



Impact of Risk Reduction Strategies in the U.S. Rail Industry:

Behavior-Based, Continuous Improvement and Safety Leadership Methods Improve Train Crew Safety and Safety Culture

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U.S. Department
of Transportation
**Federal Railroad
Administration**





Obama appoints Killefer Chief Performance Officer to cut waste

- Los Angeles Times, January 8, 2009

Nancy Killefer, a professional efficiency expert, is charged with scouring the federal budget to eliminate programs that don't work and improve those that do. Obama called her appointment "among the most important that I will make."

- The Associated Press, January 8, 2009



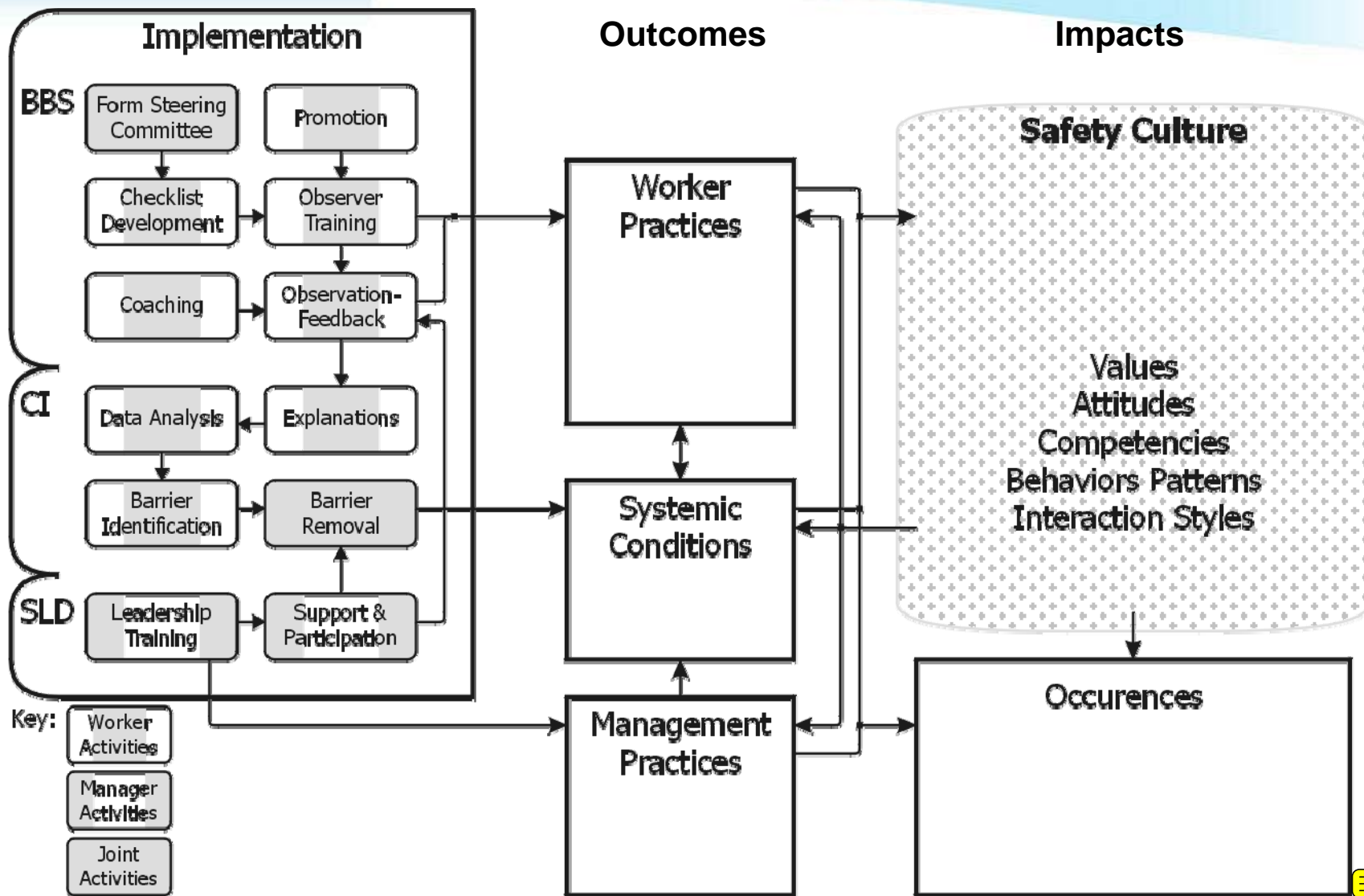
FRA Strategic Goals

- Demonstrate an innovative risk reduction approach for improving safety and safety culture in the railroad industry
 - *proactive, positive and cooperative communication processes;*
 - *systematic, objective data collection and reporting with corrective actions*
 - *sustainable*
- Develop successful implementation models in the rail industry in non-traditional *dispersed work environments* and different organizational levels
 - *station services*
 - *in-cab communications*
 - *switching operations*
 - safety leadership training (management, labor, government)
- Document and report on implementation, impact, and effectiveness of each model program
- If successful, stimulate adoption of model programs and new safety approach across industry





Clear Signal for Action (CSA) Theory of Change





CSA Risk Reduction Demonstration Pilots

Location	Name	Type of Work	Evaluation Period
Amtrak, Chicago	EAGLES	Baggage	2001-2005
UP, San Antonio	CAB	Road & Yard	2005-2007
UP, Livonia	STEEL	Yard	2006-2009

