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Federal Railroad
Administration

USDOT Federal Railroad Administration's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention: Volume II—Appendices

Office of Research
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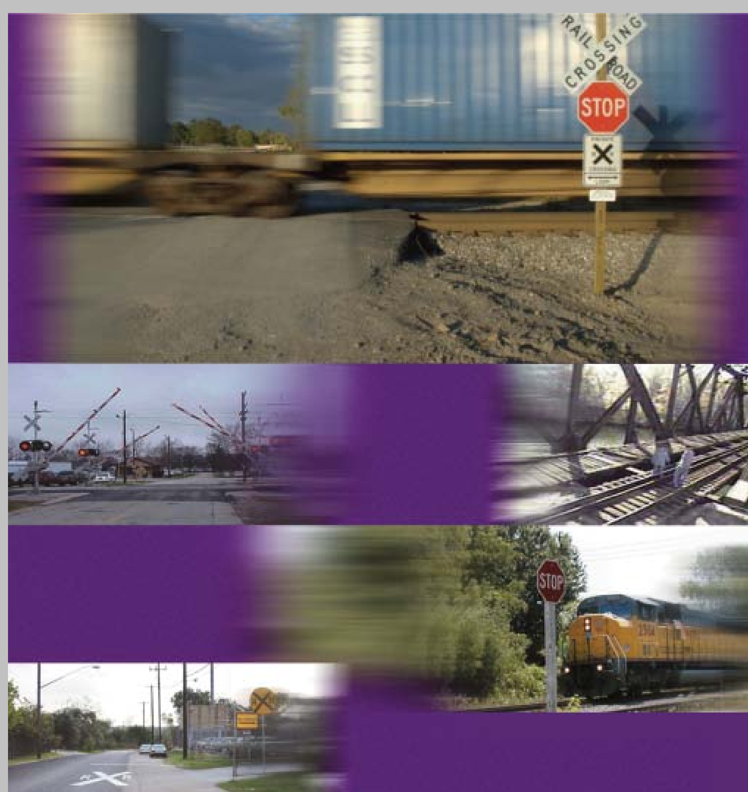
Washington, D.C. 20590



Safety of Highway-Railroad Grade Crossings

DOT/FRA/ORD-10-/01

Final Report
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13. ABSTRACT (Maximum 200 words)

On July 14-16, 2009 the Volpe Center hosted the United States Department of Transportation (US DOT) Federal Railroad Administration's (FRA) Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention (workshop). The primary purpose of this workshop was to bring together nationally and internationally recognized subject matter experts to collaborate, identify and prioritize specific research needs to facilitate the reduction of highway-rail grade crossing and trespass incidents and fatalities for incorporation into the strategic vision of FRA, other US DOT modes and their stakeholders. There were approximately 90 participants, including support staff, over the two-and-a-half day workshop, representing the Federal, State, and local governments, as well as railroads, transit agencies, labor unions, academia, non-profit organizations, and consultants.

The Research Needs Workshop was organized into six research needs areas and four cross-cutting areas by the steering committee's recommendation. The research needs areas were: Grade Crossing Modernization, Traffic Patterns, New Technology Opportunities, Regulation and Enforcement, Education and Public Awareness and Institutional Issues. The four cross-cutting areas were Human Factors, Transit-Oriented Communities, Data Requirements and Efforts Related to High Speed Rail. This document provides the supporting and ancillary information to the Proceedings report (in Volume I) including presentations and all generated research needs.

14. SUBJECT TERMS
Highway-rail grade crossing, rail industry, safety, security, fatalities, research needs, trespasser, trespass prevention, railroad

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ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in)	=	2.5 centimeters (cm)
1 foot (ft)	=	30 centimeters (cm)
1 yard (yd)	=	0.9 meter (m)
1 mile (mi)	=	1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in^2)	=	6.5 square centimeters (cm^2)
1 square foot (sq ft, ft^2)	=	0.09 square meter (m^2)
1 square yard (sq yd, yd^2)	=	0.8 square meter (m^2)
1 square mile (sq mi, mi^2)	=	2.6 square kilometers (km^2)
1 acre = 0.4 hectare (he)	=	4,000 square meters (m^2)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz)	=	28 grams (gm)
1 pound (lb)	=	0.45 kilogram (kg)
1 short ton = 2,000 pounds (lb)	=	0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp)	=	5 milliliters (ml)
1 tablespoon (tbsp)	=	15 milliliters (ml)
1 fluid ounce (fl oz)	=	30 milliliters (ml)
1 cup (c)	=	0.24 liter (l)
1 pint (pt)	=	0.47 liter (l)
1 quart (qt)	=	0.96 liter (l)
1 gallon (gal)	=	3.8 liters (l)
1 cubic foot (cu ft, ft^3)	=	0.03 cubic meter (m^3)
1 cubic yard (cu yd, yd^3)	=	0.76 cubic meter (m^3)

TEMPERATURE (EXACT)

[(x-32)(5/9)] °F = y °C

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeter (mm)	=	0.04 inch (in)
1 centimeter (cm)	=	0.4 inch (in)
1 meter (m)	=	3.3 feet (ft)
1 meter (m)	=	1.1 yards (yd)
1 kilometer (km)	=	0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm^2)	=	0.16 square inch (sq in, in^2)
1 square meter (m^2)	=	1.2 square yards (sq yd, yd^2)
1 square kilometer (km^2)	=	0.4 square mile (sq mi, mi^2)
10,000 square meters (m^2)	=	1 hectare (ha) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gm)	=	0.036 ounce (oz)
1 kilogram (kg)	=	2.2 pounds (lb)
1 tonne (t)	=	1,000 kilograms (kg)
	=	1.1 short tons

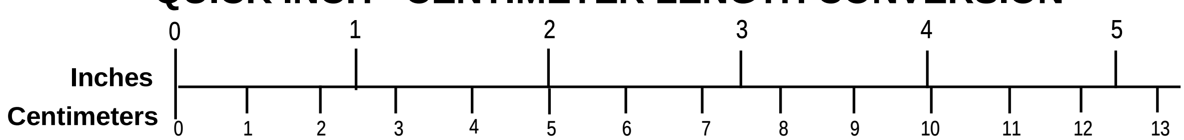
VOLUME (APPROXIMATE)

1 milliliter (ml)	=	0.03 fluid ounce (fl oz)
1 liter (l)	=	2.1 pints (pt)
1 liter (l)	=	1.06 quarts (qt)
1 liter (l)	=	0.26 gallon (gal)
1 cubic meter (m^3)	=	36 cubic feet (cu ft, ft^3)
1 cubic meter (m^3)	=	1.3 cubic yards (cu yd, yd^3)

TEMPERATURE (EXACT)

[(9/5) y + 32] °C = x °F

QUICK INCH - CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT - CELSIUS TEMPERATURE CONVERSIO

°F	-40°	-22°	-4°	14°	32°	50°	68°	86°	104°	122°	140°	158°	176°	194°	212°
°C	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°

For more exact and or other conversion factors, see NIST Miscellaneous Publication 286, Units of Weights and Measures. Price $2.50
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John P. McGuiggin, Chief, Systems Engineering and Safety Division, USDOT Research and Innovative Technology Administration (RITA) Volpe National Transportation Systems Center (Volpe Center), provided managerial direction and support for the workshop. Anya A. Carroll, National Expert, Multimodal Surface Transportation, Physical Infrastructure Systems Center of Innovation, Volpe Center, and Marco daSilva, Highway-Rail Grade Crossing and Trespass Research Program Manager, Systems Engineering and Safety Division, Volpe Center, provided overall direction for the workshop. Debra Chappell, Systems Engineering and Safety Division, Volpe Center, served as the Team Leader. The RNW logistical support was provided by Patrick Bien-Aime, Steven Peck, Tashi Ngamdung, Adrian Hellman, Dan Kubaczyk, and Erica Squillacioti, of the Systems Engineering and Safety Division, Volpe Center. The RNW Team Facilitators were Rachel Winkeller, Jeff Bryan, Aaron Jette, Suzanne Sloan, Rachael Barolsky, Cassandra Oxley, and David Damm-Luhr of the Volpe Center.

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Appendix B. Agenda, Correspondence, and Forms

Contents

<u>**Agenda**</u>

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention

John A. Volpe National Transportation Systems Center
July 14-16, 2009 • Cambridge, Massachusetts

JULY 14, 2009

8:00 AM **REGISTRATION AND CONTINENTAL BREAKFAST–AUDITORIUM LOBBY (BUILDING 2)**
U.S. Department of Transportation
Research and Innovative Technology Administration's
John A. Volpe National Transportation Systems Center (Volpe Center)

8:30 AM **WELCOME**
Robert Dorer, Director of Physical Infrastructure Systems Center of Innovation
Volpe Center
Richard R. John, Acting Director, Director Emeritus
Volpe Center

8:45 AM **OPENING REMARKS**
- David Matsuda, Acting Assistant Secretary for Transportation Policy
U.S. Department of Transportation
- Jo Strang, Associate Administrator for Railroad Safety and Chief Safety Officer
Federal Railroad Administration
- Dr. Magdy El-Sibaie, Director, Office of Research and Development
Federal Railroad Administration

9:30 AM **GENERAL SESSION PRESENTATION**
Level Crossing Needs: Thoughts from Overseas
Aidan E. C. Nelson, Co-Director
Community Safety Partnerships, Ltd. (United Kingdom)

9:50 AM **WORKSHOP PARTICULARS**
John McGuiggin, PE, PMP
Chief, Systems Engineering and Safety Division
Volpe Center

10:00 AM **HUMAN FACTORS: A RESEARCH NEEDS CROSS-CUTTING AREA**
Applying a Sociotechnical Framework for Improving Safety at Highway-Railroad Grade Crossings

Jordan Multer, Ph.D., Manager, Rail Human Factors Program
Volpe Center

10:30 AM ***Break***

10:45 AM **GRADE CROSSING MODERNIZATION**
TEAM LEADER: BRIAN GILLERAN, FEDERAL RAILROAD ADMINISTRATION

This research needs area will focus on the identification and evaluation of conventional and enhanced systems at or near highway-rail grade crossings. The research in this area lays a foundation for the development of innovative technologies, methodologies, and countermeasures with a potential high return for R&D.

Speakers:
Accessibility Issues at Highway-Rail Grade Crossings
David Peterson, Senior Manager, Industry and Public Projects
Union Pacific Railroad

Education and Analysis—Highway-Rail Grade Crossings in the Modern World
Paul O'Brien, Rail Service General Manager
Utah Transit Authority

11:30 AM **TRAFFIC PATTERNS**
TEAM LEADER: ANYA A. CARROLL, VOLPE CENTER

This research needs area will focus on creating a better understanding of the highway traffic pattern and its impact on highway-rail grade crossing safety and railroad infrastructure. The research in this area will support the need to plan and implement efficient rail corridors and highway/pedestrian geometric features to reduce delays and congestion, thereby increasing throughput of the railroad and highway networks.

Speakers:
Roundabouts at or Near Highway-Rail Grade Crossings
Mark Morrison, Grade Crossing Safety Engineer
Wisconsin Department of Transportation

The Massachusetts Bay Transportation Authority: Lessons Learned
Gerard J. Ruggiero, WSO-CSS, Deputy Director of Safety
Massachusetts Bay Transportation Authority
Safety Department

Lorraine M. Pacocha, Senior Project Coordinator
Massachusetts Bay Transportation Authority

Design and Construction Department

12:15 PM **LUNCH (ON YOUR OWN)**

1:30 PM **NEW TECHNOLOGY OPPORTUNITIES**
TEAM LEADER: RICK CAMPBELL, CAMPBELL TECHNOLOGY CORPORATION

This research needs area targets various innovative technologies and technology transfer opportunities to test for applicability (and implementation if deemed a valuable tool) within the rail infrastructure. The research in this area will allow for the development and/or assessment of techniques or technologies that reduce incidents along the railroad rights-of-way, as well as to enhance congestion mitigation of the rail's infrastructure.

Speakers:
Queue-Cutter Signals at Highway-Rail Grade Crossings
Brent Ogden, Vice President
AECOM

Effectiveness of LED Signs at Passive Crossings
John Shurson, Assistant Director of Public Projects
Burlington Northern Santa Fe Railway Company

Warrants for Pedestrian Treatments at Highway-Rail Grade Crossings
Dan Guerrero, Director of Communications and Signals
Metrolink Los Angeles

2:15 PM **REGULATION AND ENFORCEMENT**
TEAM LEADER: DEBORAH M. FREUND, FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION

This research needs area targets a review and analysis of current regulations, policies, and programs to enhance safety along the railroad rights-of-way. The research in this area will facilitate standardization of regulation and enforcement efforts nationwide, which has the potential to reduce the number of violation and incident rates.

Speakers:
Commercial Driver's License Program
Robert (Bob) Redmond, Senior Transportation Specialist
Federal Motor Carrier Safety Administration

Enforcement Issues at Highway-Rail Grade Crossings

LTC. Ralph D. Mitchell, Jr., Patrol Commander
Louisiana State Police

Safety and Enforcement: A Local and Regional Perspective
Jack C. Hanagriff, Senior Police Officer
Houston Police Department
Neighborhood Protection Corps

3:15 PM ***Break***

3:30 PM **EDUCATION AND PUBLIC AWARENESS**
TEAM LEADERS: HELEN SRAMEK, OPERATION LIFESAVER, INC. (USA)
DANIEL DI TOTA, OPERATION LIFESAVER (CANADA)

This research needs area targets the outreach aspect of highway-rail grade crossing safety and trespass prevention.

Speakers:
New Outreach Technologies: Florida Operation Lifesaver's Perspective
Annette Lapkowski, Rail Operations Administrator
Florida Department of Transportation

Public Education and Enforcement Research Study (PEERS)
Suzanne M. Horton, Operations Research Analyst
Volpe Center

Operation Lifesaver Data Collection – Power of the Internet
Daniel Di Tota, National Director
Operation Lifesaver, Canada

4:30 PM **INSTITUTIONAL ISSUES**
TEAM LEADER: STEVE LAFFEY, ILLINOIS COMMERCE COMMISSION

This research area will focus on the successes and challenges related to planning and implementing programs at the industry, local, state, and national levels. The research will provide agencies/organizations with decision-making concepts and methodologies to embrace and implement as a means to update and/or advance safety programs in a comprehensive and cost-effective manner.

Speakers:
John Shurson, Assistant Director of Public Projects
Burlington Northern Santa Fe Railway Company

Karen M. Marshall, Program Development Director
American Association of Suicidology

Ronald E. Ries, Staff Director

Highway-Rail Grade Crossing and Trespasser Prevention Division
Federal Railroad Administration

5:30 PM **ANNOUNCEMENTS AND ADJOURNMENT FOR THE DAY**

6:30–8:30 PM **RECEPTION–**CAMBRIDGE MARRIOTT HOTEL, SALONS I AND II

JULY 15, 2009

8:30 AM **CONTINENTAL BREAKFAST–AUDITORIUM LOBBY (BUILDING 2)**

9:00 AM **WELCOME**
Organization of Working Groups and "Rules of Engagement"
Marco P. daSilva, Team Leader
Volpe Center

Introduction of Research Needs Workshop Team Leaders and Facilitators
Debra (Dee) Chappell, Grade Crossing Team Liaison
Volpe Center

• **Grade Crossing Modernization (Green Team)** Team Leader: Brian Gilleran Facilitator: Rachel Winkeller Team Assistant: Steve Peck/Erica Squillacioti Location: Room 625 (Building 1)	• **Regulation and Enforcement (Yellow Team)** Team Leader: Deborah M. Freund Facilitator: Cassandra Allwell Team Assistant: Adrian Hellman Location: Room 120 (Building 2)
• **Traffic Patterns (Purple Team)** Team Leader: Anya A. Carroll Facilitator: Jeff Bryan Team Assistant: Patrick Bien-Aime Location: Room 143 (Building 2)–Learning Center	• **Education and Public Awareness (Red Team)** Team Leader: Helen Sramek/Daniel Di Tota Facilitator: Rachael Barolsky Team Assistant: Tashi Ngamdung Location: Reserved Dining Room 4 (Building 1, Second Floor)
• **New Technology Opportunities (Orange Team)** Team Leader: Rick Campbell Facilitator: Aaron Jette Team Assistant: Debra Chappell/Dan Kubacyzk Location: Room 519 (Building 1)	• **Institutional Issues (Blue Team)** Team Leader: Steve Laffey Facilitator: David Damm-Luhr Team Assistant: Marco P. daSilva Location: Reserved Dining Room 4 (Building 1)

9:30 AM **WORKING GROUPS BREAKOUT**

12:00 PM **LUNCH**
BOX LUNCH INCLUDED IN THE COST OF REGISTRATION

1:00 PM **WORKING GROUPS RESUME**

5:00 PM **ADJOURNMENT FOR THE DAY**

July 16, 2009

8:00 AM **CONTINENTAL BREAKFAST–AUDITORIUM LOBBY (BLG. 2)**

8:30 AM **WELCOME AND WORKING GROUP TOP FIVE SUMMARIES**
Facilitator: Marco P. daSilva

- **Grade Crossing Modernization** – Brian Gilleran
- **Traffic Patterns** – Anya A. Carroll
- **New Technology Opportunities** – Rick Campbell
- **Regulation and Enforcement** – Deborah M. Freund
- **Education and Public Awareness** – Helen Sramek and Daniel Di Tota
- **Institutional Issues** – Steve Laffey

9:45 AM BREAK

10:00 AM **RESEARCH NEEDS DISCUSSION AND PRIORITIZATION**
Facilitator: Anya A. Carroll, National Expert, Multimodal Surface Transportation
Physical Infrastructure Systems Center of Innovation
Volpe Center

11:00 AM **FINAL THOUGHTS**
Len W. Allen, Program Manager and Workshop Steering Committee Chair
Federal Railroad Administration

11:15 AM **LUNCH (ON** YOUR OWN**)**

12:30 PM **OPTIONAL TOUR (PRE-REGISTRATION REQUIRED)**
Massachusetts Bay Transportation Authority (MBTA)
Silver Line Control Room and Transitway Tour

3:30 PM **CONCLUSION OF WORKSHOP**

Steering Committee Letter

U.S. Department
of Transportation

Federal Railroad Administration

1200 New Jersey Avenue, SE.
Washington, D.C. 20590

Name
Title
Address
City, State Zip

Dear <Name>:

The Third Research Needs Workshop on *Highway-Rail Grade Crossing Safety and Trespasser Prevention,* sponsored by the Federal Railroad Administration (FRA) and coordinated and hosted by the John A. Volpe National Transportation Systems Center, will be held Monday, June 15th through Wednesday, June 17th in Cambridge, MA. The primary objective of this workshop is to identify specific high priority research needs related to technology, human factors, methodology, and education that will lead to a reduction of highway-rail grade crossing and trespasser injuries and fatalities.

You are nominated to participate on the workshop steering committee due to your level of expertise in this area. The role of the steering committee is to: recommend topic areas, identify speakers and delegates, refine the agenda, and participate in the workshop. Six members of the steering committee will also lead working groups during the workshop. In order to minimize the impact of the steering committee activities on your schedule, we plan to have two teleconference calls, one on February 3rd and the other sometime in April. Follow-up action items will be handled by e-mail. The workshop draft agenda is enclosed for you r review.

Please notify Debra Chappell as to whether or not you accept this steering committee nomination as soon as possible at (202) 366-0236 or debra.chappell@dot.gov.

Sincerely,

Dr. Magdy El-Sibaie
Director, Office of Research and
Development

Enclosure

Speaker Letter

U.S. Department
of Transportation

Research and Innovative Technology Administration

John A. Volpe
National Transportation
Systems Center

55 Broadway
Cambridge, Massachusetts 02142-1093

<Date>

Name
Title
Address
City, State Zip

Dear <Name>,

You have been nominated to participate at the Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention, which will be held July 14-16 at the USDOT Research Innovation and Technology Administration's John A. Volpe National Transportation Systems Center (Volpe Center) in Cambridge, MA. The Research Needs Workshop (RNW) is sponsored by the USDOT Federal Railroad Administration, and coordinated and hosted by the Volpe Center. The primary purpose of the RNW is to bring together subject matter experts to collaborate, identify and prioritize specific research needs related to technology, human factors, methodology, and education to facilitate the reduction of highway-rail grade crossing and trespass incidents and fatalities for incorporation into the USDOT Federal Railroad Administration's, other USDOT modes and stakeholders strategic vision.

You were recommended by <Name> of the <Organization> as an excellent speaker on <topic area> at highway-rail grade crossings and/or along the railroad's rights-of-way. The agenda and additional RNW information can be found online at

http://www.macrosysrt.com/conference/FRA3rdresearch/default.html

The RNW will take place over two and one half days, starting on Tuesday, July 14 and ending midday on Thursday, July 16. The first day will be dedicated to reviewing the current status of research with three presentations each and/or panel discussion on the following topic areas:

- Grade Crossing Modernization
- Traffic Patterns
- New Technology Opportunities

- Regulation and Enforcement
- Education and Public Awareness
- Institutional Issues

The second day will be used to identify previously established research needs that have been completed, and generate additional research needs. The third and final day will be used to review selected research needs by topic area and a tour of the Massachusetts Bay Transportation Authority's (MBTA) Silver Line Control Center and Transit Way (space for the tour is limited).

We have secured rooms at the Cambridge Marriott Hotel at the RNW rate of $189. To reserve your room, contact the hotel directly (617) 494-6600, and indicate that you are part of the *DOT FRA Meeting*. Discounted rate deadline is **Monday, July 3**. The number of discounted rooms is limited. It is recommended that you reserve your room as soon as possible to avoid missing out on the discount. **The RNW registration fee for speakers has been waived.** I will be in contact with you to gather logistical information necessary for the Workshop.

Please let me know as to whether or not you accept this speaking nomination as soon as possible with a suspense date of two weeks from the date of this letter of invitation. Thank you very much for your consideration of this important activity.

Sincerely,

Debra M Chappell

Debra M. Chappell
Research Needs Workshop
Conference Coordinator

Attachment

cc: File

Invitee Letter

U.S. Department
of Transportation

**Research and
Innovative Technology
Administration**

John A. Volpe
National Transportation
Systems Center

55 Broadway
Cambridge, Massachusetts 02142-1093

<Date>

Name
Title
Address
City, State Zip

Dear <Name>,

You have been nominated to participate at the *Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention,* which will be held July 14-16 at the USDOT Research Innovation and Technology Administration's John A. Volpe National Transportation Systems Center (Volpe Center) in Cambridge, MA. The Workshop is sponsored by the USDOT Federal Railroad Administration, and coordinated and hosted by the Volpe Center. The primary purpose of the workshop is to bring together subject matter experts to collaborate, identify and prioritize specific research needs related to technology, human factors, methodology, and education to facilitate the reduction of highway-rail grade crossing and trespass incidents and fatalities for incorporation into the USDOT Federal Railroad Administration's, other USDOT modes and stakeholders strategic vision.

Your nomination was received by the Research Needs Workshop Steering Committee, and is based on your expertise and leadership on highway-rail grade crossing safety and trespass prevention. Details of the workshop, including registration, are located online at:

http://www.macrosysrt.com/conference/FRA3rdresearch/default.html
Research Needs Workshop Invitation Code: FRAVOLPE

The Workshop length will take place over two and one half days, starting on Tuesday, July 14 and ending midday on Thursday, July 16. The first day will be dedicated to reviewing the current status of research with three presentations each and/or panel discussion on the following topic areas:

- Grade Crossing Modernization
- Traffic Patterns
- New Technology Opportunities

- Regulation and Enforcement
- Education and Public Awareness
- Institutional Issues

The second day will be used to identify previously established research needs that have been completed, and generate additional research needs. The third and final day will be used to review selected research needs by topic area and a tour of the Massachusetts Bay Transportation Authority's (MBTA) Silver Line control center and transitway (space is limited for the tour).

Please let me know no later than June 22 as to whether or not you accept this nomination. I can be reached at debra.chappell@dot.gov or (202) 366-0236. Thank you very much for your consideration of this important activity.

Sincerely,

Debra M Chappell

Debra M. Chappell
Research Needs Workshop
Conference Coordinator

Attachment

cc: File

Breakout Working Group Assignments

Grade Crossing Modernization Working Group

Name	Organization
Brian Gilleran (Team Leader)	FRA
Rachel Winkeller (Facilitator)	Volpe Center
Steve Peck (Team Assistant)	Volpe Center
Erica Squillacioti (Team Assistant)	Volpe Center
Leonard Allen	FRA
William Barringer	Norfolk Southern Corporation
Ed Boni	Interactive elements Incorporated
Mark Ciurej	Brotherhood of Railroad Signalmen
Jessica Franklin	Texas Transportation Institute
Frank Frey	Massachusetts Department of Public Utilities
Paul O’Brien	Utah Transit Authority
Ed O’Connor	Massachusetts Operation Lifesaver
David Peterson	Union Pacific Railroad
Phillip Poichuck	Transport Canada
Scott Windley	U.S. Access Board
Paul Worley	North Carolina Department of Transportation

Traffic Patterns Working Group

Name	Organization
Anya Carroll (Team Leader)	Volpe Center
Jeff Bryan (Facilitator)	Volpe Center
Patrick Bien-Aime (Team Assistant)	Volpe Center
Jim Krieger	Canadian Pacific
Carolyn Cook	FRA
Shou-Ren Hu	National Cheng Kung University, Taiwan
Chip Frazier	HDR, Inc.
Oi Kei Ng	University of Waterloo, Canada
John Mitchell	Massachusetts Bay Commuter Rail
Brann Greager	Jacobs Consulting
Daniel LaFontaine	Transport Canada
Mark Morrison	Wisconsin DOT
Lisandra Garay-Vega	Volpe Center

New Technology Opportunities Working Group

Name	Organization
Rick Campbell (Team Leader)	Campbell Technology Corporation
Aaron Jette (Facilitator)	Volpe Center
Debra Chappell (Team Assistant)	Volpe Center
Dan Kubaczyk (Team Assistant)	Volpe Center
Paul Chaput	Brotherhood of Locomotive Engineers and Trainmen
Andy Davis	Quixote Transportation Safety
Bill Grizard	APTA
Dan Guerrero	SCRRA/Metrolink
Bob Hoffman	CSX
Vijay Kohli	Fulcrum Corporation
Brent Ogden	AECOM
Dick Pew	BBN Technologies
Tom Potter	Reno A&E
John Sharkey	Campbell Technology Corporation
Sesto Vespa	Transport Canada
Michelle Yeh	Volpe Center

Regulations and Enforcement Working Group

Name	Organization
Deborah Freund (Team Leader)	Federal Motor Carrier Safety Administration (FMCSA)
Suzanne Sloan (Facilitator)	Volpe Center
Adrian Hellman (Team Assistant)	Volpe Center
Richard Brown	TRANSPO Industries
Lou Frangella	FRA
Jack Hanagriff	Houston Police Department
Dan Lauzon	Brotherhood of Locomotive Engineers and Trainmen
Gina Melnik	Volpe Center
LTC Ralph Mitchell	Louisiana State Police
Dr. Thomas Raslear	FRA
Robert Redmond	FMCSA
Gerald Ruggiero	Massachusetts Bay Transportation Authority (MBTA)
James Sottile	PVB Consulting Group
Guan Xu	FHWA

Education and Public Awareness Working Group

Name	Organization
Helen Sramek (Team Leader)	Operation Lifesaver (OLI)
Daniel Di Tota (Team Leader)	OL Canada
Rachael Barolsky (Facilitator)	Volpe Center
Tashi Ngamdung (Team Assistant)	Volpe Center
Tarah Harkins	CSX Transportation
Annette Lapkowski	Florida Department of Transportation
Cliff Strayton	CSX Transportation
Alvin Richardson, Sr.	Amtrak
Suzanne Horton	Volpe Center
Hadar Rosenhand	Volpe Center
Richard Towle	FRA
Lorraine Pacocha	MBTA

Institutional Issues Working Group

Name	Organization
Steven Laffey (Team Leader)	Illinois Commerce Commission
David Damm-Luhr (Facilitator)	Volpe Center
Marco daSilva (Team Assistant)	Volpe Center
William Browder	Association of American Railroads
Ian Lake	Railway Safety Commission (Ireland)
Jay Holman	Union Pacific
Karen Marshall	American Association of Suicidology
Jordan Multer	Volpe Center
Ronald Ries	FRA
Joy Schaad	Chicago Metropolitan Agency for Planning
John Shurson	Burlington Northern Santa Fe Railway Corporation

Sample Research Need Form

Research Needs Project Template: Instruction Sheet

Section	Description
1. Research Needs Area	Enter the name of one of the six Research Needs Areas: • Grade Crossing Modernization (GCM) • Traffic Patterns (TP) • New Technology Opportunities (NTO) • Regulations and Enforcement (RE) • Education and Public Awareness (EPA) • Institutional Issues (II)
2. Research Topic Area / Number	Enter the Abbreviation of the Research Needs Area and the sequential order of the proposed projects in this Research Needs Area (e.g., TP-1, TP-2, etc.). Abbreviations are located under the Research Needs Area above.
3. Title	Enter the name of the proposed project
4. Project Statement	Provide a brief description of the following: • The issue(s)/challenge(s) to be addressed • The purpose of the project • The expected outcome(s)
5. Cross-Cutting Areas	Mark an X if this project will specifically address a cross-cutting area (or areas): • Human factors • Transit-oriented communities • Data requirements • Efforts related to high Speed Rail
6. Relationship to Current Research	Indicate whether this is a new project or a follow-on to previous research.
7. Potential Benefit(s) of Identified Research Need Area	Briefly describe the positive tangible and non-tangible (but beneficial) outcomes that are expected to result from such a project. If possible, indicate whether it would be a short- or long-term benefit (short term = 5 years or less; long term > 5 years) and who would be the benefactors.
8. Research Need Urgency	Mark an X to indicate the level of criticality of the need for this research project, e.g., high-priority, medium priority (strong consideration), or low priority (closely monitored for future action).
9. Cost of Research	Mark an X to indicate the total estimated cost to conduct the research.
10. Potential Organization(s) to Conduct Research	Provide the specific name(s) or organization type(s) that should conduct the research. For example: Specific name: FRA, AREMA, AAR, Volpe Center, OLI, et. al. Categories: Highway agencies, industry, railroads, international collaboration, academia, consultants, unions, non-union organizations, et. al.

11. Ease of Implementation	Mark an X to indicate the anticipated level of difficulty to implement the results of the research. If medium or difficult, please explain what the key implementation issues are.
12. Other Comments	Provide any supplemental information that could provide insight on items of interest or concern related to this project. *Example: potential to combine with other Research Needs Areas.*

1. Research Needs Area	
2. Research Topic Area / Number	
3. Title	
4. Project Statement	
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors ___ Transit-Oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	
8. Research Need Urgency	__ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues	__ Easy __ Medium __ Difficult Issues:
12. Other Comments	

<u>**Ballot Letter**</u>

Prioritization of Projects from the
Third Research Needs Workshop on Highway-Rail Grade Crossing and Trespass Prevention (RNW)

Instructions

Please email to debra.chappell@dot.gov by COB <u>August 19, 2009</u>

Dear RNW Attendees:

Thank you for your attendance and input at the RNW. As discussed during Anya A. Carroll's presentation and discussion on July 16, 2009 the effort to prioritize the Top 33 projects would be completed via an electronic document. This document provides you the opportunity to review the top five or six projects developed during the July 15, 2009 breakout sessions, and to assist you with establishing your thoughts on research needs for highway-rail grade crossing safety and trespass prevention.

The next page contains the form to be used to prioritize the projects developed at the RNW. As you select projects, please place a number next to each title in order of need. If you feel that a certain project has the highest priority, then place a "1" next to the project title. Please place a "2" to the project with the second highest priority, and so forth for all 33 projects.

It is important to note that this effort is to prioritize the 33 projects *as a whole*, and *not* by research need area. For example, John Doe may mark TP-3 with a "1" for the highest priority research need and II-3 with a "2" for the second highest priority need, and so forth.

The one-page project write-ups are also enclosed for your reference.

Please email your choices to Debra (Dee) Chappell no later than Friday, August 14 at debra.chappell@dot.gov. If you have any questions, please email or call Dee at (202) 366-0236.

Thank you for your assistance.

Sincerely,

Debra M Chappell

Debra (Dee) Chappell
RNW Coordinator

Ballot

TOP 33 PROJECTS
DEVELOPED AT THE FRA's THIRD RESEARCH NEEDS WORKSHOP ON
HIGHWAY-RAIL GRADE CROSSING AND TRESPASS PREVENTION

Rank	Project Number*	Title
	EPA-1	Evaluation of Social Media Outreach
	EPA-2	Evaluation of Existing Education and Outreach Strategies
	EPA-3	Crossing Consolidation Education
	EPA-4	Evaluate Effectiveness and Potential Motorist & Pedestrian Signage and Treatments
	EPA-5	Evaluate the Effectiveness of Mobile Warning Devices When Approaching Grade Crossings
	GCM-1	Warning Device Minimum Requirement for 80-110 MPH Trains
	GCM-2	Flangeway Gap Solutions
	GCM-3	Global Positioning Satellite (GPS)/Positive Train Control (PTC) Constant Warning Time
	GCM-4	Second Train Warning Devices for Pedestrian Crossings
	GCM-5	Personal Detection Device for Railroad Workers
	II-1	Establishment of a Railroad/Transit Data Clearinghouse
	II-2	Cost/Benefit analysis of Grade Crossing Improvements
	II-3	Synthesis to Evaluate How, When, and Where Human Perception Negatively Impacts Rail Safety
	II-4	Institutionalize Evaluation as a Key component of Project/Program (countermeasure) Design and Implementation
	II-5	Improved Effectiveness of Stakeholder Interaction
	II-6	Identify Opportunities to Make Legislation and Regulations Across Jurisdictions Compatible, Meaningful and Up-to-Date
	NTO-1	Alternative Sensors and Warning Systems for Vital Applications
	NTO-2	Pedestrian, Non-Motorized and Limited Mobility Treatments
	NTO-3	On-Track Vehicle Detection
	NTO-4	Effectiveness of LED Enhanced Grade Crossing Traffic Signs
	NTO-5	Minimum Traffic Control Devices for High-speed Train (HST, formerly known as HSR) HRGC
	NTO-6	Enhanced Commercial Systems to Improve HRGC Safety
	RE-1	Data Needs for Proactive Enforcement
	RE-2	Collecting and Analyzing Trespass Data
	RE-3	Photo Enforcement at HRGXs
	RE-4	Regulations and Signage: No-Train-Horn Xings
	RE-5	National Campaign for Targeted Seasonal Enforcement Programs
	TP-1	Application of Warning Devices/Treatments at High Speed Rail Corridors
	TP-2	Highway Traffic Signal Pre-emption at Highway-Rail Grade Crossings
	TP-3	Effectiveness of Gates for Pedestrians
	TP-4	Signage at Roundabouts
	TP-5	Driver Decision Making At Complex Crossings
	TP-6	Review and Improvement of Hazard Indices and Accident Prediction Formulae

* In some cases, the project number shown may not reflect the project numbers from the ones generated during the breakout session on July 15.

Key:
EPA – Education and Public Awareness
GCM – Grade Crossing Modernization
II – Institutional Issues
NTO – New Technology Opportunities
RE – Regulations and Enforcement
TP – Traffic Patterns

<u>Evaluation Form</u>

Cambridge, MA – July 14-16, 2009

Evaluation

Workshop Evaluation: Please take a moment to complete this evaluation and leave it at the Workshop registration desk. Your responses will be valuable in planning future Workshops. *Please use the back of the page as needed for your comments.* Thank you.

Which of the following best describes the industry you belong to?

- ☐ Federal State or Local agency
- ☐ Transit agency
- ☐ Designated Employer Representative
- ☐ Management
- ☐ Consultant
- ☐ Union Rep
- ☐ Association or organizations representing the railroad community
- ☐ Academic or University research
- ☐ Education and Public Awareness
- ☐ Other ____________

Please rate your satisfaction level for the following.

Category	Extremely	Very	Somewhat	Not at all	Comments
Registration process					
Workshop presentations					
Workshop session structure					
Courtesy and helpfulness of workshop staff					
Conference location and facilities					
Overall quality of the Workshop					

Did the Workshop meet your expectations? ☐ YES ☐ NO
Comments:

What kinds of topics would you like to see included at future Workshops?

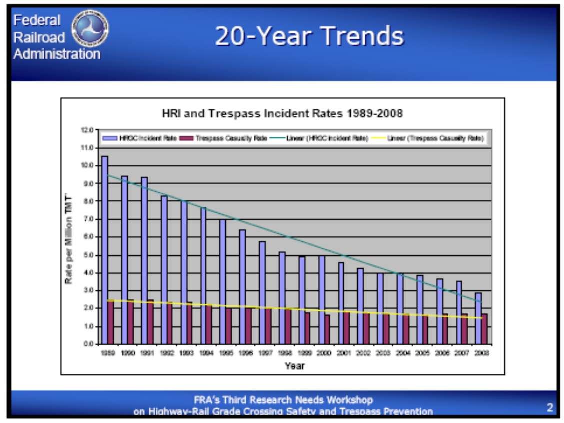
What did you like <u>most</u> about this Workshop?

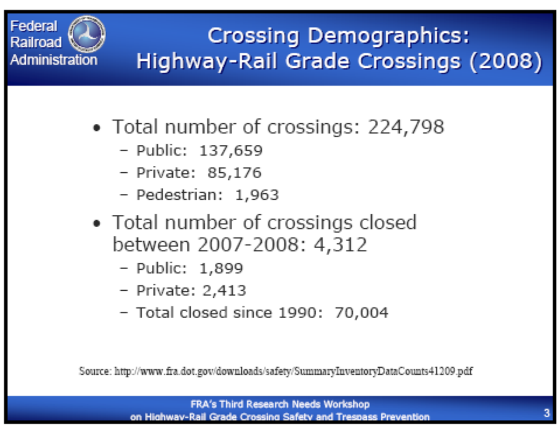
What did you like <u>least</u> about this Workshop?

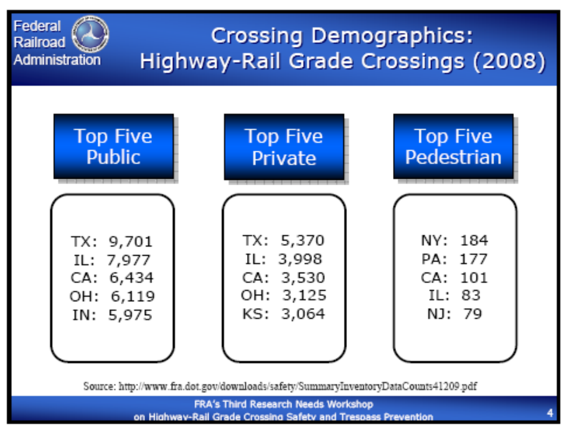
Appendix C. Day One Presentations

OPENING REMARKS

- Dr. Magdy El-Sibaie, Director, Office of Research and Development, Federal Railroad Administration







Federal Railroad Administration

Some key lessons learned

Successful Safety Initiatives

- Freight Car Reflectorization
- Locomotive Alerting Lights
- Commercial Driver Safety Initiatives
- Operation Lifesaver

Safety Initiatives with Challenges

- Driver behavior
- Pedestrian warning devices
- Intelligent grade crossings
- Low cost active warning devices

Sources: Volpe Center (Horton, et. al.) and Northwestern University (Savage)

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention 5

Federal Railroad Administration

Goals for the Highway-Rail Grade Crossing and Trespass Prevention Research Program

- Reduction of injuries and fatalities
- Tools for grade crossing safety assessment and inventory
- Effective education and outreach efforts
- Rationale for effective rulemaking
- Improvements along vital rail corridors (including HSR)

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention 6

Federal Railroad Administration

Key Strategies as we move forward

- Aging infrastructure and equipment
- Providing cost-effective railroad safety and security
- Efficient and environmentally compatible use of energy resources
- Ensuring investments are made to enable network capacity to meet future demands
- Implementing effective policies and regulations

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention 7

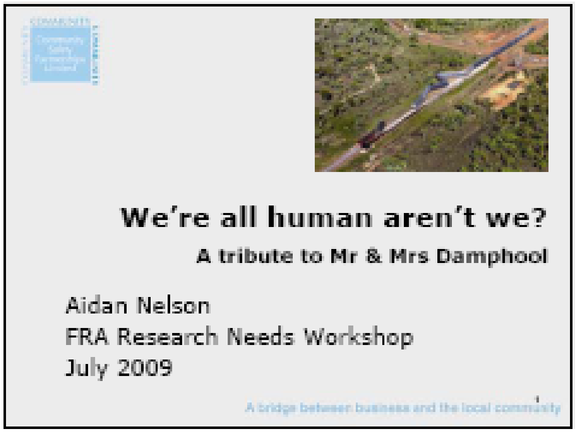
Thank You!

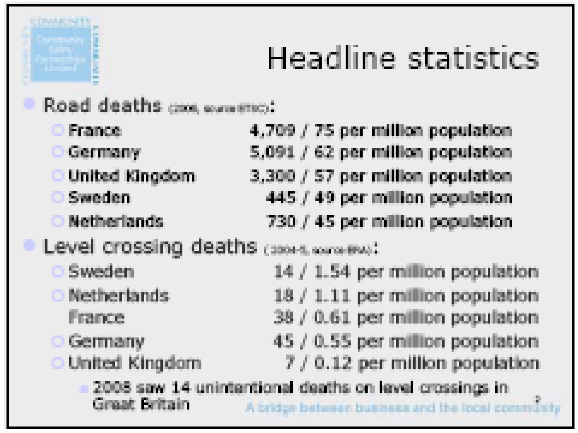
Dr. Magdy El-Sibaie
Director
Office of Research and Development
Federal Railroad Administration

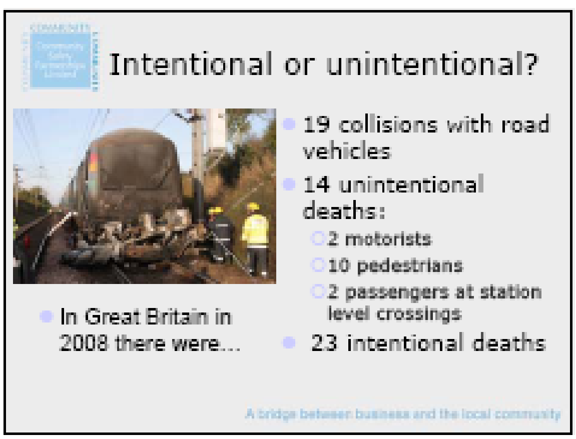
General Session Presentation

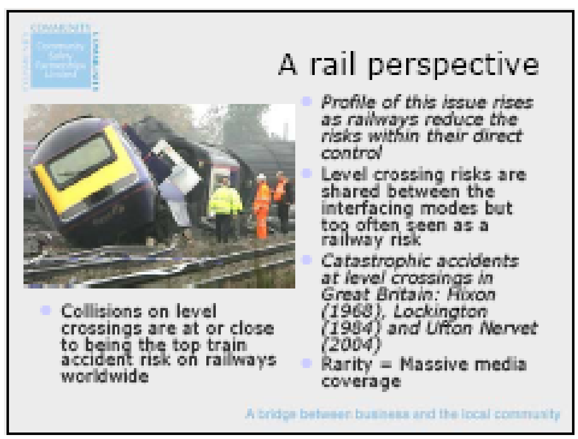
Level Crossing Needs: Thoughts from Overseas

Aidan E. C. Nelson, Co-Director
Community Safety Partnerships, Ltd. (United Kingdom)









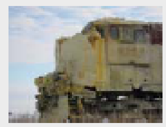
A roads perspective

- Collisions with road vehicles on level crossings are near the bottom of the risk on the country's roads
- *Profile of this issue will remain low as the numbers killed on the roads is so high*
- Level crossing risks may be shared between the interfacing modes but they are predominately a railway risk
- *In the 4.5 years since a train occupant died in a level crossing accident 14,000 have died on the roads*

A bridge between business and the local community

Key issues

Public attitudes, physiology, road user behaviours and abuse



- Attitude and role of highways authorities
- Attitude and role of planning authorities
- Partnership approaches
  - Engineering, Education, Enforcement
- Costs of level crossings / new technology
- Proportionate & properly targeted recommendations
- International collaboration

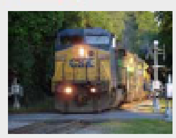
A bridge between business and the local community

Schizophrenic attitudes

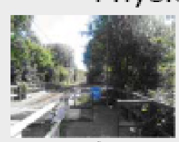
- We're a rich country, we can afford to make our railways totally safe
- *I'm invincible when behind the wheel of my car*
- A train driver ran a red light: disgusting
- *A car driver ran a red light: we all do it, don't we?*
- 3,000 killed on the roads: minor news
- *One passenger killed in a train accident: front page news for days*
- Why should I wait? I can look out for myself
- *You should make it so I can't do anything stupid*

A bridge between business and the local community

Physiology



- Looming
  - Large objects – difficult to judge distance away



- Frontal view

- Rear view

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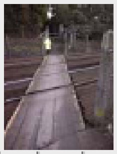
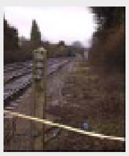
Pedestrians



- Dog off lead; dog along the railway; owner in pursuit; dog "orphaned"
- *Dog on lead, safely across - look, listen and live*



- Music on: train whistles; walker doesn't make it
- *Headphones off; train whistles; warning heeded*
- Child crying; pushchair stuck in flangeway gap; mother struggles; pushchair stuck; train can't stop
- *Child crying; pushchair stuck in flangeway gap; child out; mother & child safely off the crossing*
- That's our train; light at red & alarm sounding; run across but second train coming…….

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Down on the farm

- Traditional farm crossing – a five bar gate each side of the line
- It's pouring with rain & the gates are closed….
- Stop, get out, open the near side gate
- Cross, open the far side gate and return
- Get in the vehicle, drive across
- Get out, walk across to close the gate
- Back across, close the gate, get in drive off
- I'm soaked, It's only going to be a couple of minutes before I come back, I'll leave the gates open
- The postman will be along soon, I'll leave the gates open for him, save him getting wet too

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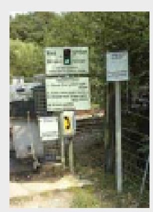
Large animals

- Unspeakable in pursuit of the uneatable; fox across the railway; hounds follow; huntsmen don't stop
- train hits horse; train derails…..

- 30 July 1984: a cow on the line was struck near Polmont; this led to thirteen deaths on the train
  - Many lessons learned
- 5 October 1999; a train was derailed near Ware after hitting a bullock that had strayed onto the line: the same day as the Paddington tragedy
  - Who remembers the lessons from this derailment?

