



Staying smooth

A harsh winter couldn't rough up this northern Wisconsin award winner

By Bill Wilson
Editorial Director

Last year's modern day Ice Age buried routes across the U.S. with its frozen malice.

Many public works officials had to pick through the remains of pavement during the spring and summer months of 2014.

Up in Wisconsin, the glacier-like effect left an 8.1-mile portion of State Trunk Highway (STH) 22 from Gillet to Oconto Falls just as flat and smooth as Northeast Asphalt Inc. paved it a year earlier. This wasn't due to a freakish event; it was simply the result of quality construction.

The \$8.2 million STH 22 job narrowly missed competing for the 2013 Sheldon G. Hayes Award, the highest honor of the National Asphalt Pavement Association, which meant waiting another year for the pavement evaluators to come around and measure it against younger mats of asphalt. So as the winter of 2013-14 hammered down on the northern Wisconsin landscape, Kevin Gannon, vice president of Northeast Asphalt, sat and wondered about the toll it was going to take on the company's most recent prized possession. There were a total of 59 days when the temperature was at or below 0°F, which as it turns out had little impact on a stretch of asphalt that was way above average. Despite the meteorological test and analysis delay, Northeast Asphalt Inc. claimed the 2014 Hayes award.

"We submit a few jobs [for Quality in Construction Awards, which is a prerequisite for being considered for the Hayes award] each year," Gannon told *ROADS & BRIDGES*. Northeast Asphalt was a finalist for the Hayes for work done on U.S. Hwy. 45 from Eagle River to the Michigan/Wisconsin state line in 2011. "After the winter we had, which was horrendous, I

was up there a month and a half ago and went through it and it looks absolutely fabulous.

"Sometimes we forget as a company to celebrate things that we do really, really well because we have exceptionally high expectations of our people. When everybody does their part each and every day this is the result you can have."

When the leaves fall, the densities will rise

But projects like this do not come around every day. A late starting time meant Northeast Asphalt had to deal with the testy Wisconsin autumns during the most critical part of the STH 22 project. Unexpected utility movement also played a part, and in the middle of it all was a newly constructed roundabout.

Still, there was no special circumstance behind the timing of job itself—it was just due for some attention. The last overlay on STH 22 was completed in 1994, and according to Gannon thermal cracking was taking hold, and in some spots the condition was advancing.

"Those cracks were starting to gap open and were effecting the ride," Brett Stanton, director of engineering services for Northeast Asphalt, told *ROADS & BRIDGES*. "You would hit a crack every 20 or 25 ft going across the pavement pretty much the entire length of the road."

"It was in OK shape," added Gannon, "but it had run its cycle, and as the DOT reviewed the jobs this one was up for that year."

In a typical road construction job, utility work runs ahead or behind of everything else. The work is completed when the paving contractor is out of the picture, but on STH 22 crews were planning on widening the route 5 ft on both sides of the existing road, and utilities still needed to be addressed. Officials were talking about delaying the job into the next paving season when Northeast

Total lift thickness for the roundabout was 6.5 in. The 19-mm mix was used for the first lift (2.5 in. thick) and second (2.25 in. thick), but Northeast Asphalt had to use a Wisconsin DOT higher ESAL mix for the 1.75-in. surface course.

Asphalt and dirt contractor Relyco Inc. came together for a solution. By using Spar 3-D underground mapping technology, ground-penetrating radar and advanced software, the utilities were located quickly and Northeast Asphalt was able to adjust when needed.

"The crew knew the areas where the utilities crossed, so they skipped those areas," said Ric Szalewski, project manager for Northeast Asphalt. "And where the utilities were running with construction, they could stay away from them or stay above them."

When the coast was clear Northeast Asphalt moved in with a Wirtgen W250 milling machine armed with a ski, which removed 6 in. of pavement. The same equipment was used to do the required amount of pulverization in the typical section with existing concrete below.

A portable Bituma asphalt plant located 4.5 miles south of the project cranked out approximately 3,900 tons of mix per day. The project called for three lifts and two different types of mixes. A 19-mm blend with a PG 58-28 binder, which also was comprised of 21% reclaimed asphalt pavement (RAP) and 22% binder replacement, was used on the lower layer and intermediate course. The 12.5-mm surface course called for 25% RAP and 24% binder replacement. It also called for the use of a PG 58-28 binder.

At the plant, a sample was taken every 600-700 tons. For the 19-mm mix, the target air voids was 4%, and on 50 samples the average was 4%. The asphalt content target was 4.5% and on 50 samples that target was met. The 200 sieve target was 4.2% and the 50-sample average was 4%, and the No. 8 sieve target was 47.6% and Northeast Asphalt was hitting an average of 46.7%. The air void target on the 12.5-mm mix was 4% and 29 samples averaged 4%. The asphalt content target was 4.9% and 29 samples averaged 5%.