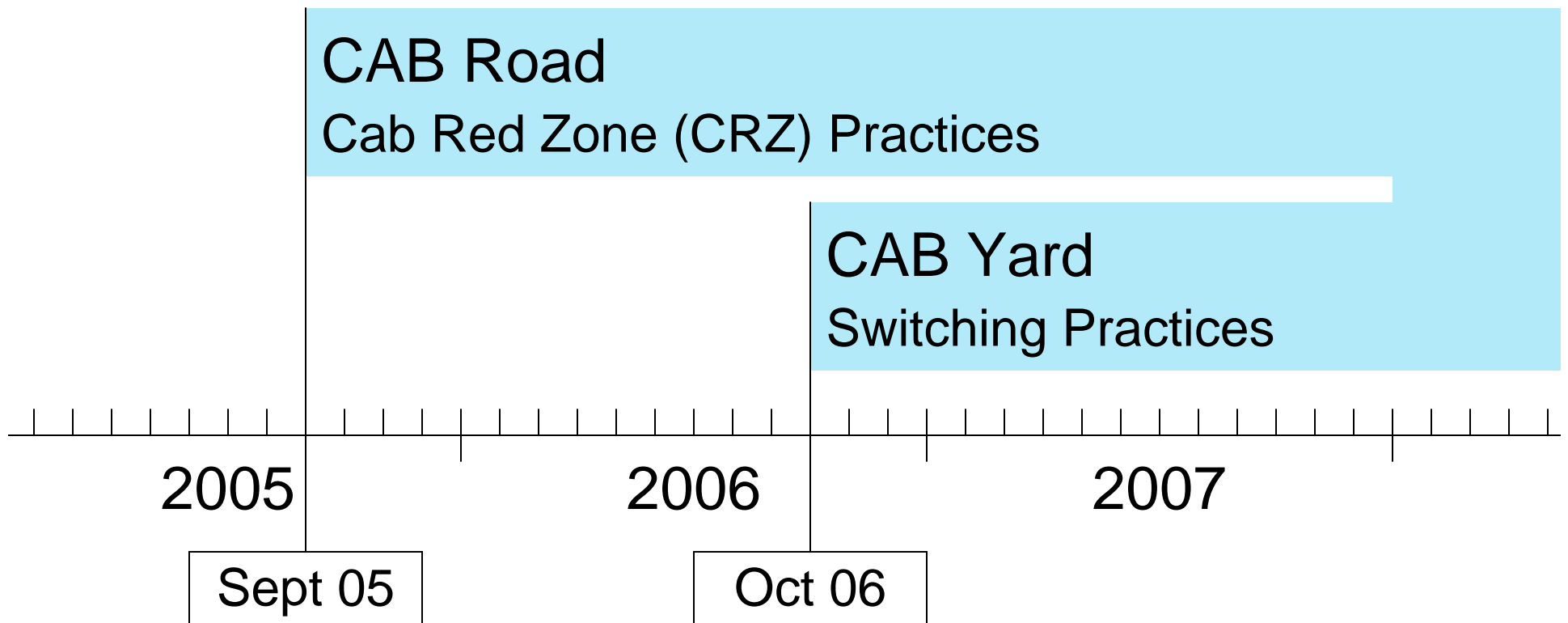


Demonstration CSA Pilots to Answer Four **Evaluation** Questions

- What makes a successful **CSA** **implementation**?
- Do **safety and culture** improve as a result?
- Will the intervention be **sustained over time**?
- Does the intervention **transform the culture**?

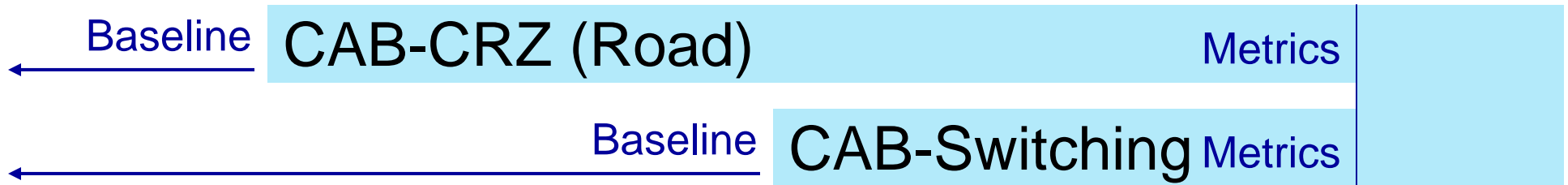


CSA Demonstration Pilot: Changing At-risk Behavior (CAB)

