In recent years many relatively new pavements have been exhibiting a surface material loss or type of raveling. The department is addressing this issue with a multi-faceted approach including aggregate and mixture durability testing. As an approach to treat affected pavements there may be sealer products that will help prevent further deterioration.

Biores tor is an asphalt pavement rejuvenator/sealer. Biorestor is petroleum free and is composed of 95% bio-based content, including soy bean and other agricultural oils. It adds a polymer to the asphalt binder to create a more oxidation-resistant material (Asphalt Systems). Biorestor’s stated claims are:

- Seals and penetrates asphalt surfaces
- Restores asphalt to near its original performance condition
- Prevents raveling and cracking
- Cures in as little as 20 to 30 minutes
- Cost savings are maximized if new pavement is treated as quickly as possible after paving to reduce oxidation.
- Little to no change in friction value
- Postpones or eliminates the need for chip seal application

The material was applied by Mike and Keith Freisthler of Asphalt Systems, Inc. of Sidney, Ohio to two sections of roadway. A 1000 foot long portion of a 3/4” warm mix overlay completed this year and an abutting 1-1/4” hot mix asphalt overlay completed in 2015. The construction joint is within a few yards of the Paris-Buckfield town line sign. This section of roadway was selected because there are two separate overlays (2015 and 2016) and the paving mix has been problematic in regards to raveling.

A heavy dew overnight was slow to dry in shaded areas, delaying the start of application. The ambient temperature at the time of application was 69°.
The Buckfield terminus of the test area. 100 feet north from the Paris-Buckfield town line.

Biorestor distribution truck.

Application began on the northbound side of the highway at the southernmost end of the demonstration project (2016) shortly after noon.

Biorestor application underway. The target distribution rate is .02 gal per square yard.
Spotty areas where tracking of emulsified tack from the recent paving may have affected the absorption of the Biorestor product on the 2015 pavement.

Construction joint near the town line.

Looking northeast onto 2015 pavement.

The end of the 1000 foot long test area.
Here is the Biorestor application on the 2015 pavement after drying for approximately one hour. The road surface was still slick and remained so for the next 2 hours. After several hours waiting for the material to dry sufficiently to allow traffic, it was requested that the local Highway Maintenance Crew sand the pavement.

After sanding, the crew used a powered road broom to remove the excess sand from the surface. This improved the friction greatly and the lane closure was then removed and traffic allowed to resume on both lanes. The total time for the application of 2000 feet was approximately three hours.

According to the furnished Safety Data Sheets, the ingredients are: 75% D-Limonene, 20% Soybean oil, methyl ester, and 5% Styrene-butadiene copolymer. The product has a very strong pine odor.

D-Limonene is used widely as a solvent for cleaning asphalt from paving tools & equipment and as an insecticide and herbicide. D-Limonene is a flammable liquid and vapor. D-Limonene also has the following additional warnings and cautions: may be fatal if swallowed and enters airways, may cause an allergic skin reaction, and is very toxic to aquatic life with long lasting effects.

In addition to use as a cooking oil, soybean oil is often using as a drying agent in inks and paints. There are no noted cautions for use. Styrene-butadiene is often used in tire manufacturing as a synthetic rubber compound. Again, there are no noted cautions for its use.

The total cost for this demo was $5,000 to treat approximately 2,667 square yards.

The performance of this treatment will be evaluated by comparing both test sections (2015 and 2016 pavements) to an adjacent control section. Field observations for raveling and ARAN pavement distress data will be reviewed. Surface test methods to quantify the amount of raveling may be employed.

Information gathered by Dale Peabody, Director of Transportation Research Division & Doug Gayne, Product Evaluation Coordinator. Thanks to Arthur Abbott and his crew, particularly Shawn Morse. Prepared by Doug Gayne, State of Maine Department of Transportation, Transportation Research Division October 24, 2016