PREPARATION OF RUMBLE STRIPS BEFORE OVERLAYMENT

RUMBLE STRIPS are 18-inch long, 1/2-inch deep depressions milled into the pavement shoulder designed to alert an errant driver that they are about to leave the travel way. They have been shown to significantly decrease run-off-road accidents.

THE PROBLEM

Since the use of rumble strips is relatively new (mid to late 1990s), rehabilitation of the pavements where they have been installed is just now beginning. NH performed its first overlay of rumble strips during the 2003 construction season. A one-inch overlay was simply placed over the untreated rumbles. They immediately reflected through the 1-inch overlay. They are visible and can be felt when driven upon.

Eventually, rumble strips will be milled into the new surface in the same location as those that were covered. Will that effort be successful? Will the alternating density of the asphalt mix in the rumbles ravel under these conditions? Is the area safe from damage, since the shoulder sees little traffic?

The determination of appropriate techniques appears to be timely to avoid encountering problems after many miles of rumble strip are overlaid.

THE OBJECTIVE

This project is designed to develop a specification or guideline defining materials, sequences and/or options to perform rehabilitation of rumble-stripped roadways successfully and economically.

TESTING

Four 500-foot test areas were incorporated into a paving project on I-89 July 1, 2005. Each test area received a preparation technique whose performance is being observed.

Section A - Shim, overlay: The rumble strip was tack coated and shimmed to fill the rumbles. The shim was compacted, followed by the 1.5-inch overlay.

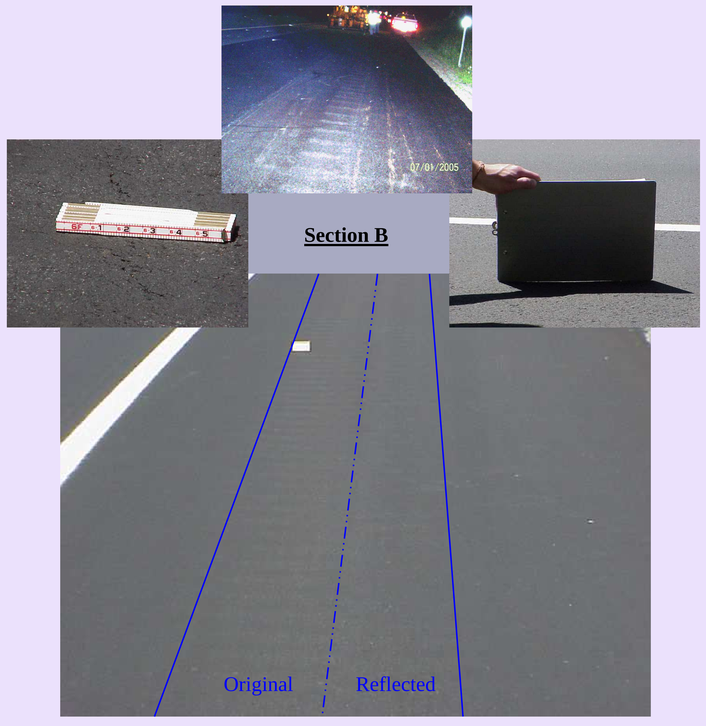
Initial results showed no indication of rumble strip reflection.

Full-width Shim Followed By 1.5-Inch Overlay

Section A

Section B - Overlay: Application of a tack coat was the only preparation prior to the 1.5-inch overlay (resulting in 2-inch depth in rumbles).

This section showed occasional longitudinal cracks along the edge of the rumble strip, indicating movement of the mix. The rumble strip has reflected through the overlay along the entire length of this section. Additionally, a parallel line of "reflected" rumbles was observed in this section. It is interpreted that the vibratory drum roller bounces or rocks due to the alternating mix thickness/density in the rumble strip, resulting in the indentation of the surface alongside of the original rumble strip.



Section B

Section C—Mill, inlay, overlay: The rumbles were removed by milling one inch wider than the rumble strip. The area was tacked and inlaid and compacted to the existing pavement surface. The 1.5-inch overlay was then placed over the entire roadway.

Section C showed no reflection of the milling, which would have displayed as a rut.

Cold Planing

Rumbles Removed

Asphalt Inlay

Asphalt Inlay

Section C

Section D—Mill, overlay: The rumbles were milled as in Section C, tacked, then overlaid with 1.5 inches of surface mix. This resulted in a single 2-inch lift in the rumble strip.

No immediate reflection of the milled rumbles were noted.

Section D

BENEFITS

This project is expected to provide performance information with which decisions may be made to potentially eliminate unnecessary construction steps, reduce cost and increase production.

Conversely, the research could show that additional steps are necessary to produce a quality overlay that does not require premature repair, escalating highway maintenance costs.

Observations will continue through at least 2008. Final evaluations for this project are pending.

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