

# **Data Collection Practice for Use with In-Service Performance Evaluations (ISPEs)**

## **Dissemination and Implementation Plan**

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### **NCHRP 22-44**

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## **INTRODUCTION**

The primary objective of this research was to develop a transportation agency data collection methodology and associated guidelines to support individual investigative In-Service Performance Evaluations (ISPEs), ISPE Programs, and Asset Management of roadside safety hardware. The next critical step is to implement these guidelines broadly in transportation agencies nationwide such that highway agencies can base roadside hardware decisions on observed performance data. Basing roadside hardware decisions and policy on observable data ensures that scarce agency resources are targeted at policies and design decisions that will achieve the lowest practical risk to highway users. The following sections describe a detailed dissemination and implementation plan for the products of this research.

Successful implementation of ISPEs will ultimately be measured through a reduction in serious and fatal roadside crashes. The following implementation plan identifies the desired outcomes of implementing this research. Each of the following section titles indicates a particular desired outcome. The conclusion of this plan summarizes the identified recommendations to achieve the following desired outcomes:

- ISPE results are used in decision making and policy development;
- ISPE data are collected by trained individuals using a consistent methodology;
- ISPE results are shared among transportation agencies; and
- Funding and resources are made available for ISPEs.

## **DESIRED OUTCOMES**

The best possible outcomes of implementing this research have been outlined in the following sections. Best practices and institutional barriers to implementing ISPEs were identified through the pilot test conducted under this effort and were discussed in the Final Report. The following outcomes and associated recommendations provide solutions for the identified obstacles and build upon the identified best practices to remove institutional barriers to conducting ISPEs. The outcomes are indicated by the section titles and the specific recommendations are provided using an italic font.

### **ISPE Results are Used in Decision Making and Policy Development**

The AASHTO TCRS Strategic Plan identified the need to institutionalize ISPEs. Roadside hardware decisions and policy that are based on observable field performance ensures that resources are most effectively used to reduce fatal and serious injury run-off-road crashes. In support of that objective, the AASHTO TCRS advanced the research needs statement (RNS) which led to this research project. The data collection guidelines developed in this research provide a data collection methodology which can support individual ISPEs, ISPE programs, and asset management of roadside safety hardware. When these data are collected consistently between the various transportation agencies, the ISPE data analysis guidelines published under NCHRP Report 1010 can be successfully used by various transportation agencies and the results shared among agencies.

A common misconception about performing ISPEs is that an inventory of roadside hardware is needed. Roadside hardware inventories are useful if available, but an ISPE can also be performed without inventory information. An observed best practice for ISPEs was the balancing of the inventory costs with potential savings. Specifically, the budget necessary to

collect and maintain a hardware inventory could be balanced by the potential savings which may be realized by avoiding hardware update policies that have little measurable effect in the field.

Another common concern is that data will not be collected consistently or that critical fields will be missed. The guidelines developed under this effort largely eliminate that concern by establishing a standardized methodology for collecting data for use in ISPEs. *Those performing ISPEs are encouraged to use the data collection methodology developed under NCHRP Project 22-44 as well as the ISPE data analysis methodology presented in NCHRP Report 1010.*

Another obstacle to institutionalizing ISPEs is the question of how to best use the results in decision making and policy development. If there is no immediate use for the ISPE results, there is little incentive to allocate the resources needed to perform ISPEs. The AASHTO TCRS strategic plan proposed “that prior to any policy change, a review of the in-service performance of the outgoing hardware be performed. If the hardware is found to be performing acceptably, then the ISPE may be offered in place of changing the hardware policy. If the performance is judged to be unacceptable, then steps to improve or change the test and evaluation criteria (i.e., MASH) or the site design and installation recommendations (i.e., RDG) should be initiated.” [2] ISPEs can be used to ensure that a new roadside hardware policy is likely to result in measurable and observable reductions in the number of fatal and serious injury crashes.

There is also a need to define what constitutes “acceptable” roadside hardware performance. The TRB AKD20 and AASHTO TCRS advanced a RNS during the Summer 2021 meeting with the objective to develop national guidelines which defines acceptable field performance thresholds for roadside hardware. The RNS is provided at the end of this plan and titled “National Guidelines for Defining Acceptable Roadside Hardware Field Performance through In-Service Performance Evaluations (ISPEs).” The RNS statement was advertised as NCHRP Project 22-58. The contract is pending.