The number to hit on the No. 200 sieve was 4.6% and the average of 29 samples was 4%, and with the No. 8 sieve crews were shooting for a 53.2% and were producing a 52.2% 29-sample average.

"Both of the mix designs were created a couple of weeks before the job started," said Stanton. "We were actually under production during construction so we were making the aggregate as we were using it. There was a lot of quality control going into testing off the crusher, testing off the wash plant and then obviously testing the mix going out the door."

The asphalt was about 305 °F coming out of the plant and arrived at the jobsite at about 290 °F. A Roadtec Shuttle Buggy SP2500C transferred the mix to a Volvo 6160 paver with skis and a Carlson Easy 4 asphalt screed. Serving as the breakdown roller was an Ingersoll-Rand DD110 high-frequency roller with 78-in. steel drums. Following the breakdown roller was a Bomag BW27 pneumatic-tire roller in the intermediate position accompanied by another IR DD110, which served as the finish roller. For a majority of the job the breakdown roller was at a seven-pass pattern and the intermediate roller was at a five-pass pattern. Because the pavement was being

constructed during the middle of fall, it was essential that the breakdown roller stay close to the asphalt paver.

The three lifts formed a mat 6.5 in. thick. The lower layer (19 mm) was 2.5 in. thick, the intermediate course (19 mm) was 2.25 in. thick and the surface course (12.5 mm) was 1.75 in.

Northeast Asphalt used a CPN MC1DRP nuclear density gauge to check for densities every 1,500 ft.

"The tests were offset 10 ft longitudinally, so you would have one shot at a random location from the centerline to the first 4 ft, then another shot from 4 ft to 8 ft and then another shot from 8 ft to 10 ft, and they would do that every 1,500 ft," said Stanton.

Compaction is practically religion at Northeast Asphalt. The company trains its operators extensively and in a variety of different ways, and the expertise made a statement on the STH 22 job. The target density for the lower layer was 89.5% and crews were hitting 92%. The target for the intermediate course was 90.5% and Northeast Asphalt came in at 92.3%, and the target for the surface course was 91.5% and the actual density was 92.7%.

"We look at compaction as being just as important as ride quality," said Gannon.

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The portable Bituma asphalt plant employed just 4.5 miles offsite produced some 3,900 tons of mix each and every day.

"The varying conditions that you deal with every time you are out there . . . we are always paying attention to what we are achieving behind us and we are constantly tweaking depending on what is happening out in the field."

Northeast Asphalt used an inertial profiler to check smoothness on every lift, and even profiled the asphalt after the first day of paving to make sure the paver was dialed in properly. To deal with the centerline joint an ARS infrared 20-ft joint heater attached to the paver was used, so on the second pass the new pavement would mesh with the cold pavement.

The attention to detail resulted in crews receiving an extra \$31,000 in incentives for hitting their density targets and \$22,000 for ride quality. Northeast Asphalt achieved an average IRI smoothness rating of 33.3 in. per mile in the eastbound direction and 33.2 in. in the westbound direction.

Roundabout way

In the middle of all the grinding and mixing and matting, a new roundabout was constructed. It took 5 to 6 weeks to construct the roundabout, which also called for curb-and-gutter and concrete median work.

"We have become very familiar with [roundabout work]," Szalewski told ROADS & BRIDGES. "Each roundabout can be different as far as how they change the cross-slope in the roundabout.

"This roundabout was 18 ft wide all the way around. We had a 1- to 2-ft extension [on the asphalt screed] to give us a little more extension and we would tip that right extension at the 6-ft mark so you could get a 1.5% cross-slope going the other way."

Total lift thickness for the roundabout was 6.5 in. The 19-mm mix was used for the first lift (2.5 in. thick) and second (2.25 in. thick), but Northeast Asphalt had to use a Wisconsin

DOT higher ESAL mix for the 1.75-in. surface course. The mix contained a PG 64-28 binder and had 17% RAP.

Because this strip of STH 22 is surrounded by farmland, traffic control was not as intense as on other jobs. However, Northeast Asphalt could not start on the west side of the roundabout until after July 9.

Work was complete on Oct. 30, then the wait came before Northeast Asphalt was notified it was a Hayes finalist.

"There are so many things that happen in a day, and if you don't do everything the way you are supposed to do it all the time you set yourself up for not getting there," said Szalewski. "I'm humbled by the amount of parts and pieces, people and hours that everybody put in to this project. **R&B**

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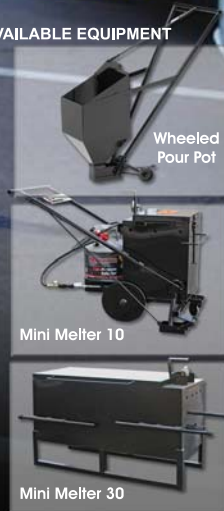
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