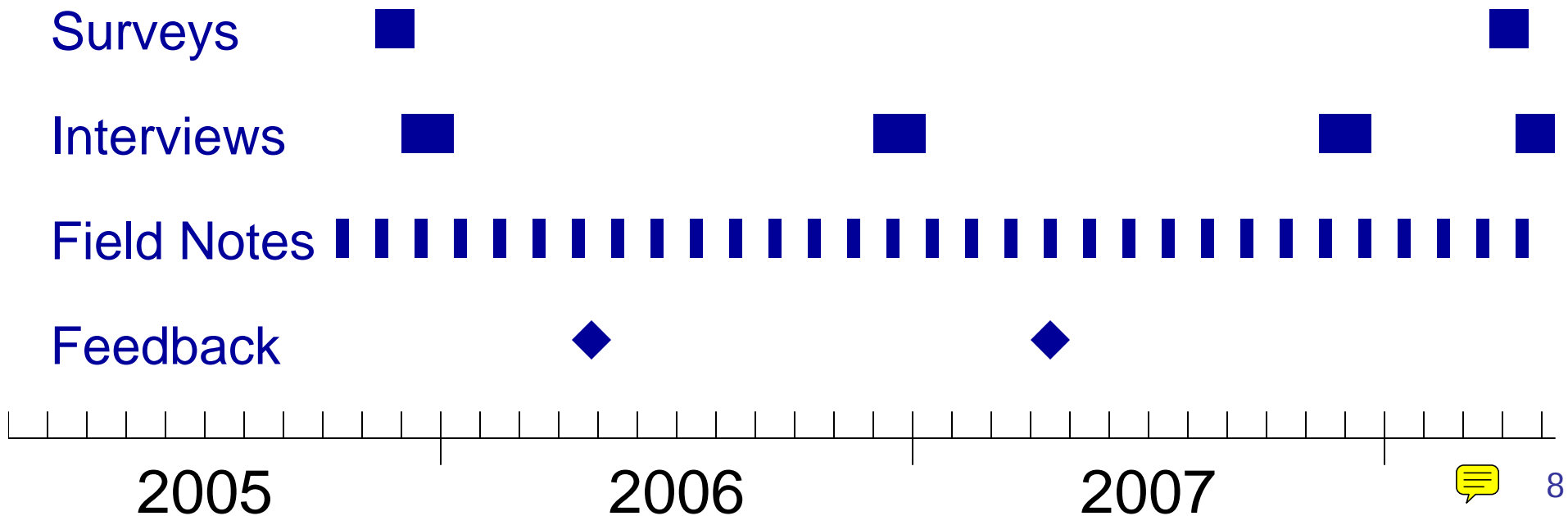




Evaluation Methods



Corporate Safety Data (1/01—11/07)





Implementation: Effective if not Ideal

Measures

Results

Proc Metrics	Constant training
Proc Metrics	Adequate sampling
Interviews	Employee acceptance
Interviews	Management support and commitment
Interviews	Training and communication
Interviews	Process evolution and expansion
Field Notes	Worker-management cooperation

Details:

Ranney J, Zuschlag M & Coplen M 2008. Improvements in U.S. Railroad Road Crew Safety Associated with Behavior-Based and Continuous Improvement Safety Methods. Transportation Research Board 87th Annual Meeting, Washington DC, January, 2008.



