

Closing rail crossings: a case study from Louisiana



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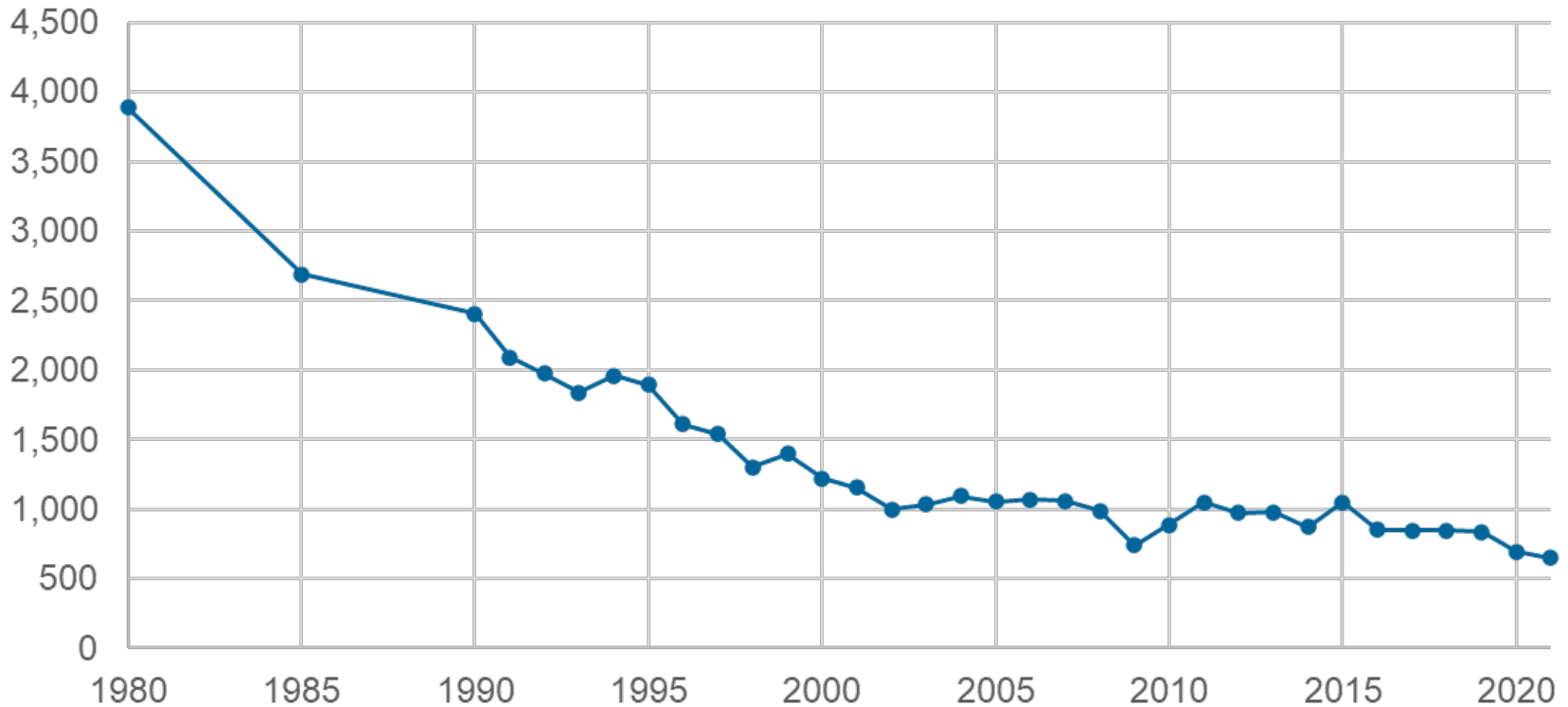
Introduction

- In 2021, 430,000 crossings in the U.S., 191,800 are closed (FRA).
- In 2020, 5,503 people injured and 752 fatalities related to the railroad system,
- of which 688 and 197 happened at highway-rail grade crossings (BTS).

