CHAPTER 21
Reducing Train-Vehicle Crashes

KEY TOPICS

- Operation Lifesaver program

GOALS

- Reduce motorist violations of traffic control devices at railroad crossings.
- Improve visibility and clear warning of crossings.
- Study and improve design or reflectivity elements in signs and other passive warning devices.
- Establish guidelines for highway-rail grade crossings.
- Improve driver education and licensing relative to safe practices for approaching and traversing highway-rail crossings.
- Adopt more advanced technology for enforcement and crash prevention at Iowa's railroad-highway grade crossings.
- Implement the findings and recommendations of the U.S. Department of Transportation (U.S. DOT) grade crossings safety reports.

BACKGROUND

Each year thousands of collisions resulting in hundreds of fatalities and injuries are sustained at the nations' railroad-highway grade crossings. Most of the crashes that occur at railroad-highway grade crossings are the result of motor vehicle driver behavior. There also exists a declining public awareness about highway-rail crossings. In addition, a lack of urgency for the highway-railroad grade crossing education process and a reactive rather than proactive sensitivity to motor vehicle and train collisions have affected the ability to eliminate crashes.

NATIONWIDE

Approximately every two hours, either a vehicle or a pedestrian is struck by a train in the United States. That's 12 incidents a day, making railroad-highway grade crossing a serious national safety concern.

National Facts

- 50% of crashes occur at railroad-highway grade crossings with passive devices (signing).

- 50% of the railroad-highway grade crossing crashes occur at crossings with active control devices.
- 3,502 railroad-highway crossing incidents occurred in 2000.
- 425 railroad-highway crossing fatalities occurred in 2000.

This represents a 0.4% increase in crossing incidents and a 5.7% increase in railroad-highway grade crossing fatalities between 1999 and 2000.

Federal Railroad Administration

By law, the Federal Railroad Administration (FRA) has responsibility for ensuring railroad safety throughout the nation. To monitor railroad compliance with federally mandated safety standards, FRA employs 400 inspectors operating out of 47 offices throughout the country.

Between 1978 and 1993, the number of railroad accidents in the United States declined by more than 75%. The railroad accident rate per million train miles dropped by more than two-thirds, and the number of rail-related fatalities and injuries fell by three-fourths during this period. These substantial safety improvements occurred even as freight railroad traffic and train density increased to record high levels following economic deregulation of the industry as a result of the Staggers Rail Act of 1980.

Beginning in 1993, FRA reassessed its safety program to focus on results. Overall, the FRA's short-term performance objective is to reduce by 10% all rail-related fatalities from 1994 through 1998, using 1993 as a base year. Achievement of this objective will result in a cumulative reduction of about 380 fatalities over the five-year period.

To meet this challenge, the FRA concluded that those most affected by rail issues would need to become more involved in the safety improvement process. The FRA uses a multidisciplinary approach—involving railroad employees and their labor organizations, railroad management, manufacturers, shippers, and the traveling public working as a team—to enhance safety.

The new Safety Assurance and Compliance Program (SACP) is intended to provide a comprehensive approach in which SACP participants work with the FRA to identify and correct root causes of problems across an entire railroad system.

U.S. DOT Grade Crossing Safety Task Force Reports

The recommendations for improving certain aspects of highway-rail safety are contained in U.S. DOT report *Accidents that Shouldn't Happen* and in a subsequent status report, *Implementation Report of the U.S. DOT Grade Crossing Safety Task Force*. Some of the recommendations are appropriate for immediate implementation in Iowa are contained in the Potential Strategies section in this chapter.

IOWA

A significant number of crashes occur at highway-rail grade crossings in Iowa where motorists violate an active railroad traffic control device. A continued emphasis on railroad corridor reviews is recommended in order to identify appropriate safety improvements to be accomplished at Iowa's railroad-highway grade crossings.

Iowa's rail transportation system provides both freight and passenger service. Rail serves a variety of trips, including those within Iowa and those to other states as well as to foreign markets. In 1998, Iowa's rail transportation system could be described as follows:

- 4,275 miles of track (41% remaining of the peak in 1911)
- 17 railroads
- 35.5 million tons shipped
- 41.2 million tons received
- 54,192 passenger rides

Freight

While rail accounts for only 3% of the freight network miles, the network carries 37% of Iowa's freight tonnage. Although Iowa rail miles have remained stable, the amount of tonnage moving over the Iowa network increased 77%, while rail miles fell by 3% between 1988 and 1998. Changes

in Iowa's freight transportation system and service over the last 10 years can be characterized as follows:

- Slightly fewer miles being operated
- Better track conditions
- Safer train operations and rail-highway crossings
- More rail freight traffic
- More tons hauled per car
- Fewer major carriers serving Iowa, but more regional and short-line carriers
- Lower average rail rates per ton-mile

Passengers

Rail passenger service in Iowa is provided at six stops on two routes. In the last 10 years, rail passenger service has remained the same and the number of passengers has decreased slightly.

