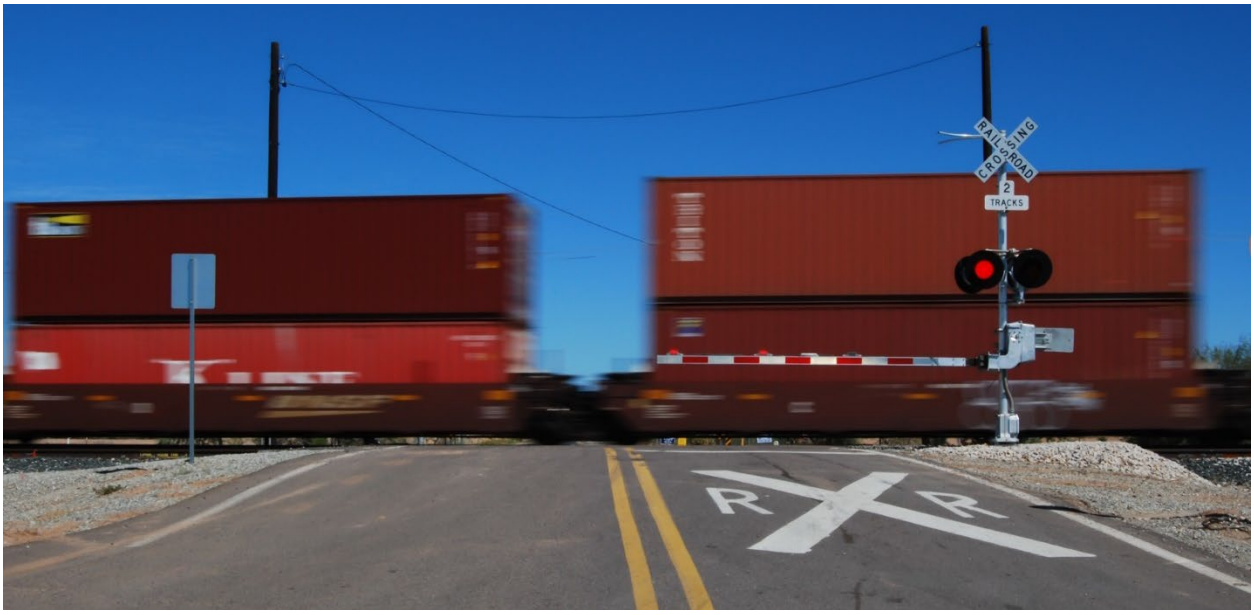
Railway-Highway Crossings Program Stakeholder Input Summary



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U.S. Department of Transportation
Federal Highway Administration

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List of Abbreviations

Abbreviation	Term
AADT	Annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
AAR	Association of American Railroads
ASLRRA	American Short Line and Regional Railroad Association
CFR	Code of Federal Regulations
CY	Calendar Year
DOT	U.S. Department of Transportation
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FY	Fiscal Year
GAO	Government Accountability Office
GCIS	Grade Crossing Inventory System
LED	Light-emitting diode
RAIRS	Railroad Accident Incident Reporting System
TMT	Train miles traveled
U.S.C.	United States Code
VMT	Vehicle miles traveled

Executive Summary

Introduction

The Federal Highway Administration (FHWA) and the Federal Railroad Administration (FRA) are responsible for improving and overseeing safety at public railway-highway crossings. A public railway-highway crossing is an intersection where a roadway that is under the jurisdiction of, and maintained by, a public authority crosses railroad tracks. Railway-highway crossings can be at-grade (i.e., the roadway and railroad intersect at the same level) or grade separated (i.e., there is physical separation between the roadway and railroad tracks).

The FHWA's Railway-Highway Crossings Program (23 United States Code (U.S.C.) 130), which is known as the Section 130 Program, provides funds to States for the elimination of hazards at railway-highway crossings, including crossings at roadways, bike trails, and pedestrian paths. The Section 130 Program funds are a set-aside portion of the Highway Safety Improvement Program (HSIP), which is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. Through the HSIP, States are provided with over 2 billion dollars each year for the implementation of highway safety improvement projects. In fiscal year (FY) 2020, the annual set-aside for the Section 130 Program was $245 million.

Senate Report 116-109, accompanying the Department of Transportation Appropriations Act, 2020 (Public Law 116-94), directed FHWA to conduct an evaluation of the Section 130 Program in order to identify challenges that could allow States to more strategically address problem areas, as follows:

> "Grade Crossing Safety.-- In 2017, there were more than 2,100 crashes, resulting in 273 fatalities, at highway-rail grade crossings. While Federal investment in grade crossing safety improvement has noticeably reduced the historical number of deaths and injuries at these crossings, the number of accidents has remained relatively static since 2009. FHWA's Railway-Highway Crossings Program is the primary Federal funding source for states to address safety issues at these crossings. In a recent report, the Government Accountability Office found that it was unclear whether that program remains effective in continuing to reduce the risk of crashes or fatalities at grade crossings. The Committee directs FHWA to conduct an evaluation of this program in order to identify challenges that could allow States to more strategically address problem areas. This evaluation should include: a comprehensive assessment of nationwide crash trends over multiple years in order to determine why crashes are continuing and what types of projects would be effective in eliminating those crashes; a re-examination of eligibility requirements that limit the flexibility of States to consider other types of projects, including research into and demonstrations of new types of pavement markings at grade crossings to improve driver behavior, as well as technology that would enable crossing infrastructure to communicate wirelessly with vehicles or mobile devices; and recommendations of any needed statutory changes to improve the program's effectiveness in reducing crashes and fatalities. The Committee directs the Department to produce a report summarizing the results of this evaluation within 1 year of enactment of this act."

In response to this requirement, FHWA engaged the John A. Volpe Center (Volpe Center) to conduct a study of the Section 130 Program. This report summarizes the results of the study.

Study Methodology

This FHWA study focused on two aspects:

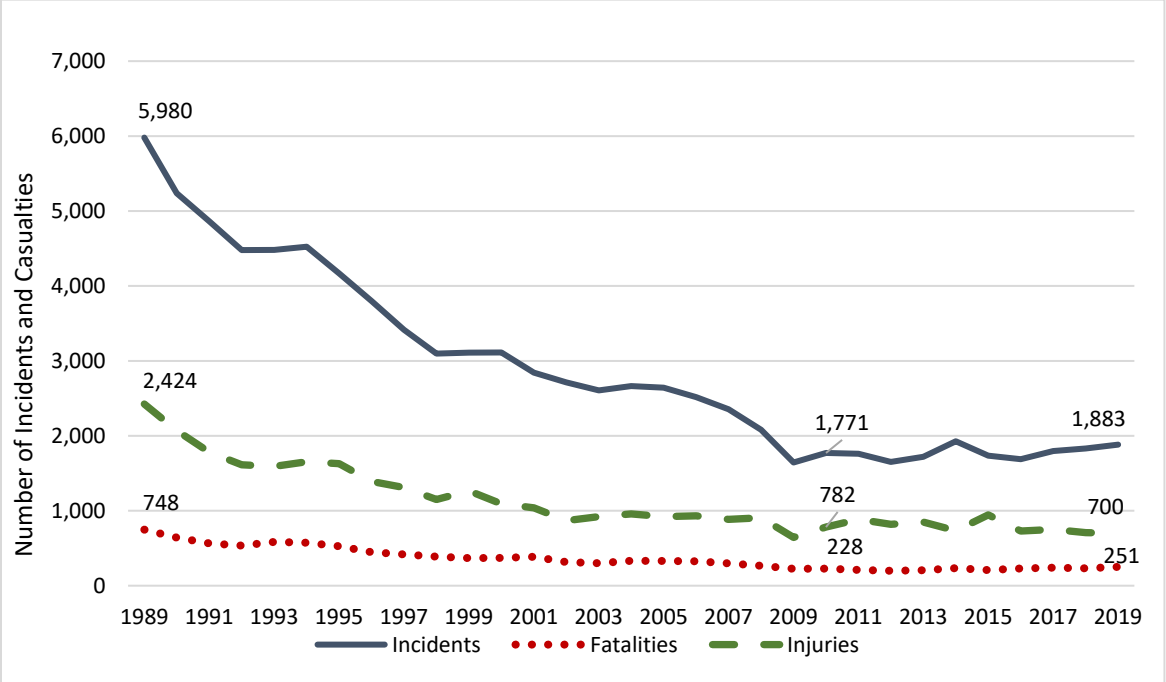
1. Assessing nationwide crash trends over a 10-year period to identify factors that are associated with crashes and the types of projects that would potentially be effective in eliminating those crashes, and
2. Gathering input from a sample of Section 130 stakeholders regarding:
    a. Experience with the Section 130 Program requirements on State railway-highway crossing programs and policies, and
    b. Flexibility to address current and emerging railway-highway crossing safety issues.

The study team conducted a 10-year nationwide crash trend analysis of incidents that occurred at public railway-highway at-grade crossings from 2010 to 2019 to identify factors that are associated with crashes and identify the types of projects that would potentially be effective in eliminating those crashes. The team also conducted a review of available literature to gain an understanding of the Section 130 Program structure and requirements. Finally, the team conducted in-depth, semi-structured interviews with representatives from nine States. Staff from FHWA Division Offices responsible for administering the Section 130 Program and FRA regional staff were also interviewed. Additional input was received from a Class I railroad and surface transportation association industry groups. To supplement the stakeholder interviews, the project team organized two focus groups and participated in workshops and conferences to collect additional input from stakeholders.

Crash Trend Data Analysis

From 1989 to 2019, there was overwhelming improvement in crossing safety, with the number of incidents reduced by 68 percent. However, from 2010 to 2019, there was an increase/stagnation in the number of incidents, fatalities, and injuries (see Figure 1). Over this 10-year period the overall number of incidents and fatalities increased by 6.3 percent and 10.1 percent respectively, while the overall number of injuries declined by 10.5 percent.

Figure 1: Public At-Grade Crossing Incident and Casualty Statistics from 1989-2019



Data notes: Data for all highway users includes pedestrians at public at-grade crossings. The data does not include reported cases of suicide/attempted suicide.

Data trends and effective practices to address factors associated with crashes at at-grade railway-highway crossings include, but are not limited to, the following:

- **Incidents by crossing type:** The majority of incidents at public at-grade crossings occurred at crossings equipped with gates. However, when compared evenly in terms of vehicle and train exposure, data shows that passive crossings have the highest risk, followed by crossings equipped with bells/flashing-light signals, and crossing equipped with gates have the lowest risk. Low-cost devices, such as LED-enhanced signage, maintenance of pavement markings and cleared vegetation for increased sight distance are effective practices to increase safety at passive crossings.
- **Incidents by road user type:** Over the 10-year period, personal vehicles (i.e., auto, pick-up truck, van, motorcycle, and other motor vehicles) accounted for approximately 70 percent of total incidents at public at-grade crossings, but 65 percent of total injuries and 52 percent of total fatalities. During this same period, commercial vehicles (i.e., truck, truck-trailer, bus, and school bus) accounted for about 20 percent of total incidents, 27 percent of total injuries, and 9 percent of total fatalities. Pedestrian incidents at public at-grade crossings account for 7 percent of all incidents, but about 33 percent of all fatalities.

  Appropriate signage can be an effective practice to address commercial vehicle safety. Effective treatments to address pedestrian safety include, but are not limited to, pedestrian channelization improvements, gate skirts, low-rise signals, pavement markings, innovative signage, swing gates, and second train warning signs.
- **Incidents by motorist action:** Motorists who failed to stop at the crossing accounted for the highest number of incidents (33.3 percent), followed by motorists who stopped on the crossing

(24.9 percent). Engineering treatments designed to prevent motorists from driving around lowered gates at at-grade railway-highway crossings include the use of median separation, such as delineators, barriers, raised curbs, or four-quadrant gates. In addition, law enforcement strategies focused on the enforcement of traffic safety laws at railway-highway grade crossings have also been effective at mitigating crossing risk.

- **Incidents by nearby intersection:** From 2010 to 2019, crossings nearest to a roadway intersection had the highest incident rates. One of the reasons traffic queues at a crossing is due to impacts from the operation of traffic signals at nearby roadway intersections. When the traffic signal turns red downstream from a crossing, vehicles may queue up past the railroad tracks if traffic signal preemption is not used. Traffic signal preemption allows the traffic signal downstream from the crossing to cycle to a green phase when a train is detected by the crossing train detection circuitry, thus allowing vehicular traffic to clear before the train arrival. Other strategies include, but are not limited to, the use of LED-enhanced grade crossing signs and dynamic envelope pavement markings to delineate the area around at-grade railroad crossings where motorists should not stop.
- **Incidents by demographic:** When normalized by vehicle miles (VMT), male drivers were almost two times more likely to be involved in at-grade crossing incidents than female drivers. When normalized by VMT, young drivers between the age of 16 and 19 had the highest rate of incidents overall.

Summary of Stakeholder Feedback

The following is a summary of the stakeholder feedback on the study's two topic areas.

Topic Area 1: Experience with the Section 130 Program requirements on railway-highway crossing programs and policies.

The structure of the Section 130 Program enables States to design a Railway-Highway Crossing Safety Program to meet its unique safety needs. Discussions with stakeholders indicate there is no standard process or criteria that States use to assess the safety or risk of a railway-highway crossing, or to prioritize projects for funding. Stakeholders reported that some of the Section 130 Program requirements may limit a State's ability to fund certain types of projects to address emerging crossing safety issues. Specifically, some stakeholders reported the requirement that 50 percent of funds be used for the installation of protective devices may impact a State's ability to address evolving railway-highway crossing safety needs. In order to continue achieving safety goals, some stakeholders indicated a greater proportion of Section 130 funding may assist in funding projects that go beyond protective devices, such as projects to make site improvements, construct grade separations, eliminate crossings, or install corridor traffic signal preemption systems. In addition, States' interpretation of Section 130 eligibility requirements may be limiting the types of railway-highway crossing safety projects that are funded. Several States have interpreted Federal-aid requirements regarding maintenance to preclude the replacement of functionally obsolete warning devices as well as the use of Section 130 funds on crossings that have been improved previously using Section 130 funds.

