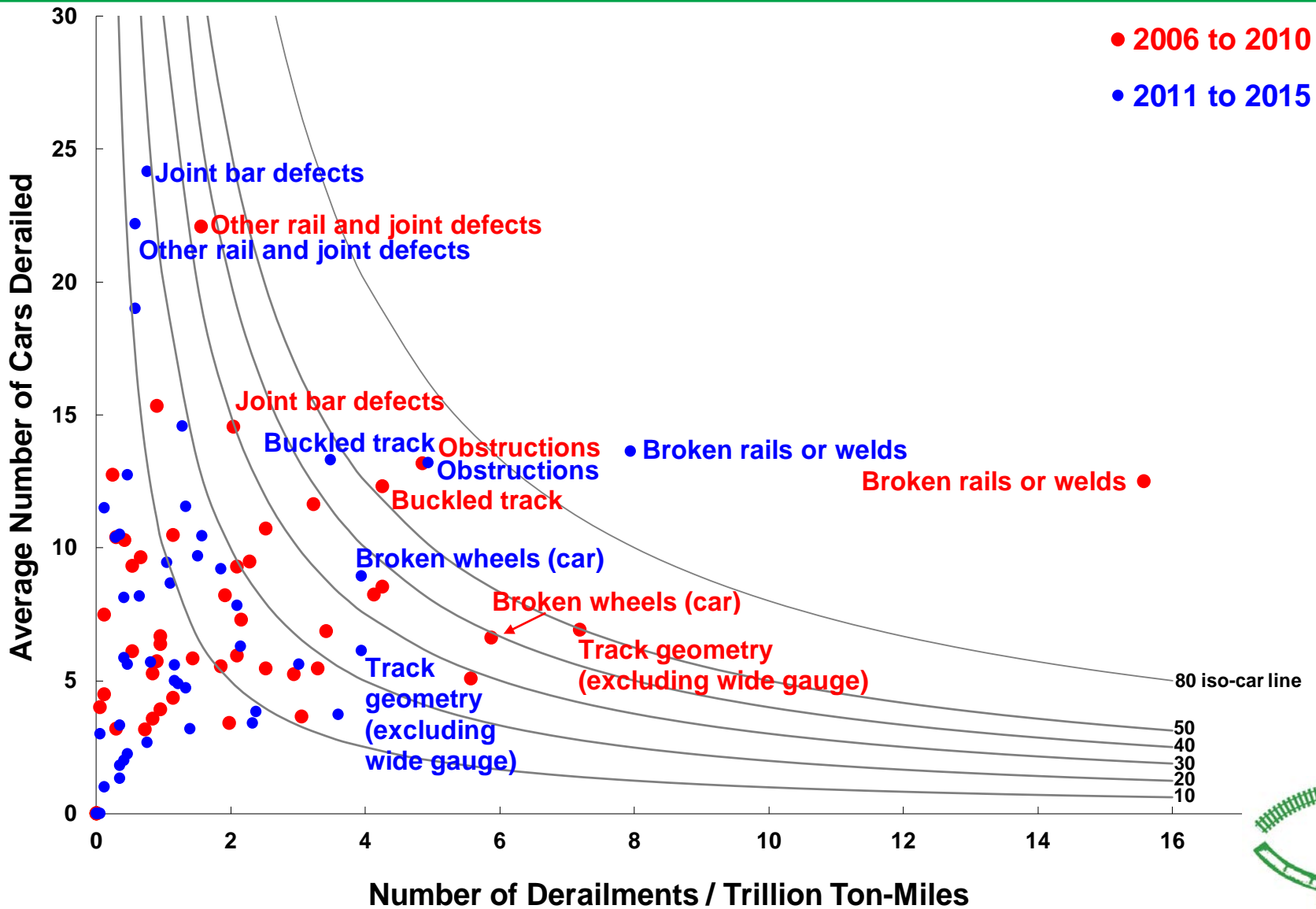
Change in Estimated Derailment Rate by Method of Operation