A bridge between business and the local community

Upgrade brings a new risk



- Train drivers regularly report gates left open
- A couple of near hits reported last year
- An accident, we must upgrade the crossing
- Why not add some miniature warning lights?
- We have warning lights, we don't need gates
- Oh, I didn't see the lights, I didn't know there was a train at this time of day, I'm so sorry……..
- Are we surprised? Crossings with lights and no barriers have a disproportionate concentration of risk
- A better answer; a set of co-acting gates?

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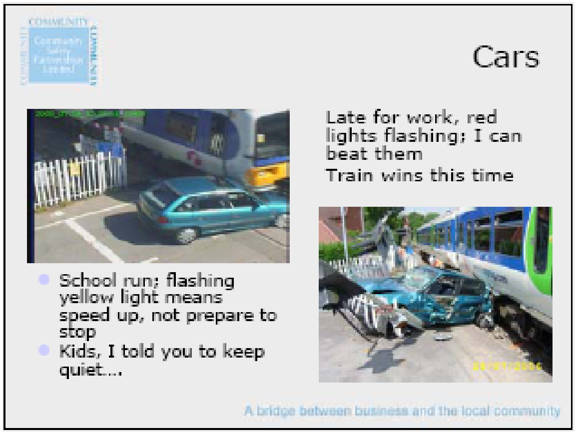
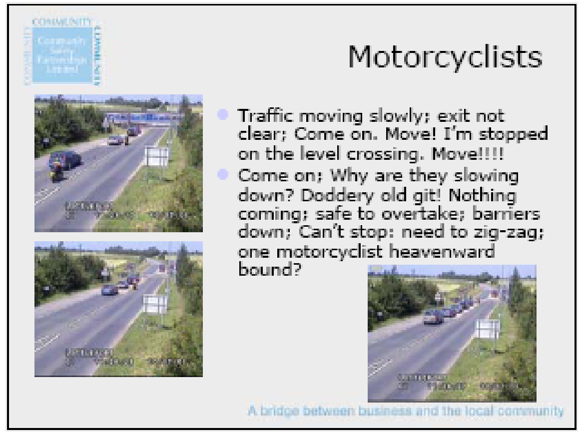

Cars
Late for work, red lights flashing; I can beat them
Train wins this time
School run; flashing yellow light means speed up, not prepare to stop
Kids, I told you to keep quiet….
A bridge between business and the local community


Motorcyclists
Traffic moving slowly; exit not clear; Come on. Move! I'm stopped on the level crossing. Move!!!!
Come on; Why are they slowing down? Doddery old git! Nothing coming; safe to overtake; barriers down; Can't stop: need to zig-zag; one motorcyclist heavenward bound?
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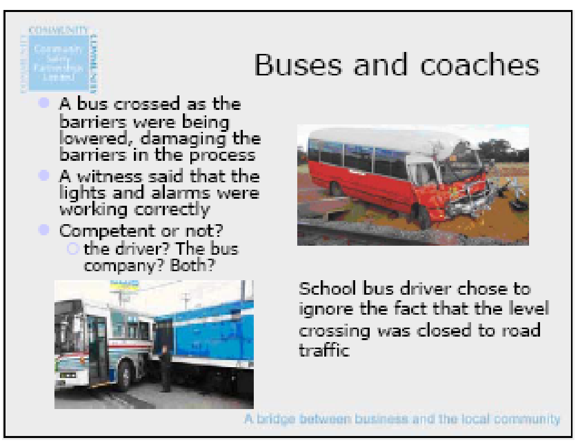
Buses and coaches
A bus crossed as the barriers were being lowered, damaging the barriers in the process
A witness said that the lights and alarms were working correctly
Competent or not?
the driver? The bus company? Both?
School bus driver chose to ignore the fact that the level crossing was closed to road traffic
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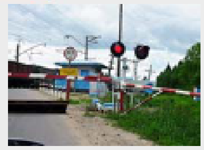
Commercial vehicles over-represented
I do this journey every day
It really is difficult to get this thing moving again
A bridge between business and the local community

Hazards

- Weather
- Time of day
- Sighting:
  - Vegetation
  - Built environment
- Expectation
  - No train at this time of day
  - The train's a long way off
  - I've got time
- Parallel road and rail, skew crossings, curved approaches, bad signage

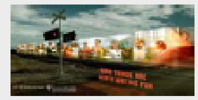
A bridge between business and the local community

Cost effective measures



- The answer isn't to add more bells and whistles regardless of cost
- Neither is it a post-accident knee jerk "we must do something" issue
- Don't forget the learning from research in the past

- Keep on learning lessons from accident investigation
- Look for transferable lessons wherever the might be found
- Objective means of determining priorities
- Look for measures which influence and change behaviours
- Evaluation of efficacy



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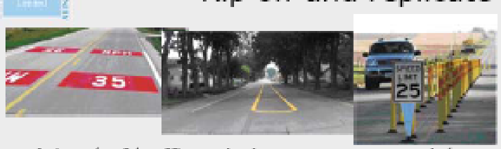
Rip off and replicate



- A host of traffic calming measures exist

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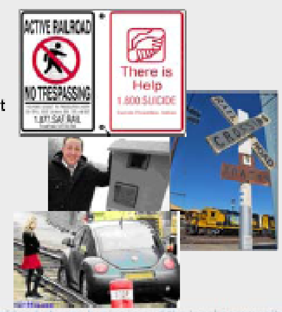
Other issues common to all

- Suicide – there are measures that work, Germany for example
- Second train coming, not just pedestrians at stations
- Long traverse over railway
- Case for photo enforcement
- Follow the GPS



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WORKSHOP PARTICULARS

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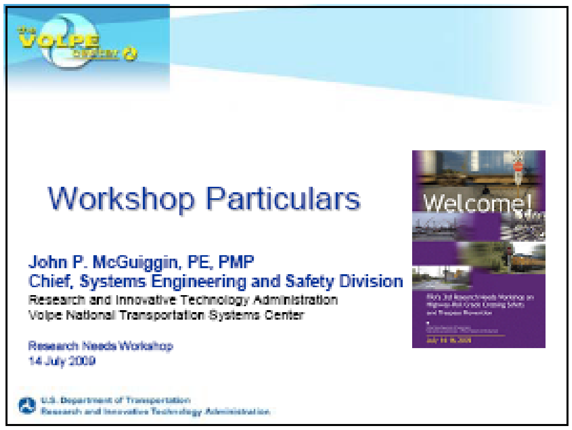
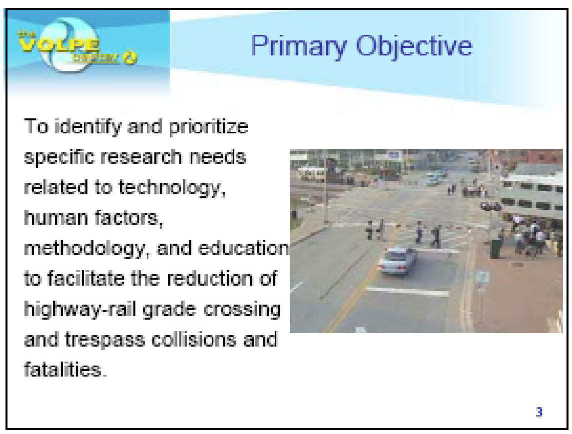
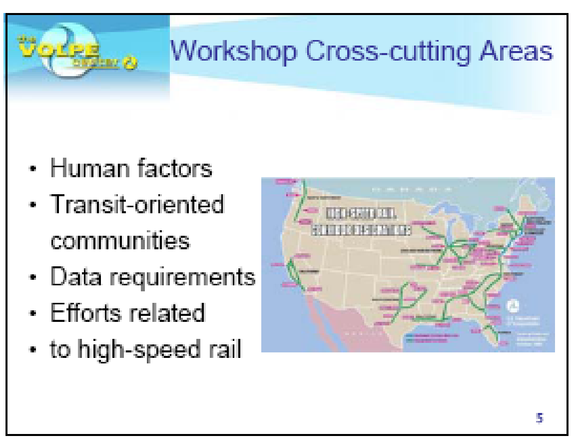
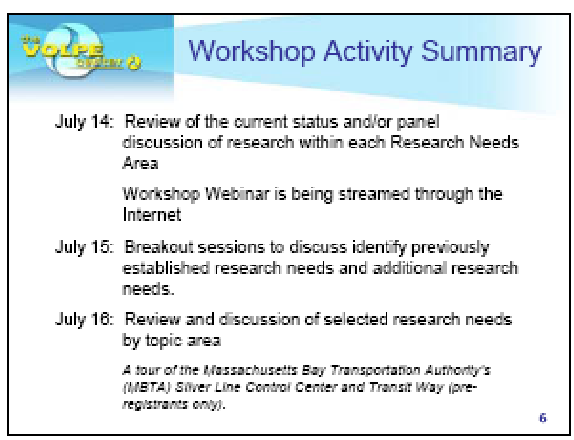
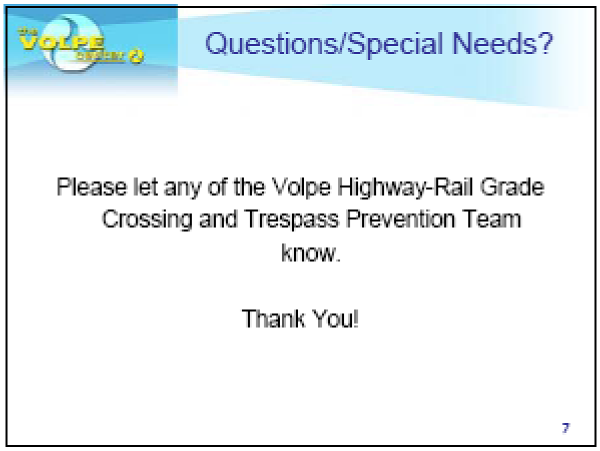
Chief, Systems Engineering and Safety Division, Volpe Center







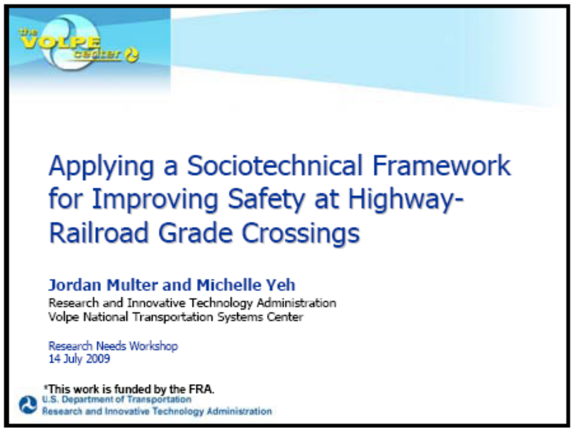


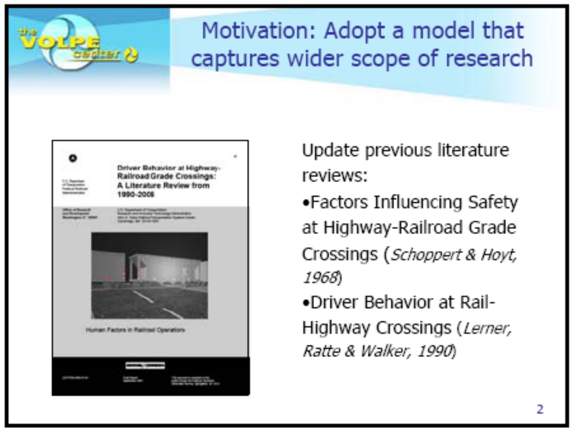

Questions/Special Needs?
Please let any of the Volpe Highway-Rail Grade Crossing and Trespass Prevention Team know.
Thank You!
7

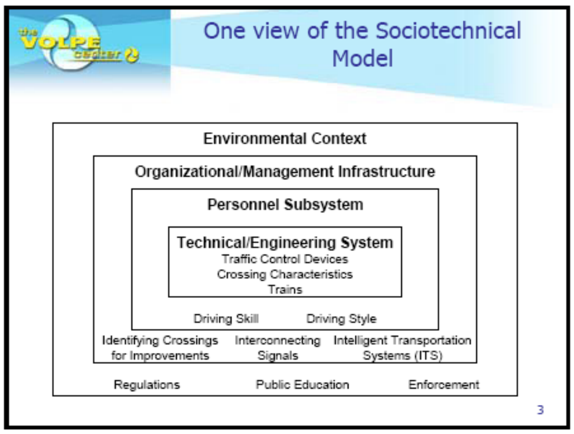
HUMAN FACTORS: A RESEARCH NEEDS CROSS-CUTTING AREA

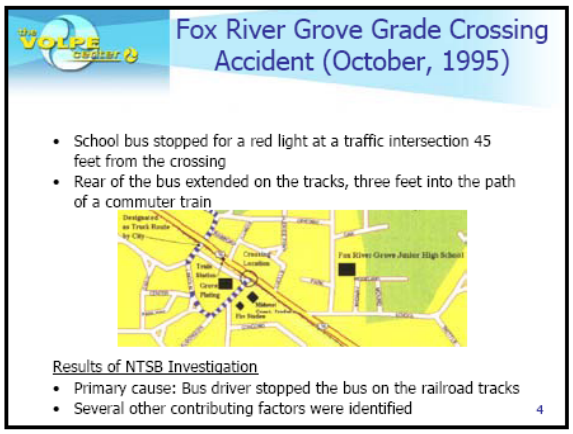
Applying a Sociotechnical Framework for Improving Safety at Highway-Railroad Grade Crossings

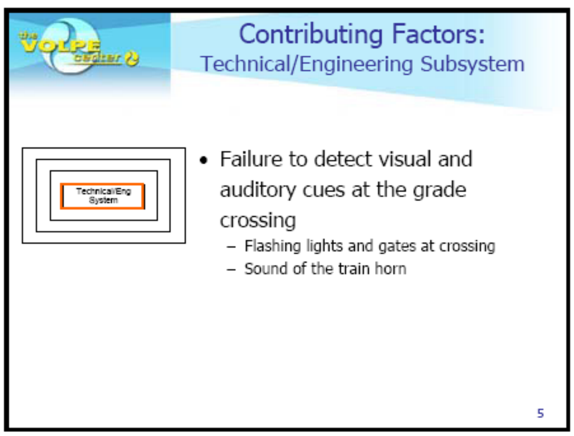
Jordan Multer, Ph.D., Manager, Rail Human Factors Program, Volpe Center

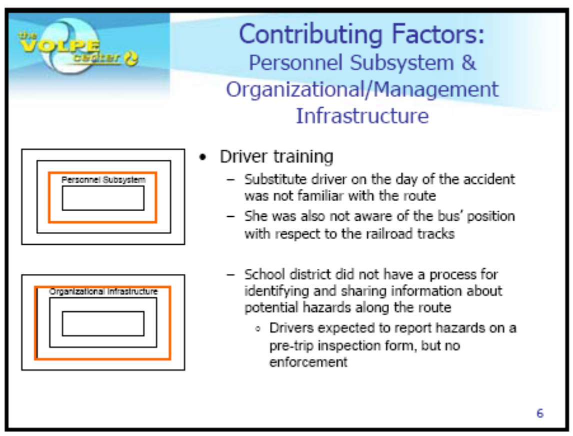


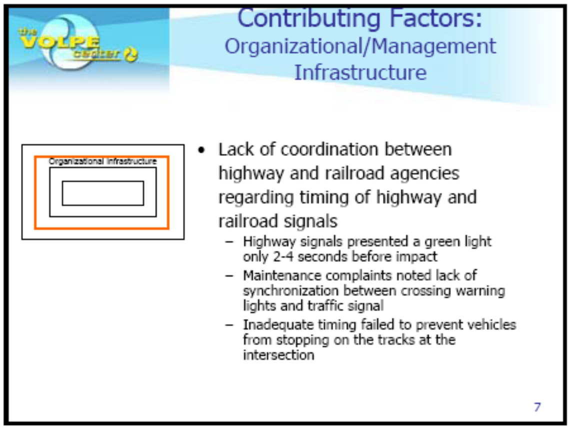


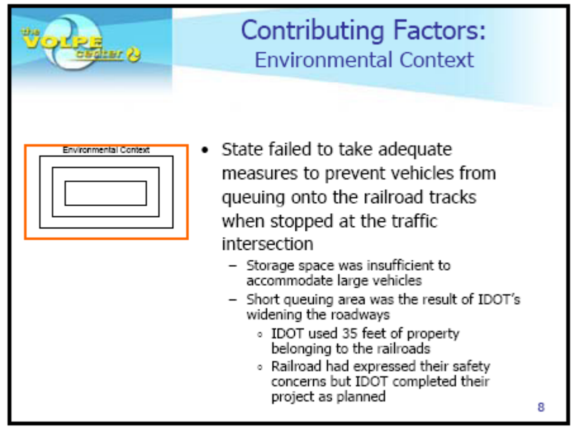


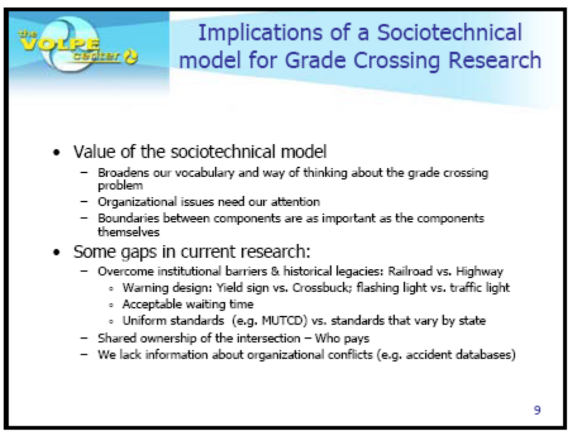


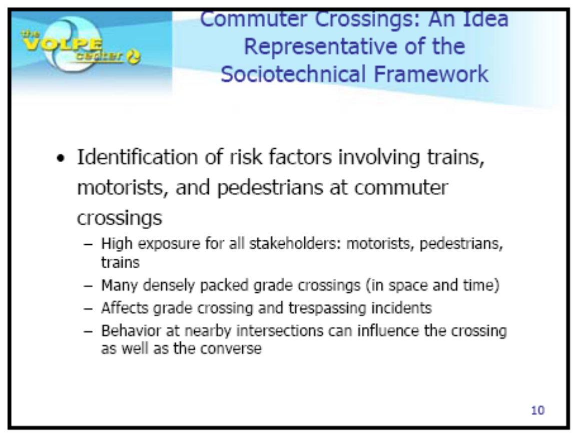





Contributing Factors:
Organizational/Management Infrastructure
Organizational Infrastructure
• Lack of coordination between highway and railroad agencies regarding timing of highway and railroad signals
– Highway signals presented a green light only 2-4 seconds before impact
– Maintenance complaints noted lack of synchronization between crossing warning lights and traffic signal
– Inadequate timing failed to prevent vehicles from stopping on the tracks at the intersection
7


Contributing Factors:
Environmental Context
Environmental Context
• State failed to take adequate measures to prevent vehicles from queuing onto the railroad tracks when stopped at the traffic intersection
– Storage space was insufficient to accommodate large vehicles
– Short queuing area was the result of IDOT's widening the roadways
◦ IDOT used 35 feet of property belonging to the railroads
◦ Railroad had expressed their safety concerns but IDOT completed their project as planned
8


Implications of a Sociotechnical model for Grade Crossing Research
• Value of the sociotechnical model
– Broadens our vocabulary and way of thinking about the grade crossing problem
– Organizational issues need our attention
– Boundaries between components are as important as the components themselves
• Some gaps in current research:
– Overcome institutional barriers & historical legacies: Railroad vs. Highway
◦ Warning design: Yield sign vs. Crossbuck; flashing light vs. traffic light
◦ Acceptable waiting time
◦ Uniform standards (e.g. MUTCD) vs. standards that vary by state
– Shared ownership of the intersection – Who pays
– We lack information about organizational conflicts (e.g. accident databases)
9


Commuter Crossings: An Idea Representative of the Sociotechnical Framework
• Identification of risk factors involving trains, motorists, and pedestrians at commuter crossings
– High exposure for all stakeholders: motorists, pedestrians, trains
– Many densely packed grade crossings (in space and time)
– Affects grade crossing and trespassing incidents
– Behavior at nearby intersections can influence the crossing as well as the converse
10

Accessibility Issues at Highway-Rail Grade Crossings

David Peterson, Senior Manager, Industry and Public Projects
Union Pacific Railroad

Accessibility Issues at Highway-Rail Grade Crossings

David Peterson, Sr. Manager Industry & Public Projects

July 14, 2009

Highway-Railroad Grade Crossing issues for people with disabilities?

- Flangeways
- Skewed Crossings
- Truncated Domes
- Quiet Zones

2

Federal Guidelines & Regulations

- Draft Guidelines for Accessible Public Rights of Way
  - Released in November 2005
  - Truncated Domes
    - Must be placed 6-15' from centerline tracks
    - 24" Depth
  - Flangeway Gap
    - 2.5" Passenger Operations only
    - 3" Freight Operations
  - Sidewalks
    - Min width should be 4' on reconstructed facilities.
    - Maximum surface discontinuities is 0.5"

3

Federal Guidelines and Regulations (cont.)

- FHWA's ADA Standards for Transportation Facilities
  - Effective November 29, 2006
  - Walking Surfaces (including sidewalks)
    - Maximum slope 1:20
      - (RR tracks can be superelevated 6.5" = 1:10 slope
  - Truncated Domes
    - Must be of contrasting color to walking surface
    - Must have 24" depth
  - Flangeway Gaps
    - 2.5" Max

4

FRA Quiet Zone Rules

- 49 CFR Parts 222 & 229
  - Current update dated August 17, 2006
  - Does not require the routine sounding of horns at pedestrian grade crossings
  - If within a proposed Quiet Zone the must be evaluated by a diagnostic team.
  - Advance Warning Signs and No Train Horn Sign must be installed.

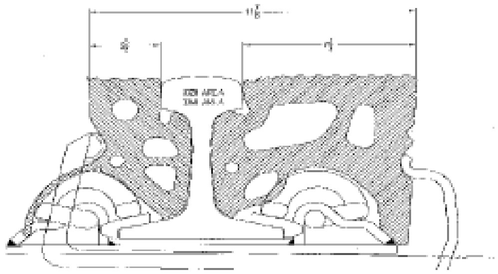
5

Flangeway Gap Issue

- No filler material exist that will withstand normal train volumes or speed.
- Railroads typically do not provide flangeway filler for timber or flange rail crossings.
- Wheel wear and tolerance limits set by international interchange rules.
- Flangeway gaps less than 3" result in wheel impacts to gage panels.

6

What is Desired for a Flangeway Gap?



No Gap at All !

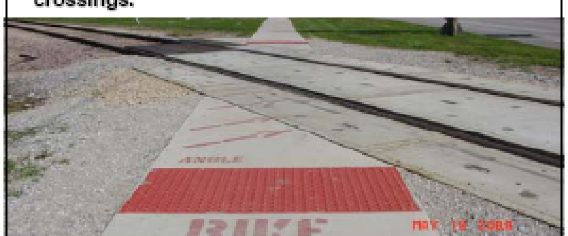
Wood Plank Crossing

Concrete Panel Crossings
(Old Style Lagfree)

Rubber Crossings

Skewed Crossings

- Should there be a guidance on intersecting angle?
- Flangeway gap issues are compounded at skewed crossings.



Truncated Domes

- Need to be at least 2' in depth across the full width of the pathway.
- Contrasting color with paving surface.
- Should be at least 12' from centerline of track. Ideally opposite the crossing warning device.
- Ownership and maintenance needs to be defined.

Truncated Domes

Quiet Zones

- Should rules be modified pertaining to public pathway crossings?
  - Standard be the sounding of the train horn at all pedestrian pathway crossings not in a quiet zone.
  - Require an audible bell at all quiet zone crossings.
  - Require truncated domes at all quiet zone crossings.

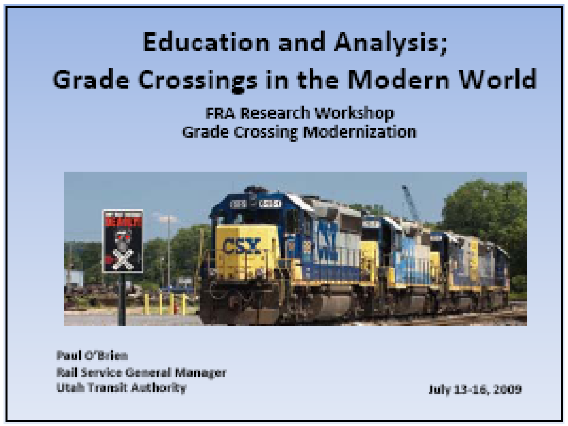
Quiet Zones

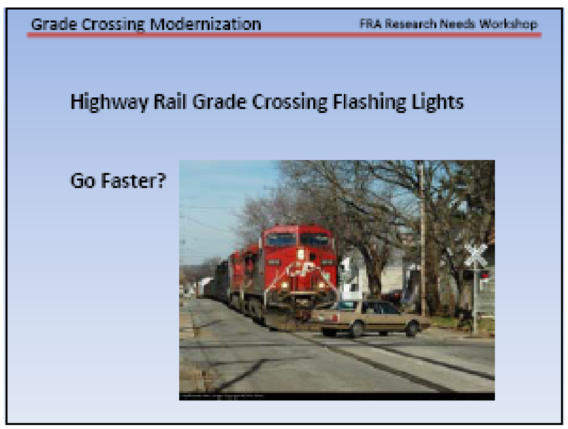
Possible Research Needs?

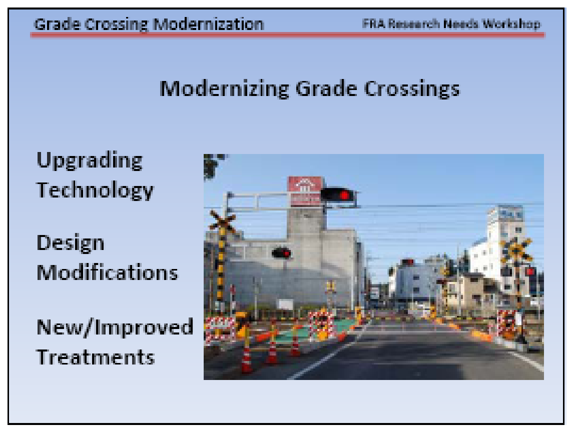
- Find material that would close the flangeway gap that is durable and will work on mainlines.
- Investigate issues related to skewed pathway and sidewalk crossings and issue design guidelines that might be incorporated in the AASHTO's Green Book and the Railroad- Highway Grade Crossing Handbook.
- Investigate if Quiet Zone rules should be modified to address pedestrian ADA issues.

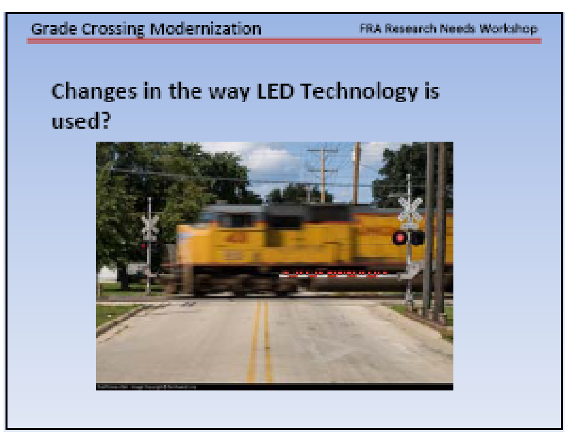
Education and Analysis—Highway-Rail Grade Crossings in the Modern World

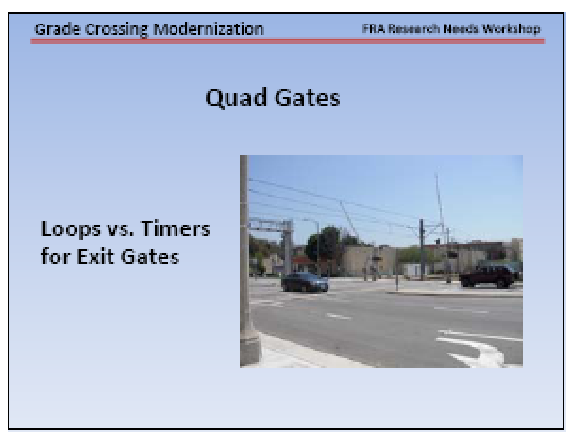
Paul O’Brien, Rail Service General Manager
Utah Transit Authority





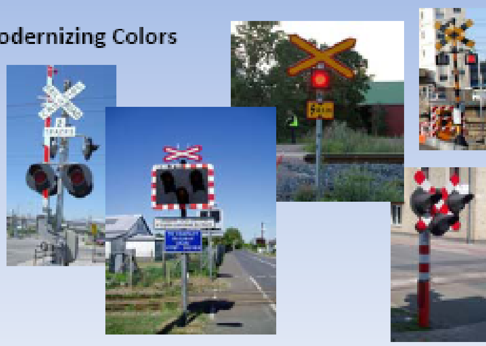






Grade Crossing Modernization FRA Research Needs Workshop

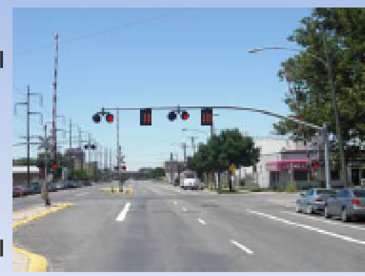
Modernizing Colors



Grade Crossing Modernization FRA Research Needs Workshop

Countdown Timers at Crossings

- To the Next Trains' Arrival
- To Train Crossing with Gate Down
- To Second Trains' Arrival

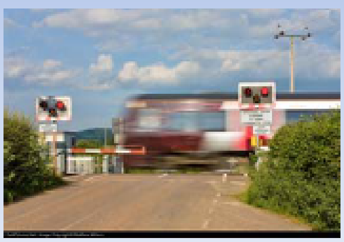


Grade Crossing Modernization FRA Research Needs Workshop

Treatments for Multi-Track Crossings

Use of "Second Train Coming" Warning

Special Treatment for Gates with Multiple Tracks



Grade Crossing Modernization FRA Research Needs Workshop

High Speed Rail

Do High Speed Crossings Need Special Treatment?

Is a High Speed Train Safer than a Low Speed Train?

Special Treatments to warn High Speed Trains are Present?

Grade Crossing Modernization FRA Research Needs Workshop

Pedestrians and Other Non-Motorists

How do we design a grade crossing for the non-motorist?

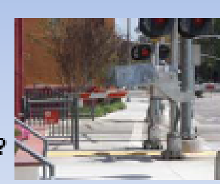
How do we design for increased numbers of Pedestrians and mode Types?

Grade Crossing Modernization FRA Research Needs Workshop

Pedestrian Gates

How effective are Pedestrian Gates?

Are Pedestrian Gates a good return on Investment?



What types or designs work and what doesn't work?

Grade Crossing Modernization — FRA Research Needs Workshop

Pedestrian Treatments

Walk/Don't Walk

Grade Crossing Modernization — FRA Research Needs Workshop

Pedestrian Treatments

Automatic Gates Tied into Crossing Gates

Grade Crossing Modernization — FRA Research Needs Workshop

Pedestrian Treatments

Effectiveness of Manual Swing Gates

Grade Crossing Modernization — FRA Research Needs Workshop

Passive Pedestrian Treatments

Z-Crossing treatments

Modified Z-Crossing treatments

Signage – Type, size, color, style, location

Grade Crossing Modernization — FRA Research Needs Workshop

Changes in MUTCD

Vertical White Stripe

Time to Implement changes to MUTCD and at crossing locations

Other Changes?

Grade Crossing Modernization — FRA Research Needs Workshop

How can we protect the right of way from accidental access by motorist at crossings?

Grade Crossing Modernization FRA Research Needs Workshop

Conclusions

Technology, Design, and Treatments?

What is worth researching?

Now is the Time and Place to Modernize Grade Crossings!

Roundabouts at or Near Highway-Rail Grade Crossings

Mark Morrison, Grade Crossing Safety Engineer
Wisconsin Department of Transportation

Roundabouts Near Railroad Crossings

Research Needs Workshop on Highway-Rail Grade Crossing Safety and Trespass Prevention

July 14th 2009, Volpe Center, Cambridge Mass.

Mark Morrison, mark.morrison@dot.wi.gov
WisDOT Grade Crossing Safety Engineer

Introduction

- Here to discuss roundabouts near at-grade crossings, mainly signing issues today.
- Emerging issue as roundabouts become more the norm in highway construction.
- Nationally, Wisconsin is near the top in roundabouts to be constructed.
- Our planners/designers are directed to explore roundabouts whenever traffic signals are warranted or are proposed to be installed.

WHY ROUNDABOUTS?

- Not traffic circles like in the movies but modern roundabouts (Yield on Entry).
- Roundabouts have more throughput than conventional signalized intersections (more traffic volume).
- Reduce the amount of crashes.
- Typically change the type of crashes from right angle to side swipes.
- Reduce the severity of crashes.
- Lower operational costs. (Electricity, signal Engr.)
- Can have lower real estate impacts, especially on the approaches.

Signing

Currently no roundabout signs in the MUTCD equivalent to the W10-2, 3 & 4 signs for intersections

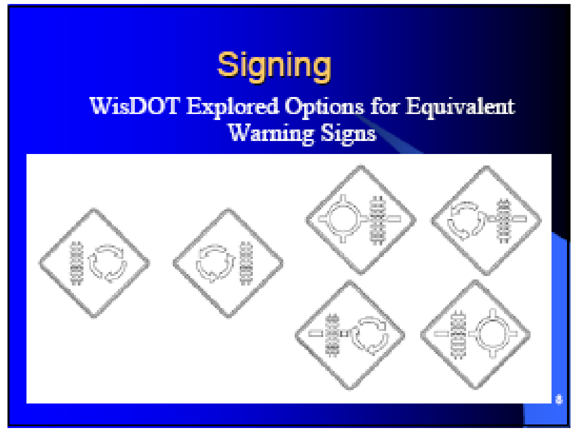
Signing

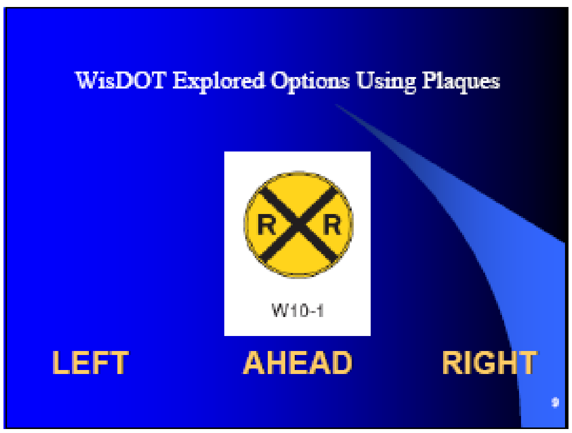
MUTCD ROUNDABOUT ADVANCE WARNING SIGN

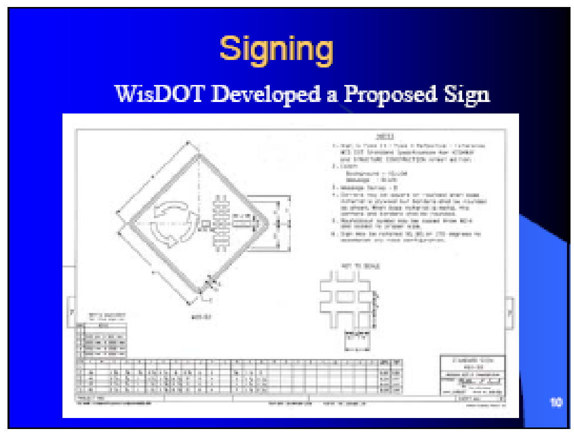
Signing

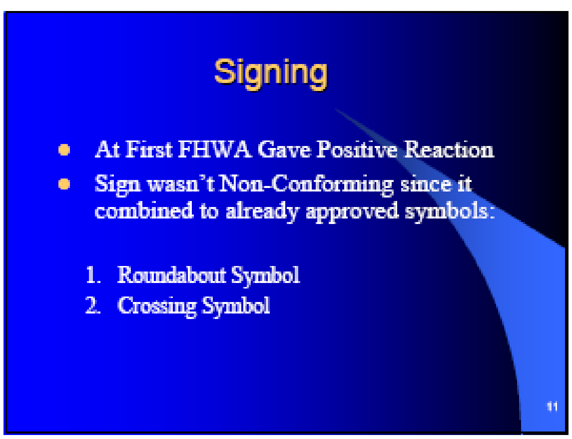
PROPOSED OPTIONAL ROUNDABOUT ADVANCE WARNING SIGN

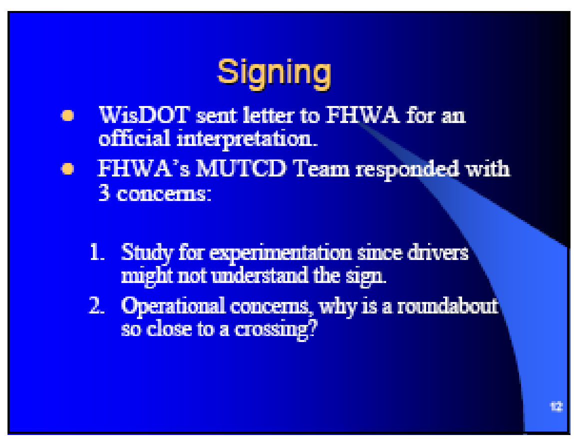

Signing
ROUNDABOUT ADVANCE GUIDANCE SIGN
NORTH
301
WEST
220
Forsberg
EAST
220
Burke
7


Signing
WisDOT Explored Options for Equivalent Warning Signs
8


WisDOT Explored Options Using Plaques
R R
W10-1
LEFT
AHEAD
RIGHT
9


Signing
WisDOT Developed a Proposed Sign
10


Signing
• At First FHWA Gave Positive Reaction
• Sign wasn't Non-Conforming since it combined to already approved symbols:
1. Roundabout Symbol
2. Crossing Symbol
11


Signing
• WisDOT sent letter to FHWA for an official interpretation.
• FHWA's MUTCD Team responded with 3 concerns:
1. Study for experimentation since drivers might not understand the sign.
2. Operational concerns, why is a roundabout so close to a crossing?
12

Signing

3. Design of sign is crowded, circle too small. Use the "standard W10-3 within the circle just before the exit or a W10-1 at the departure from the circle with a distance plaque if space permits, and only in situations where the devices at the crossing cannot be seen from within the circulatory roadway."

13

Signing

1. Study for experimentation since drivers might not understand the sign.
   a. WisDOT feels this is a national issue and should be taken up as such.
   b. It was presented to the NCUTCD technical committee for Parts 8 & 10 in January and they agree.
   c. Utilizing the existing symbols as we've proposed is probably the best but research is needed.
2. Operational concerns, why is a roundabout so close to a crossing?
   Common reaction to the issue but they already exist, aren't going away and more are coming.

14

Signing

3. Design of sign is crowded, circle too small.
- WisDOT understands and has designed the sign with a maximum size circle and larger minimum size sign.

3. Use the "standard W10-3…
- Motorists would most likely not pay attention to the W10-3 while traveling in the circulatory roadway since they are focused on the complex driving task of negotiating a roundabout.

3. Use the "standard W10-1…
- Sign is only used to replace the W10-2, 3 & 4 when there is less than 100 ft. as per the MUTCD so using the W10-1 would be in non compliance with the manual.

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What Started this Signing Discussion?

- Project on Allouez Ave. (USH 141) in the Green Bay area.
- Proposed roundabout to replace an existing signalized intersection.
- Roundabout was determined to handle the intersection traffic better and safer at this location.
- Railroad crossing impacts were actually positive compared to the existing.

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How could the impacts be positive?

- Storage distance from the "intersection" to the crossing was slightly increased as part of the project.
- Right turn movements moved significantly further from the crossing.
- Signalized intersection would have moved the intersection closer to the crossing due to additional turn lanes. A roundabout's approach lanes don't have to line up with the departure side.

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How could the impacts be positive?

- Vehicles facing a YIELD sign at a roundabout have better opportunities to clear the track zone than those facing a red traffic signal without pre-emption or a side road stop sign.
  - This alone makes the crossing safer than the previous configuration.
- Passive crossing with limited number of trains per month isn't conducive to pre-emption.
  - Rusty rail, pre-emption not assured.
  - Decreased highway operations/safety the 99.9% of the time trains aren't operating at/near the crossing.

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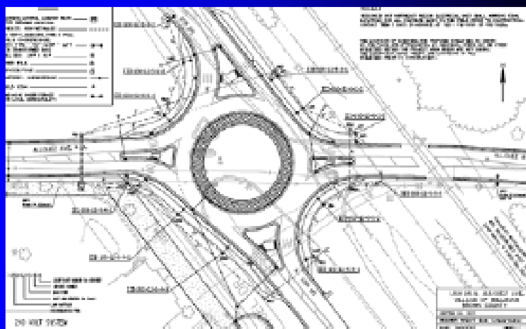
Plan Overview of the Roundabout



19

Signing Research Needs

- Need to develop a new sign (or series of signs) to address when roundabouts are in close proximity to grade crossings.
- OR, need to develop guidance on how to apply the existing signs to roundabouts.
  - Would most likely need changes to the MUTCD .

20

Other Roundabout Research

- This issue isn't going away so research needs to be done on more than just signing. There are other issues around this emerging trend:
  - Traffic signals at roundabouts for pre-emption. (How do we signalize a roundabout?)
    - What signal indications? (red/yellow/green or red/yellow or blank outs or lane use control signals ?) (For each lane or each movement?)
    - Signals dwell in flashing yellow or dark?
    - How to allow non-conflicting moves?
  - One track vs. multiple track issues. (Clear out queues before a second train.)

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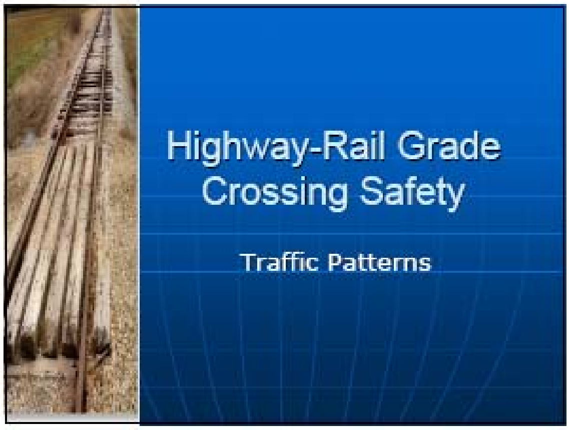
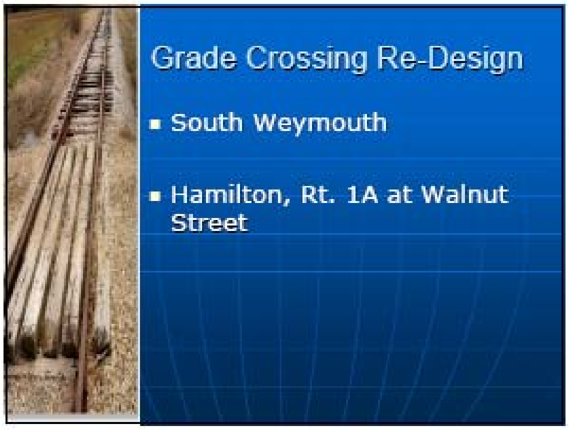
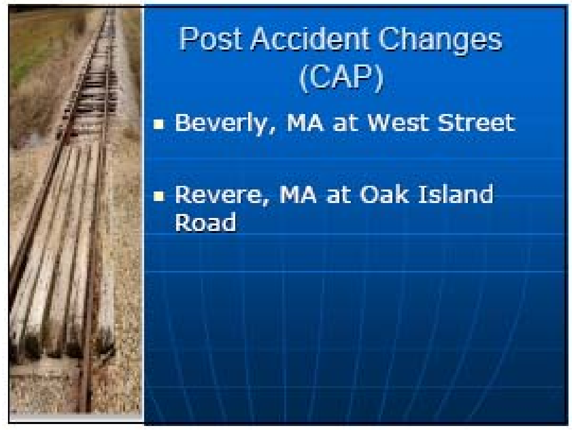
The Massachusetts Bay Transportation Authority: Lessons Learned

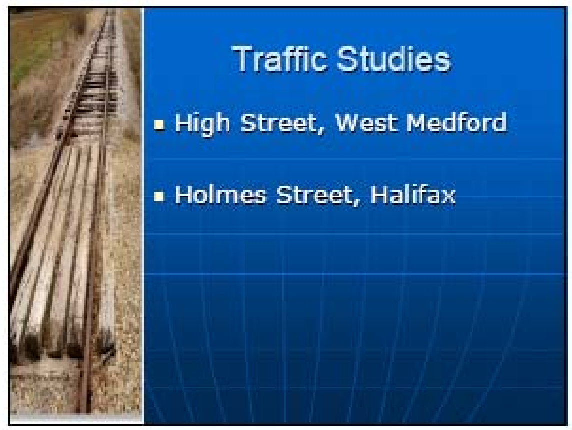
Gerard J. Ruggiero, WSO-CSS, Deputy Director of Safety, Safety Department
Lorraine M. Pacocha, Senior Project Coordinator, Design and Construction Department
Massachusetts Bay Transportation Authority

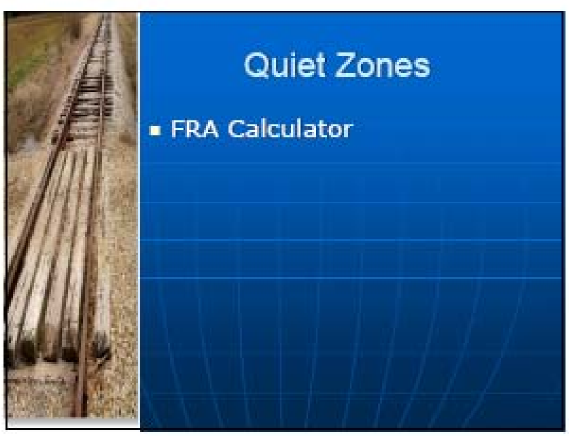



Grade Crossing Re-Design
South Weymouth
Hamilton, Rt. 1A at Walnut Street


Post Accident Changes (CAP)
Beverly, MA at West Street
Revere, MA at Oak Island Road


Post Accident Changes (CAP)
Revere, MA at Oak Island Road
BEFORE
AFTER


Traffic Studies
High Street, West Medford
Holmes Street, Halifax


Quiet Zones
FRA Calculator


Any Questions?