Topic Area 2: Flexibility to adequately address current and emerging railway-highway crossing safety issues.

Stakeholders identified several factors they feel affect their State's ability to implement effective practices to improve railway-highway crossing safety. First, the majority of stakeholders feel the requirement in 23 U.S.C. 130(f)(3) for a 10 percent non-Federal match limits their States' ability to fund

projects on local roads in certain localities, particularly those that are smaller and more rural. Stakeholders reported that this requirement reduces the effectiveness of the data-driven safety program by causing project selection decisions to be driven, in part, by a locality's ability to contribute the 10 percent match and not by crash risk. Second, stakeholders consider the $7,500 limit on the incentive payment, as per 23 U.S.C. 130(i)(3)(B), to a local government to close at-grade highway crossings to be insufficient to encourage municipalities to take this action. Third, stakeholders believe that restrictions on using Section 130 funds for education, enforcement, and trespass prevention may limit a State's ability to address the cause of some railway-highway crossing incidents related to driver/pedestrian behavior. Fourth, while States identify the important role that quality data plays in designing an effective Section 130 Program, few of them stated they use Section 130 funds to support data collection due to the associated administrative costs and confusion on what activities are eligible. Fifth, some stakeholders noted that limited funding restricts their States' ability to implement grade separation projects, which they report is one of the most effective strategies to improve safety. Sixth, several stakeholders noted that project and contract management challenges contribute to delays in Section 130 funded projects and some States' low obligation rates of Section 130 funding. Finally, input from the State departments of transportation (State DOT) staff highlighted the challenges they experience with measuring the effectiveness of individual railway-highway crossing safety projects.

Conclusion

Stakeholder input on the Section 130 Program highlights areas that may impact the effectiveness of the program. Stakeholders reported several factors that may limit States' ability to implement safety projects beyond protective devices, such as projects to construct grade separations, install traffic signal preemption systems along a corridor, or implement safety education and enforcement projects aimed at addressing driver behavior. Stakeholders also identified challenges regarding funding projects in certain localities, particularly those that are smaller and more rural.

On an ongoing basis, FHWA will assess whether any policy or regulatory changes would improve the program's effectiveness. The FHWA also will consider addressing some issues through continued and expanded outreach and education, including:

- Continue to compile and promote noteworthy practices and facilitate opportunities for peer-to-peer information sharing to enable practitioners to develop the knowledge, skills, and ability to implement effective railway-highway crossing safety programs;
- Clarify Section 130 Program eligibility requirements such as explaining the use of Section 130 funds for compilation and analysis of data, including examples of eligible activities;
- Encourage the improvement of data quality and sharing of data between railroads and local, State, and Federal Agencies;
- Increase awareness and education on the use of alternative contracting methods; and
- Encourage use of additional data to evaluate project effectiveness and share research on the types of projects that are most effective at addressing the causes of railway-highway casualties.

1. Introduction

The Federal Highway Administration (FHWA) Office of Safety initiated an effort to document stakeholder input regarding the effectiveness of the Railway-Highway Crossings Program. The FHWA engaged the Volpe Center to conduct the study. The following section provides an overview of the purpose of the study and an overview of the Railway-Highway Crossings Program.

1.1 Background and Study Purpose

The FHWA and FRA oversee programs that help improve safety at public railway-highway crossings. A public railway-highway crossing is an intersection where a roadway that is under the jurisdiction of, and maintained by, a public authority crosses railroad tracks. Railway-highway crossings can be at-grade (i.e., the roadway and railroad intersect at the same level) or grade separated (i.e., there is physical separation between the roadway and railroad tracks). The FHWA's Railway-Highway Crossings Program (23 U.S.C. 130), which is known as the Section 130 Program, provides funds to States for the elimination of hazards at railway-highway crossings, including crossings at roadways, bike trails, and pedestrian paths.

The Section 130 Program funds are a set-aside portion of the Highway Safety Improvement Program (HSIP), which is a core Federal-aid program with the purpose to achieve a reduction in traffic fatalities and serious injuries on all public roads. Through the HSIP, States are provided with over two billion dollars each year for the implementation of highway safety improvement projects. In FY 2020, the annual set-aside for the Section 130 Program was $245 million.

In 2017, the Government Accountability Office (GAO) reviewed Federal efforts to improve railway-highway crossing safety. As part of its review, GAO examined several aspects of the Federal Government's approach and recommended that FHWA evaluate the Section 130 Program's requirements to determine whether they allow States sufficient flexibility to adequately address current and emerging railway-highway crossing safety issues, and to determine whether statutory changes to the program are necessary to improve its effectiveness.[1] Similarly, in 2019, the Senate Committee on Appropriations directed FHWA to conduct an evaluation of the Section 130 Program in order to identify challenges that could allow States to more strategically address problem areas.

The FHWA engaged the Volpe Center to conduct a study of the Section 130 Program. This report summarizes the results of the study.

1.2 Section 130 Program Overview

The Section 130 Program provides funds for the elimination of hazards at public railway-highway crossings. These funds are apportioned to States by formula, which is based, in part, on the number of public railway-highway crossings in each State (23 U.S.C. 130(f)). As mentioned, in FY 2020, the annual set-aside for the Section 130 Program was $245 million. State's apportionment of Section 130 funding ranged from $1,225,000 to $20,481,394.[2]

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[1] GAO. November 2019. *GAO-19-80. Grade-Crossing Safety.* https://www.gao.gov/products/GAO-19-80

[2] FHWA. October 1, 2019. Notice 4510.837, *Apportionment of Federal-Aid Highway Program Funds for FY 2020*. Available at https://www.fhwa.dot.gov/legsregs/directives/notices/n4510837/n4510837_t1.cfm.

Section 130 Program funds are eligible for projects at public railway-highway crossings including roadways, bike trails, and pedestrian paths. Fifty percent of a State's apportionment is dedicated for the installation of protective devices at crossings (23 U.S.C. 130(e)). The remainder of the funds apportioned can be used for any hazard elimination project, including protective devices. In accordance with 23 U.S.C. 130(i), the funds can be used as incentive payments for local agencies to close public crossings provided there are matching funds from the railroad. Also, in accordance with 23 U.S.C. 130(h), the funds can be used for local agencies to provide matching funds for State-funded projects. Section 130 projects are funded at a 90 percent Federal share (23 U.S.C. 130(f)(3)).

Each State is required to conduct and maintain a survey of all highways to identify railroad crossings that may require separation, relocation, or protective devices and establish and implement a schedule of projects (23 U.S.C. 130(d)). At a minimum, this schedule is to provide signs for all railway-highway crossings. States are also required to submit annual reports on the progress of implementing their Railway-Highway Crossings Program (23 U.S.C. 130(g)). The FHWA Division Office staff oversee States' use of Section 130 Program funds, including ensuring that projects meet program eligibility requirements.

The FHWA's Office of Safety provides stakeholders a number of resources to support implementation of the Section 130 Program. In 2019, FHWA and FRA released an updated *Highway-Railway Crossing Handbook, Third Edition*[3], which provides information on prevalent and noteworthy practices as well as State-adopted standards relative to the design and operation of railway-highway crossings. The FHWA and FRA host an on-going joint Webinar series on a variety of railway-highway crossing safety topics.[4] The FHWA also documented noteworthy practices and organized several peer exchanges to provide opportunities for State DOTs to discuss and share effective practices on Section 130 Program administration and implementation.

1.3 Report Structure

The remainder of this report is organized as follows:

Section 2 describes the study methodology, including the data sources and data analysis methods.

Section 3 presents the nationwide crash trend data analysis.

Section 4 summarizes the stakeholder input gathered as part of the study.

Section 5 identifies factors that are associated with crashes and the types of projects that would potentially be effective in eliminating those crashes. It also outlines areas that may improve the effectiveness of the Section 130 Program, based on stakeholder input.

Appendix A provides information on the stakeholder input approach, including a list of interviewees and focus group participants, as well as the interview and discussion guide.

[3] FHWA. July 2019. *Highway-Rail Crossing Handbook, 3rd Edition.* https://safety.fhwa.dot.gov/hsip/xings/com_roaduser/fhwasa18040/fhwasa18040v2.pdf

[4] Recordings of the FHWA-FRA Joint Webinar Series webinars are available on FHWA's Section 130 Program website at https://safety.fhwa.dot.gov/hsip/xings/.

2. Study Design

This FHWA study focused on two aspects:

1. A comprehensive assessment of nationwide crash trends over a 10-year period to identify factors that are associated with crashes and the types of projects that would potentially be effective in eliminating those crashes, and
2. Gathering input from a sample of Section 130 stakeholders regarding:
    a. Experience with the Section 130 Program requirements on State Railway-Highway Crossing programs and policies;
    b. Flexibility to address current and emerging railway-highway crossing safety issues;

2.1 Study Methodology

The project team used three primary data collection methodologies to inform this study:

- Crash trend data analysis;
- Literature and document review;
- Stakeholder input via interviews, focus groups, and an interactive conference session.

2.1.1 Crash Trend Data Analysis

The study team conducted a 10-year nationwide crash trends analysis of incidents that occurred at public railway-highway at-grade crossings from 2010 to 2019 to identify factors that are associated with crashes and identify the types of projects that would potentially be effective in eliminating those crashes.

The primary source of data for the crash trend analysis is FRA Office of Railroad Safety Data Analysis website.[5] Crossing incident data was downloaded from the Railroad Accident Incident Reporting System (RAIRS) database[6] and crossing inventory data was downloaded from the Grade Crossing Inventory System (GCIS) database.[7] The FRA GCIS database contains all U.S. public and private railway-highway grade crossings, with detailed current and historical information on individual crossings. Only active public at-grade crossings were considered for this analysis.

2.1.2 Literature and Document Review

The project team conducted a literature review to gain an initial understanding of the Section 130 Program structure and requirements. The team reviewed program requirements, FHWA Section 130 Program website,[8] the 2016 and 2018 FHWA Railway-Highway Crossing Program Biennial Reports to

[5] FRA Office of Safety Analysis website. Available at https://safetydata.fra.dot.gov/OfficeofSafety/default.aspx

[6] FRA Office of Safety Analysis website. Accident Data as reported by Railroads. Available at https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/on_the_fly_download.aspx

[7] FRA Office of Safety Analysis website. Highway-Rail Crossing Database Files and Reports. Available at https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/DownloadCrossingInventoryData.aspx

[8] FHWA. Railway-Highway Crossings (Section 130) Program. Available at https://safety.fhwa.dot.gov/hsip/xings/#

Congress, and the GAO *Grade-Crossing Safety* Report. Findings from the initial literature review were used to develop the study approach and interview guides.

The team also reviewed Section 130 Program documentation for each of the nine States in the interview sample (described below). The team reviewed the Railway-Highway Crossings (Section 130) Program annual reports for FY 2013 through FY 2018. These annual reports provided information on the State's Section 130 Program structure, project selection methods, methods used to measure effectiveness, and project metrics data. The team also reviewed the State railway-highway crossing action plans (when available).

2.1.3 Stakeholder Input

The project team conducted stakeholder interviews and focus groups, and participated in workshops and conferences to collect feedback from a broad group of stakeholders.

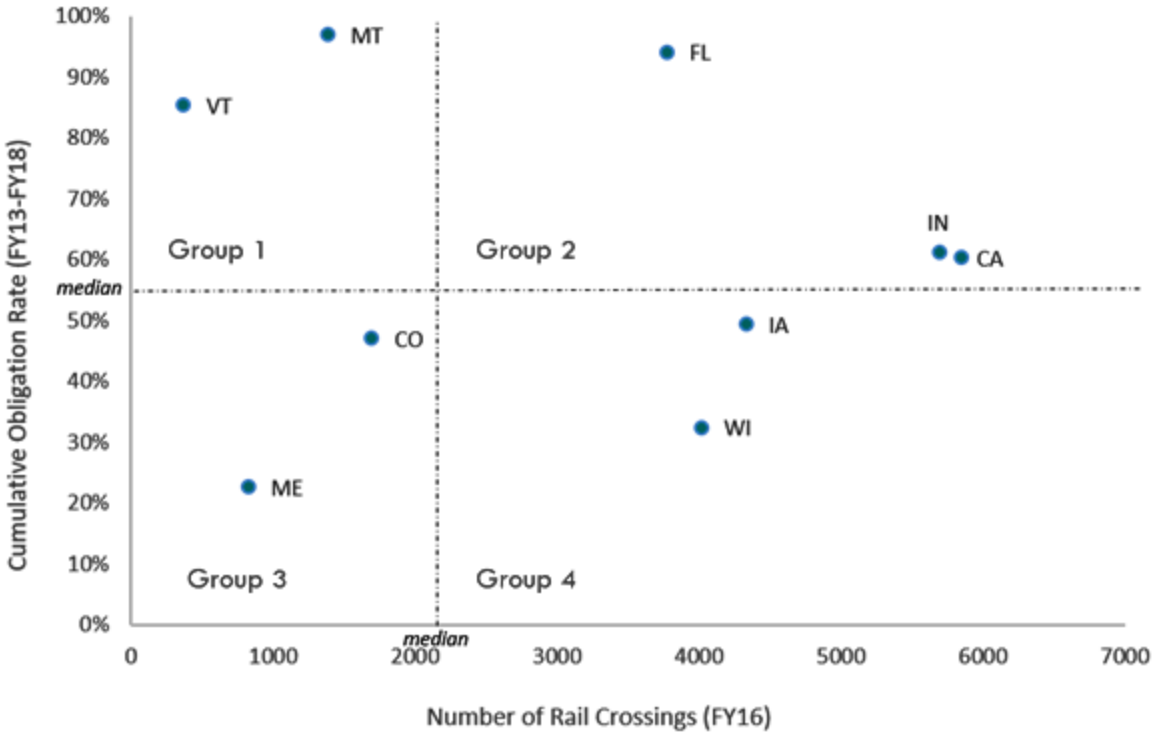
Stakeholder Interviews

The project team used a stratified purposeful sampling approach to select a non-generalizable sample of nine States to interview. The sample was selected to explore how States administer the Section 130 Program under a variety of conditions. The project team used two primary criteria to select the interview sample: the six-year cumulative obligation rate of Section 130 funds (FY 2013 to FY 2018)[9] and the number of public at-grade railway-highway crossings (calendar year 2016)[10]. The team organized the States into four subgroups – high obligation rate/low number of crossings; high obligation rate/high number of crossings; low obligation rate/low number of crossings; and low obligation rate/high number of crossings (see Figure 2). The team selected two States from each subgroup to provide a diverse cross-section, plus one additional State. The project team considered geographical diversity and recommendations from the FHWA Office of Safety when selecting the States to include in the sample. The nine States in the sample were: California, Colorado, Florida, Indiana, Iowa, Maine, Montana, Vermont, and Wisconsin.

