

Full Depth Reclamation & CCPR allowed INDOT to repair and upgrade a major collector in Northeast Indiana. State Route 101 appeared to need surface repairs, but upon further investigation, a deeper treatment was needed in order to restore the roadway and create a safer route for both the local Amish traffic and regular vehicular traffic.



36% less expensive than traditional reconstruction



The final pavement consisted of 90% recycled "in-place" materials



Treatment restored pavement to condition comparable to reconstruction

BACKSTORY:

State Route 101, a major collector for US-24, in Indiana Department of Transportation's (INDOT) Fort Wayne District was originally scoped to be treated with a single lift HMA overlay with excessive localized full-depth patching. This section of SR 101 measures approximately 8.6 miles long with an AADT of 2000 and is known for being heavily traveled by horse-drawn buggies from the surrounding Amish communities.

PROBLEM:

The existing asphalt pavement on SR 101 was experiencing widespread age-related distresses and fatigue. It had an average IRI of 153 in./mi. and 31% of the roadway surface was in "poor" condition. Past chip seals were delaminating and creating potholes. INDOT was performing yearly patching in order to maintain a rideable surface. Other issues throughout the project included rutting up to 1.0-inch deep, lack of a crowned cross slope, and drainage issues. Due to a large number of horse-drawn buggies that travel along the project, there was a concern with the lack of shoulder, INDOT wanted to improve safety for the vehicles passing the buggies.

Pavement sampling revealed bottom-up cracking beginning to propagate to the surface. Delaminated, unbound layers, asphalt stripping, and cracked underlying layers were also observed during sampling. INDOT then performed FWD testing on SR 101 to calculate stiffness-related parameters of the pavement structure. It was discovered that there was also poor subgrade strength below the asphalt pavement. These findings revealed that the project was beyond the point where a single lift HMA overlay would be cost-effective.

It became evident that reconstruction would be the necessary treatment method to restore SR 101 to good condition. The traditional reconstruction method for the roadway would include soil improvements, laying back and compacting base aggregate, placing a layer of HMA base, a layer of intermediate mix, and then a wearing course.

INDOT was asking the question: what approach could we take that would reduce cost, reuse DOT owned material, and get the same results as a traditional reconstruction with full depth HMA?

SOLUTION:

INDOT's research led to the solution of placing a Cold Central Plant Recycling (CCPR) treatment on top of a Cement FDR. The project began by milling off the top 8.0-inches of existing asphalt and stockpiling the asphalt millings nearby at a central location. Then the cement FDR was performed on the remaining existing asphalt and the existing base and subgrade to a final depth of 10.0-inches and to a final width of 26 feet.

The CCPR mix was produced utilizing engineered emulsion and the road's stockpiled asphalt millings at the central location, then loaded onto trucks and hauled back to the roadway where the mix was paved to a depth of 6.0 inches. 37,000 tons of CCPR mix was produced at a rate of 300 tons per hour and the paving of the CCPR mix took 16 days. Once the construction and the curing of the paved CCPR mix were completed, the roadway was profile milled and then a 2.0-inch 12.5mm Surface Mix was placed.

Initial post-construction FWD testing showed significant improvements in both surface and subgrade deflections. INDOT is planning on doing yearly future testing to develop MEPDG local calibrations. INDOT and surrounding communities were pleased with improvements made to SR 101. INDOT not only used the existing materials but realized a cost savings of 36% versus traditional Reconstruction.

PHOTOS:



Existing Pavement Surface during Investigative Sampling



CCPR Mat after Profile Milling



Pavement Samples taken during Investigative Sampling



10.0-inch Cement FDR process



Paving of the 2.0-inch 12.5mm HMA surface



Final pavement surface