

CUTLER COURIER

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IN-PLACE RECONSTRUCTION LEVERAGES HIGHWAY FUNDS FOR NEW MEXICO DRIVERS

Far-Flung State Slashes Backlog of Inadequate Pavements,
Boosts Customer Approval Using Road Recycling Process

The State of New Mexico has slashed its backlog of deficient roads by utilizing a unique, hot in-place (HIP) pavement recycling process which provides new driving surfaces at a fraction of the cost of conventional mill-and-fill operations.

The result is more money to go around to reconstruct additional roads in a vast, largely rural state.

“New Mexico encompasses 122,000 square miles,” said Pete K. Rahn, secretary, New Mexico State Highway & Transportation Department. “We could take the land area of New York, Pennsylvania, New Jersey, Maryland, Delaware, Massachusetts, Connecticut and Rhode Island and fit it all into New Mexico and still have a thousand miles left over. We have 1.8 million people, while those states have 53 million people. We are big, and don’t have a lot of people.”

While New Mexico is growing as a destination state for new households, and state population is increasing, that population means more drivers on a highway system not designed for a large influx of residents.

New Mexico’s problem is compounded by the fact that it serves as a “bridge” state for drivers from the densely populated Midwest and Eastern states, and Texas, on their way to Arizona and California. As a result, its highways are stressed by constant East-West truck traffic which roars through the state, but rarely stops to do business and add to the state economy.

Some of this truck traffic is traveling at high rates of speed, and often with overinflated tires to improve fuel mileage. These practices quickly damage highways and New Mexico taxpayers are stuck with the bills. “We really take a beating on I-10 and I-40,” Rahn said. “The heavy commercial vehicle traffic on those highways exceeds 50 percent.”



Cutler's hot-in-place (HIP) recycling process, called Repaving, provides a virgin hot mix asphalt (HMA) driving surface bonded to a leveling or base course incorporating the recycled former road surface, shown here on I-25 in Las Vegas, New Mexico.



Also, New Mexico has many climates that impact pavement performance and longevity. “New Mexico has nine of the 13 major climates of the world,” Rahn said. “We range from low desert to alpine mountaintops. We have problems of groundwater damage, temperature fluctuations of 50 to 60 degrees in a single day, and freeze/thaw problems in our spring and fall periods. These fluctuations are brutal on our roads.”

OVERWHELMING DEFICIENT ROADS

In this political context and physical abuse, it's little wonder that the state has been challenged in keeping its number of deficient roads in check.

“Every year for 23 years our deficient road miles increased, peaking in 1997,” Rahn said. “In that year we peaked at 5,940 deficient road miles. Since 1997 we've been able to reduce those deficient miles to 3,500 and we anticipate another reduction in 2001.”

New Mexico has been able to strike at deficient miles by extensively utilizing a hot in-place (HIP) recycling process called Repaving. “The key to our reductions has been our strategic use of Repaving,” Rahn said.

“The state does not have the money to completely rebuild all sections that

need to be improved,” said Benny Roybal, sales engineer, Cutler Repaving, Inc. “We anticipate the state will take seven to ten years to allocate funds to rebuild a section, or for us to come back and keep the section in a rideable condition.”

“The state gets a lot of truck traffic and 18-wheelers,” Roybal said. “There is a lot of cracking, shoving and rutting of pavements,” he said. “The pavements deteriorate, and maintenance crews will do patching. But our process not only repaves, but re-levels the roads, so it's a good process in that respect.”

BEYOND PAVEMENT MAINTENANCE

While the state considers this HIP process to be a maintenance expenditure, the process allows the state to go beyond mere maintenance.

All in one pass, the process recycles the existing driving surface in-place as a leveling or base course, then tops that course with a virgin hot mix asphalt (HMA) driving course.

“The process has allowed us to address entire corridors, instead of just pieces,” Rahn said. “Instead of just a five-mile segment, we've been able to improve an entire 60-mile corridor by using this HIP

process. It's been a huge factor in our ability to bring down our deficient road miles.”