[9] FHWA. Obligation Rates for the HSIP. Table 3: Moving Ahead for Progress in the 21st Century Act and Fixing America's Surface Transportation Act Cumulative RCHP Cumulative Obligation Rates by State. Available at https://safety.fhwa.dot.gov/hsip/gen_info/slorhsip/

[10] FHWA. *2018 Railway-Highway Crossing Program Biennial Report to Congress.*

Figure 2: Interview Sample Selection



Between May 2019 and December 2019, the project team conducted in-depth, semi-structured telephone interviews with staff from the nine States, FHWA Division Offices, and FRA regional offices.

The team also spoke with one Class I railroad[11], and three surface transportation association industry groups – the American Association of State Highway and Transportation Officials (AASHTO), the Association of American Railroads (AAR), and the American Short Line and Regional Railroad Association (ASLRRA). See Appendix A for a complete list of participants.

The interviews were designed to address each topic area. Interviewees were provided a list of questions in advance (see Appendix A for the interview guide). The team assured all interviewees that their identities would remain confidential in order to achieve unbiased answers to interview questions.

Focus Groups and Conference Sessions

To supplement the stakeholder interviews, the project team organized two focus groups and participated in workshops and conferences to collect additional input from stakeholders. The project team conducted the two focus groups in July 2019 and September 2019 as part of FHWA-sponsored peer exchanges focused on the administration and implementation of the Section 130 Program. Forty participants representing 24 States participated in the focus groups. The participants included representatives from FHWA Division Offices, State DOTs, and rail commissions (see Appendix A for a complete list of focus group participants). The focus group participants discussed a similar set of topics as discussed in the stakeholder interviews. Each focus group discussion lasted 90 minutes.

The team also collected feedback from additional stakeholders through participation at several workshops, including the FRA Listening Session on Railway-highway Grade Crossing Safety (April 2019)

[11] The study team requested an interview with a second Class I railroad but did not receive a response.

and the FRA Grade Crossing Technology Symposium (November 2019). In addition, the team hosted a booth at the jointly sponsored FHWA and AASHTO National Safety Engineer Peer Exchange (July 2019) to collect input from participants. The team also led an interactive session at the National Railway-highway Grade Crossing Safety Conference (August 2019) to collect input from conference participants. The interactive session lasted approximately 60 minutes; the topics discussed aligned with those discussed in the interviews and focus groups. The team also hosted a booth at the conference to collect additional stakeholder input.

2.1.4 Qualitative Analysis of Stakeholder Input and Document Review

To identify prevalent themes across interviewees, the project team coded the interview notes, grouping common responses and marking unusual responses. The team compared the feedback gathered across the stakeholder interviews to the input collected in the focus groups and at the various conferences to identify converging, complementary, or contradictory information and to assess the validity of the documented input. Where applicable, the analysis indicates the representativeness of a reported response provided by the interview sample (e.g., five out of eight States reported). Due to the nature and structure of the focus groups, interactive conference session, and input collected via the conference booths, the frequency of the feedback collected through these methods is not quantified. Instead, the documented input indicates whether the input provided by the focus group and conference participants aligns with or differs from that of the interviewees.

3. Crash Trend Data Analysis

This section presents the results of the 10-year nationwide crash trends analysis from 2010 to 2019, including the factors that are associated with crashes and what types of projects would potentially be effective in eliminating those crashes.

3.1 Types of Public At-Grade Crossings

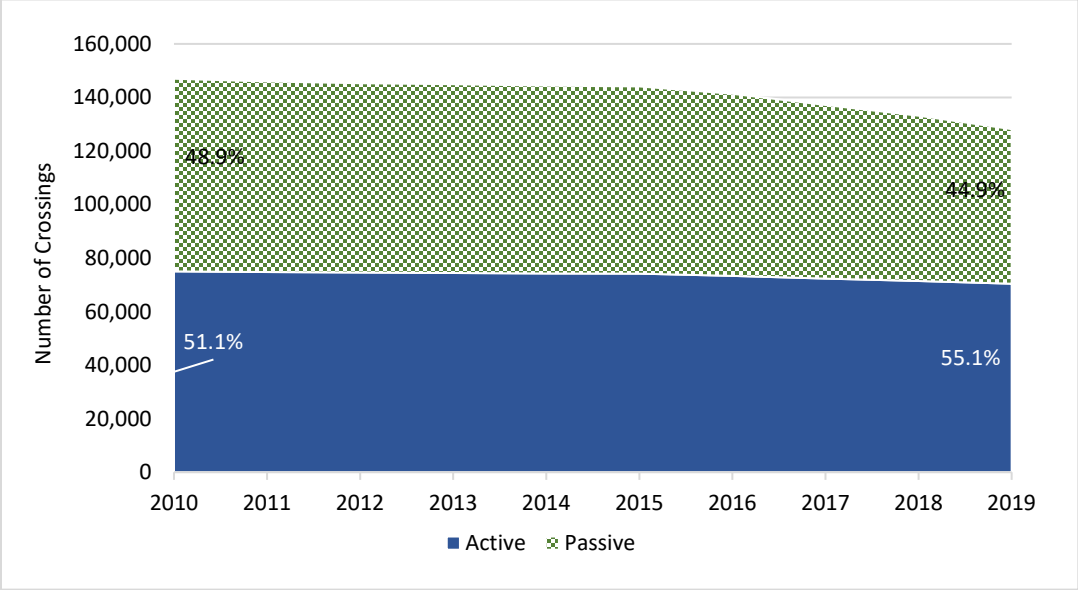
Public at-grade crossings are classified as either active or passive based on the type of warning devices present at each crossing. Active crossings are those equipped with flashing-light signals with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of rail traffic at grade crossings. A passive crossing is a crossing where there are no automatic traffic control devices associated with an active crossing warning system and the traffic control devices consist entirely of signs and/or markings.

Warning devices associated with active versus passive crossings include:

- Active crossings:
  - Gates:
    - Two quadrant gate systems
    - Four quadrant gate systems
    - Pedestrian gates
  - Bells/Flashing-Light Signals
    - Highway traffic signals, or other activated traffic control device Flashing-Light Signals
    - Bells or wayside horn systems
- Passive crossings:
  - Stop or Yield signs
  - Crossbuck Assemblies
  - Other signs
  - Pavement markings

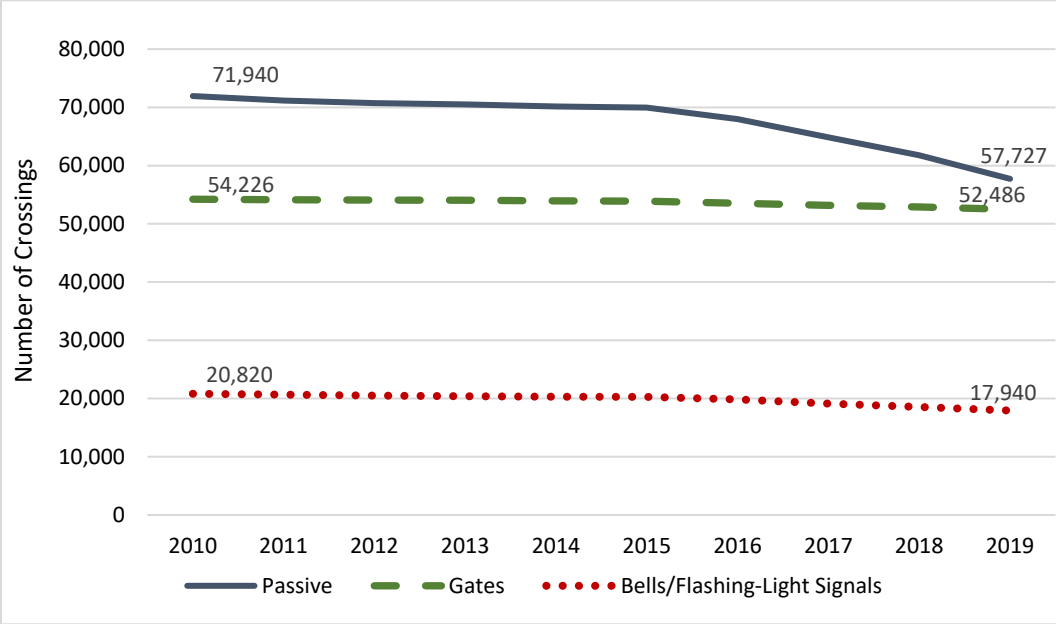
Figure 3 shows the breakdown of public at-grade crossings by active versus passive. The number of public at-grade passive crossings decreased by 12.8 percent from 146,986 in 2010 to 128,153 in 2019. This decrease is mostly due to an increase in the number of passive crossings that were closed or upgraded to active crossings over that time (see Figure 4). The overall number of passive crossings decreased by 19.8 percent from 2010 to 2019, followed by the number of crossings with bells/flashing-light signals at 13.8 percent. The number of crossings with gates experienced the smallest relative decline at 3.2 percent.

Figure 3: Inventory of Public, At-Grade Railway-Highway Crossings, Active vs. Passive, 2010-2019



Data source: FRA GCIS

Figure 4: Inventory of Public, At-Grade Railway-Highway Crossings by Warning Devices, 2010-2019



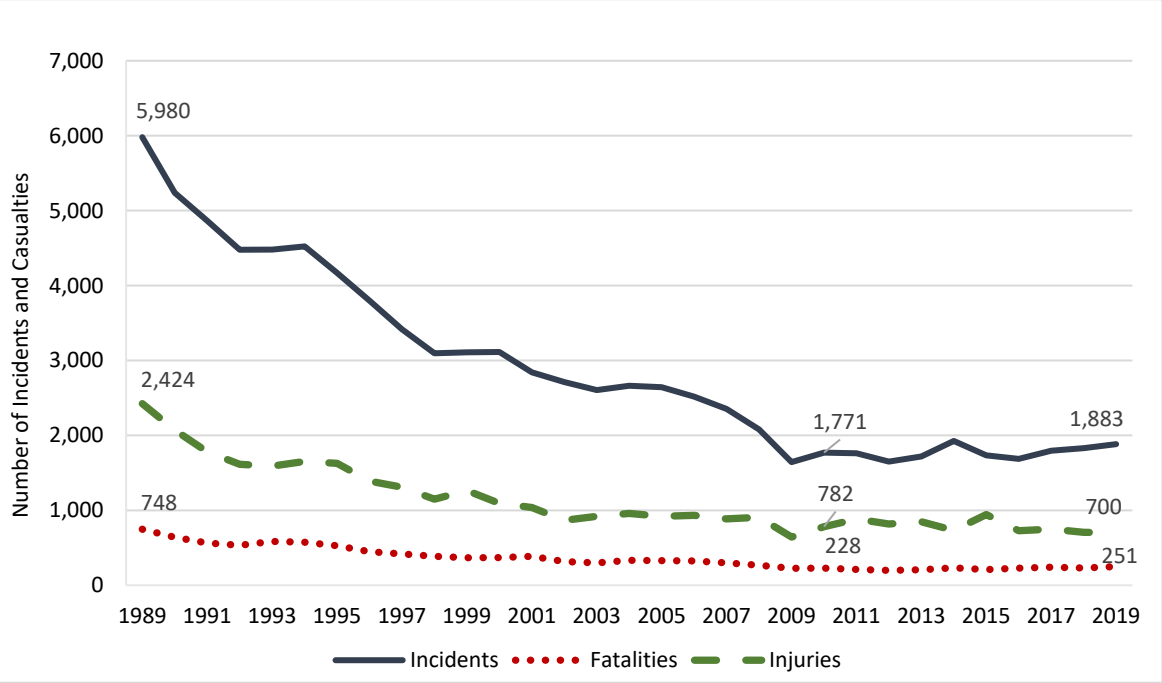
Data source: FRA GCIS

3.2 At-Grade Crossing Incidents

From 1989 to 2019, there was overwhelming improvement in railway-highway at-grade crossing safety, with the number of incidents reduced by 68.5 percent. However, from 2010 to 2019, there was an increase/stagnation in the number of incidents, fatalities, and injuries (see Figure 5). Over this 10-year

period the overall number of incidents and fatalities increased by 6.3 percent and 10.1 percent respectively, while the overall number of injuries declined by 10.5 percent.

Figure 5: Public At-Grade Crossing Incident and Casualty Statistics from 1989-2019



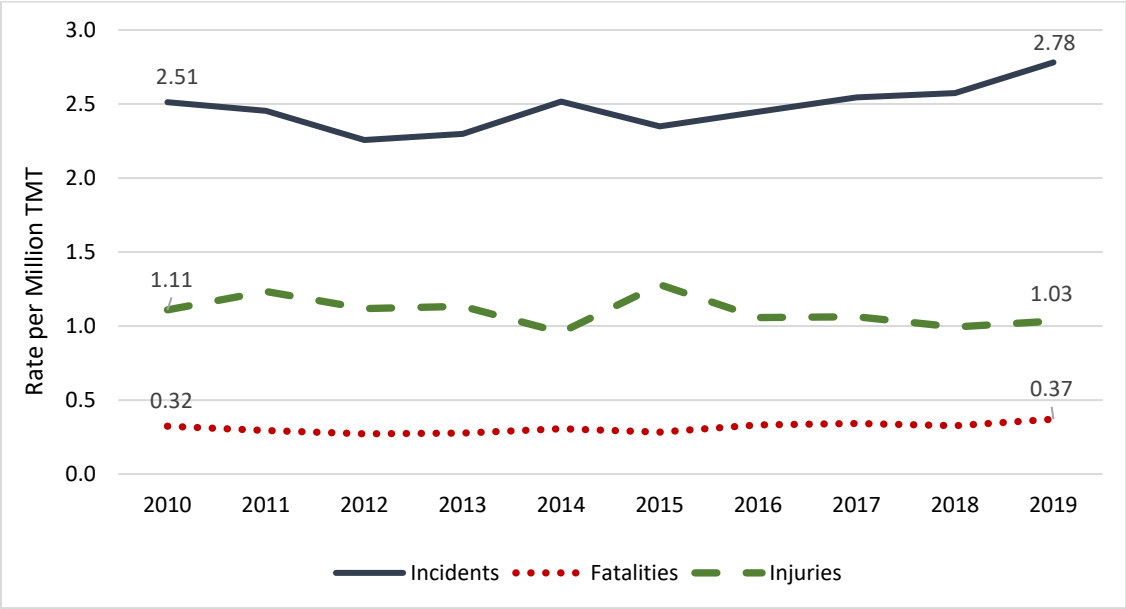
Data source: FRA RAIRS database. Data for all highway users includes pedestrians at public at-grade crossings. The data does not include reported cases of suicide/attempted suicide.

