Presented by:
Starr Kidda, PhD
Human Factors Division Chief
FRA Office of Research, Development & Technology
E-mail: Starr.Kidda@dot.gov

U.S. Government Grade Crossing Research & Stakeholder Engagement

International Level Crossing Awareness Day (ILCAD) — 11TH EDITION
Amersfoort, Netherlands • June 6, 2019 • 16:00 - 16:55
Theme of Session: Engineering, Innovation
Federal Railroad Administration (FRA)

FRA’s Mission:

• To enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future.

We accomplish our mission of grade crossing safety and trespasser prevention by:

• Issuing and enforcing safety regulations
• Investing in rail corridors
• Conducting research and developing technology

Image source: https://www.aar.org/railroad-101
U.S. Grade Crossing and Trespassing Trends

The U.S. Railroad System
775 Railroads
140,000 Route Miles of Track
209,000 At-Grade Railroad Crossings

Crossings in the U.S.
Active 54%
Passive 46%
(with gates, bells, and/or flashing lights)
(with signs and markings, but not active warning devices)

Stop! Trains Can’t!
A train traveling 55 mph takes 1 mile or more to stop!

5-Year Trespassing Trends
Fatalities 2014 2018
470 570

Top 5 for Trespassing Fatalities
(2014—2018)
CA 503
TX 177
FL 163
NY 120
AL 100

5-Year Crossing Trends
Fatalities 2014 2018
262 270

Top 5 for Crossing Fatalities
(2014—2018)
CA 183
IL 105
TX 87
FL 69
AL 50

87% of all Incidents (2014-2018) of rail-related fatalities over past 10 years are due to railroad crossing and trespassing.

9 people or vehicles are hit by a train daily.

Drivers 14% of all Incidents (2014-2018) went around lowered gates.
Fatalities in the United States

Source: FRA Safety Data, May 28, 2019
2018 Fatalities in the United States
[excluding suicides]

Highway-Rail Grade Crossing
• 267 fatal, down 1% from 2017

Rail Trespassing
• 562 fatal, up 10% from 2017

Source: FRA Safety Data, May 28, 2019
Highway-Rail Grade Crossing Safety and Trespass Prevention Research Program

**Goal**
- Analyze impact causation and develop safety countermeasures, programs, and guidance to reduce the number of causalities at grade crossings and along railroad rights-of-way

**Research Methods**
- Research the root cause of incidents and fatalities
- Identify corrective actions
  - Engineering, Enforcement, Education
- Engage stakeholders
- Deploy and evaluate solutions
1. Photo-Based Education at Crossings

Project Description
• Studied the effectiveness of photo enforcement to detect and enforce highway-rail grade crossing violations
• Location: Orlando, Florida

Status
• 2,958 violation notices
  (August 11, 2016 – December 31, 2018)
• 333 survey responses
  (August 11, 2016 – December 31, 2018)
Photo-Based Education at Crossings: Violation Notice and Educational Material

WARNING NOTICE OF RAILROAD CROSSING VIOLATION

Orlando STOPS Program
400 S. Orange Ave.
Orlando, Florida 32801-4900

Plate Number: Password: View your violations at www.ZeroFatality.com

This is not a Notice of Violation. You are not required to pay a fine, but you must comply with the law.

Your vehicle was recorded crossing through the active rail crossing at

LOGIKS: Princepoint 10 W with Akin Rd
Date: 09/03/2017 Time: 01:42:59
Plate Number: Vehicle Make:

This warning is part of an educational effort by the City of Orlando and the Florida Transit Authority to educate all drivers on the importance of staying alert and being aware of railroad crossings. This warning is intended to promote rail safety and prevent accidents. Violators will be subject to fines.

According to national statistics, 98% of all railroad fatality and injury victims were not following the law at the time of the incident. Most of these fatalities can be prevented. According to Florida Statutes, a vehicle must:

• Stop at least 15 feet from each crossing when signals are activated.
• Not proceed through, around, or under any crossing gates or barriers while the gate is in the down position.
• Not enter the crossing without following traffic signals to drive completely through the crossing without stopping.

As motorists, we need to always be prepared to stop at the railroad crossing, slow down, look both ways, listen, obey warning devices, and check that the track is clear. If you have a question, stop, and think. If you cannot see the train, you should never race a train and never stop on tracks.

At your earliest convenience, we would appreciate your assistance by participating in our survey online, which we will use to refine and maintain the effectiveness of this rail program and improve safety at railroad crossings. Please click the survey that is available on the following link:

https://www.surveymonkey.com/r crefreetraffic

Thank you for your attention to this matter.

Sincerely,
The City of Orlando cares about your safety.