Queue-Cutter Signals at Highway-Rail Grade Crossings

Brent Ogden, Vice President
AECOM

Queue Cutters and Pre Signals

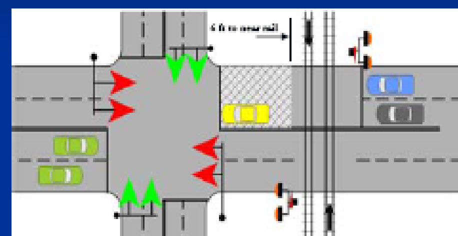
Examples and Research Questions

Federal Railroad Administration
Third Research Needs Workshop
Volpe Transportation Center, Cambridge MA (July 2009)

Presented by
Brent D. Ogden, AECOM

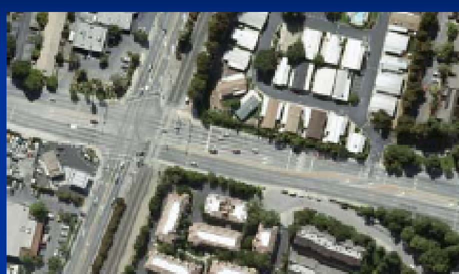
Clear Storage Distance

Key Definition



Pre Signal

Mary/Evelyn/UPRR, Sunnyvale, CA



Clear Storage = 20 ft; Stop Bar Offset = 75 ft

Pre Signal

Mary/Evelyn/UPRR, Sunnyvale, CA

Stop Bar Offset = 75 ft; Distance to Heads = 25 ft

Pre Signal

Typical Cycle (No Train)

Video #1

Pre Signal

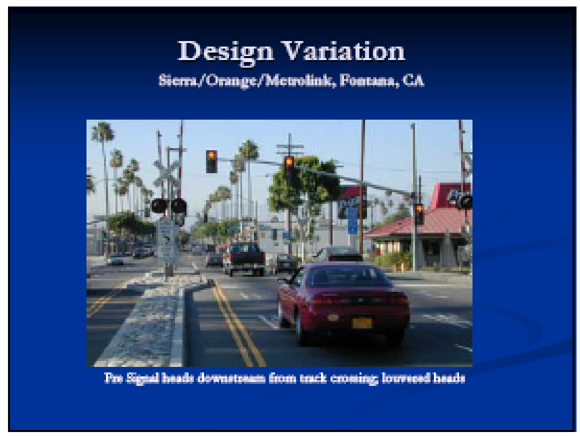
Typical Cycle (with Lagging Left Service)

Video #2

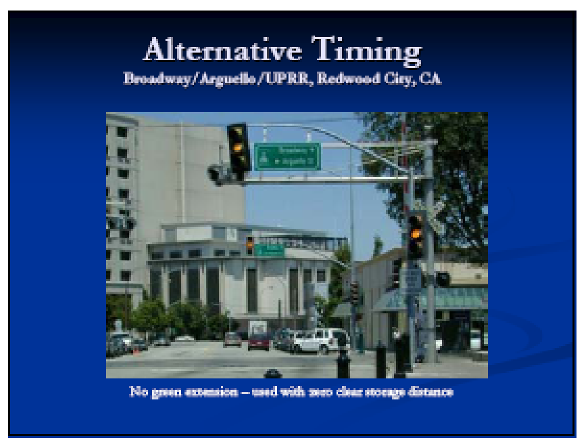

Coordinated Signals
Balboa/Victory/Orange Line Busway, Los Angeles, CA
Clear Storage = 175 ft; Stop Bar Offset = 0 ft


Coordinated Signals
Typical Cycle (No Bus)
Video #3

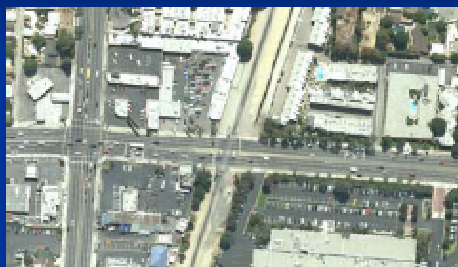

Coordinated Signals
Bus/Train Activation Example
Video #4


Design Variation
Sierra/Orange/Metrolink, Fontana, CA
Pre Signal heads downstream from track crossing; louvered heads


MUTCD Standard Timing
Katella/Manzanita/BNSF, Orange, CA
With Green Extension timed to clear tracks


Alternative Timing
Broadway/Arguello/UPRR, Redwood City, CA
No green extension – used with zero clear storage distance

Queue Cutter
Balboa/Victory/UPRR, Los Angeles, CA



Clear Storage = 330 ft; Stop Bar Offset = 0 ft

Queue Cutter
Typical Activation at End of Red Phase

Video #5

Queue Cutter
Non Compliance Event

Video #6

Queue Cutter
Heavy Vehicle Event

Video #7

Queue Cutter
Lane Distribution Event

Video #8

Differentiators

- Pre Signal
  - Applicable to Locations with Limited Clear Storage Distance
  - Interconnected with Downstream Intersection Signal
  - Cycles Continuously
- Queue Cutter
  - Applicable to Locations with Substantial Clear Storage Distance
  - Not Interconnected with Downstream Intersection Signal
  - Cycles Intermittently

Guidance and/or Requirements

- Pre Signal
  - Passive DO NOT STOP ON TRACKS sign
  - NO TURN ON RED sign
  - Queue Clearance Time shall be long enough to allow the [design] vehicle to move through the intersection, or to clear the tracks if there is sufficient clear storage distance."
  - May use programmed visibility heads
- Queue Cutter
  - Active DO NOT STOP ON TRACKS SIGN or Traffic Signal

Research Needs – Device Selection

- Pre Signal
  - What is the maximum Clear Storage Distance? *
  - What site conditions may limit applicability?
- Queue Cutter
  - What is the minimum Clear Storage Distance?
  - Is there a maximum effective Clear Storage Distance?
  - What site conditions may limit applicability

* IL DOT 56 ft (autos) 81 ft (trucks) max

Research Needs – Compliance

- Pre Signal
  - Known Issues
    - Heavy Right Turn on Red
    - Driver Confusion (especially at Busways)
  - What are the countermeasures?
  - What alternative treatments are available?
- Queue Cutter
  - Known Issues
    - Frequent cycling due to recurrent queuing
    - Visual clutter
  - What are the countermeasures?
  - What alternative treatments are available?

Research Needs – Design

- Pre Signal
  - Placement of heads upstream or downstream from crossing
  - Use of programmed visibility heads or louvres
  - Minimum stop bar offset to signal heads
  - When is green extension required?
- Queue Cutter
  - Placement of detection loops
  - Minimum red time
  - Minimum green time
  - Does visibility of downstream intersection signals matter?

Effectiveness of LED Signs at Passive Crossings

John Shurson, Assistant Director of Public Projects
Burlington Northern Santa Fe Railway Company

BNSF Railway

New Technologies
Research Needs Workshop

BNSF RAILWAY

John Shurson
Assistant Director Public Projects

Volpe Research Center
Cambridge, Massachusetts

LED Lights on Passive Signs at Private at-grade Crossings

Existing BNSF Standard for Signage at Private at-grade Crossings

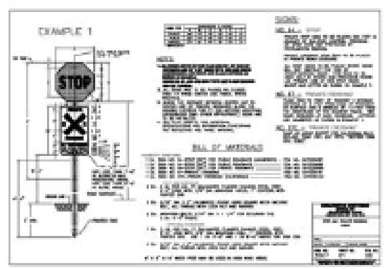
- BNSF adopted a Standard for signage at private at-grade crossings
- Other Class I railroad followed suit and developed similar standard signage at private at-grade crossings
- BNSF is initializing pilot project to install enhanced signage that would provide a greater level of visibility at locations that have less than ideal sight distances that are commercial, industrial or park access crossings.

LED Lights on Passive Signs at Private at-grade Crossings

TAPCO Solar Powered Blinker Signs

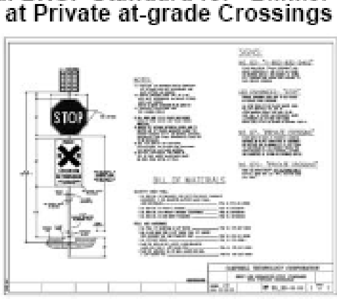
LED Lights on Passive Signs at Private at-grade Crossings

Existing BNSF Standard for Signage at Private at-grade Crossings



LED Lights on Passive Signs at Private at-grade Crossings

Additional BNSF Standard for "Blinker" Signage at Private at-grade Crossings



New Technologies

LED Lights on Passive Signs at Private at-grade Crossings

- Target pilot installation project at using existing BNSF Standard for Signage at Private at-grade Crossings
- Supplement BNSF Standards by adding "Blinker" LED Signage at Private at-grade Crossings
- "Blinker" Signs at Public at-grade crossings?

LED Lights on Passive Signs at Private at-grade Crossings

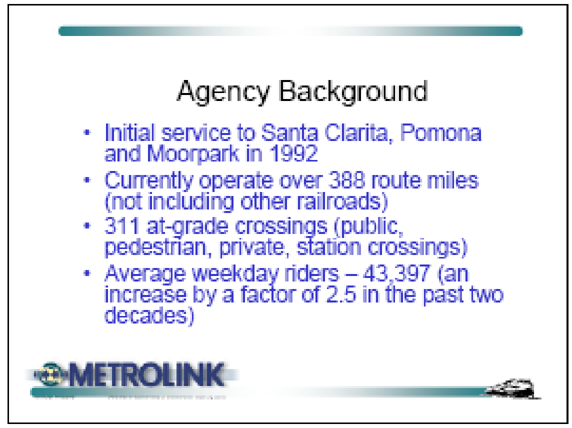
Upcoming issues:

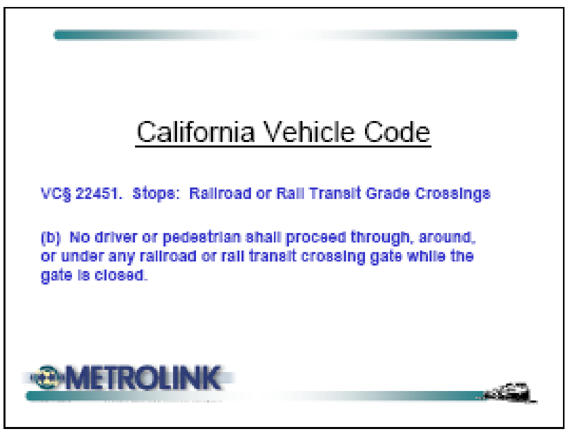
- Standardization in railroad industry
- Crossing selection
- Activation of LED lights
  - 24 hours – 7 days
  - Timed
  - Train activation
- Adoption at public crossings

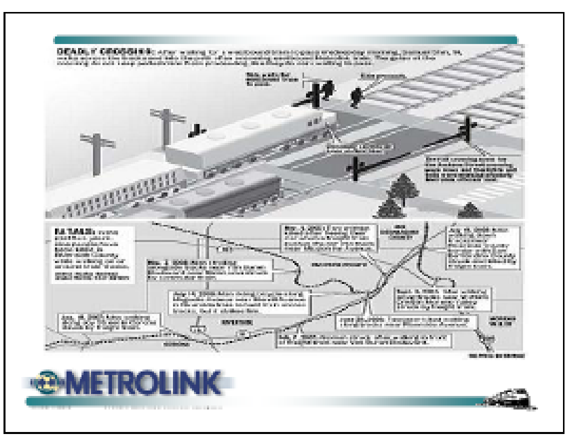
BNSF RAILWAY

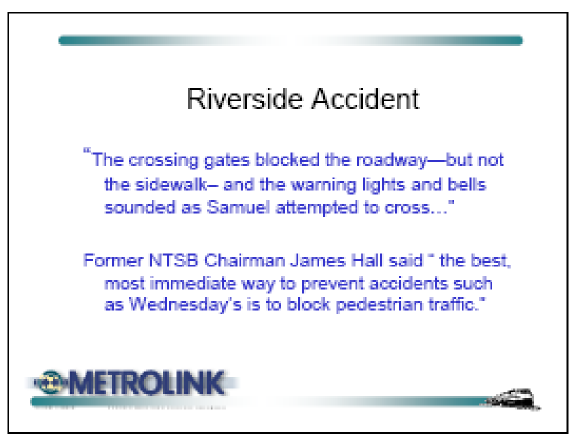
Warrants for Pedestrian Treatments at Highway-Rail Grade Crossings

Dan Guerrero, Director of Communications and Signals
Metrolink Los Angeles









Grade Crossing Manual

TECHNICAL ADVISORY GROUP (TAG)

- Purpose: *Provide input on the draft document by a group with varying expertise in design, construction and operation of grade crossings.*
- SCRRA (Civil Engineering, C&S, Rail Corridor Crossings, Safety, Legal, Risk Management)
- Civil Consultants: AECOM, JLP, Rail Pros, LAN
- Signal Consultant: XoRail, PRE
- LACMTA
- CPUC
- City of Los Angeles

METROLINK

Committee Goals

Establish Defined Design Procedures
- Proper field diagnostics
- Develop the engineering flow and approval process
- Establish Defined Design Procedures

Publish SCRRA Standard Configuration
- Define proper applications of technology
- Provide clear direction on the applications of technology
- Provide direction that can be used in a variety of cases

ENHANCE HIGHWAY-RAIL GRADE CROSSING AND PEDESTRIAN PATHWAY SAFETY

METROLINK

Why Pedestrian Standards?

- Provide consistency in the application of standards for highway-rail grade crossing safety within the SCRRA/Metrolink 5 County system
- Reference for municipalities on the SCRRA system when improving crossings
- Standards tool for upcoming capital programs in Riverside (PVL), Los Angeles (Sealed Corridor) and Orange County (Service Expansion and Crossing Program)

METROLINK

Why Pedestrian Standards?

- Ensure enhanced warning for pedestrian traffic at highway-rail and pathway grade crossings.
- Ensure the appropriateness, type, configuration, and location of the devices to be installed.
- Ensure regulatory and local authority compliance requirements are met.

METROLINK

Manual Content

PEDESTRIAN CONSIDERATIONS

- Pedestrian grade separations
- Ten-minute walk rule (proximity to schools, hospitals other high density locations)
- ADA issues
- Refuge areas
- Warning devices – type and configuration
- Channelization
- Number of Tracks

METROLINK

Manual Content (Cont.)

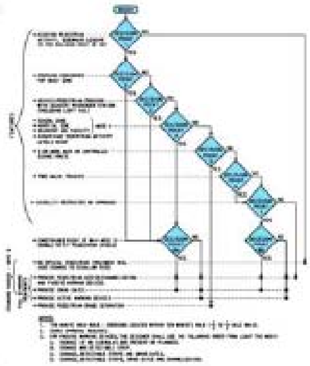
PEDESTRIAN CONSIDERATIONS

- Pedestrian treatments work well with proper channelization and signs.
- Sidewalk area on either side of tracks and/or through track area.
- Pavement striping continued across the track portion of roadway is good visual and effective.
- Important to add extra pedestrian treatments near stations-- people run to catch trains.
- All crossings unique and need diagnostic reviews

METROLINK

PEDESTRIAN CROSSINGS

PEDESTRIAN CROSSING DESIGN CONSIDERATION TABLE



METROLINK

RECOMMENDATION

- Research and develop appropriate warrants to ensure industry-wide consistency in determining need and applicability of pedestrian treatments.

METROLINK


SCRRA Highway-Rail Grade Crossing Recommended Design Practices and Standards Manual
• Can be accessed by going to: www.metrolinktrains.com, click on "About Us" (pull down menu) "Public Projects" and "Grade Crossing Section" (on right side).
METROLINK

Regulation and Enforcement

Team Leader: Deborah M. Freund, Federal Motor Carrier Safety Administration

2004 Public Xing Statistics

		Autos	Buses	Trucks
Collisions	Number	1028	7	587
	Rate per BVM	0.67	1.05	2.59
	Percent	75.19	0.29	24.15
Fatalities	Number	204	0	35
	Rate per BVM	0.08	0	0.15
	Percent	84.65	0	14.52
Injuries	Number	648	7	225
	Rate per BVM	0.24	1.05	0.99
	Percent	73.22	0.79	25.42
VMT, billions		2,719.32	6.64	226.51
Registered vehicles		228.276 M	795,000	8,171,000
Collisions per million vehicles		8.01	8.81	71.94

Source: Highway-Rail Grade Xing Handbook, 2nd Revised Edition

2007 Public Xing Statistics

		Autos	Buses	Trucks
Collisions	Number	1562	2	508
	Rate per BVM	0.56	0.29	2.24
	Percent	75.39	0.10	24.52
Fatalities	Number	162	0	36
	Rate per BVM	0.06	0	0.16
	Percent	81.82	0	18.18
Injuries	Number	593	0	194
	Rate per BVM	0.21	0	0.85
	Percent	75.35	0	24.65
VMT, billions		2,782.27	6.98	226.96
Registered vehicles, M		237.402 M	834,436	9,027,624
Collisions per million vehicles		6.58	2.40	56.27

Sources: FHWA, Office of Highway Policy Information, Highway Statistics 2007 and Volpe Center, US DOT
FRA Railroad Accident/Incident Reporting Systems (RAIRS) Database, February 2009

2008 Public Xing Statistics

		Autos	Buses	Trucks
Collisions	Number	1389	5	364
	Rate per BVM			
	Percent	79.01	0.28	20.71
Fatalities	Number	159	0	16
	Rate per BVM			
	Percent	90.86	0	9.14
Injuries	Number	530	1	195
	Rate per BVM			
	Percent	73.00	0.14	26.86
VMT, billions				
Registered vehicles, M				
Collisions per million vehicles				

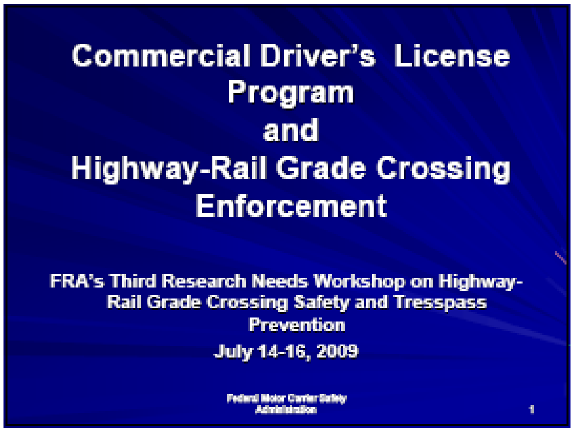
Sources: FHWA, Office of Highway Policy Information, Highway Statistics 2007 and Volpe Center, US DOT
FRA Railroad Accident/Incident Reporting Systems (RAIRS) Database, June 2009

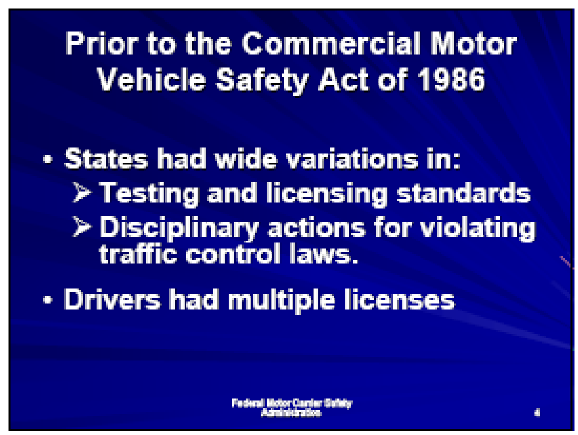
In sum …

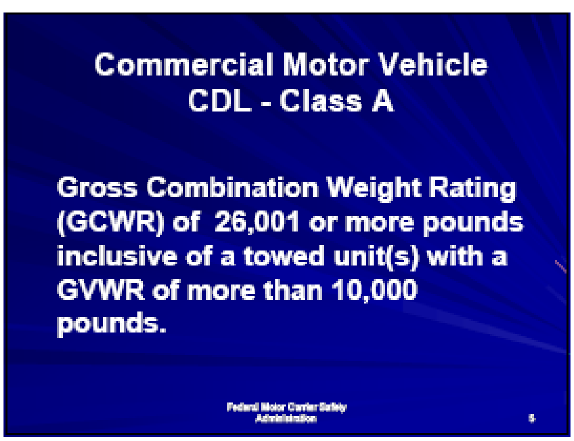
- The changes from 2004 to 2008 are striking:
  - 36% drop in collisions
  - 54% drop in fatalities
  - 13% drop in injuries
- From 2007 – 2008, 28% drop in collisions, 55% drop in fatalities, but one more injury
- Granted, some of this may be due to lessened truck and train traffic from economic downturn
- VMT and vehicle registration figures will be available this fall to compute rate-based outcomes

Commercial Driver's License Program

Robert (Bob) Redmond, Senior Transportation Specialist
Federal Motor Carrier Safety Administration







Commercial Motor Vehicle CDL – Class C

- Any single vehicle or combination of vehicles, that meets neither the definition of Class A or Class B;
- Is designed to transport 16 or more passengers, including the driver; or
- Is transporting hazardous materials required to be placarded or select agents or toxins.

Enforcement of CDL requirements is a joint effort involving:

- Federal regulations and oversight
- State testing and licensing
- State and local law enforcement
- Judicial system

Disqualifying Offenses

- Major Offenses
- Serious Traffic Violations
- Violations of Out-Of-Service Orders
- Railroad Grade Crossing Violations

Background

- Regulation mandated by section 403 of the ICC Termination Act of 1995
- Final rule effective on October 4, 1999
- Reduce number of CMV/train collisions at grade crossings involving injuries and fatalities

Railroad-Highway Grade Crossing Violations

[49 CFR § 383.51(d)]

<u>For drivers who are not required to always stop</u>:

- Failing to slow down and check that the tracks are clear of an approaching train;
- Failing to stop before reaching the crossing, if the tracks are not clear.

Railroad-Highway Grade Crossing Violations (cont.)

<u>For drivers who are always required to stop</u>:

- Failing to stop before driving onto crossing.

Railroad-Highway Grade Crossing Violations (cont.)

For all drivers:

- Failing to have sufficient space to drive completely through the crossing without stopping;
- Failing to obey traffic control device or instructions of enforcement official at crossing;
- Failing to negotiate a crossing due to insufficient undercarriage clearance.

Federal Motor Carrier Safety Administration 13

Disqualification for Railroad-Highway Grade Crossing Violations

- 1st Conviction = 60 days
- 2nd Conviction = 120 days
- 3rd or Subsequent Conviction = 1 year
- Violations must occur within a 3-year period.

Federal Motor Carrier Safety Administration 14

Civil Penalties for Railroad-Highway Grade Crossing Violations

Employer: Civil penalty of not more than $10,000 must be assessed against an employer who knowingly allows, permits, requires or authorizes driver to operate a CMV in violation of Federal, State or local laws or regulations pertaining to railroad-highway grade crossings

[49 CFR 383.37(d) and 383.53(d)]

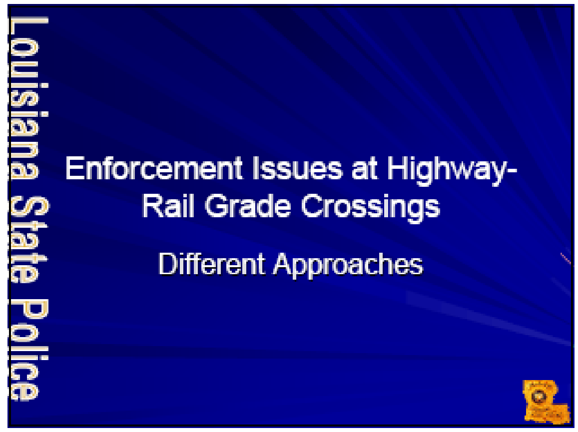
Federal Motor Carrier Safety Administration 15

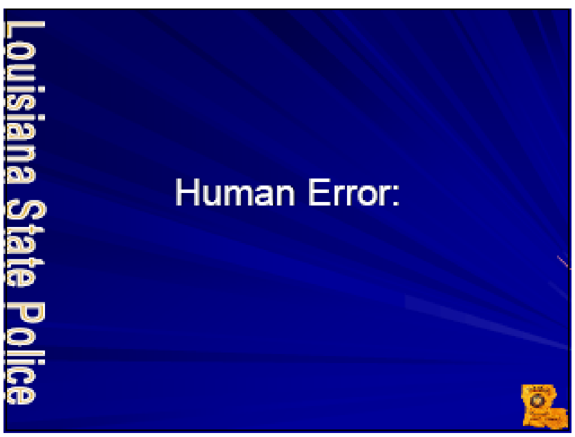
Questions

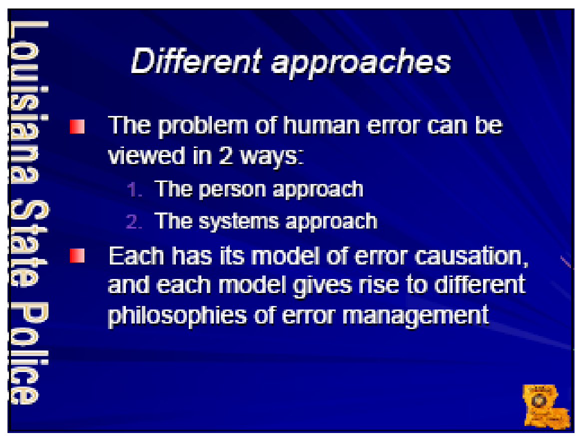
Federal Motor Carrier Safety Administration 16

Enforcement Issues at Highway-Rail Grade Crossings

LTC. Ralph D. Mitchell, Jr., Patrol Commander
Louisiana State Police







Louisiana State Police

Person approach, basis

- The long-standing and widespread tradition of person approach focuses on the unsafe acts -errors and statutory violations- of people in the transportation system: DRIVERS and PEDESTRIANS.

Louisiana State Police

Uniformity of Laws

[illegible]

Louisiana State Police

Person approach, philosophy

- This approach views these unsafe acts as arising primarily from atypical mental processes such as forgetfulness, inattention, poor motivation, carelessness, negligence, and recklessness.
- People are viewed as free agents capable of choosing between safe and unsafe mode of behavior.
- If something goes wrong, a person must be responsible.

Louisiana State Police

Person approach: countermeasures to errors

- The associated countermeasures are directed mainly at reducing unwanted variability in human behavior.
- Posters and campaigns that appeal to people's fear, disciplinary measures, threat of litigation, retraining, naming, blaming, and shaming.

Louisiana State Police

Louisiana State Police

Person approach: countermeasures to errors

- Followers of these approaches tend to treat errors as moral issues, assuming that bad things happen to bad people- what has been called the *"just- world hypothesis"*

Louisiana State Police

person approach, why?

- Blaming individuals is emotionally more satisfying than targeting institutions.
- Uncoupling of person's unsafe acts from any institutional responsibility is in the interests of managers.
- Person approach is also legally more convenient.

Louisiana State Police

Person approach: shortcomings

- Although some unsafe acts rise to a level above the general publics standard behavior, many do not.

Louisiana State Police

Person approach: shortcomings

- Effective risk management depends crucially on establishing a reporting culture. Without a detailed analysis of mishaps, incidents, near misses and "free lessons", we have no way of uncovering recurrent error traps.
- Reliable Data
- Compstat/Trafficstat Process

Louisiana State Police

Person approach: shortcomings

- 2 important feature of human error tend to be overlooked:
  - It is often the *best people* who make the worst mistakes- error is not the monopoly of an unfortunate few
  - Far from being random, mishaps tend to fall into *recurrent patterns*. The same set of circumstances can provoke similar errors, regardless of the people involved.

Louisiana State Police

Person Approach: Shortcomings

- The pursuit of greater safety is seriously impeded by an approach that does not seek out and remove the *error-provoking properties* within the system.
- Quiet Zones

Louisiana State Police

Systems Approach

Louisiana State Police

Systems Approach

- Humans are fallible and errors are to be expected, even in the best society
- Errors are seen as consequences rather than causes, having their origins not so much in the perversity of human nature as in *"upstream"* systemic factors.

Louisiana State Police

System Approach: Countermeasures to Errors

- Although we can not change the human conditions, we can change the conditions under which human operate.
- When an adverse event occurs, the important issue is not who blundered, but how and why the defenses failed.

Louisiana State Police

The *Swiss cheese* model of system accident

- Defenses, barriers, and safeguards occupy a key position in the system approach.
- some are engineered (highway, motor vehicle, warnings)
- others rely on people (training, skill, experience),
- and others depend on procedures and laws.

Louisiana State Police

- This approach leads to proactive rather than reactive risk management

Louisiana State Police

- Active failures are like mosquitoes, they can be swatted one by one, but they still keep coming. The best remedies are to create more effective defenses and to drain the swamps in which they breed. The swamps, in this case, are the ever-present latent conditions.

Louisiana State Police

Error management

- Error management has 2 components:
  1. Limiting the incidence of dangerous errors (this will never be wholly effective).
     1. Photo Enforcement
  2. Creating systems that are better able to tolerate the occurrence of errors and contain their damaging effects.

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Error management

- Followers of the person approach direct most of their management resources to trying to make *individuals* less fallible or wayward.
- Followers of the system approach strive for a comprehensive management program aimed at several targets: *the person, the highway, the environment, the vehicle, and the process.*

"I never notice what has been done. I only see what remains to be done."
Madame Curie

Louisiana State Police

225-925-6402(Phone)

ralph.mitchell@dps.la.gov

LTC. Ralph D. Mitchell Jr.

Louisiana State Police Patrol/TESS

www.lsp.org

Safety and Enforcement: A Local and Regional Perspective

Jack C. Hanagriff, Senior Police Officer
Houston Police Department
Neighborhood Protection Corps

CONNECTING WITH LAW ENFORCEMENT

Jack C. Hanagriff, Police Officer
Houston Police Department
Federal Railroad Administration Law Enforcement Liaison

Improve Communication

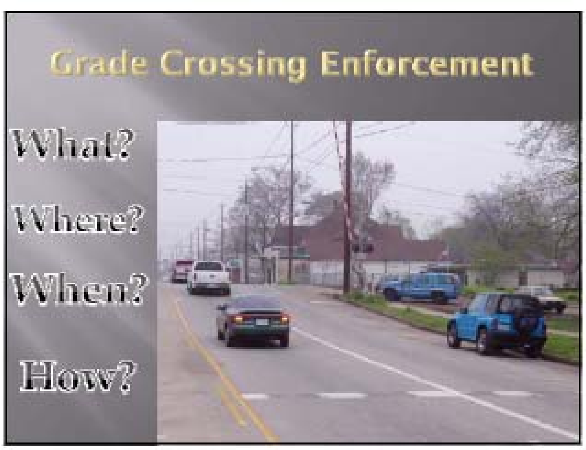
- Translate Incident Data
- Incorporate City, County, State Names
- Utilize closest Street Name and Block Number
- Average Times and Days of Incident

Trespassing Incidents

RR	Subdivision	Mile Post	Incident
UP	Palestine	189.10	Trespasser
UP	Palestine	203.80	Trespasser
UP	Palestine	204.50	Trespasser
UP	Palestine	208.25	Trespasser


bing

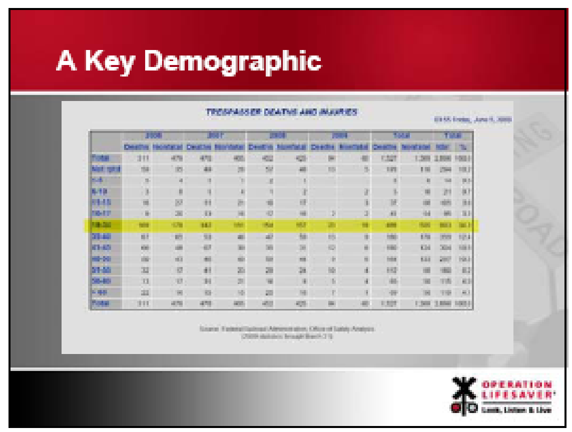

Legislate to enact Standardized Trespassing Laws
Texas Criminal Code
Criminal Trespassing
Requires prior warning or sign
Mandates Arrest
Involves Fingerprinting of subject
Involves drafting report
Involves filing charges
Time Consuming
Texas Transportation Code
Interfering with Railroad Property
Arrest not Mandatory
Issuance of Citation
Place Property Owner and Phone number of Contact

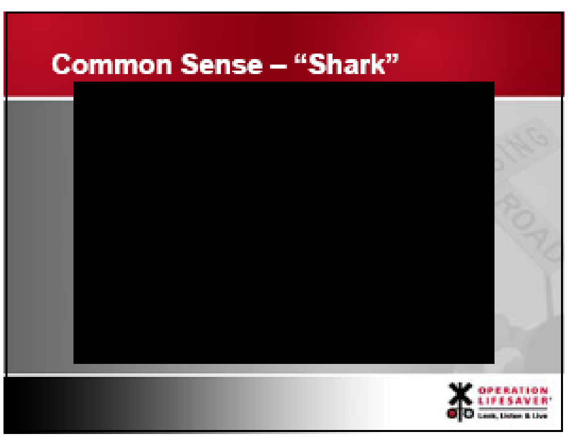

Grade Crossing Enforcement
What?
Where?
When?
How?


Directed Enforcement
FRA and Railroads deliver data to Law Enforcement
Railroad establish a mechanism on specific RR Crossing
Railroad informs Law Enforcement on train operation related to that crossing
Law Enforcement Monitors RR Crossing

Education and Public Awareness

Team leaders: Helen Sramek, Operation Lifesaver, Inc. (USA)
Daniel Di Tota, Operation Lifesaver (Canada)






Common Sense Website
OPERATION LIFESAVER

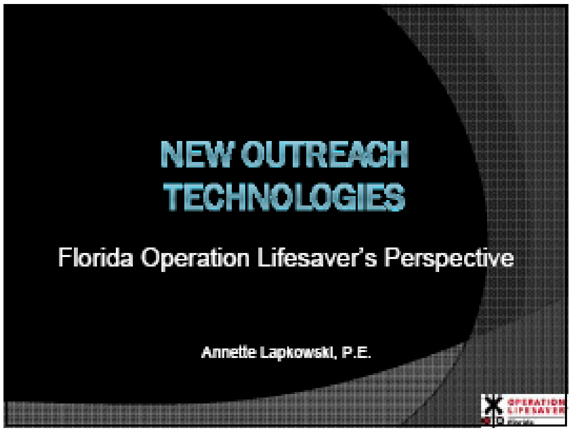

Sample Ad
It's Using very electronic difficult devices to near pay railroad attention tracks to can two be things extremely at dangerous once.
Don't text near trains.
OPERATION LIFESAVER

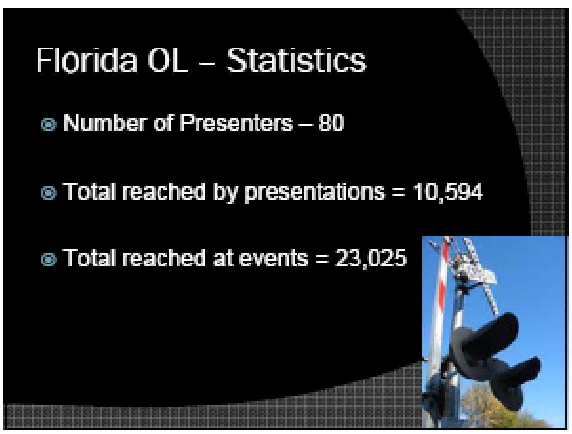

www.CommonSenseUseIt.com
OPERATION LIFESAVER

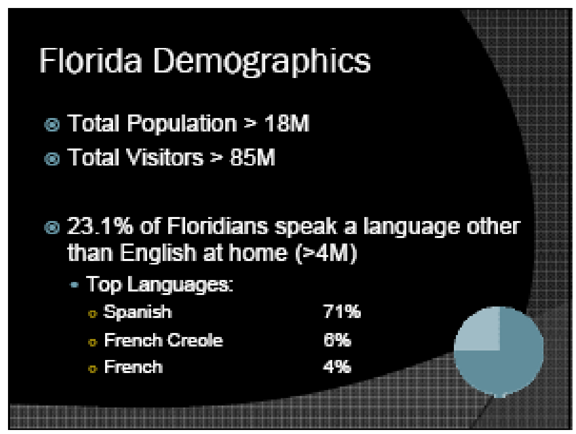

OPERATION
LIFESAVER®
Look, Listen & Live

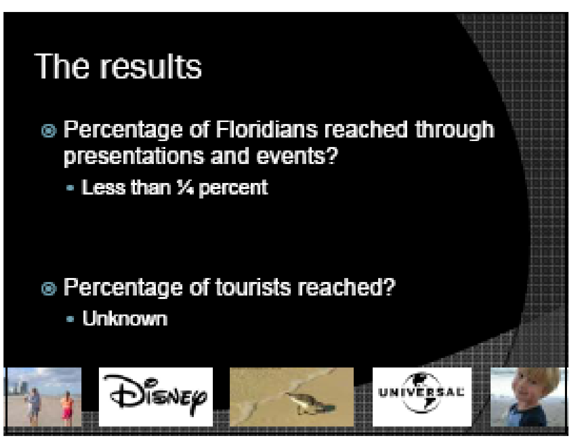
New Outreach Technologies: Florida Operation Lifesaver's Perspective

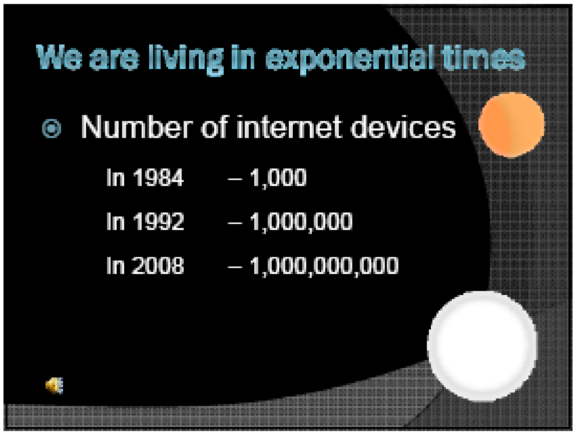
Annette Lapkowski, Rail Operations Administrator
Florida Department of Transportation

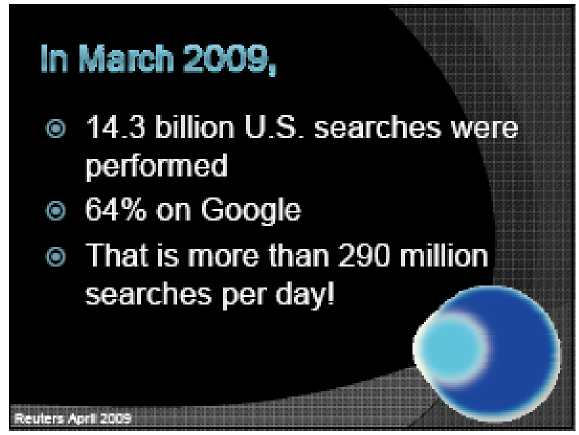


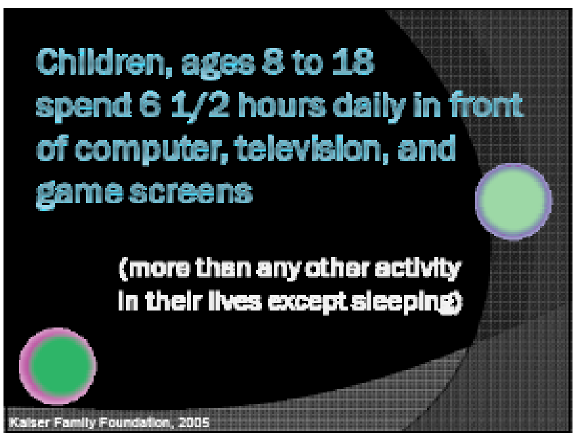


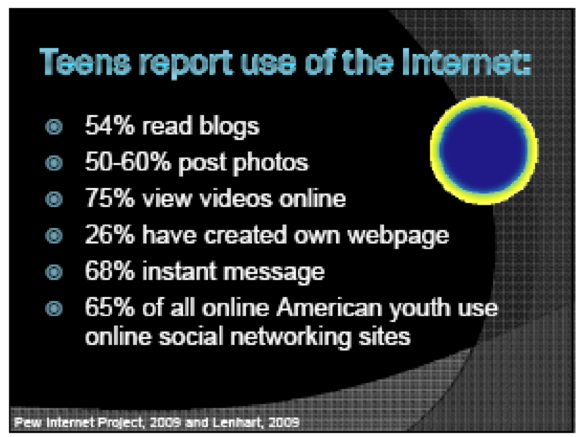


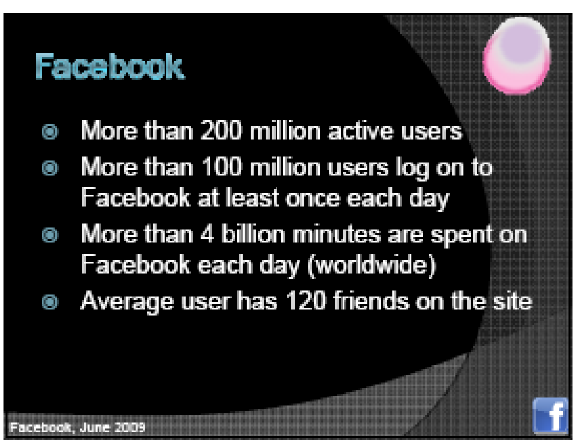


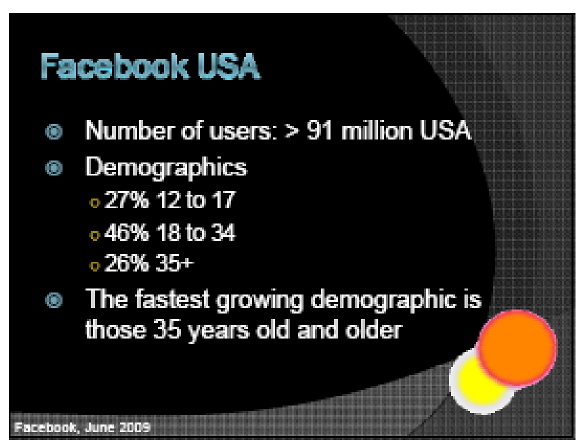

We are living in exponential times
Number of internet devices
In 1984 – 1,000
In 1992 – 1,000,000
In 2008 – 1,000,000,000


In March 2009,
14.3 billion U.S. searches were performed
64% on Google
That is more than 290 million searches per day!
Reuters April 2009


Children, ages 8 to 18 spend 6 1/2 hours daily in front of computer, television, and game screens
(more than any other activity in their lives except sleeping)
Kaiser Family Foundation, 2005


Teens report use of the Internet:
54% read blogs
50-60% post photos
75% view videos online
26% have created own webpage
68% instant message
65% of all online American youth use online social networking sites
Pew Internet Project, 2009 and Lenhart, 2009


Facebook
More than 200 million active users
More than 100 million users log on to Facebook at least once each day
More than 4 billion minutes are spent on Facebook each day (worldwide)
Average user has 120 friends on the site
Facebook, June 2009


Facebook USA
Number of users: > 91 million USA
Demographics
27% 12 to 17
46% 18 to 34
26% 35+
The fastest growing demographic is those 35 years old and older
Facebook, June 2009

According to the Wall Street Journal …

- YouTube receives a billion videos per day
- In fact, every minute, ten hours of video is uploaded to YouTube

Your Marketing may be Dated?

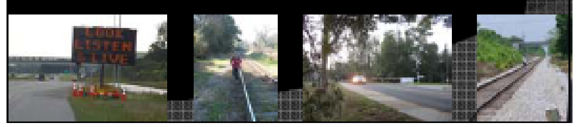
- Millions of people no longer watch TV, and many that do skip the ads
- Print newspapers/magazines are dying
- Society influencers spend a majority of their time on the web
- Over 130 million Americans watch video on the Internet each month

Growth of customization & personalization

- Create fans around your mission
- They will spread your message for you through social media
- Build a culture
- Brand with dynamic people
- Keep it transparent

What's the Florida plan?

