

Using Data to Drive HSIP Investments

A Safe System Starts with Quality Data

The first step to a safer roadway system is good data. The traditional approach to addressing traffic safety identifies safety issues after crashes occur. Using quality data to identify and mitigate contributing circumstances can reduce crash severity and help prevent future crashes. Quality data provides transportation professionals a means to make better decisions, select more strategic investments, and improve overall network safety. Two types of data-driven safety analysis help transportation agencies quantify safety impacts and identify high-risk roadways:

1. **Predictive Analysis**—Practitioners and the public make decisions based on a roadway’s projected safety performance using crash, roadway feature, and traffic volume data.
2. **Systemic Analysis**—Practitioners use crash and roadway data to identify and target improvements at locations throughout a network that share risk characteristics for serious crashes.¹

The HSIP can help fund projects that improve the ways agencies collect and analyze data.

In 2021

States obligated \$48 million in HSIP funds to data-related projects.

HSIP in 2021



HSIP funded **140** DATA-RELATED PROJECTS.



7% OF DATA-RELATED PROJECTS WERE ROAD SAFETY AUDITS.

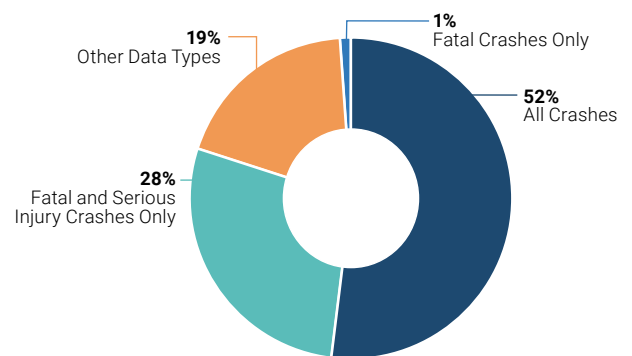


Data collection projects had an AVERAGE COST OF **\$700,000.**

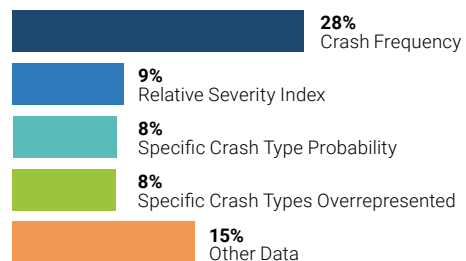


Data analysis projects had an AVERAGE COST OF **\$200,000.**

WHAT TYPES OF DATA DID PROJECTS USE?



WHAT PROGRAM METHODOLOGIES DID PROJECTS USE?



This information comes from 2021 State HSIP reports. To view individual reports, visit <https://safety.fhwa.dot.gov/hsip/reports/>.

¹ FHWA, "Data-Driven Safety Analysis (DDSA)," Roadway Safety Data Program, <https://safety.fhwa.dot.gov/rsdp/ddsa.aspx>.

Create Comprehensive Databases with MIRE FDE

The HSIP requires States to use crash, roadway, or traffic data in a data-driven safety management process to identify and prioritize highway safety improvement projects. This data should be collected using the practices outlined by the Federal Highway Administration's (FHWA's) Model Inventory of Roadway Elements (MIRE).

MIRE provides an organizational framework that State, local, and Tribal agencies can use to create more uniform, comprehensive, and interconnected databases of roadway characteristics and traffic inventory elements.² MIRE helps agencies with limited resources use advanced tools to improve roadway safety, design, and operation.

MIRE 2.0 introduced MIRE fundamental data elements (FDE).³ This subset was established in Federal regulation with subsequent guidance at <https://highways.dot.gov/safety/hsip/guidance-state-safety-data-systems>. By September 30, 2026, States must have access to the complete collection of MIRE FDE elements for all public roads.

MIRE FDE guidance helps agencies to improve their roadway inventories and analysis capabilities in several key ways:



Meet FDE requirements.



Improve overall roadway data inventory for all public roads, enabling more robust safety analysis.



Improve single elements of roadway data.

For more on MIRE, visit <https://safety.fhwa.dot.gov/rsdp/mire.aspx>.

HSIP in Action

Systemic Benefits for Cost-Effective Improvements

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT)

Over nearly two decades, HSIP-funded PennDOT projects have made safety improvements at 4,300 locations. Since 2020, PennDOT has used HSIP funds to perform a simple before/after evaluation of observed crashes at each past project site to determine the benefit/cost ratio. These reviews revealed which improvement types had the greatest benefits, and PennDOT now uses this data to help identify and select subsequent safety improvement projects.

One key finding was that systemic projects tended to have higher benefit/cost ratios (BCRs) than spot improvement projects. The most effective improvement types included rumble strips on both the centerline and edge line (73.8 BCR), curve-related signing and pavement markings (64.1 BCR), and high friction surface treatment (37.1 BCR). Reviews also revealed improvement types that have not been effective at reducing crashes—such as adaptive traffic signal control—and these are no longer PennDOT-eligible for HSIP funds. PennDOT is subsequently conducting an evaluation of select improvement types using empirical Bayes methods to create high-quality, Pennsylvania-specific crash modification factors.

PROBLEM

Numerous Crashes



SOLUTION

Systemic Safety Improvements



RESULT

State-Specific Effectiveness Evaluation



² FHWA, Model Inventory of Road Elements: MIRE 1.0 (October 2010), https://safety.fhwa.dot.gov/tools/data_tools/mirereport/mirereport.pdf.

³ FHWA, Model Inventory of Roadway Elements: MIRE 2.0 (July 2017), <https://safety.fhwa.dot.gov/rsdp/downloads/fhwas17048.pdf>.

To find out how HSIP can help save lives in your community, contact your State DOT:

<https://www.fhwa.dot.gov/about/webstate.cfm>



Have an HSIP success story? Share your projects on Facebook, Twitter, and Instagram with #HSIPsavesLives.

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE



U.S. Department of Transportation

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Federal Highway Administration

