

2017
GRADE
CROSSING
RESEARCH NEEDS
WORKSHOP

»» AUGUST 15-17
ST. LOUIS, MO



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Working Group Summary of Top Recommended Actions



U.S. Department
of Transportation



Federal Railroad Administration

Engineering/Technologies

Team Leader: Frank Frey (FRA)

Support: James Harrison (Volpe), Tashi Ngamdung (Volpe)



Federal Railroad Administration

Top Five Recommended Actions for Engineering/Technologies

1. Wireless Technology for Crossing Activation
2. Research and Develop V2V and V2I to Inform, Warn, and Force Stop Motor Vehicles
3. Research Alternate RR Warning Devices
4. Intelligent Traffic System Application for Motor Vehicles
5. Research Vehicle Activated Enhanced Advanced Warning Sign

1. Wireless Technology for Crossing Activation

Description: Leverage existing PTC network for activating highway-rail grade crossing

Rationale: More reliable train detection & crossing warning times.

Benefits: to mitigate loss of shunt and activation failure crossing disabling and improve station stop warning times.

Key Implementation Issues: interoperability, standardize safety criteria.

2. Research and Develop V2V and V2I to inform, Warn, and Force Stop Motor Vehicle

Description: In vehicle warning using connected vehicle infrastructure with the ability to enforce stopping.

Rationale: Piggy backing on existing technologies/infrastructure (cost efficient implementation)

Benefits: Improve grade crossing safety

Key Implementation Issues: auto industries adoption, regulatory issues, liability issues

3. Research Alternate RR Warning Devices

Description: Enhanced warning devices to grab motorist attention (embedded strobe lights, different colors lights, different frequency pattern) – HUMAN FACTORS

Rationale: To grab motorist attention by varying operation of warning devices

Benefits: Keep attention grabbing

Key Implementation Issues: NCUTCD endorsement, cost

4. Intelligent Traffic System Application for Motor Vehicles

Description: Enhance pre-emption technique and que cutting/ traffic management

Rationale: To decrease vehicle stopped at a crossing

Benefits: Decrease accidents due vehicles stopped on dynamic envelope, better traffic flow through crossing

Key Implementation Issues: city/county issues, cost

5. Research Vehicle Activated Enhanced Advanced Warning Sign

Description: Vehicle triggered advanced pre warning to alert motorist on approach to highway-rail grade crossing

Rationale: To provide motorist additional warning time and distance.

Benefits: To improve safety especially at passive crossings.

Key Implementation Issues: city/county issues, absence of infrastructure (power, communication)

Human Factors

Team Leader: Starr Kidda (FRA)

Support: Scott Gabree (Volpe), Norma Griffiths (FRA)



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Top Five Recommended Actions for Human Factors

1. Improve Close Call/Near Miss Reporting (People or Vehicle Strike)
2. Integration of Rail Safety Messages into Driver Education and Licensing
3. Incorporating Rail Safety People into Development/Planning Process
4. Educate Youth to Educate Adults

1. Improve Close Call/Near Miss Reporting (People or Vehicle Strike)

Description: Phase 1: Develop a process to systematically collect and categorize vehicle and person near miss events (e.g. simplify the process – forms – narrative and potential to use automate and time-stamp the process using technology such as cameras).

Phase 2: Pull out more detailed information such as behaviors.

Rationale: We don't have an understanding of the whole population of unsafe behaviors (i.e., where risky behaviors occur)

Benefits: More accurate data. Reduction in unsafe acts. Proactive safety through analysis for better resource management. Cost reduction.

Key Implementation Issues: getting carrier buy-in, confidentiality

2. Integration of Rail Safety Messages into Driver Education and Licensing

Description: Expand both commercial and private driver education and testing to more accurately reflect the interaction of railroads in driving environment. In areas such as Driver Re-education and traffic schools, State Driver Education Manuals and other high traffic areas such as bars, restaurants, public restrooms etc. Possibly utilize social media to drive down publication costs for general educational materials.

Rationale: this is currently an education gap

Benefits: More compliance by drivers in rail settings.

Key Implementation Issues: requires partnership and buy in with states

3. Incorporating Rail Safety People into Development/Planning Process

Description: Incorporate rail safety input into development or planning processes to identify potential increases in rail safety hazards, possibly in the environmental assessment.

