

SAFETY GROOVING



ODOT uses longitudinal grooving for safety on asphalt as well as concrete pavements

>>> DIAMOND GROOVING ON THREE OHIO HIGHWAYS SIGNIFICANTLY REDUCED WET-WEATHER ACCIDENT RATES

ODOT HAS SPECIFIED longitudinal diamond grooving—which helps reduce hydroplaning risks, increases drainage at the tire/pavement interface, and aids in vehicle control—on concrete bridge decks since 2012. However, most of Ohio’s state roadways are not concrete; they are asphalt or composite pavement. The superior safety performance of grooving on bridge decks encouraged the department to use the technique on several sections of asphalt pavement, all located on high-speed roadways and tight curves where wet weather safety was a concern.

>>> SR 126 IN HAMILTON COUNTY

SR 126 in Hamilton County has a mile-long S-curve that was experiencing a significant number of fixed-object/run-off-the road crashes in wet road conditions. Milling had been performed in 2010, but ODOT decided to groove the pavement in 2013 to improve safety and minimize noise.

Post-grooving skid numbers, tested according to ASTM E524: Standard Specification for Standard Smooth Tire for Pavement Skid Resistance Tests, showed nearly a 50 percent improvement in SN 40 smooth tire values. Crash rates also showed improvement after grooving.

>>> I-90 IN CUYAHOGA COUNTY

Various treatments were considered by ODOT to reduce accidents on both the eastbound and westbound lanes of Cuyahoga County’s I-90 Innerbelt Curve, where traffic slows to make a hard turn. A mix issue with the roadway’s Superpave asphalt—a performance-based asphalt binder and mixture specification that has been used in Ohio since the late 1990s—was determined to be causing a reduction in surface macrotexture. Pavement grooving and fine planing were identified as ways to improve macrotexture and safety and extend the life of the asphalt, which had been installed in 2014.

The eastbound lane received a fine carbide mill treatment—a common solution for this type of project—while the westbound lane received longitudinal diamond grooving. The westbound lanes of the curve were longitudinally diamond grooved in mid-November 2015. Crash data before and after the grooving and milling showed that wet weather crashes decreased along both curves. The diamond grooved section improved the average SN 40 smooth tire value by more than 50 percent, increasing it to 1.5 times its previous value.

TEAM MEMBERS

- BOCA Construction, Norwalk, Ohio (Grooving Contractor)
- Ohio Department of Transportation (ODOT) (Owner)

>>> I-75 IN MONTGOMERY COUNTY

On I-75 in Montgomery County, commercial trucks were experiencing a higher-than-expected crash rate while navigating a heavily traveled high-speed zone with multiple curves. ODOT conducted skid testing at the location and determined the macrotexture required improvement.

Resurfacing the pavement with a high friction surface treatment (HFST) was considered, but the cost was prohibitive. In June 2013, grooving was performed on approximately two lane miles. ODOT modified the state’s bridge deck grooving specification to better suit its use on asphalt, making grooves slightly wider and deeper than those in concrete, to prevent asphalt grooves from collapsing and deforming as a result of heavy traffic.

Crash data showed that the grooving all but eliminated issues on the northbound lanes. Southbound lanes experienced a reduction in the number of incidents as well. The diamond grooved section improved the average SN 40 smooth tire value by more than 70 percent, increasing it to 1.7 times its previous value.