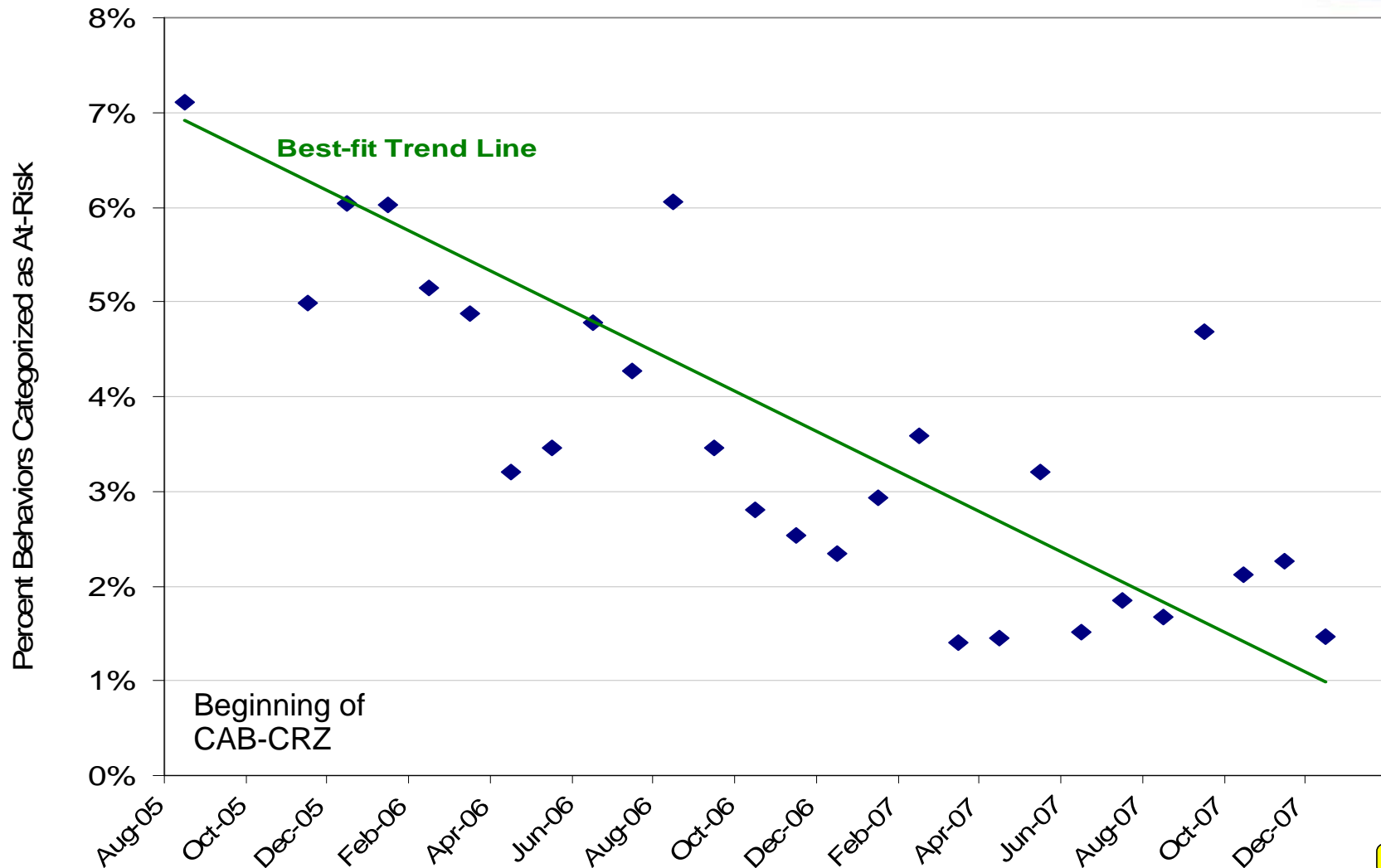


Safety and Culture Outcomes & Impacts



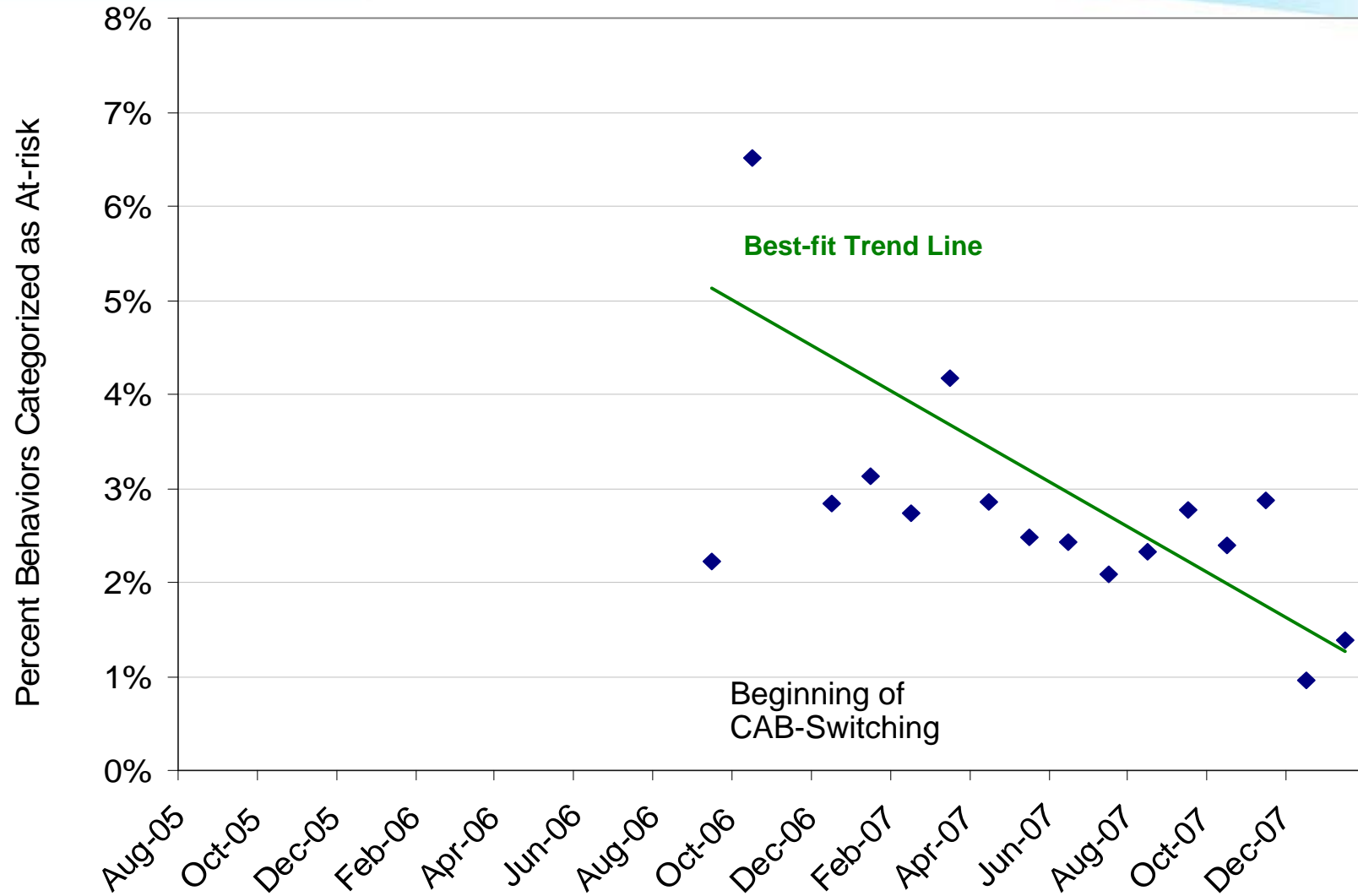


Process Metrics: More safe and less at-risk CRZ behavior in road employees





Process Metrics: Yard employees also showing more safe and less at-risk behavior





Notes and Interviews: Management Removes Barriers to Safety

- A/C in lead locomotives
- Facilities & equipment improvements
 - Most workers and managers report improvements in facilities and equipment since the baseline phase
- Work schedule and fatigue issues addressed
 - Many workers and some managers report improvements in the predictability of work schedules, helping workers better manage fatigue



Corporate Safety Data

Data	Decertifications	HF Incidents
Application	CAB-CRZ	CAB-Switching
Start Date	9/1/2005	10/1/2006
Normalization	Worker-hours between decerts	Car-moves between incidents

“Work completed between events”
normalization for more power

Opposite of “events per x amount
of work” (higher = safer)



Decertifications Data Comparisons

Compare	Effect Expected	Relative To
Time	During CAB-CRZ	Before CAB-CRZ
Service Units	San Antonio Service Unit (SASU)	Others (Fort Worth, Houston, Livonia)
Decert Type	Related to CRZ (Stop, Speed, Main Track Authority)	Not Related to CRZ (Drugs & Alc., Brake Test, Alert Tampering)



Safety Data: CRZ-related Decerts Improving at SASU, not elsewhere

Worker-hours Between Decertifications

Correlations with Date

Location	Type	Before CAB-CRZ		During CAB-CRZ	
		<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>
SASU	Stop Speed MT	.031	45	.347*	40
Other	Stop Speed MT	-.071	141	-.078	180
SASU	D&A Brake Tamper	.479	13	-.345	10

