

FORT WORTH RETURNS TO HOT-IN-PLACE RECYCLING FOR PREVENTIVE MAINTENANCE

ONCE 'BURNED', TEXAS CITY TAKES ANOTHER LOOK AT HIR AND RETURNS PROCESS TO PRESERVATION PROGRAM

By Tom Kuennen

Scorched vegetation and contractor mistakes were among the reasons the City of Fort Worth stopped using hot-in-place recycling (HIR) as a pavement preservation process back in the 1990s. But now, in the 21st century, HIR has returned to the city's "toolbox" of pavement preservation techniques.

Today, Fort Worth utilizes a one-pass, hot in-place recycling process in which the existing, deteriorated pavement is heated and recycled to a depth of 1 in., and mixed with a rejuvenating

to standard overlays, we get a good quality riding surface that is bonded well to the base course. Overall it's a good product at a reasonable price."

But adoption of the HIR process took place only after the city rebuilt its confidence in HIR. The city had a HIR program in the late 1980s into the early 1990s, but suspended it due to some bad experiences.

"We had some issues with the previous contractor, who became careless and began burning shrubs," Behmanesh said. "We decided to shut the program down. But Cutler Repaving, Inc. came along almost a decade later, and was so persistent that we decided to visit one of their jobsites in University Park [Dallas suburb]. I went once and spoke with the contractor on the job. The second time I went without being seen, just to see how the process was applied without a customer being around. We decided to give Cutler one contract to see how it would go prior to expanding the program. And so far, based on what I have seen and what the staff has reported, I'm pleased with the work."

The city reached its decision to restart with HIR repaving based on performance of the contractor and final product. During Cutler's first contract with the city both customer and contractor learned from the process.

"One day I visited the jobsite and did not like the way they were doing the joints between the passes," Behmanesh said. "I brought it to their attention and it was quickly fixed to my satisfaction. We are all professionals and there is no reason for us to beat around the bush. We let our contractors know what we like and don't like."

ONGOING PRESERVATION PROGRAM

Fort Worth has a very aggressive pavement management and preservation program and HIR is a major part of it, Behmanesh said.

"We started our current pavement management system in 2002 and have been using it to analyze the cost effectiveness of our major maintenance program," he said. "We have shared the information with our elected officials in numerous workshops and showed them that the result of spending more dollars on timely preventive maintenance now will save us millions of dollars in reconstruction costs down the road.

"Our elected officials have been great, after seeing the numbers and understanding the extent of the problem," Behmanesh said. "They also

agent prior to being placed as a leveling course. This 100 percent-recycled leveling course then is topped with 1 in. of virgin hot mix asphalt—placed simultaneously by the same machine—which achieves a thermal, interlocking bond between the lifts..

"The HIR process is a good product," said George Behmanesh, P.E., assistant director, Fort Worth Transportation and Public Works Department. "Otherwise we would not be using it. It's a quick process that permits the contractor to get in and out of the right-of-way very quickly. Compared



Single machine process did not disrupt traffic in front of the Tarrant County Courthouse.

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University Drive was repaved near Texas Christian University with no disruption to TCU's operations.



understand the importance of our pavement management and preventive maintenance programs, and have responded well by increasing our maintenance program budget. And they have increased our major maintenance program funding five-fold over the last decade.”

Fortunately, Fort Worth never had to choose between funding pavement preventive maintenance and capacity improvements, Behmanesh said. “They are totally different funding sources,” he said. “Maintenance is funding from the general fund operating budget, and reconstruction comes from bonds and capital improvement programs. Our city council is well-versed and knows that you have to do more maintenance now in order to reduce the need for total reconstruction in the future. Timely oil changes now will reduce the need to replace the engine later.”

Fort Worth’s pavement management system inventories all 7,300 lane miles of pavement in the city, said Najib N. Fares, P.E., infrastructure manager, Transportation and Public Works Department, Infrastructure Group. His crew of three

struction or maintenance approach is necessary to bring it to a condition that we want it to be. And the more heavy maintenance we can do, the more cost-effective our dollars are, because you are preserving the pavements.”

Anderson has a good deal of experience with HIR, even before his tenure at Fort Worth. “I’ve been around HIR my entire career,” Anderson said. “I was familiar with it in both Texas and Utah. It’s a good approach to pavement preservation, so long as you have the right structure to begin with, and right condition of the pavement. Repaving is not a cure-all, but in the right place it’s a very good approach to heavy street maintenance.”