Derailment Cause: Frequency - Severity

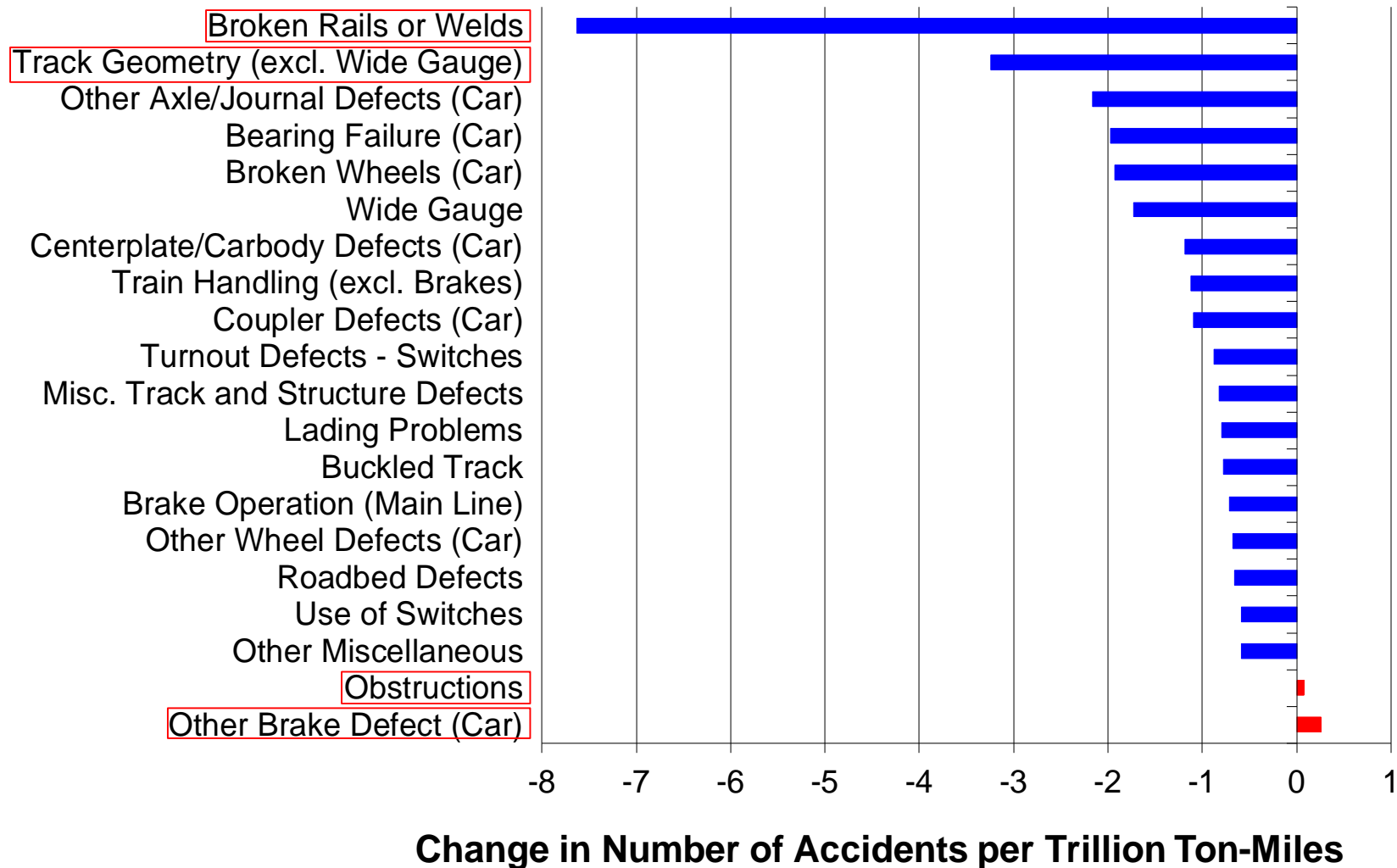


Frequency vs Severity of Class I Mainline Freight Train Derailments

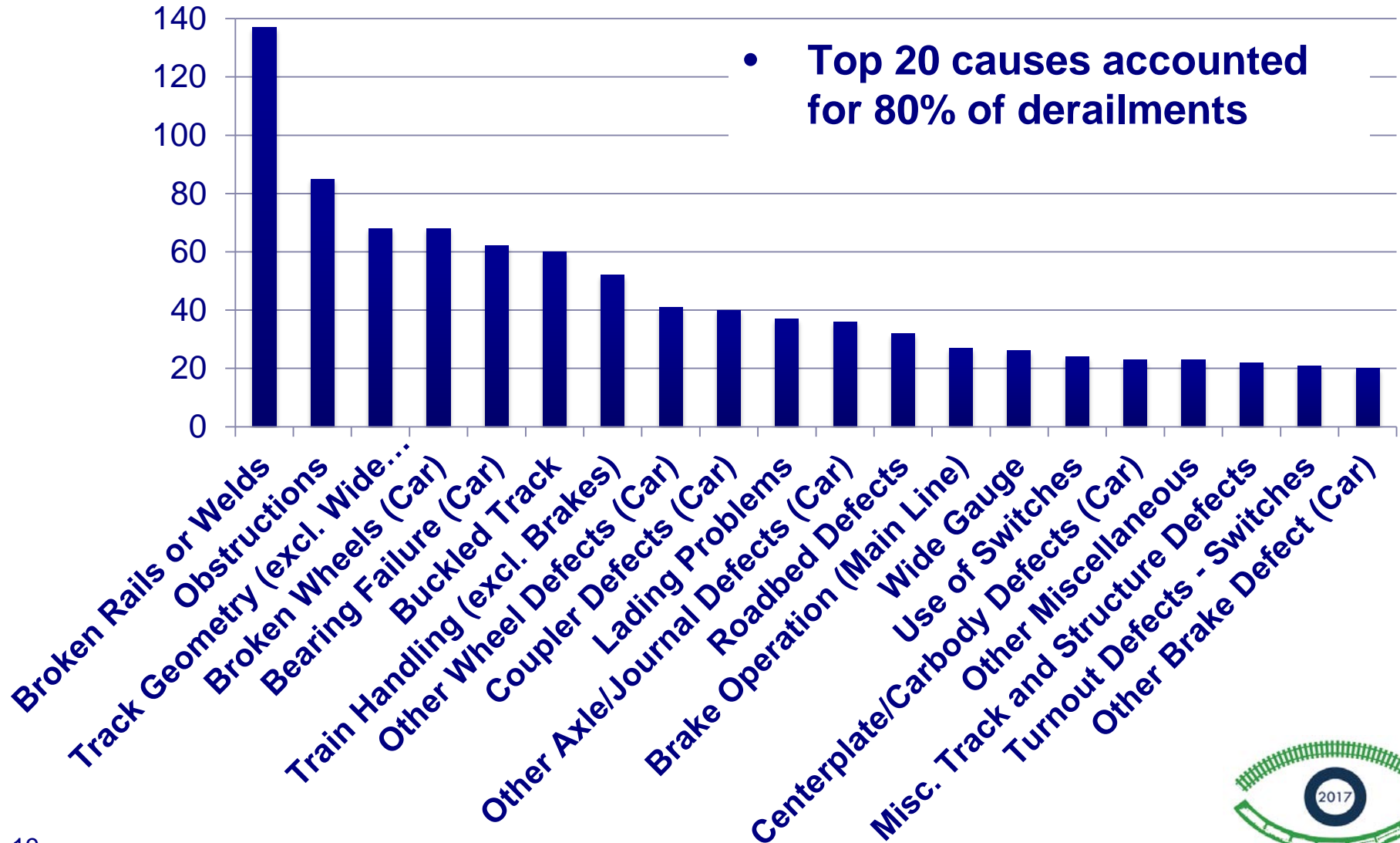


Change in Derailment Frequency by Cause Group

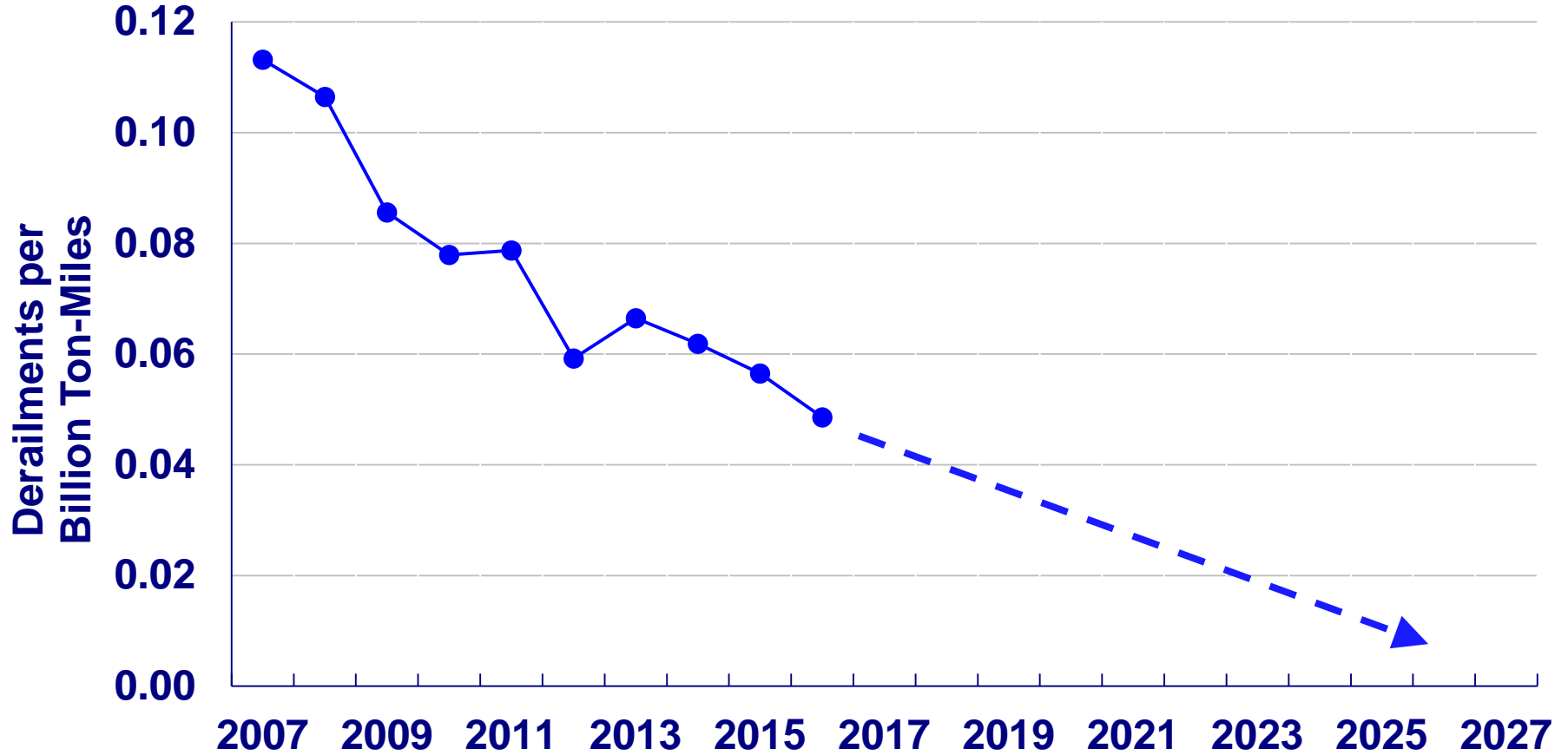
- Broken rails or welds showed the most reduction, followed by track geometry
- Obstructions and other brake defects showed slight increase



Top 20 Class 1 Railroad Mainline Derailment Causes: 2011-2015



Can We Get to (Near) Zero?



Anything is Possible in the Future!



Acknowledgements



U.S. Department
of Transportation



Conference Agenda and Plan for the Day

C. Tyler Dick, P.E.

Senior Research Engineer and Director of Education
Rail Transportation and Engineering Center (RailTEC)
University of Illinois at Urbana-Champaign



Administrative Items

- Wireless Internet Access
 - Instructions on **page 15** of conference program
- Uploading conference presentations
 - Please see Emma Ehrenhart if you have not uploaded your PPT
 - **20 minutes maximum per presentation**
- Administrative Support Staff
 - Tim Gress - Managing Director
 - Lilabeth (LB) Frye - Rail Program Coordinator
 - Emma Ehrenhart - Rail Program Coordinator