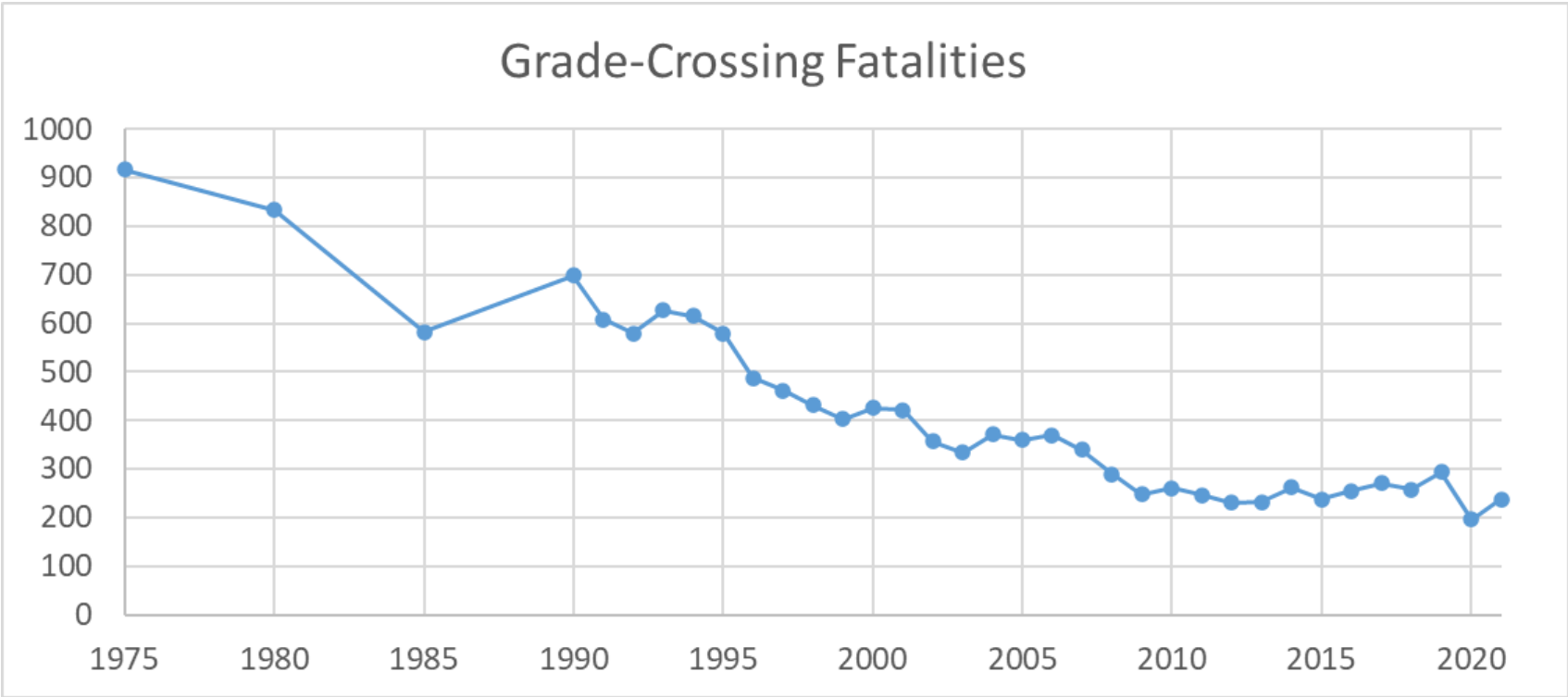


Wally Skalij / Los Angeles Times

Grade-Crossing Injured Persons



Bureau of Transportation Statistics (BTS). Railroad and Grade-Crossing Injured Persons by Victim Class. <https://www.bts.gov/content/railroad-and-grade-crossing-injured-persons-victim-class>



Bureau of Transportation Statistics (BTS). Railroad and Grade-Crossing Fatalities by Victim Class. <https://www.bts.gov/content/railroad-and-grade-crossing-fatalities-victim-class>

■ 2010, 10 states, SAP

- In 2010, FRA required the ten states that had the most highway-rail grade crossing collisions to develop a State Highway-Rail Grade Crossing Action Plan
- To “identify specific solutions for improving” grade crossing safety and to “focus on crossings that have experienced multiple accidents or are at high risk” for accidents.
- These ten states are: Alabama, California, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Ohio, and Texas.

■ 2020, all states, SAP

- In 2020, FRA extended this requirement to mandate the rest 40 states and the District of Columbia to develop and implement highway-rail grade crossing action plans
- Required the ten states that developed plans previously to update their plans and report actions they have taken to implement them.



States will be required to submit their SAPs by February 14, 2022. Questions can be sent to the SAP Team at StateActionPlan@dot.gov.

