TPF

EVALUATION OF LOW-COST SAFETY IMPROVEMENTS (ELCSI)

by Tricia Sergeson and Roya Amjadi

January 2023

SUCCESS STORY

Safety is a top priority of the U.S. Department of Transportation (USDOT). In 2020, even though the volume of traffic was down overall, 38,824 people still died in motor vehicle crashes, and an estimated 2.28 million were injured.[1] To reach the USDOT's safety goals, the transportation sector needs to work together to identify and implement safety solutions. The Transportation Pooled Fund (TPF) Program provides an opportunity to collaborate with stakeholders around the world to help solve transportation problems like safety. By pooling funds and expertise, government agencies can develop innovative solutions at a lower cost.

The FHWA-led TPF study *Evaluation of Low-Cost Safety Improvements (ELCSI)*, first established in 2005, actively leverages partnerships to develop low-cost, feasible countermeasures that reduce safety risks. The study has had many proven successes that demonstrate the need for high-impact, low-cost solutions. Safety countermeasures born out of this study, like adding a retroreflective tape or adjusting a sign height, may not be noticeable to the road-using public, but they have been proven to reduce crashes and save lives.

At the beginning, the ELCSI study chose safety improvements from a series of guides developed by the National Cooperative Highway Research Program for evaluation.[2] The study examined these countermeasures through rigorous data collection, effectiveness evaluations, and cost-benefit analysis.

The safety countermeasures evaluated in the ELCSI study included a wide variety of topics, such as pedestrian and cyclist solutions, pavement friction, rectangular rapid-flashing beacons, rumble strips, and curve delineation. The researchers evaluated topics and countermeasures for programs and budgets of all sizes.

Source: FHWA. Mumble strips were one of the safety countermeasures developed in the ELCSI study.

Mumble strips were one of the safety countermeasures developed in the ELCSI study. Like rumble strips that offer an audible and vibratory warning to drivers veering off a roadway, mumble strips can also alert drivers but are much quieter. This TPF study's research found that though the sound heard inside the vehicle is virtually the same with rumble strips and mumble strips, the latter produces significantly less noise outside—improving the quality of life for those who live and work near a roadway.

U.S. Department of Transportation
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TPF TRANSPORTATION POOLED FUND

Turner-Fairbank Highway Research Center

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Source: FHWA. High-friction surface treatment has been shown to significantly reduce wet pavement crashes.

Since its inception, the ELCSI study has adapted to meet the evolution of safety needs throughout the Nation. For example, this TPF study's "Pavement Safety Performance" project researched different types of flexible and rigid pavement treatments and their applications (like chip seal, concrete diamond grinding, and high-friction surface treatment for horizontal curves). Treating horizontal curves addresses a major safety risk. Approximately one-quarter of highway fatalities occur at or near horizontal curves. The deterioration of pavement's surface friction could be a factor for roadway departure crashes (a crash which occurs after a vehicle crosses an edge line, a center line, or otherwise leaves the traveled way), particularly in wet weather. The Federal Highway Administration estimates that 70 percent of wet pavement crashes are preventable through improved pavement friction.[3] ELSCI research indicated significant benefits from the use of high-friction surface treatments at curves.

The more than 60 publications documenting the ELSCI study's evaluated low-cost safety countermeasures provide further details on the research results and insight.

The ELCSI study has also contributed more than 800 crash modification factors (CMFs) (factors used to compute the expected number of crashes after implementing a given safety measure at a specific site) to the national CMF Clearinghouse. Data used in these reports have helped identify strategies ELCSI study partners could implement throughout the United States. TPF study partners can analyze the CMFs to meet their safety goals. The discoveries made in the ELCSI study have helped develop a network within scientific communities (the Transportation Research Board, the Bureau of Labor Statistics, and the American Statistical Association) to advance safety research.