When normalized with respect to million train miles traveled (TMT)[12], the trends for public at-grade crossings incidents, injuries and fatalities are similar to the raw incident data shown above (see Figure 6). Incidents and fatalities per million TMT increased by 10.7 percent and 14.6 percent respectively, while the rate of injuries per million TMT decreased by 6.8 percent. When normalized with respect to billion vehicle miles traveled (VMT)[13] there was a decrease in incidents, injuries, and fatalities rates (3.5 percent, 18.8 percent, and 0.1 percent respectively) from 2010 to 2019 (see Figure 7).

[12] Data for train miles traveled was obtained from the FRA Office of Safety Analysis website. Available at https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/rrstab.aspx (Accessed in March 2020)

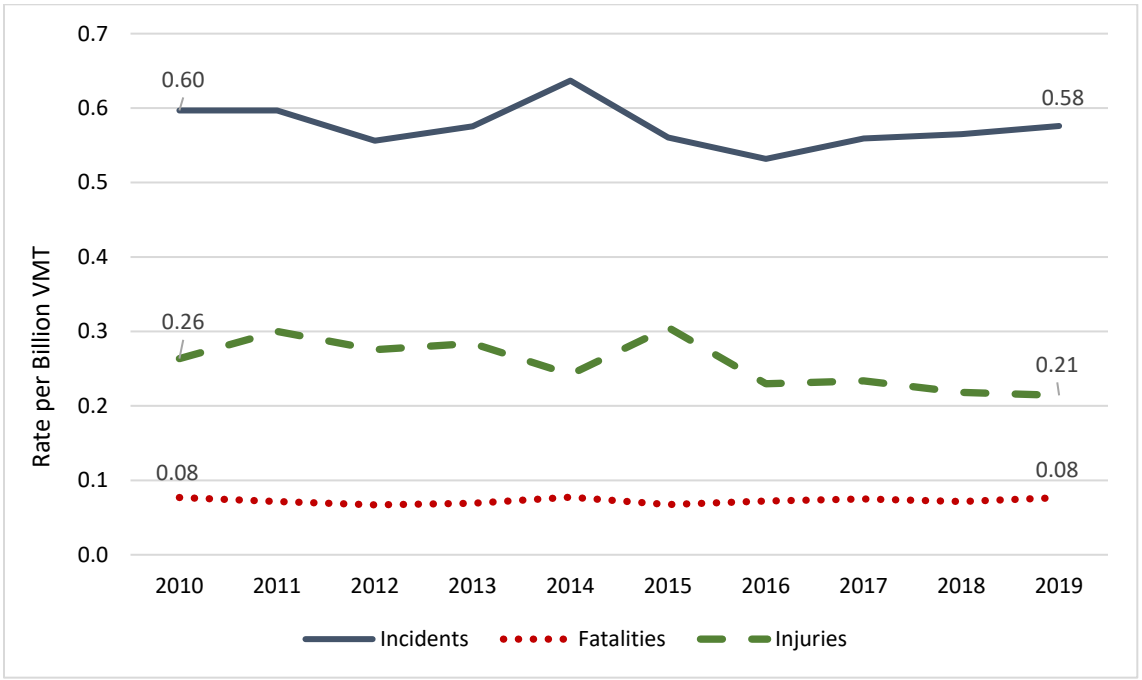
[13] Data for vehicle miles traveled was obtained from the FHWA Office of Highway Policy Information website. Available at https://www.fhwa.dot.gov/policyinformation/travel_monitoring/19dectvt/19dectvt.pdf (Accessed in March 2020)

Figure 6: Public At-Grade Crossing Incidents and Casualties per Million Train Miles Traveled, 2010-2019



Data sources: Crossing incident data from FRA RAIRS database and TMT data from FRA Office of Safety Analysis website.

Figure 7: Public At-Grade Crossing Incidents and Casualties per Billion Vehicle Miles Traveled, 2010-2019

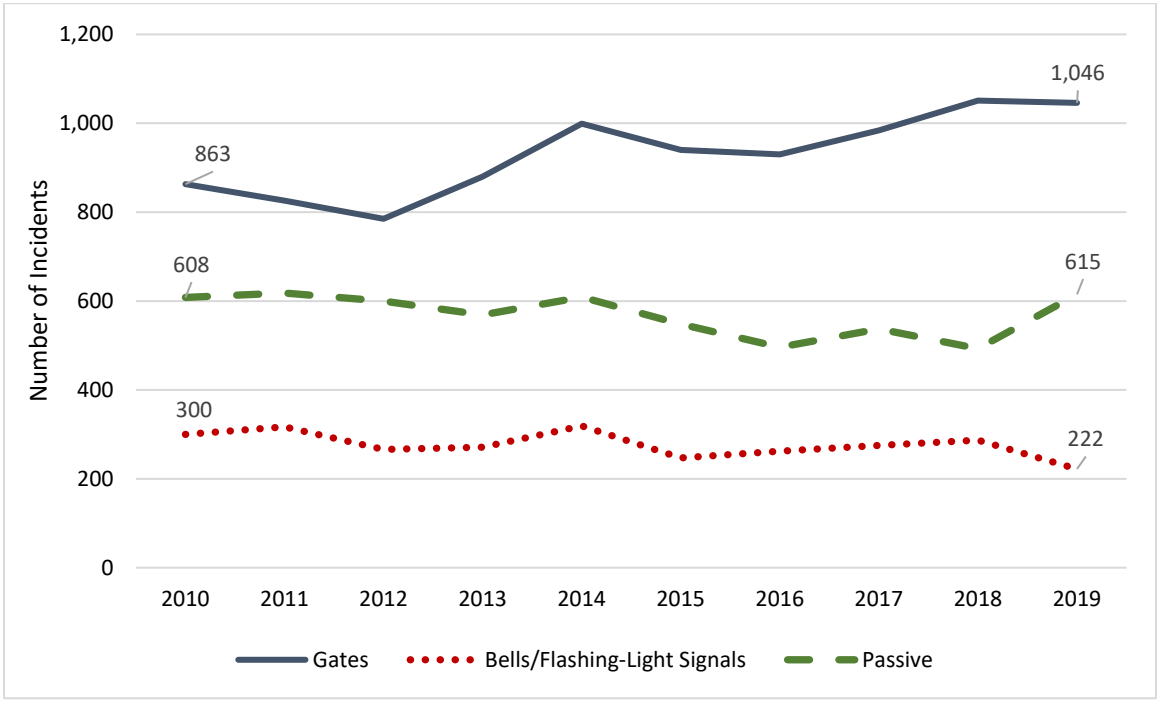


Data sources: Crossing incident data from FRA RAIRS database and VMT from FHWA Office of Highway Policy Information website.

3.2.1 Incidents by Crossing Type

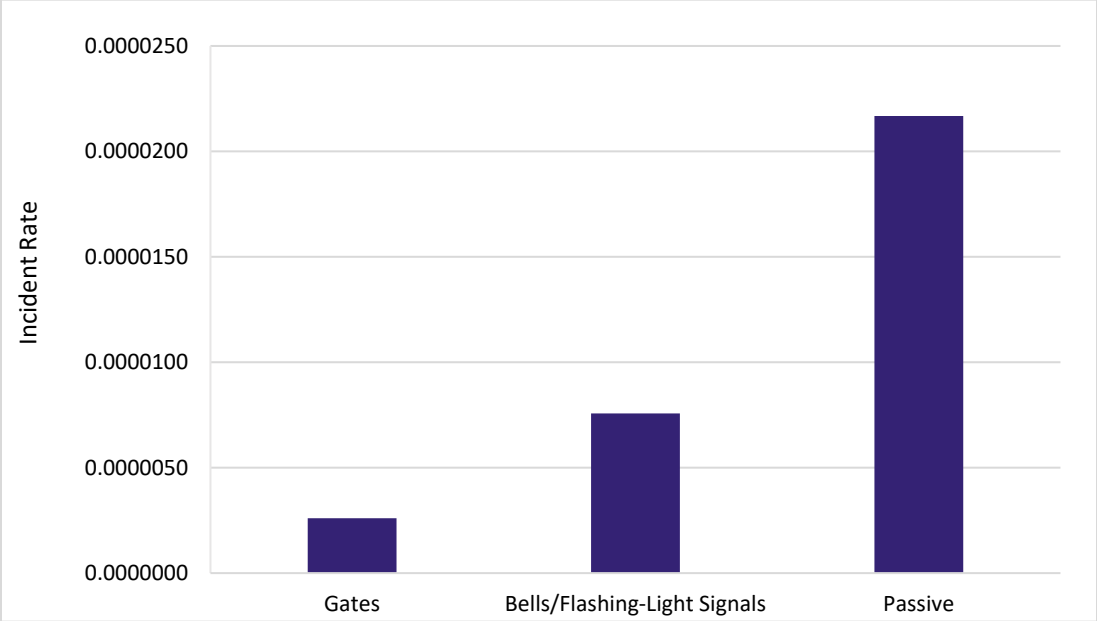
The majority of incidents at public at-grade crossings occurred at crossings equipped with gates (see Figure 8). The proportion of incidents at crossings equipped with gates increased from 48.7 percent in 2010 to 55.5 percent in 2019. This may be expected, as the proportion of crossings equipped with gates also increased over this period. When normalized by the total number of crossings by type per year, crossings equipped with gates had the highest rate of incidents per crossing, followed by crossings equipped with bells/flashing-light signals and passive crossings. However, when each crossing type is compared evenly in terms of vehicle and train exposure, data shows that passive crossings have the highest risk and crossings equipped with gates have the lowest risk (see Figure 9).

Figure 8: Public At-Grade Crossing Incidents by Warning Devices, 2010-2019



Data source: FRA GCIS database

Figure 9: Incidents by Crossing Type per Crossing per Train per Vehicle, 2010-2019



Data sources: Crossing incident data from FRA RAIRS database and crossing inventory data from FRA GCIS database. Number of crossings, trains, and vehicles is based on 2019 crossing inventory data.

3.2.2 Incidents by Road User Type

Table 1 shows the breakdown of the at-grade crossing incidents at public crossings by highway user.

Table 1: Public At-Grade Crossing Incidents by Highway User, 2010-2019

Vehicle Type	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	Percent
Personal Vehicles	**1,258**	**1,225**	**1,151**	**1,205**	**1,334**	**1,230**	**1,192**	**1,279**	**1,276**	**1,317**	**12,467**	**70.2%**
Auto	852	882	796	858	939	833	817	881	892	943	8693	*48.9%*
Pick-up truck	260	221	216	219	243	226	212	214	244	209	2264	*12.7%*
Van	52	47	56	48	54	61	40	49	35	38	480	*2.7%*
Motorcycle	3	5	6	6	9	7	7	8	6	4	61	*0.3%*
Other motor vehicles	91	70	77	74	89	103	116	127	99	123	969	*5.5%*
Commercial Vehicle	**341**	**384**	**364**	**372**	**414**	**332**	**316**	**333**	**348**	**349**	**3553**	**20.0%**
Truck	103	112	118	131	132	103	82	74	98	94	1047	5.9%
Truck-trailer	234	270	243	239	281	226	231	254	246	249	2473	13.9%
Bus	4	2	3	2	1	3	3	5	4	6	33	0.2%
School bus	0	0	1	0	0	1	0	2	0	3	7	0.0%
Pedestrian	**139**	**112**	**96**	**103**	**124**	**117**	**126**	**137**	**158**	**151**	**1263**	**7.1%**
Other	**33**	**40**	**39**	**40**	**55**	**55**	**54**	**45**	**49**	**63**	**473**	**2.7%**
Total	**1,771**	**1,761**	**1,651**	**1,720**	**1,927**	**1,735**	**1,688**	**1,796**	**1,831**	**1,883**	**17,763**	

Data source: FRA RAIRS database.

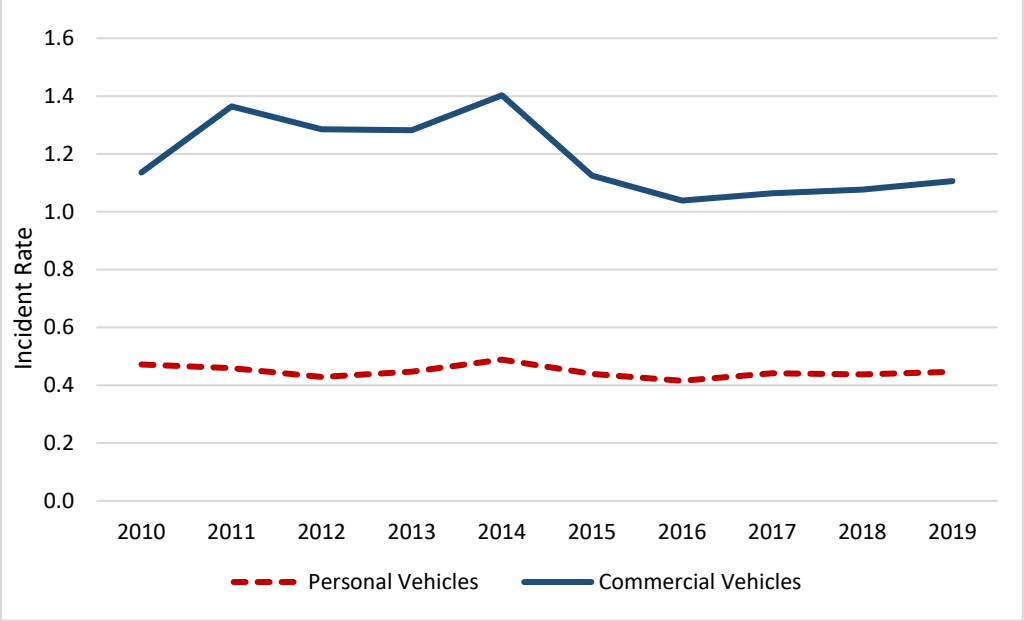
Personal Vehicles

Over the 10-year period, personal vehicles (i.e. auto, pick-up truck, van, motorcycle, and other motor vehicles) accounted for approximately 70 percent of total incidents at public at-grade railway-highway crossings, but accounted for 65 percent of total injuries and 52 percent of total fatalities. Although there was no change in the proportion of incidents involving personal vehicles over this period, a linear trend shows an increase in the proportion of injuries involving personal vehicles and a decrease in the proportion of fatalities involving personal vehicles.