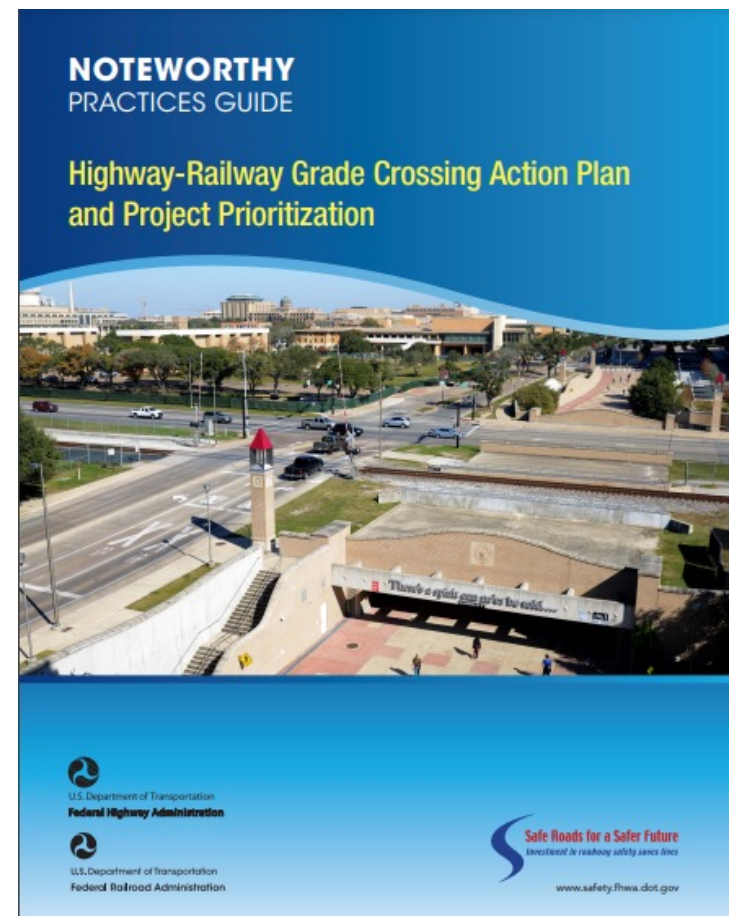




Literature Review

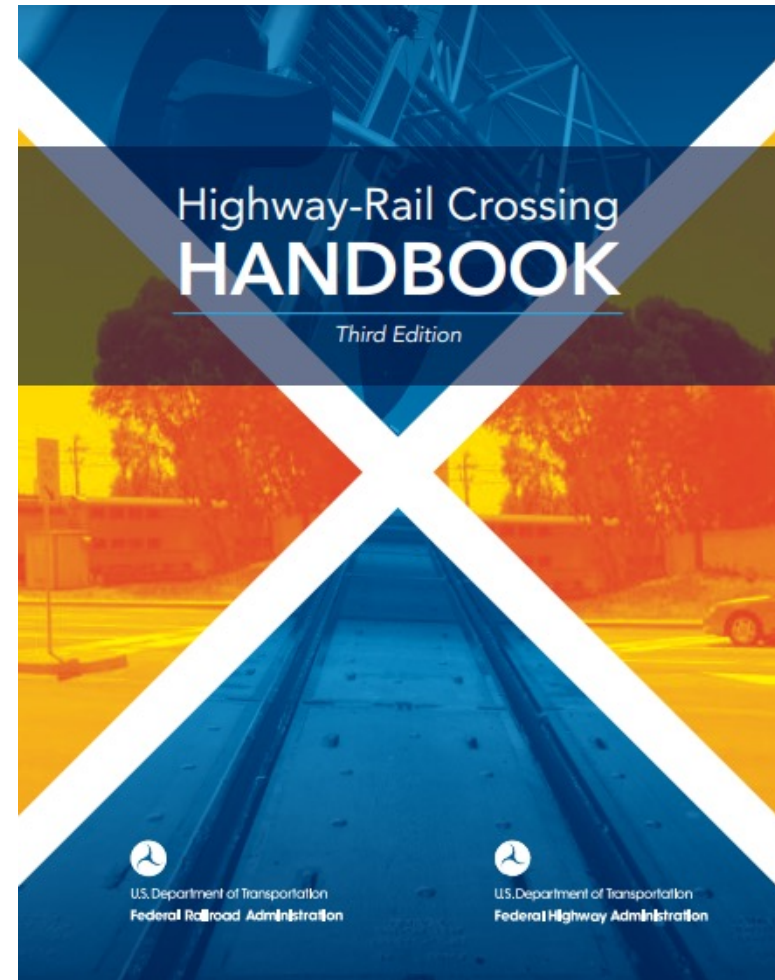
Federal guidelines

- Highway-Railway Grade Crossing Action Plan and Project Prioritization(2016)
 - States are required to identify “specific solutions for improving safety at crossings, including highway-railway grade crossing closures or grade separations”.
 - Cost and benefit analysis; crossing closure and grade separation are 100% effective.
 - Closure (\$25,000 to \$100,000), grade separation (\$5M to \$40M).



- Highway-Rail Crossing Handbook(2019)

- Closure is recommended as the first alternative for a highway-rail crossing.
- It may not always be fully beneficial or practical due to other factors.
- The selection of crossings for closure should be a balance.



Funding sources

■ **3 federal funding sources**

- Railway-Highway Crossing Program (Section 130)
- Federal-aid highway funds, such as National Highway System Designation Act (NHS), or Surface Transportation Program (STP)
- Safety program funds, such as Highway Safety Improvement Program (HSIP)

■ **Section 130**

- Crossing consolidations, elimination, and relocation are among eligible, \$7,500
- Not so popular as an incentive program (Codjoe, 2018)
- Some believe that the cash incentive program is not worth the trouble of public resistance

An earlier study

Table 1. Incentive Programs (Codjoe, 2018)

Program Name	Description	Popularity	Effectiveness*
Cash incentive	This program is usually affiliated with federal-aid programs under the federal Section 130 program, offering up to \$7,500.	10 states	1
Road improvement	This program provides road improvements and connectivity in the area to mitigate the undesirable results of crossing closure.	6 states	2
Nearby crossing grade separation	This program provides grade separation crossings nearby as an alternative of crossing closure.	5 states	4
Nearby crossing improvement	This is a form of improvement-based program aimed to consolidate the overall crossings.	10 states	3
Track relocation	This program aims to switch operation away from congested locations.	4 states	5

*Note: *1 – least effective and 5 – most effective*

Other studies

Studies have been conducted for different aspects of highway-rail grade crossings to improve safety and efficiency.


