

The city of Richfield, OH, was experiencing pavement raveling less than one year after applying HMA. The cause of the premature raveling was believed due to reduced asphalt in the mixture. There was two options to resolve the problem: 1) remove and replace the HMA or 2) apply an effective surface treatment to stabilize the pavement matrix.

The city selected a rejuvenator as the most cost-effective method to solve the problem. The material selected was an asphalt-based rejuvenator enhanced with Gilsonite. Gilsonite is naturally occurring and mined as an ore. It is a very low pen asphalt with low aromatic content. The superior durability, resistance to oxidation, and relatively low polynuclear aromatic composition make Gilsonite the ideal component to rejuvenation asphalt. Gilsonite is less prone to free radical oxidation, thus interfering with the asphalt oxidation process naturally occurring with untreated asphalt. The nitrogen also provides additional UV protection. Gilsonite is rich in maltenes (aka as the lower molecular weight (<3,000), more fluid resinous components) providing asphalt flexibility in HMA. The basic characteristic is likely the reason Gilsonite is less prone to free radical oxidation, thus interfering with the asphalt oxidation process naturally occurring with untreated asphalt. Gilsonite provides increased UV protection to surface asphalt. The four functional mechanisms incorporated into the rejuvenator are:

1. Add fluxing oil to the surface
2. Add virgin asphalt to in-place asphalt (as Gilsonite)
3. Add refined asphalt (typical asphalt emulsion)
4. Add maltenes (resins) to the asphalt to increase ductility

The product was selected due to its ability to deliver new asphalt and rejuvenate the in-place asphalt in the HMA. The combination was expected to provide three to five years of extended life to the pavement.

The rejuvenator was applied at an average treat rate of 0.08/gal/sq. yd. Two applications were applied on the highly raveling pavement. The material was applied to over 18,000 sq. yds. The project was completed in August 2017. On the day of application, the temperature was between 75-85°F, partly cloudy, no rain, pavement temperature 71-114°F, with a five-mph breeze — initial drying 1.5 hours, initial traffic 2 hours, open to all traffic in 4 hours.



Shown is the surface before rejuvenator. After less than a year, the pavement is oxidized and starting to ravel.

(Showing exposed aggregate before application)





After application

After application with an Etnyre Application Truck, the surface was fully coated with the aggregate less exposed. Typically HMA contains 6% wt asphalt; the rejuvenator added approximately 1% asphalt to the top quarter of an inch asphalt. In addition to penetrating and rejuvenating the in-place asphalt.



Rejuvenator covered all aggregate and pavement striping.



Starting spraying location, after one year.

One year after the rejuvenator application, the city of Richfield is pleased with the rejuvenator performance. Future maintenance projects are planned for the rejuvenator due to positive performance and cost savings relative to milling and overlaying.

Follow up pictures will be available annually for five years.



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