The process' relatively low cost-per-mile – compared with complete reconstruction – has enabled the state to leverage scarce dollars and spread them over more of the state's roadways.

“From my point of view as secretary of the SH&TD, it's a matter of cost,” Rahn said. “Because the process catches a road before it's lost, it allows us to treat a lot more mileage than if we used the traditional approach such as mill-and-inlay, or overlay. It's a process that has a lot of value to it.”

New Mexico had been paying an average of \$1 million per mile to rebuild a pavement for a total reconstruction, compared to \$50,000 to \$60,000 per mile with this process, Roybal said. “While we don't provide a total reconstruction we provide an overlay which upgrades the riding surface, bonded to a recycled base course, and that's really what the state is looking for: To bring the riding surface up to a level that's no longer deficient.

“With most states, in a mill-and-inlay operation, they're milling the old roadway off anywhere from an inch to two inches in depth, and they've got to dispose of that milled material,” Roybal said. “But we use that material and there is no problem of hauling it off, because it's being scarified there and placed back down. It's recycled right on the job site as a base course.”

New Mexico uses far more techniques on its system than just this process. “We continue to use the full variety of pavement treatments,” Rahn said. “The key is to know what's appropriate for the condition the roadway's in. This process has been applicable to a very large number of road miles in our state, in that it enables us to catch the road and prolong its life before we have only the choice of total reconstruction.”



The machine travels quickly and lane closures are minimized. All reclaimed material is used on the spot without hauling and truck traffic is eliminated.

MONOLITHIC LEVELING/ FRICTION COURSE

In New Mexico, the one-pass HIR process reuses the existing deteriorated asphalt as a leveling course, and on it places a fresh layer of virgin hot mix asphalt (HMA).

The pavement is heated to about 350 degrees F and once it's in a softened, pliant condition, is scarified to a depth of 1 inch by 11 to 13 feet wide. A recycling agent that restores the viscosity of the aged asphalt is applied and mixed in. This existing material is then reapplied and distributed with a screed as a 1-inch leveling course. Crown and profile adjustments can be made.

Immediately, while that material remains at 225 degrees F, a 1-inch virgin hot mix asphalt overlay is placed over the recycled leveling course. The equipment does the scarification, mixes in the recycling agent, places the leveling course, and places the virgin overlay simultaneously.

"The pavement is scarified to a full inch depth," Roybal said. "We re-lay that material with our machine, which also places a 1- to 2-inch virgin hot mix asphalt overlay, depending on the application."

Road users and road owners benefit from a safer maintenance reconstruction process because there is no delay between the time the pavement is recycled and the time a riding or friction course is placed.

There also is an engineering benefit. Because the hot virgin asphalt is placed on the hot recycled leveling course, a thermal bond is achieved between the recycled layer and the friction course. There can be no delamination between the recycled layer and the new overlay, as the two layers are effectively compacted into one lift.

The immediate application of the driving or friction course means no motorist wheel ruts are placed in the recycled, leveling layer, as can be the case with other recycling methods.

The virgin surface is applied by a separate, vibrating screed no more than 3.0 feet behind the leveling course screed. It's fed from a hopper at the front of the Repaver via a drag/slat conveyor chain, which brings the HMA through a tunnel along the length of the machine to the paving screed.

The resulting monolithic pavement is 2 to 3 inches in depth, dependent on the overlay thickness specified by the state. The process also reheats the edge of adjacent repaved lanes, resulting in a more durable, higher-density seam between driving lanes.

The machine travels at 18 to 20 feet per minute, which shortens the duration of lane closures. And because all reclaimed material is used on the spot without hauling, truck traffic is eliminated.

Even though the Cutler Repaving process provides a revitalized intermediate course with virgin HMA overlay, including structural improvement, the state considers the process a maintenance technique and funding falls within the maintenance category.