- Predict crashes and identify potential hazardous crossings for treatments. (Djordjević et al., 2018; Pasha et al., 2020; Gao et al., 2021; Zhou et al., 2020)
- Examine the effects of different devices and design features on safety and traffic: in-vehicle auditory alerts (IVAAs), Computer Vision (CV), geometric features, urban context, etc. (Landry et al., 2019; Zhang et al., 2018; Keramati et al., 2020; Singh et al., 2021; Pasha et al., 2021; Soleimani et al., 2021)
- Balance between safety and efficiency with limited budgets: optimization of resource allocation, multi-objective resource allocation. (Kavoosi et al., 2020; Singh et al., 2022; Pasha et al., 2022)
- Critical research gaps: the effect of highways' operational, the dilemma of drivers, the proactive safety evaluation of Pedestrians, non-motorized vehicles at crossings, etc. (Vivek, t al., 2021)

Based upon the incentive program policies existing in the literature that can be used to entice voluntary closure of public and private grade crossings, This study aims to investigate perspectives of professionals working in this area to help improve overall safety and efficiency at grade crossings by using the case of Louisiana.

Methodology *A case study of Louisiana*


- The Mississippi River empties into the Gulf of Mexico
- It has a multimodal transportation system of highways, rail, transit, ports, airports that connects land, water, and air for freight and passengers.
- When highways and railroads meet, it creates crossings.


11th 
Largest highway
system in U.S.
16,660 centerline miles


 **3rd**
Highest bridge deck area in U.S.
12,900 bridges (21st highest)


33 million transit
rides annually

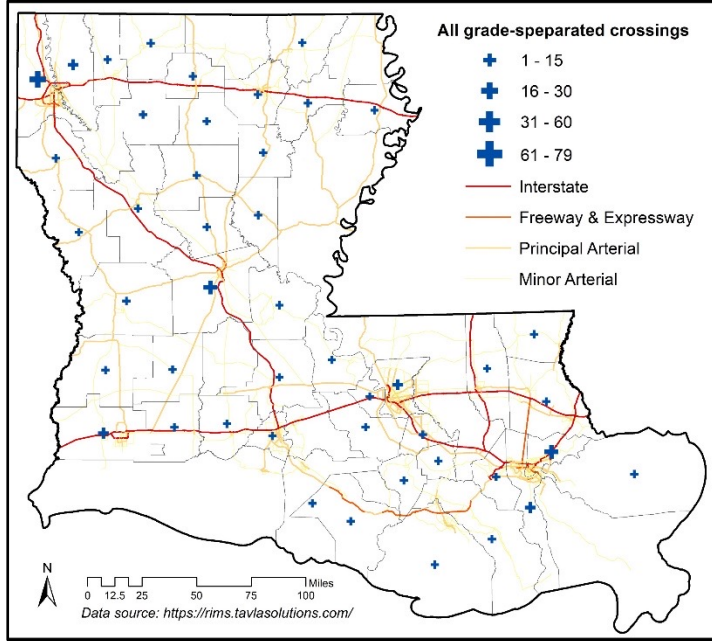
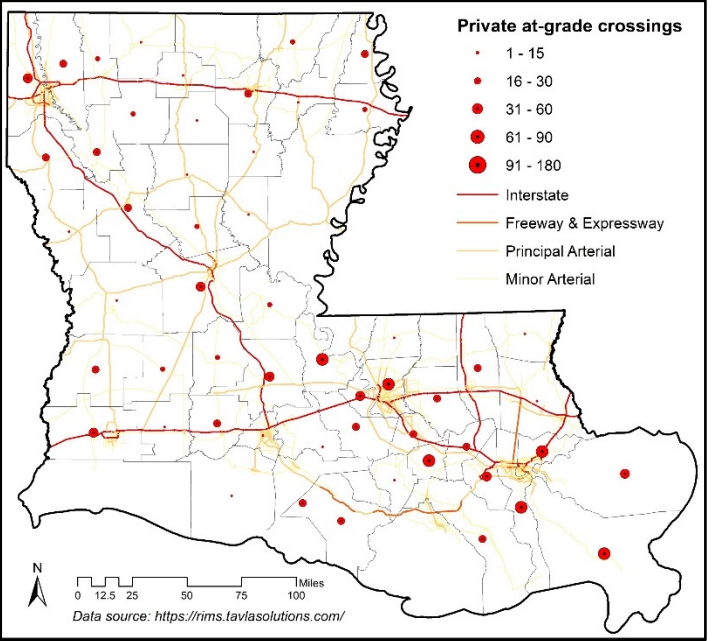
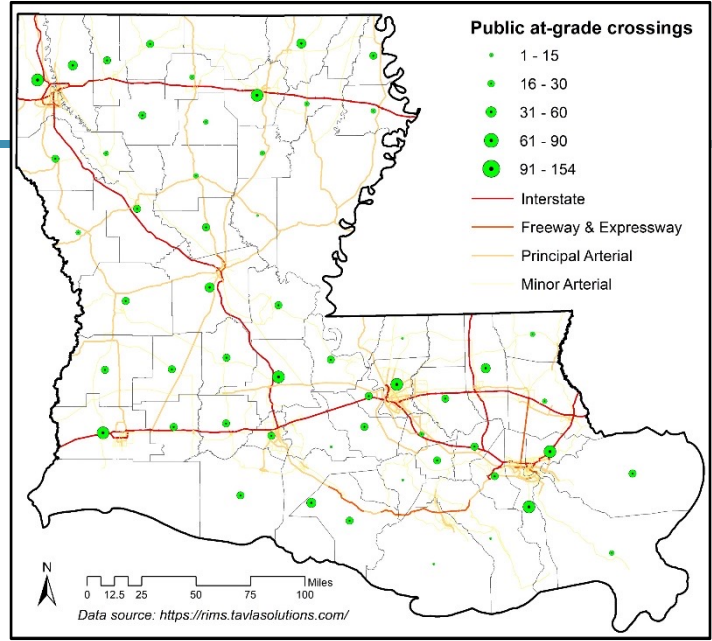
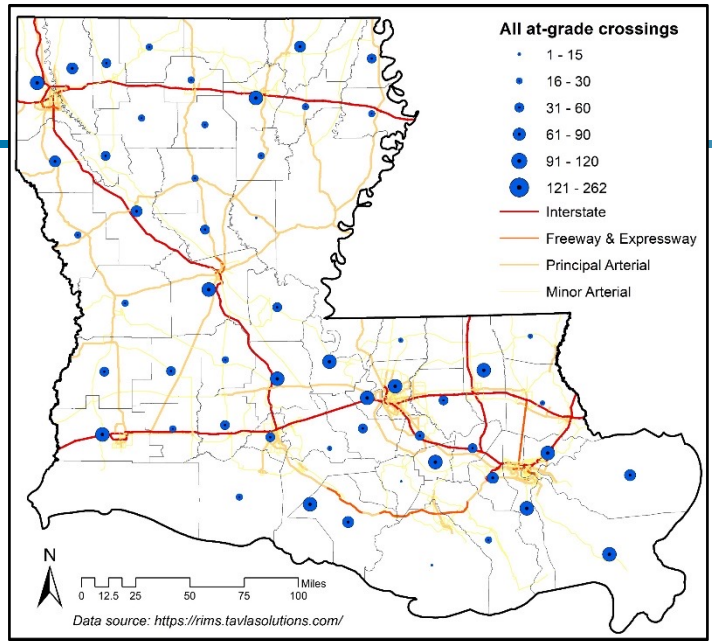
6 Class I
Railroads 
2,583 main
track miles