- Keep the fans we have
- Encourage the use of new media
- Be fluid and adapt
- Create media that better appeals to younger audience
- Focus on our needs



Twitter

What are you doing?
twitter.com

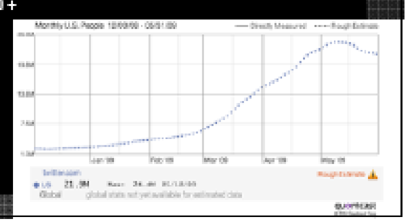
- Twitter the 3rd largest social network
- Allows its users to send and read other users' updates (known as tweets), which are text-based posts of up to 140 characters
- Sample users = Jet Blue, IBM, BBC, Red Cross

- Number of users: > 21 million
- Number of monthly visitors: > 190 million

Twitter

What are you doing?
twitter.com

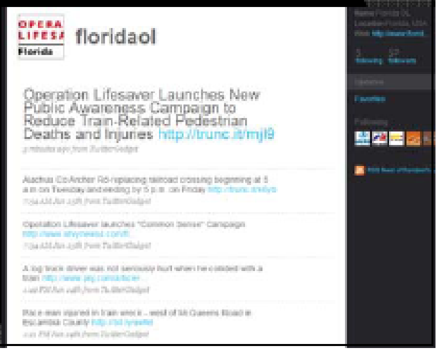
- Demographics
  - 5% 12 to 17
  - 43% 18 to 34
  - 32% 35 to 49
  - 20% 50 +



Twitter

What are you doing?

twitter.com



Facebook

Facebook helps you connect & share with the people in your life

Facebook.com

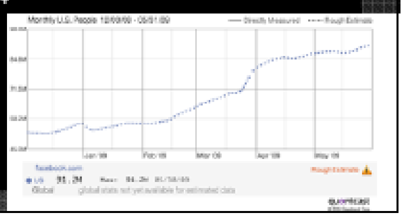
- Facebook is the largest social network
- Users can join networks organized by city, workplace, school, and region to connect and interact with other people
- People can also add friends and send them messages, and update their personal profiles to notify friends about themselves
- Number of users: > 91 million USA

Facebook

Facebook helps you connect & share with the people in your life

Facebook.com

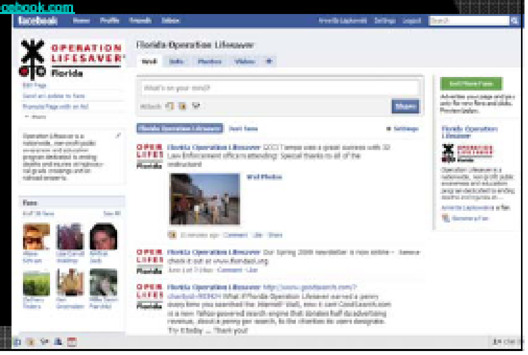
- Demographics
  - 27% 12 to 17
  - 46% 18 to 34
  - 16% 35 to 49
  - 10% 50 +



Facebook

Facebook helps you connect & share with the people in your life

Facebook.com



Advertising – Top Visited Sites

Properties	Accepts Ads?	US People
google.com	Yes	141,178,202
facebook.com	Yes	137,870,934
yahoo.com	Yes	121,924,325
live.com	Yes	113,960,179
msn.com	Yes	99,980,306
youtube.com	Yes	81,574,936
microsoft.com		79,761,405
wikipedia.org		72,804,891
myspace.com	Yes	64,338,380
ebay.com	Yes	60,103,095
aol.com	Yes	58,048,729
ask.com	Yes	53,037,854
craigslist.org		49,500,444

Advertising – Free Sites

- Video sharing
  - YouTube
  - Google Video
  - Vimeo
  - Dailymotion
- Photo sharing
  - Flickr
  - Slide


Questions?
Annette Lapkowski, P.E.
Rail Operations Administrator
Operation Lifesaver State Coordinator
Florida Department of Transportation
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OPERATION LIFESAVER
Florida
http://www.floridaol.org/

Public Education and Enforcement Research Study (PEERS)

Suzanne M. Horton, Operations Research Analyst
Volpe Center

Public Education and Enforcement Research Study

Suzanne M. Horton
USDOT FRA Highway-Rail Grade Crossing Research Needs Workshop
July 14-16, 2009

the VOLPE center

U.S. Department of Transportation
Research and Innovative Technology Administration

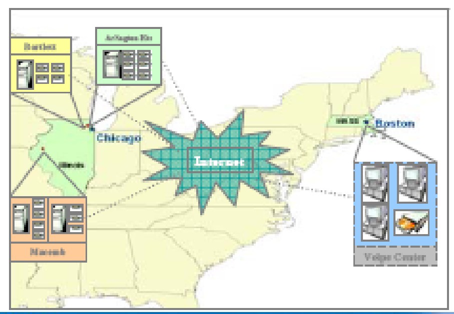
PEERS Purpose and Goals

- The *USDOT 2004 Secretary's Action Plan on Highway-Rail Crossing Safety and Trespass Prevention* identifies Education and Enforcement as key elements in reducing grade crossing incidents, injuries, and fatalities
- The Volpe Center was funded by FRA to conduct a Field Operational Test at highway-rail crossings to establish the effectiveness of education and enforcement programs

PEERS Project Overview

- 16-month video monitoring period
  - Pre-test case data collection period (2 months)
  - Test case data collection period (12 months)
  - Post-test case data collection period (2 months)
- Initiatives during test case period
  - Scheduled police information and enforcement blitzes
  - Community public awareness campaigns

Overall System Schematic



Violation Types

Type I Violation – Flashers active, gate is vertical

Violation Types

Type II Violation – Flashers active, gate in motion

Violation Types

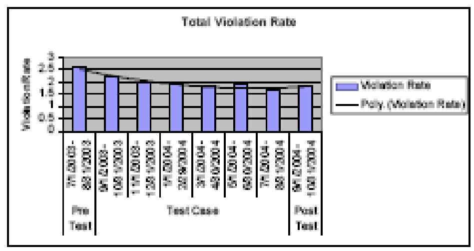
Type III Violation – Flashers active, gate fully deployed

Differences in Communities

	Arlington Heights, IL	Macomb, IL
Population	76,000	18,000
Trains per day	~75	~20
Train distribution	12 freight 63 commuter	18 freight 2 Amtrak
Number of tracks	3	1

Arlington Heights, IL

Arlington Heights Violations



The overall violation rate reduction (from the pre-test to post-test) was 30.92%

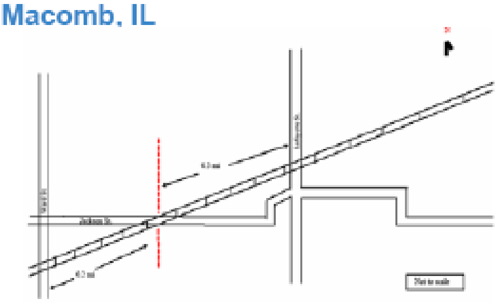
Arlington Heights Violations

Violation Rates by Violation Type for All Crossings

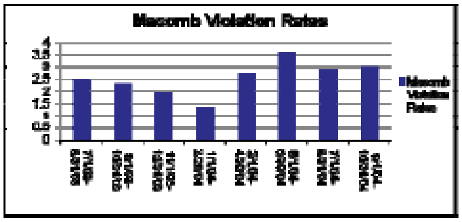
Violation	*Pre-test*	*Test*	*Post-test*
Type I	0.46	0.48	0.53
Type II	1.35	1.07	1.04
Type III	0.78	0.36	0.22

- Minimal increase in Type 1 violation rate
- Type 2 violation rate decreased by 29%
- Type 3 violation rate decreased by 72%

Macomb, IL



Macomb Violations



*Data loss in January/February resulted in an outlier for this period

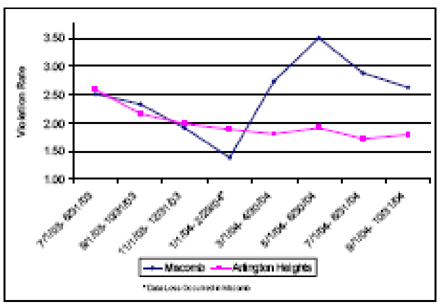
The overall violation rate increased from the pre-test to post-test period

Macomb Violations

Violation Rates by Violation Type for All Crossings			
Violation	*Pre-test*	*Test*	*Post-test*
Type I	0.40	0.41	0.36
Type II	2.02	2.12	2.22
Type III	0.08	0.05	0.06

- Type 1 violation rate decreased by 10.1%
- Type 2 violation rate increased by 9.6%
- Type 3 violation rate was too small to be significant

Arlington Heights vs. Macomb



Population Demographics

Arlington Heights

- Commuters – used the crossing daily and were exposed to safety initiatives on a regular basis

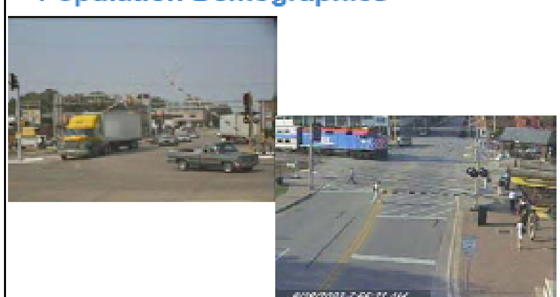
Macomb

- Motorists – may drive over the crossing infrequently and not exposed to PEERS programs regularly
- Students – every September approximately 25% of the student population in Macomb is new

Macomb PEERS Timeline

- The population of Macomb fluctuates by time of year
- Post-test data includes students who were not exposed to the PEERS programs

Population Demographics



PEERS Program Implementation

Arlington Heights

- Police presence was major part of PEERS program
- Education and enforcement blitzes were conducted randomly but frequently throughout study

Macomb

- Primary activities included envelope stuffers, newsletters, posters, PSAs
- Activities reach a wide audience but do not specifically target crossing users

Education and Enforcement Blitzes

Gate Down Time

Arlington Heights

- Primarily commuter rail trains
- Crossing warning devices active for 2.1 minutes per train event

Macomb

- Primarily freight trains
- Crossing warning devices active for 3.7 minutes per train event

Gate Down Time

Conclusions

- The PEERS programs in Arlington Heights and Macomb had different effects on crossing-user behavior
- A variety of elements should be considered when constructing an education and enforcement program
- Best practices and guidance are next steps

Thank you

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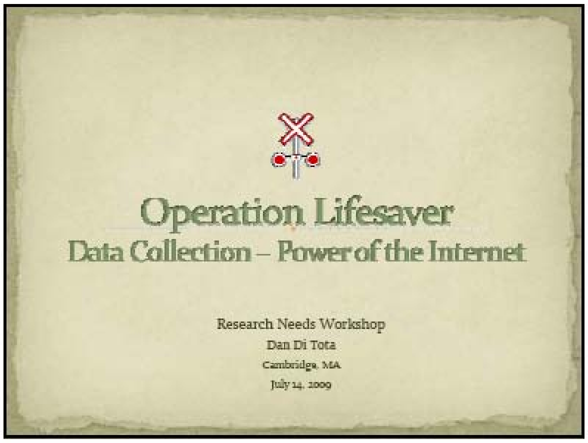
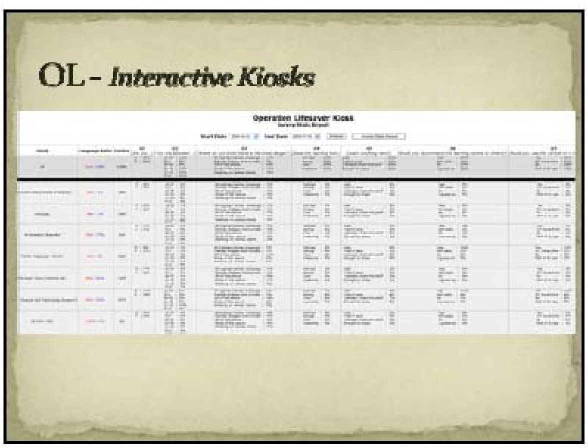
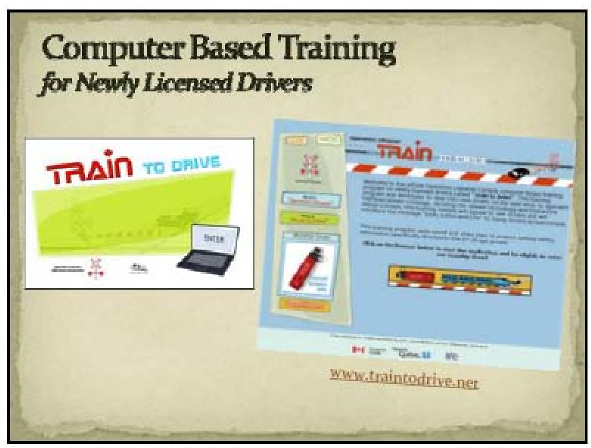
Operation Lifesaver Data Collection – Power of the Internet
Daniel Di Tota, National Director
Operation Lifesaver, Canada








Computer Based Training
for Newly Licensed Drivers
Operation Lifesaver - Train to Drive - Statistics
Train to Drive Monthly Draw


OL Kids – www.olkids.ca
HEY KIDS!
ROVER'S STORY
TRAIN YOUR BRAIN


OL Kids – www.olkids.ca
HELP ROVER
TRAIN YOUR BRAIN


OL Kids – www.olkids.ca

OL Main – www.operationlifesaver.ca

OL Main – www.operationlifesaver.ca

Questions?

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Institutional Issues

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BNSF Railway

Institutional Issues
Research Needs Workshop

BNSF RAILWAY

John Shurson
Assistant Director Public Projects

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Institutional Issues

Perception of Grade Crossing Safety

- Does vehicular and trespassing issues at grade crossings take "back seat" to overall highway safety issues? If so, then industry experts need to address:
  - Limited Federal funds for grade crossing improvements
  - Limited State and local funds when using public works projects
  - Limited nationwide source for research, public education and creating uniform application of installation of safety improvements

Institutional Issues

Quiet Zones

- Does the creation of Quiet Zones improve safety at grade crossings?
  - Are quiet zone projects adequately addressing pedestrians at grade crossings?
  - Are quiet zone projects adequately addressing private and publicly used private crossings within quiet zones?
  - Should diagnostic field studies be conducted at all prospective quiet zone crossings?

Institutional Issues

Pedestrian safety and trespassing

- Are existing and new developments adjacent to rail corridors adequately addressing pedestrian safety?
- Should standards for fencing and channelization be developed at rail corridors?
- Should land zoning be developed in urban areas adjacent to rail corridors that provides for limited pedestrian traffic?
- Require grade separations and sealed rail corridors when schools, stores, parks and trails are proposed in urban areas

Institutional Issues

Grade crossing closures and consolidations

- Do grade crossings closures and consolidation improve grade crossing safety?
  - Channelizing grade crossings to improved at-grade crossings and constructing grade separations reduces risk of train – vehicle incidences
  - Promote education to public agencies that encourages crossing closures and "smart" development near grade crossings

Institutional Issues

Instituting new technology

- What are the obstructions to adopting new technology?
  - Is there incentive for industry to development new technology
  - Can new technology be universally adopted by Regulatory Agencies and by private industry throughout the nation?
  - Should video surveillance and enforcement be promoted?

Institutional Issues

Positive Train Control

- How does the rule making and implementation of positive train control effect grade crossing safety?
  - Can PTC be used to improve grade crossing safety?
  - Or will PTC take focus and resources away from grade crossing safety?

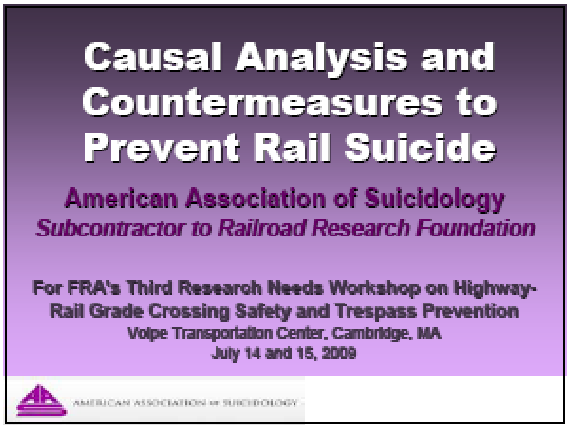
Institutional Issues

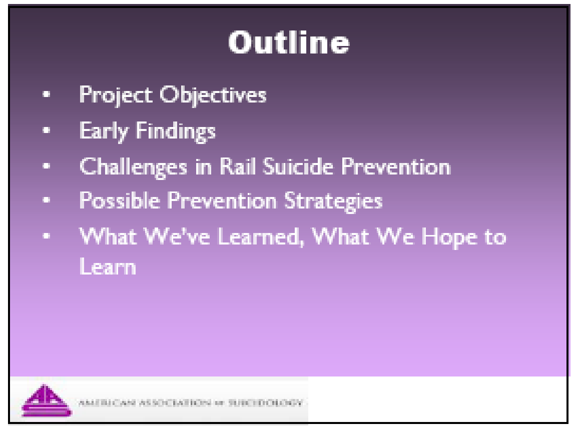
High Speed Rail

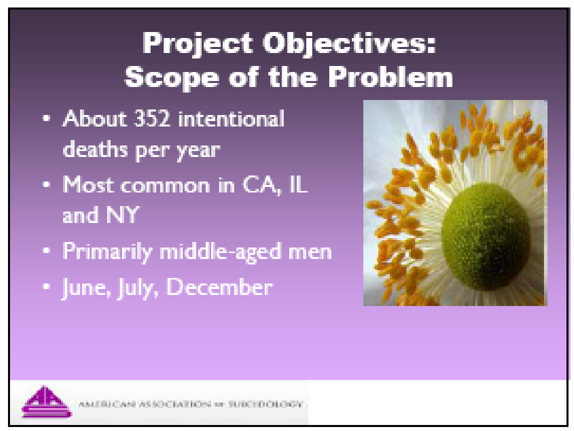
- Can standards for grade crossing safety at HSR corridors be used on existing rail corridors?
  - When HSR is adjacent to existing rail, then opportunities for improvements such as grade separations and sealed corridors should be required.

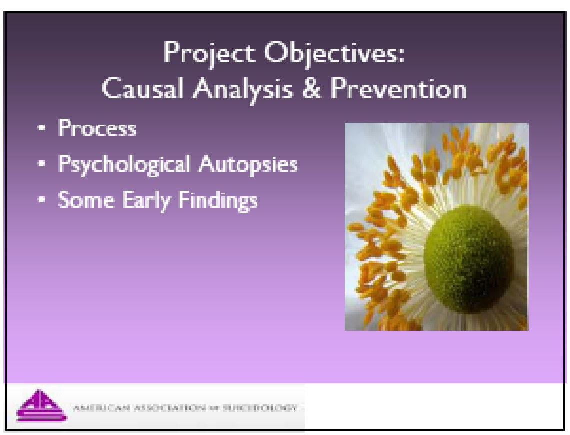
Causal Analysis and Countermeasures to Prevent Rail Suicide

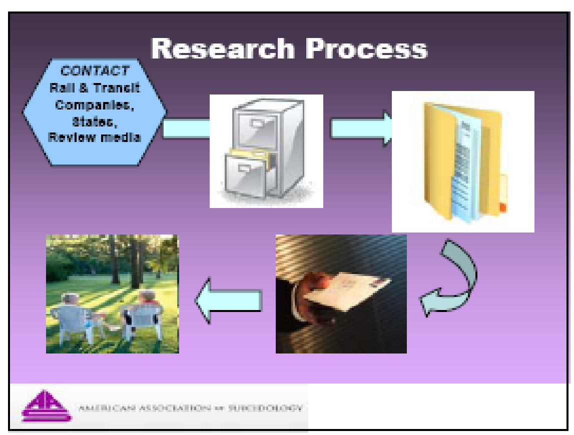
Karen M. Marshall, Program Development Director
American Association of Suicidology





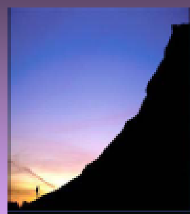






Challenges

- Lack of a surveillance system
- Disparate data sources
- Confirmation by Medical Examiners/Coroners
- Widespread access to tracks
- Sensational, glamorized, romanticized coverage by media



Potential Interventions

- Barriers (living and others)
- Reduced speeds?
- Improved communication between station & train, crew-to-crew
- Media training
- Community education

AMERICAN ASSOCIATION of SUICIDOLOGY

Signs, Signs …

- Several rail and transit organizations have installed signs
- Effective?
- Wording?
- With or without telephones?
- Dedicated lines?

AMERICAN ASSOCIATION of SUICIDOLOGY

Since the Project Began …

- Proposed Rules Change on Reporting Suicide Incidents
- Federal Legislation Requires Railroad Plans for Mitigating Effect on Employees
- FTA Dropped Out

AMERICAN ASSOCIATION of SUICIDOLOGY

What We've Learned

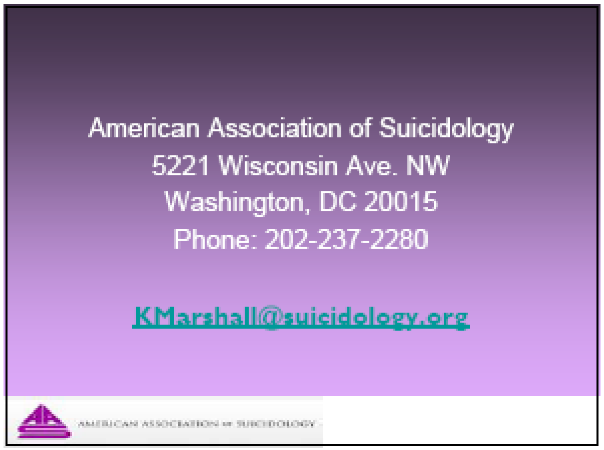
- Clusters or "Hot Spots"
  - An American Phenomenon?
- Opportunities for Prevention
- The Power of Community

AMERICAN ASSOCIATION of SUICIDOLOGY

What We Hope to Learn

- Are Signs Effective?
- What Interventions Will Work, in What Combination?
- Can Communities and the Industry Partner to Stop Intentional Deaths?
- Will Unintentional Deaths be Positively Impacted as Well?
- Can Learnings be Applied to Other Means?

AMERICAN ASSOCIATION of SUICIDOLOGY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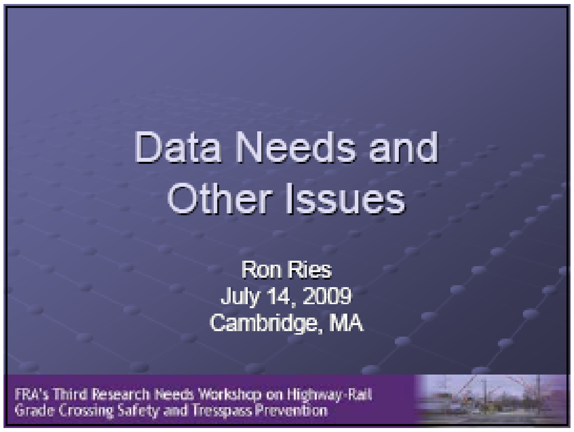
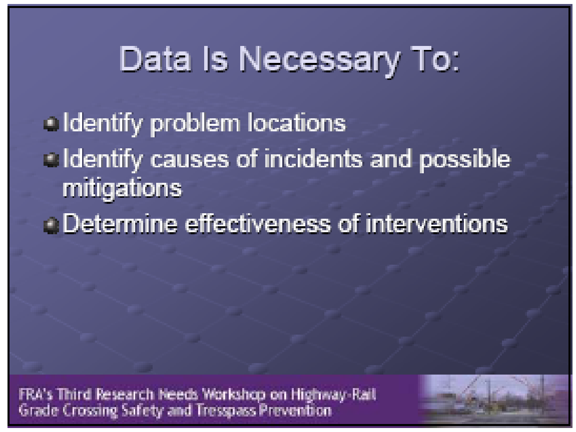
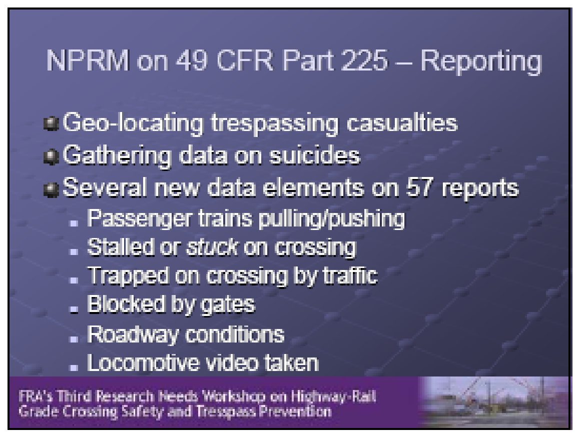
AMERICAN ASSOCIATION of SUICIDOLOGY

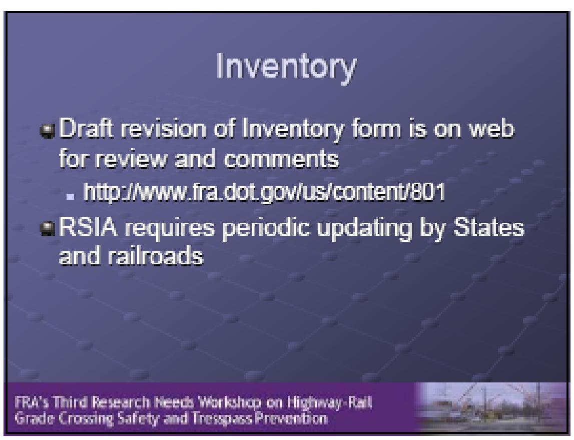
Data Needs and Other Issues

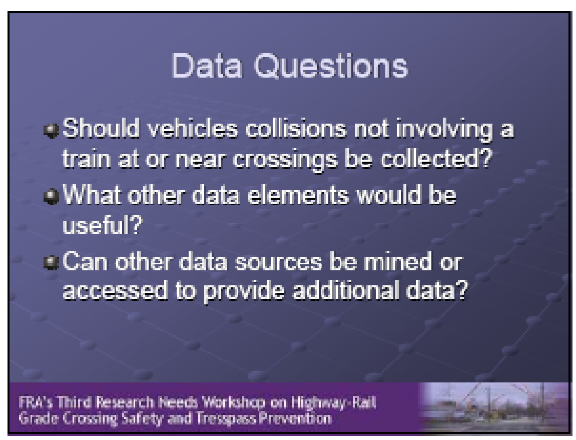
Ronald E. Ries, Staff Director
Highway-Rail Grade Crossing and Trespasser Prevention Division
Federal Railroad Administration











Locomotive Video

- More locomotives are being equipped with video cameras.
- How can they be used for data?
  - "Eye witness" to actual events of a collision
  - Identify hotspots – both crossing and trespassing
  - Quantify the results of mitigation efforts

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Tresspass Prevention

Intrusion Detection

- Both at crossings and along rights-of-way
  - Provide notice of vehicles stalled/trapped on crossing
  - Virtual fence to detect trespassing
    - CA beaches
- Research on whether this information should be provided to engineer
  - Impacts on train handling
  - Number of collisions that would be avoided

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Tresspass Prevention

High Speed Rail

- How should crossings be treated as high speed passenger rail is implemented?
- 80 mph to 110 mph
  - What is needed?
  - Impact on safety of train passengers and crew
  - How to quantify the benefits of the improvements?
- Notification to train crew

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Tresspass Prevention

Ron Ries
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(202) 493-6285

FRA's Third Research Needs Workshop on Highway-Rail Grade Crossing Safety and Tresspass Prevention

APPENDIX D. DAY TWO AND DAY THREE PRESENTATIONS

Organization of Working Groups and "Rules of Engagement"

Marco P. daSilva, Highway Rail Grade Crossing and Trespass Research Team Leader
Volpe Center

Working Group Particulars

Marco daSilva,
Principal Investigator, Grade Crossing Safety and Trespass Research Program
Systems Engineering and Safety Division
Research and Innovative Technology Administration
Volpe National Transportation Systems Center

Research Needs Workshop
15 July 2009

U.S. Department of Transportation
Research and Innovative Technology Administration

Purpose for Working Groups

- Provide FRA and all the US DOT modes with a current status of research in the area of Highway-Rail Grade Crossing Safety and Trespass Prevention.
- Formulate an up-dated set of research needs created by Intermodal and stakeholder consensus.
- Prepare these research needs in a prioritized action item format, including appropriate modal agency designations.

2

Format for the Working Groups

9:00 AM Welcome and Working Group Particulars - Auditorium

9:30 AM Break out Sessions
Team Leaders and Facilitators Orchestrate the Sessions
- Review background materials
- Brainstorm New Research Needs
- Complete One Page Research Needs Form for each

12:00 PM Box Lunch

1:00 PM Break out Sessions
- Complete research needs form for each need
- Prioritize research needs by Highly Urgent and Other

5:00 PM Team Report Outs and Adjournment - Auditorium

3

Logistics for Working Groups

Color Coded Working Groups
- Grade Crossing Modernization (GCM) - Green
- Traffic Patterns (TP) - Purple
- New Technology Opportunities (NTO) – Orange
- Regulation and Enforcement (RE) - Yellow
- Education and Public Awareness (EPA) - Red
- Institutional Issues (II) - Blue

Group Member Roster and Room Assignment in Registration Package

4

Rules of Engagement

Team Leaders and Facilitators Orchestrate the Groups

Rules of Engagement
- **Respect**
- **Logistics**
- **Group Dynamics**
- **Outcome**

5

Rules of Engagement - Respect

- Turn off cell phones
- Minimize sidebar conversations
- Avoid digression
- Do not interrupt others
- War Story rule - 1-minute max.

6

Rules of Engagement - Logistics

- State name when speaking at first until group are familiar with each other
- Stick to facilitator's agenda
- Honor time limits of agenda
- Please return promptly from breaks

7

Rules of Engagement – Group Dynamics

- Consensus decision making unless otherwise mentioned
- Listen and respect other's viewpoint
- Diversity in opinion is valuable
- Be open-minded
- Be creative
- Don't be defensive
- Set aside baggage you carried into the room
- Have fun

8

Rules of Engagement – Outcome

- Consider alternatives on the basis of public interest
- Don't base discussions on current conventions, current standards
- Needs, perceptions, and potential more important than existing conventions
- Discuss possible research projects with different procedures, innovative technologies, new participants, changed responsibilities

9

Rules of Engagement – Outcome

- Prepare your Team Leader for the Summary Presentation for Thursday AM
- Prioritize Research Needs by High Urgency and Other categories
- Team Leader will provide Summary and Discuss Highly Urgent Research Needs from your working Group

10

Introduction of Team Leaders

Debra Chappell, FHWA – CIP
Tom Raslear, FRA – HF
Rhonda Crawley, FTA – STP
Brian Bowman, Auburn University – DGS
Gerri Hall, OLI – DPE
Jim Smailes, FRA – IT

11

Breakout of Working Groups

- Break
- Follow your Team Leader to designated room assignment
- Try to pair up with a "Federal Buddy"
- Security Level "Yellow"
- Good Luck on Your Deliberations
- Enjoy and Have Fun

12

Top Five Research Needs Summaries – Team Leader Day 3 Presentations

Top Five Project Summary:
Grade Crossing Modernization

Team Leader - Brian Gilleran
Federal Railroad Administration

July 16, 2009

Top Five Research Needs Areas for Grade Crossing Modernization

- Warning Device Minimum Requirement for 80-110 MPH Trains
- Flangeway Gap Solutions
- GPS/PTC Constant Warning Time
- Second Train Warning Devices for Pedestrian Crossings
- Personal Detection Device for Railroad Workers

Project #1: Warning Device Minimum Requirement for 80-110 MPH Trains

- **Description** – Research and determine warning device requirements for high-speed corridors in the 80-110 mph range
- **Rationale** – Imminent deployment of HSR corridors calls for clear requirements for warning devices in this speed range
- **Benefits** – Uniform high standard of warning for road users at all HSR crossings nationwide
- **Key Implementation Issues** – Need to develop firm basis for warning device requirements

Project #2: Flangeway Gap Solutions

- **Description** – Flangeway gaps at grade crossings are a problem for wheel chair users
- **Rationale** – Need to develop an effective treatment for rail crossings so that road users may cross tracks without risk of entrapment
- **Benefits** – Safer and more uniform mobility for all road users
- **Key Implementation Issues** – Material used to fill the gap must be able to withstand the harsh railroad environment

Project #3: GPS/PTC Constant Warning Time (CWT)

- **Description** – Develop lower cost constant warning time system based on GPS and PTC
- **Rationale** – CWT is desirable, but not currently practicable at many crossings
- **Benefits** – Opportunity to make the benefits of CWT available at many more crossings
- **Key Implementation Issues** – Developed system must be compatible with existing population of crossing warning systems

Project #4: Second Train Warning Devices for Pedestrian Crossings

- **Description** – Develop universal active warning devices to let pedestrians know when a second train is approaching their location
- **Rationale** – Pedestrians need external cues to alert them to unseen potential danger
- **Benefits** – Reduction in pedestrian injuries and fatalities; better working environment for train crews
- **Key Implementation Issues** – Need to determine how best to communicate a complex message of second train location and direction

Project #5: Personal Detection Device for Railroad Workers

- **Description** – Develop a type of personal protection device using GPS/PTC technology that a railroad employee could wear to warn of approaching trains.
- **Rationale** – Need to enhance safety of workers at crossings and elsewhere on railroad
- **Benefits** – Reduction in roadway worker injuries and fatalities; safer and more productive workplace
- **Key Implementation Issues** – Any such device must be fail safe to be used in railroad industry

Acknowledgements

- Leonard Allen, FRA
- William Barringer, Norfolk Southern Corp.
- Ed Boni, Interactive Elements Incorporated
- Mark Ciurej, Brotherhood of Railroad Signalmen
- Jessica Franklin, Texas Transportation Institute
- Frank Frey, Massachusetts DPU
- Dan Guerrero, SCRRA/Metrolink
- Paul O'Brien, Utah Transit Authority
- Ed O'Connor, Mass. Operation Lifesaver
- David Peterson, Union Pacific Railroad
- Phillip Poichuck, Rail Safety, Transport Canada
- Scott Windley, US Access Board
- Paul Worley, NC Department of Transportation

Top Five Project Summary: Grade Crossing Modernization

Team Leader - Brian Gilleran
July 16, 2009

Top Six Project Summary: Traffic Patterns

Anya A. Carroll
Volpe Center

July 16, 2009

Top Six Research Needs Areas
Traffic Patterns

- TP-10 - Application of Warning Devices/Treatments at High Speed Rail
- TP-7 - Highway Traffic Signal Pre-emption At Highway-Rail Grade Crossings
- TP-5 - Effectiveness of Gates for Pedestrian
- TP-9 - Signage At Roundabouts
- TP-3 - Driver Decision Making At Complex Crossings
- TP-13 - Review And Improvement of Hazard Indices And Accident Prediction Formulae

11

TP-10
Application of Warning Devices/Treatments at High Speed Rail

- **Description** – Determine adequate warning devices for High Speed Rail up to 110 MPH. Determine or evaluate whether or not existing types of warning devices are adequate for use on HSR corridors. Above 79 MPH, should different devices be required and at what speeds? Recommend treatments for pedestrian traffic at HSR crossings. Identify pathway crossing treatments for HSR crossings.
- **Rationale** – Covers three of the four cross-cutting issues High Speed Rail; Transit-Oriented Development and Human Factors
- **Benefits** – Standardize treatments for more effective and efficient design. Reduce likelihood of incidents at HSR crossings.
- **Key Implementation Issues** – Broad scope of dealing with HSR between stakeholders FHWA, AASHTO, FRA, TRB. High Cost > $550K.

12

TP-7
Highway Traffic Signal Pre-emption At Highway-Rail Grade Crossings

- **Description** – Assess best practices nationally to determine proper application or use of traffic signal preemption at highway-rail grade crossing. Determine proper use of advanced pre-emption versus simultaneous pre-emption. Review equipment (hardware and software), particularly on the traffic signal controller side, to ensure those devices can adequately perform pre-emption as intended. Also assess best practices of field reviewing pre-emption. Research accident reports to identify "hot spots" (high incident areas) and factors relevant to pre-emption.
- **Rationale** – Covers three of the four cross-cutting issues High Speed Rail; Transit-Oriented Development and Data Requirements
- **Benefits** – Reduce incidents and More efficient traffic management
- **Key Implementation Issues** – High Cost > $550K. Difficult to Implement.

13

TP-5
Effectiveness of Gates for Pedestrians

- **Description** – Test the effectiveness of various gate treatments for pedestrians and passenger stations, commuter rail crossings in transit oriented development and freight rail crossings. Gather information for development of warrants.
- **Rationale** – Covers three of the four cross-cutting issues High Speed Rail; Transit-Oriented Development and Human Factors.
- **Benefits** – National standard/warrants for pedestrian gates
- **Key Implementation Issues** – High Cost; Difficult Implementation

14

TP-9
Signage at Roundabouts

- **Description** – Evaluate alternatives for advanced warning signs within or in close proximity to roundabouts. Need to develop an advanced warning sign(s) for a crossing located within 100 feet of the yield line at a roundabout. There is currently no equivalent series of signs to the W10-2, 3, & 4 for crossings in close proximity to roundabouts. A sign also needs to be developed for situations where the rail line runs directly through a roundabout. Review body of existing literature in international examples. Gather information for development of warrants
- **Rationale** – Covers three of the four cross-cutting issues High Speed Rail; Transit-Oriented Development and Human Factors.
- **Benefits** – National standard signage for MUTCD
- **Key Implementation Issues** – Medium Cost; Easy Implementation

15

TP-3

Driver Decisions Making at Complex Crossings

- **Description** – Close proximity between rail/tracks and complex intersection such as roundabouts and multiple access roads near RRX. Driver must divide attention and make decision in a short period of time. Purpose; Better understanding of driver performance and information needed in order to provide means to reduce driver error. Expected outcome; Input design process and safety review and enhancements.
- **Rationale** – This topic was in the RNW 2003 topics.
- **Benefits** – Reduce driver confusion and information overload. Reduce driver error and improve safety and mobility.
- **Key Implementation Issues** – Low Urgency. Medium ease of implementation.

16

TP-13

Review And Improvement Of Hazard Indices And Accident Prediction Formulae

- **Description** – New methods for evaluating the system safety performance of crossings are needed. The API calculation has become less valuable as the majority of crossings with high train and traffic volumes have been signalized or grade-separated. The risk of a low-volume crossing is not fully reflected in the current evaluation standard, and the API calculation may indicate crossings for upgrade that do not warrant signalization. A standardized evaluation method should be established for multiple agency use.
- **Rationale** – Covers two of the four cross-cutting issues Human Factors and Data Requirements.
- **Benefits** – A holistic evaluation method will help state agencies to select crossings that most deserve improvements.
- **Key Implementation Issues** – High Urgency. Medium ease of implementation.

17

Additional One-Page Research Needs Statements Developed

TP Number	Title
TP-1	Driver Reaction to Active Advance Warning Signs and Variable Message Signs
TP-2	Driver Compliance with do not stop on Track Sign
TP-4	Driver Behavior at Crossings with Mix Train Traffic (Jo Strang Question)
TP-6	Impact Of Storage Information Sign on Combination (Long-Wheel Base) Vehicle Use
TP-8	Railroad Signals Through Roundabouts
TP-11	Identify barriers to crossing consolidation implementation (Magdy El-Sibaie Presentation)
TP-12	Method for estimating traffic volumes at grade crossings where counts are not available
TP-14	Review of current GIS Methods and data for "hot spot" analysis
TP-15	Investigate safety performance of grade crossings using micro-simulation
TP-16	Best methods for linkage/sharing of crossing data, traffic data, and collision data among stakeholders (agencies, industry, and public)

18

Acknowledgements

- Jim Kreiger, Canadian Pacific
- Carolyn Cook, FRA
- Shou-Ren Hu, National Cheng Kung University, Taiwan
- Chip Frazier, HDR, Inc.
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- John Mitchell, Mass Bay Commuter Rail
- Brann Greager, Jacobs Consulting
- Daniel LaFontaine, Transport Canada
- Mark Morrison, WisDot
- Lisandra Garay-Vega, Volpe Center

Support
- Jeff Bryan, Facilitator, Volpe Center
- Patrick Bien-Aime, Scribe, Volpe Center
- Anya A. Carroll, Team Lead, Volpe Center

19

Top ~~Five~~ Six Projects Summary: New Technology Opportunities

Rick Campbell
Campbell Technology Corporation

July 16, 2009

Top Six Research Needs Areas for New Technology Opportunities

1. Alternative Sensors and Warning Systems for Vital Applications (NTO-1)
2. Pedestrian, Non-Motorized and Limited Mobility Treatments (NTO-2)
3. On-Track Vehicle Detection (NTO-3)
4. Effectiveness of LED Enhanced Grade Crossing Traffic Control Signs (NTO-4)
5. Minimum Traffic Control Devices for High-Speed Train (HST) HRGC (NTO-5)
6. Enhanced Commercial GPS Systems to Improve HRGC Safety (NTO-6)

Project #1: Alternative Sensors and Warning Systems for Vital Applications

- Description – To develop a vital non-traditional means for train detection and communication
- Rationale – Existing technology has significant limitations
- Benefits – Cost-effective means to provide additional warning time for preemption of adjacent signalized intersections and some warning devices (e.g., 4QG)
- Key Implementation Challenge(s) – Extensive knowledge of vital signal systems, train detection and communications

Project #2: Pedestrian, Non-Motorized and Limited Mobility Treatments

- Description – Identify and evaluate technology at active and passive HRGC
- Rationale – Need to develop standards for use of treatments for these conditions
- Benefits – Improve safety
- Key Implementation Issues – Increase in demand to meet transit/passenger and accessibility needs

Project #3: On-Track Vehicle Detection

- Description – Develop a system for on-track vehicles to activate HR warning devices
- Rationale – Numerous collisions between roadway users and on-track equipment
- Benefits – Safety for road users and railroad employees
- Key Implementation Issues – Necessary to activate one crossing at a time. Radio may not be an alternative due to communication congestion

Project #4: Effectiveness of LED Enhanced Grade Crossing Traffic Control Signs

- Description – Evaluation of effectiveness of LED enhanced signs at HRGC
- Rationale – Current signs compete for driver's attention
- Benefits – Low cost means to increase safety
- Key Implementation Issues – Development of a national standard for use of the devices

Project #5: Minimum Traffic Control Devices for High-Speed Train (HST) HRGC

- Description – Development of a model to evaluate effectiveness of 4QG versus barrier gates on HST corridors
- Rationale – Determine if the use of barrier gates is a reliable, cost-effective measure instead of 4QG
- Benefit – Potential cost savings
- Key Implementation Issues – Data collection and analyses,

Project #6: Enhanced Commercial GPS Systems to Improve HRGC Safety

- Description – To incorporate HRGC data into commercial GPS systems
- Rationale – With the proliferation of GPS systems HRGC data can likely be incorporated to increase user awareness of crossings
- Benefit – Increase safety, especially for commercial motor vehicles
- Key Implementation Issues – GPS manufacturer buy-in and regulations requiring use

Acknowledgements

- Facilitator – Aaron Jette, Volpe Center
- Staff Assistant – Dee, Volpe Center
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- Bill Grizard, APTA
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- Tom Potter, Reno A&E
- John Sharkey, Campbell Technology Corp.
- Sesto Vespa, Transport Canada
- Michelle Yeh, Volpe Center

Top Five Project Summary: Research Needs Area Name Here

Rick Campbell

July 16, 2009

Top Five Project Summary: Regulations & Enforcement

Deborah M. (Debbie) Freund
Federal Motor Carrier Safety Administration

July 16, 2009

Top Five Research Needs Areas

- Project 1: Data Needs for Proactive Enforcement
- Project 2: Collecting and Analyzing Trespassing Data
- Project 3: Photo Enforcement at HRGXs
- Project 4: Regulations and Signage: No-Train-Horn Xings
- Project 5: National Campaign for Targeted Seasonal Enforcement Programs

Project #1: Data Needs for Proactive Enforcement

- **Description –** What data do stakeholders (including HRGX researchers, local law field-enforcement and administrative officers) need to support proactive enforcement efforts? Can we automate many common data searches from FRA, RR, and highway databases?
- **Rationale –** We're updating the Grade Crossing Inventory – great opportunity to help the end-users!
- **Benefits –** Increase efficiency of data analyses; improve ability to pinpoint hotspots and to target enforcement activities.
- **Key Implementation Issues –** Timing of Inventory update; different levels of challenges in gathering information from FRA, FHWA, States and RRs; coordination of disparate databases (GX 38 and others).

Project # 2: Collecting and Analyzing Trespassing Data

- **Description –** Upgrade existing trespassing data collection to include sufficient definitions of the term "trespasser;" provide effective guidelines to develop model law for nationwide application.
- **Rationale –** Need more consistent State and local regulations to better identify trespassing problem size and scope, and to develop consistent State and local regulations and enforcement mechanisms.
- **Benefits –** Improved knowledge of State and local trespassing situations, leading to improved prevention and mitigation.
- **Key Implementation Issues –** Incentives and disincentives for States; ownership, risk, and liability concerning ownership of ROW and data availability and data sharing.

Project # 3: Evaluating Photo Enforcement at HRGXs

- **Description –** Assess potential benefits of photo enforcement to improve traffic safety; develop model laws, guidelines, and procedures to provide for standard and consistent application nationwide.
- **Rationale –** Potential benefits: improve traffic safety by deterring improper actions and documenting those that occur.
- **Benefits –** Verifiable data to document violations can provide a deterrent effect and promote sustained improvements in motorist behavior.
- **Key Implementation Issues –** Overcoming negative attitudes ($$ generation over safety enhancement); privacy; initial and ongoing operational costs.

Project # 4: Regulations and Signage: No-Train-Horn Xings

- **Description –** Modification of W10-1 sign to indicate no-train-horn crossing.
- **Rationale –** Provide notification to motorists unfamiliar with the particular crossing.
- **Benefits –** Enhanced motorist awareness of no-train-horn crossing – an "expected" audible warning may not be available.
- **Key Implementation Issues –** Development of sign, review by NUTCD, rulemaking by FHWA to modify W10-1, posting of new sign.

Project # 5: National Campaign for Targeted Seasonal Enforcement Programs

- **Description** – Develop targeted, seasonal, topical campaigns for HRGX and trespass prevention activities.
- **Rationale** – Many highway safety concerns (seat belts, drunk driving, child safety seats) have seasonal targeted outreach and enforcement programs -- no similar program for HRGX safety and trespass prevention activities.
- **Benefits** – Raise awareness of HRGX and trespass prevention, increase officer awareness and precision of enforcement practices.
- **Key Implementation Issues** – Funding will be a challenge in time of limited resources.

Acknowledgements

- Richard Brown, Transpo Industries
- Lou Frangella, FRA Region 1
- Deborah M. Freund, PE, FMCSA Policy
- Officer Jack Hanagriff, Houston Police Department
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- Gina Melnik, Volpe Center
- LTC Ralph Mitchell, Louisiana State Police
- Dr. Thomas Raslear, FRA R&D
- Robert (Bob) Redmond, PE, FMCSA Enforcement
- Gerald Ruggiero, MBTA
- James Sottile, PVB Consulting Group
- Guan Xu, PE, FHWA Safety

Top Five Project Summary: Regulations & Enforcement

The Yellow Team
Debbie Freund, Team Leader
July 16, 2009

Top Five Project Summary: Education and Public Awareness

Helen Sramek – Operation Lifesaver USA
Daniel Di Tota – Operation Lifesaver Canada

July 16, 2009

Top Five Research Needs Areas for Education and Public Awareness

- Evaluation of Social Media Outreach
- Evaluation of Existing Education and Outreach Strategies
- Crossing Consolidation Education
- Evaluate effectiveness and potential motorist & pedestrian signage and treatments
- Evaluate the effectiveness of Mobile Warning Devices when approaching grade crossings

Project #1: Evaluation of Social Media Outreach

- **Description** – To identify, assess, and test the effectiveness of social media
- **Rationale** – Use of new media applications offers the opportunity to reach a broader audience with minimum resources.
- **Benefits** – Collection of data that has never before been utilized or captured, improve targeting of future educational efforts, better utilization of limited resources
- **Key Implementation Issues** – N/A

Project #2: Evaluation of Existing Education and Outreach Strategies

- **Description** – To quantify the role that education plays in preventing incidents on active rail lines
- **Rationale** – It is crucial to assess the impact and effectiveness of existing education and outreach strategies in changing public behavior
- **Benefits** – Identify effective current education methods to better target intended audience to reduce incidents on RR right-of-way
- **Key Implementation Issues** – Collection of data, and designing research study

Project #3: Crossing Consolidation Education

- **Description** – To determine effective methods to educate community leaders in this area
- **Rationale** – Many communities are unaware of the benefits of public/private partnerships regarding grade crossing consolidation and grade separation funding.
- **Benefits** – Increased community safety, forges better partnerships, long term safety benefits, and mutual benefit among cross-sectional groups (FRA, industry, community, DOT, law enforcement, etc.)
- **Key Implementation Issues** – N/A

Project #4: Evaluate effectiveness and potential motorist & pedestrian signage and treatments

- **Description** – Assess the effectiveness of existing and potential new driver and pedestrian signage/treatments on or around railroad tracks and station platforms
- **Rationale** – Current signage may be misunderstood or overlooked by motorist and pedestrian traffic
- **Benefits** – Further reductions in motorist and pedestrian grade crossing and trespass incidents, increased motorist and pedestrian awareness of public rail safety, and improved compliance to signs
- **Key Implementation Issues** – Design of new signage, changes in signage, MUTCD compliance

Project #5: Evaluate the effectiveness of Mobile Warning Devices when approaching grade crossings

- **Description** – Research the effectiveness of mobile warning devices as means to alert drivers and pedestrians within close proximity of active rail lines
- **Rationale** – Utilization of current technology (i.e. cell phones, GPS, PDAs, etc.) as mobile warning devices can offer additional alerts
- **Benefits** – Active warning alert, reduction in collisions at crossings, long term benefit to general public and industry
- **Key Implementation Issues** – Integration with existing equipment, and the challenge to using this technology includes driver distraction.

