



# ONE-PASS

## repaving process smoothes Missouri I-29

*Kansas-based Cutler Repaving, Inc. uses its preheater-conveyor-vehicle (PCV) to preserve and improve heavily-traveled interstate*

By Greg Udelhofen, editor

**A**n 11-mile stretch of Interstate 29 south of St. Joseph, MO is receiving a much needed upgrade, with the Missouri Department of Transportation (MoDOT) opting to repave rather than “mill and fill” the roadway located in Platte County, north of Platte City. The northbound side of the I-29 project was completed this year and the southbound lanes are scheduled for next spring.

Missouri’s first hot in-place recycling (HIR) project got



## PAVEMENT PRESERVATION



**The top photo shows the one-pass asphalt recycling method in action. The middle photo shows the recycling agent being applied and mixed, while the bottom photo shows the recycling screed laying the recycled mix.**

Smooth Roads Initiative project. “We were going to mill off two inches and replace with three and three-quarters inches, so it just seemed like a good candidate for hot in-place recycling. MoDOT is interested in trying to expand the number of solutions we have in our pavement preservation toolbox. We are always interested in cost-effective and environmentally-friendly ways to maintain our aging system,” says Skinner. “The one inch of recycled asphalt on this job will address surface problems such as cracking, rutting and pot holes. Surface irregularities are improved and we’re able to add structure.”

The project called for recycling the top one-inch of the roadway using a hot in-place preservation approach that heats, rejuvenates with a polymer modified emulsion and then levels the reconditioned asphalt in preparation for a new 1 3/4-inch wearing course of virgin HMA Superpave SP125 (12.5 mm).

In a single pass over the I-29 project roadway, Cutler’s repaving machine not only covered most of the 12-foot-wide inside travel lane, but the 6-foot-wide inside shoulder of the interstate project. On the second lane pass, the repaving machine overlapped the longitudinal joint to heat, recycle and repave a seamless bond between the two travel lanes.

underway late this summer, with Superior Bowen Asphalt Co. of Kansas City, MO, serving as primary contractor for the \$4.3 million rehabilitation. Superior Bowen milled the outside 10-foot shoulder and placed an HMA overlay on the shoulder, ramps, and acceleration and deceleration lanes that tie into the project.

Cutler Repaving Inc., based in Lawrence, KS, was awarded

the contract to recondition the existing asphalt surface and apply a new hot-mix asphalt (HMA) overlay.

Jesse Skinner, district pavement specialist for MoDOT, researched the HIR process and lobbied to try it in District 4. The resurfacing of I-29, which was originally constructed of concrete with several asphalt overlays applied over the years to upgrade the structure, is a



“We overlapped two to three inches of the previous repaved lane to make sure we had a clean bond between the two travel lanes,” says Don Allensworth, Cutler paving superintendent who is in charge of the I-29 repaving work.

Allensworth says it took his crew 24 working days to complete the northbound repaving portion of the project, with prime contractor Superior Bowen handling all exit and entrance ramps, as well as final paving on the outside shoulder of the road.

Cutler’s main challenge in completing its portion of the work was doing so during the restricted hours outlined in MoDOT contract.

“We had to start at 3 a.m. each day we were on the project and complete the day’s work by noon in order to be off the road by 3 p.m.,” Allensworth says. “It’s an area with a lot of heavy commuter traffic and the DOT wanted the road clear of construction activity by late afternoon each day.”

For MoDOT, the repaving process was a first of its

kind on an interstate roadway, and the cost-effective process caused minimal disruptions to motorists who use the busy interstate. Rejuvenating and correcting the profile of the existing road surface provided an economical alternative over the conventional mill and fill resurfacing approach that is generally used to address aged pavement surfaces. Since the old surface is not hauled away, but rather used as a new leveling course, the cost and congestion associated with trucking the old asphalt material is eliminated.

Allensworth’s crew was also able to achieve compaction densities from 91.5 to 96 percent by rolling the recycled leveling course and the new HMA wearing course at the same time. The thermal bonding between the two layers allowed for sufficient compaction time since the recycled leveling course did not have a chance to cool down before the immediate placement of the wearing course. The continuous one-pass recycling/repaving method also generated an addi-

**Surface deformities and a road’s profile can be corrected in the process immediately prior to the placement of the new wearing course.**

tional \$42,000+ in smoothness bonus, with recorded profilograph surface deviations held to a minimum.

### **PCV technology**

Cutler Repaving’s preheater-conveyor-vehicle (PCV) is a self-propelled hot in-place recycling/hot mix asphalt (HMA) paving machine that preheats the aged asphalt pavement in advance of the main recycler, while receiving virgin HMA for the surface course. Much like a material transfer vehicle, the PCV isolates the main repaver from the HMA delivery truck, eliminating bumps often caused when trucks back into the paver.

The PCV operates closer to the repaver than a conventional preheater, resulting in less cool-down time between the preheater and the repaver, and consequently, reducing the possibility of thermal seg-

regation. Its 260-square-foot heating hood generates 12.5 million Btus of heat.

The unit was designed to function as a material transfer vehicle, capable of storing 15 to 20 tons of HMA ahead of the paver to facilitate a continuous, non-stop paving speed, which produces a smoother finished surface.

The one-pass asphalt recycling method heats, scarifies and applies a rejuvenating agent to an existing aged pavement that then becomes a new leveling course, which is then topped with a virgin HMA overlay. The double screed configuration, with the front one applying the reconditioned leveling course and the back screed placing the HMA overlay, thermally bonds the two mats to form one monolithic pavement.

Generally, one inch of the old pavement surface is recycled and then topped with at least an inch of fresh HMA. The one-inch depth of recycled road material represents a significant savings in trucking and disposing of perfectly good asphalt and aggregate that can be kept in-place to be used as a leveling course. Surface deformities and a road's profile can be corrected in the process immediately prior to the placement of the new wearing course.

Since the old pavement is heated to 300 degrees F prior to scarification and adding the rejuvenator to restore the viscosity of the aged asphalt, by the time the reclaimed material leaves the screed as a new leveling course the temperature has only dropped to a minimum 225 degrees.

With the second HMA screed operating approximately three feet behind the recycled mat, the new surface course mat thermally bonds to the recycled mat and eliminates the need for a tack coat application between the two layers. Immediate compaction of the



**Above is an example of the "seamless" joint between lanes after compaction.**

two mats eliminates the possibility of delamination between the recycled mat and new overlay, which further enhances the life cycle performance of the road.

The entire PCV recycling/paving train travels at 15 to 20 feet per minute. The virgin HMA four-section vibratory screed is 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.

The complete one-pass repaving process reduces traffic disruption and costs a fraction of the conventional total reconstruction. ■



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921 East 27th Street, Lawrence, KS 66046  
 Phone: (785)843-1524 Fax: (785)843-3942  
[www.cutlerrepaving.com](http://www.cutlerrepaving.com)