7 
Commercial
service airports

 **39**
Ports

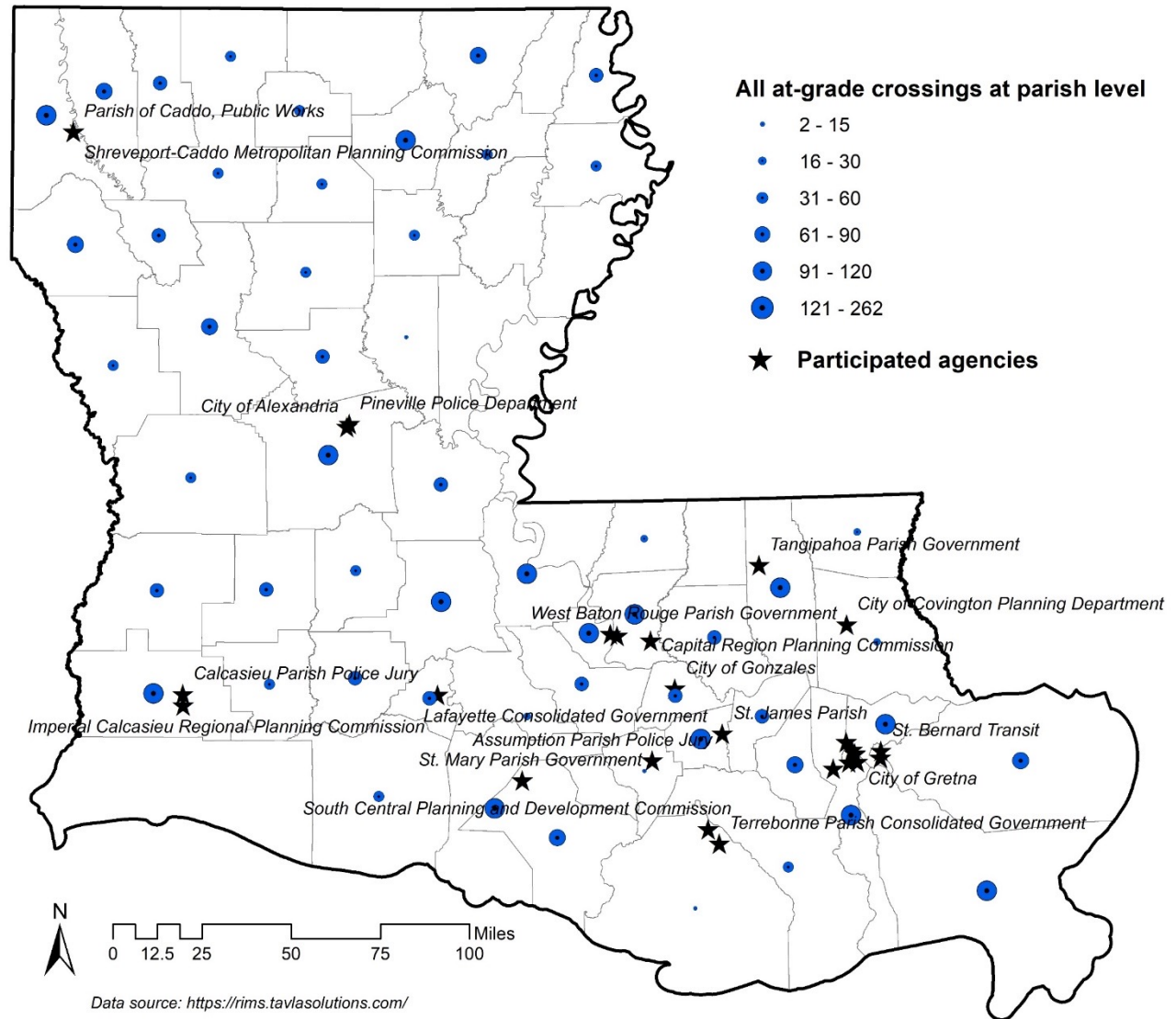
17 Major
waterway
corridors 





Survey and interview

- Contacted 344 personnel from 145 agencies.
- Responses from 30 different public and private entities.



Results

Safety and other concerns

How much of a concern is safety at railroad grade crossings to your agency?