Commercial Vehicles

Over the 10-year period, commercial vehicles (i.e. truck, truck-trailer, bus, and school bus) accounted for about 20 percent of total incidents at railway-highway crossings, but accounted for about 27 percent of total injuries and about 9 percent of total fatalities. A linear trend shows a decrease in the proportion of both incidents and casualties involving commercial vehicles. Although personal vehicles accounted for a higher proportion of incidents than commercial vehicles, commercial vehicles had a higher incident rate than personal vehicles when normalized by VMT (see Figure 10).

Figure 10: Public At-Grade Crossing Incident Rate by Highway User Type per Billion VMT, 2010-2019



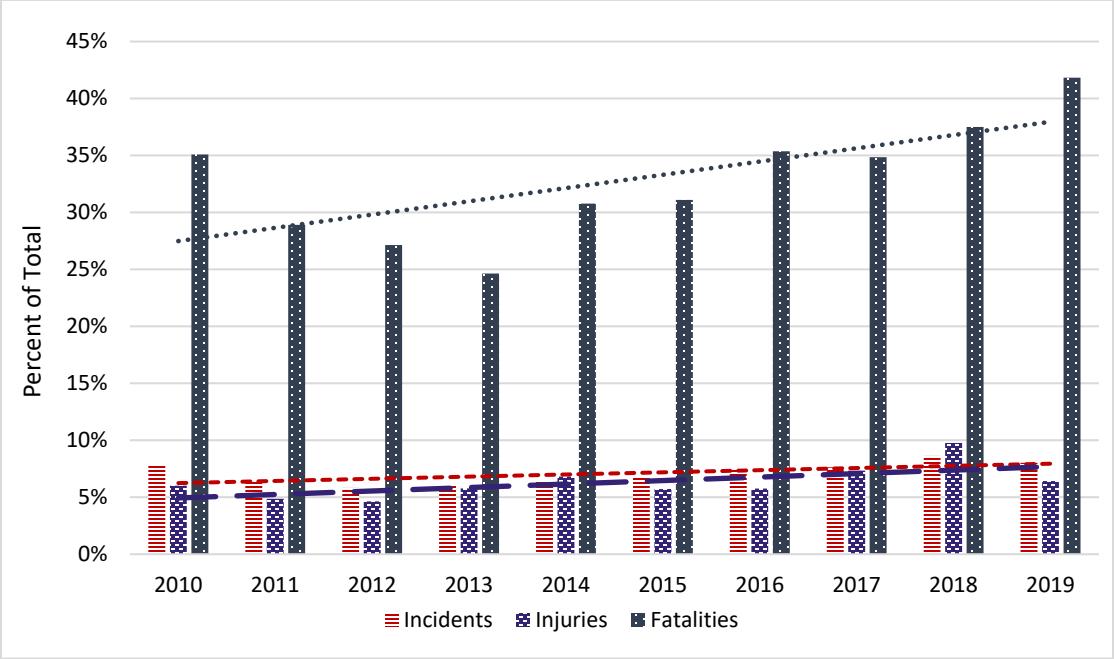
Data sources: Crossing incident data from FRA RAIRS database and VMT from FHWA Office of Highway Policy Information website.

Pedestrians

Over the 10-year study period, pedestrian incidents accounted for about 7 percent of all incidents and pedestrian injuries accounted for about 6 percent of all injuries. However, despite only accounting for 7 percent of all incidents, pedestrian fatalities accounted for about 33 percent of all fatalities and have increased by almost 20 percent from about 35 percent in 2010 to about 42 percent in 2019 (see Figure 11).

There was a total of 740 pedestrian fatalities over the 10-year study period. Of the total, almost 92 percent occurred at crossings equipped with gates and almost half of fatalities that occurred at gated crossings resulted from pedestrians walking around the gates.

Figure 11: Proportion of Total Public At-Grade Crossing Incidents, Injuries, and Fatalities for Pedestrians, 2010-2019



Data source: FRA RAIRS database

3.2.3 Incidents by Motorist Action

Table 2 shows the distribution of incidents at public at-grade railway-highway crossings by motorist action immediately prior to an incident, as coded in the RAIRS database. Table 3 shows the distribution of fatalities at public at-grade railway-highway crossings by motorist action immediately prior to an incident. Motorists who failed to stop at the crossing accounted for the highest number of incidents (33.3 percent), followed by motorists who stopped on the crossing (24.9 percent). The number of incidents involving motorists who failed to stop at the crossing decreased by 6.4 percent, but incidents involving motorists who stopped on the crossing increased by 44.1 percent from 2010 to 2019.

Although incidents involving highway users going around the gates accounted for 16.4 percent of all incidents, they accounted for a disproportionately large number of fatalities (35.2 percent). The number of fatalities in this group increased by 118 percent from 2010 to 2019. Pedestrian fatalities accounted for 41.6 percent of all fatalities involving highway users going around the gates.

Table 2: Distribution of Public At-Grade Crossing Incidents by Motorist Action, 2010-2019

Motorist Action	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	Percent of Total
Did not stop	625	667	603	588	635	562	517	563	575	585	5,920	33%
Stopped on crossing	363	426	449	481	548	439	371	371	454	523	4,425	25%
Went around the gates*	264	257	238	260	316	255	310	312	334	368	2,914	16%
Other	274	238	211	263	266	293	277	363	264	215	2,664	15%
Stopped and then proceeded	107	92	91	71	93	85	114	93	89	81	916	5%
Went thru the gate**	0	29	54	50	67	96	95	90	102	98	681	4%
Went around/ thru temporary barricade**	0	0	1	0	0	4	4	2	9	8	28	0%
Blank	138	52	3	7	2	1	0	2	3	5	215	1%
Total	**1,771**	**1,761**	**1,651**	**1,720**	**1,927**	**1,735**	**1,688**	**1,796**	**1,831**	**1,883**	**17,763**	

Data source: FRA RAIRS database
** Category name change as of June 1, 2011*
*** New Motorist Action category; action was not available in RAIRS prior to June 1, 2011*

Table 3: Distribution of Public At-Grade Crossing Fatalities by Motorist Action, 2010-2019

Motorist Action	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	Percent of Total
Went around the gates*	50	60	61	68	87	81	87	89	96	109	788	35%
Did not stop	65	66	67	66	69	50	55	64	52	51	605	27%
Other	13	23	33	19	25	26	42	47	28	26	282	13%
Stopped on crossing	15	18	22	32	35	35	22	17	22	38	256	11%
Stopped and then proceeded	6	1	6	5	5	4	14	6	14	10	71	3%
Blank	79	29	2	4	1	1	0	0	4	4	124	6%
Went thru the gate**	0	14	8	13	12	12	9	18	16	13	115	5%
Went around/thru temporary barricade**	0	0	0	0	0	0	0	0	0	0	0	0%
Total	**228**	**211**	**199**	**207**	**234**	**209**	**229**	**241**	**232**	**251**	**2,241**	

Data source: FRA RAIRS database
** Category name change as of June 1, 2011*
*** New Motorist Action category; action was not available in RAIRS prior to June 1, 2011*

3.2.4 Incidents by Nearby Intersection

One of the reasons traffic queues at a crossing is due to impacts from the operation of traffic signals at a nearby roadway intersection. When the traffic signal turns red downstream from a crossing, vehicles may queue past the railroad tracks if traffic signal preemption is not used. Traffic signal preemption allows the traffic signal downstream from the crossing to cycle to a green phase when a train is detected by the crossing train detection circuitry, thus allowing vehicular traffic to clear before the train arrival. Table 4 provides the distribution of public at-grade crossings and incidents by proximity to a nearby roadway/highway intersection. From 2010 to 2019, crossings nearest to a roadway/highway intersection had the highest incident rates.

Table 4: Effect of Nearby Intersection on Public At-Grade Crossing Incident Rate, 2010-2019

Distance to nearby Intersecting Highway	Number of Grade Crossings	2010-2019 Incidents	Incidents per Crossing
Less than 75 feet	46,412	8,417	0.1814
75 to 200 feet	14,894	2,085	0.1400
200 to 500 feet	9,240	1,361	0.1473
N/A	57,421	5,900	0.1027
Total	127,967	17,763	0.1388

Data source: The FRA GCIS database contains information about distance to the nearest intersection. The incident rate was calculated for each group by dividing the number of incidents in that group (from FRA RAIRS database) by the number of public at-grade crossing in that group (from the FRA GCIS database).

3.2.5 Incidents by Demographic

Over the 10-year period from 2010 to 2019, approximately 69 percent of the incidents involved male drivers and approximately 26 percent involved female drivers. When normalized by VMT, male drivers were still almost two times more likely to be involved in at-grade crossing incidents than female drivers.

The majority of the incidents at public at-grade crossings involved individuals between the age of 30 and 59. When normalized by VMT, young drivers between the age of 16 and 19 had the highest rate of incidents, at a rate of 1.49 incidents per billion VMT.

4. Summary of Stakeholder Input

This section summarizes the stakeholder input received from the study sample. The feedback, summarized in Table 6, cannot be generalized to the broader population of Section 130 stakeholders.

Table 5: Summary of Stakeholder Input

Topic Area	Stakeholder Feedback
1. Experience with the Section 130 Program requirements on railway-highway crossing programs and policies	1A. States reported they have the flexibility to develop and design their Section 130 Programs to address the States' specific safety context.
	1B. Stakeholders reported that the requirement in 23 U.S.C. 130 (e)(1) that 50 percent of funds be used for the installation of protective devices largely aligns with States' current crossing safety needs, but may not do so in the future as State's railway-highway crossing safety programs continue to mature.
	1C. Stakeholders offered that States' varying interpretation of eligibility may limit projects.
2. Flexibility to address current and emerging railway-highway crossing safety issues	2A. Stakeholder feedback is that the non-Federal match requirement in 23 U.S.C. 130(f)(3) may limit project selection.
	2B. Stakeholder feedback is that the incentive payment in 23 U.S.C. 130(i)(3)(B) is too low to encourage communities to close at-grade railway-highway crossings.
	2C. Stakeholders believe that expanding eligibility to education and enforcement projects may improve safety outcomes.
	2D. States reported data needs, but few use Section 130 funds to support data collection.
	2E. Stakeholder feedback is that limited funding may restrict States' ability to implement railway-highway grade separation projects.
	2F. States offered that, in their experience, project and contract management challenges can contribute to project delays and low obligation rates.
	2G. Stakeholders reported it can be difficult to measure the effectiveness of individual projects.

4.1 Topic Area 1: Stakeholder experience with Section 130 Program requirements on State railway-highway crossing programs and policies

1A: States reported they have the flexibility to develop and design their Section 130 Programs to address the States' safety context.

States use a variety of methods to measure the relative safety risk of public railway-highway crossings in their States – including both quantitative and qualitative assessments. The majority of States interviewed use either a hazard index formula or a crash prediction algorithm to prioritize individual crossings based on safety or risk of a crossing. They then conduct on-site diagnostic inspections with

safety experts, including representatives from the FHWA Division Office, FRA regional office, public utility commission, local public agency, and railroad to evaluate the site's deficiencies and provide recommendations for site safety improvements. Multiple States described the importance of using a site diagnostic visit to validate information in their models and to confirm both project ranking and local public agency/railroad commitment to the project.

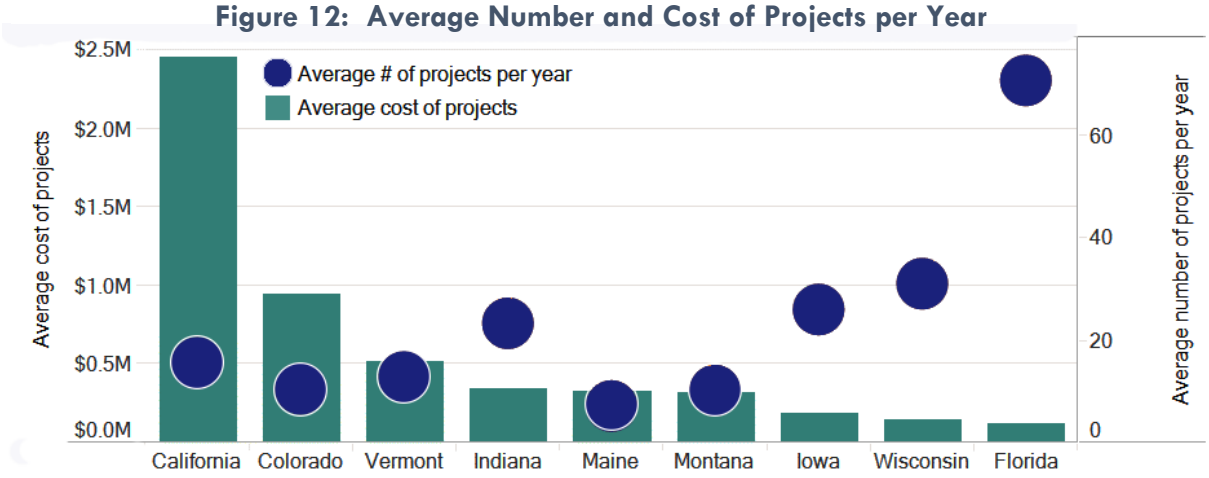
While there is no standard set of criteria that States use to assess the safety or risk of a crossing, commonly used criteria include:

- Vehicle and train annual average daily traffic
- Pedestrian activity
- Number and type of railroad tracks existing at the crossing
- Train speed at the crossing
- School bus and/or hazmat vehicle traffic at crossing
- Vehicle's stopping sight distance
- Existing traffic protection devices
- Roadway width
- Horizontal and vertical alignment
- Previous crash rates at the crossing
- Near miss data

Several States noted they engage railroads and/or local public agencies in the project selection process. One of the States interviewed described their application-based program where railroads and local public agencies apply for Section 130 funding. Based on the applications received, the State DOT conducts a benefit-cost analysis to select projects based on the relative impact of improving the railway-highway crossing in terms of reducing crashes, injuries, and property damage. Alternatively, another State DOT first conducts an internal assessment of the State's public railway-highway crossings by applying its hazard index formula. The agency then shares the results with each operating railroad company in the State, who in turn nominate projects for funding.