* $p < 0.05$



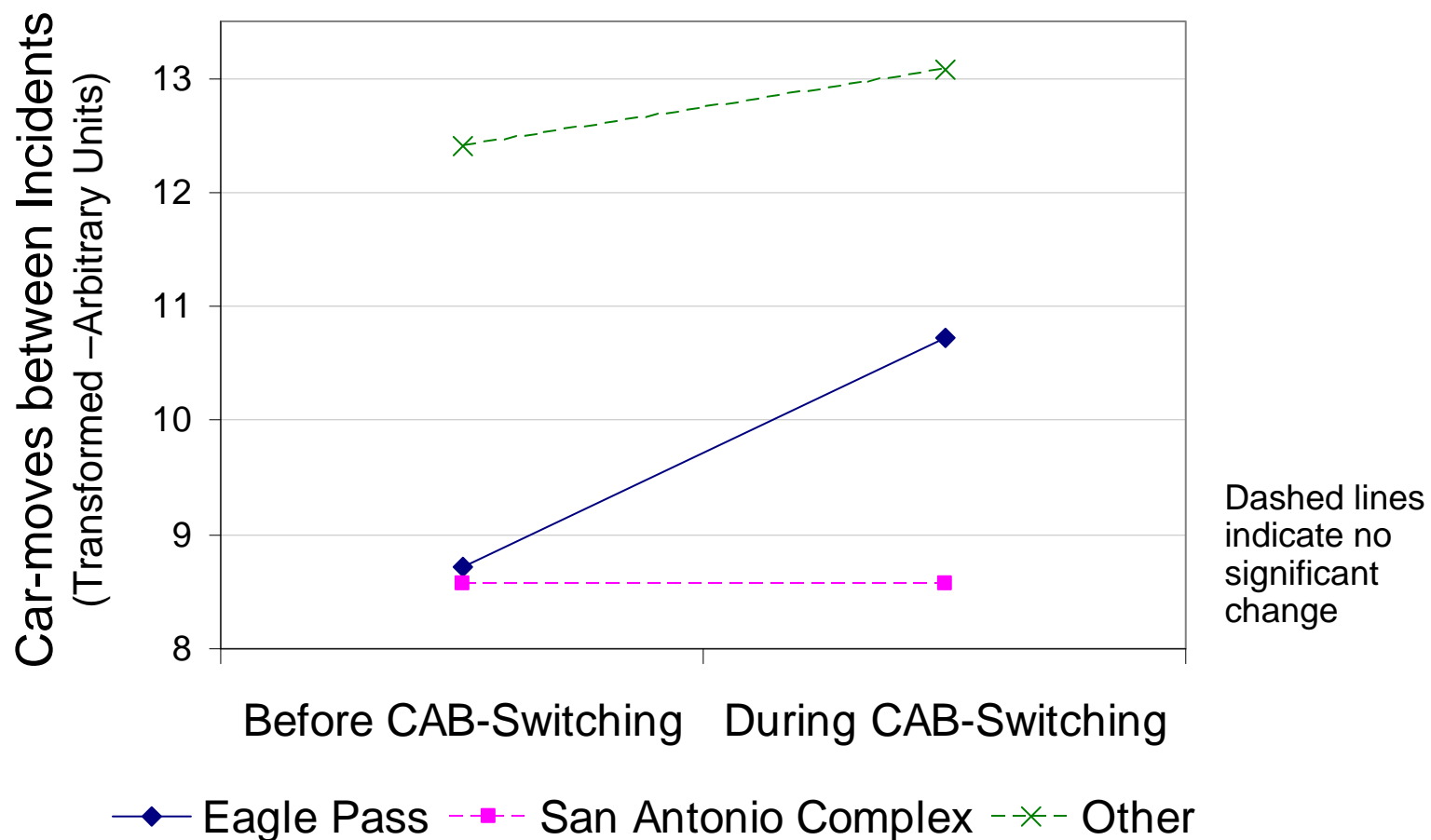
HF Incident Data Comparisons

Stations in SASU	Implementation	Effect Expected
Eagle Pass	Very Strong	High
San Antonio Complex	Moderate	Moderate
Other	None	Low