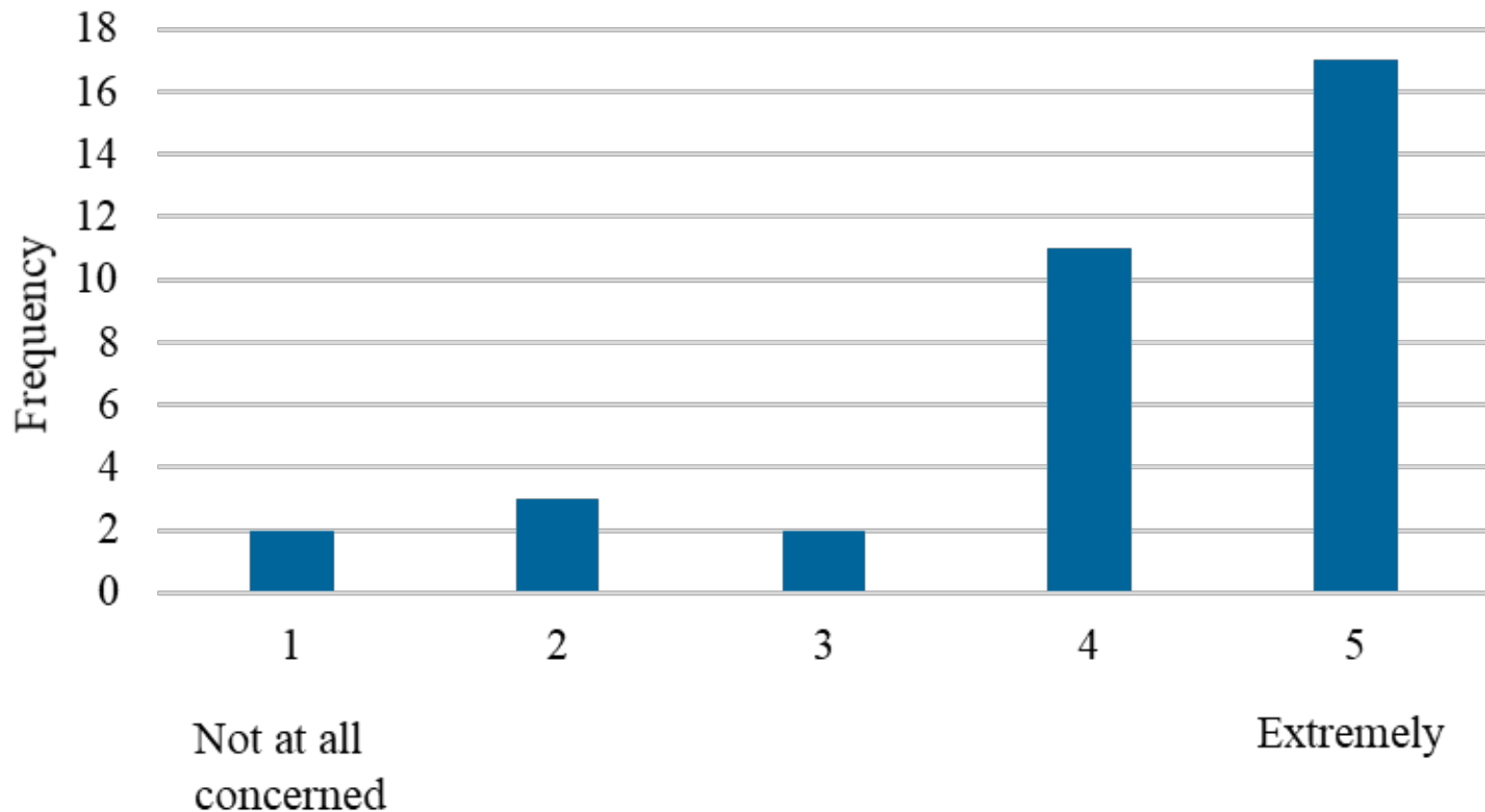


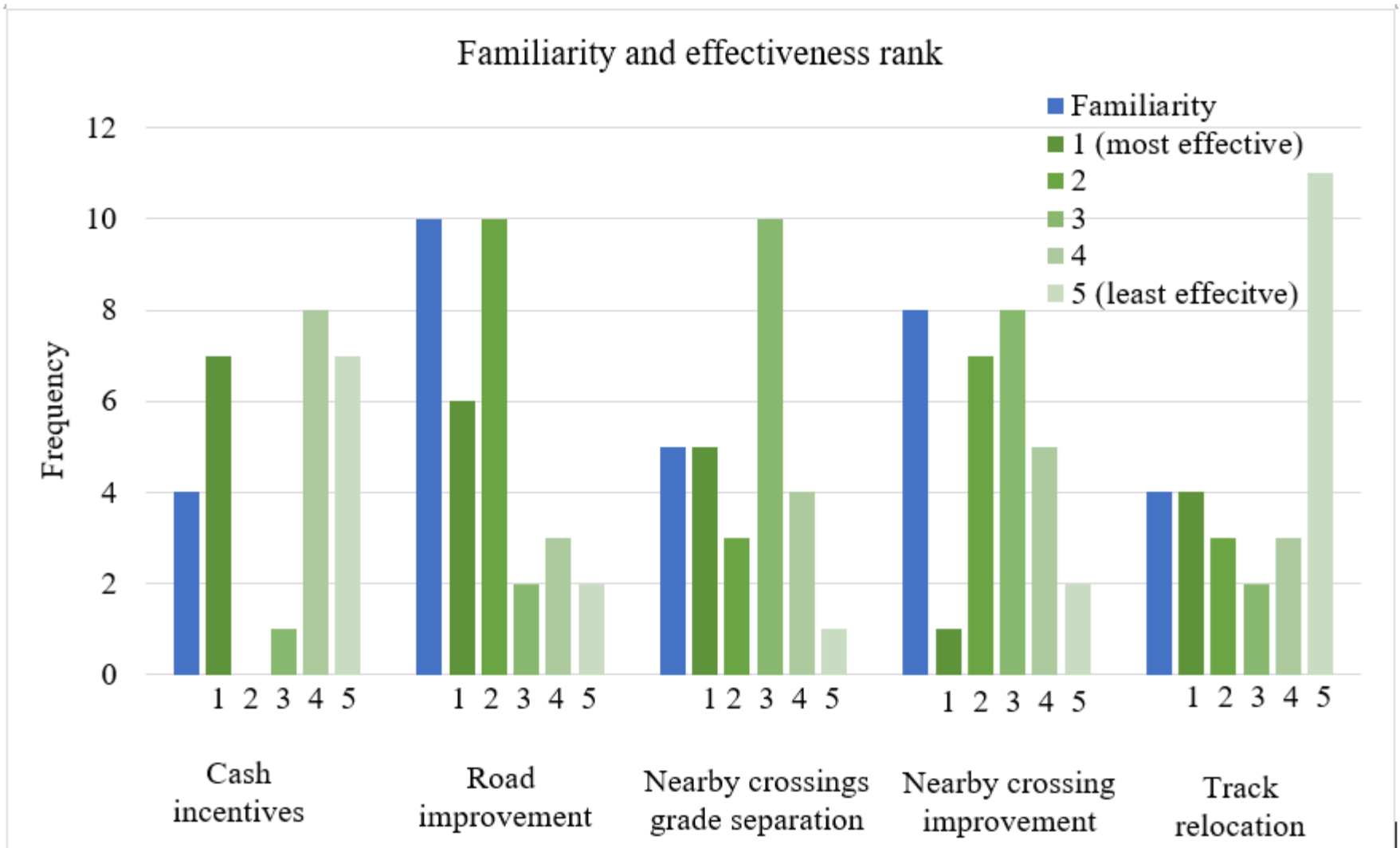
Table 2. Other concerns

Concerns	Description	Frequency
<i>Condition</i>	the condition and maintenance of crossing surface and equipment	11
<i>Traffic management</i>	the efficiency of moving traffic, traffic congestion, traffic flow interruption	10
<i>Active transportation</i>	access for pedestrians and cyclists (such as sidewalk, bridge, etc.)	6
<i>Access</i>	access for public utilities and permission of railroad right-of-way for public projects	2
<i>Community</i>	community connectivity and revitalization	2
<i>Emergency response</i>	emergency response	1

However, only about one third of agencies (12 out of 35) supported closing crossings as the means to alleviate their concerns.