Iowa Facts

With the decrease in operating mileage, the number of rail-highway crossings in Iowa has declined by 9% during the last 10 years to 5,753 (see the table of number of crossings by warning device). Iowa's crossings have better warning and protection devices now than in the past. Those with signals and gates increased by 24% as a result of investments made by railroads, local jurisdictions, and the state to improve crossing safety.

Number of Crossings by Warning Device

Warning Device	1988		1998		1988–1998
	Number of Crossings	Percent of Total	Number of Crossings	Percent of Total	Percent Change
Separated	809	13	761	13	–6
Signals and gates	541	8	670	12	+24
Signals only	1,015	16	1,018	18	+0
Crossbucks/other	3,967	63	3,304	57	–17
Total	6,332	100	5,753	100	–9

As a result of the investments made to improve the crossings and through education awareness programs, the number of crossing accidents has decreased significantly. Since 1988, total accidents have declined by 49%, while rail traffic measured in ton-miles has increased by 77% and non-

interstate vehicle miles of travel has increased by 31%. The majority of the accidents involve property damage, followed next by injury accidents, and then those with a fatality.

Iowa in Motion Rail System Plan

The Iowa Department of Transportation (Iowa DOT) received public input through the Iowa in Motion process to help identify the department's future investment directions as documented in the *State Transportation Plan*. The purpose of the *State Transportation Plan* was to identify transportation investments to meet the needs of Iowans through the year 2020. Iowa's rail transportation policy and goals are an outgrowth of the Iowa Transportation Policy.

POTENTIAL STRATEGIES

Legislation, Policy, and Enforcement

- Require reflective tape on railroad cars. Phase in as accomplished in motor carrier industry—require on all new or refurbished cars.
- Allow more advanced technology for enforcement and crash prevention at Iowa's railroad-highway grade crossings.
- Encourage more publicized enforcement activities (e.g., Operation Lifesaver and Officer On-Board).
- Support commercial driver license (CDL) rules (e.g., a proposal to fine commercial drivers $10,000 for grade crossing violations).
- Investigate safety implications of trains that block emergency response patterns.
- Monitor proposed federal rule for the use of locomotive horns.

Education and Public Awareness

- Improve driver education and licensing relative to safe practices for approaching and traversing highway-rail crossings.
- Increase the number of railroad questions on all permit and drivers tests.
- Increase the amount of railroad information in driver improvement courses.
- Provide Operation Lifesaver brochures at all Iowa DOT facilities, and play Operation Lifesaver videos at all licensing stations.

- Encourage more publicized enforcement and education activities (e.g., Operation Lifesaver) (see Successes and Strategies Implemented section in this chapter).
- Use Federal Highway Administration (FHWA) and Operation Lifesaver efforts to retrain the public on crossing issues (e.g., Always Expect a Train).
- Collaborate with the FHWA in targeting specific drivers for crossing education (e.g., Operation Lifesaver video targeting young drivers and distributed to schools, professional drivers, and school bus drivers).
- Use a community, multidisciplinary approach to solve problems locally. (In 1993, the FRA established a safety partnership with Kentucky Operation Lifesaver, the City of Louisville Public Works Department, Kentucky Transportation Cabinet, and the Jefferson County Public Schools Transportation/Training Section for grade crossing safety. This resulted in the closing of 28 of Louisville's 163 crossings. After the initial success of the Louisville closings, the program was expanded statewide. To date, a total of 525 railroad crossings have been permanently closed in Kentucky. This model could be studied for potential use in Iowa.)

Design and Technology

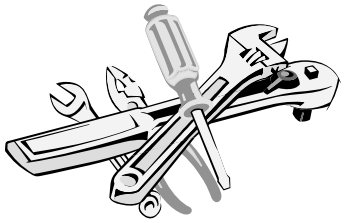
- Establish guidelines for railroad-highway grade crossings.
- Consider stopping area length, traffic lights, and cross arm configurations to accommodate large vehicles. Consider escape shoulders or other solutions in some cases. (Denison, Iowa, beef packing plant model.)
- Improve passive warning devices (e.g., consider highly reflective materials on posts).
- Use state-of-the-art reflectorized signing in accord with the *Manual on Uniform Traffic Control Devices* (MUTCD).
- Improve the effectiveness of passive devices through statewide passive signing upgrade projects.
- Select crossings for upgrading according to actual crash data or by the crash predictor formula.
- Analyze crash data to determine the best upgrade possible in accordance with Iowa Administrative Code Chapter 812.
- Monitor progress in other states.
- Evaluate passive warning devices using train headlights (Washington, Ohio, Oregon, and Indiana models).

