

TPF Success Story

TPF-5(385) Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs)

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Transportation Pooled Fund (TPF) studies are a proven way for State agencies to test new technologies and connect with the academic community pursuing research. Study members accept the risk because they know they are getting a huge benefit in return.

Example of TSDDs operating on a highway.

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Research shows that incorporating pavement structural condition into pavement management planning leads to more informed decisionmaking and more cost-effective preservation and rehabilitation strategies.⁽¹⁾ Falling weight deflectometers (FWD), commonly used for pavement management applications at the project level, measure structural properties at discrete points along pavement sections. However, FWDs are inefficient at the network level because the equipment is stationary during each testing point. As a result, productivity is limited, and the required lane closures disrupt traffic and affect the safety of transportation agency work crews and facility users.¹

Over the last 15 years, several private companies have developed TSDDs that continuously measure pavement structural condition while traveling at traffic speed. Like FWDs, TSDDs can map structural conditions via a geographic information system and transfer those data into a user's asset management system.² TSDDs can also cover more distance at a faster pace while making it safer to collect pavement structural information for transportation agency work crews and drivers. However, to effectively implement TSDDs and incorporate the collected data in pavement management decisionmaking, transportation agencies need guidance and a framework.

The TPF-5(385) study established a research consortium that provides participating agencies with guidelines on collecting data with TSDDs, including how to apply and interpret the data and integrate it into pavement management system (PMS) decisionmaking processes. The lack of available models makes acquisition and use of TSDDs by State agencies prohibitively expensive. The TPF study enables participating agencies to conduct pilot demonstration testing in their respective networks and share their findings with one another. Currently, 26 States participating in the study have tested TSDDs on their road systems or are planning to do so.

¹John Arambarri, State Pavements Engineer, Idaho Transportation Department; interview conducted by Katie Flaherty on September 8, 2023.

²See footnote 1.