One particular response may provide some insight, “1) the railroad made those agreements with agencies and landowners long ago to allow for the railroad to be placed; 2) reducing the number of crossings forces that traffic to other crossings; 3) the use of these crossings by emergency vehicles is imperative; 4) the closure of these crossings is an unsightly mess.”

Programs and effectiveness



-
- Providing intelligent transportation system (ITS) to inform the public of blockages to allow detour routes on appropriate roadways;
 - Improving the design of crossings for safety and visibility with lights, signage, warning technologies;
 - Public and community engagement, behavioral education outreach;
 - Better communication /contacts with the railroad companies;
 - Improving safety measures for non-motorized users;
 - Scheduled railroad use at particular off-peak times throughout the day;
 - Increasing railroad responsiveness and cooperation in maintenance efforts; and
 - Federally funded grade separation efforts.

Interviews

- Regulation and law enforcement are protective tools, and state and local agencies can prepare regulatory plans based upon the safety needs of their communities.
- A good transportation policy makes the transportation network more resilient. It involves all stakeholders, gets their voice heard, and considers concerns of all parties including traffic safety engineers, railroad companies, nearby communities, and landowners.
- All interviewees unanimously emphasized the significant impact of education on safety improvement.
- Different parties may possess conflicting perspectives on the closure of at-grade crossings depending on their immediate or long-term benefits.

Conclusion

- **The majority of agencies are concerned about safety at railroad grade crossings, but only one third of them would support closing crossings to mitigate their concerns.**
- **Besides safety, three other primary concerns were identified: the condition and maintenance of crossing related facilities, traffic management, and access for active transportation (pedestrians and bicycles).**
- **The perceived effectiveness: road improvement, nearby crossing grade separation, nearby crossing improvement, cash incentives, and track relocation.**
- **Limitations and future research.**

Policy Recommendations

1

Any is better than none

Any type of incentive program would work better than no incentive program and the combination of multiple incentive programs may be more effective than any individual program.

2

Popularity vs Effectiveness

There seems to be a conflict between popularity and effectiveness due to cost of implementation. This study recommends utilizing federal funding programs and opportunities, such as cash incentives and road improvement.

3

Context-sensitive

Good transportation policies are easily accessible, transparent, and engage all stakeholders throughout the whole process. context-sensitive, not a one-size-fits-all policy.

4

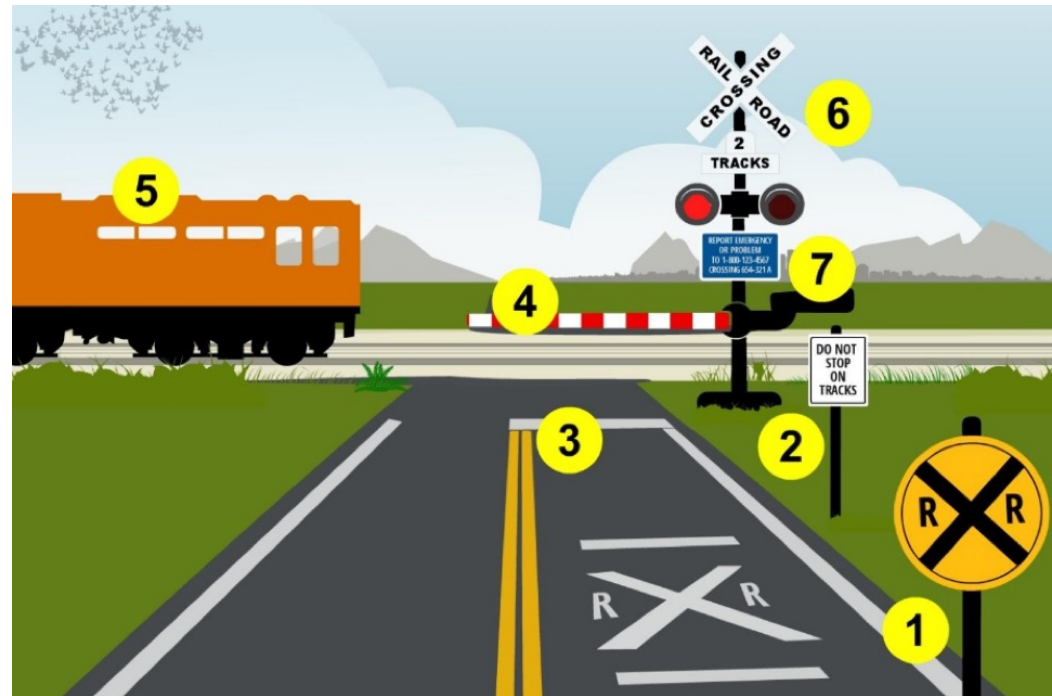
Public education

The importance of public education on safety and awareness is emphasized by all professionals.

5

New technologies

New technologies may provide alternatives and help improve safety and efficiency.



<https://www.nhtsa.gov/campaign/railroad-crossing>

Thank You!



Q & A