Establishing national guidelines for defining acceptable field performance will provide a critical element to support national and regional use of ISPE results consistently. The proposed research would develop performance thresholds defining acceptable performance for each of the evaluation criteria established by NCHRP Report 1010. The guidelines developed under this effort will provide the methodology to collect standardized ISPE data element, which in turn will support the standardized ISPE data analysis and support achieving this desired objective.

Recently, NCHRP WOD 292 (Roadside Hardware Replacement Analysis User’s Guide) developed a method for using ISPE, traffic, and construction cost data to assess when and how to implement future roadside hardware changes. The method uses ISPE data to assess if replacing the hardware is economically practical. Some changes in hardware have been proposed based on the results of crash tests but the likely reduction in fatal and serious crashes is very small and unlikely to be a good investment. This is not intended to imply that crash testing is frivolous. Crash test evaluations of roadside safety features have long been recognized as an initial assessment of hardware performance. An ISPE demonstrates how roadside safety features perform within a broader range of real-world conditions such as environmental and operational situations.

The roadside hardware replacement analysis procedure provides a way to develop policy that determines if systemwide replacement, replacement in specific improvement projects, replacement through attrition, or no replacement at all is warranted for different roadways. The roadside hardware replacement analysis procedure is an example of using ISPE results to make data-driven roadside hardware decisions.

The TRB AKD20 and AASHTO TCRS advanced a RNS during the Summer 2023 meeting with the objective to develop a methodology for using ISPEs to update MASH test conditions and evaluation criteria. This proposed research is also intended to evaluate, through ISPE, hardware developed under Report 350 and MASH.

*Interested parties are encouraged to consider leveraging ISPE results to support the decision to replace or maintain existing hardware. Interested parties are encouraged to consider leveraging ISPE results to develop roadside design guidelines. Interested parties are encouraged to consider leveraging ISPE results to determine when changes to MASH would provide observable improvements in the field. Interested parties are encouraged to support the funding of the proposed research titled “Develop a Methodology for Using ISPEs to Update MASH.”*

### **ISPE Data are Collected by Trained Individuals Using a Consistent Methodology**

The lack of availability of training for performing ISPEs has been recognized as a barrier to institutionalizing ISPEs. This research project provided multiple training opportunities for the pilot states and showed that transportation agencies can collect the data necessary to perform ISPEs if provided proper training and support. The training, however, was a one-time effort limited to the pilot states participating in this research. There is a critical need to continue the dissemination of these results and train additional transportation agencies on collecting data for use in ISPEs using the NCHRP 22-44 methodology. *Interested parties are encouraged to support NCHRP implementation funding to provide training.*

### **CONCLUSIONS**

“Simply stated, each member of the community has a vested interest in the performance of hardware on the roadside and each member can play a valuable role in the institutionalization of ISPEs.” [2] AASHTO, through the NCHRP, has provided the catalyst to develop a collaborative approach to ISPEs through a series of recent research projects.

It is not enough to create the list of outcomes shown above. Successful implementation of this research will necessitate identifying and empowering champions for each of the outcomes. Recommendations have been provided in italicized text through this implementation plan. The recommendations are summarized in Table 1.

**Table 1. Summary of Outcomes, Recommendations, and Stakeholders.**

Outcome	Recommendations
ISPE results are used in decision making and policy development.	Those performing ISPEs are encouraged to use the data collection methodology developed under NCHRP Project 22-44 as well as the ISPE data analysis methodology presented in NCHRP Report 1010.
	Interested parties are encouraged to leverage ISPE results to support the decision to replace or maintain existing hardware.
	Interested parties are encouraged to leverage ISPE results to develop roadside design guidelines.
	Interested parties encouraged to leverage ISPE results to determine when changes to MASH would provide observable improvements in the field.
ISPE data are collected by trained individuals using a consistent methodology.	Interested parties are encouraged to support the funding of the proposed research titled “Develop a Methodology for Using ISPEs to Update MASH.”
	Interested parties encouraged to support NCHRP implementation funding to provide training.

## REFERENCES

1. Carrigan, C.E., *NCHRP Project 22-44, A Transportation Agency Data Collection Practice for use with In-Service Performance Evaluations (ISPEs)*. 2023 [Expected].
2. Carrigan, C.E., *Research for AASHTO Standing Committee on Highways. Task 360. Development of a Strategic Plan for the Technical Committee on Roadside Safety (TCRS)*. 2015.
3. TPF. *In-Service Performance Evaluation (ISPE) of Roadway Safety Features, TPF-5(481)*. 2021.