A review of State Railway-Highway Crossings Program Annual Reports and input provided by the Section 130 stakeholders revealed that State DOTs vary in how they allocate their Section 130 Program funding. Some State DOTs distribute Section 130 Program funds proportionally across the State or among railways, while others distribute funds based solely on where the safety need is the greatest. Similarly, some States implement fewer, more expensive projects each year, while other States prioritize a larger number of low-cost railway-highway crossing safety projects (see Figure 12).

Figure 12: Average Number and Cost of Projects per Year



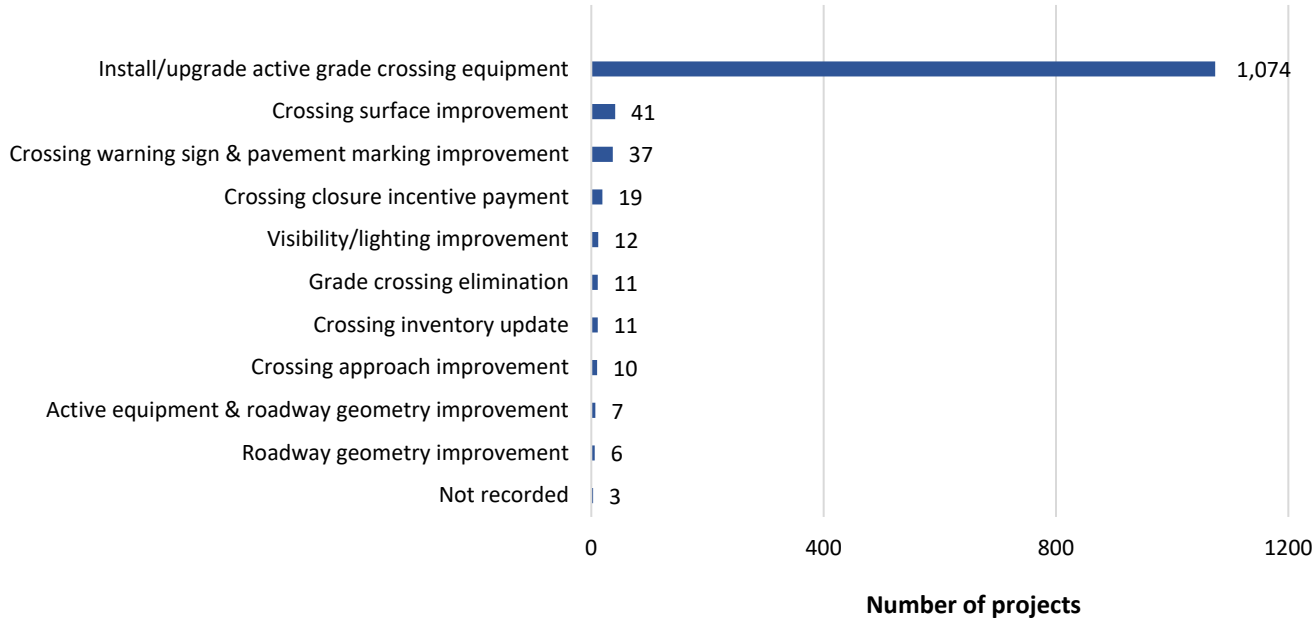
Data source: State Railway-Highway Crossings Program Annual Reports, 2013-2018

While the structure of the Section 130 Program enables States to design a Railway-Highway Crossing Safety Program to meet their individual State needs, and it is noted States may choose a more conservative approach than Federal minimum requirements, several representatives from Class I railroads cited inconsistency across States' programs as a challenge. Some States reported only allowing funds to be used for converting passive crossings to active crossings or for crossings that had not previously been treated with a Section 130 funded project. In contrast, other States reported they allow a holistic evaluation of active crossings to identify ongoing problems.

1B: Stakeholders reported the requirement that 50 percent of funds be used for the installation of protective devices largely aligns with States' current crossing safety needs, but this may not be the case in the future as State's railway-highway crossing safety programs continue to mature.

Per 23 U.S.C. 130(e)(1), at least half of the Section 130 funding a State receives shall be available for the installation of protective devices at railway-highway crossings. Each of the nine States interviewed reported they historically spend the majority of their Section 130 funds on the installation of protective devices (see Figure 13). However, two States reported that, as their Railway-Highway Crossing programs mature, the requirement to use 50 percent of funds on the installation of protective devices limits the flexibility of the types of projects the State can implement.

Figure 13: Total Number of Projects by Project Type, 2013-2018



Data source: State Railway-Highway Crossings Program Annual Reports, 2013-2018

One State noted that its Railway-Highway Crossing Program has had success with installing signals at many of its high priority locations. That State noted it has started, in more recent years, to consider larger, holistic projects, such as preemption projects and/or improvement to roadway geometry, to improve the safety of railway-highway crossings and reduce fatalities. Similarly, a second State reported that the State's remaining passive crossings may not benefit from active warning systems. That State reported it has shifted its focus from installing protective devices to updating obsolete equipment that cause safety issues. That State also noted they had not been able to pursue geometric improvement projects due to the requirement that 50 percent of funds be used for the installation of protective devices.

Focus group participants and conference participants provided similar feedback. Stakeholders noted that crossings with active warning devices often continue to have high numbers of incidents, but program requirements and selection metrics tend to drive projects to passive sites. Stakeholders offered that, in order for States to continue achieving safety goals, a greater proportion of Section 130 funding may be needed for projects that go beyond protective devices. Focus group participants noted the 50 percent requirement may limit States' ability to pursue certain types of high-cost, yet high-impact projects, such as projects to make site improvements, construct grade separations, or install traffic signal preemption systems along a corridor. In one State, for example, a single project to improve the vertical alignment of a crossing profile could cost several million dollars, which, in many cases, is more than a State's entire Section 130 Program annual allocation. However, focus group participants cautioned that without the 50 percent requirement, Section 130 funding could be aimed at operational improvements, such as surface improvement projects targeted more on ride quality rather than safety improvements; therefore, focus group participants suggested eligible activities should also be clarified.

1C: Stakeholders offered that States' varying interpretation of eligibility may limit projects.

Railroad representatives perceived that States' prioritization of projects to install active railway-highway crossing equipment was due in part to the State DOT's interpretation of the statute. Title 23 U.S.C. 130(e)(1)(B) states, "At least ½ of the funds set aside each fiscal year under subparagraph (A) shall be available for the installation of protective devices at railway-highway crossings".

As noted previously, crossings with active warning devices often continue to have a higher number of incidents. Stakeholders reported that crossings with active warning devices may eventually need additional safety measures, such as site modifications to further improve safety. However, railroad representatives noted, in their experience, some States do not allow Section 130 funds to be used on crossings that have been improved previously using Section 130 funds. Stakeholders also reported that States may vary in allowing Section 130 funds to be used to replace functionally obsolete warning devices. They conveyed that while some States have purposely chosen to prioritize their program in this way, in other instances States may have misinterpreted Federal-aid requirements regarding maintenance to preclude use of funding on railway-highway crossings that have been improved previously using Section 130 funds or on replacement of functionally obsolete equipment for safety reasons.

4.2 Topic Area 2: Feedback from stakeholders on flexibility to address current and emerging railway-highway crossing safety issues

2A: Stakeholder feedback is that the non-federal match requirement may limit project selection.

In accordance with 23 U.S.C. 130(f)(3), Section 130 projects are funded at a 90 percent Federal share. Seven of the nine States interviewed reported that the requirement of a 10 percent non-Federal match impacts the projects selected for funding. These States remarked that the 90 percent share for railway-highway crossing safety projects makes it challenging to target safety investments by the locations most in need and not be affected by a locality's ability to contribute funding or feel obliged to focus on the lowest cost projects.

Four of the States interviewed reported the requirement for the 10 percent match limits their ability to fund projects on local roads, particularly those that are smaller and more rural. Representatives from these four States noted that as their programs have matured, more of the State highways have active warning systems, and therefore, many of their remaining crossing safety needs are located in smaller and more rural municipalities and counties. Representatives from these four States surmised that these local agencies often do not have the financial resources to contribute the required 10 percent match. Based on a review of State data, the average cost for a project to install active railway-highway crossing equipment is approximately $300,000;[14] the local agency contribution required could be as much as $30,000. One State reported that because many local public agencies in their State do not have the funding to provide the 10 percent match, the number of railway-highway crossing safety projects implemented has fallen. A review of State Railway-Highway Crossings Program Annual Reports also showed this trend across several other States; in one case, the number of projects have fallen from 20-30 projects to 5 projects per year.

[14] Based on the analysis of the State Railway-Highway Crossings Program annual reports the average cost for a project to install active grade crossing equipment across the nine sample states was $323,000.

Three of the States interviewed expressed concern that the 10 percent match requirement reduces the effectiveness of the State's data driven safety program, as project selection decisions are driven, in part, by a locality's ability to contribute the 10 percent match and not purely on crash risk. One State reported instances where the local officials did not concur that a specific crossing needed to be upgraded, and requested that another crossing with much less crash risk be improved instead.

Focus group and conference participants provided similar feedback, noting some States have a State legislative requirement that State funds can only be used as a match for projects on State routes, whereas stakeholders report the majority of project needs in a State may be on locally owned county roads. Another State reported that its Section 130 Program largely funds the installation of signs and pavement markings because local agencies are more likely to be able to afford the 10 percent match contribution for these types of low-cost projects.

Two of the States interviewed stated they did not find that the 10 percent match requirement limits project selection; these States have small programs and they reported they have the ability to use State funds to provide the non-Federal match on both State and local roads. Similarly, focus group participants that did not view the 10 percent match requirement as impacting project selection reported they used State funding or railroad funds to cover the required match.

While many stakeholders noted the challenges created by the 10 percent match requirement, some stakeholders noted benefits to the match requirement. In their experience, when local public agencies and/or railroads provide funding, it may demonstrate their commitment to the project and to keeping it on schedule.

2B: Stakeholder feedback is that the incentive payment is too low to encourage communities to close at-grade railway-highway crossings.

The amount of the incentive payment for at-grade crossing closures is limited to $7,500 per 23 U.S.C. (i)(3)(B). Six of the nine States interviewed reported they have made an incentive payment to a local government to close an at-grade railway-highway crossing. However, the States noted that in their experience, the Section 130 incentive rarely influences the local agency's decision to close the crossing. States noted that because at-grade railway-highway crossing closures typically require roadway improvements and the rerouting of traffic, closure projects can be expensive. Seven of the nine States interviewed reported the $7,500 limit, per 23 U.S.C. 130(i)(3)(B), is insufficient to encourage municipalities to close at-grade railway-highway crossings. In their experience, the railroads often contribute a larger incentive payment, which for some Class I railroads is a minimum of $20,000, and may be a stronger factor in influencing a municipality's decision to close an at-grade railway-highway crossing.

Several States noted that being able to offer a larger incentive payment, particularly in rural areas, may make a difference in encouraging more at-grade railway-highway crossing closures in their State. However, States also acknowledged that more funding for incentive payments may not necessarily lead to more at-grade railway-highway crossing closures, particularly in cases where they have experienced a lack of political support or in cases where there may be community opposition to closing a crossing. Focus group and conference participants provided similar feedback.

2C: Stakeholders find it challenging to provide education and enforcement with limited funding.

Seven of the nine States interviewed reported that the limitations on the use of Section 130 funds prevents funds being expended on education and enforcement strategies, such as concentrated

enforcement events at priority at-grade railway-highway crossings (traffic enforcement activities at a railway-highway crossing are currently eligible for HSIP funding per 23 U.S.C. 148(a)(4)(B)(vii)). Nearly all States interviewed confirmed they are active in Operation Lifesaver, Inc., a non-profit organization focused on rail safety education. They report State participation in their State's Operation Lifesaver Program is typically supported through State funds.[15] Several States also noted that having additional funding to support safety education campaigns would be beneficial to their railway-highway crossing safety programs.

Eight of the nine States interviewed agreed that Section 130 funding challenges included not being able to fund activities to reduce illegal trespassing, including education and engineering treatments, such as scale-proof fencing within a defined distance of a crossing. The stakeholders also noted there could be liability concerns associated with trespassing, including questions of who is responsible for maintaining trespass prevention treatments.

Focus group and conference participants also noted that Section 130 funds did not provide flexibility to address driver/pedestrian behavior, which they report is often the root cause of railway-highway crossing incidents, including implementing education strategies, installing traveler information systems up/downstream of railway-highway crossings, or implementing trespassing prevention strategies, such as installing fencing within a specified distance from a public crossing.

Focus group participants suggested that any activities that Section 130 Program funds could be used on should be balanced with oversight measures to ensure that use of the funding remains focused on improving safety at railway-highway crossings.

2D: States reported data needs, but few use Section 130 funds to support data collection.

