



Project Summary

Texas Department of Transportation

0-5230: Short Term Solutions to “Bleeding” Asphalt Pavements

Background

The Texas Department of Transportation (TxDOT) is seeking cost-effective, short-term solutions to address the problem of “bleeding” or “flushing” asphalt for its pavements with seal coats and surface treatments. To meet this need, this research project focused on documenting typical manifestations of bleeding and flushing, discovering the causes and underlying factors that contribute to bleeding and flushing, and identifying cost-effective treatment approaches.

What the Researchers Did

This one-year research project was accomplished in five tasks. Researchers began with a literature review, international in scope (Task 1). Here the focus was on gaining breadth of information. Task 2 consisted of researchers conducting structured interviews with various non-TxDOT knowledge sources, nationwide, in order to further develop and refine the researchers’ understanding of the bleeding asphalt problem. In Task 3, researchers shifted their data-gathering focus from breadth to depth and conducted face-to-face interviews with knowledgeable persons in both TxDOT divisions and districts. More than 120 TxDOT personnel participated in this effort, allowing researchers to capture more than 2,500 years of construction and maintenance experience and institutional knowledge. Analysis of the data (Task 4) identified recommended practices for addressing the problem of bleeding and flushed asphalt pavements. The project reports (Task 5) document findings for both the maintenance and scholarly communities.

What They Found

General agreement exists that the basic mechanism associated with both bleeding and flushing has to do with excess asphalt binder filling the voids between the aggregate particles. Despite this common origin, however, bleeding and flushing problems *are* different – one of the more helpful descriptions researchers heard in the districts is that “flushed” is past tense whereas “bleeding” is an active verb. The main factors that contribute to bleeding and flushed pavements include aggregate issues, binder issues, traffic issues, environmental issues, and construction issues.

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There is no better advice for dealing with bleeding and flushed pavements than to avoid the problem from the outset. As in medicine, so in maintenance: “An ounce of prevention is worth a pound of cure.” Three topics emerged as being key to reducing bleeding and flushing. These are avoidance of known pitfalls and problem areas, implementation of a centralized seal coat management program, and judicious selection of seal coat and surface treatment binders.

Bleeding asphalt pavement is an immediate maintenance problem that must be addressed using corrective or, in some cases, emergency maintenance. Maintenance forces employ several methods to treat bleeding asphalt pavements. The basic approaches are (a) to bridge over the liquid asphalt by applying aggregate of various types and gradations, (b) to cool off the pavement surface by applying water with or without additives, or (c) to remove the bleeding asphalt and rebuild the pavement seal.

Flushed asphalt pavement, by contrast, is typically *not* a maintenance problem that must be addressed immediately. The maintenance thresholds that call for treatment of a flushed asphalt pavement include a slippery pavement surface, low skid resistance, and rutting and water accumulation in the wheel paths. The approaches maintenance forces employ to treat flushed asphalt pavements are either (a) to retexture the existing flushed pavement surface, or (b) to add a new textured surface over the flushed pavement.

Intersections can be especially problematic. Turning and braking of heavy vehicles can cause aggregate to roll, leading to aggregate loss and bleeding of the seal. Concentrations of heavy traffic at intersections may cause excess aggregate embedment, leading to flushing of the binder. The approaches maintenance forces employ to treat bleeding and flushed pavements at intersections are (a) to retexture the existing pavement surface, or (b) to replace the seal coat/surface treatment with a new, more durable pavement material.

Research suggests that the use of polymer-modified and other binders has improved seal coat and surface treatment performance in recent years relative to bleeding and flushing. Poor binder quality is sometimes an issue, and where it is, this must be addressed. But this research suggests that binder quality in general and temperature susceptibility problems in particular are not the dominant factors responsible for current bleeding and flushing problems.

What This Means

To facilitate implementation, researchers prepared a booklet titled *Maintenance Solutions for Bleeding and Flushed Pavements*. Wide dissemination of this booklet at the maintenance section level, both in print and online, will be a key implementation activity. Researchers also identified three maintenance solutions which deserve further consideration: (a) use of lime water for bleeding, (b) ultra high pressure water cutting for flushing, and (c) use of the racked-in seal at intersections. Follow-on implementation research in these promising areas will help to leverage TxDOT’s investment in this study.

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