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Protects the roadway like a chip seal, while the micro surfacing layer on top provides a smooth surface

Extended the life of the pavement so the City can reduce the number of mill and overlay or reclamation projects

Added layer of protection from moisture

60-plus mile-years of life added

BACKSTORY:

The Town of Lexington, Massachusetts, part of the Greater Boston Area, is celebrated as the site of the "Shot Heard Around the World" at the beginning of the American Revolutionary War. Today, with a population exceeding 31,000, the Town covers 16.5 square miles, and has a roadway system comprising 284 lane miles of residential, main, sub-main and collector streets. By combining the right treatment at the right time with an informative community outreach agenda, Lexington has evolved its pavement preservation program to become one of the most proactive and advanced programs in the Northeast. Cape sealing is one of the newest tools in the Town's growing pavement preservation repository.

PROBLEM:

For years, the Town of Lexington, Massachusetts had maintained its streets with a program that consisted of mill and overlay and reclamation, along with crack sealing as necessary. But Town Engineer John Livsey has never been a fan of letting roads go until they need major repair, and over the past five years, his team has introduced a number of pavement preservation techniques into its overall program, including micro surfacing and fog sealing. In August 2016, the Town initiated cape sealing, testing the technique on one street with 21,867 square yards of treatment.

A cape seal is a two-phase process that consists of a chip seal, which is allowed to cure for about a week, followed by one or two layers of a slurry or micro surfacing treatment. It is ideally applied to a roadway that is further down the pavement condition index (PCI) deterioration curve than a fog seal or micro surfacing candidate (which are best as treatments for roads in relatively good condition).

"I'd had experience with chip seal before, and it is an excellent process for sealing out moisture. But as a surface treatment, we receive complaints — both during the chip seal process and afterward because of the rough surface," says Livsey. "We wanted to introduce cape seals because they protect the roadway like a chip seal, while the micro surfacing layer on top provides a smooth surface, and also provides another layer of protection from moisture."

The Town chose to use Grove Street, a collector street on the north side of town that handles approximately 10,000 vehicles a day, for its inaugural cape seal project in 2016. "We had been looking for the right first road, and Grove Street was the one. The road was experiencing some cracking with a lot of raveling, and we wanted to stop that progression," Livsey notes.

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— John Livsey, Town Engineer

SOLUTION:

Community Outreach is Key

Lexington employs a town meeting form of government, and Livsey knew that one key to the success of the cape sealing process was to receive buy-in from the community. In order to achieve understanding from a public that was used to seeing mill and overlay and reclamation projects, Livsey's team created a letter and GIS map that explained which treatments the Town's roads would receive, a general description of each treatment, and why they were chosen.

"We knew a cape seal might make the community a little concerned, because they see that chip seal portion put down, and they get nervous. But the letters seemed to raise their level of confidence. Not only did we receive no complaints, but we actually received praise that the street was smooth and quiet," Livsey says. "More than two years after its cape seal treatment, Grove Street looks great; I drive it every day, myself," he adds.

Formula for Success

Livsey says in addition to their Pavement Condition Index (PCI) evaluations, his team also uses the Remaining Service Life concept outlined in the FHWA publication titled, "A Quick Check of Your Highway Network Health," as a big-picture evaluation tool. The FHWA formula simply multiplies the number of miles of each treatment times the service life (in years) expected for the treatment to calculate the mile-years of new service life injected into the Lexington road network. The goal is to ensure the annual work program is a net positive action, and not a step backward. "Using this formula over the past two years for our road network, we've calculated that our program has been net positive to the tune of about 60-plus mile-years of added life," Livsey says.

Following the success of the Grove Street cape seal project, Lexington applied the technique to several streets in August 2017, including Cedar Street, East Street, and Woburn Street, for a total of 46,318 square yards of cape seal treatment. Again, the Town sent letters and maps to all of its community members prior to the projects and has received nothing but praise from its citizens.

Today, just five years after the Town first introduced the idea of pavement preservation to its residents, greater than 80 percent of Lexington's streets and collector roads have received treatments that inject new service life into the town's roadway network.

Challenges of a Cape Seal

According to Dan Patenaude of Braintree, Massachusetts-based Sealcoating, Inc., and Jimmy Kendrick of Bergkamp Inc., the Town of Lexington, Massachusetts has overcome a number of challenges as it introduced cape sealing into its pavement preservation toolkit over the past couple of years. "John Livsey and the Town of Lexington have done an outstanding job incorporating preservation into their pavement management program. Since first being introduced to cape seals and other innovative maintenance treatments in 2015, John and his team have gone from student to expert level pavement preservationists," Patenaude says. The challenges of a cape seal project include:

1. Educating the public. For a cape seal, it is important that the community know it is a two-phase project that starts with a chip seal and ends with a smooth, black surface.
2. Picking the right candidate road for the treatment. A cape seal is ideal for roadways with heavier traffic, as it can address minor to moderate cracking as it seals and protects the road.
3. Planning for the maintenance season. As a busy town department that is in charge not only of roads, but also sidewalks, water mains, sewer mains, and pump

stations, etc., it is a challenge to plan for numerous projects that involve multiple contractors.

4. Following stringent quality management standards. It is imperative to specify clean, dry, durable aggregates and high-quality emulsions, and to apply them at the correct rate, with good workmanship.

PHOTOS:



Application of Microsurfacing



Cedar St 813 x 19 = 1,716 SY (Freemont St to end)



View from Operator's Platform



Micro surfacing over chipseal on one side and chipseal on other side of roadway



CAPE SEAL- HiMA* 2016