Program Changes

- Session on *Rolling Stock: Wayside Systems – Running Gear*
 - was Tuesday 1:25pm in room 2312
 - moves to **Wednesday 3:05pm in room 2312**
- Session on *Infrastructure: Autonomous Inspection Technologies & Inspection Solutions*
 - Tuesday 1:25pm, was in room 2311
 - moves to **room 1310**
- For the latest program updates, see the conference Whova app
 - Free download
 - Instructions on **page 15** of conference program



Tuesday Technical Program

- *Practical Use of UAS Technology*
 - 5 technical presentations, 8:25 – 10:30am, room 1310
- Break (1st Floor Lobby)
- *UAS Technology Challenges & Opportunities*
 - Panel discussion, 11:00 – 11:50am, room 1310
- Lunch and Keynote
- *Infrastructure: Autonomous Inspection Technologies & Inspection Solutions*
 - 4 technical presentations, 1:25 – 3:05pm, room 1310
- Break (1st Floor Lobby) and Gather for Tours



Tuesday Lunch and Keynote

- Lunch today and tomorrow in the Electrical and Computer Engineering (ECE) Building → **Follow student guides**

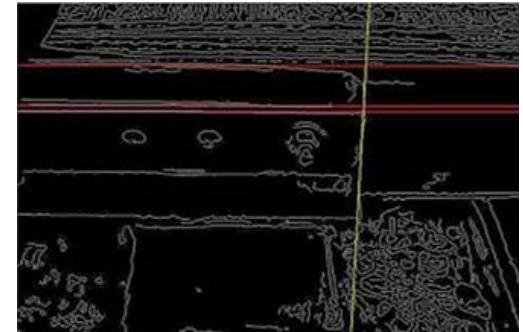


- Tuesday Lunch Keynote Speaker
John Cech
Assistant Vice President
and Chief Engineer,
System Maintenance & Planning
BNSF Railway



Tuesday Technical Tours

- Choose one of three options (see page 6 of program)
- RailTEC Research and Innovation Laboratory (RAIL)
 - Full-scale track loading system
 - Test track section
- Research Lab Walking Tour
 - Computer vision and robotics
 - Nano sensor lab
 - Structural engineering lab
- Blue Waters Supercomputer
 - National Petascale Computing Facility
 - the fastest supercomputer on a university campus



Tuesday Technical Tours (continued)

- Confirm choice of tour with the registration desk by the end of the first break this morning
- Depart at 3:20pm
 - RAIL meet at bus outside Yeh Center
 - Campus lab walking tour meet in 1310
 - Blue Waters meet in 1311
- Arrive back at Newmark Lab Yeh Center by 5pm
- Identification requirements at RAIL (on USACE grounds)
 - **Non-US Citizens**: attendees who submitted their passport details in advance **MUST bring your passport** on the tour
 - **US Citizens**: You **MUST bring a valid state photo ID** (driver's license) on the tour



Reception & Dinner at Memorial Stadium



- 5:35pm Busses depart Yeh Center
- 6:00pm Social Hour at 6:00pm
- 7:00pm Group Photo
- 7:15pm Dinner
- 8:30pm (approx) Busses return
- See page 14 of program for more information

Wednesday Technical Sessions

	2311 Yeh Center	2312 Yeh Center	2310 YEH CENTER
AM	INFRASTRUCTURE Track Inspection Vehicles; More Autonomy, More Data, More Information	ANALYTICS Data -Driven Inspections: Imaging & Machine Learning	
	INFRASTRUCTURE Bridge & Structural Inspection Advances	ANALYTICS Future Inspection with Artificial Intelligence & Augmented Reality	INFRASTRUCTURE <i>Rail Flaw & Rail Weld Defect Detection</i>
PM	INFRASTRUCTURE Ballast/Geotech	ANALYTICS Data-Driven Inspections: Collection & Management	INFRASTRUCTURE <i>Advancements in Crosstie Automated Inspection & Evaluation</i>
	INFRASTRUCTURE Substructure Monitoring & Evaluation	ROLLING STOCK Wayside Systems: Running Gear	

- All technical sessions on second floor of Yeh Center
- Breaks - 2nd Floor Lobby
- Lunch - Electrical and Computer Engineering (ECE) Building





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