REPAVING UNIVERSITY DRIVE

The repaving process keeps traffic moving and road user disruptions to a minimum, Anderson said. “We need for our contractors to get in and get out,” he said. “We need to be minimally disruptive to traffic, and to other institutions. Our University Drive repaving project (2010) went right through the heart of the TCU [Texas Christian University] campus, so we had to keep the disruption to traffic and TCU students and staff to an absolute minimum, as well as the neighborhood there in and around the campus.”

But for University Drive there was more to deal with than just the TCU campus. It is the main thoroughfare accessing some of Fort Worth’s more important institutions and tourist attractions, such as the Fort Worth Zoo, famous Forest Park, Will Rogers Complex, and the Fort Worth Botanical Gardens right across the street.

“University Drive is one of our highest-traveled thoroughfares,” said David W. Bowers, construction inspector II, Transportation and Public Works Department, Infrastructure Design and Construction Group. “It connects downtown with the southeast part of Fort Worth, connects TCU campus, a major golf course, the zoo, and major condominium projects and shopping malls. It’s also one of the prettiest thoroughfares and is very aesthetically pleasing.”

Given these local conditions, the City of Fort Worth pays particular attention to the disruption road work in the area might have on the surroundings. Yet Cutler’s one-pass HIR process was ideally suited for minimal disruption to traffic flow and local institutions. “I did not hear one complaint, and I saw the progress each day,” Anderson said.

The University Drive project in Fort Worth ran three and a half lane miles from I-30 on the north and Berry St. on the south, approximately 320,000 sq. yd. of HIR. The pavement suffered from rutting, cracking and other surface distresses, said Rick Hatcher, senior construction inspector, Fort Worth Construction Services Division.

On University Drive, the city was seeing separation of layers of conventional hot mix asphalt. “The lifts start to move on you, and that creates cracking and a lot of damage to pavements,” Hatcher said. “There will be a lot of shoving at in-



uses a van equipped with a computerized system to collect information on pavement conditions and ride index.

“We have a crew that travels every day to check condition and rating of streets, and compiles all that information, which is used to plan our annual street maintenance program,” Fares said. “Even when a work list is generated I will have one of my inspectors go out and verify the information, measurements and quantities, and this will go into the contract quote.”

“It’s all about optimizing the funds we have,” said Andy Anderson, P.E., RPLS, assistant director, Transportation and Public Works Department, Infrastructure Design and Construction Group, City of Fort Worth. “The elements of pavement preservation are part of an overall strategy of how we deal with the condition of our streets. We’re constantly upgrading the sufficiency rating of our streets, which gives us a clue to which recon-

tersections, and as the pavement heats up in the summer, the traffic will rut the pavement. But the hot-on-hot repaving process and added rejuvenator from Martin Asphalt breaks through the independent layers and makes for a revived pavement.”

“University Drive had a lot of cuts and a lot of cracking,” Fares said. “We needed to preserve this major arterial, because we know that if we spend a dollar today on preservation we know we will save five dollars in future pavement expenditures. Preventive maintenance is what our program is all about, because if we work on it right now it will be a lot cheaper than doing it later.”

Concrete work also was required. “The curb-and-gutter by TCU was pretty old, and had done its fair share of settling,” Bowers said. “We had to reset grades for drainage, set new sidewalks and curb ramps, walkways, and promote positive drainage. We had so many layers of asphalt that it would have cost a fortune to mill it all off. Instead it was simpler to use the repaving process to bring it back to life.”

The less disruptive the work is, the better off all parties are, Anderson said. “If we had done mill-and-fill the work would have taken at least twice as long,” he said. “That’s because we’d have to do a mill operation first, then come back and do the paving. Also, a lot of the repaving was done from 9 a.m. to 4 p.m., and the morning commute took place with no evidence of a work zone or construction having taken place the day before. The machinery was gone, the pavement in place and the road was ready to drive for the commute each morning.”

ONE-PASS PROCESS

The fast-moving, one-pass repaving process expedited renewal of University Drive. “As fast as this process moves, it allows for the least amount of inconvenience for motorists,” Bowers said. “As the process moves forward we just move the traffic control so traffic can go in and out.”

