

## Inlaid Durable Pavement Markings: Year One

Snow zones throughout Oregon experience some very harsh weather conditions. As a result, snow plows, graders, tire chains, and studded tires all do damage to the road surface and the pavement markings throughout the winter season. As a result, ODOT spends a great deal of time and money restriping with waterborne paint each year, or in some cases even twice a year.

The ODOT Research Unit, along with the ODOT Statewide Pavement Marking Committee, are evaluating the use of inlaid durable pavement markings within snow zones.

Durable pavement markings are becoming more prevalent on primary highways statewide, increasing the safety of the traveling public and the ODOT maintenance personnel responsible for maintaining the striping. Several durable products are now being used throughout the state, but their use within snow zones has been limited due to past performance issues. Winter maintenance activities, and the prevalence of studded tires combine to prematurely wear the markings to the point where reduced retroreflectivity compromises motorist safety.

The general consensus of the poor performance has focused on the slot design for the inlaid markings. The current standard is a 250 mil slot that is backfilled with material and then topped with a layer of glass beads that is brought to

approximately 10 mils above the surrounding pavement. Based on the poor performance of inlaid markings, a special provision to the standard was developed and is currently being used for protected inlaid markings. The special provision protects the markings by backfilling the 250 mil slot with approximately 220 mils of material.

The research project is focusing on several durable pavement marking products, as well as a slot design that may prolong the life of markings within snow zones

### Test Deck Installation

During the summer of 2003, a test deck was installed on I-84 eastbound near

Meacham, Oregon (MP 237.35-238.67). Two different durable pavement marking products were initially installed on the test deck - Dura-Stripe®, a methyl methacrylate, and Permaline®, a thermoplastic material. It should

be noted that Dura-Stripe® has been used as an inlaid durable pavement marking within some snow zones in Oregon. Permaline® however, had very limited use in snow zones prior to the research and had not been used as an inlaid product. Initially, both materials were installed in seven sections each on both concrete and asphalt surfaces. Due to the location of the test deck, a third durable product, 3M™ Stamark™ 380 tape was inlaid into a 600 ft section running parallel to an exit. A single 200 ft section, on both concrete and asphalt, was sprayed



with waterborne paint into a 125 mil slot. In total, 31 test sections were installed.

For the concrete section, the white fog line and center skips were included in the study, but not the yellow edge line. For the asphalt sections, all lines were included in the study, including the yellow edge line.

The current ODOT standard slot design (250 mil slot, 260 mils of material) was used as a control for the test deck on both concrete and asphalt. Three different slot depths were used throughout the test deck - 250, 180 and 125 mils deep. For each slot depth, material depths were varied to provide two different recess depths, a 30 mil recess, and a 60 mil recess. The 3M™ Stamark™ 380 tape was inlaid into a 125 mil slot which provided an approximate 35 mil recess for protection.

### **Year One Evaluation**

The test deck was evaluated during the summer of 2004 to assess the durability of the different pavement markings after one winter maintenance season. The durability, or line presence, and the overall condition of the markings within each section were evaluated. For the sections on concrete, most of the Dura-Stripe®



*Transition from 180 mil slot backfilled with 120 mils of material (top) to a 125 mil slot backfilled with 95 mils of material (bottom).*

performed very well, however, almost all of the Permaline® performed poorly, experiencing problems bonding to the concrete surface.

For the sections on the asphalt pavement, the Dura-Stripe® again performed very well, and the Permaline® performed much better than it did on the concrete surface. The 3M™ Stamark™ 380 tape inlaid on the yellow edge line and the white skips also performed very well..

In general, the 250 mil and 180 mil deep slots both performed well, however the 125 mil slot did not retain much material after one year, for either product. In some areas, mainly along the white fog line, the slot was not visible after one year. The yellow edge line and center skips however, did not experience the excessive pavement loss, but again retained small amounts of material.

### **Future Evaluations**

A second evaluation will be conducted in May 2005 to determine line durability, and measure the retroreflectivity of the remaining markings. Based on the 2004 and 2005 inspections, a final report will be produced, with recommendations about future slot designs for inlaid durable markings within snow zones.

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