Rationale: proactive strategy for identifying potential safety hazards (i.e., bring safety into the planning process)

Benefits: Incorporated as part of existing railroad safety certification program. (Safety and Security Certification.)
Environmental Assessment.

Key Implementation Issues: requires partnerships with states and localities

4. Educate Youth to Educate Adults

Description: Similar to NHTSA Model on Seat Belts. Change culture of how kids and families see railroads (trespassing and crossing violations).

Rationale: it worked with seat belts.

Benefits: Increase in safety awareness, personalized understanding and reduction in unsafety behaviors.

Key Implementation Issues: determining the most effective way to disseminate the message

Community Outreach & Education

Team Leader: Robert Rohauer (CSX)

Support: Suzanne Horton (Volpe), Carolyn Cook (FRA)



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Top Three Recommended Actions for Community Outreach and Education

1. Trespasser Identification, Motivation and Messaging
2. Research into the Efficacy of Social Media Platforms and Messages
3. Driver Education (General and Commercial Driver License)

1. Trespasser Identification, Motivation and Messaging

Description:

- Identify types and reasons for trespassing and develop modes and methods to test messaging aimed at trespassers

Rationale:

- This will provide communities tools for deterring trespassing

Benefits:

- Better targeting of messaging based on demographics, geography and reasons for trespassing

Key Implementation Issues:

- Significant research project with a large data collection effort

2. Research into the Efficacy of Social Media Platforms and Messages

Description:

- Research appropriate social media platforms based on target audience
- Examine existing social media content and determine the effectiveness versus new content

Rationale:

- Assist stakeholders in choosing the most effective social media platform and offer messaging which more effective based on target audiences

Benefits:

- Reach more people using social media

Key Implementation Issues:

- Technology is rapidly changing, so this project should be implemented quickly

3. Driver Education (General and Commercial Driver License)

Description:

- Evaluate driver education programs for grade crossing safety content and investigate effective distribution of grade crossing safety messaging to drivers.

Rationale:

- Human factor (drivers) is a key contributor to grade crossing incidents

Benefits:

- Better driver understanding of safe crossing procedures, resulting in fewer incidents

Key Implementation Issues:

- Collaboration with and across many different State agencies that conduct driver education

Enforcement

Team Leader: Ryan Gustin (CSX), Mike Grizkewitsch (FRA)

Support: Lou Frangella (FRA)



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Top Five Recommended Actions for Enforcement Session

1. Technology Opportunities for Law Enforcement
2. Funding Opportunities for Law Enforcement
3. Uniformity of Highway-Railroad Grade Crossing Laws
4. Development of National Highway-Railroad Grade Crossing Law Enforcement Campaign
5. Closure of Highway-Railroad Grade Crossings

1. Technology Opportunities for Law Enforcement

Description: Identify technology opportunities that law enforcement can use to be more effective in identifying and enforcing grade crossing laws. This could include unmanned aerial vehicles (UAV)/drones, portable detection equipment, etc.

Rationale: Law enforcement, as it relates to enforcement of railroad related issues, needs to have the ability to use technology to be as effective as possible.

Benefits: Decrease violations and 'non-compliant' behavior.

Key Implementation Issues: Funding for technology can be expensive. Specific training, maintenance, and installation of equipment might be required.

2. Funding Opportunities for Law Enforcement

Description: Earmark funding sources for law enforcement that is specific to grade crossing enforcement.

Rationale: Often the simplest of ideas require funding sources, whether this is for manpower, equipment, training, etc. Create mechanisms that allow for law enforcement agencies to apply for funds that can be used to focus their efforts on grade crossing enforcement opportunities.

Benefits: When competing against many other law enforcement related issues and their respective campaigns, law enforcement agencies might be more apt to focus their efforts if monies exist. Decrease violations and 'non-compliant' behavior.

Key Implementation Issues: Can't just print more money! Will often have to appropriate existing funds from some other bucket.

3. Uniformity of Highway-Railroad Grade Crossing Laws

Description: Move beyond offering 'model' guidance and push for actual legislation requiring states to have uniform grade crossing laws (sanctions).

Rationale: Right now there isn't consistency among the various states, as it pertains to highway-railroad grade crossing laws.