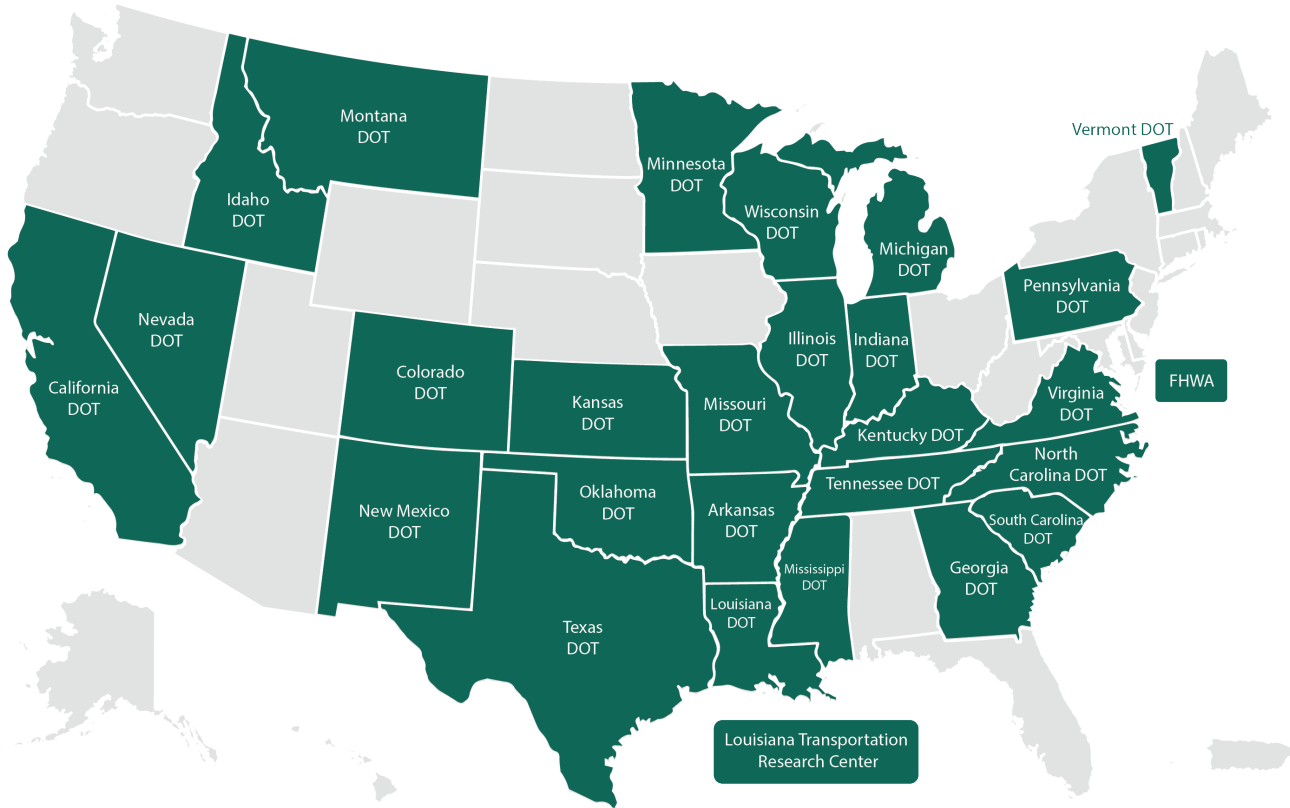


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Map of TPF-5(385) study partners



Source: FHWA.
DOT = department of transportation.

The TPF study’s participating agencies share information and experiences through quarterly meetings, webinars, and an annual technology advisory meeting. Within 5 years of initiating the study, more than half of the States involved have deployed TSDDs for testing, each using the data a little differently.

The Idaho Transportation Department (ITD) was one of the first State agencies to join the study. Through the study, ITD can use the data to prioritize repairs for the road sections that need the

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most work as well as implement pavement forecasting in certain districts.³ ITD has worked with its districts to develop a TSDD testing route that maximizes the transportation network, with a focus on the end user, and has shifted its asset management practices.⁴

The Mississippi Department of Transportation (MDOT) tested TSDDs as part of the TPF study to target a corridor with one of the lowest performing pavement systems.

³See footnote 1.

⁴See footnote 1.

MDOT coordinated with the local district to change the methodology used to address local pavement health and asset management.⁵

Throughout the TPF study, both the technology itself and the way members analyze data have evolved. The guidelines that study members are developing for the use of TSDDs reflect this change. Study member feedback has enabled technology manufacturers to tailor the product to better meet the needs of end users and upgrade the technology.

As this TPF study wraps up, many of the same participants will join a new study, Implementation of Structural Data from Traffic Speed Deflection Devices (TPF-5(518)), which focuses on the implementation of TSDDs to make better decisions for PMS.⁽²⁾ Many of the State agencies that participated in the TPF-5(385) study intend to continue regularly testing TSDDs on more of their roads by coordinating with local districts and opening up new potential funding sources for using TSDDs. Study members also aim to further define TSDD metrics that demonstrate value, use TSDDs as a decisionmaking tool, and continue to collaborate with and learn from each other.

Testing TSDDs through the TPF Program has accelerated the use of the technology, and the results of this study have shaped national and international research on TSDDs.⁶ TPF studies are a proven way for State agencies to test new technologies and connect

with the academic community pursuing research. Study members accept the risk because they know they are getting a huge benefit in return. This study has been a good example of what TPF studies can do—put a lot of heads together to advance a research initiative that improves transportation asset management and safety.

Study member feedback has enabled technology manufacturers to tailor the product to better meet the needs of end users and upgrade the technology.



© Gerardo Flintsch, Virginia Tech Transportation Institute. TSDDs being used on a highway.

⁵Jim Poorbaugh, Alex Middleton, and Cindy Smith; interview conducted by Katie Flaherty on September 27, 2023.

⁶See footnote 1.

References

1. National Cooperative Highway Research Program. 2023. "Pavement Structural Evaluation with Traffic Speed Deflection Devices (TSDDs)" (web page). <https://www.pooledfund.org/Details/Study/637>, last accessed January 3, 2024.
2. National Cooperative Highway Research Program. 2023. "Implementation of Structural Data from Traffic Speed Deflection Devices" (web page). <https://www.pooledfund.org/Details/Study/750>, last accessed February 13, 2024.

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/>.

Conducting the testing of TSDDs through the TPF Program has accelerated the use of the technology, and the results of this study have shaped national and international research on TSDDs.



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For More Information, Contact:

Tricia Sergeson
TPF Program Manager
(202) 493-3166
patricia.sergeson@dot.gov

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