States depend on accurate data to effectively evaluate rail crossings and prioritize railway-highway crossing safety projects. States reported that they primarily use funding sources other than the Section 130 Program, such as general administrative funds, State funds, or multimodal funds, to cover data collection efforts. States reported two primary reasons for doing so:

- The 2 percent of Section 130 funds per 23 U.S.C. 130(k)[16] that can be used for data collection may equate in some States to a very small amount of funding (in some cases, less than $30,000); therefore, States feel it may not be worth the staff time and effort to pursue a Federal-aid project for data collection.
- States said they were either unaware of or unclear on what types of data collection activities may be eligible for Section 130 funding under 23 U.S.C. 130(k), which has resulted in inconsistencies across States regarding what activities they may have considered eligible.

Two of the States that reported using Section 130 funds to support data collection noted the amount of Section 130 funding available was insufficient to meet their needs. Both States noted the importance of having current and accurate data to effectively assess hazards and risks as part of their State programs. One State reported they have a high number of crossings and are only able to inventory a small percentage of crossings each year due to a lack of other funding; inventorying all crossings at its current

[15] FHWA contributes approximately $510,000 each year to the national Operation Lifesaver Program through a 5-year cooperative agreement.

[16] 23 U.S.C. 130(k) states, "Not more than 2 percent of funds apportioned to a State to carry out this section may be used by the State for compilation and analysis of data in support of activities carried out under subsection (g)."

rate could take that State over 5 years utilizing the allowed 2 percent Section 130 funding for data collection. The second State shared they have a smaller number of crossings, but receive less overall Section 130 funding as a result. That State noted it has been working on developing a mobile application to streamline and improve data collection in the field. That State noted that the smaller amount of funding for data collection presents challenges to completing the mobile application development as quickly as they would like and to creating data collection enhancements to support local agencies with submitting railway-highway crossing data to the FRA National Crossing Inventory.

Per 23 U.S.C 130(l), States are required to report current information on railway-highway crossings to FRA for the FRA National Crossing Inventory. States confirmed they use the data in the FRA National Crossing Inventory to inform funding decisions as part of their State programs. Several of the States interviewed, as well as focus group participants, cited the quality of data in the FRA National Crossing Inventory may be a challenge, noting that in their experience, some of the data is outdated or missing. Focus group participants cited several issues that they feel may impact the accuracy of the data, including difficulty with inputting data via the FRA GCIS.

Stakeholders routinely identified one piece of data – close call/near miss reporting – as a key input that they feel could help in assessing crossing hazards and risks. Stakeholders shared that some Class I railroads provide this data to the State DOTs, but in their experience, it may not be not consistent across all railroads or all States. One State DOT also cited the age of warning device circuitry as a data need. A representative from the railroad industry cited experience with inaccurate traffic counts as an issue, noting it may not be possible to effectively evaluate crossing conditions without accurate, up-to-date traffic volume numbers.

2E: Stakeholder feedback is that limited funding may restrict States' ability to implement grade separation projects.

Several stakeholders noted that having a dedicated funding source is critical to their ability to implement railway-highway crossing safety projects; without the dedicated funding, they feel such projects may likely not be possible.

Four of the nine States interviewed noted that their railway-highway crossing safety needs outpace available funding. One State noted that the amount of funding the State receives has not kept pace with the increasing costs they have experienced of certain railway-highway crossing improvement projects, such as preemption projects and projects to improve a roadway's geometry. Another State noted it needs five times the amount of funding it currently receives in order to address its volume of railway-highway crossings on medium density rail lines. While States reported they would like to have more funding to improve railway-highway crossings, States were clear that they did not want this funding to decrease the amount of HSIP funding each State receives.

The majority of States interviewed also noted a lack of funding as an impediment to grade separation projects. States repeatedly indicated that one of the most effective strategies to improve safety is to reduce the number of at-grade railway-highway crossings, either through crossing closures or grade separation projects. However, because grade separation projects are generally more expensive, only three of the nine States interviewed have used Section 130 funding to construct grade separation projects over the past 5 years. Several States noted that one grade separation project would cost more than their annual Section 130 funding allocation, while other States estimate they would have to pool funding over several years in order to have enough funding for one grade separation project. To ensure funds do not lapse, States are encouraged to maximize their annual obligation rates. However, in doing so, States may have difficulty pooling funds over several years to fund grade separation projects.

2F: Stakeholders offered that, in their experience, project and contract management challenges may contribute to project delays and low obligation rates.

Interviewees identified potential project and contract management issues that contribute to project delays. Challenges raised include:

- **Coordination with railroads:** Numerous State DOT staff identified coordination challenges with the railroads as a common reason for delays in Section 130 funding authorizations. Interviewees noted that in recent years, they feel railroads have been slower to respond to State DOT initiated projects. The State DOT staff also reported delays in receiving the railroads' final billing, which in turn delays their State from closing out the project.

  Railroad representatives also cited coordination challenges with the transportation agencies. These railroad representatives feel State DOTs may lack a clear understanding of railroad procedures and may not engage railroad companies early enough in the project development process. In their experience, these issues make it challenging for the railroad to develop realistic project cost estimates.

  One State DOT noted that language in 23 CFR 646 impacts the States' ability to work with some railroads on cost share. Language in 23 CFR 646.210(b)(1) regarding the classification of projects and railroad share of the cost, states:

  > *Projects for grade crossing improvements are deemed to be of no ascertainable net benefit to the railroads and there shall be no required railroad share of the costs.*

  The State DOT indicated that they have experience with some railroads who cite this language when being asked to partner with the State DOT to fund railway-highway crossing safety projects. The State DOT responded that they feel railway-highway crossing improvement projects benefit the railroad by increasing safety on both the railway and highway, and by reducing risks of delays and other monetary impacts associated with railway-highway crossing incidents.

- **Contract management challenges:** Numerous stakeholders cite contracting requirements as a possible impediment to efficiently delivering low-cost railway-highway crossing projects, such as projects to install warning signs and pavement markings. The State DOTs conveyed it can be difficult in their experience to get contractors to respond to a competitive bid for low-cost projects. Several States reported that because of the competitive bid process, it can take up to 24 months to deliver straightforward projects to install active traffic control devices. The State DOTs also noted that in their experience, local public agencies may be unfamiliar with contracting requirements, which can contribute to project delays.

2G: Stakeholders reported it can be difficult to measure the effectiveness of individual railway-highway crossing projects.

Per 23 U.S.C. 130(g), States are required to submit annual reports on the progress of implementing their railway-highway crossings program and the effectiveness of such improvements. Universally, stakeholders highlighted their challenges with measuring the effectiveness of individual railway-highway crossing safety projects. Most States reported that they usually evaluate the effectiveness of completed projects by comparing before and after crash rates. States also commonly reported using trend analysis of fatalities and serious injuries related to public railway-highway crossings statewide or along rail lines to evaluate the effectiveness of the Section 130 Program as a whole. States acknowledged that these

evaluation methods may have limited utility, since collisions at railway-highway crossings may be infrequent events.

In addition to the individual State evaluation efforts, FHWA analyzes and reports national crash trends, including rates of crashes per train miles and vehicle miles traveled, as part of its biennial report to Congress.

5. Conclusion

While crashes at railway-highway crossings represent a small percentage of highway traffic fatalities on the public roadway transportation system, they account for one of the leading causes of railroad-related deaths. The Section 130 Program provides States with a dedicated funding source to support railway-highway crossing improvements. Without this dedicated funding source, stakeholders note railway-highway safety projects may have to compete for funding against other safety needs, and as a result, fewer such projects may be implemented.

5.1 Crash Trends and Effective Practices

The nationwide incident data trend analysis reveals several issues that have contributed to the continuing crossing safety problem. The following section identifies factors that are associated with crashes and the types of projects that would potentially be effective in eliminating those crashes.

Crossing closure and grade separation

Eliminating an at-grade railway-highway crossing, by either closing the crossing so that no highway user is allowed to cross the tracks or replacing the at-grade crossing with a grade separated facility, provides the highest level of crossing safety. Guidelines and industry best practices for railway-highway crossing consolidation are documented in several publications, including:

- FRA's *Railway-highway Grade Crossings – A Guide to Crossing Consolidation and Closure*.[17]
- AASHTO's *Highway Rail Crossing Elimination and Consolidation*.[18]
- FRA's *Crossing Consolidation Guidelines*. [19]
- FRA's *Effect of Grade Separation on Pedestrian Railroad Trespass Activity at Shuttlesworth Drive in Collegeville, AL*. [20]

While closing or grade separating railway-highway crossings provide the greatest safety benefits to road users, such projects may not always be possible due to local opposition or funding limitations. The following provides information on other treatments and effective practices to reduce incidents at railway-highway crossings.

Passive crossings

Passive public at-grade railway-highway crossings have the highest incident rate when normalized by the number of trains and vehicles that traverse those crossings. Passive crossings may not be equipped with active devices if low levels of rail and roadway traffic do not justify their installation or due to other factors considered in a State's Railway-Highway Crossing Improvement Program. A recent FRA-sponsored research effort investigated the suitability of non-track-circuit-based technologies as a cost-

[17] FRA. July 1994. *Highway-Rail Grade Crossings – A Guide to Crossing Consolidation and Closure*. Available at https://railroads.dot.gov/elibrary/highway-railroad-grade-crossings-guide-crossing-consolidation-and-closure

[18] AASHTO. March 1995. *Highway Rail Crossing Elimination and Consolidation*. Available at https://trid.trb.org/view/573825

[19] FRA. July 2009. *Crossing Consolidation Guidelines*. Available at https://rosap.ntl.bts.gov/view/dot/40241

[20] FRA. May 2019. *Effect of Grade Separation on Pedestrian Railroad Trespass Activity at Shuttlesworth Drive in Collegeville, AL*. Available at https://rosap.ntl.bts.gov/view/dot/40278

effective means to deploy active warning devices at passive railway-highway grade crossings.[21] One of the major findings of that study was that there was a subset of existing passive crossings that contain the largest proportion of risk for these types of crossings, and that upgrading those to active warning devices could potentially decrease the overall risk. A result from that study indicated a decrease in 198 total yearly incidents if 957 passive crossings were upgraded to gates with flashing lights.

Low-cost treatments can also be used to increase safety at passive railway-highway crossings. One such example is the use of LED-enhanced signage at passive crossings, which is already permitted in FHWA's *Manual on Uniform Traffic Control Devices* (MUTCD)[22] and has been studied in the field.[23] Maintenance of pavement markings, signage, and cleared vegetation for increased sight distance are other effective practices to enhance conspicuity of passive crossings and improve sight lines.

Commercial vehicles

Over the 10-year period, commercial vehicles accounted for about 20 percent of total incidents at railway-highway crossings, but accounted for about 27 percent of total injuries and about 9 percent of total fatalities. In addition, commercial vehicles had a higher incident rate than personal vehicles when normalized by VMT.

Appropriate signage can be an effective practice to address commercial vehicle safety at railway-highway crossings. The FHWA's MUTCD establishes standards for the use of signage as traffic control for railroad and light rail transit grade crossings. In accordance with Section 8B.24 of the MUTCD,[23] a Storage Space (W10-11) sign supplemented by a word message storage distance (W10-11a) sign should be used where there is a highway intersection in close proximity to the at-grade crossing and an engineering study determines that adequate space is not available to store a design vehicle(s) between the highway intersection and the train dynamic envelope.

The Federal Motor Carrier Safety Administration has a nationwide educational campaign targeting drivers, motor carriers and users of commercial motor vehicles. [24]

Pedestrians

While pedestrians were involved in only 7 percent of all public at-grade railway-highway crossing incidents, pedestrian fatalities accounted for about 33 percent of all fatalities and have been steadily increasing over the 10-year period. Pedestrians comprised about 42 percent of the total public at-grade crossing fatalities in 2019[25] (see Figure 11). In addition, almost 92 percent occurred at railway-highway crossings equipped with gates and almost half of fatalities that occurred at gated crossings resulted from pedestrians walking around the gates.

Attention to pedestrian issues at railway-highway crossings has been increasing, and novel solutions are being sought. The U.S. Department of Transportation (DOT) has published numerous reports that

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[21] FRA. December 2019. *Analysis of Non-Track-Circuit Highway-Rail Grade Crossing Train Detection Technologies.* Available at https://rosap.ntl.bts.gov/view/dot/42916

[22] FHWA. May 2012. *Manual on Uniform Traffic Control Devices.* Available at https://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm

[23] FRA. February 2016. *Evaluation of LED Sign Technology at a Passive Highway-Rail Grade Crossing.* Available at https://rosap.ntl.bts.gov/view/dot/12279

[24] FMSCA. Highway-Rail Grade Crossing Safety. Available at https://www.fmcsa.dot.gov/safety/rail-crossing/highway-rail-grade-crossing-safety

[25] FRA RAIRS database.

document different pedestrian warning devices and treatments installed at railway-highway crossings across the country:

- FRA's *Compilation of Pedestrian Safety Devices in Use at Grade Crossings*[26]
- FRA's *Engineering Design for Pedestrian Safety at Railway-highway Grade Crossings*[27]
- FRA's *Effect of Gate Skirts on Pedestrian Behavior at Railway-highway Grade Crossings*[28]
- FHWA's *Pedestrian Safety Guide for Transit Agencies*[29]

Effective treatments include, but are not limited to: pedestrian channelization improvements, gate skirts, low-rise signals, pavement markings, innovative signage, swing gates, and second train warning signs. In addition to information on specific engineering treatments aimed at improving pedestrian safety at at-grade railway-highway crossings, FRA also has published guidance on the use of a risk-based hazard analysis methodology to evaluate pedestrian crossing safety at or near passenger stations.[30]

Highway users stopping on the crossing

Over the 10-year period, the number of incidents involving highway users who stopped on the crossing increased by 44.1 percent from 2010 to 2019. The analysis revealed that the presence of roadway/highway intersections in close proximity to crossings are a significant factor increasing the risk of vehicles stopping on the tracks.