URBAN AND RURAL APPLICATIONS



While long considered to be applicable to rural roads, with their long hauls adding trucking costs to a project, hot in-place recycling as provided by Cutler is applicable to urban situations as well.

"We're doing urban and rural jobs alike," Cutler's Benny Roybal said. "We finished a six-lane-wide main route through Santa Fe, St. Francis Drive," Roybal said. "And we just finished Paseo del Norte, six lanes within Albuquerque."

Urban construction has its own requirements for Cutler's unique equipment, Roybal said. "Anytime you do construction in a city or large town, you're going to have traffic considerations," he said. "It doesn't matter whether your train is 50 feet long, or 100 feet long, traffic control is traffic control. You'll have traffic challenges to the public."

This process does employ a larger-sized piece of equipment for the riding surface reconstruction. "The size or length of our paving train is not the issue; instead, the issue is that people hate to have their daily life disrupted," Roybal said. "And we can do the work in one pass, and certainly faster, opposed to full reconstruction," he added. "We can get in and out in a matter of weeks or days. Other processes will take a lot longer than that."

"The recycling train that this contractor uses interferes with traffic less than a traditional mill-and-fill approach," New Mexico's Pete K. Rahn said. "And in urban areas we like to work at night. The process need not change, even as the time of day during which the work takes place does."

In New Mexico, the use of the technology is not limited to the SH&TD, Roybal said. "We work for a number of different counties and municipalities," he said. "We've done a lot of work for Albuquerque, Las Cruces, Santa Fe, Roswell, the list goes on."

"We've used the process everywhere," Rahn said, "on urban interstates, main streets in towns, and on the rural highways. We've found that the condition of the road is the defining factor, not whether it's urban or rural. We're satisfied with the performance in both areas."

Nonetheless, the open road permits the process to move ahead at full bore. "When we're out on a rural road we can work faster because city streets are more time consuming," Roybal said. "Out in the sticks we can do as much as a mile per day."

In an urban situation, traffic can be allowed on the new pavement as soon as with conventional asphalt paving, and curb cuts, driveways and intersections are blocked no longer than 15 minutes from start to finish.

Also, the disagreeable tack coat is dispensed with. Instead, the temperature of the leveling and surface courses are such that bonding takes place between the two, outperforming the tack coat. And in urban situations, foregoing the tack coat eliminates the mess that develops from the liquid being tracked onto parking lots and inside businesses.

The performance is such that Cutler Repaving won a pavement smoothness award from the New Mexico SH&TD in April 2000. "Every year the department conducts an annual engineering conference in Las Cruces," Roybal said.

"At that conference the state honors individuals and businesses with awards for performance," Roybal said. "We were recognized as a winner of the Smooth Pavements Award within the category of maintenance for our work on U.S. 54 near Corona. Our process is

a good one, and we're constantly trying to achieve the best quality and results."

"The department's public approval rating has gone up as has the condition of our roads. As our roads have gotten better, so has the public's opinion of the department. The process has been a savior for our state."

*Pete K. Rahn
Secretary, New Mexico State
Highway & Transportation
Department*

GROWING CUSTOMER APPROVAL

"New Mexico not only is getting the best bang for the dollar, they're getting a good process that will take care of their roadways for a long period of time," Roybal said.

"That's everyone's ultimate desire," Roybal said. "We want a good process that won't cost a million bucks, yet be provided with a good riding surface without ills for a while."

And this is translating into better public approval of the work the SH&TD is doing.

Much of this work is driven by a desire to satisfy New Mexico road users. "After 1995 we made a decision that smooth roads would be one of the deliverables that the public expected of us," Rahn said. "We had to rethink how we were maintaining the pavement surfaces, and that's where this process came in. I'm extremely happy with the outcome."

The SH&TD's annual surveys of customers reflects this. "The department's public approval rating has gone up as has the condition of our roads," Rahn said. "As our roads have gotten better, so has the public's opinion of the department. The process has been a savior for our state." ■

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