Acknowledgements

- Tarah Harkins, CSX Transportation
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- Hadar Rosenhand, DOT – Volpe
- Richard Towle, FRA
- Lorraine Pacocha, MBTA

Top Five Project Summary: Education and Public Awareness

Helen Sramek and Daniel Di Tota

July 16, 2009

Top Five Project Summary: Institutional Issues

Steve Laffey
Illinois Commerce Commission

July 16, 2009

Top Five Research Needs Areas for Institutional Issues

1. Establishment of a railroad/transit data clearinghouse
2. Cost/benefit analysis of grade crossing improvements
3. Synthesis to evaluate how, when, and where human perception negatively impacts rail safety
4. Institutionalize evaluation as key component of project/program (countermeasure) design and implementation

5a. Improved effectiveness of stakeholder interaction

5b. Identify opportunities to make legislation and regulations across jurisdictions compatible, meaningful and up to date

Project #1: Establishment of a railroad/transit data clearinghouse

- **Description** – Development of a framework/architecture for integrating existing databases.
- **Rationale** – Maximize distribution of information
- **Benefits** – To make better informed decisions
- **Key Implementation Issues** – none

Project #2: Cost/benefit analysis of grade crossing improvements

- **Description** – Developing examples of how to conduct cost/benefit analyses of Federally funded grade crossing improvements under the Section 130 Program.
- **Rationale** – Defend continued need for the Sec. 130 Program
- **Benefits** – Making more efficient use of Federal funds
- **Key Implementation Issues** – none

Project #3: Synthesis to evaluate human perception implications on rail safety

- **Description** – Evaluating human perception to positively modify behavior
- **Rationale** – Local authorities', media, and public misperception of rail dangers
- **Benefits** – Reducing collisions, injuries, fatalities
- **Key Implementation Issues** – none

Project #4: Institutionalization of evaluation as key component of projects

- **Description** – Build "evaluation" into the planning stage of a project
- **Rationale** – Building evaluation up front is most beneficial
- **Benefits** – Identify and Maximize potential benefit
- **Key Implementation Issues** –Adds cost in the short-term, resistance due to being potential culture change for some organizations.

Project #5a: Improved effectiveness of stakeholder interaction

- **Description** – Role definition and best practices for communication and coordination among diverse stakeholders
- **Rationale** – Improving communication is always a good idea
- **Benefits** – Improved effectiveness of stakeholder interaction
- **Key Implementation Issues** –Diverse group of stakeholders with entrenched interests and well defined positions.

Project #5b: Identify opportunities to make legislation/regs across jurisdictions compatible, meaningful and up to date

- **Description** – Is the original legislation or regulation still relevant?
- **Rationale** – Harmonization
- **Benefits** – Streamlining of project implementation
- **Key Implementation Issues** – Legislative and regulatory inertia, long lead times and powerful coalitions needed.

Acknowledgements

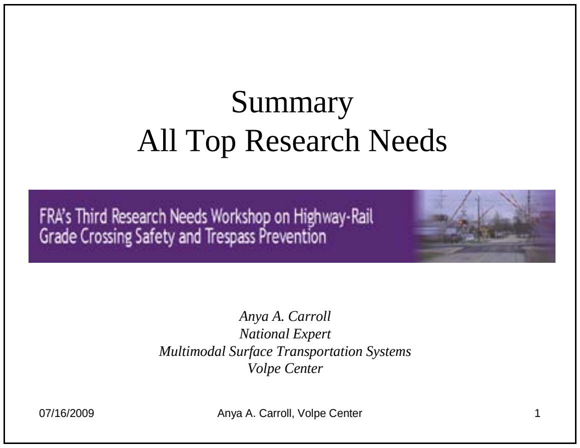
- William Browder, Association of American Railroads
- Ian Lake, Railway Safety Commission
- Jay Holman, Union Pacific
- Karen Marshall, American Association of Suicidology
- Jordan Multer, USDOT – Volpe Center
- Ronald Ries, Federal Railroad Administration
- Joy Schaad, Chicago Metropolitan Agency for Planning
- John Shurson, BNSF Railway Company

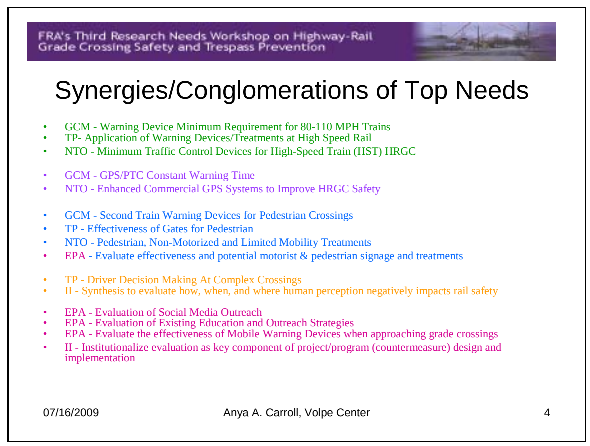
Top Five Project Summary: Institutional Issues

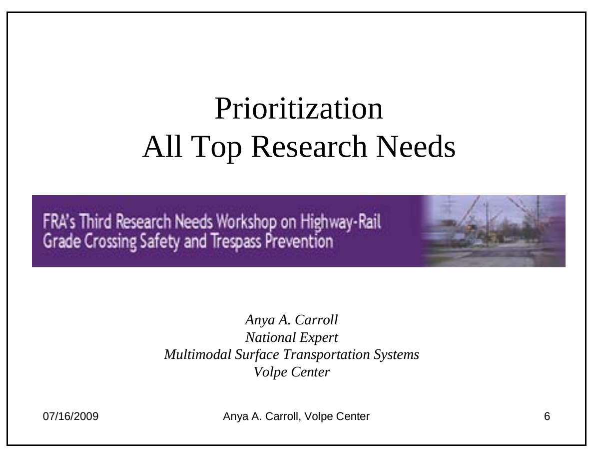
Steve Laffey
July 16, 2009

Top 33 Research Needs Summary Presentation

Anya A. Carroll, National Expert, Multimodal Surface Transportation
Physical Infrastructure Systems Center of Innovation, Volpe Center







THANK YOU ALL

☺

Anya A. Carroll
National Expert
Multimodal Surface Transportation Systems
Volpe Center

APPENDIX E. FINAL DAY DISCUSSIONS AND CLOSING REMARKS

U.S. DEPARTMENT OF TRANSPORTATION

RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION

JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER

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FEDERAL RAILROAD ADMINISTRATION'S)
THIRD RESEARCH NEEDS WORKSHOP ON)
HIGHWAY-RAIL GRADE CROSSING SAFETY)
AND TRESPASS PREVENTION)

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DAY 3 OF THIRD RESEARCH NEEDS WORKSHOP

CAMBRIDGE, MASSACHUSETTS

JULY 16, 2009

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RESEARCH AND INNOVATIVE TECHNOLOGY ADMINISTRATION

JOHN A. VOLPE NATIONAL TRANSPORTATION SYSTEMS CENTER

- - -

FEDERAL RAILROAD ADMINISTRATION'S)
THIRD RESEARCH NEEDS WORKSHOP ON)
HIGHWAY-RAIL GRADE CROSSING SAFETY)
AND TRESPASS PREVENTION)

Day 3 of THIRD RESEARCH NEEDS WORKSHOP held at the John A. Volpe National Transportation Systems Center Auditorium, 55 Broadway, Cambridge, Massachusetts, commencing at 8:41 a.m., Thursday, July 16, 2009, before Donna Kimmel, CSR No. 116293.

P R E S E N T E R S

WELCOME AND WORKING GROUP TOP FIVE SUMMARIES

Welcomer: Debra Chappell

Facilitator: Marco P. daSilva

Grade Crossing Modernization -- Brian Gilleran

Traffic Patterns -- Anya A. Carroll

New Technology Opportunities -- Rick Campbell

Regulation and Enforcement -- Deborah M. Freund

Education and Public Awareness -- Helen Sramek and Daniel Di Tota

Institutional Issues: Steve Laffey

RESEARCH NEEDS DISCUSSION AND PRIORITIZATION

Facilitator: Anya A. Carroll, National Expert, Multimodal Surface Transportation Physical Infrastructure Systems Center of Innovation, Volpe Center

FINAL THOUGHTS

Len W. Allen, Program Manager and Workshop Steering Committee Chair, Federal Railroad Administration

I N D E X

(Continued)

CONTINUATION OF INDEX

DAY 3 OF THIRD FEDERAL RAILROAD ADMINISTRATION'S
RESEARCH NEEDS ON HIGHWAY-RAIL GRADE CROSSING
SAFETY AND TRESPASS PREVENTION WORKSHOP

WELCOME AND WORKING GROUP TOP FIVE SUMMARIES

MS. CHAPPELL: Okay. We're going to get started now. 08:31:12
Good morning, everyone. 08:41:22
ATTENDEES: Good morning. 08:41:22
MS. CHAPPELL: This is our last day here. And I have to 08:41:23
tell you, contrary to common belief here, it has been an 08:41:27
absolute joy. 08:41:32
I've appreciated the fact that -- and humbled in the 08:41:33
fact that this whole thing could not be put together without a 08:41:36
team. And as you all have seen, when the folks that are teamed 08:41:39
stand forward together, everyone achieves more. The grade 08:41:44
crossing team, my team management staff here at the Volpe 08:41:48
Center: Mirna Gustave, Rich Gopen and Craig Austin who manages 08:41:54
Webinar, I'm just humbled; and I appreciate everything you've 08:42:05
done to make it successful. So to you, I thank you. This all 08:42:08
could not have been done without you. 08:42:11
And a special thank you goes to Len Allen from 08:42:12
Federal Railroad Administration, Program Manager for the Grade 08:42:16
Crossing and Trespass Research and Development Program. A 08:42:16
special thank you to Len for his support. 08:42:23
So with that, let's move on to our business here. 08:42:26

We're going to go ahead and get started. 08:42:29
First things first. I want to make sure everybody 08:42:32
has a copy of the presentation today. If not, we'll make sure 08:42:35
that we get one to you. 08:42:38
We will have evaluations for this workshop, and we'll 08:42:40
be passing them out to you. Feel free to start with the 08:42:43
evaluations at your leisure and to drop them off at the counter 08:42:48
where Mirna stands, the orange counter. And if you get a 08:42:53
chance and you enjoyed yourself, just let her know. This is 08:42:57
what she does, and she does a fabulous job with everything. 08:43:01
The other thing is I'm doing quick lost and found in 08:43:06
here. I have a jump drive. I have -- I think it's a network 08:43:08
card. And in reserve Item No. 4, a pad full of notes. So if 08:43:16
any of this looks familiar, please let me know. 08:43:22
We also have outside a few copies of the Railway- 08:43:25
Highway Grade Crossing Handbook, or Highway-Railroad Grade 08:43:29
Crossing Handbook as some people refer to it. I ordered some 08:43:35
of those from FHWA to have here, and they're ready to go. It's 08:43:37
an extremely popular document everyone wants to hang onto. So 08:43:41
please feel free to take the documents. They're right outside. 08:43:45
What we're going to do now is go into our summary of 08:43:49
our break-out sessions. So to facilitate that will be our team 08:43:53
leader, Marco daSilva; but before he arrives on the stage here, 08:44:00
I just wanted to introduce to you Donna Kimmel. Donna Kimmel 08:44:05
is a court reporter from depo.com. What we're doing is that 08:44:10

we're transcribing all of the information, all the comments 08:44:17
here to make sure that we capture your comments, your thoughts 08:44:19
because it's important that we incorporate this information 08:44:23
into the proceedings of the Research Needs Workshop. 08:44:26

And with that, Erica and Dan will have the 08:44:29
microphones. I'd ask you to please hold for the mike before 08:44:34
you make comments or questions so that they can -- that Donna 08:44:39
can hear you and it can be captured. So with that I will turn 08:44:42
everything over now to Marco. Thank you. 08:44:49

MR. daSILVA: Good morning, everyone. 08:44:57

ATTENDEES: Good morning. 08:44:59

MR. daSILVA: Nice to see that most of you actually stayed 08:45:01
till the third day. I'd like to echo these comments about the 08:45:03
Volpe staff. I'm most proud of our staff for putting this 08:45:05
together and hanging on and doing a good job. So thank you 08:45:07
again, guys. 08:45:10

And also for you for participating throughout the 08:45:10
week, and especially yesterday putting your heads together, 08:45:12
really coming up -- coming up with some really good -- good 08:45:18
ideas. 08:45:19

So what we're going to do here today is first we're 08:45:20
going to start with the top five research needs from each 08:45:22
group, sort of a report out by the team leaders. And then 08:45:26
after each report out, if you have any questions, raise your 08:45:29
hand; and then when the mike gets to you, please ask them away. 08:45:33

So the first one will be the Grade Crossing 08:45:35
Modernization Group led by Brian Gilleran. And this is the key 08:45:38
area to focus on the identification evaluation of the 08:45:41
conventionally enhanced systems at or near highway rail grade 08:45:45
crossings. 08:45:51

So, Brian, if you want to come up. 08:45:51

ATTENDEES: (Applause.) 08:46:00

MR. daSILVA: We'll all give you a hand. 08:46:03

MR. GILLERAN: We'll wait. 08:46:03

Good morning, everyone. Thank you, Marco and Dee and 08:46:09
everyone here at the Volpe Center. 08:46:15

The Top Five Project Summaries For Grade Crossing 08:46:16
Modernization. Our top five consists of: a warning device 08:46:22
minimum requirement for 80- to 110-mile-per-hour trains. The 08:46:27
second one is flange-way gap solutions. No. 3 was 08:46:33
GPS-/positive-train-control-based constant warning sign system. 08:46:40
Second train warning devices for pedestrian crossings, and the 08:46:45
development and implementation of a personal detection device 08:46:48
for railroad workers. 08:46:51

The first one would be research and determine the 08:46:53
warning device requirements for high-speed corridors where 08:46:58
trains run in the 80- to 110-mile range, the rationale being 08:47:02
that the imminent deployment of high-speed rail corridors calls 08:47:08
for clear requirements for warning devices within the speed 08:47:09
range. 08:47:12

Among the benefits would be uniform high standard of 08:47:13
warning for road users at all high-speed rail crossings 08:47:17
nationwide. 08:47:20

Among the key implementation issues, we identified 08:47:21
the need to develop a firm basis for these standardized 08:47:24
nationwide warning device requirements. 08:47:31

Priority No. 2, the development of a flange-way gap 08:47:32
filler for use at grade crossings because, as we all know, 08:47:37
currently the flange-way gap at the grade crossing is a problem 08:47:43
for wheelchair and other nonmotorized users. The rationale 08:47:46
being the need to develop an effective treatment for rail 08:47:51
crossings so that any road users may cross the tracks at the 08:47:54
intended crossing without the risk of entrapment. 08:47:58

The benefit obviously would be safer and more uniform 08:48:01
mobility for all classes of road users. 08:48:05

Among the key implementation issues we identified, 08:48:07
the material used to fill the gap must be able to withstand the 08:48:09
harsh railroad environment, both the wheel impacts and the UV 08:48:15
and other environmental long-term impacts. 08:48:19

No. 3, the development of a constant warning time 08:48:22
system based on GPS and positive train controlling works. 08:48:25

The rationale, a constant-warning-time system 08:48:34
obviously is desirable at a grade crossing; but with current 08:48:37
technology and methodologies it's not practical at many 08:48:40
crossings that could derive a benefit from constant warning 08:48:43

time. 08:48:47
And obviously the benefit would be the opportunity to 08:48:47
make these benefits of constant warning time available at many 08:48:48
more public crossings. 08:48:51
Among the key implementation issues we identified, 08:48:53
that the developed system would have to be compatible with the 08:48:56
existing population of crossing warning systems so that they 08:48:59
all work together effectively. 08:49:04
No. 4, the development of a universal active warning 08:49:06
device to let pedestrians know when a second train is 08:49:11
approaching their location. The rationale being that 08:49:15
pedestrians moving within station areas and at other crossings 08:49:18
will need external cues to alert them to an unseen potential 08:49:22
danger. 08:49:30
The benefits would be, among other things, a 08:49:31
reduction in pedestrian injuries and fatalities while also 08:49:32
creating a better working environment for the train crews. 08:49:37
Among key implementation issues we identified is the 08:49:41
need to determine how best to communicate a complex message of 08:49:44
second train location and second train direction of travel. 08:49:45
No. 5, the development of a type of personal 08:49:50
protection device that would be based upon the GPS or positive- 08:49:53
train-control technology inputs that a railroad employee could 08:49:58
wear to warn them of approaching trains and also to advise 08:50:02
control systems of that employee's location while they're 08:50:06

performing their work tasks. 08:50:12
The rationale for this would be to enhance the safety 08:50:13
of workers at grade crossings and also a secondary benefit 08:50:17
elsewhere on the railroad. 08:50:21
The benefits would be a reduction in roadway work 08:50:23
injuries and fatalities while providing a safer and more 08:50:27
productive workplace. 08:50:30
Among the key implementation issues we identified, 08:50:31
any such device must operate in a fail-safe condition to be 08:50:34
used in the railroad industry. 08:50:40
I'd like to make acknowledgements of all the people 08:50:42
that worked on the working group with me. First of all, the 08:50:45
Volpe staff that we were lucky enough to work with. Rachel, 08:50:48
Steve and Erica did an outstanding job. We would not have the 08:50:55
experience of success that we did without their hard work and 08:50:59
patience and diligence. 08:51:02
On my team was Leonard Allen from FRA; William 08:51:02
Barringer from Norfolk Southern; Ed Boni, Interactive Elements 08:51:07
Incorporated; Mark Ciurej, Brotherhood of Railroad Signal; 08:51:14
Jessica Franklin, TTI; Dan Guerrero, Metrolink; Paul O'Brien, 08:51:19
Utah Transit Authority; Ed O'Connor, Massachusetts Operation 08:51:25
Lifesaver; David Peterson from the Union Pacific Railroad; 08:51:26
Phillip Poichuk from Rail Safety, Transport Canada; Scott 08:51:28
Windley from U.S. Access Board; and Paul Worley from North 08:51:34
Carolina Department of Transportation. 08:51:38

I personally could not possibly overstate my 08:51:39
appreciation for the time, diligence and efforts of these 08:51:41
transportation professionals in coming from far and wide. In a 08:51:44
time when travel dollars are very scarce, these people put in 08:51:47
the time, made the effort to do the work that produced our work 08:51:52
products here today. So thanks to everybody involved. 08:51:56
And are we taking questions now, or are we waiting 08:52:00
until everybody's made their presentation? How do we want to 08:52:03
do this? 08:52:06

MS. CARROLL: Now. 08:52:06

MR. GILLERAN: Now? If there are any questions for the 08:52:07
grade crossing modernization top five items, please let me 08:52:11
know; and I will try as best I can to provide some measure of 08:52:16
satisfaction. 08:52:16
Once. Twice. Seeing none, I will yield the floor. 08:52:23
Thanks very much. And again, thanks to everyone who's been 08:52:26
involved. 08:52:31

ATTENDEES: (Applause.) 08:52:31

MR. daSILVA: Thank you, Brian. 08:52:41
Next one is traffic patterns. Focused on the 08:52:41
creating a better understanding of highway traffic patterns, 08:52:46
its impact on highway-rail grade crossings, safety and railroad 08:52:49
infrastructure. The team leader was Anya Carroll. 08:52:54

MS. CARROLL: Good morning, everyone. 08:52:59

ATTENDEES: Good morning. 08:53:02

MS. CARROLL: Okay. Just a few anecdotal notes to share 08:53:04
about our team. We had a dynamic -- 08:53:07

MR. BROWDER: In one minute. 08:53:10

MS. CARROLL: Pardon me? 08:53:11

MR. BROWDER: Less than one minute. 08:53:13

MS. CARROLL: Oh, no war stories? 08:53:14

MR. BROWDER: No. 08:53:16

MS. CARROLL: We had a very dynamic, diverse team; and 08:53:16
I'll share with you folks in a slide later on. We came up with 08:53:20
something like 56 independent ideas that the group diligently 08:53:26
put together and crafted 24 separate condensed ideas of which 08:53:35
we came up with 16 one-pagers, and I'm going to show you six of 08:53:46
them. 08:53:53

We did have a dot-malfunction; so when we did our 08:53:53
ranking, we -- the team decided to include six rather than five 08:54:00
priorities for your digestion. And our seventh one we had 08:54:06
three projects that were tied for seventh place, so we're going 08:54:16
to show you the top six today. 08:54:20

So our top six included, very similar to the grade 08:54:22
crossing modernization team, the application of warning device 08:54:26
treatment at high-speed rail corridors. Our next one, highway 08:54:29
traffic signal preexemption at highway-rail grade crossings. 08:54:35

The third priority was the effectiveness of gates for 08:54:41
pedestrians. The third one was the signage at roundabouts. 08:54:46
The fourth one was guide decision making at complex crossings. 08:54:50

And out sixth one was the review and improvement of hazard 08:54:56
indices and accident prediction formula. 08:55:00
Now, we decided -- the group as a whole decided to 08:55:04
use the systems approach. So we looked at the user, the 08:55:08
environment and the interaction thereof. So that's why we have 08:55:11
so many diverse research needs. So those are the top six. 08:55:15
The application of high-speed -- warning devices at 08:55:22
high speed, we had an interesting discussion on this one. And 08:55:29
the group did decide to go for just the high-speed operations, 08:55:37
although personally I feel that lower speeds should be included 08:55:41
in this type of regime; but it's to determine the adequate 08:55:45
warning devices for high-speed rail up to 110 miles an hour, 08:55:49
determine or evaluate whether or not existing types of warning 08:55:55
devices are adequate for use on high-speed rail corridors. 08:55:58
Above 79 miles an hour should different devices be required and 08:56:01
at what speeds? Recommend treatments for pedestrian traffic at 08:56:05
high-speed rail crossings, identify pathway crossing treatments 08:56:10
for high-speed rail as well. 08:56:16
Our rationale, actually, we had quite a number of 08:56:20
discussions; but when I reviewed the one-pagers, this 08:56:23
particular topic covers three of the four cross-cutting issues; 08:56:26
and I think that's a good rationale for moving forward with 08:56:31
this one. 08:56:34
And the benefits are you standardize the treatments 08:56:35
for more effective and efficient design and to reduce the 08:56:38

likelihood of incidents at high-speed rail crossings. 08:56:42
Key implementation issues, it's a broad scope in 08:56:46
dealing with high-speed rail; and we have a large number of 08:56:49
stakeholders that would be necessary to move forward with this 08:56:55
one. 08:56:58

Highway traffic signal preemption at highway-rail 08:56:59
grade crossings, we need to assess best practices nationally to 08:57:04
determine proper application of use of traffic signal 08:57:08
preemption at highway-rail grade crossings, determine proper 08:57:12
use of advanced preemption versus simultaneous preemption, 08:57:18
review the equipment, hardware and software, particularly on 08:57:23
the traffic signal controller side to ensure those devices get 08:57:29
adequately -- adequately perform preemption as intended. 08:57:32

Also assess best practices of field -- of the field 08:57:36
reviewing preemption, research accident reports to identify hot 08:57:41
spots and factors relevant to preemption. 08:57:45

Again, the rationale could be that these -- this area 08:57:45
is -- cuts across three of the cross-cutting areas. The 08:57:46
benefits are to reduce incidents and more -- and to create more 08:57:53
efficient conflict management. 08:57:53

Some of the key implementation issues is it is a high 08:57:56
cost to look at this area, and to implement it would be 08:57:59
difficult -- would have some difficulty. 08:58:02

Signage at roundabouts. Well, you heard Mark 08:58:04
Morrison's presentation two days ago. He was very passionate 08:58:09

in his presentation. We do need to address this up-and-coming 08:58:14
environment within the highway-rail crossing intersection, and 08:58:23
we need to evaluate alternatives for advanced warning signs 08:58:26
within a close proximity to roundabouts. 08:58:32

We need to develop an advanced warning sign for a 08:58:34
crossing located within a hundred feet of the yield line at the 08:58:37
roundabout. There is currently no equivalent series of signs 08:58:39
to the W10-2, -3 or -4 for crossings in close proximity to 08:58:44
roundabouts. A sign also needs to be developed for situations 08:58:53
where the rail line runs directly through roundabout. 08:58:55

We need to review the body of existing literature and 08:58:59
international examples and gather information for development 08:59:00
of warrants. Once again, this area covers three of the four 08:59:04
cross-cutting areas: high-speed rail, transit-oriented 08:59:08
development and human factors. 08:59:14

The benefits would be to provide a national standard 08:59:16
for input to the manual on newborn traffic control devices. 08:59:19

The implementation issues is a medium cost, but it's 08:59:27
easy to implement. 08:59:30

The next one is driver decision-making at complex 08:59:32
crossings. I did not get a chance to review the 2003 research 08:59:36
needs workshop. I think this one actually is resonant from six 08:59:42
years ago, but the group felt that it should move forward in a 08:59:47
presentation to you as a priority. Close proximity between 08:59:51
railroad tracks and complex intersections such as roundabouts 08:59:57

and multiple access roads near railroad crossings, drivers must 09:00:01
divide their attention and make decision in a short period of 09:00:06
time. The purpose of the work would be to -- excuse me -- 09:00:09
better understand driver performance and information needed in 09:00:12
order to provide means to reduce driver error, and our expected 09:00:17
outcome would be input to the design process and safety review 09:00:22
and enhancements at grade crossings. 09:00:27

As I mentioned here, I'm quite sure that this was 09:00:30
part of the research needs workshop in 2003, and also this 09:00:35
would be a supplemental area of research. Transport Canada did 09:00:40
some work on visual constituity looking at the grade-crossing 09:00:46
signs and signals. 09:00:55

The benefits, would reduce driver confusion and 09:00:56
information overload, would reduce driver error and improve 09:01:00
safety and mobility. 09:01:02

Implementation issues, we ranked it as low urgency; 09:01:04
but that's because it's a basic research premise. We need to 09:01:10
understand what's happening in this area. And the 09:01:14
implementation -- the ease of implementation would be medium. 09:01:19

Review and improvement of hazard indices and accident 09:01:25
prediction formula. This was our last one that made the cut. 09:01:31
And for those of you practitioners in the audience, we realize 09:01:41
that the last update to this formula and the indices was in 09:01:46
1987. So we need new methods for evaluating the systems safety 09:01:51
performance of crossings. The ATI calculation has become less 09:01:58

available as the majority of the crossings with high train and 09:02:04
high traffic volumes have been signalized or grade-separated. 09:02:09
The risk of a low-volume crossing is not fully reflected in the 09:02:13
current evaluation standard, and the API calculation may 09:02:18
indicate crossings for upgrade that do not warrant 09:02:22
signalization. 09:02:26

A standardized evaluation method should be 09:02:27
established for multiple agency use. This covers two of the 09:02:28
four cross-cutting areas, human factors and data requirements. 09:02:30

And the benefits would be a holistic evaluation 09:02:35
method, will help state agencies to select crossings that most 09:02:40
deserve improvements. That was a very creative writing group. 09:02:46

It's high urgency, and its ease of implementation is 09:02:53
medium. 09:02:57

Just a quick snapshot of some of the other ones that 09:02:57
we crafted, and eventually Volpe will release all of the 09:03:00
one-page projects; but we looked at driver reaction to active 09:03:05
advance warning signs, driver compliance to the do-not-stop-on- 09:03:09
track signs, driver behavior at crossings with mixed train 09:03:14
traffic. That was a question that Jo Strang had after hearing 09:03:21
some of our presentations on the first day. 09:03:27

The impact of storage information signs on long 09:03:29
combination vehicle use, which is of interest to FMCSA. 09:03:32
Railroad signals through roundabouts, again, this was another 09:03:40
area that has not been addressed. 09:03:43

Identify barriers to crossing consolidation 09:03:46
implementation, Dr. Magdy El-Sibaie questioned why he could 09:03:50
only close 4,000 crossings a year. 09:04:00
Method for estimating traffic volumes at grade 09:04:02
crossings where counts are not available. 09:04:05
Review of current GIS methods and data for hot-spot 09:04:05
analysis, this relates to Karen Marshall and her suicidology as 09:04:08
well as some of the work that's being done in Transport Canada. 09:04:11
Investigate safety performance of grade crossings 09:04:16
using microsimulation, University of Waterloo under the 09:04:18
auspices of Dr. Frank Saccomanno has done a lot of work in the 09:04:21
area of risk and modeling; and that was an area we thought was 09:04:26
worth pursuing. 09:04:31
And best methods for linkage or sharing of crossing 09:04:32
data, traffic data, collision data amongst all stakeholders. 09:04:37
So I would like to acknowledge our team. Could my 09:04:44
team please stand up? 09:04:48
Jim Kreiger, Canadian Pacific; Carolyn Cook, FRA; 09:04:51
Shou-Ren Hu from Taiwan, from the University of Cheng Kung; 09:04:59
Chip Frazier, Oi Kei Ng from Waterloo; John Mitchell from MBCR; 09:05:00
Brann Greager; Daniel LaFontaine from Transport Canada; Mark 09:05:12
Morrison from WisDOT; and Lisandra Garay-Vega from the Volpe 09:05:12
Center. Thank you very much. 09:05:19
ATTENDEES: (Applause.) 09:05:19
MS. CARROLL: I couldn't have done this without you. 09:05:20

Any questions? I'm going to have the team answer the 09:05:29
questions. 09:05:31
ATTENDEE 1: What happened to No. 5, pedestrian gates? 09:05:31
MR. BROWDER: You've got two 9s and no 5. 09:05:37
ATTENDEE 2: You're not making an error. The slide just 09:05:37
isn't there. 09:05:42
MS. CARROLL: The slide's just not there right now, 09:05:42
I guess. 09:05:45
ATTENDEE 2: Oh, you repeated 9. 09:05:46
MS. CARROLL: Oh, sorry. We'll fix it. 09:05:49
MR. BROWDER: I'm here from the Government to help you. 09:05:51
MS. CARROLL: Thank you. 09:05:53
Okay. We've got two roving mikes, so -- 09:06:04
MR. POICHUK: I want to express my happiness in seeing 09:06:04
roundabouts making your cut of six, but I respectfully suggest 09:06:07
that this goes a lot deeper than signage. Roundabouts are 09:06:13
widely being seen as a replacement for intersections by the 09:06:16
traffic operations community. 09:06:20
MS. CARROLL: Mr. Poichuk, could you please introduce 09:06:22
yourself for our court reporter and tell her where you're from? 09:06:25
MR. POICHUK: Certainly. Phil Poichuk from Transport 09:06:29
Canada. 09:06:36
Going back to roundabouts, they're widely being seen 09:06:36
by the traffic operations community as a replacement for 09:06:38
intersections that are about to be signalized, largely -- as we 09:06:43

heard at the presentations -- due to energy consumption and 09:06:47
also cost. The U.S. has just come to their solution to having 09:06:50
these stop-sign crossings that are proximate to grade 09:06:57
crossings. They've been a thorn in the side of rail safety 09:07:04
practitioners for years. And, in fact, I look at the MUTCD and 09:07:08
the U.S. Warrant 9 as being a solution to that because, of 09:07:13
course, it would force signalization so then you can 09:07:16
interconnect. 09:07:19

The problem with roundabouts is you can't 09:07:19
interconnect them, and you still have the right-of-way 09:07:23
assignment at roundabouts that requires the exiting -- that the 09:07:26
vehicles on the approach exiting from a crossing -- to yield. 09:07:31
Not as bad as a stop; but, nonetheless, the fact that there's a 09:07:34
right-of-way assignment against the person that may get hung up 09:07:39
on a crossing -- it might be a truck, for example -- that's 09:07:43
still a thorn in the side now. So it sort of regurgitates the 09:07:47
whole problem again. 09:07:51

I would respectfully suggest that the research try 09:07:52
and investigate the area of right-of-way assignments so that we 09:07:54
can come up with some sort of a unified and consistent position 09:07:58
from the rail safety community on that. Thank you. 09:08:01

MS. CARROLL: We actually -- the group came up with three 09:08:05
separate research needs: one on highway signs, one on highway 09:08:08
signals and one on railroad signals; but only one made the top 09:08:16
cut. 09:08:20

Anybody else with a question? 09:08:22
Thank you very much. Sorry for my human error. 09:08:26
ATTENDEES: (Applause.) 09:08:32
MR. daSILVA: Okay. Next we'll move on to new technology 09:08:44
opportunities which really focus on innovative technologies and 09:08:48
high transfer opportunities to test for probabilities within 09:08:54
the rail infrastructure, and that was led by Rick Campbell. 09:08:56
MR. BROWDER: You ought to get a hand, too. 09:09:14
ATTENDEES: (Applause.) 09:09:14
MR. BROWDER: You're not that bad a guy. 09:09:17
MR. CAMPBELL: Thank you, Bill. 09:09:20
Greetings. I won't make everybody say, "Good 09:09:21
morning," again. That gets to be redundant. 09:09:24
Well, as you can see, as a lot of times happens, we 09:09:26
turned out to be the mavericks. We couldn't be happy with five 09:09:33
research need statements as the top picks, so we actually kind 09:09:38
of jointly put the sixth one together based on work that Helen 09:09:42
and her work did regarding GPS. And it's interesting to note 09:09:46
that, while we had some very parallel work that happened in 09:09:50
that area, we also have some other parallel topics as well with 09:09:54
some of the other groups on this group with devices for high- 09:09:58
speed train applications, which it's interesting because there 09:10:04
are obviously a lot of us in this group that are focused on 09:10:07
similar needs and we chose to come at them from different 09:10:10
directions in the work that we did. 09:10:14

But to review our top six choices, the first one, the 09:10:17
top choice that we had, was alternative sensors and warning 09:10:21
systems for vital applications. No. 2 was pedestrian 09:10:26
nonmotorized and limited mobility treatments. No. 3 was 09:10:31
on-track vehicle protection. No. 4, effectiveness of LED- 09:10:37
enhanced grade crossing traffic control signs. No. 5, the 09:10:42
minimum traffic control devices for high-speed train highway- 09:10:47
rail grade crossings. And No. 6, enhanced commercial GPS 09:10:52
systems to improve highway-rail grade crossing safety. 09:10:56

No. 1, the alternative sensors of warning systems for 09:10:59
vital applications, this was interesting. It's actually 09:11:02
intended to develop a viable, nontraditional -- and what we 09:11:04
mean by "nontraditional" is nonrail-based means for train 09:11:10
detection and communication. The rationale is that the 09:11:14
existing technology, rail-based technology has significant 09:11:17
limitations, a lot of them which come from the electrical 09:11:21
application of the devices. And this is, again, an off-rail 09:11:25
solution that has some significant benefits to reduce costs 09:11:28
associated with warning devices and applications that require 09:11:35
additional time such as traffic signal preemption and 09:11:39
interconnection for connection of vehicles prior to train 09:11:43
arrival and even for some other types of devices such as 09:11:47
four-quadrant gates where we have to figure in additional time 09:11:51
for the exit-gate clearance-time value. 09:11:55

And we believe that there is existing technology out 09:11:58

there that's capable of doing a lot of this, but we need some 09:12:02
additional research to be able to extend and define exactly 09:12:08
what that technology is capable of providing and then how we 09:12:12
would integrate it into existing crossing warning systems. So 09:12:15
the group felt this was our No. 1 choice because we see so much 09:12:20
need now for additional warning time. And in so many cases the 09:12:25
costs are extremely high, okay -- half a million dollars or 09:12:30
more -- to provide added time on top of the cost of the warning 09:12:34
system. So that was No. 1. 09:12:39

No. 2 dealt with pedestrian, nonmotorized and limited 09:12:42
mobility treatments; and the project, the research needs 09:12:47
project is intended to identify and evaluate technology -- both 09:12:50
existing and new -- at active and passive highway-rail grade 09:12:57
crossings. And the rationale behind this is that we need to 09:13:04
develop standards and potentially warrants for the use of 09:13:08
treatments for these conditions. 09:13:09

Right now the industry essentially takes a shotgun 09:13:12
approach to it that in many cases pedestrian, nonmotorized and 09:13:16
limited mobility needs are not even addressed. You saw some 09:13:22
pictures the day before yesterday about items such as sidewalks 09:13:23
that stop at the railroad right-of-way line, surfaces that had 09:13:25
not been properly treated, use or misplacement of truncated 09:13:30
domes and in many cases the total absence of active warning 09:13:36
devices for pedestrians. 09:13:41

And we believe that this entire area needs a global 09:13:43

look at it -- at, like I said, treatments old and new but also 09:13:47
some standards for application and warrants to determine their 09:13:51
use. We also have a fear that there will be a wholesale 09:13:55
application of every potential device at every crossing, and in 09:13:59
many cases they're not needed. 09:14:07

We need a reasonable method -- much like warranting 09:14:08
for traffic signals -- to determine which devices are really 09:14:12
necessary at a given location. Surfaces and approaches may be 09:14:15
required at all locations, but we may not need pedestrian gates 09:14:22
at all locations. So that's the intent of this, is to develop 09:14:26
a workable tool that can be used to develop the standards for 09:14:31
application of use. 09:14:35

Obviously the benefits of this particular research is 09:14:36
improved safety for these crossing users; and the key 09:14:39
implementation issue, as we see it, is that there's an ever- 09:14:43
increasing demand right now to meet pedestrian needs at transit 09:14:47
and passenger stations and also just generally accessibility 09:14:54
needs, not only at stations but at all highway-rail grade 09:14:59
crossings. 09:15:04

No. 3, on-track vehicle detection, an interesting 09:15:04
project. We've learned that many railroads have had numerous 09:15:08
collisions between on-track equipment -- high-rail-type 09:15:14
vehicles, track machines, that sort of equipment -- and road 09:15:20
users at highway-rail grade crossings; and in many cases the 09:15:24
active warning systems do not operate because those vehicles 09:15:29

were insulated. They don't shunt or short the rails together 09:15:33
to activate the warning systems. 09:15:33

And there have been limited attempts at a methodology 09:15:41
that would provide for reliable activation of warning devices 09:15:43
when this equipment approaches a crossing, and it's critical 09:15:45
that when that equipment approaches a crossing it activates the 09:15:50
crossing that they wish to traverse over but also not 09:15:54
downstream crossings. So this project actually develops a 09:15:58
system for on-track vehicles to activate the warning devices at 09:16:04
crossings, and we believe that it will have a significant 09:16:10
safety impact for road users and railroad employees because it 09:16:13
will essentially eliminate these collisions by providing 09:16:16
increased safety by activation of the active warning devices. 09:16:20

There's some limitations and challenges to 09:16:27
implementation of this because, as I mentioned earlier, the 09:16:30
system needs to focus on specific crossings. It needs to 09:16:34
address the potential for multiple track machines that may show 09:16:37
up simultaneously and also needs to be capable of dealing with 09:16:40
an on-track equipment such as a high-rail vehicle that may stop 09:16:44
on the crossing, pick up the rail wheels and then drive off on 09:16:49
the road surface. So there are a few challenges. 09:16:53

We also recognize that radio, which has been used in 09:16:55
the past, may not be the correct answer due to channel 09:16:59
congestion. In many cases railroads have limited frequencies 09:17:03
available and given -- especially in large metropolitan 09:17:08

areas -- the use of -- the repeated use of DTMF or touch tones 09:17:12
on the radio frequency crossing after crossing could almost 09:17:16
hinder voice traffic between trains and dispatchers. So 09:17:20
another interesting segment for technology to be used for 09:17:26
critical safety issue. 09:17:29

No. 4 is effectiveness of LED-enhanced grade crossing 09:17:31
traffic control signs. We spent a lot of time discussing this 09:17:39
particular item. And the research we're looking at is to 09:17:39
evaluate the effectiveness of these LED-enhanced signs at 09:17:42
highway-rail grade crossings. 09:17:47

The rationale is that the current signage right now 09:17:49
competes for driver attention. In urban areas there are so 09:17:53
many signs that the roadway users have to deal with and 09:17:57
process, but also in rural applications this is a means to be 09:18:01
able to attract driver attention where they tend to get lulled 09:18:06
into a tunnel-vision-almost approach as a driver may become 09:18:10
lulled into a stretch of roadway that's straight and level 09:18:16
where they tend to almost get into a semi-tranquil state. 09:18:20

We believe that the benefits of this are that it's a 09:18:24
low-cost means to increase safety, may in fact be one of the 09:18:27
potential solutions to the elusive low-cost warning system. We 09:18:31
believe that because we've always looked at low-cost warning 09:18:37
systems as trying to be applications of lights and gates and 09:18:41
similar devices; but, in fact, it may that we need a different 09:18:44
type of traffic control device as our low-cost warning system. 09:18:49

A key implementation issue to deal with this is we 09:18:53
need to develop a national standard for use of the devices. 09:18:56
Right now these devices are gaining in popularity; and there 09:19:00
are a lot of different viewpoints as to how they're applied, 09:19:04
whether it's a 24/7 operation or train activated, approaching- 09:19:08
vehicle activated, maybe only blink with the nighttime hours. 09:19:15
So we need to develop a standard for application and use of 09:19:20
these devices. 09:19:24

No. 5 dealt with some minimum traffic control devices 09:19:25
for high-speed trains at highway-rail grade crossings. And we 09:19:30
looked at whether in the global approach, a specific question, 09:19:38
that has been addressed and discussed; and that's development 09:19:41
of a model to evaluate the effectiveness of four-quadrant-gate 09:19:43
warning systems versus the use of barrier gates on high-speed 09:19:49
train corridors. 09:19:55

And the rationale is we need to determine if the use 09:19:57
of barrier gates is a reliable, cost-effective measure to use 09:20:00
in lieu of four-quadrant gates. In other words, is the 09:20:04
additional expense of a full barrier warranted in terms of 09:20:07
reduction of crashes and cost benefit. 09:20:08

The real benefit here is potential cost savings. As 09:20:12
we see an increase in high speed trains, the increases in 09:20:16
warning systems -- and we know because we step into a minimum 09:20:20
four-quadrant-gate scenario -- do we need to go with full 09:20:24
barrier protection and at what speed and what are the true 09:20:29

benefits of those types of devices. 09:20:33
The real implementation issue here is data collection 09:20:34
and analysis because, again, we're not trying to develop a 09:20:37
technology, as such, but to develop a model to guide us in the 09:20:40
proper application of technology. 09:20:45
And finally, No. 6, our joint project -- and I'm not 09:20:47
going to steal all of Helen's thunder. I wouldn't do that to 09:20:53
her. So she can talk about this, too -- but we both felt as we 09:20:58
talked about -- we talked together yesterday after our 09:21:03
sessions -- that there's some real applications for use of 09:21:04
commercial GPS systems to improve highway-rail grade crossing 09:21:07
safety. 09:21:12
And what the intent -- our intent was, was to 09:21:12
incorporate highway-rail grade crossing data into commercial 09:21:16
GPS systems. And especially with the fact that the Rail Safety 09:21:20
Improvement Act has mandated the updating of the grade-crossing 09:21:23
inventory, in a year we're going to have a lot of fresh data 09:21:29
that could be supplied to be included in these types of 09:21:32
devices. And we think that there are a number of different 09:21:35
things that could be included like presence of crossings, 09:21:38
whether they're grade-separated or not, active or passive 09:21:42
devices. And in some cases for commercial vehicles we could 09:21:48
even include data such as hump-crossing information, 09:21:52
potentially frequency of trains to be expected so that a 09:21:58
commercial vehicle may seek an alternate route due to one or 09:22:01

more limitations or uses of the crossing. 09:22:06
Of course, obviously the benefit is increased safety, 09:22:09
especially for commercial motor vehicles. 09:22:10
And we saw this as a difficult-to-implement issue 09:22:12
because it's going to require buy-in on the GPS system 09:22:17
manufacturers. And those things have actually dropped 09:22:23
significantly in price since their release. So they're real 09:22:25
price-point systems. So we feel that we're going to have to 09:22:28
work to get the manufacturers to buy in and really recognize 09:22:32
what we perceive as a benefit but may not be perceived as a 09:22:36
significant benefit by the manufacturers. So that covers our 09:22:42
six statements. 09:22:45
Number of folks that we had, we had an interesting 09:22:46
group that sat on New Technology. And we talked about in 09:22:49
excess of 50 different items. We actually had four pages of 09:22:56
items we discussed in our morning session. Actually, we 09:23:00
whittled it down to 15 different research-needs statements. 09:23:07
And as you can see just from some of the characters 09:23:11
involved that it was a lively discussion. Our facilitator was 09:23:14
Aaron Jette with the Volpe Center, and Dan Kubaczyk from the 09:23:19
Volpe Center who assisted Aaron. 09:23:28
We had the blessing of having our staff attendant as 09:23:28
Dee Chappell. And between all of her running to support the 09:23:31
entire conference and trying to type -- and last night as we 09:23:33
worked on this her fingers had just about quit. So she typed 09:23:37

three letters; and we'd edit, too. But she kept going, and 09:23:42
I don't know how she did it. And I really want to commend her 09:23:43
for the work that she has done on this particular program. So 09:23:44
a big hand for Dee, if you would. 09:23:48

ATTENDEES: (Applause.) 09:23:48

MR. BROWDER: There's another page there, I think. 09:23:51
There's another page there of suspects. You don't have it 09:23:54
marked? 09:23:54

MR. CAMPBELL: I know. I'm going to read through them. 09:23:57

MR. BROWDER: All right. You're going to read through 09:23:57
them? 09:23:57

MR. CAMPBELL: Yes, I am. 09:24:02

MR. BROWDER: Oh, okay. 09:24:02

MR. CAMPBELL: I think they deserve recognition for their 09:24:02
work. 09:24:02

So, people that sat on our committee: Andy Davis 09:24:04
with Quixote Transportation -- and we have one, actually, 09:24:07
that's missing from this particular list that -- again, one of 09:24:10
those oversights, but -- who provided a lot of insight and 09:24:14
commentary about what goes on around the world; and that's 09:24:19
Aidan Nelson with Community Safety Partnerships. And he 09:24:20
certainly gave us guidance on a lot of topics that he sees with 09:24:23
highway-rail grade crossing safety issues around the world; 09:24:29
Bill Grizard with APTA; Dan Guerrero with Metrolink was a big 09:24:32
help with pedestrian treatments and warning devices; Bob 09:24:37