Benefits: Creates understanding of how drivers should approach and negotiate grade crossings, regardless of location. This supports law enforcement's ability to address railroad specific issues.

Key Implementation Issues: Getting all 50 states to adopt uniform law might prove difficult.

4. Development of National Grade Crossing Law Enforcement Campaign

Description: Develop national safety/enforcement campaign to garner national attention and buy-in from both the public and the law enforcement community.

Rationale: Work to get recognized by those associations that often manage funding (Governor's Highway Safety Office) for support/funding. National 'roll-out' with federal/state/local partners, with the goal of annual recurrence. Develop program marketing, resource materials, tracking methods, and related incentives.

Benefits: Garner buy-in from state/local law enforcement focused on grade crossing enforcement. Decrease violations and 'non-compliant' behavior. Gain national exposure on issue that is otherwise kept in the shadows.

Key Implementation Issues: Competing against other law enforcement campaigns might make implementation more difficult.

5. Closure of Highway-Railroad Grade Crossings

Description: Research effective strategies to close highway-railroad grade crossings that have higher rates of driver 'non-compliance,' especially when viable alternate access exists.

Rationale: Standardized matrix to identify and incent communities to address problem or redundant crossings doesn't really exist (Section 130 application is an example).

Benefits: Create funding sources used to encourage grade crossing closures. Closure of grade crossings eliminates the need for enforcement. The safest crossing is the one that doesn't exist. Decrease violations and 'non-compliant' behavior.

Key Implementation Issues: Show us the money! Communities are needing more and more money to be a willing partner in crossing closures and consolidations.

Hazard Management

Team Leaders: Debra Chappell (FRA), Kelly Morton (FHWA)

Support: Bernard Kennedy (Volpe)



Federal Railroad Administration



Top Five Recommended Actions for Hazard Management

1. Additional Train Approaching Warning System
2. Grade Crossing Hazard Matrix
3. Model Communication Process
4. Enhanced Data Exchange Between Vehicle Control Systems and Train Control Systems
5. Updating Evaluation Tools for Rail/Highway Grade Crossing Improvements

1. Additional Train Approaching Warning System

Description: Identify and evaluate a wide range of potential solutions as a means to alert road users of the approach of a second train approach

Rationale: There is consideration to include Another/Second Train Coming sign within the MUTCD. This effort has been researched in the past, but further analysis on various traffic control device concepts may be warranted.

Benefits: Expected to reduce frequent cause of pedestrian collisions usually resulting in fatalities.

Key Implementation Issues: Lab testing, followed by prototype in-field testing. (Medium)

2. Grade Crossing Hazard Matrix

Description: Develop a matrix that shows the annual number of incidents, types of hazards, injuries and deaths, and indicate which treatment will prevent or mitigate the hazard.

Rationale: A “deep dive” data-trend analysis should be considered to potentially mitigate and/or eliminate crossing incidents.

Benefits: Develop standard operating procedures; long-term planning; improved coordination and seamless project completion

Key Implementation Issues: Availability of information, data gaps, variability/accuracy of data (Easy)

3. Model Communication Process

Description: Improve communication and coordination between various agencies and railroads

Rationale: Effort would assist with project development, long-term planning efforts, engineering design coordination, and long-term budgeting for big projects (e.g., grade separations).

Benefits: Provides standard operating practices, improved coordination and seamless project completion

Key Implementation Issues: Stakeholder coordination and commitment (Medium)

4. Enhanced Data Exchange Between Vehicle Control Systems and Train Control Systems

Description: Determine the list and type of information (in addition to preemption) required by vehicle control systems from train control systems and vice versa

Rationale: Safety and efficiency improvements of both systems

Benefits: Increased and long-term safety of highway crossing, improvement of highway traffic flow.

Key Implementation Issues: None provided (Medium)

5. Updating Evaluation Tools for Rail/Highway Grade Crossing Improvements

Description: Modernize both the Accident Prediction and Severity model and GradeDec

Rationale: The current models focus on the benefits associated with upgrading from crossing treatment when the APS model was created 30+ years ago. Grade crossing technology and the railroad operating environment and available data has changed.

Benefits: Help ensure that grade crossing resources are directed to the areas of greatest benefit and risk reduction – thereby saving as many lives as possible...it may even end up justifying an increase in spending on crossing improvements.

Key Implementation Issues: None identified (Medium)

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