Effective practices to address highway-users stopped on the crossing include, but are not limited to:

- Use of LED-enhanced versions of grade crossing R8-8 signs that read "DO NOT STOP ON TRACKS."[31]
- Use of dynamic envelope pavement markings to delineate the area around at-grade railroad crossings where vehicles should not stop. Florida has launched a 2-year, $60 million program to install dynamic envelope pavement marking at more than 4,000 grade crossings.[32]
- Use of traffic signal preemption at active crossings in close proximity to nearby intersections. Traffic signal preemption allows the traffic signal downstream from the crossing to cycle to green when a train is detected by the crossing train detection circuitry, thus allowing potential

[26] FRA. January 2008. *Compilation of Pedestrian Devices in use at Grade Crossings.* Available at https://railroads.dot.gov/elibrary/compilation-pedestrian-safety-devices-use-grade-crossings

[27]FRA. June 2016. *Engineering Design for Pedestrian Safety at Highway-Rail Grade Crossings.* Available at https://rosap.ntl.bts.gov/view/dot/12306

[28] FRA. December 2013. *Effect of Gate Skirts on Pedestrian Behavior at Highway-Rail Grade Crossings.* Available at https://rosap.ntl.bts.gov/view/dot/11997

[29] FHWA. February 2008. *Pedestrian Safety Guide for Transit Agencies.* Available at https://safety.fhwa.dot.gov/ped_bike/ped_transit/ped_transguide/transit_guide.pdf

[30] FRA. April 2012. *Guidance on Pedestrian Crossing Safety at or Near Passenger Stations.* Available at https://railroads.dot.gov/elibrary/guidance-pedestrian-crossing-safety-or-near-passenger-stations

[31] FRA. June 2019. *Effectiveness of LED-Enhanced Signs in Reducing Incidents of Vehicles Stopping on Tracks.* Available at https://rosap.ntl.bts.gov/view/dot/41694

[32] Florida DOT. December 5, 2019. *FDOT Secretary Directs Unprecedented Rail Safety Measures, Launches Statewide Education Initiative.* https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/info/co/news/newsreleases/12052019-rail-safety.pdf?sfvrsn=f58dd329_2

vehicular traffic to clear before the train arrival. As noted in the MUTCD,[33] current guidance is to consider installing pre-signals to control traffic approaching the crossing if the crossing is within 50 feet of the intersection, provide preemption where a traffic signal is within 200 feet of a crossing, and to consider other alternatives including queue detection at locations where the intersection is located over 200 feet from the crossing.

Railroads have been collaborating with route planning companies to include railway-highway crossing information in mapping applications in order to provide real-time safety information to drivers. In 2018, the Long Island Railroad initiated a pilot project with Waze to alert motorists using the app that they are approaching an at-grade railway-highway crossing.[34] In 2019, Norfolk Southern partnered with Waze to increase driver safety around crossing in parts of Georgia.[35]

Highway users going around gates

Although incidents involving highway users (both pedestrians and motorists) going around lowered gates accounted for 16.4 percent of all railway-highway crossing incidents, they accounted for a disproportionately large number of fatalities (35.2 percent). The number of fatalities in this group increased by 118 percent from 50 in 2010 to 109 in 2019.

Engineering treatments designed to prevent motorists from driving around lowered gates at at-grade railway-highway crossings include the use of median separation, such as delineators, barriers, raised curbs, or four-quadrant gate systems. Information about the use of traffic channelizing devices at railway-highway grade crossings has been documented in several publications, including:

- *The Railway-highway Crossing Handbook - Third Edition*[36]
- FRA's *Use of Traffic Channelization Devices at Railway-highway Grade Crossings*[37]
- FRA's *Driver Behavior at Highway-Railroad Grade Crossings: A Literature Review from 1990–2006*[38]

Numerous law enforcement strategies focused on the enforcement of traffic safety laws at railway-highway grade crossings have shown to be effective at mitigating crossing risk[39,40]. Such strategies

[33] See footnote 23.

[34] Metropolitan Transportation Authority. June 6, 2018. *LIRR Partners with Waze for Railroad Crossing Safety Initiative.* Available at http://www.mta.info/news/2018/06/06/lirr-partners-waze-railroad-crossing-safety-initiative

[35] Norfolk Southern. *Norfolk Southern Harness Mobile App to Save Lives at Rail Crossings.* Available at http://pulling-together.com/georgia/

[36] FHWA. July 2019. *Highway-Rail Crossing Handbook, 3rd Edition.* Available at https://safety.fhwa.dot.gov/hsip/xings/com_roaduser/fhwasa18040/

[37] FRA. August 2012. *Use of Traffic Channelization Devices at Highway-Rail Grade Crossings.* Available at https://rosap.ntl.bts.gov/view/dot/9656

[38] FRA. October 2008. *Driver Behavior at Highway-Railroad Grade Crossings: A Literature Review from 1990-2006.* Available at https://rosap.ntl.bts.gov/view/dot/8929

[39] FRA. June 2019. *Law Enforcement Strategies for Mitigation Highway-Rail Grade Crossing Risk Factors.* Available at https://rosap.ntl.bts.gov/view/dot/41816

[40] FRA. June 2019. *Long-Term Effect of Photo Enforcement-Based Education on Vehicle Driver Behavior at a Highway-Rail Grade Crossing.* Available at https://rosap.ntl.bts.gov/view/dot/40785

include the use of photo enforcement technologies (where allowed), concentrated rail safety enforcement during major events, and officer education.

5.2 Stakeholder Feedback

Stakeholder input on the Section 130 Program highlights areas that may impact the effectiveness of the program. Stakeholders reported several factors that may limit States' ability to implement safety projects beyond protective devices, such as projects to construct grade separations, install traffic signal preemption systems along a corridor, or implement safety education and enforcement projects aimed at addressing driver behavior. Stakeholders also identified challenges regarding funding projects in certain localities, particularly those that are smaller and more rural.

The following outlines areas that may be addressed through continued and expanded outreach and education.

Continue to share noteworthy practices among practitioners. Stakeholder input reveals the structure of the Section 130 Program provides States with flexibility to develop and design a Railway-Highway Crossing Safety Program to address their State's own safety needs. The FHWA Office of Safety routinely develops resources and provides opportunities for railway-highway crossing practitioners to share notable practices associated with designing and administering the Section 130 Program. Stakeholders suggested FHWA continue to compile and promote noteworthy practices and facilitate opportunities for peer-to-peer information sharing to enable practitioners to develop the knowledge, skills, and abilities to implement effective grade crossing safety programs. Stakeholders identified topics of interest including:

- Project prioritization formula/project selection process.
- Coordination between State DOT and railroads.
- Conducting diagnostic reviews.
- Grade crossing inventory development and data management.
- Safety benefits of new and innovative improvements.

Clarify Section 130 Program requirements through enhanced education. Railway-highway crossing stakeholders highlighted several areas that they feel could benefit from being clarified, including:

- Eligibility of using Section 130 funds on railway-highway crossing locations that were previously improved with Section 130 funds.
- Eligibility of Federal-aid requirements for upgrading/replacing obsolete railway-highway crossing equipment.
- Pedestrian crossing treatments.
- Alternative contracting methods to streamline the delivery of Section 130 projects.
- Use of Section 130 funds for compilation and analysis of data, including examples of eligible activities.

Encourage use of additional data to measure project effectiveness and share information on project effectiveness results. Stakeholders report the low crash rates in individual States makes it difficult for States' to evaluate the effectiveness of railway-highway crossing safety projects.

Stakeholders suggested DOT encourage data sharing between railroads and State DOTs and encourage the improvement of the quality of data to inform a State's evaluation of project effectiveness. Stakeholders also cited a need for sharing research on the types of projects that are most effective at addressing the causes of railway-highway casualties and the continued sharing of noteworthy practices nationwide.

Appendix A: Stakeholder Input Approach

Stakeholder Interviews

Between May 2019 and December 2019, the project team conducted in-depth, semi-structured telephone interviews with staff from nine States. See Table 7 for a complete list of agencies interviewed.

Table 6: List of Interviewees

Agency	Date of Interview
Federal Agencies	
FHWA Montana Division	May 20, 2019
FHWA Colorado Division	May 29, 2019
FHWA Wisconsin Division	May 30, 2019
FHWA Indiana Division	June 3, 2019
FHWA Vermont Division	August 1, 2019
FHWA California Division	August 2, 2019
FHWA Iowa Division	September 13, 2019
FHWA Maine Division	September 27, 2019
FHWA Florida Division	October 3, 2019
FRA Region 1	November 8, 2019
FRA Region 3, 4, 5, and 7	December 11, 2019
State Agencies	
Indiana Department of Transportation	June 4, 2019
Colorado Department of Transportation	June 10, 2019
Montana Department of Transportation	June 13, 209
Colorado Public Utility Commission	July 3, 2019
Wisconsin Department of Transportation	July 23, 2019
California Public Utility Commission	August 14, 2019
California Department of Transportation	August 22, 2019
Vermont Agency of Transportation	September 4, 2019
Iowa Department of Transportation	September 18, 2019
Maine Department of Transportation	October 9, 2019
Florida Department of Transportation	November 7, 2019

Private/Industry Groups[41]	
American Association of State Highway and Transportation Officials (AASHTO)	October 2, 2019
BNSF Railway	October 4, 2019
Association of American Railroads (AAR)	October 9, 2019
American Short Line and Regional Railroad Association (ASLRRA)	October 18, 2019

Focus Groups

The project team conducted two focus groups. The focus groups were held in conjunction with the FHWA Section 130 Program Peer Exchanges sponsored by the FHWA Office of Safety's Roadway Safety Professional Capacity Building Program. The first focus group, which was held on July 30, 2019, in Baltimore, Maryland, involved representatives from 10 State DOTs and 5 FHWA Division Offices. The second focus group, which was held on September 10, 2019, in Nashville, Tennessee, involved representatives from 12 State DOTs, 1 State rail commission, and 4 FHWA Division Offices. See Table 8 for a complete list of focus group participants.

Table 7: Focus Group Participants

Focus Group 1 Participants	Focus Group 2 Participants
Connecticut Department of Transportation	Alabama Department of Transportation
Idaho Transportation Department	Arkansas Department of Transportation
Kentucky Transportation Cabinet	Georgia Department of Transportation
Maryland State Highway Administration	Illinois Department of Transportation
Mississippi Department of Transportation	Kansas Department of Transportation
Montana Department of Transportation	Louisiana Department of Transportation and Development
Nevada Department of Transportation	Nebraska Department of Transportation
New Hampshire Department of Transportation	North Carolina Department of Transportation
New Jersey Department of Transportation	Ohio Rail Development Commission
Utah Department of Transportation	Oklahoma Department of Transportation
FHWA Idaho Division Office	Pennsylvania Department of Transportation

[41] The project team requested an interview with a second Class I railroad but did not receive a response.

FHWA Maryland Division Office	Tennessee Department of Transportation
FHWA Massachusetts Division Office	Texas Department of Transportation
FHWA Mississippi Division Office	FHWA Arkansas Division Office
FHWA New Hampshire Division Office	FHWA Illinois Division Office
	FHWA Louisiana Division Office
	FHWA Tennessee Division Office

Interactive Conference Sessions

In July 2019, the project team had a booth during the National Safety Engineer Peer Exchange Collaboration Corner held in Minneapolis, Minnesota. Nearly 200 people attended the event; participants included transportation safety staff from 48 States, the District of Columbia, Puerto Rico, and staff from FHWA and AASHTO.

On August 20, 2019, the project team led an interactive session and had a booth at the National Railway-highway Grade Crossing Safety Conference to collect input from conference participants. There were over 250 conference participants representing a wide variety of DOT modal agencies, State DOTs, State public utility commissions, transit agencies, Class I railroads, short line railroads, universities, consulting firms, and rail safety non-profit organizations.

Interview Guide

The interview guide was designed to address each topic area. The project team tailored the specific questions to the relevant stakeholder group. A subset of the questions (those marked with *) were used to facilitate discussions at the focus groups and the interactive conference session.

Project Selection

1. Please describe the process you use to identify, evaluate, and select projects to fund using Section 130 funds.
    a. What factors do you consider when selecting projects?
2. Do your coordinate with the HSIP manager to identify/select projects?
3. How do you coordinate with stakeholders – including local agencies and rail companies – to identify and select projects?

Impact of Program Requirements

In the next series of questions, we want to discuss the Section 130 Program requirements and how each helps or hinders your State's ability to address its railway-highway crossing safety issues.

4. How does the 10 percent match requirement influence project selection?*
    a. What funds do you use to provide the 10 percent for Section 130 projects?
    b. Are there State-dedicated funding programs that supplement 130 funding?

5. How does the program requirement that 50 percent of funds be used for the installation of protective devices impact project selection?*
6. How does the program's limitation on the amount of funding that can be used to incentivize at-grade railway-highway crossing closures impact project selection?*
7. Do you use any of the Section 130 funds to support inventory improvements or to develop a State Action Plan?
    a. Is the 2 percent ceiling on use of Section 130 funds to compile and analyze data to support the reporting requirements sufficient to meet State's needs or would you like the ability to invest more?*
8. What specific aspects of the Section 130 Program are most helpful to your States' ability to address current and emerging railway-highway crossing safety issues?
9. What challenges does your agency experience with pursuing certain types of innovative and/or expensive projects?
10. Were there any crossing safety projects that you wanted to implement but could not because of limitations in the Section 130 Program? If yes, describe.*
11. Are there other types of projects beyond engineering (i.e. enforcement, education, trespass mitigation) that your agency has identified to improve the safety of railway-highway crossings?
    a. For States with a State Action Plan, are there any strategies in the plan that are not covered by Section 130 funds?
12. If the only limitation in the Section 130 Program were that the funds had to be used to improve crossing safety, would your program be any different? If yes, in what way?*
13. Has your State used HSIP funds to implement railway-highway crossing projects?

Project/Program Implementation

14. Please describe how you coordinate with stakeholders – including local agencies and rail companies – to implement projects.
15. What challenges do you face with fully allocating and expending your State's Section 130 funds?*

Project/Program Effectiveness

16. How do you determine the effectiveness of your Section 130 fund investments?
17. What challenges do you face in measuring the effectiveness of Section 130 projects?
18. Do you have any recommendations on how FHWA could better support States with evaluating the effectiveness of Section 130 projects?*
19. What additional data does your State need to inform decisions on how best to use Section 130 funds?*

Recommendations

20. What changes are needed to the Section 130 Program to allow your State to more strategically address problem areas?*

21. Do you have any other feedback on the Section 130 Program or recommendations for program changes?