Hoffman with CSX, we did some work on remote monitoring and 09:24:40
abilities to use reliable remote monitoring to seek relief from 09:24:46
some of the signal monitoring requirements in Part 234; Vijay 09:24:51
Kohli, an input on databases and how we better use data. 09:24:57

We also had John McGuiggin who sat in with us; and he 09:25:03
didn't pulled his hair out and run out screaming from the room, 09:25:09
so I guess he followed where we were headed with some of our 09:25:12
conversations. Brent Ogden helped us with traffic-signal 09:25:15
applications, presignal speed cutters. Dick Pew, of course, 09:25:18
was an asset to us in telling us that we need to get the human 09:25:21
factors right before we build a product. And that kept us on 09:25:25
track in a lot of areas to be able to get first things first. 09:25:29

Tom Potter with Reno A&E helped with alternative 09:25:34
detection. John Sharkey was there and kept us mindful of 09:25:40
railroad simple circuitry and the fail-safe issues we have to 09:25:46
deal with. Sesto was a tremendous help with Transport Canada. 09:25:48

Oh, I'm sorry. I turned my page, not that page. I'm 09:25:53
just up here going, "Give me that button." 09:25:57

So Sesto was a valuable assistant to us to keep us 09:26:00
informed of parallel research that Transport Canada is involved 09:26:05
with. And finally, Michelle Yeh with the Volpe Center was 09:26:09
there and provided insight to us from a different -- some 09:26:13
different perspectives of her view of where we approach the 09:26:17
research needs. 09:26:21

So that concludes my report. I'll thank you for 09:26:22

listening to me, thank our team and all the people that 09:26:25
traveled so far to not only spend the dollars associated with 09:26:28
the travel on being here but also their valuable time. Thanks 09:26:33
for supporting us. 09:26:38

ATTENDEES: (Applause.) 09:26:39

MR. daSILVA: There is a question, Rick, out in the front. 09:26:49

MR. SOTTILE: Rick, Jim Sottile, PVB Consulting. 09:26:53

MR. CAMPBELL: Yes, sir. 09:26:55

MR. SOTTILE: One-track vehicles that don't shunt, 09:26:55
Northeast Corridor at the School Street, Connecticut, at one 09:26:58
time they had a -- you know, vehicle detector loops. And when 09:27:02
the nontending went -- theirs went over it, it put a train in 09:27:07
emergency on an adjacent track. How would you get around that 09:27:12
type of -- and the only fix they have is operating rule. So 09:27:14
how would you -- what type of device would you envision that 09:27:19
could be used for that purpose? 09:27:22

MR. CAMPBELL: Well, it seems to me that my recollection 09:27:24
of that event was that when that, when that high-rail vehicle 09:27:28
went over the vehicle detection system and the crossing was 09:27:34
already active, what they realized was that the system needed 09:27:37
to be designed in such a way that, once the crossing was closed 09:27:41
and the gates were down, standard practice now in four-quadrant 09:27:45
gate operation is that we ignore the vehicle detection system. 09:27:50
And that was the solution to their problem. 09:27:53

Obviously, there's a lot more to it -- and, Jim, 09:27:56

I don't want to get into a lot of that here -- but we could do 09:28:01
some gate-position monitoring. There are ways to look at 09:28:05
occupancy of the loops to validate what comes over the loop, if 09:28:08
it would be on-track equipment; but our research needs 09:28:13
statement for on-track equipment was detection of equipment in 09:28:16
advance of the highway-rail grade crossing. And that certainly 09:28:20
could be incorporated into the system like this such that it 09:28:26
would know that the idling circuit was going to indicate 09:28:30
occupied on the loops at the four-quadrant system. Does that 09:28:32
answer your question? 09:28:36

Thank you. 09:28:37

Bill. 09:28:38

MR. BROWDER: Bill Browder from the Association of 09:28:38
American Railroads. 09:28:41

I thought about this all through your presentation, 09:28:42
Rick. Good presentation. Then you brought it up right at the 09:28:44
end in connection with acknowledging the chart, these 09:28:44
participations. For these six projects is it a given that they 09:28:54
would incorporate fail-safe systems, or is that a variable 09:28:59
parameter that might be considered in the development of these 09:29:05
project proposals? 09:29:13

MR. CAMPBELL: Well, the ones that -- 09:29:16

MR. BROWDER: I mean where they apply. 09:29:18

MR. CAMPBELL: Right. And that's the issue, Bill. Like, 09:29:20
for the GPS, obviously that's a nonvital piece of hardware to 09:29:22

begin with. So there's no expectation of vitality with that 09:29:27
device. But for the alternative train detection, we actually 09:29:31
mention that, that it has to be vital. If we're going to use 09:29:35
it as control for preemption or four-quadrant-gate additional 09:29:39
warning time, it will have to be a vital system. 09:29:42

And we do have a vital system to do that. What we 09:29:45
don't have is the full roll-out and implementation and how we 09:29:49
use that to be able to get the data reliably to the crossing 09:29:53
and make it cost-effective. 09:29:58

In terms of the on-track equipment detection, that's 09:29:58
also a vital device because we want to make sure that we know 09:30:02
that that system is functioning. 09:30:06

MR. BROWDER: The reason that I ask you is, some of you 09:30:08
may remember back ten, 15 years ago AAR attempted in looking at 09:30:12
these particular project areas to suggest that, if we were ever 09:30:21
going to get all of the grade crossings in the United States 09:30:25
addressed with some kind of better warning device that maybe we 09:30:31
should look at going something -- at something less than fail- 09:30:38
safe in consideration of what we would want to consider, 09:30:43
regardless of whether FRA or other government agencies would 09:30:52
ever allow us to do that. I'm convinced -- and I'm still 09:30:57
convinced -- if you could come up with a low-cost -- and 09:31:01
I would say low-cost now less than $50,000 at a grade 09:31:05
crossing -- I could go over on the Hill and get them to approve 09:31:11
those type of devices for all of the public crossings that are 09:31:18

left in the United States. 09:31:24
We tried to do that at Texas Transportation 09:31:27
Institute, and we had a town meeting and suggested it. We 09:31:31
never got any kind of participation from prospective 09:31:34
contractors that would accommodate that kind of situation; but 09:31:47
I would encourage in any of these examinations to do what 09:31:51
Sharkey's suggestion is, to keep that in mind in terms of 09:31:58
expenditures that might occur. Thank you. 09:32:03

MR. CAMPBELL: And Bill, let me just to add to that. 09:32:10
I think that's exactly right. When we box ourselves in with 09:32:13
vitality, then the cost goes up and, you know, not just from a 09:32:16
hardware standpoint but the entire installation standpoint. 09:32:23
And -- 09:32:27

MR. BROWDER: Maintenance. 09:32:27

MR. CAMPBELL: We believe that the off-track system may 09:32:30
offer some significant reduction. It may not get us to the 09:32:33
$50,000 point but significant reduction in cost; but, again, 09:32:36
it's another reason that we strongly looked at these LED signs 09:32:41
for the passive crossings because it's a relatively -- or very 09:32:45
inexpensive way to provide enhanced warning, which is what 09:32:49
we're talking about. These are locations that are so far down 09:32:54
on the priority list we'll never live to see active warning 09:32:58
devices at those locations; but the LED-enhanced signs could be 09:33:04
done on a wide-scale basis and effectively treat all of these 09:33:09
passive crossings that exist out there because they're 09:33:13

typically a less-than-$10,000 fix and probably closer to $5,000 09:33:16
fix. 09:33:23

So it is something that's easy to deploy. We want to 09:33:23
make sure there's a valid increase in safety and driver 09:33:27
response. And that's where we think a lot of the research 09:33:32
needs to be. Do we see a reduction in speed as the vehicle 09:33:37
approaches the crossing? Do we get the driver looking up and 09:33:42
down the tracks? 09:33:44

We believe from research that had been done on these 09:33:46
devices at highway intersections they've proven to be extremely 09:33:49
effective in reducing stop-sign running. And I think that we 09:33:54
expect similar types of improvements at highway-rail grade 09:33:58
crossings. 09:34:04

Let's see. Rich. 09:34:05

MR. BROWN: Yes, Rick. 09:34:05

MS. CARROLL: Could you wait for the mike, please. 09:34:11

MR. CAMPBELL: Oh. Well, he's got one. 09:34:14

MR. BROWN: Rich Brown with Transpo Industries. 09:34:15

On the detection, I wasn't clear. The detection 09:34:16
devices or whatever the concept is, was the discussion that the 09:34:19
devices may be contained within crossings; or would they be off 09:34:24
of the crossing? 09:34:29

MR. CAMPBELL: Well, the devices would be up- and 09:34:32
downstream from the crossing because the intent is to detect 09:34:35
the train as it approaches the crossing. 09:34:39

MR. BROWN: I'm talking about the vehicle detection, detecting the vehicle on the crossing. 09:34:43 09:34:47

MR. CAMPBELL: The on-track equipment detection system? 09:34:50

MR. BROWN: Yes. 09:34:52

MR. CAMPBELL: Well, it would be located immediately outside in a roadway area so that, as the on-track equipment approached the crossing, there would be an area that they would pull into; and then it would automatically activate the active warning devices. But typically it would be close, within 50 feet or so of the edge of the traveled way. 09:34:53 09:34:55 09:34:59 09:35:02 09:35:09 09:35:11

MR. DORER: Bob Dorer, Volpe Center. 09:35:17

I thought a few years ago I saw someone making a presentation. I think it was from Wisconsin DOT. They were doing -- excuse me -- an experiment on -- it was a combination of S-volt, low-cost LED light and directing to yield at a stop sign and using peak -- a variant of a GPS locator on the short line. 09:35:20 09:35:22 09:35:29 09:35:30 09:35:34 09:35:40

MR. CAMPBELL: It was in Minnesota. 09:35:41

MR. DORER: And was that ever documented to the extent that that information could help further the continuing effort to come up with a more effective low-/no cost? And I don't think that one was vital, even though it accepted -- it came from this. 09:35:42 09:35:45 09:35:49 09:35:54 09:35:54

I never heard the results of that. I'm just wondering if it was passed out to the industry, if somebody 09:35:58 09:36:00

knows if it worked and this issue can benefit from that 09:36:04
experience. 09:36:08
MR. CAMPBELL: What actually happened with that system is 09:36:09
it initially started off -- for those of you that have been 09:36:12
involved in this project -- as a low-cost approach. It did 09:36:14
make use of GPS equipment on board the trains; but along the 09:36:19
way there were a number of obstacles that were encountered such 09:36:23
as need for vitality, the fact that the train had to be 09:36:28
equipped with a special device to activate the system. 09:36:32
So, if a train -- for example, a piece of equipment 09:36:36
operated over the crossing that wasn't equipped, the warning 09:36:39
system would not operate. And as I understand it, the 09:36:43
system -- as the system grew in complexity to deal with the 09:36:47
unique characteristics that we find at crossings that the costs 09:36:51
continued to increase and got to the point that it got away 09:36:56
from the elusive low-cost device. 09:37:00
And that's a problem as we've done analysis on cost 09:37:04
of crossings. There is an excellent paper that was done by 09:37:08
Bill Peterson with the Burlington Northern Santa Fe Railway 09:37:13
that Bill really went in and dissected cost of crossing warning 09:37:16
devices and the different elements and broke it down. And what 09:37:21
you really realize, there was no real central point that you 09:37:24
could attack and say, if we come up with a lower cost one of 09:37:27
these, then the whole cost will go down significantly. 09:37:31
But essentially, half of the costs when we put in 09:37:34

these devices essentially goes to installation cost. So that's 09:37:39
the single biggest area to reduce as a way to be able to 09:37:44
minimize installation costs. That's one of the things we're 09:37:51
looking for with this off-rail-based system, is that it would 09:37:55
be wireless system, that it could be easily installed, the 09:37:58
sensors under the rails, a simple device that sits by the side 09:38:01
of the track with solar power, with communications that would 09:38:05
be vital to communicate back to the crossing. 09:38:09

So there are some potential benefits to be recognized 09:38:14
there. You know, we look at savings in terms of power because 09:38:17
there are certain expenses associated with delivery of power; 09:38:20
but the trade-off for solar is equally expensive due to cost of 09:38:24
solar panels and increased battery systems for energy storage. 09:38:30
It's just hard to come at this from -- with conventional 09:38:35
equipment to say we could make a significant impact on the 09:38:39
cost. 09:38:43

And again, that's why we come back to this approach 09:38:43
with the signs, that maybe we need to take a little different 09:38:46
view and not try and mimic flashing lights and gates; but let's 09:38:49
find a device that's effective. We're going to have locations 09:38:54
where we need lights and gates due to train volume and the 09:38:58
vehicular volumes, but at these passive crossings that are so 09:39:02
far down on our priority list -- and there are so many that 09:39:07
it's going to be hard to treat them unless we have some device 09:39:10
that really does provide a low-cost solution. 09:39:14

Other questions? 09:39:17
MR. SOTTILE: Yes. What about the Wi-Fi device impact box 09:39:19
from -- they have this -- 09:39:23
MR. CAMPBELL: Hold on. Let me get you a mike, Jim. 09:39:23
MS. CARROLL: Would you please introduce yourself for the 09:39:34
court reporter. 09:39:34
MR. SOTTILE: James Sottile, PVB Consulting. 09:39:36
What about the Wi-Fi on-site at YTT? On the local 09:39:39
locomotive -- and it's proximity sensitive -- you could -- it's 09:39:41
25 bucks. They use them all over the country. 09:39:45
MR. CAMPBELL: Well, you know, there's a lot of that 09:39:48
that's going to be rolled into PTC, is the train will actually 09:39:50
communicate with wayside devices as it progresses down the -- 09:39:58
down the track. You know, again, that's -- those are all 09:40:00
doable things. And PTC likely down the road will shape how we 09:40:03
think about crossings and do things; but, you know, we're under 09:40:09
some pretty strict mandates to implement PTC in terms of train 09:40:13
control right now, and crossing applications are going to fall 09:40:19
beyond that just because of the timing. 09:40:22
Obviously we're dealing with infrastructure needs 09:40:25
right now. We haven't ignored crossings; but in terms of just 09:40:28
the magnitude of the project, to get it developed and installed 09:40:34
it's -- the crossings are going to have to come as a separate 09:40:37
approach. But once that comes I think we will see a lot more 09:40:41
information. 09:40:46

And once we know exactly what the intentions of the train are, it's going to make a significant improvement in operation of crossing warning systems because we'll be able to deal with things like station stops before the crossings or civil speed restrictions that right now would result in increased warning times. So we'll see significant improvements; but we just -- we've got so many things to do and a short period of time to do it in. It's going to be a little further down the road.

Another question?

Okay. It looks like we're done. Thank you again for your time.

ATTENDEES: (Applause.)

MR. BROWDER: A great job.

MR. daSILVA: Thanks again, Rich. A quick housekeeping note. You were handed your copy of evaluation forms. If you could take a minute to do those and get it back to one of us or drop them off at the desk right outside the auditorium here when we go out into the break -- have a break.

The next one is regulation and enforcement; and it was really looking at a review and analysis of current initiatives, policies and programs to enhance safety along the right of way. And Debbie Freund was the team leader.

ATTENDEES: (Applause.)

MS. FREUND: Before I begin, I'd just like to thank the

people who put this workshop together and kept us going. Dee, 09:42:12
Marco, Anya and all of your colleagues, thank you very much for 09:42:16
giving us the venue where we could get together and exchange 09:42:20
ideas and hopefully moving forward and improve safety. 09:42:25

We have a very, very lively group in the regulations 09:42:30
and enforcement area. Our expertise, our agencies varied from 09:42:34
law enforcement to highway engineering to regulatory policy 09:42:40
matters to human factors research. 09:42:45

Clearly we had very diverse points of view, and those 09:42:54
were reflected in the conversations that we had. We did come 09:42:58
up with 11 ideas for research, and we were able to reach 09:43:03
consensus on our top five. And those top five were: data 09:43:08
needs for proactive enforcement, collection and wah -- 09:43:13
analysis -- I haven't had my coffee this morning yet -- 09:43:22
trespass data, photo enforcement at highway-rail grade 09:43:25
crossings, regulation and signage for no-train-horn crossings, 09:43:33
and a national campaign for seasonal enforcement programs. 09:43:37

In order to do enforcement, in order to develop 09:43:40
regulations it's critical that we have a problem size 09:43:45
assessment and know what the needs are. And many people who 09:43:49
work in state and local law enforcement environments have a 09:43:53
very difficult time getting hold of the data that they need to 09:43:59
enable them to plan effective, proactive education and 09:44:04
enforcement. 09:44:10

As we were having our conversations, we were reminded 09:44:12

that the highway-rail grade crossing inventory is being 09:44:16
updated. So there's a fine opportunity there. We also 09:44:20
thought, well, why can't we move things forward a little bit to 09:44:24
automate and simplify many of the common data searches that our 09:44:27
law enforcement and educational partners need. 09:44:36

Our benefits, increase the efficiency of their data 09:44:39
analysis, saving them sometimes literally weeks or months of 09:44:43
work. Improve the knowability of additional hot spots and to 09:44:48
target their outreach and enforcement activities much more 09:44:52
effectively. 09:44:58

There are some implementation issues involving timing 09:44:58
of the inventory's update, difficult challenges in gathering 09:45:01
the information and the information technology coordination of 09:45:06
these various databases. None of these insurmountable but 09:45:10
challenges nonetheless. 09:45:16

The second project deals with the collection and 09:45:17
analysis of trespassing data. Trespassing deaths are exceeding 09:45:20
those of highway-rail grade crossing deaths. It's a concern 09:45:29
that many of us are very worried about, a trend we don't want 09:45:33
to see continuing. 09:45:36

So there is a need to update our existing data 09:45:39
collections; but before we start collecting data, we need to 09:45:42
define what kind of data that we are collecting. One of the 09:45:45
gaps that we have is that there are no consistent national 09:45:49
definitions for "trespasser" in terms of improper, unauthorized 09:45:55

access to rail right of way. 09:45:59
We would derive benefits from improved knowledge of 09:46:04
the state and local situations. We would be able to get 09:46:07
additional information to look at national-level concerns. And 09:46:11
our bottom line: improving prevention, mitigation, saving 09:46:16
lives, reducing property damage. 09:46:21
We do have some implementation issues here as well. 09:46:24
There are some incentives and disincentives for states. How 09:46:29
are they going to fit this in among all of their other 09:46:34
information collection needs? 09:46:38
There's also a certain amount of concern in terms of 09:46:39
the ownership, risk and the liability concerning the right-of- 09:46:42
way ownership itself as well as data availability and data 09:46:47
sharing. Again, not insurmountable; but it will take some very 09:46:52
serious and well-thought-out conversation. 09:46:58
Well, we do enforcement. And so our third item is 09:47:02
directly premised on that, and that's evaluation of photo 09:47:08
enforcement at highway-rail grade crossings. Can't put a 09:47:13
trooper or a law enforcement officer of any sort at every 09:47:18
crossing. We just don't have the personnel resources. Photo 09:47:23
enforcement has proved its worth in many traffic enforcement 09:47:27
situations. 09:47:32
But we don't have model laws. We don't have 09:47:33
consistent guidelines. We don't have consistent recommended 09:47:37
practices and procedures. That's what we would like to see 09:47:40

developed in Project 3. 09:47:43
Photo enforcement has two benefits. First, it can 09:47:48
provide solid data, a real record of the violations that occur. 09:47:52
Secondly, it has a deterrent effect. If people know that they 09:47:57
can be watched and their actions can be recorded, they might be 09:48:03
a bit less likely to try to take a shortcut, so to speak. 09:48:06
There are implementation issues, of course. There 09:48:14
have been some negative public attitudes that have arisen from 09:48:18
some implementations of red-light-running cameras and photo 09:48:25
enforcement. There are concerns about privacy. And, of 09:48:30
course, this is equipment; so there are potential concerns 09:48:31
about initial and ongoing national and installation operational 09:48:34
costs. 09:48:39
The fourth item, regulations and signage for no- 09:48:40
train-horn crossings, probably generated the most discussion in 09:48:49
our group. Fundamentally, we spent a lot of time on what are 09:48:53
these crossings about, what is the expectation of the motorist. 09:48:59
And after going around for probably about half an hour, one of 09:49:07
our team members said, "You know, look, we're not talking about 09:49:11
quiet zones. We're talking about crossings where train horns 09:49:17
are not sounded. This is something that is not matching most 09:49:22
motorists' expectations. We need to let them know. And again, 09:49:30
not all motorists go through the same crossings every day. 09:49:39
Most motorists expect a train horn to be sounded when they're 09:49:44
approaching a crossing. If it's not going to happen, let the 09:49:49

motorist know." 09:49:53
We do have a few implementation issues here. 09:49:54
Development of the sign would require review by the National 09:49:58
Commission on Uniform Traffic Control Devices as well as 09:50:03
rulemaking by Federal Highway Administration to modify W10-1 or 09:50:07
develop a new sign for the Manual on Uniform Traffic Control 09:50:14
Devices; and, of course, after rulemaking is completed the 09:50:17
implementation costs of resources of installing the signs. 09:50:21
Our final recommendation builds upon national 09:50:31
campaigns that have been very successful in other highway 09:50:36
safety settings. For example, Mothers Against Drunk Drivers, 09:50:40
NCSA, many other organizations, have personal-target outreach 09:50:48
and educational programs. They target such issues as 09:50:57
construction work sites on highways, seat belts, drunk driving 09:51:02
around highways, proper installation of child safety seats; but 09:51:06
we don't have anything similar to that in the highway-rail 09:51:11
grade crossing and trespass-prevention community. 09:51:14
We do have the very, very strong benefit of working 09:51:17
with organizations -- primarily Operation Lifesaver -- that 09:51:21
focus on outreach, but maybe some seasonal campaigns to help us 09:51:25
to make a special focus on some of these efforts might give us 09:51:32
that additional little spark that we need to get the public's 09:51:38
attention and to get people thinking and knowing you can't ever 09:51:42
beat the train. 09:51:49
Clearly we could not have done this work without the 09:51:52

great participation of the folks on our team. And they are, in 09:51:57
alphabetical order: Lou Frangella from FRA Region 1; yours 09:52:03
truly; Officer Jack Hanagriff of Houston Police Department; 09:52:09
Dan Lauzon of the Brotherhood of Locomotive Engineers and 09:52:15
Trainmen; Gina Melnik, Volpe; Lieutenant Colonel Ralph 09:52:20
Mitchell, Louisiana State Police; Dr. Thomas Raslear, FRA 09:52:26
Research and Development; Bob Redmond, FMCSA Enforcement 09:52:35
office, Gerald Ruggiero from MBTA; James Sottile from PVB 09:52:38
Consulting Group; and Guan Xu from Federal Highway 09:52:43
Administration Office of Safety. 09:52:48

Also many, many thanks to our facilitator Suzanne. 09:52:50
She did an outstanding job of keeping us on track and herding 09:52:54
the rather challenging herd of cats. And thanks in advance to 09:52:58
Adrienne. We've got a lot of notes and will be looking forward 09:53:04
to seeing the write-up. 09:53:07

Thank you all very much for your kind attention. Be 09:53:09
happy to take any questions. 09:53:12

MR. MORRISON: Mark Morrison, Wisconsin DOT. 09:53:22

On your regulation pertaining to no-train-horn 09:53:27
centers focus on the W10-1 sign, hopefully, you would change 09:53:27
that read any advance warning sign for railroad crossings 09:53:33
because there are W10-2, -3 and -4s, these other ones. 09:53:36

MS. FREUND: Absolutely. We put it on the W10-1 as one 09:53:41
example, and clearly there could be other signs that could be 09:53:45
influenced by this. Absolutely correct. 09:53:47

MR. VESPA: My name is Sesto Vespa with Transport Canada. 09:53:52
I just have a little comment about the law 09:53:54
enforcement project. We did do a pretty extensive law 09:53:57
enforcement evaluation in Canada, and it did lead to reduction 09:54:00
in violation. However, this is where the issue of human factor 09:54:04
studies are very important. We did a very careful video 09:54:08
collection, a data collection program; and some of the behavior 09:54:12
that you end up creating as a result of law enforcement cameras 09:54:15
at grade crossings can be quite interesting, something that you 09:54:23
might never even imagine. 09:54:25
So when we looked over the videos, for example, we 09:54:26
had people giving us the finger. And we had people -- 09:54:28
ATTENDEES: (Laughter and applause.) 09:54:32
MR. VESPA: -- and one of the things that happened in 09:54:35
that, because of the way crossings work -- the crossings work 09:54:36
vis-a-vis highway intersections -- there are different problems 09:54:39
that arise. For example, we had false activations. A number 09:54:43
of times we had activation due to exchanges of cars, railway 09:54:44
cars at a close-by location. 09:54:53
To make a long story short, we had all sorts of 09:54:55
idiotic behavior that also occurred. For example, when drivers 09:54:58
had been at a crossing longer than they thought they should be 09:55:03
there without seeing a train at the crossing, they would stand 09:55:07
back, put tape on the license plates and then run across the 09:55:07
crossings. 09:55:13

ATTENDEES: (Laughter.) 09:55:13
MR. VESPA: Believe it or not, we saw a number of 09:55:13
incidences where drivers would actually turn around and drive 09:55:17
backwards over the crossings. 09:55:20
So, just to make a long story short, we have to be 09:55:22
very, very careful in the way we use that technology; and we 09:55:26
came up with a list of recommendations on how to use it, but 09:55:30
it's -- what really that project showed is how important it is 09:55:33
when you install technology to make sure that you look after it 09:55:38
carefully because you can get a lot of -- all sorts of strange 09:55:39
things you had never actually expected. 09:55:41
MS. FREUND: Appreciate those comments. And if we could 09:55:43
get the report number at some point to add it to this research 09:55:46
area, if it is selected; but we certainly want to include it in 09:55:49
a literature review. 09:55:54
MR. OGDEN: Brent Ogden, AECOM. 09:55:59
The Los Angeles County Metropolitan Transportation 09:56:01
Authority did a law enforcement study at a Blue Line crossing. 09:56:04
The study was done I think about six or seven years ago, and so 09:56:07
that's also available. My understanding from their 09:56:12
experience -- and I didn't, I didn't read the details of the 09:56:17
report to see if there was some erratic behavior; but I know 09:56:21
that the numbers in terms of the effectiveness at the crossing 09:56:24
was very substantial as far as their report found. 09:56:28
They did -- there were a lot of legal issues with 09:56:31

Met- -- well, with that photo enforcement. And, actually, one 09:56:35
of their experiences with the -- one of the first people that 09:56:38
they caught was an assistant D.A. who ran through the crossing; 09:56:40
and he challenged it in court and lost. 09:56:44

ATTENDEES: (Laughter.) 09:56:47

MR. OGDEN: He wasn't feeling good about that. 09:56:50

But the other -- I think the other thing that -- you 09:56:54
know, in terms of the way it's implemented on the traffic 09:56:55
side -- and this has created a big ruckus, as we know. Traffic 09:56:58
is like the neighbor. Basically, it's a vendor-driven program 09:57:02
that is based -- where they basically, you know, go out and 09:57:05
they self- -- basically, it's a self-financed operation. 09:57:10
There's proceeds from tickets used to, first of all, pay the 09:57:12
manufacturer; and also we don't pay someone on the support 09:57:17
costs. These things are money makers. 09:57:19

One of the issues that came up at the San Diego 09:57:22
conference where there was a lively debate about this was that 09:57:26
the manufacturers -- one of the criteria for selecting 09:57:28
locations for different models not out yet was the fact that 09:57:31
the signals weren't timed right. They knew they were going to 09:57:34
be able to nail a lot of people. 09:57:39

It's absurd, but almost half of them complained about 09:57:39
their own systems weren't timed right. Maybe you should fix 09:57:41
the signal first before you start issuing tickets. Well, 09:57:46
anyway, there's just -- you know, there are probably issues 09:57:49

with implementing them; but they were all effective. 09:57:52
MS. FREUND: Points very well taken. And I would add that 09:57:54
it's probably important to look at differences in -- on 09:57:57
crossings in different -- different types of facilities, urban 09:58:00
surface rail as opposed to heavy rail and other different 09:58:06
installation types and operational traffic concerns. 09:58:11
Absolutely. 09:58:17
Going once. Going twice. Thank you all very much. 09:58:23
ATTENDEES: (Applause.) 09:58:26
MR. daSILVA: Okay. Next up we have the Education 09:58:35
and Public Awareness group led by Helen Sramek and Dan 09:58:40
Di Tota, but I think Helen's going to take it; and it focused 09:58:42
on the outreach aspect. 09:58:44
ATTENDEES: (Applause.) 09:58:48
MS. SRAMEK: Last night at dinner I drew the short straw. 09:58:55
My colleague from Canada has decided that he will back me 09:59:03
100 percent in etiquette -- 09:59:06
ATTENDEES: (Laughter.) 09:59:06
MS. SRAMEK: -- but I do want to single him out here. He 09:59:06
was a very active participant in our sessions yesterday. And 09:59:09
it's not only that he is my counterpart for Operation Lifesaver 09:59:11
in Canada. Canada is known for some -- Canada and the wealth 09:59:15
of records in particular is doing some very innovative work 09:59:21
that a lot of us in the United States are also looking at. So 09:59:25
my thanks to Dan for his involvement in this program. 09:59:29

We had a very spirited discussion yesterday. And we 09:59:32
probably began with 12 to 15 research ideas; but we quickly 09:59:35
came -- on the first vote -- to about four to five priorities 09:59:39
that we want to share with you today. 09:59:44

Our top five research needs are: first of all, 09:59:49
evaluation of social media outreach. Second is evaluation of 09:59:53
existing education and outreach strategy. Crossing 09:59:58
consolidation education. We want to evaluate the effectiveness 10:00:02
of potential motorists and pedestrian signage and treatments. 10:00:06

And this is the last one that we got engaged in at 10:00:12
about 4:30 yesterday, and we were really going at it. And this 10:00:16
is the topic of evaluating the effective of mobile warning 10:00:20
devices when approaching grade crossings. I'm going to mention 10:00:24
it, but at about the 5:30 we decided this isn't really 10:00:26
education. This is technology, and we are going to pump this 10:00:30
to Rick Campbell and his team. 10:00:33

Okay. Our first one is evaluation of social media 10:00:37
outreach. You know, when this was last held in 2003 a lot of 10:00:41
the tools that we're talking about today didn't even exist. 10:00:46
It's fairly remarkable when you think of it. 10:00:49

So what we would like to suggest as our description 10:00:52
is to identify, assess and test the effectiveness of social 10:00:54
media. The rationale is the use of new media applications 10:00:57
offers the opportunity with limited resources to reach a 10:01:02
broader audience. And that is something that we in the public 10:01:06

awareness and education field are always looking for. 10:01:09
The benefits, the collection of data that has never 10:01:12
before been utilized for captures. It will help improve the 10:01:17
targeting of future educational efforts and better utilization 10:01:21
of limited resources. When you deal in the area of education 10:01:25
and awareness, you're always very aware that resources remain a 10:01:28
constant challenge. 10:01:33
Here's one that I spoke about at the beginning of -- 10:01:34
when I talked on whatever day it was, Tuesday. It's evaluation 10:01:38
of existing education and outreach strategy. My friends, this 10:01:43
was mentioned in 1995 as a priority area. It was mentioned 10:01:48
again in 2003. We would like to suggest that it is time to 10:01:53
find some sort of study to help us evaluate the effectiveness 10:01:58
of what it is we do. 10:02:02
Description, to quantify the role education plays in 10:02:05
preventing incidents on active rail lines. 10:02:08
The rationale, it is crucial to assess the impact and 10:02:11
effect -- effectiveness of existing education and outreach 10:02:14
strategies in changing public behavior. We need to start 10:02:17
finding a new way -- and there are lots of experts in here. We 10:02:21
need to start finding a way to quantify what is the benefit. 10:02:24
How do we measure the effective -- not just the effectiveness 10:02:28
but can we somehow isolate what the education component brings 10:02:32
to highway rail safety? 10:02:38
Benefits, identify effective current education 10:02:39

methods to better target and send to audiences to reduce 10:02:44
incidents on railroad right-of-way. 10:02:49
Implementation issues obviously is the collection of 10:02:51
data and how you design a research study. Operation Lifesaver 10:02:53
exists in 50 states. This is not necessarily going to be an 10:02:57
easy project to design. 10:03:02
Crossing consolidation education, to determine the 10:03:03
effective methods to educate community leaders in this area. A 10:03:07
lot of discussion on this particular topic. Many communities 10:03:11
are unaware of the benefits of public/private partnerships 10:03:15
regarding grade-crossing consolidation and grade-separation 10:03:19
funding. 10:03:23
The benefits, increased community safety forges 10:03:24
better partnerships, long-term safety benefits and mutual 10:03:28
benefit among cross-sectional groups. So my evaluator/ 10:03:30
researcher has got in there cross-sectional groups. I think 10:03:34
that's pretty impressive. And so that's one of our key topics. 10:03:37
Evaluate the effectiveness and potential of motorist 10:03:43
and pedestrian signage and treatments. Description, assess the 10:03:46
effectiveness of existing and potential new driver and 10:03:51
pedestrian signage treatments on or around railroad tracks and 10:03:53
station platforms. 10:03:56
The rationale for signage may be misunderstood or 10:03:58
overlooked by motorists and pedestrian traffic. 10:04:02
The benefits we would hope would lead to further 10:04:05

reductions in motorist and pedestrian grade crossing and 10:04:07
trespass incidents, increased motorist and pedestrian awareness 10:04:10
of public rail safety and improved compliance to signs. 10:04:13
Key implementation issues would be design of a new 10:04:17
signage, changes in the signage and the MUTCD compliance. 10:04:20
Lastly, we suggest -- and since this made No. 6 in 10:04:28
Rick Campbell's presentation, we can say it made No. 5 if you 10:04:32
lop it into ours. It's evaluate the effectiveness of mobile 10:04:36
warning devices when approaching a grade crossing. Research 10:04:41
the effectiveness of mobile warning devices as means to alert 10:04:44
drivers and pedestrians within close proximity of active rail 10:04:48
lines. 10:04:53
Rationale, utilization of current technology -- 10:04:54
cell phones, et cetera, as mobile warning devices can offer 10:04:58
additional alerts. 10:04:58
Benefits, active warning alert reduction in 10:05:00
collisions at crossings, long-term benefit to general public 10:05:04
and the lost-identity industry. 10:05:08
Implementation issues, really this is technology. It 10:05:10
is -- we would be the group that tries to help educate the 10:05:13
public on this. And it's integration with existing equipment 10:05:16
and a challenge of using this technology which is driver 10:05:21
distraction. 10:05:24
And rather than go and read everybody's name, I'd 10:05:31
like the group to stand. And I want to make a special mention 10:05:34

that Paul Chaput with the Brotherhood of Locomotive Engineers 10:05:38
was left off inadvertently. It was one of those human-factor 10:05:41
slips. But I want to -- rather than give their names -- and 10:05:45
these are great people -- we had a very spirited discussion. 10:05:47
Take a look at these folks. 10:05:50

One, they span all age groups. Two, we have 10:05:52
practitioners. We've got Paul. Dan Tota I want you to meet. 10:05:55
I didn't introduce him. He was a locomotive engineer in one of 10:05:58
his past lives. And Cliff Stayton was a locomotive engineer. 10:06:03

So we have the guys who know what this is all about. 10:06:07
We have safety practitioners. We have evaluators. Suzanne 10:06:09
Horton actually did an evaluation of the PEERS program. And we 10:06:13
have law enforcement, and we have representatives from the 10:06:17
public agency. A very good group who knows about public 10:06:20
awareness and education, and we thank all of them. 10:06:23

And we particularly also want to thank our 10:06:26
facilitator, Rachael, who -- you know, we're communicators. So 10:06:29
we talk a whole lot, and we go all over the lot. And Rachael 10:06:32
made sure that we stayed on point. We had a number of red dots 10:06:36
that we had to allocate accordingly. And we want to thank 10:06:41
Tashi, who was our scribe during our sessions. 10:06:46

So thank you all very much. Are there any questions? 10:06:49

That was easy, Dan. I didn't have to point to you. 10:06:53

MR. DI TOTA: Thank you. 10:06:59

ATTENDEES: (Applause.) 10:07:01

MR. daSILVA: All right. And last but certainly not 10:07:03
least -- especially since I was in that group -- Institutional 10:07:08
Issues, a focus on successes and challenges related to planning 10:07:12
and implementing programs at all levels of industry: state, 10:07:17
local and Federal; and the team leader was Steve Laffey. 10:07:20

ATTENDEES: (Applause.) 10:07:20

MR. LAFFEY: It's good to see so many people have still 10:07:31
remained and are active with us. We covered a big, broad range 10:07:33
of issues, big institutional -- pretty much everything, big 10:07:44
stuff that fall into our jurisdiction. 10:07:44

We started off with kind of developing some nice big 10:07:46
pots to stick little ideas into, so we have seven big pots. 10:07:48
Then after our break we ended up with little -- 71 individual 10:07:52
ideas. So then after lunch we took our 71 individual ideas and 10:07:55
condensed them back down to six basic themes. So we're going 10:08:00
to end up talking about six individual projects that we did 10:08:03
here, and I'll go over our little statements. 10:08:08

So our top six statements here were establishment of 10:08:23
a railroad/transit data clearinghouse. So this data 10:08:26
clearinghouse would cover all types of data relating to 10:08:31
incidents and inventory. 10:08:33

No. 2 is do cost/benefit analysis of grade crossing 10:08:35
improvements. 10:08:40

Three is a synthesis to evaluate how, when and where 10:08:41
human perception negatively impacts railroad safety. So this 10:08:44

is how people view railroad safety as well as the messages that 10:08:49
are provided to help you interpret grade and separate issues. 10:08:51
Institutionalized evaluation as a key component of 10:08:55
project/program and countermeasure design and implementation. 10:08:59
Improved effectiveness of stakeholder interaction. 10:09:02
There are a lot of folks who are involved in this entire 10:09:04
business, you know, well over 20, 30 various nations. The 10:09:07
industry itself is very diverse. 10:09:10
5B there is identified opportunities to make 10:09:14
legislation and regulations across jurisdictions compatible and 10:09:18
meaningful and up to date. Those of you work for railroads 10:09:22
obviously have to deal with a number of jurisdictions to get 10:09:26
anything done. We simply want to put up a fence on private 10:09:28
property. You've got to negotiate deals with folks. That gets 10:09:31
to be very complicated and actually way too complicated. 10:09:35
So Project No. 1, establishment of a data -- a 10:09:42
railroad transit data clearinghouse, a description of this is 10:09:46
simply to take a framework and an architecture for integrating 10:09:49
existing databases. We're not advocating the creation of a 10:09:52
bunch of new databases. What we want to do is link existing 10:09:56
databases together as is done in the aviation and highway 10:10:00
fields. 10:10:03
A lot of states have done this now with traffic crash 10:10:03
records. So many states -- like, Illinois has a traffic crash 10:10:06
records coordinating committee work there; but what they do is 10:10:10

develop deals with various state agencies and institutions to 10:10:13
link databases together from the private side, public side, so 10:10:17
that all of your event data is in one easy-to-find location. 10:10:20
And you can reference that data so you can query across 10:10:24
multiple databases so that when a police officer wants to know 10:10:27
where he comes across a crossroad, he can do it and not have to 10:10:31
deal with mileposts. It can actually tell him the city and 10:10:33
cross streets. 10:10:36

So it will facilitate people doing more work, and 10:10:37
obviously the rationale is to maximize distribution of 10:10:40
information. We want to make it easy for people to get 10:10:44
information, use that information to do their jobs more 10:10:47
effectively. And then the benefits obviously are to make 10:10:50
better informed decisions. 10:10:52

When it came to key implementation issues, we kind of 10:10:54
took the perspective of are there any things out there which 10:10:56
will hinder possibly being able to do this; and for this 10:10:59
particular topic there wasn't anything that was going to hinder 10:11:03
us. It's relatively easy to do. It's a medium cost, and it 10:11:06
really a very high need for folks to go out there and find 10:11:10
information they need quickly and integrate it and get out in 10:11:14
the field and put it in solutions. 10:11:17

Cost/benefit analysis of grade crossing improvements. 10:11:19
Now, obviously, you know, this is something you really need to 10:11:23
do. Not a lot of it is done right now. 10:11:25

The rationale for doing this is to really continue 10:11:28
to deflec- -- to really have a defensible argument that we need 10:11:30
the money we get. We want more money. We don't really 10:11:34
particularly want to see, for example, Section 130 money dumped 10:11:38
into a huge pool of safety money. We want 130 funds to be able 10:11:42
to stand on their own. 10:11:46

And until we can actually go out and defend that 10:11:47
Section 130 money or any grade crossing to do with money -- it 10:11:50
doesn't really make any difference -- we can't do that. 10:11:53

So the benefits of this would be to really enable the 10:11:57
addition of more -- some Federal funds and any funds that are 10:11:58
routed to railroad safety. And here again, the key 10:12:00
implementation issues, we didn't really find any negatives. 10:12:04
And this is something that we could do pretty easily. It had a 10:12:07
medium cost and a very, very high need, particularly once the 10:12:12
authorization -- somewhat under progress. 10:12:14

The synthesis, to evaluate human perception 10:12:17
implications on rail safety. The description of this is to 10:12:21
evaluate the human perception to modify human behavior. We 10:12:23
need to see how people actually interpret signs. Are signs 10:12:26
giving them the right message? Are they giving them the wrong 10:12:30
message? If they're giving them the wrong message, how could 10:12:33
we change that so they actually understand what we're intending 10:12:36
them to do. 10:12:38

Engineers often work at one level. The public is way 10:12:40

down here at a different level. The messages don't often get 10:12:42
across. 10:12:46

So the rationale here is for the local authorities, 10:12:46
the media and the public to correct some misperceptions of rail 10:12:48
dangers. The media has one way of talking about incidents and 10:12:54
accidents. For example, the media often will say, "A 10:12:57
pedestrian was struck." However, there was truly a trespasser. 10:13:00
The person was there illegally. This doesn't get across in the 10:13:06
press or in the media so that the public has a perception that 10:13:09
this person was innocently in the wrong place at the wrong time 10:13:12
when in reality he was in the wrong place at the wrong time on 10:13:15
purpose. 10:13:18

And the benefits of this will be to reduce collisions 10:13:18
and to reduce fatalities. Here again, we didn't really see any 10:13:21
key negative implementation issues. And this is something 10:13:27
that's relatively easy to do. It's really just an education 10:13:29
campaign, a very low cost; and it's a very high need. 10:13:32

Our fourth project here was the institutionalization 10:13:39
of evaluation as a key component of projects. Now, we need to 10:13:41
build evaluation into the initial letting of a project. You 10:13:45
can't go back after a project is done and say, "Look, how do we 10:13:49
evaluate this?" Well, it's too late at that point. If you 10:13:53
haven't developed a performance menu when you build a project, 10:13:56
when you start an education campaign, it's too late to go back 10:13:59
afterwards and put a Band-Aid on it for yourself. So it's much 10:14:03

better to -- really to identify and maximize the potential 10:14:06
benefits of your project at the front end. 10:14:10

For example, if you were going to put in a new 10:14:12
pedestrian warning device, you should do your surveillance 10:14:15
ahead of time to at least get your baseline situation. And a 10:14:17
lot of our projects that we do an hour, that would be great 10:14:20
because then every week you sit down and analyze those; but you 10:14:23
need to spend a lot of money up front. 10:14:25

And the PEERS project, to simply evaluate that -- it 10:14:28
was an ongoing project over about 18 months -- cost on the 10:14:31
order of a million dollars. So you're looking at probably ten 10:14:34
bucks. Every time a gate drops, it cuts into a college co-op. 10:14:37
Put into identities, was there a violation? What kind of 10:14:40
violation? So it's very expensive. 10:14:45

So it does add cost in the short term. There is some 10:14:48
resistance to doing this because it will take longer, 10:14:49
obviously; but the long-term benefits that you can really prove 10:14:53
prevent the cost of something you're trying to do. 10:14:56

Improved effectiveness of stakeholder interaction. 10:14:59
Like I mentioned previously, there are a lot of players in this 10:15:05
business. We all kind of communicate effectively? I really 10:15:08
don't think so. 10:15:10

At the Illinois Commerce Commission we have our 10:15:12
contact communications with local communities. We deal with 10:15:14
townships, cities, counties, railroads. We have 50 railroads 10:15:16

on line. Trying to get everybody at the same page is impossible.

Now, if we can actually get some kind of pool together, if you look at how people communicate, find out who is doing it correctly and emphasize that in the future, that could really improve the communications; and improved communication is always a good idea.

Sometimes it's kind of painful. Some people don't want to talk to one another. It can be like dragging toenails or fingernails out of people to do it, but it has to be done to get the best out of our investments.

Implementations here, these are ideas. I mean, there's a huge group of stakeholders. They're very entrenched. The engineering industry is very conservative. Railroad safety must be very conservative. Trying to get things to move at, you know, other than a glacial pace is -- it's tough.

No. 5B -- or actually -- we are actually at No. 6 -- identified opportunities to make legislation/regulations across jurisdictions compatible, meaningful and up to date. Now, basically, an outburst of regulations in Ann Arbor deal with water -- with water and livestock and cars. Is there a lot of livestock shipped by rail these days? I don't think so.