- Evaluate use of video system to record rail-highway crossing violations and issue citations.
- Use a community, multidisciplinary approach to solve problems locally. (The FRA established a safety partnership with the City of Laredo, Texas; the Union Pacific Railroad; and the Texas Mexican Railroad for grade crossing safety, pedestrian safety, intermodal congestion, and railroad security. The resulting *Laredo Rail Crossing Safety Plan* identified, evaluated, and consolidated grade crossings within the metropolitan area. A goal was established to close 34 of the 108 grade crossings in Laredo. This model could be studied for potential use in Iowa.)
- Implement the findings and recommendations of the U.S. DOT's grade crossings safety reports *Accidents that Shouldn't Happen* and *Implementation Report of the U.S. DOT Grade Crossing Safety Task Force* (e.g., regarding median barriers, flexible delineators, four-quadrant gates, vehicle arresting barrier).
- Evaluate use of crossing whistles in place of train whistles.
- Continue monitoring research on state-of-the-art technology such as automated horns, camera surveillance systems, four-quadrant gates, and satellite technology.
- Provide more median barriers in crossing roadways to prevent drivers from crossing lanes to drive around crossing arms (Ames, Iowa, model).
- Consider limited use of fluorescent yellow-green signs.
- Reduce the number and frequency (density) of rail crossings inside city limits to reduce public exposure to rail crossing crashes.
- Consider technology developments such as advance crossing condition warnings for train engineers (Florida pilot of Nestor and Geofocus).

Other Initiatives

- Investigate crash descriptions for major contributing factors such as rural/urban, driver characteristics, etc.
- Use the FRA's Highway-Rail Grade Crossing Evaluation Software where practical.

SUCCESSES AND STRATEGIES IMPLEMENTED



- U.S. DOT Rail Crossing Safety Program has been documented.
- FRA safety education efforts:
  - o As part of the agency's *Rail-Highway Crossing Safety Action Plan* (1994), the FRA has made improving child-related rail safety a national priority. The classroom teaching program is part of the FRA interactive classroom web site.
  - o "Always Expect A Train" public education campaign was created in 1995.
  - o In 1996, the FRA partnered with the Association of American Railroads and Operation Lifesaver to create the Highways or Dieways—the Choice Is Yours public awareness campaign. It's an aggressive, multimedia public education campaign—deliberately graphic reenactments of train–motor vehicle collisions and railroad trespassing incidents—aimed at reducing highway-rail grade crossing collisions and railroad trespassing incidents.
- Operation Lifesaver is a national, nonprofit education and awareness program dedicated to ending tragic collisions, fatalities, and injuries at highway-rail grade crossings and on railroad rights-of-way. To accomplish its mission, Operation Lifesaver promotes "3 E's": education, enforcement, and engineering. Each year, Operation Lifesaver presenters provide free safety presentations to more than two million Americans, including school children.

- Iowa SMS approved funding to provide Operation Lifesaver training kits for Iowa State Patrol education officers and volunteers.
- The Iowa SMS Railroad Crossing Task Force reviewed a number of the concerns discussed in this chapter and concluded that issues such as reflectivity tape are national issues. Iowa SMS will issue statements of support for national strategies when appropriate opportunities arise.

NOTE

The potential strategies in this chapter do not represent specific recommendations of the Iowa SMS Coordination Committee or any agency, group, or individual represented in Iowa SMS. The strategies represent a range of alternatives for legislators, department or agency directors, local governments, and citizen groups to consider when they elect to address a specific highway safety concern.

This toolbox is a living document that will continue to provide information, direction, and ideas for highway safety decision makers. Any strategies selected for implementation by Iowa SMS or any other entity will require further development through identifying potential partners, entities impacted, potential funding, steps for implementation, evaluation, and other pertinent tasks.

RESOURCES

Information in this chapter is drawn from many individuals and sources. Known sources are listed here. **Contributors:** John Smith (primary), Gary Groat, Jari Mohs, and Mary Stahlhut.

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Enhancing Rail Safety Now and into the 21st Century—The FRA's Safety Programs and Initiatives:
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