

# No Gaps: Kentucky Pilots New Friction Management Approach

Roadway departure (RwD) and intersection crashes make up 75 percent of all traffic fatalities in the U.S. Many of those crashes come down to how vehicle tires interact with the pavement of the roadway. In other words, adequate pavement friction to meet friction demand is crucial to roadway safety. That means agencies need reliable methods for measuring pavement friction to meet safety performance goals.

In Kentucky, 60-70% of their yearly highway fatalities are the result of roadway departures. Those crashes have an annual economic impact of over \$10 billion, as well as life-changing effects on Kentucky residents.



Credit: Texas Transportation Institute

“We’ve reframed the way we think about roadway fatalities overall,” said Michael Vaughn, traffic safety branch manager at the Kentucky Transportation Cabinet (KYTC). “It’s much more proactive and about preventing the next crash, not reacting to the last one. We’ve started thinking that way about managing friction on our roadways.”

Recently, the KYTC piloted a program that uses Continuous Pavement Friction Measurement (CPFM) to better measure and manage friction on Kentucky roadways. CPFM equipment measures pavement friction continuously, through tangents, curves, and intersections at speeds as high as 50 mph, eliminating data gaps created by other friction-testing methods that are not continuous.

KYTC used CPFM to collect friction data on 15,118 lane miles of its 63,878 total lane miles. Data were collected on interstates, parkways, and State primary and secondary routes, as well as ramps on all these facility types.

The data included friction coefficient (SFN40), texture (mean profile depth), curve radius, grade, cross slope, and GPS coordinates. This information was incorporated into the State's Linear Referencing System (LRS) and then the roadway network was divided into 0.1-mile-long analysis segments. Each segment was assigned to a site category, such as curves with a radius of less than 300 feet, curves 300-700 feet, intersections, tangents, etc.

From there, KYTC developed a network-level safety performance function that helped predict the crash reduction for each site category along the various KYTC-managed route systems if friction were increased by 10 points. A 10-point increase in friction corresponds to increasing a pavement's coefficient of friction by a value of 0.1.

The analysis showed that a 10-point increase in average friction across the network would lead to a crash reduction of over 10% of all crashes. This could save many lives and serious injuries as well as save Kentucky residents more than \$1 billion per year. Treatments such as resurfacing, microsurfacing, chip seals, shot blasting, and diamond grinding typically provide a 10-point or higher increase in friction. Other treatments, such as high-friction surface treatment (HFST), can provide a 30-40 point or higher increase in friction. With a wide variety of friction treatment options available, KYTC is confident that utilizing CPFM will allow for better management of pavement friction and over time will achieve a 10-point increase in average friction across their roadway network.

"This has helped us reassess how we see our whole network," Vaughn said. "We used to focus more on our high-volume roads and freeways because of the increased traffic. But this study has shown us that we have real opportunities to save lives on lower-volume roads because they can have more challenging geometry and contextual issues that friction management can help."

KYTC is using the CPFM data to identify locations where friction enhancements may be worthwhile.

Transportation practitioners at KYTC plan to use their experience with CPFM in many ways going forward. They are using friction and texture data to identify locations for the installation of HFST. A few dozen sites have been prioritized for installation of HFST during the 2023 construction season and more will be prioritized for installation during the 2024 construction season. They are also working to incorporate more strategic use of HFST, as well as other friction and texture enhancing treatments. Additional plans include incorporating friction and texture measurements in the scoring matrix used to prioritize pavement resurfacing projects, improving mix designs and materials specifications, and more.

"I truly believe CPFM is an opportunity to make significant strides in reducing severe crashes nationwide and help us achieve our safety goals," Vaughn said.

Watch an [FHWA video on CPFM](#). Find [case study summaries, best practices, and more on CPFM](#). [Pavement Friction Management](#) using CPFM is a [Proven Safety Countermeasure](#) and is consistent with the [Safe System Approach](#).

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