There are lots of opportunities here to really go and streamline the touch of legislation and rules and regs that are out there. There's a Public Utility Commission. They've got

lots of rules. Feds have lots of rules. Railroads have their 10:16:37
own rules. There is not exactly a lot of harmonization between 10:16:40
those sets. If you can streamline all those, that would really 10:16:46
benefit things and speed up the whole process. 10:16:48

Ah, but, of course, there's a lot of inertia there. 10:16:50
Nobody wants listening to rules that have been there over 10:16:51
50 years. It's a lot of work. 10:16:53

We have an administrative rules committee in 10:16:55
Illinois, JCAR. To get anything changed in Illinois is a huge 10:16:57
pain in the butt. A short and sweet thing at the Federal level 10:17:02
from the railroads, everything is very institutionalized. 10:17:05
People don't want to change things if it's simple. And, 10:17:10
actually, there are some pretty powerful coalitions out there 10:17:11
who don't particularly want to see some things change after 10:17:15
all. 10:17:15

As far as some folks we have on our committee, first 10:17:21
of all, facilitators in our stripe, Marco and David Damm-Luhr 10:17:24
were fabulous. Without those assistants we could certainly not 10:17:29
have accomplished what we did. 10:17:33

Bill Browder from AAR and Ian Lake from the Railway 10:17:36
Safety Commission of Ireland really added a nice different 10:17:40
flavor to our discussions. Karen Marshall from American 10:17:42
Association of Suicidology helped us focus on some of the human 10:17:45
issues: the pedestrians and the willful, intentional 10:17:50
trespassers. Jordan Multer had some very nice reflections on 10:17:53

different industries that he did with regard to discussions, 10:17:57
particularly from the aviation industry. 10:17:59

Ron Ries, supports and referee. Joy Schaad from 10:18:02
Chicago Metropolitan Agency for Planning. And John Shurson 10:18:10
from BNSF really gave us a good railroad perspective. And 10:18:10
also -- sorry there -- Jay Holman from Union Pacific, a public 10:18:13
safety officer and police officer, also gave us the 10:18:18
interpretations on how things are done. 10:18:21

And those are our top six institutional issues. So, 10:18:23
if anybody had any questions, it was welcome to taking a shot 10:18:26
at them. 10:18:30

Okay. Thank you very much. 10:18:32

ATTENDEES: (Applause.) 10:18:34

MR. daSILVA: I know we're a little bit over, but we're 10:18:42
going to make up for it. We have a couple of things to deal 10:18:45
with before the break, really quickly. We do want to present 10:18:48
our team leaders with a memento of their active participation 10:18:51
at this conference -- at this workshop. 10:18:55

So if we could please have Brian come up. We'll do 10:18:57
this in order. Brian Gilleran led the Grade Crossing 10:19:01
Modernization team. 10:19:04

ATTENDEES: (Applause.) 10:19:07

MS. CARROLL: Going to take a photo? 10:19:13

MR. daSILVA: Oh, you told me that. 10:19:17

ATTENDEES: (Applause.) 10:19:17

MR. daSILVA: And then Anya with Traffic Patterns. 10:19:18
ATTENDEES: (Applause.) 10:19:18
MR. daSILVA: Rick Campbell from New Tech Opportunities. 10:19:32
ATTENDEES: (Applause.) 10:19:32
MR. daSILVA: Debbie Freund with Regulation and 10:19:39
Enforcement. 10:19:41
ATTENDEES: (Applause.) 10:19:41
MR. daSILVA: And Helen Sramek and Dan Di Tota for the 10:19:50
Education and Public Awareness. 10:19:55
ATTENDEES: (Applause.) 10:19:55
MR. daSILVA: And, obviously, Steve Laffey, Institutional 10:20:14
Issues. 10:20:17
ATTENDEES: (Applause.) 10:20:17
MR. daSILVA: So this is your team. Thank you so, so 10:20:27
much, guys. 10:20:30
ATTENDEES: (Applause.) 10:20:30
MR. daSILVA: All right. I think their duties are 10:20:34
relieved, right? 10:20:36
All right. So we're going to break. And we do have 10:20:40
a handout for you that you'll pick up on your way out. It has 10:20:41
all of the top research needs. We ask you that when you come 10:20:44
back really start thinking about what your own priorities are. 10:20:47
And then Anya's going to lead a discussion to wrap things up, 10:20:50
and then we'll be done. 10:20:55
So thank you very much. Break is right outside, if 10:20:56

you want to come back in about ten minutes or so. Make it 10:20:59
10:30, 10:35. Thank you. 10:21:03
(Recess taken.) 10:21:03
MR. daSILVA: Okay. I have one announcement that Debbie 10:44:19
Freund pointed out to me that we apologized for an omission but 10:44:56
we have an omission of Richard Brown, who was on the Yellow 10:44:58
team, on the Regulation and Enforcement team. So we apologize 10:45:01
for that omission from the presentation. 10:45:07
MS. CARROLL: We'll adjust it. 10:45:07
MR. daSILVA: And that will be adjusted. 10:45:12
I'm still waiting for a few people to come back in. 10:45:22
So the first thing I'd like to do is actually 10:46:02
acknowledge the in-house staff, the Volpe staff that is still 10:46:05
present this morning. If they want to stand up so that we know 10:46:09
who everybody should thank, Volpe people. I believe that I see 10:46:14
a bunch back there. 10:46:19
ATTENDEES: (Applause.) 10:46:22
MR. daSILVA: So thank you for all your help throughout 10:46:24
this week and leading up to this. 10:46:27
The other group of people that we really need to 10:46:29
thank is the steering committee. The team leaders are all part 10:46:32
of the steering committee, but there were also other people. 10:46:35
So if the steering committee -- want to stand up, please. You 10:46:37
know who you are. You've been involved with us for the past 10:46:40
six months or so. 10:46:47

ATTENDEES: (Applause.) 10:46:47

MR. daSILVA: Thank you for all your effort and hard work 10:46:48
and all those conference calls which I think really paid off. 10:46:50

So we're going to go into the last session, and Anya 10:46:52
is going to lead the discussion and prioritization. And I hope 10:46:54
that you got a list of all of the top 30 -- 34, right? 10:46:58

MS. CARROLL: 33. 10:46:58

MR. daSILVA: -- 33 -- 33 research needs statements. So 10:47:02
if you don't have a copy, there are probably some extras 10:47:06
floating around, so just phasing it and a timeline. 10:47:09

MS. CARROLL: Thank you. We're going to take a little bit 10:47:20
of time. Since we had a lot of discussion with questions and 10:47:25
answers while the team leaders were up here, we'll have some 10:47:28
more discussion and, hopefully, a little bit of time to do some 10:47:33
prioritization with you. 10:47:38

So with that, the list that you should have in hand 10:47:40
discusses -- let me premise my comments by the fact that 10:47:50
operator error in the wee hours of the morning may cause human 10:47:53
error. So -- as exemplified by my earlier presentation where 10:48:01
I missed an entire project -- I hope I've got this right. 10:48:06

So I'll just to through very quickly the titles. For 10:48:10
the Grade Crossing Modernization we looked at warning device 10:48:16
minimum requirements for high-speed rail, flange-way gap, GPS 10:48:24
and PTC constant warning signs, second-train warning devices, 10:48:27
personal detection device -- I see that. I've got that twice. 10:48:30

I forget what the fifth one is now. 10:48:33
Trespass -- Traffic Patterns are application of 10:48:37
warning devices, highway traffic signals, the effectiveness of 10:48:40
pedestrian gates, signage at roundabouts, driver 10:48:44
decision-making, review and improvement of the hazard indices 10:48:49
and accident prediction formulae. 10:48:49
The New Technology group, alternative sensors, 10:48:54
pedestrian treatments, on-track vehicle detection, LEDs, 10:48:58
minimum traffic control devices for high-speed rail, enhanced 10:49:03
commercial GPS systems to improve highway-rail grade crossing 10:49:08
safety. 10:49:11
As you can see, unless -- excuse me -- on my slide 10:49:11
I have some key -- color keys; and that's a surprise on the 10:49:14
next slide, if you haven't guessed already. I bet some people 10:49:18
have identified what that means. 10:49:24
Our next slide talks to the Regulation and 10:49:25
Enforcement, the data needs, collecting and analyzing trespass 10:49:34
data, photo enforcement, regulation and signage, national 10:49:39
campaign for targeted seasonal enforcement. 10:49:42
We work into the Education and Public Awareness a lot 10:49:47
of evaluation: evaluation of social media, evaluation of 10:49:50
outreach strategies, crossing consolidation education, 10:49:55
evaluation of effectiveness of potential motorist and 10:49:58
pedestrian signage, evaluation of the effectiveness of mobile 10:50:01
warning devices. 10:50:07

The Institutional group brought to bear some of the 10:50:08
outer skin of the onion, as Jordan mentioned: you know, 10:50:11
establishment of a data clearinghouse across the organizations; 10:50:16
cost/benefit analysis which would provide us with some level of 10:50:21
effectiveness of the types of warning device improvement; the 10:50:24
synthesis to evaluate how -- how, when and where human 10:50:30
perception negatively impacts safety; institutionalize the 10:50:36
evaluation as a key component, improved effectiveness of 10:50:42
stakeholder interaction, and the identification of 10:50:45
opportunities to make legislation and regulations across 10:50:54
jurisdictions compatible. 10:50:54

I want to applaud everybody here and everybody who 10:50:54
was here for the tremendous job they did. My anecdotal 10:50:58
information was that we generated more than 150 ideas that 10:51:02
generated one-page sheets to the total of 70, 70 plus -- 10:51:10
I think there might be 72 we actually generated. And what we'd 10:51:14
like to discuss today is these top issues that the teams came 10:51:19
up with and have a discussion about that. 10:51:25

My color scheme sort of tries to link across the 10:51:29
teams some of the trends. So, as you can see, the Grade 10:51:35
Crossing Modernization team, the Traffic Patterns and the New 10:51:40
Technology all focused on what do we do with the incoming high- 10:51:44
speed-rail legislation and funding; and how can we proactively 10:51:50
get to a level of comfort to implement the high-speed-rail 10:51:56
issue. 10:52:01

The GPS came up a couple of times with constant 10:52:02
warning time and also the use of a possibility of ITS types of 10:52:08
systems as David Matsuda brought to bear in his opening 10:52:12
presentation on Tuesday. 10:52:17

The next grouping looked at grade crossing 10:52:20
modernization, traffic patterns, new technologies and education 10:52:27
and public awareness. We talked about pedestrians. It seems 10:52:31
like pedestrians is a cross-cutting issue. 10:52:37

Yes, Scott. Could we get you a microphone first, 10:52:40
please. And could you state your name and your organization. 10:52:43

MR. WINDLEY: Yeah, I'm Scott Windley with the U.S. Access 10:52:48
Board. 10:52:51

I hate to do this to you, but I have to point out a 10:52:51
human error. 10:52:55

MS. CARROLL: Okay. 10:52:55

MR. WINDLEY: You left out flange-way gaps in your next 10:52:57
group. 10:53:00

MS. CARROLL: Okay. It will be in the formalized edited 10:53:01
proper list. That's why we may do a precursory prioritization, 10:53:05
but we're going to save that for a more consistent 10:53:12
prioritization. 10:53:17

So we will add the flange-way gaps to the color blue. 10:53:19

In yellow we talk about driver decision making a 10:53:26
human factors area that has been with us for at least the last 10:53:30
six years in this venue of research needs; and, hopefully, we 10:53:36

need to get moving on this area. 10:53:41
And then the last area of purple evaluation was 10:53:44
evaluation, evaluation and more evaluation. And I was just 10:53:48
having a sidebar conversation with Jim Sottile; and similar to 10:53:53
what Steve Laffey and his team put together as far as having a 10:54:02
database of where you could get information, wouldn't it be 10:54:05
great to have a database of all the evaluation results right 10:54:10
after they're done? It's just a thought. 10:54:15
So with that I would like to open the floor to 10:54:17
anybody to discuss any issue that you have, any of these needs 10:54:20
that you want to discuss further or anybody that would like to 10:54:27
support one of these research needs or another. So with that 10:54:34
I'll open it up to the floor. 10:54:39
Microphone, please. And please state your name and 10:54:49
your organization, Paul, because we're trying to -- 10:54:53
MR. WORLEY: Paul Worley, and North Carolina DOT. And 10:54:56
also I'm representing AASHTO at this meeting. 10:55:00
One thing that's been very important to us at AASHTO 10:55:04
is the Section 130 program, seeing that continue as some kind 10:55:06
of grade-crossing safety set-aside. And every time we get into 10:55:11
the situation of the reauthorization and transportation bills, 10:55:15
we get into this defense-of-gate, bar-the-door-type kind of 10:55:17
mode. 10:55:23
We have a lot of good reasons for the Section 130 10:55:24
program, not just the safety benefits that we've had over the 10:55:29

life of the program; but also involved in crashes are economic 10:55:32
factors, factors of mobility and communities as well as the 10:55:36
rail systems. And as we look in our country to develop high 10:55:40
speed rail corridors and more intercity passenger and freight 10:55:44
and as that becomes more important, the mobility of rail lines, 10:55:49
the validity of those rail lines and the velocity of the trains 10:55:51
becomes more important and maintaining a good grade crossing 10:55:57
set for it as well. 10:55:59

So, with that in mind, we have been pursuing through 10:55:59
TRB and we would love to see some kind of cost-back analysis 10:56:04
and research done into what are the economic impacts, what are 10:56:10
positive economic impacts and mobility impacts of railroad 10:56:13
crossings safety and use that, that body of work that we can 10:56:16
get out of that kind of research as our further walking-around 10:56:19
backup to the Section 130 program. And we've also got some 10:56:25
other ideas of where that should go; but we really need some 10:56:29
good data on that, not just to safety but there are some other 10:56:33
benefits we need to look at, too, and modify. 10:56:36

MS. CARROLL: Thank you, Paul. 10:56:40

Anybody have any comments for Paul's suggestion? 10:56:41
That was one of the research needs that was established, the 10:56:44
cost/benefit of a grade crossing safety treatment. 10:56:48

Yes. Down here. 10:56:52

MS. FREUND: Debbie Freund, Federal Motor Carrier Safety 10:57:00
Administration. 10:57:03

I'd like to add to Paul's comments. One of the 10:57:03
reasons that FMCSA is looking at rail highway grade crossing 10:57:07
safety as carefully as it is is not necessarily the number of 10:57:13
events but the risk of the very, very serious catastrophe. 10:57:17
There is more hazardous material being moved by truck than by 10:57:24
rail at any time. The trends continue to increase. 10:57:29
In that way, you know, it's a little bit like 10:57:32
aviation. It's extremely safe, and that's to protect the 10:57:35
traveling public from risk. So do keep that in mind as we go 10:57:40
on evaluations. It's not just what is happening. It's what 10:57:46
potentially could happen. 10:57:50
MS. CARROLL: Thank you, Debbie. Right behind you? 10:57:55
MS. COOK: Hi, everybody. I'm Carolyn Cook, and I'm the 10:57:59
regional crossing manager out of Region 5 for Federal Railroad 10:58:02
Administration. And for the last five years I've been working 10:58:09
on state action plans for -- crossing safety action plans in 10:58:11
Louisiana and in Texas. And the big reason that I asked to 10:58:14
come to this was because I have a big concern about traffic 10:58:19
signal and crossing interconnections. 10:58:26
You know, I've also served on planning committees for 10:58:28
three different engineering conferences. And every time I've 10:58:32
had to convince the group that we still need to be talking 10:58:35
about this because in my region we're still having collisions. 10:58:39
I first got involved really with the topic when three 10:58:42
people were killed at a grade crossing in Louisiana when the 10:58:46

truck driver was looking up and waiting for the light to change 10:58:50
and failed to look at the Norfolk Southern's train approaching. 10:58:53
It was ignored by the fact that cantilever flashers had just 10:59:00
gone off. There wasn't a gate there, and the traffic -- signal 10:59:04
wasn't interconnected with the traffic light. 10:59:07

That was in 2004 three people died. So then we did 10:59:10
the state action plans in Louisiana and found out that close 10:59:14
proximity to intersections was the main reason why we were 10:59:19
having multiple collision -- multiple-incident collision. 10:59:22

We didn't go as far with the data analysis as we've 10:59:26
done in Texas, and now in Texas we've looked at 1328 collisions 10:59:30
with 466 multiple-incident collisions. In 46 percent on the 10:59:36
multiple-incident collisions -- no, 46 percent of the total 10:59:43
collisions were at multiple-incident locations where an active 10:59:49
crossing device was interconnected with a traffic signal. 10:59:55

So that's the biggest difference among the single- 10:59:59
incident collision and the multiple-incident collision. That's 11:00:05
the only thing, really, that separates the multiple-incident 11:00:09
collision with the single-incident collision. 11:00:13

So it tells us, you know, that the big thing we've 11:00:16
got to look at in Texas is the fact that those crossings 11:00:19
interconnected with the signal. Something -- it's the only -- 11:00:28
you know, it's the only indicator we have that there's 11:00:31
something going on in those multiple-incident locations. 11:00:34

So my pitch to you is that some of you may think we 11:00:37

have the problem solved with preemption; but I don't think that 11:00:42
we do, at least not in my region. So just my pitch for that 11:00:48
research need area. 11:00:53
MS. CARROLL: Brent. Can we get a microphone to Brent? 11:00:59
MR. OGDEN: Brent Ogden with AECOM. 11:01:04
I wanted to speak to the high-speed rail grouping. 11:01:06
And I guess the first comment I would have would be that my 11:01:11
understanding is that 125 is the limit for grade separation. 11:01:16
So if you start with 110 there on some of the considerations in 11:01:20
the statements there, I think it should go to 125. 11:01:25
The way -- the way the New Technology group looked at 11:01:28
the grade crossing issue with high speed rail, I think -- well, 11:01:35
first of all, I think in California and being that we love 11:01:38
regulation and love -- we always go to trade on the best- 11:01:42
available technology. So we're putting full enclosure on our 11:01:46
new light rails. I mean, we're closing off everything, four or 11:01:51
five gates, pedestrian gates, full standardization. It's 11:01:55
just -- it's almost impossible for me to believe that somebody 11:01:57
could put in a high-speed rail crossing that didn't have best- 11:02:01
available technology. 11:02:03
So we're sort of starting off with the mindset that 11:02:04
there's going to be full closure. And then the question is: 11:02:07
What do you do next? Just put a barrier up to stop the cars 11:02:09
from running in? Do you secure the crossing and stop the train 11:02:13
before it gets there between -- the warning time is three 11:02:16

minutes, four minutes, whatever? So the way we look at the 11:02:19
high-speed rail issue is really, you know: What do you do over 11:02:23
and above just the best-available treatment? And so that was 11:02:27
sort of our focus, and I just wanted to sort of clarify, you 11:02:30
know, why we took that approach on it and why we put the 11:02:35
barrier gate down. 11:02:37

We also had another one that didn't, I guess, make 11:02:38
the short list was the video surveillance of the crossing and 11:02:43
verify that the crossing is secure; but I think that's another 11:02:48
thing in one of these New Technology areas, is, you know, it 11:02:49
could actually become a very, very important consideration, is 11:02:53
having video surveillance on these crossings, one of the 11:02:58
countermeasures. 11:03:03

MS. CARROLL: Thank you, Brent. Our team, as well, in the 11:03:03
Traffic Patterns looked at this issue as well. As you saw, 11:03:05
there were three teams that brought this issue up. 11:03:07

MR. CAMPBELL: Hi. Rick Campbell. 11:03:11

I'm going to echo a little bit about Carolyn's 11:03:14
statement on traffic signal interconnection and preemption for 11:03:16
crossings. Like Carolyn, I'm convinced that this is a 11:03:18
significant problem and that we've really failed to address it. 11:03:23
We got all worked up after Fox River Grove, and we had the big 11:03:27
flash in the pan; but we've really just set all this aside and 11:03:34
in many states have taken virtually no action to deal with 11:03:38
improvements regarding preemption. 11:03:41

A case in point, we were involved in a study with the 11:03:43
State of Ohio that ultimately will evaluate and assess every 11:03:45
interconnected location in Ohio. And we're in the very early 11:03:49
stages of that program, and we've only looked at roughly 20 to 11:03:53
25 crossings as kind of a dozen sample. And it's amazing of 11:03:58
those 20 to 25 locations 100 percent of them have problems. 11:04:02
And the problems range from moderate to severe. 11:04:07

You can find locations where the presumption has been 11:04:09
disabled. And even after all that we've learned about, we saw 11:04:14
agencies had disabled the interconnection. And it's just 11:04:19
inconceivable that we could take such a casual approach to such 11:04:21
a serious problem. 11:04:27

And I just want to support Carolyn. There were a 11:04:28
number of different research need statements about preemption 11:04:33
with different elements. We had someone in our organization. 11:04:36
I know there are other groups that did as well. So just 11:04:38
encourage them to continue to look at that. Let's not set the 11:04:41
research aside in terms of preemption and interconnection. It 11:04:45
is a significant issue that's out there. 11:04:49

And when you look at the numbers, when the various 11:04:51
elements line up, it's not a question of if the crash occurs. 11:04:55
The crash will occur. It will happen. You can prove it 11:04:59
mathematically. So it's only a case when one of the 11:05:02
contributing elements either isn't present or at the last 11:05:05
minute moves out of the way and removes that element that the 11:05:09

crash doesn't occur. So that's it for my comments about that. 11:05:15
MS. CARROLL: Thank you, Rick. 11:05:18
Up in the back, Scott? 11:05:20
MR. WINDLEY: If somebody has to comment about what Rick 11:05:21
is talking about, my issue is different. So I don't want to 11:05:24
interrupt the discussion of what we're talking about there. 11:05:29
So if somebody needs to comment further, I'll yield 11:05:31
for him. 11:05:31
MR. SOTTILE: Jim Sottile, PVB Consulting. 11:05:45
Rick, one of the things that's in my experience since 11:05:48
retirement has been with the preemption issue at certain grade 11:05:51
crossings. The salt conditions during winters start false 11:05:56
activations and then start the cycle. And I've done some 11:06:01
nominative research into police departments responding because, 11:06:08
as you know, in 49CFR234 it's a requirement before the next 11:06:11
train movement that the railroad respond to it; but it does it 11:06:14
all the time. 11:06:18
But police departments going out there and propping 11:06:18
up gates, that's more hazardous because of the intermittent 11:06:21
occurrences. So -- and I agree with the FRA speaker and you 11:06:24
that there has to be some research into that because, just 11:06:29
because you have preemption, it may cause accidents instead of 11:06:32
helping. 11:06:36
MS. CARROLL: Thank you. 11:06:38
Let's go back to Scott in the back corner, please. 11:06:39

MR. WINDLEY: Actually, I just wanted to give Erica a 11:06:47
workout, but -- 11:06:51

ATTENDEES: (Laughter.) 11:06:51

-- I'm Scott Windley, U.S. Access Board. 11:06:52

I'd like to -- I was in the 2003 research needs 11:06:53
meeting, and in that meeting I felt like I was the only one 11:06:58
beating the pedestrian drum. So I'd like to commend all of us 11:07:03
for having as many projects as with do that list pedestrian 11:07:07
issues. 11:07:12

I would just like to give my support to the 11:07:12
flange-way gap research because that's been an issue forever. 11:07:19
And if you want -- I'll keep my horror story to a minute, a 11:07:24
minute long -- but if you want to picture yourself in a 11:07:29
wheelchair all by yourself and you get your wheels stuck in the 11:07:32
flange-way and there's no one around to help you, you're either 11:07:37
going to be a dead duck when the train comes or, if you're 11:07:41
lucky, somebody will come along and help you out before the 11:07:44
train comes. 11:07:47

So I know that this high speed rail is a real big 11:07:48
issue right now. I would just want us to not lose sight of the 11:07:52
fact that we need to address the flange-way gap issue because 11:07:56
it's not just for wheelchairs. Bicyclists have that trouble. 11:08:00

I think I remember somebody saying in our group that 11:08:05
there was a story about a woman who got her stroller caught in 11:08:08
the flange-way gap and got so -- in the panic moment got so 11:08:12

involved in trying to get the stroller loose that she didn't 11:08:16
think about scooping the baby out of the stroller. 11:08:18
So, you know, these are just things that it's more -- 11:08:22
there's more issues here than just wheelchairs. It's for all 11:08:26
small-wheel vehicles that are going across that pedestrian 11:08:31
crossing. So I commend you all for all the pedestrian issues 11:08:38
that you've brought up, and I don't feel all alone anymore. 11:08:42
Thank you. 11:08:44

MS. CARROLL: Thank you, Scott. 11:08:47
And the way in the back, please give your name and 11:08:48
your organization. 11:08:52

MS. XU: Hi. I'm Guan Xu with Federal Highway 11:08:54
Administration Office of Safety. 11:08:58
I want to remind you when you are considering 11:09:00
prioritize the project, keep in mind that we probably want to 11:09:05
consider "all" DOT and official strategies. Note the emphasis. 11:09:17
I think my life pact now is that future cost studies would 11:09:27
treat the priority of safety, name of the body and present of 11:09:33
the learning. 11:09:33
So that's -- of course, safety, we're talking about 11:09:38
safety now. That's what is on target but also the means to 11:09:47
survive which is -- which we need look into what Scott was 11:09:54
mentioning in the back on parking. 11:09:58
And also, with that in mind, I think the flange-way, 11:10:00
the topic is right on target. And there's probably something 11:10:09

that will be supported by other communities like pedestrian and 11:10:14
the people with disabilities and may have high potential to be 11:10:18
funded in the use -- to that use. 11:10:24

And we find that I think maybe we need to change the 11:10:26
name of the flange-ways to make it more clear to people outside 11:10:33
railway society. I don't have any suggestion, but that's been 11:10:40
solved. And something about pathway. Like, I mentioned the 11:10:46
first day that -- who presented pathway design standards. 11:10:49
I think that's kind of, like, one solution to resolve the 11:10:55
flange-way problem and also have high potential to be accepted 11:11:01
by other communities such as the design community -- roadway 11:11:10
design -- and pedestrian safety groups and also the railway 11:11:16
community talking. So this -- so when you consider that, keep 11:11:20
this in mind. 11:11:28

And also, another point I want to make that the start 11:11:30
of next authorization deal I think one thing is added which is 11:11:41
performance of engines. So this was something they need to run 11:11:47
the data again. And we want to have good data to do evaluation 11:11:52
and also to do performance measurements. 11:12:02

And also the ultimate goal of the DOT is to review 11:12:05
fatalities and severe injuries -- severe enough injuries. So 11:12:21
when people look at what they have, they always see all these 11:12:25
causes and that made so low. If they'd spend money actually on 11:12:29
that it will not produce good results, to contribute so and 11:12:33
that fund is not inhabited. 11:12:33

The number is so low because we are only looking at 11:12:44
the train and vehicle we have; but there's a lot of fatalities 11:12:48
and injuries that are related to the vehicle on the pathways 11:12:50
and crashes that somehow cost by the percent of the crossing or 11:12:55
between the trains. So we need to expand our database to 11:13:08
include those. So I think that's necessary to do that because 11:13:15
those are overpopulated in its use. I'll expand that. 11:13:19

So, in conclusion, I think -- I think my priority 11:13:28
will be such a project related to the data, looking at how a 11:13:37
lack of rough database and also something that will relate to 11:13:42
other fields like design conversion, certainly see these. So 11:13:54
I'm thinking, you know, what also has had a potential to be 11:13:59
funded. 11:14:04

MS. CARROLL: Thank you, Guan. 11:14:08

We've got to stop. 11:14:08

MR. WINDLEY: Just real quick. I'm Scott Windley from the 11:14:11
U.S. Access Board. 11:14:13

I just forgot to mention that while my agency is only 11:14:14
a $7-million-a-year agency in our entire budget, I will -- 11:14:17
I can commit some dollars through a fund we have. 11:14:23

MS. CARROLL: For a pathways safety -- 11:14:28

MR. WINDLEY: Yes, something. And I agree with Guan that 11:14:31
it needs to be somehow made a little bit more understandable 11:14:34
because I think that might be why -- while I've submitted it to 11:14:38
NCHRP several times, I've submitted it to TCRP a couple of 11:14:42

times, I believe -- it never gets funded. So -- but, anyway, 11:14:47
thank you. 11:14:51
MS. CARROLL: Thank you, Scott. Thank you. 11:14:51
Way in the back there. Rich? 11:14:54
MR. BROWN: Thank you. I'm Rich Brown with Transpo 11:14:56
Industries. 11:14:58
I participate in a lot of these meetings. And I sit 11:15:02
here and listen and sort of -- and I just want to reinforce 11:15:06
what Scott is saying; but I also feel that in the research 11:15:11
mode, the basics of a research project, you begin to look at 11:15:15
what is currently available. We've got a number of different 11:15:21
systems that are out there. 11:15:25
Some are better than others, some utilizing different 11:15:28
types of rail seal, different manufacturers of rail seal. Rail 11:15:32
seal has been around for a long time. I think we need to 11:15:39
broaden research to bring in some of these manufacturers of 11:15:43
rail seal. 11:15:49
And I think also as the program moves forward you 11:15:49
need to have a base point and you need to look at what's 11:15:52
currently in use. And I think you need to establish barometers 11:15:57
as to some systems work better than others. We need to look at 11:16:00
why that is. I don't have the answer but certainly would be 11:16:05
interested in seeing that evaluation take place. Thank you. 11:16:10
MS. CARROLL: Thank you. 11:16:15
Paul. Up here. 11:16:17

MR. O'BRIEN: Paul O'Brien, the Utah Transit Authority. 11:16:21
I'd just like to put in a general pitch for the 11:16:25
pedestrian-related research and grade-crossing work and 11:16:29
research. Now, if we looked over at the last 20 years, the 11:16:33
number of people that are using rail transportation has grown 11:16:37
geometrically; and it's probably not going to slow down. It 11:16:41
covers light rail, commuter rail. Now we're talking about more 11:16:46
intercity service. So I think it's time that we really devote 11:16:50
some effort to both the pedestrian and the grade crossing. You 11:16:56
know, how will we -- we are going to have more pedestrians 11:17:08
around trains whether we -- whether we like it or not it's 11:17:10
going to come to it. 11:17:10
MS. CARROLL: Thank you for your perspective. 11:17:16
Does anybody else have a comment? A question? 11:17:18
ATTENDEE 3: Here, in the middle. 11:17:20
MS. CARROLL: Actually, I was going to call on our foreign 11:17:21
visitors to share their insights and connections with our U.S. 11:17:24
research. 11:17:29
MR. LAKE: Hello. I'm Ian Lake from the Railway Safety 11:17:30
Commission of Ireland. Thanks for the invite available for me 11:17:34
and crossings. 11:17:34
I'm just meaning to say a couple of words. And it's 11:17:38
been interesting to observe lots of common issues, and things 11:17:44
aren't that different that I left on the other side of the Pond 11:17:50
over in Europe. And I'm going to hedge work some uses here on 11:17:55

these to outreach and education to look back a bit. It's the 11:17:59
same issue. How do you get past reaching less than 1 percent 11:18:00
of the population when something approaching hundreds in the 11:18:05
population use level crossings and end up with 100 percent they 11:18:10
give you? 11:18:15

Flange-way gaps, I mean, that's a potential issue, 11:18:16
surfacing, particularly in Vienna. You have a higher grade 11:18:20
surface in a lot of these sites in Europe, reductions just like 11:18:23
that; and in those the last stand. It's a big issue for them. 11:18:26
And indeed their common networks is the place. And private 11:18:34
crossings is the bane of our lives. And we anguish having 11:18:39
another one, that's basically where our avoidable fatalities 11:18:42
occur, the bulk of them. 11:18:47

But my other point was, as well, is that -- make sure 11:18:50
you look around and look over to Europe before you spend a lot 11:18:53
of money on some of these things because, I mean, there's been 11:18:57
a lot of talk about 125-mile-an-hour for high-speed and 11:19:01
crossings on high-speed lines; but I mean, if you go and talk 11:19:06
to the French and Germans they'd probably cost you an hour. 11:19:11
They wouldn't even think of a level crossing on a 11:19:12
125-mile-an-hour. 11:19:17

And that not even for safety reasons. That's purely 11:19:17
for performance reasons. If you want to get trains from A 11:19:19
to B, never crossings with having to back up. And they cause 11:19:26
the main bunch up. And get your method from A to B -- train 11:19:27

from A to B, and then we've got crossings methods. And that's even before you start with the issues of 125-mile-an-hour crossings. You're talking about CCTV or supervising level crossings; and, I mean, that's pretty much in the UK. And for over 20 years any crossing over 100 miles an hour has to be directly supervised from there or remotely by CCTV. 11:19:28 11:19:31 11:19:35 11:19:40 11:19:43 11:19:47

Now, I'm not saying that's necessarily the right way to go; but go over there and talk to someone who's got the equipment in and say, "How well did it work? How well has it performed?" And the boundaries set on it, have notes if they have any. So you can save yourself a lot of taxpayer dollars there. 11:19:51 11:19:54 11:19:56 11:20:00 11:20:00 11:20:06

And obstacle detection is something that I think we've briefly touched on today. I know in the last three weeks -- I went to a conference in London last week. And at least on those ten level crossings, automatic crossings and still we had obstacle detections radar by a system that detect any mass in a defined crossing box. So that's a vehicle, person, soggies or any other foreign object. It could be a tree. 11:20:07 11:20:11 11:20:14 11:20:17 11:20:21 11:20:25 11:20:29 11:20:35

The equipment is out there. The technology is out there. People are working on these issues, so keep your eyes open and send to me -- though I'm across a map, you phone amongst your friends and say you're not alone on this one. 11:20:35 11:20:38 11:20:42 11:20:44

MS. CARROLL: Thank you, Ian, for your insights. And 11:20:49

I know that a couple of the research problem statements did 11:20:51
consider looking at, you know, looking at the international 11:20:55
scene to see what's been done in the area. 11:20:58

I'd like to turn it over to Sesto to give us the 11:21:02
Transport Canada research perspective, if he would oblige. 11:21:06

MR. VESPA: My name's Sesto Vespa from Transport Canada. 11:21:14

Actually, I was very interested to hear on the 11:21:18
subjects come out here very similar the issues that we are 11:21:19
looking at in Canada and certainly we're hoping towards signing 11:21:23
an MOU with you as to create better cooperation between us. 11:21:26

However, I do have a comment in terms of the overall 11:21:29
research issues. And that's that when we look at the issue of 11:21:32
human behavior and performance, one of the things that you find 11:21:36
is that the systems out there are really very, very safe. What 11:21:39
generally is happening now, that when we look at human behavior 11:21:43
we're also starting to look at the limits of human performance. 11:21:46

So one of the things that we need to do is really 11:21:50
make a dent in the kind of things that we're doing right now, 11:21:52
is we need to look at really new technology conveying 11:21:56
information to human beings. So, for example, that's one of 11:21:59
the reasons why I like the issue of GPS remaining a small group 11:22:01
and an issue in a way -- the issue of LEDs and signage and how 11:22:04
can we do something different. 11:22:08

Because oftentimes we put blame on human behavior, 11:22:09
but in large part the failures of human behavior are really 11:22:12

failure of human performance. And a lot of our systems are 11:22:16
forcing people to make decisions with information that they 11:22:18
don't have; for example, in terms of second trains, in terms of 11:22:21
higher speed trains, multispeed trains on the same track. 11:22:27

So there's a whole bunch of issues that if you want 11:22:29
to make a difference in occurrence, if you will, statistics 11:22:33
considering that we have half of the trespassing fatalities 11:22:37
that are due to -- we're finding they're suicides, for example. 11:22:41
When we start looking at trespassing, coverage of territory, 11:22:44
what that involves, that we really need to have a much better 11:22:49
understanding of how human beings make decisions and why they 11:22:52
make those decisions and what kind of technology do we need to 11:22:56
really help provide them with new information. 11:22:59

So I really want to support the issues of looking at 11:23:04
the new technology from the point of view of how can we convey 11:23:07
more information but in a way that human beings can actually 11:23:09
understand and without the possibility of error. So that's 11:23:12
what I would emphasize. 11:23:15

MS. CARROLL: Thank you, Sesto. I think I'm going to 11:23:17
learn how to Tweet. 11:23:20

Anybody else? Would our colleague from Taiwan like 11:23:22
to say a few words, Shou-Ren? 11:23:26

MR. HU: I'm Shou-Ren Hu from the National University in 11:23:34
Taiwan, and I'm here because I realize that there's a severe 11:23:37
problem at railroad crossings in Taiwan. Even though we have a 11:23:42

different number of railroad crossings, but the number of 11:23:47
fatalities has been quite high due to this regarding data in 11:23:51
the States and also looking at European countries. 11:23:58
And I notice direct sorts of low fatality behavior, 11:24:01
especially for due to drivers. Those are crazy people that -- 11:24:05
where they don't really care about the control at the railroad 11:24:11
crossing, for example. 11:24:15
And secondly, I'm here to share my information. We 11:24:16
have a high-speed rail just opened last January. It's the very 11:24:24
first imported train, high-speed rail ground. It just opened 11:24:29
last January. This was flown in. It's approximately 58 11:24:35
kilometers from northern to southern. It's a fully elevated 11:24:41
high-speed rail system. So we don't have any crossing -- 11:24:47
railroad crossing problems so far. And this is the kind of 11:24:51
information I would like to show you. 11:24:55
My one final comment, being a Taiwanese person, you 11:24:57
have to be very -- I think that's the data, a lot of 11:25:02
information; but also our spirits are there in the Asian 11:25:04
community. So I think this would be to -- it looks to me like 11:25:08
I'm here to learn something more and also to share some 11:25:12
international information also from me. Thank you. 11:25:16
MS. CARROLL: Thank you. 11:25:22
Any other comments? Questions? 11:25:23
All right. Well, we were supposed to finish at 11:25:27
11:15; but the conversation was going so well, and we still 11:25:30

have one final speaker. 11:25:33
So, without further ado, I would like to ask Len 11:25:35
Allen, who is our program manager at FRA and who has provided 11:25:45
the support to us to be able to conduct this workshop here, to 11:25:48
give us some closing remarks. Len. 11:25:53
MR. ALLEN: Thanks. I just wanted to say thanks to 11:25:58
everyone here for participating in this workshop and taking 11:26:00
time out of your busy schedules and coming up with the travel 11:26:03
funds to travel in these tough times. 11:26:07
I think we've done a lot of good work here. We came 11:26:11
up with a lot of good ideas that FRA will use to focus their 11:26:14
research over the next few years. And we've got -- for those 11:26:20
of you who don't know, we've got about $2 million in our budget 11:26:26
for grade crossing research which isn't a lot of money; but 11:26:29
I think that the ideas that we've created here today can be 11:26:33
used not only by FRA but by AASHTO, by TRB, AAR. Perhaps our 11:26:37
friends from Canada, Transport Canada can cooperate on some of 11:26:45
the projects that we find that we have a mutual need on. 11:26:51
As far as the results of this workshop are concerned, 11:26:57
we're planning on putting together a report of those one-page 11:27:01
summaries that we came up with in our workshops and probably 11:27:06
publishing that in a couple of weeks. And then we will have a 11:27:12
more comprehensive report probably in a couple of months that 11:27:16
will analyze some of the results and categorize them and put 11:27:20
them in a sort of theme that will help us focus our research. 11:27:27

And we've gone through and had people stand up as far as the steering committee is concerned, the speakers, the team leaders, facilitators and the Volpe staff that made this all happen; but once again, I'd like to thank you all for participating in this and helping FRA focus their research needs in the future. Thank you. 11:27:32 11:27:35 11:27:40 11:27:44 11:27:47 11:27:51

ATTENDEES: (Applause.) 11:27:55

MR. daSILVA: Thank you, Len. 11:28:04

I think this wraps up the morning session, unless Dee has anything else to add. 11:28:05 11:28:10

MS. CHAPPELL: What are the instructions for this? 11:28:13

MR. daSILVA: For the -- right. 11:28:16

MS. CARROLL: I think based on operator error and our operator overload became an error that we need to realign ourselves with the exact titles and all of the needs and go out either electronically or with Survey Monkey or something else so that we accurately reflect everybody's issues appropriately. 11:28:23 11:28:26 11:28:30 11:28:36 11:28:40

So you can be looking forward, thinking about -- I think they'll be one-pagers. Dee is going to give you some more information about what might be available outside as you depart. And then there's a few -- there's about 19 or so of you that are going on the tour. And, hopefully, Dee will talk to that, too. 11:28:45 11:28:49 11:28:55 11:28:59 11:29:01 11:29:06

MS. CHAPPELL: I want to thank everyone for hanging in there for these past two-and-a-half days, full of information. 11:29:08 11:29:11

And tried our darnedest to be great hosts and hostesses here. 11:29:16
Like my mom says, "Always make sure when people come to visit 11:29:21
you they're not happy to see you twice. Happy to come and 11:29:23
happy to go." 11:29:27
So, with that, I wish you all safe travel; but for 11:29:28
those who will be participating with the tour, I'll ask you if 11:29:31
you could please come down front over here to my right, your 11:29:34
left. And we'll talk to the logistics. 11:29:39
And is Gerry Ruggiero here? Has he made it yet? 11:29:42
Okay. He will be your guide over to the Silver Line. 11:29:47
So, with that -- those -- Dan Lauzon for the 11:29:50
Brotherhood. 11:29:56
MR. LAUZON: Yes. 11:29:57
MS. CHAPPELL: Did you have your opportunity? I know you 11:29:58
wanted to make that statement. 11:30:00
MR. LAUZON: Oh, no, no. That's okay. I covered the 11:30:02
tracks. 11:30:02
MS. CHAPPELL: Excellent. 11:30:02
MR. LAUZON: But I will -- all right. You brought it up. 11:30:04
The Brotherhood of Locomotive Engineers stands ready to assist 11:30:06
anybody -- I just wanted to speak on behalf of the Brotherhood 11:30:13
of Locomotive Engineers. We would be willing to help anybody 11:30:16
throughout the United States, in all 49 states who have rail. 11:30:20
So if you feel that you may have that need, you know, see me; 11:30:24
and I'll provide you with the contact information. Thank you. 11:30:29

MS. CHAPPELL: Thank you. And with that, I thank everybody for coming. And please, safe travels and until next time. 11:30:35 11:30:38 11:30:41

ATTENDEES: (Applause.) 11:30:41

MS. CHAPPELL: Excuse me. One last, last announcement. There are a number of handouts outside that are -- they're all the -- all of the projects, project descriptions and project templates. We have copies of all of them outside on the table for you. Thank you. 11:30:58 11:31:01 11:31:04 11:31:09 11:31:12

(Ending time: 11:31 a.m.)

REPORTER’S CERTIFICATE

COMMONWEALTH OF MASSACHUSETTS)
NORFOLK, SS.)

I, DONNA KIMMEL, Registered Diplomate Reporter, Certified Realtime Reporter, MCRA Certified Shorthand Reporter No. 116293, and Massachusetts Notary Public whose Commission expires March 24, 2011, certify;

That the foregoing proceedings were held before me at the time and place therein set forth;

That the presentations, the questions propounded, and all statements made at the time of the proceedings were recorded stenographically by me and were thereafter transcribed;

That the foregoing is a true and correct transcript of my shorthand notes so taken.

I further certify that I am not a relative or employee of any attorney of the parties, nor financially interested in the proceedings.

I declare under penalty of perjury under the laws of Massachusetts that the foregoing is true and correct.

Dated this 21st day of July, 2009.

____

DONNA KIMMEL, CSR No. 116293

Appendix F. All Research Needs

Contents

Grade Crossing Modernization Research Needs

Topic No.	Research Need Title
GCM-1	Warning Device Minimum Requirement for 80-110 MPH Trains
GCM-2	Flangeway Gap Solutions
GCM-3	Global Positioning Satellite (GPS)/Positive Train Control (PTC) Constant Warning Time
GCM-4	Second Train Warning Devices for Pedestrian Crossings
GCM-5	Personal Detection Device for Railroad Workers
GCM-6	Channelization at Pedestrian Crossings
GCM-7	Skewed Angle Pedestrian Crossings
GCM-8	Humped/High Profile Crossing Approaches
CGM-9	System to Monitor and Assess Existing Warning Devices
CGM-10	Develop Lower Cost Warning Devices for HSR
GCM-11	In-vehicle Warning System
CGM-12	Automated Vehicle (Automobile) Stopping System
GCM-13	Best Practices/Model Specifications for Ideal Crossing
GCM-14	Surface Material Performance – Entire Crossing
GCM-15	Best Practices for Crossing Surfaces
GCM-16	Investigate Alternative Warning Devices at Ped/Pathway Crossings
GCM-17	Lower Cost, Lower Volume User-activated Crossings
GCM-18	Low Cost Pedestrian 4-Quad Gates

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-1
3. Title	Warning Device Minimum Requirement for 80-110 MPH Trains
4. Project Statement	Research and determine warning device requirements for high-speed corridors in the 80-110 mph range.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors X Transit-oriented Communities ___ Data Requirements X High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Clarity of regulatory requirements.
8. Research Need Urgency	X High __ Medium __ Low
9. Cost of Research	__ High >$500K X Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, Highway Agencies
11. Ease of Implementation If medium or difficult, list key implementation issues.	X Easy __ Medium __ Difficult Issues:
12. Other Comments	Trespassing considerations? (improved trespasser abatement)

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-2
3. Title	Flange way Gap Solutions
4. Project Statement	Flange way gaps at level grade crossings are a problem for wheel chair users as well as bicyclists and other non-motorized vehicles with small or narrow wheels. A material needs to be researched that would fill the gap and withstand rail cars without derailment. Weather factors would also need to be addressed. Research and develop an effective treatment for rails or rail crossings so that pedestrians using wheelchairs may cross tracks without risk of entrapment.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	X Human Factors X Transit-oriented Communities ___ Data Requirements X High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improve safety for all users of crossings
8. Research Need Urgency	X High __ Medium __ Low
9. Cost of Research	X High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, AAR, TTC
11. Ease of Implementation If medium or difficult, list key implementation issues.	X Easy __ Medium __ Difficult Issues: Easy to implement in new construction and alterations once material is identified.
12. Other Comments	Injuries and fatalities have occurred from people with disabilities getting their front casters stuck.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-3
3. Title	Global Positioning Satellite (GPS)/Positive Train Control (PTC) Constant Warning Time
4. Project Statement	Develop lower cost constant warning time system. (more cost effective) Would the use of GPS be less expensive, cost effective
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements X High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	More likely to be used/implemented
8. Research Need Urgency	X High __ Medium __ Low
9. Cost of Research	X High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, Highway Agencies, Railroads
11. Ease of Implementation If medium or difficult, list key implementation issues.	X Easy __ Medium __ Difficult Issues: If it is cheap, it is easy.
12. Other Comments	Potential to use in other areas.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-4
3. Title	Second Train Warning Devices for Pedestrian Crossings.
4. Project Statement	Develop and recommend universal active warning devices to let pedestrians know if a second train is approaching. Pedestrians and Motorists. Standardized through MUTCD.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities X Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__ New X Supplemental (list organization & title of current research) Transport Canada Report on Second Train Warning Signs; LAMTA Report on Second Train Warning Active Devices, etc.
7. Potential Benefit(s) of Identified Research Need Area	Prevent fatalities
8. Research Need Urgency	X High __ Medium __ Low
9. Cost of Research	__ High >$500K X Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, and FHWA.
11. Ease of Implementation If medium or difficult, list key implementation issues.	X Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-5
3. Title	Personal Detection Device for Railroad Workers
4. Project Statement	Develop a type of personal protection device using GPS/PTC technology that a railroad employee could wear to warn of approaching trains. Device could be used not only at RR crossings but anywhere on the right of way.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	X Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New X Supplemental (list organization & title of current research) Railway worker protection system FRA R&D. FTA Right-of-way protection (PROTRAN – employee, railway, train devices – set wayside train detectors or train based detectors that notify personnel).
7. Potential Benefit(s) of Identified Research Need Area	Safety – reduce/eliminate roadway worker injury and deaths.
8. Research Need Urgency	X High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA (coordinate with FTA)
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	FTA – is developing a PROTRAN safety system (not GPS based) Limitations to GPS technology – tunnels & canyons (connectivity issues).

