

Pavement Friction

Roadway departure crashes account for the majority of roadway fatalities, and many of them occur on wet pavements. 70 % of wet pavement crashes can be prevented or minimized by improving pavement friction.

Background

In 2008, more than 19,000 people were killed in roadway departure crashes in the United States. Poor roadway conditions, especially wet pavement, has been identified as a major contributing factor in roadway departure crashes.

Current Federal Highway Administration (FHWA) policies regarding pavement are as follows:

- The FHWA pavement policy indicates that States shall design pavement to accommodate current and predicted traffic needs in a safe, durable, and cost effective manner.
- The FHWA policy related to the Highway Safety Improvement Program (HSIP) indicates that each State shall incorporate a process for analyzing available safety data that identifies highway safety improvement projects on the basis of crash experience, crash potential, or other data supported means.

Further, research conducted by the National Transportation Safety Board and FHWA indicates that about 70% of wet pavement crashes can be prevented or minimized by improved pavement friction.

Key Points

1. 70% of wet pavement crashes can be affected by pavement friction improvements.
2. States should do the following:
 - a. Establish a Pavement Friction Management Program.
 - b. Develop policies to improve new pavement friction.
 - c. Address locations with immediate safety needs with high-friction overlays.

New FHWA Guidance on Pavement Friction Management

A new technical advisory issued by FHWA on June 17, 2010, *Pavement Friction Management* (T 5040.38), provides guidance to State and local highway agencies on managing pavement surface friction on roadways. The new advisory supersedes the 1980 FHWA Technical Advisory 5040.17, Skid Accident Reduction Program.

The new technical advisory also covers topics such as: test equipment for measuring pavement friction; the identification and classification of roadway locations with elevated crash rates; how to prioritize projects for improving pavement friction; the appropriate frequency and extent of friction testing on a highway network; and how to determine a pavement friction management program's effectiveness. Additional reference materials on pavement friction management and measurement are highlighted as well.

Purpose of a Friction Management Program

The main purpose of a pavement friction management program is to minimize friction-related vehicle crashes by:

- Ensuring that new pavement surfaces are designed, constructed, and maintained to provide adequate and durable friction properties;
- Identifying and correcting sections of roadways that have elevated friction-related crash rates; and
- Prioritizing the use of resources to reduce friction-related vehicle crashes in a cost-effective manner.

Key Components of a Friction Management Program

Pavement friction management includes engineering practices to provide surfaces with adequate and durable friction properties plus data collection and analysis to ensure the effectiveness of the engineering practices. The most effective data collection and analysis components of friction management programs use pavement friction and friction-related data, crash data, and traffic data to:

- Evaluate pavement design, construction, and maintenance practices to ensure pavement surfaces with good friction characteristics are provided;
- Identify and investigate locations with elevated wet-weather crash rates relative to comparable locations for the purposes of minimizing locations with elevated friction-related crash rates; and
- Provide data for use in prioritizing projects to improve highway safety.



Source: FHWA

Pavement Friction Program Examples

The **New York State DOT (NYSDOT)** implemented a program to identify sites statewide with a low skid resistance and treat them with overlays as part of their maintenance program. A site is eligible for treatment if its 2-year wet accident proportion is 50 % higher than the average wet crash proportion for roads in the same county. Between 1995 and 1997, NYSDOT treated 36 sites, which reduced the annually recurring wet road crashes by more than 800. These results, and others throughout the State, support earlier findings that treating wet-road crash locations can reduce this type of crash by 50% and reduce total crashes by 20%.

The **Florida DOT (FDOT)** treated a curved freeway ramp with Tyregrip®, a high-friction material consisting of a highly modified exothermic epoxy resin dressed with a calcinated bauxite with a Polish Stone Value of 70%+. This treatment proved effective at increasing the skid resistance value from 35 to 104. While the FDOT application was on a freeway ramp, the material may also be applicable to a higher volume curve with a higher than normal number of wet pavement crashes. The treatment type and product example provided above does not imply validation or endorsement by the FHWA Office of Safety; several products and materials are available and should be considered to improve pavement friction.

For More Information

FHWA's Pavement Friction Management Technical Advisory at www.fhwa.dot.gov/pavement/t504038.cfm

Guide for Pavement Friction NCHRP Project 1-43 at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_321.pdf

Evaluation of Pavement Friction Characteristics NCHRP SYNTHESIS 291 at

<http://pubsindex.trb.org/view.aspx?id=675639>

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