



Systemic Applications of High Friction Surface Treatment in Tennessee

➤ What was the safety issue, problem, or gap?

In 2010, the Tennessee Department of Transportation (TDOT) created a Safety Office to analyze crash types, causes, and severity. In 2011, Tennessee adopted their Roadway Departure Implementation Plan, which included high friction surface treatments (HFST). Up to that time, TDOT had implemented HFST at ten locations statewide, primarily for lengthening bridge lifecycles, and were now interested in widespread deployment of the treatment as a safety improvement through the State's HFST Initiative.

➤ What were the key challenges that needed to be addressed before the new practice could be implemented?

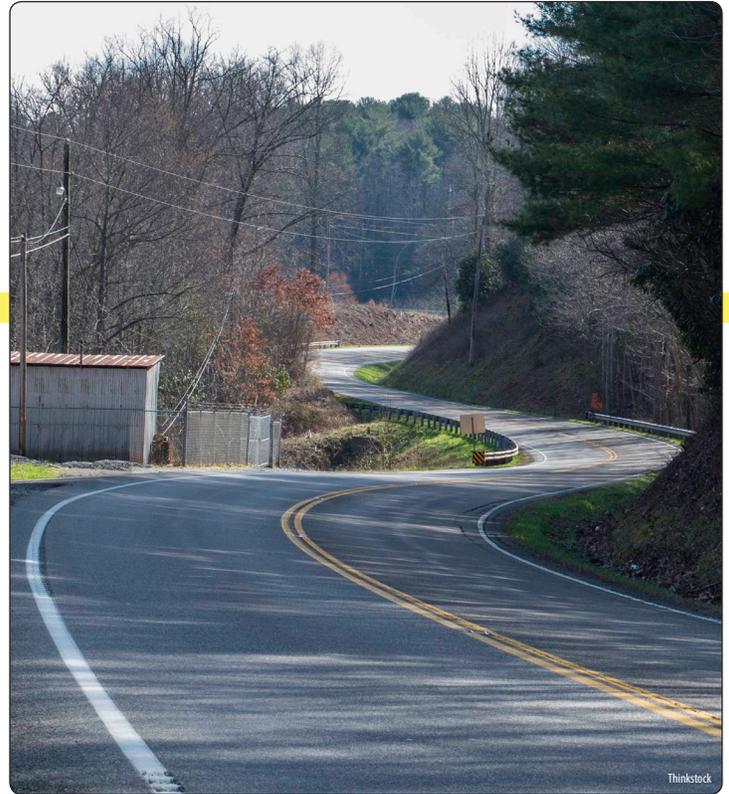
Relatively new to HFST implementation, TDOT wanted to utilize a data-driven procedure to select sites where HFST could effectively improve safety as they launched the Initiative. TDOT regarded crash history and site-specific conditions related to pavement conditions, existing delineations, proximity to other curves, and other factors as important considerations for selecting appropriate sites. However, analysis of these criteria was no small feat and required field visits to each candidate location by Safety and Pavement/Materials Office staff.

TDOT requires a defined need before obligating safety funds for any improvement. It was important to not only document how safety at a particular site may improve after HFST installation, but to limit HFST use to locations with sufficient pavement integrity, allowing HFST to last a full life span of up to 10 years.

➤ Describe the new practice:

TDOT employed three approaches to help determine potential locations to include in their HFST Initiative, such as:

REACTIVE	PROACTIVE	EVENT-BASED
TDOT has an active Road Safety Audit (RSA) program and conducts an RSA at some locations with a significant crash history.	The DOT has an exhaustive horizontal curve inventory and overlays crash data onto known curve locations to identify opportunities to further investigate. Curves slated for HFST installation through this approach are included in TDOT's HFST Initiative and the project is programmed accordingly.	TDOT considers other spot locations as issues or opportunities arise, such as locations experiencing wet-weather related crashes or a curve with close proximity to an upcoming HFST installation.



TDOT mostly used the proactive approach to develop the candidate location list and relied on the following systemic process to do so:

- 1 Overlay crash data onto horizontal alignment.**
TDOT overlaid three years' of crash data onto their horizontal alignment inventory.
- 2 Flag candidate locations and review data.**
Staff isolated all curves with four or more crashes in three years for further review, noting those that were indicated as weather- or speed-related in the crash report.
- 3 Perform field investigation.**
Small teams of Safety Office and Pavement/Materials Office staff visited each candidate location to review and document curve geometry, sight distance, cross-slopes, existing safety improvements (e.g., signs, pavement marking), and evidence of past crashes (e.g., skid marks, damaged infrastructure). The team marked and documented potential limits for each HFST location and ensured signing and pavement markings were appropriate and in good condition.
- 4 Narrow the list.**
After field reviews, some locations were eliminated from the HFST Initiative for various reasons, including poor pavement integrity, crashes attributed to intersections within the curve, and others. Curves remaining on the list were grouped by proximity and programmed for installation.

➤ Key accomplishments, including roadway safety improvements:

Since the launch of the HFST Initiative in 2011, TDOT has completed approximately 50 HFST projects ranging from 2-lane rural to 5-lane urban locations, and approximately 60 locations were selected for HFST applications in the past year. TDOT plans to complete performance evaluations for the HFST installations, after collecting three to five years of crash data.

Additionally, TDOT held an "open house" event in 2015, as seen in photo, where they provided nearly 50 participants representing local agencies, engineering consultants, TDOT, FHWA, and universities with an opportunity to learn more about HFST application, benefits, and costs. The event included a live, on-site demonstration of HFST installation by the TDOT Materials and Test Division; presentations on HFST history, development, effectiveness, and installation; and an opportunity for questions and answers with TDOT and FHWA presenters.



HFST Open House by TDOT

➤ What technical and/or institutional changes resulted from the new practice?

TDOT's systemic HFST implementation has impacted local agencies; several have expressed a desire to try HFST and contacted TDOT for guidance and information. Along with their impressive local route inventory, local agencies in Tennessee have a solid funding mechanism that can sustain HFST installations on the local network.

➤ What benefits were realized as a result of the practice?

Applying a systemic approach and rigorously vetting proposed locations ultimately helped leadership support the HFST initiative and moved it forward. The process also garnered support and proved to be beneficial at the local agency level.

FOR MORE INFORMATION

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