“We like the single-pass procedure of repaving,” Fares said. “When you go in with your paving train, you start and you finish and you get out. After you heat the pavement you don’t have to wait for another machine to overlay it; repaving is completed by one machine, with the pavement opened to traffic in an hour. It impacts less traffic with less inconvenience, and the thermal bond between the recycled and virgin layer creates a homogenous lift of asphalt without seams. And it’s about \$25,000 to \$35,000 cheaper per lane mile than mill-and-overlay. You also are recycling the existing pavement 100 percent, so that’s good for the environment.”

HIR can put vegetation at risk, but Bowers said the Cutler process did not burn any trees or shrubs, especially important in a high-profile neighborhood like University Drive’s. “If you notice, the canopy over University Drive is still intact,” he said. “I don’t think we lost one tree, because they protect vegetation. It was a smooth process for all involved.”



The lack of a tack coat is a big advantage to the repaving process, Hatcher said. “On a conventional overlay we do get a lot of complaints as people are not aware that there is fresh oil on the pavement, and they go zipping through and the next thing you know there are black spots all over their nice shiny white car,” Hatcher said. “With the repaving process we’re done with that.”

But it’s in the seat of the pants that Hatcher best judges the repaving work. “As a senior inspector, I’m hung up on ride quality,” Hatcher said. “If it’s not comfortable for me, I know it’s not comfortable for our residents and drivers. Ride quality is at the top of my list, and I can’t abide spending taxpayer money for a substandard product.”

REPAVING AN HIR PROCESS

The Cutler Repaving process takes place in one pass, in one continuous train, eliminating continuous lane closures and construction traffic. Residents may leave home in the morning on a decayed pavement and return from work on an entirely new pavement.

With repaving, the existing pavement is heated to 300 deg F. Once it reaches a softened, pliant condition, the pavement is scarified to a depth of 1 in., and in the mobile repaving unit, a recycling agent that restores the viscosity of the aged asphalt is mixed into the scarified, reclaimed asphalt.

This reclaimed material then is reapplied and distributed with a screed as a 1-inch leveling course. While that material remains at a minimum 225 deg F, a virgin hot mix asphalt overlay is placed over the recycled leveling course.

Cutler’s repaving machine scarifies, applies recycling agent, places the leveling course, and applies the new overlay simultaneously in one pass. That benefits road users because there is no delay between the time the pavement is recycled and the time a riding or friction course is placed, resulting in a safer work zone for road users and for contractor personnel.

To place a final friction or driving course, other hot in-place processes use a separate paver



Fort Worth's Colonial Parkway serves Colonial Country Club and important attractions like Forest Park and the Fort Worth Zoo, but University Drive repaving there took place with minimal disturbance to patrons.

following the heater/scarification process. But Cutler uses a screed at the rear of the repaver and thus is able to eliminate an entire machine.

Because the hot virgin mix is placed over the heated, recycled leveling course, the process achieves a thermal bond between the recycled layer and the new layer.

“From an engineering point of view, there is no delamination between the recycled layer and the new overlay,” said Cutler vice president John Rathbun. “The recycled and virgin courses interlock to become a monolithic overlay. That’s very important in predicting life cycle performance.”

A core of the new pavement would not reveal an inch of virgin mix on top of reclaimed material, Rathbun said. Instead you would see a consistent, 2-in.-thick layer of HMA. This thermal or hot-on-hot paving adds to the longevity of the pavement and improves the smoothness of the highway. And because it’s done in one pass it saves owner and user delay costs, without the additional traffic control and delays to the public.

In addition to the benefits of recycled material, hot in-place recycling as executed by Cutler provides a smaller energy consumption and emissions profile cumulatively than nearly every other surface reconstruction method.

MORE REPAVING IN FUTURE

Anderson said the city will continue to use repaving in the future.

“Based on our success and its performance, and based on what I’ve learned about HIR over the years, I have no doubt that we will continue to use HIR as long as we continue to have the success we’re having,” Anderson said. “Having driven University Drive daily I knew where every dip, manhole and hump was. But on completion the smoothness was unbelievable. It was much more improved than I would have expected. But what really got my attention was how the crew was able to deal with appurtenances like valve boxes and manholes, and their variations of elevation, and still do an excellent job.

“You can lay a beautiful mat as your final course,” Anderson said, “but if you haven’t dealt with the appurtenances you have not done away with all the rough ride. And from my perspective, the rough ride was gone.” 

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