To Promote, Protect and Improve the Health, Safety and Welfare of our Citizens

To Protect and Improve the Health, Safety and Welfare of our Citizens

Railroad Crossing Warnings

To Promote, Protect and Improve the Health, Safety and Welfare of our Citizens

www.ZeroFatality.com

STOP signs at railroad crossings—the same laws apply here as for any other intersection regulated by a STOP sign. You must come to a complete stop. If no trains are coming, you may proceed.

CROSSING at an angle—You must STOP before crossing the track to make sure the tracks are clear.

CROSSING at a grade—You must yield to trains.

CROSSING at a grade—You must yield to trains. Slow down and be prepared to stop when you see the crossing sign. A sign below the crossing indicates the number of tracks.

www.ZeroFatality.com

U.S. Department of Transportation
Federal Railroad Administration

Sensys America, Inc. is proud to provide our Railroad Data systems to improve the safety of rail crossings. www.sensysamerica.net
### Why Offenders Drove Through the Crossing During Activation*

<table>
<thead>
<tr>
<th>RESPONSE</th>
<th>COUNT</th>
<th>PERCENT OF TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did not see the activated crossing signals (e.g., lights flashing, gate lowering)</td>
<td>139</td>
<td>42%</td>
</tr>
<tr>
<td>I felt I had enough time to get through</td>
<td>70</td>
<td>21%</td>
</tr>
<tr>
<td>I did not see the train</td>
<td>39</td>
<td>9%</td>
</tr>
<tr>
<td>I followed the car in front of me</td>
<td>27</td>
<td>8%</td>
</tr>
<tr>
<td>I was unfamiliar with the rules</td>
<td>28</td>
<td>8%</td>
</tr>
<tr>
<td>I don’t know</td>
<td>23</td>
<td>7%</td>
</tr>
<tr>
<td>I was in a rush (e.g., late for an appointment)</td>
<td>17</td>
<td>5%</td>
</tr>
<tr>
<td>I felt the wait would be too long</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>No Answer</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>62</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>419</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Respondents were instructed to “check all that apply.”
2. Vehicle Right-of-Way (ROW) Incursion Prevention

Project Description

• Study interventions to prevent vehicle incursions into railroad rights-of-way
• Install and evaluate low-cost site-specific strategies
• Location: Orlando, Florida
Vehicle Right-of-Way Incursion Prevention
Vehicle Right-of-Way Incursion Prevention
Vehicle Right-of-Way Incursion Prevention
3. Real-Time Railroad Crossing Information System for Emergency Vehicle Drivers

**Project Description**

- Develop an in-vehicle notification system to alert emergency vehicle operators when rail crossings are blocked
- The system will:
  - Help emergency service vehicle drivers avoid blocked crossings, and
  - Re-route vehicles to save response time
- Models will use GPS data from emergency vehicles and actual railroad crossing blockage data to measure and quantify the benefits of real-time information on emergency vehicle response times
4. Enhanced Humped Crossing Database Using LiDAR

Project Description

• Enhance FRA’s National Grade Crossing Inventory database by including LiDAR (Light Detection and Ranging) point clouds of humped crossings

• Develop and test a quasi real-time alerting system if a humped crossing is detected and not reported as such

• Verify data reported to the National Grade Crossing Inventory database
5. Trespass Detection and Warning – Drone System

Project Description
- Test the effectiveness of drone technology to detect trespassers on railroad property
- Mobile camera deployed on a drone by police
  - Provides significant coverage over the ROW in the project location when in use
  - Identifies and tracks trespassers in areas of the ROW difficult to access by the police

Potential Outcomes
- Reduce trespass frequency through detection and education of trespassers on right-of-way (ROW)
- Document best practices and lessons learned
- Possibility for nationwide application
Stakeholder Engagement: 2017 Grade Crossing Research Needs Workshop

- Workshop to collaborate, identify, and prioritize specific research needs
- 150+ attendees: Federal, state, and local governments; railroad industry, academia, and consultants
- Five topic areas:
  - Engineering/Technologies
  - Human Factors
  - Community Outreach/Education
  - Enforcement
  - Hazard Management

Site URL: https://www.fra.dot.gov/conference/2017/rnw/presentations.shtml
Stakeholder Engagement:  
Grade Crossing Listening Sessions

- FRA held six listening sessions with following stakeholder groups between March and April 2019:
  - Railroads
  - Signal Equipment Manufacturers
  - Trade & Advocacy Groups
  - Technology Companies
  - Federal, State, Local Governments, and DOT Modes
  - Law Enforcement
- Topics discussed: Demonstrated and emerging technologies, barriers to implementation, and ideas for regulatory changes
CONTACT US

Federal Railroad Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

For more information visit us at
www.fra.dot.gov

Connect with us USDOTFRA