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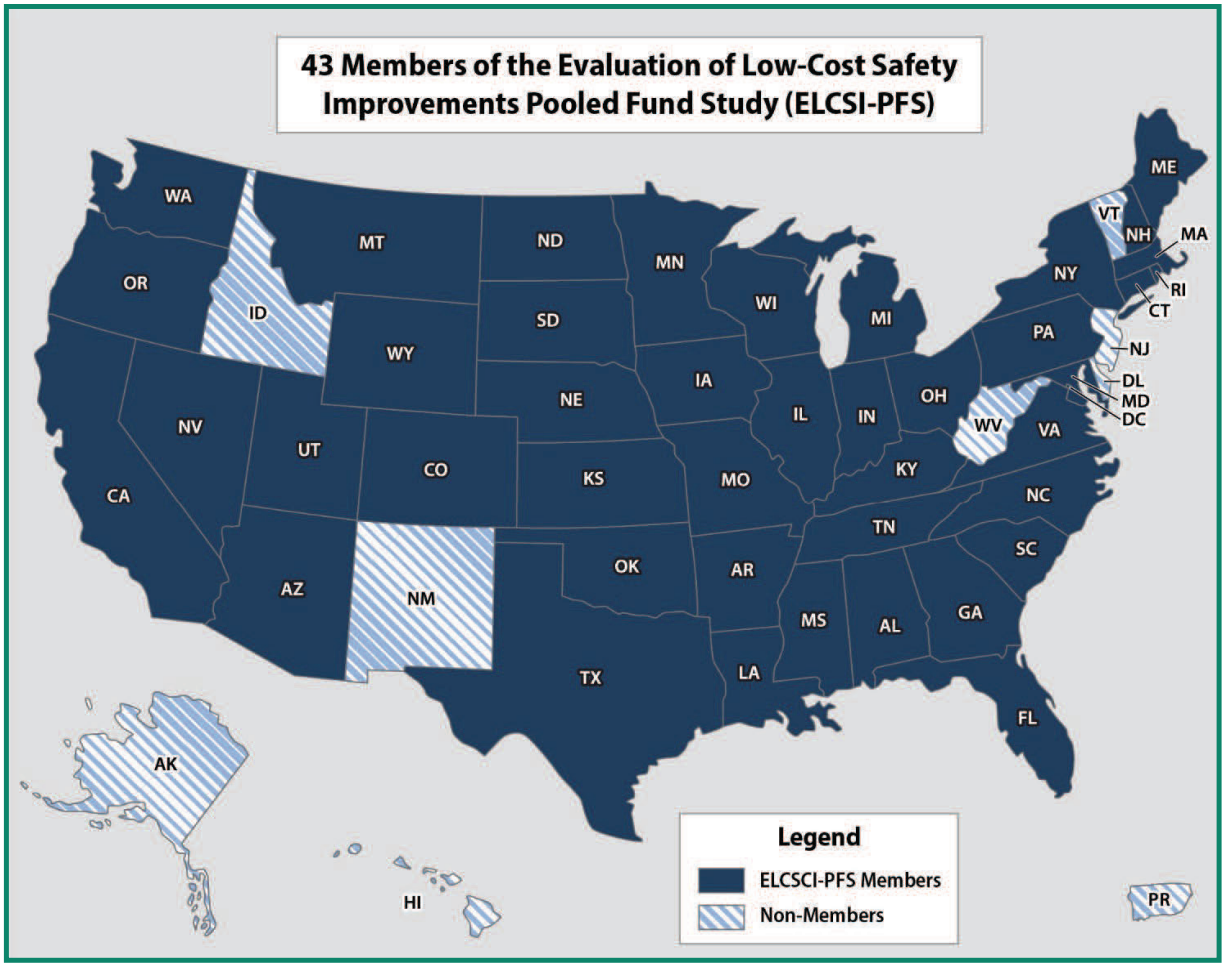

Source: FHWA. With over 43 partner agencies, the ELSCI study boasts the most members of all the TPF studies.

PARTNERSHIP AND COLLABORATION

With over 43 partner agencies, the ELSCI study boasts the most members of all the TPF studies. (See the map of partnering agencies.) Each ELSCI partner agency includes agency representatives and subject matter experts on the technical advisory committee (TAC). The TAC helps to guide the research for a TPF study and facilitates knowledge and technology transfer to staff at different agencies. Members of the ELSCI study meet annually to give presentations on their research and share their ideas. Participants learn from each other's experience and form connections that help advance overall transportation research. These invaluable meetings showcase an agency's innovations that other partner agencies can also use.

"This pooled fund study has been invaluable to both the Michigan DOT and staff in safety programs. The annual meeting allows various staff members to learn about new and improved low-cost safety improvements and, more importantly, to network and learn from fellow DOTs and researchers," said Mark Bott, engineer of traffic and safety for the Michigan DOT.

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VALUE

The ELSCSI study will remain important for years to come as it continues to conduct research on cutting-edge technologies that improve safety. The proven research from this study allow transportation partners to invest in low-cost safety countermeasures that reduce fatalities and injuries around the world. Many of the proven safety countermeasures have now become institutionalized practices among partner agencies.

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3. Merritt, D. K., C. A. Lyon, B. N. Persaud, and H. N. Torres. 2020. *Developing Crash-Modification Factors for High-Friction Surface Treatments*. Report No. FHWA-HRT-20-061. Washington, DC: Federal Highway Administration.

4. Transportation Pooled Fund Program. n.d. "Welcome to the Transportation Pooled Fund Program Web Site" (web page). https://www.pooledfund.org/, last accessed January 6, 2021.

Make an Impact Through a TPF Study!

The TPF Program is a great resource to combine limited funds to address important transportation issues. Learn more about initiating a TPF study and browse the list of open solicitations on the TPF website at https://www.pooledfund.org/.[4]

For More Information, Contact:

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