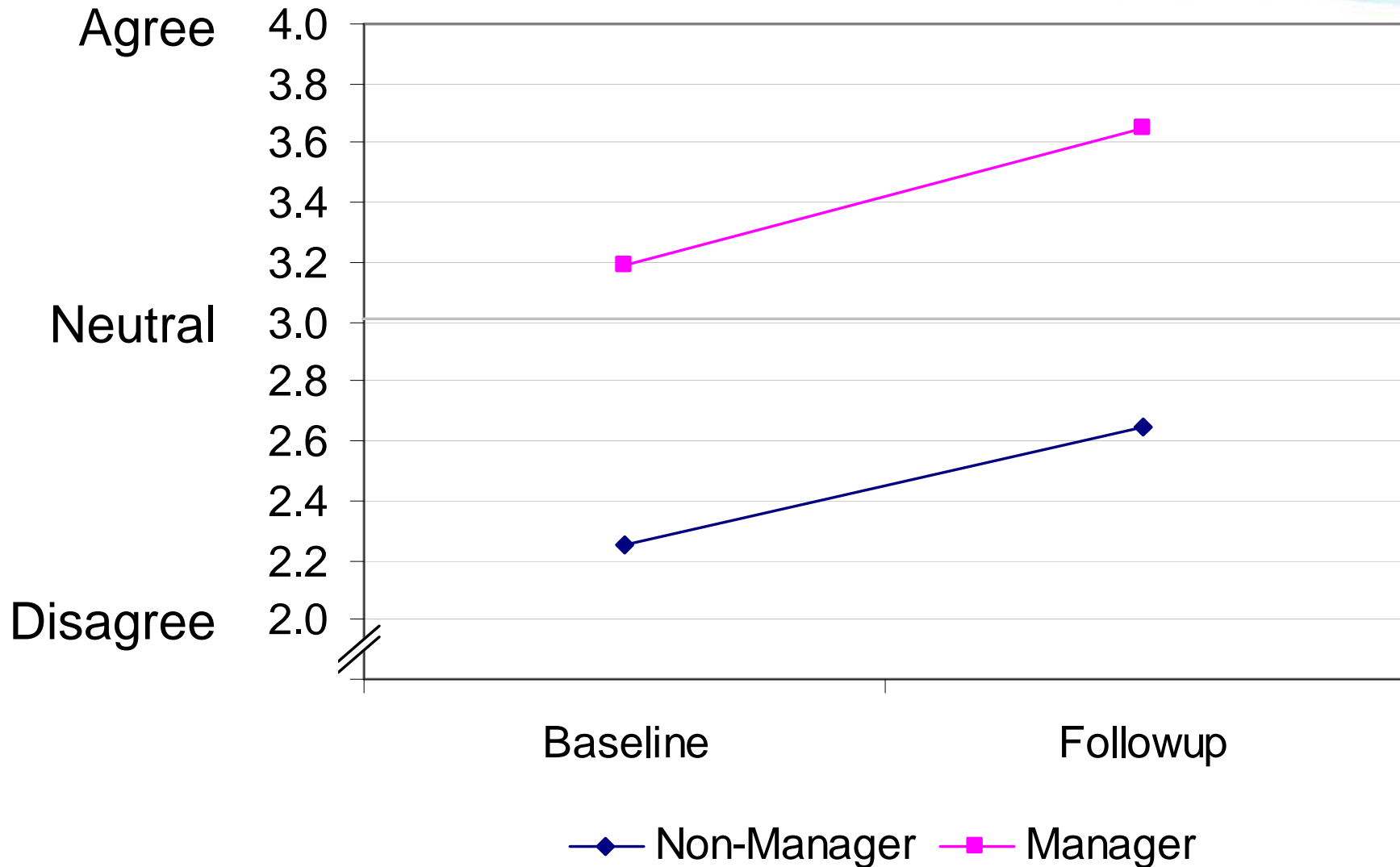
Safety Data: Fewer Incidents in Yard with Most Concentrated Implementation

Yard & Industry Track Only





Survey: Management-labor Relations Reported to be Improving





Sustainability: Strong indications of resilience and adaptability

Measures	Results
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Field Notes	Challenges met and overcome
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Contact rate increased through motivation plan

Administrative cost cut, and budget increased

Managers take an increasingly active role.

Field Notes	Succession plan carried out on schedule
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Transformation: Pro-active non-punitive safety spreading throughout UP and rail industry

Measures	Results
Field Notes	CSA expands through entire corporation as “Total Safety Culture”
Field Notes	Reduced reliance on discipline for safety Reversal of rule-violation penalties Positive evaluation points earned passed field operations tests More emphasis on coaching in field operations testing
Field Notes	Interest in CSA increases in government and at other companies



Conclusions

- CSA can be implemented to work in the railroad industry, including yard and road
- CSA improves safety, reducing accidents and close calls (decerts)
- CSA improves safety culture, promoting safety communication and enhancing labor-management relations
- CSA can be sustained through a process for adaptation
- CSA transformed the organization and industry towards more risk-reduction approaches