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-6
3. Title	Channelization at Pedestrian Crossings
4. Project Statement	Study and research the effectiveness of swing gates, “zee’ style fencing leading up to the tracks, and other related channelization structures.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) CPUC documents Z-gates (not effectiveness). Other places implemented – effectiveness not categorized.
7. Potential Benefit(s) of Identified Research Need Area	Reduce the wide open area of a pedestrian crossing into small specific area designed to transport pedestrians smoothly.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-7
3. Title	Skewed Angle Pedestrian Crossings
4. Project Statement	Identify and recommend the maximum skewed angle for a pathway/sidewalk approaching the tracks.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High-Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Greatly reduce the number of incidents, accidents, and fatalities when wheels get hung up on the skewed flangeway.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	If #2 (Flange way Gap) is addressed, then #7(skewed angle) becomes less important.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-8
3. Title	Humped / High Profile Crossing Approaches
4. Project Statement	Due to the variability in truck and trailer design, investigation is needed to determine if W10-5 warning sign should have a supplemental plaque to categorize severity of profile.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) Possible NTSB accident report. FRA LIDAR project.
7. Potential Benefit(s) of Identified Research Need Area	Providing operators with advance information of high profile crossings could avoid potential catastrophic derailments.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	NCHRP
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Will require road authority to survey approaches in order to classify hump severity.
12. Other Comments	The DOT inventory form has a field for humped crossings. This could be used by operators to identify routes.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-9
3. Title	System to Monitor and Assess Existing Warning Devices
4. Project Statement	Study and develop an effective process to assess and monitor the age and condition of "older" warning devices and components, and manage a replacement or upgrading program to maximize safety with scarce funding resources. Best practices for States and RRs.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors _X__ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduce maintenance costs and failure rates. Reduce interruption to train operations. Efficient use of scarce funding.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA Office of R&D, States, and Railroads.
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Determine age or Performance Standard for older devices (failure rate or maintenance calls to field).
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-10
3. Title	Develop Lower Cost Warning Devices for HSR
4. Project Statement	At private crossings where train speeds or volumes will not accept manual locking gates, develop active warning devices that may include recycled active devices or components, and that may provide a simpler level of warning at the private crossing (no constant warning time). Lower cost than current systems used at public crossings.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Enhanced safety at private crossings that do no depend on crossing user to lock it after use, etc.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA through Broad Agency Agreement
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Property owners responsibilities (establish) Maintenance responsibilities (establish)
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-11
3. Title	In-vehicle Warning System
4. Project Statement	Develop and evaluate an in-vehicle warning system that indicates to the motorist that a train is coming. The device would use GPS to determine whether the vehicle is going to cross the grade crossing. It would also use a signal from the railroad wayside equipment which would indicate whether or not a train is approaching.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X_ New __ Supplemental (list organization & title of current research) A number of in-vehicle warning systems have been tried
7. Potential Benefit(s) of Identified Research Need Area	Collision avoidance.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe, FHWA, NHTSA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: The in-vehicle device could use existing GPS Navigation system to keep down implementation cost. Coordinate with NHTSA would be needed to implement. Institutional barrier
12. Other Comments	Difficult to implement – institutional barrier. Size and variability of vehicle fleet.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-12
3. Title	Automated Vehicle (automobile) Stopping System
4. Project Statement	Develop an in-vehicle control system to stop a highway vehicle from entering the highway-rail intersection when a collision is predicted. System should have signal from wayside system (train), GPS in-vehicle that integrates with acceleration and braking of vehicle.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	__ New _X__ Supplemental (list organization & title of current research) FHWA, JPO work Stop Sign Collision Avoidance
7. Potential Benefit(s) of Identified Research Need Area	Positive collision avoidance
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe – auto industry - AAR
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	Build off FHWA and RITA/JPO ITS work (Cooperative Intersection Collision Avoidance Systems, Vehicle Track Interaction, Integrated Vehicle-Based Safety Systems, IntelliDrive). Partial technology exists.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-13
3. Title	Best Practices / Model Specifications for Ideal Crossing
4. Project Statement	More local governments and developers are upgrading crossings to accommodate growth and traffic. This specification would provide example of a best practice crossing installation as related to contain types of rail lines. Would place condensed recommendations of TWG 2003 Crossing document in one place. Estimating Tool
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) Add-on to 2002 TWG Crossing document.
7. Potential Benefit(s) of Identified Research Need Area	Freight and integrity rail passenger lines. Commuter rail. Other rail transit.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	TRB / IDEA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Determine classes/types of rail lines with stakeholders. Condemning down existing specs, w/o diluting.
12. Other Comments	Would include signal/surface and corridor (closure) best practices.

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-14
3. Title	Surface Material Performance – Entire Crossing
4. Project Statement	Compile performance data for crossing surfaces to established life cycles and costs of different surface types.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) Some States have conducted individual research
7. Potential Benefit(s) of Identified Research Need Area	Better crossing surfaces can increase safety
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	TRB, FRA, NCHRP, TCRP, and FHWA.
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-15
3. Title	Best Practices for Crossing Surfaces
4. Project Statement	Guidelines to provide crossing surface material. Study methods used to keep grade crossings surfaces durable, maintain drainage runoff to prevent track fouling, and levels consistent to alleviate humps. Compilation of best practices compilation - document & finding research – not field demo.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research) AREMA, Grade Crossing Handbook (not to extent desired) Gerry Rose (University of Kentucky), Some States.
7. Potential Benefit(s) of Identified Research Need Area	Allows for cost savings of crossing maintenance.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe, AREMA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-16
3. Title	Investigate Alternative Warning Devices at Ped/Pathway Crossings
4. Project Statement	Investigate the effectiveness of passive and active warning devices at pedestrian pathway at grade crossings.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New __X_ Supplemental (list organization & title of current research) Multiple Agencies have compiled info but did evaluate effectiveness Many States have conducted research – limited findings
7. Potential Benefit(s) of Identified Research Need Area	Improve warning devices for use at pathway crossings.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	NCHRP
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Might require adoption of new warning devices in MUTCD by FHWA.
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-17
3. Title	Lower Cost, Lower Volume User-activated Crossings
4. Project Statement	Develop low cost private crossing controlled-access equipment, such as locking gates that can not be operated in a train is an approach.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Enhanced safety for transit systems and railroads on lines with lower train volumes, lower train speeds, or lower traffic volumes.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA / Broad Agency Announcement
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Needs to be simple to use Needs to verify that it is closed and locked.
12. Other Comments	

1. Research Needs Area	Grade Crossing Modernization (GCM)
2. Research Topic Area/Number	GCM-18
3. Title	Low Cost Pedestrian 4-Quad Gates
4. Project Statement	Develop low-cost, four-quad gates for pedestrian crossings similar to those installed in Bregenz, Austria. The gates should reflectorized and a chain link fence should extend at least 50 feet in each direction to prevent going around the gates.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New __X_ Supplemental (list organization & title of current research) Similar system is installed.
7. Potential Benefit(s) of Identified Research Need Area.	Protects pedestrians
8. Research Need Urgency	__ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	A similar system was installed in Bregenz, Austria.

Traffic Patterns Research Needs

Topic No.	Research Need Title
TP-1	Application of Warning Devices/Treatments at High Speed Rail Crossings
TP-2	Highway Traffic Signal Pre-emption at Highway-Rail Grade Crossings
TP-3	Effectiveness of Gates for Pedestrians
TP-4	Signage at Roundabouts
TP-5	Driver Decision Making At Complex Crossings
TP-6	Review and Improvement of Hazard Indices and Accident Prediction Formulae
TP-7	Driver Reaction to Active Advance Warning Signs and Variable Message Signs
TP-8	Driver Compliance with "Do Not Stop on Tracks" Sign
TP-9	Driver Behavior at Crossings with Mix Train Traffic
TP-10	Impact Of Storage Information Sign on Long-Wheel Base Vehicle Use
TP-11	Railroad Signals Through Roundabouts
TP-12	Identify Barriers to Crossing Consolidation Implementation
TP-13	Method for Estimating Traffic Volumes at Grade Crossings Where Counts are not Available
TP-14	Review of Current GIS Methods and Data for "hot spot" Analysis
TP-15	Investigate Safety Performance of Grade Crossings Using Microsimulation
TP-16	Best Methods For Linkage/Sharing of Crossing Data, Traffic Data, and Collision Data Among Stakeholders (Agencies, Industry, and Public)

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP-1
3. Title	Application of Warning Devices/Treatments at High Speed Rail Crossings
4. Project Statement	Determine adequate warning devices for High Speed Rail up to 110 MPH. Determine or evaluate whether or not existing types of warning devices are adequate for use on HSR corridors. Above 79 MPH, should different devices be required and at what speeds? Recommend treatments for pedestrian traffic at HSR crossings. Identify pathway crossing treatments for HSR crossings.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-oriented Communities __ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) FRA R&D reports on the effectiveness of HSR warning devices; NCDOT, etc.
7. Potential Benefit(s) of Identified Research Need Area	Standardize treatments for more effective and efficient design. Reduce likelihood of incidents at HSR crossings.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA, AASHTO, FRA, TRB,
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _x_ Medium __ Difficult Issues: Broad scope of dealing with HSR between stakeholders.
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 2
3. Title	Highway Traffic Signal Pre-emption at Highway-Rail Grade Crossings
4. Project Statement	Assess best practices nationally to determine proper application or use of traffic signal preemption at highway-rail grade crossing. Determine proper use of advanced preemption versus simultaneous pre-emption. Review equipment (hardware and software), particularly on the traffic signal controller side, to ensure those devices can adequately perform preemption as intended. Also assess best practices of field reviewing preemption. Research accident reports to identify "hot spots" (high incident areas) and factors relevant to preemption.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors _X_ Transit-oriented Communities _X_ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduce incidents More efficient traffic management
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 3
3. Title	Effectiveness of Gates for Pedestrians
4. Project Statement	Need to test the effectiveness of various gate treatments for pedestrians and passenger stations, commuter rail crossings in transit oriented development and freight rail crossings. Gather information for development of warrants.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	__X_ New _ __ Supplemental (list organization & title of current research) Effectiveness of devices in pedestrian brochure published by FRA January 2008.
7. Potential Benefit(s) of Identified Research Need Area	Learn effectiveness of having pedestrian treatment inside versus outside of gate mechanisms and other gate treatments at stations and transit oriented developments.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe Center
11. Ease of Implementation If medium or difficult, list key implementation issues.	_ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 4
3. Title	Signage at Roundabouts
4. Project Statement	Evaluate alternatives for advanced warning signs within or in close proximity to roundabouts. Need to develop an advanced warning sign(s) for a crossing located within 100 feet of the yield line at a roundabout. There is currently no equivalent series of signs to the W10-2, 3, & 4 for crossings in close proximity to roundabouts. A sign also needs to be developed for situations where the rail line runs directly through a roundabout. Review body of existing literature in international examples.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	National standard signage for MUTCD.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_x_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 5
3. Title	Driver Decision Making at Complex Crossings
4. Project Statement	Close proximity between rail/tracks and complex intersection such as roundabouts and multiple access roads near RRX. Driver must divide attention and make decision in a short period of time. Purpose: Better understanding of driver performance and information needed in order to provide means to reduce driver error. Expected outcome: Input design process and safety review and enhancements.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduce driver confusion and information overload. Reduce driver error and improve safety and mobility.
8. Research Need Urgency	_X_ High __ Medium _ _ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	USDOT in coordination with local DOTS (FRA)/Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues:
12. Other Comments	Potential to combine with grade crossing modernization and new technology opportunities.

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 6
3. Title	Review and Improvement of Hazard Indices and Accident Prediction Formulae
4. Project Statement	New methods for evaluating the system safety performance of crossings are needed. The API calculation has become less valuable as the majority of crossings with high train and traffic volumes have been signalized or grade-separated. The risk of a low-volume crossing is not fully reflected in the current evaluation standard, and the API calculation may indicate crossings for upgrade that do not warrant signalization. A standardized evaluation method should be established for multiple agency use.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	A holistic evaluation method will help state agencies to select crossings that most deserve improvements.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K _ _ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	TRB or AASHTO
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Complexity of issue.
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 7
3. Title	Driver Reaction to Active Advance Warning Signs and Variable Message Signs
4. Project Statement	Signs and variable message sign. Issue: Provide advance warning and information to highway users. EX train presence and or vehicle stopped at crossings queue at crossing approach.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X__ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Examine feasibility and application of its technology at rail road crossings. Purpose: Provide options/ alternatives to users. Provide alternative for traffic management.
8. Research Need Urgency	__ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 8
3. Title	Driver Compliance with “Do Not Stop on Tracks” Sign
4. Project Statement	Compare current “Do Not Stop on Tracks” sign with Canadian sign and active “Do Not Stop on Tracks” sign. Purpose: Effectiveness of each sign Evaluation with focus group Field evaluation
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Determine better alternative Review and if required revise warrants
8. Research Need Urgency	__ High _x_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 9
3. Title	Driver Behavior at Crossings with Mix Train Traffic
4. Project Statement	Need to understand driver behavior at crossings used by freight and passenger trains with variable speed. Purpose: To evaluate driver behavior at crossings with trains of different speeds. Drivers will have higher compliance at crossings with only high speed trains.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	__x_ Human Factors __x_ Transit-oriented Communities ___ Data Requirements _x__ High Speed Rail
6. Relationship to Current Research	_x__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	
8. Research Need Urgency	_x_ High __ Medium __ Low
9. Cost of Research	_x_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe, TTI
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _x_ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 10
3. Title	Impact Of Storage Information Sign on Long-Wheel Base Vehicle Use
4. Project Statement	New signs have recently been implemented at warning highway users of restricted storage space between tracks and nearby intersection. • Before and after survey of drive behavior • Inventory of alternate signs across world • Evaluation of signs
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	• Effectiveness of signs • Possible improvement • Possible alternative warning systems.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K X__ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 11
3. Title	Railroad Signals Through Roundabouts
4. Project Statement	Determine types of active warning devices to be used when a rail line runs through a roundabout. Need to determine location of devices with respect to roundabout approaches and the circular roadway and how they are to operate. Review body of existing literature in international examples.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_x_ Human Factors _x_ Transit-oriented Communities _x_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_x_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Standardized warning devices used in roundabouts. Improve traffic management. Standardize user interaction with trains in roundabouts.
8. Research Need Urgency	_x_ High __ Medium __ Low
9. Cost of Research	_x_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA, ASSHTO, TRB
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _x_ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 12
3. Title	Identify barriers to crossing consolidation implementation
4. Project Statement	FRA has performed research & developed guidance for consolidation (including grade separation & closure) of railroad crossings. The goal of this project is to determine what the challenges are to implementing this guidance and to provide a path forward for implementing them.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New __X_ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	The project should smooth and speed up the decision-making process for crossing consolidation. Benefits should be short-term and will generally be for state agencies.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 13
3. Title	Method for estimating traffic volumes at grade crossings where counts are not available
4. Project Statement	State agencies use accident prediction formulae that rely on traffic volume values in order to prioritize crossing improvements. Traffic volume data at crossings is routinely unavailable or out-of-date. In the absence of current traffic counts, a method will be developed to estimate traffic volumes based on other criteria, such as nearby traffic volumes, roadway characteristics, and impacts of a nearby crossing, etc.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Standardized methods for estimating traffic volumes at railroad crossings should improve the quality of the prioritization process. State agencies would benefit.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Consultant or academia
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Complexity of the problem; methodological issue probably involved.
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP – 14
3. Title	Review of current GIS Methods and data for “hot spot” analysis
4. Project Statement	Review and describe the use of GIS technology in identifying safety “hot spots” in the rail mode.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	State-of-the-art methods will be made available for use by various agencies to remedy safety problems. Benefits will be long-term.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 15
3. Title	Investigate safety performance of grade crossings using microsimulation
4. Project Statement	The industry currently uses statistical methods to evaluate safety performance of grade crossings. The potential use of microsimulation for safety evaluation should be investigated. This method would allow consideration of various scenarios, such as traffic flow response to shared corridor rail operations (for example).
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Microsimulation is a cost-effective method for stakeholders to evaluate the impact of environments and users on grade crossing safety performance and operation.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	TRB, AASHTO, and academia
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: Development of new microsimulation methods, including calibration and validation, would require significant effort and real-world data.
12. Other Comments	

1. Research Needs Area	Traffic Patterns (TP)
2. Research Topic Area/Number	TP - 16
3. Title	Best methods for linkage/sharing of crossing data, traffic data, and collision data among stakeholders (agencies, industry, and public)
4. Project Statement	Data involving railroad crossings currently resides in numerous disconnected databases, within a variety of agencies and companies. Data completeness is an issue for most databases, and depends on the data owner. Improved methods and tools for sharing data among stakeholders should be investigated and piloted.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Availability of current, accurate, and complete data supports good decisions for any stakeholder considering options for safety improvements, consolidations, or traffic separation. Benefits will be long-term.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: Sharing data among disparate organizations is a difficult proposition that includes institutional and technical challenges.
12. Other Comments	

New Technology Opportunities Research Needs

Topic No.	Research Need Title
NTO-1	Alternative Sensors and Warning Systems for Vital Applications
NTO-2	Pedestrian, Non-Motorized and Limited Mobility Treatments
NTO-3	On-Track Vehicle Detection
NTO-4	Effectiveness of LED Enhanced Grade Crossing Traffic Signs
NTO-5	Minimum Traffic Control Devices for High-speed Train (HST, formerly known as HSR) Highway-Rail Grade Crossings (HRCG)
NTO-6	Enhanced Commercial Systems to Improve HRGC Safety
NTO-7	Signals Near Grade Crossings
NTO-8	Lower Cost Active and Passive Warning Systems
NTO-9	Use of Wayside Horns at HRGC on HST lines
NTO-10	Remote Health Monitoring and Regulatory Relief
NTO-11	Grade Crossing Safety Effectiveness Evaluation
NTO-12	Use of PTC in HRGC Applications
NTO-13	Use of Supplemental Surveillance at HRGC on HST lines
NTO-14	Evaluate alternative power options for remote sensing
NTO-15	Standard Traffic Signals at Highway-Rail Grade Crossings

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-1
3. Title	Alternative Sensors and Warning Systems for Vital Applications
4. Project Statement	• Perform an evaluation to determine what sensors will be reliable, maintainable and cost-effective. • Perform an evaluation on the communication system • Warning system display will require human factors study.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improve safety and security
8. Research Need Urgency	_X_ High) ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-2
3. Title	Pedestrian, Non-Motorized and Limited Mobility Treatments
4. Project Statement	• Identify and evaluate the effectiveness of new and existing technology on active and passive warnings (in conjunction with barriers and channelization, including 2nd train and variable speed approaches) on the basis of: o Human detection/recognition and compliance o Cost to install and maintain o Energy efficiency o Reliability • Develop guidance for the design of: o Sidewalk, pathways and station approaches o Line of route approaches o Quiet Zones
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improve Safety
8. Research Need Urgency	_X_ High ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe, Contractor, States
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-3
3. Title	On-Track Vehicle Detection
4. Project Statement	Identify and research detection alternatives for on-track vehicles that transverse highway-rail grade crossings.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Safety Crossing integrity
8. Research Need Urgency	_X_ High ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-4
3. Title	Effectiveness of LED Enhanced Grade Crossing Traffic Signs
4. Project Statement	Current retroreflective traffic control signs at grade crossings need to be more conspicuous to compete with driver inattention and distractions from ambient lighting and signage. Evaluation of the effectiveness of LED enhanced signs is needed. This includes STOP, YIELD, Crossbuck and DO NOT STOP ON TRACK signs. Evaluation to include conspicuity, 24/7 operation vs. train or vehicle activation, 24/7 vs. nighttime only, driver behavior and compliance.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduction of violations and crashes
8. Research Need Urgency	____ High _X_ Medium ___ Low
9. Cost of Research	___ High >$500K ___ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA, University, Contractor, and Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-5
3. Title	Minimum Traffic Control Devices for High-Speed Train (HST, formerly known as HSR) HRGC
4. Project Statement	Research is intended to develop the risk management model to evaluate the effectiveness of 4QG vs. physical barrier gates on HST corridors. The model should include train speed, type of rail equipment, AADT (vol. per lane), and roadway speed at a minimum.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Essential piece of information for traffic control policy decisions.
8. Research Need Urgency	_X_ High ___ Medium ___ Low
9. Cost of Research	___ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, University
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-6
3. Title	Enhanced Commercial Systems to Improve HRGC Safety
4. Project Statement	• Integrate HRGC inventory into GPS maps o Identify at-grade vs. grade separated HRGC o Identify humped crossings (comm. vehicles) • How do we implement with GPS unit mfgs? • Require this information in buses, comm. vehicles and hazmat (vehicles requiring a CDL license)
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improved road user behavior at HRGC
8. Research Need Urgency	_X_ High (very valuable) ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FMCSA; Contractor
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	Provide in 2010 once the inventory is updated

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-7
3. Title	Signals Near Grade Crossings

4. Project Statement	• Analyze crash data to determine impact of signalized intersection proximity on crash rates
	• Identify effectiveness of and warrants for use of
	  o Preemption (alone)
	  o Preemption with active DO NOT STOP ON TRACKS sign
	  o Preemption with pre-signal
	  o Queue cutter or active DO NOT STOP ON TRACKS sign
	• Identify recommended practice addressing:
	  o Min-max clear storage distance for pre-signals and queue cutters
	  o Identify known problems with each device potentially limiting effectiveness of treatments and countermeasures
	  o Identify key design features such as timing plans and signal indications

5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New _X_ Supplemental (list organization & title of current research) – TCRP Report 69
7. Potential Benefit(s) of Identified Research Need Area	Addresses the most critical factors causing collisions – recurrent queues across tracks
8. Research Need Urgency	_X_ High (very valuable) ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues: Deals with application of readily available existing technology
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-8
3. Title	Lower Cost Active and Passive Warning Systems
4. Project Statement	• Develop technologies that are adaptable • Communication systems that are easily deployable and fail safe • Detect train and convey to road user • Define life-cycle cost elements
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New X Supplemental (list organization & title of current research) Canada, UK, other countries
7. Potential Benefit(s) of Identified Research Need Area	Safety Benefactors - Highway agencies, communities
8. Research Need Urgency	_X_ High (very valuable) ___ Medium ___ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Volpe, FRA, contractors
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	Would improved technologies help since the last time this was researched?

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-9
3. Title	Use of Wayside Horns at HRGC on HST lines
4. Project Statement	• Does the speed of the train above 80 mph mandate the use of wayside horns? • Is the locomotive horn an effective warning device at speeds greater than 80 mph?
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Increased safety at HRGC on HST lines
8. Research Need Urgency	_X_ High (very valuable) ___ Medium ___ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, University
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	Look at TC research

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-10
3. Title	Remote Health Monitoring and Regulatory Relief
4. Project Statement	• Identify reliability requirements for data elements that can be monitored and have the potential to be used for regulatory relief • Help build case for regulatory relief from manual periodic inspection for those elements • Research and gather experimental/historical data to determine and justify proper level on regulatory relief from 30-day inspections at sites equipped with 7/24 monitoring. Use a few different sites on monitoring options or assessments
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improved safety Reduced inspection manual inspection costs
8. Research Need Urgency	_X_ High (very valuable) ___ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Regulatory and industry acceptance
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-11
3. Title	Grade Crossing Safety Effectiveness Evaluation
4. Project Statement	Evaluate the generic data element needs to determine the effectiveness and compliance of new grade crossing treatments and warning devices. Identify what are most valuable to collect to understand grade crossing safety.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Consistency of data reporting Increased safety Reduced costs
8. Research Need Urgency	__ High (very valuable) _X__ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Industry and government coordination.
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-12
3. Title	Use of PTC in HRGC Applications
4. Project Statement	Integrate PTC into IEEE 1570 for traffic signal preemption, blocked crossing, alternate route messaging
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	X New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improved safety, preemption Operation and mobility
8. Research Need Urgency	__ High (very valuable) _X__ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Joint AREMA Committees 36 and 39
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	Integrates ITS required protocol/interface into PTC system.

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-13
3. Title	Use of Supplemental Surveillance at HRGC on HST lines
4. Project Statement	• Should supplemental surveillance at HRGC be required where train speeds are 80 mph or greater? How should the information be used; o tied into PTC and cab display for speed reduction or train stop o securing the crossing for the duration of the approach o reducing the collision risk/severity • Identify surveillance technologies and trade-offs o Video o Loops o Radar o IR o Other?
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-Oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Increased safety at HRGC on HST corridors
8. Research Need Urgency	__ High (very valuable) _X__ Medium ___ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-14
3. Title	Evaluate alternative power options for remote sensing
4. Project Statement	Research is needed to identify and evaluate alternatives to commercial electrical power for remote sensing locations.
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Enables use of remote sensing in areas where remote sensing would not otherwise be possible
8. Research Need Urgency	__ High (very valuable) ___ Medium _X__ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA/FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	New Technology Opportunities (NTO)
2. Research Topic Area/Number	NTO-15
3. Title	Standard Traffic Signals at Highway-Rail Grade Crossings
4. Project Statement	Perform human factors study to determine the effectiveness of standard traffic control signals versus current active flashers and effect on driver behavior/compliance
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Better driver compliance with signals Lower installation cost Lower maintenance cost/transfer to city traffic engineers
8. Research Need Urgency	__ High (very valuable) ___ Medium _X__ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA, University
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	New low energy LEDs allow for less power consumption on batteries and better reliability not previously attainable.

Regulation and Enforcement Research Needs

Topic No.	Research Need Title
RE-1	Data Needs for Proactive Enforcement
RE-2	Collecting and Analyzing Trespassing Data
RE-3	Evaluation of Photo Enforcement at railroad grade crossings
RE-4	No Train Horn Crossings
RE-5	National Campaign for Targeted Seasonal Enforcement Programs
RE-6	Grade crossing crash data analysis
RE-7	Effectiveness of Various Types of Civil Penalties: HRGX Violations
RE-8	Judicial Education
RE-9	Motorist Expectations: Train and Crossing Operations
RE-10	Impact of Locomotive Horn Rule Implementation
RE-11	Quiet Zone Regulations and Signage

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area/Number	RE-1
3. Title	Data Needs for Proactive Enforcement
4. Project Statement	There is a need to work with a cross-section of stakeholders (including HRGX researchers, local law field-enforcement and administrative officers) to determine the data elements needed to enable proactive enforcement efforts. There is a particular need to inform the upcoming Grade Crossing Inventory Update. There is also a need to automate many of the data searches and sorts from FRA, railroad, and highway databases to lessen the burden on law enforcement and other safety practitioners to pinpoint hotspots and target enforcement opportunities. The data would be used to determine the opportunities for more-targeted enforcement and to assess the quantitative effectiveness of actions implemented.
5. Cross-cutting Areas	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Short term benefits in reduction of violations, crashes.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA/Volpe, International Assn. of Chiefs of Police
11. Ease of Implementation	__ Easy _X_ Medium __ Difficult Issues: Partly contingent on Inventory update; gathering information is relatively straightforward; more challenging to get information from railroad; potentially more challenging to get disparate databases coordinated (GX 32 and other datums).
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area/Number	RE-2
3. Title	Collecting and Analyzing Trespassing Data
4. Project Statement	Upgrade existing trespasser data collection to include sufficient definitions of the term "trespassed." Provide effective guidelines for mode laws for consistent nationwide application.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Provide useful and sufficient data to develop and identify trespasser problems/issues that will further provide development of model law for local and state adoption.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	RITA/Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area/Number	RE-3
3. Title	Evaluation of Photo Enforcement at railroad grade crossings
4. Project Statement	Study the benefits of traffic safety and evaluate the effectiveness of photo enforcement in reducing crossing violations by motorists. Also develop model laws, guidelines, and procedures to provide standardized applications nationwide.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Actual data to verify that sustained, increased enforcement does in fact chance motorist behavior and develop public acceptance and buy-in for photo enforcement.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA, NHTSA, IACP, NCHRP, TRB
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues:
12. Other Comments	Could be combined with other model law guideline research.

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area/Number	RE-4
3. Title	No Train Horn Crossings
4. Project Statement	Each highway approach to every public and private highway-rail grade crossing within a quiet zone is required to have a no train horn advance warning sign. Although each sign is required to conform to the standards in the MUTCD, increased signage may be required to adequately warn certain drivers. Can increased signage counter balance the lack of a train horn? Should there be regulatory guidance necessary?
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors _X__ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Enhanced motorist awareness of no-train-horn crossing – an "expected" audible warning may not be available.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues: Development of sign, review by NUTCD, rulemaking by FHWA to modify W10-1, posting of new sign.
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE-5
3. Title	National Campaign for Targeted Seasonal Enforcement Programs
4. Project Statement	Issues/challenges: Many highway safety concerns (seat belts, drunk driving, child safety seats) have seasonal targeted outreach and enforcement programs. There is no analogous program for HRGX safety and trespass prevention activities. Purpose: Raise awareness of HRGX and trespass prevention, Outcome: increase officer awareness and precision of enforcement practices.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	__X_ Human Factors ___ Transit-oriented Communities __X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	See above.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	NHTSA, OLI, IACP, AAMVA, AAA, other organizations with successful public awareness campaigns.
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium X__ Difficult Issues: Funding will be a challenge in time of limited resources.
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE-6
3. Title	Grade crossing crash data analysis
4. Project Statement	The purpose of the research is to collect and study/analyze national crossing crash data to identify major causes of HRGX crashes (gate violations, deficient controls, geometric conditions, etc.). The result of the study would allow policy to focus on most effective enforcement management practices which would lead to most effective results. This would also help state/local agencies to identify safety improvement countermeasures and to identify any needed enhancement of current laws and regulations.
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors ___ Transit-Oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improve HRGX data collection for USDOT crossing databases, as well as analysis and practices. Improve HRGX safety countermeasures (traffic control, geometric improvements, policy enforcement, practice and results, education, and strategy.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA, NCHRP, TRB, NHTSA
11. Ease of Implementation If medium or difficult, list key implementation issues	_X_ Easy __ Medium __ Difficult Issues: Data collection, if current database provides insufficient data for the study.
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE-7
3. Title	Effectiveness of Various Types of Civil Penalties: HRGX Violations
4. Project Statement	Challenge: Are monetary penalties the only possible method? What about non-monetary penalties (license suspension, public service, etc.)? What are the relative effectiveness levels? Purpose: To determine enforcement methods that are more cost-effective in terms of time and money; also to determine potential deterrence effects. Expected outcome To reduce HRGX violations
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	__X_ Human Factors ___ Transit-Oriented Communities __X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Measurable changes in #s of collisions, measurable and non-measurable changes in numbers of close calls; short-term.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Volpe, American Assn. of Motor Vehicle Administrators, AAA
11. Ease of Implementation If medium or difficult, list key implementation issues	__ Easy __ Medium X__ Difficult Issues: Depends upon whether it is federally-mandated or voluntary; State compliance may vary.
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area/Number	RE-8
3. Title	Judicial Education
4. Project Statement	How do the citations issued in the field translate into convictions? What types of actions do the courts take? How do prosecutors' recommendations and judges' understanding of the safety consequences influence judicial decisions. Purpose: To provide information that informs judges, to give them a clearer understanding of the highway-safety consequences of their decisions and their impact on state and national HRGX and trespass-prevention safety programs.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Clearer, more consistent, more uniform judicial decisions; more uniform treatment of violation of national-level safety concerns.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FMCSA, National Judicial College; National Association of Proscecuting Attorneys; OLI;
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues: Would expand upon FMCSA's efforts, just add more subject area; consider looking at other agencies' best practices.
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE-9
3. Title	Motorist Expectations: Train and Crossing Operations
4. Project Statement	Motorist expectations and operational conditions affect motorist behaviors at HRGX. Basically, why do people try to beat the train? What are motorist expectations and their resulting behaviors that lead to appropriate (and inappropriate) actions at HRGX? And, is there a difference between commercial and non-commercial drivers? Address such issues as train speed; roughness of crossing; type and complexity of gates, lamps, and other traffic control devices; reliability of TCDs; train length, blocked crossings.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) Ongoing work on warning signal reliability.
7. Potential Benefit(s) of Identified Research Need Area	Systematic assessment of crash causation and more effective prevention strategies (HRGX safety equivalent to the FMCSA/NHTSA Large Truck Crash Causation Study??); get railroads more involved in effective maintenance of crossing systems; assist law enforcement in writing citations based on quality information.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA/FHWA/FMCSA/NHTSA/Volpe
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium __ Difficult Issues: The challenge of implementation may be closely tied to the availability of funds to support specific programs.
12. Other Comments	Any new regulations would probably fall within FRA's area of responsibility.

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE–10
3. Title	Impact of Locomotive Horn Rule Implementation
4. Project Statement	Review effectiveness of locomotive horn rule in terms of implementation ease for communities and FRA. What are the community impacts and challenges? Does the rule need to be changed? Why is the implementation limited?
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors _X__ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Potential to streamline and standardize quiet zone process.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Regulations and Enforcement (RE)
2. Research Topic Area / Number	RE–11
3. Title	Quiet Zone Regulations and Signage
4. Project Statement	Review effectiveness of grade crossing advance warning sign (W10-1). Determine if placement and message should be modified for quiet zone implementation.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors _X__ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Enhanced motorist awareness of no-train-horn crossing – an "expected" audible warning may not be available
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

Education and Public Awareness Research Needs

Topic No.	Research Need Title
EPA-1	Evaluation of Social Media Outreach
EPA-2	Evaluation of Existing Education and Outreach Strategies
EPA-3	Crossing Consolidation Education
EPA-4	Evaluate Effectiveness and Potential Motorist & Pedestrian Signage and Treatments
EPA-5	Evaluate the Effectiveness of Mobile Warning Devices When Approaching Grade Crossings
EPA-6	Evaluation of New Media
EPA-7	Effectiveness of Drivers Educations
EPA-8	Analysis of trespass patterns using GPS technology
EPA-9	Drivers Educations – Computer Based Training
EPA-10	Development of Near Miss Data System (Pilot)
EPA-11	Addressing Complacency of Frequent Crossing Users
EPA-12	Confidential Close Call Reporting System
EPA-13	Trespassing Behavior Analysis
EPA-14	Evaluating existing and potential driver signage and treatment effectiveness

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-1
3. Title	Evaluation of Social Media Outreach
4. Project Statement	Use of new media applications offers the opportunity to reach a broader audience with minimum resources. Traditional outreach has a limited audience. There is a need to identify, assess, and test the effectiveness of social media (i.e. internet tools, social networking sites, text messages, email and podcast) as an outreach tool for public rail safety education. Survey and testing should include number of users and absorption of message.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	X__ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Collection of data that has never before been utilized or captured Improve targeting of future educational efforts Better utilization of limited resources Innovative method to further reduce grade crossing and trespass incidents
8. Research Need Urgency	X__ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Academia, Consultants, Research firms
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area / Number	EPA-2
3. Title	Evaluation of Existing Education and Outreach Strategies
4. Project Statement	It continues to be difficult to quantify the role that education plays in preventing incidents on active rail lines. It is crucial to assess the impact and effectiveness of existing education and outreach strategies in changing public behavior. This research should explore media message styles, methods, locations, etc. that are most appropriate for age groups or other demographics and attitudinal characteristics.
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	_X_ Human Factors ___ Transit-Oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Identify effective current education methods to better target intended audience. Further reductions in grade crossing and trespass incidents.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Academia, consultants, research firms
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Collection of data Designing research study
12. Other Comments	This was proposed in 1995 and 2003. 2003 RNW page 68

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-3
3. Title	Crossing Consolidation Education
4. Project Statement	Currently, many communities are unaware of the benefits of public/private partnerships regarding grade crossing consolidation and grade separation funding. Research is needed to determine effective methods to educate community leaders in this area.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements _X_ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Increased community safety Forges better partnerships Long term safety benefits Mutual benefit among cross-sectional groups (FRA, industry, community, DOT, law enforcement, etc.)
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	Industry and labor
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	Links to new and innovative public outreach methods.

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area / Number	EPA-4
3. Title	Evaluate effectiveness and potential motorist & pedestrian signage and treatments
4. Project Statement	Current signage may be misunderstood or overlooked by motorist and pedestrian traffic. Research should assess the effectiveness of existing and potential new driver and pedestrian signage/treatments on or around railroad tracks and station platforms including: • identification of distractions (i.e., mp3 players, visual pollution/sign saturation, cell phones) • examination of pedestrian signage needs versus motorist signage needs • testing of existing and new signage/treatments (e.g. pavement LEDs, colored pavement, etc.) • identification of best designs for consideration in MUTCD
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-Oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Further reductions in motorist and pedestrian grade crossing and trespass incidents Increased motorist and pedestrian awareness of public rail safety Improved compliance to signs
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA partnership
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: Design of new signage, changes in signage, MUTCD compliance
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area / Number	EPA-5
3. Title	Evaluate the effectiveness of Mobile Warning Devices when approaching grade crossings
4. Project Statement	Current signage may be misunderstood or overlooked by motorist and pedestrian traffic. Utilization of current technology (i.e. cell phones, GPS, PDAs, etc.) as mobile warning devices can offer additional alerts. The potential exists to offer a cost-effective alternative to traditional upgrade of warning systems. Research the effectiveness of mobile warning devices as means to alert drivers and pedestrians within close proximity of active rail lines. Determine if warning/alerts are received and effective.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors _X_ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Active warning alert Reduction in collisions at crossings Long term benefit to general public and industry
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Integration with existing equipment The challenge to using this technology includes driver distraction.
12. Other Comments	Related to DPE-02-2003 page 66

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-6
3. Title	Evaluation of New Media
4. Project Statement	Assess impact and effectiveness of new media (i.e., internet tools, social networking sites, text messages, email, and podcast) outreach programs in public rail safety awareness including grade crossings and trespass safety.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X_ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Better targeting of intended audience Provide additional tools for messaging Further reductions in grade crossing and trespass incidents.
8. Research Need Urgency	X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA, Academia, Consultants, Research firms
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-7
3. Title	Effectiveness of Drivers Educations
4. Project Statement	Research if the type and amount of drivers education correlates with the number and types of collisions.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Determine if educational program effective.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium __ Difficult Issues: Hard to collect needed information.
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-8
3. Title	Analysis of trespass patterns using GPS technology
4. Project Statement	1. Develop technology that would allow crewmember to use GPS plotting to target trespass hot spots and determine its effectiveness over time 2. Collect and report real time data 3. More accurately target of hot zooms for enforcement 4. Rapid response and prevention for law enforcement
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Same as 4 under project statement
8. Research Need Urgency	__ High X __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K X__ Low < $150K
10. Potential Organization(s) to Conduct Research	Railroad and labor groups
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy X__ Medium __ Difficult Issues: Potential cost of technology.
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area / Number	EPA-9
3. Title	Drivers Educations – Computer Based Training
4. Project Statement	Collect and analyze existing data provided by OL Canada from web based training. Determine effectiveness of online training V/S in class learning potential for pilot USA application.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X_ Human Factors ___ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (list organization & title of current research) OL Canada
7. Potential Benefit(s) of Identified Research Need Area	Cost effective method to reach entire novice driver population.
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area / Number	EPA-10
3. Title	Development of Near Miss Data System (Pilot)
4. Project Statement	1. Assess the use of near miss data to identify hot zones using FRA proposed mandatory reporting to target education efforts. 2. Determine collection methods of near miss incidents and ensure consistency of data collection to be shared among cross-section OLI/FRA/Railroad/DOT/Law enforcement 3. Lower incidents that results in injuries and fatalities and promote non-filtered dissemination of data between interested parties.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors _X_ Transit-oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Decreased loss of life to members of the community. Improve productivity for all agencies. Reallocate money spent in litigation and post accident evaluation and reporting. Short and long term advantages.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	FRA coordination with host railroad and labor organization.
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: The ability to cross communicate the data upfeed. Dependent on FRA requiring near miss data collection.
12. Other Comments	2003 highway rail grade crossing research needs workshop needs HF, HF 06 pg 42 with emphasis on communication control.

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-11
3. Title	Addressing Complacency of Frequent Crossing Users
4. Project Statement	Assess the means to address the complacency of those who use the crossing regularly (commuters and local residents).
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X__ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduction in collision New educational targeting
8. Research Need Urgency	__ High _X_ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-12
3. Title	Confidential Close Call Reporting System
4. Project Statement	1. A channel for communication to data input while maintaining autonomy 2. Increased target of hot zone without any negative ramifications 3. More accurate reporting
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	___ Human Factors _X__ Transit-oriented Communities __X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Increase honest fact based reporting Short and long term benefits
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	RR and labor groups
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-13
3. Title	Trespassing Behavior Analysis
4. Project Statement	Analyze why people are willing to take trespass risks on RR tracks in order to target specific education and outreach components for target audience.
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s)	_X_ Human Factors ___ Transit-Oriented Communities _X_ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Better indentify target audience. Allow for development of improved education programs.
8. Research Need Urgency	__ High __ Medium _X_ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	Academia, research firms
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Education and Public Awareness (EPA)
2. Research Topic Area/Number	EPA-14
3. Title	Evaluating existing and potential driver signage and treatment effectiveness.
4. Project Statement	Assess the effectiveness of existing and potential new signage/treatments including review of international signage, testing of new signage. Identify best designs for consideration by the MUTCD.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s)	_X_ Human Factors ___ Transit-oriented Communities X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	_X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	For the reduction in grade crossing and trespass incidents. Increase driver awareness.
8. Research Need Urgency	X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium X__ Difficult Issues: Design of new signage Changes in signage
12. Other Comments	

Institutional Issues Research Needs

Project No.	Research Need Title
II-1	Establishment of a Railroad/Transit Data Clearinghouse
II-2	Cost/Benefit Analysis of Grade Crossing Improvements
II-3	Synthesis to Evaluate How, When, and Where Human Perception Negatively Impacts Rail Safety
II-4	Institutionalize Evaluation as a Key component of Project/Program (countermeasure) Design and Implementation
II-5	Improved Effectiveness of Stakeholder Interaction
II-6	Identify Opportunities to Make Legislation and Regulations Across Jurisdictions Compatible, Meaningful and Up-to-Date

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area/Number	II-1
3. Title	Establishment of a railroad/transit data clearinghouse
4. Project Statement	Development of a framework/architecture for integrating existing databases (e.g.: Federal, states, local, industry, insurance) in order to provide a more complete and robust source of information on risk management and mitigation to the surface transportation industry. Centralized, searchable
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Better information sharing Better identification of issues Improved safety of operations Improved consistence Faster translation of research into practice Improved ability to track of trends
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	TRB, USDOT
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area/Number	II-2
3. Title	Cost/benefit analysis of grade crossing improvements
4. Project Statement	Developing examples of how to conduct cost/benefit analyses of Federally funded grade crossing improvements under the Section 130 Program. Best practices review to establish recommended procedures for quantitatively evaluating improvements.
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	___ New _X__ Supplemental (various, including NCDOT)
7. Potential Benefit(s) of Identified Research Need Area	Making more efficient use of federal funds Informs decision-making for policy implementation
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	FHWA, FRA, States
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area / Number	II-3
3. Title	Synthesis to evaluate how, when, and where human perception negatively impacts rail safety.
4. Project Statement	A synthesis to evaluate how, when, and where human perception negatively impacts safety. Identify what perceptions need adjusting because of extent of impacts to rail safety: • The impact of sensationalizing suicide reporting by the media • Local authorities, media and general public not understanding the difference between pedestrians and trespassers • Lack of public awareness about dangers of trespassing on railroad right-of-way.
5. Cross-Cutting Areas Please mark a mark an X next to the applicable area(s).	_X__ Human Factors ___ Transit-Oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Reduced intentional deaths on rail ROW. Reduced trespassing and unintentional deaths and injuries.
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K __ Medium = $150K - $500K _X_ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	_X_ Easy __ Medium __ Difficult Issues:
12. Other Comments	

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area / Number	II-4
3. Title	Institutionalize evaluation as key component of project/program (countermeasure) design and implementation.
4. Project Statement	Build "evaluation" into the planning stage of a project – so you can evaluate whatever you implement ("plan to evaluate" is built into the project). Quantitative evaluation to identify high payback effective interventions and key factors in success. Case studies and best practices?
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities _X__ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Ability to adjust mid-course to improve design and implementation Identify and Maximize potential benefit Informs future program decisions
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	AASHTO, AAR, APTA, FRA, TRB, AREMA
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy _X_ Medium __ Difficult Issues: Adds cost in the short-term, resistance due to being potential culture change for some organizations.
12. Other Comments	

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area / Number	II-5
3. Title	Improved effectiveness of stakeholder interaction
4. Project Statement	Role definition and best practices for communication and coordination among diverse stakeholders (e.g. regulators, railroads, locals, districts, standards setting bodies) for rail safety initiatives. Special attention to: o regional/local planning o crossing closures o pedestrian crossings o trespass o private crossings o Land development (research to get recommended regs, standards, and practices to address issues relating to land development for cooperative decision making that affect grade crossing and/or rail ROW.)
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors ___ Transit-oriented Communities ___ Data Requirements ___ High Speed Rail
6. Relationship to Current Research	__X_ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Improved effectiveness of stakeholder interaction Improved efficiency Greater clarity on ownership of and roles and responsibilities for orphan issues (e.g. pedestrian crossings, trespass, private crossings) Highlighting conflicting mandates/goals/objectives and requirements for reconciliation
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	__ High >$500K _X_ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	USDOT
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: Diverse group of stakeholders with entrenched interests and well defined positions.
12. Other Comments	

1. Research Needs Area	Institutional Issues (II)
2. Research Topic Area/Number	II-6
3. Title	Identify opportunities to make legislation and regulations across jurisdictions compatible, meaningful and up to date
4. Project Statement	Identify what the purpose of the original legislation or regulation was. Does the problem still exist? Is the original legislation or regulation still relevant? Do other types of legislations or regulations conflict (noise abatement, air quality…) and to what extent? How consistent is the approach across jurisdictional boundaries? Has the original legislation created new problems or unintended consequences?
5. Cross-cutting Areas Please mark a mark an X next to the applicable area(s).	___ Human Factors _X__ Transit-oriented Communities ___ Data Requirements _X__ High Speed Rail
6. Relationship to Current Research	_X__ New ___ Supplemental (list organization & title of current research)
7. Potential Benefit(s) of Identified Research Need Area	Streamlining of project implementation Fewer and more effective laws and regulations Reduction of legislative conflict
8. Research Need Urgency	_X_ High __ Medium __ Low
9. Cost of Research	_X_ High >$500K __ Medium = $150K - $500K __ Low < $150K
10. Potential Organization(s) to Conduct Research	
11. Ease of Implementation If medium or difficult, list key implementation issues.	__ Easy __ Medium _X_ Difficult Issues: Legislative and regulatory inertia, long lead times and powerful coalitions needed.
12. Other Comments	