



Buzz on the royal street

San Jose rejuvenates old road with zippy new process

By Allen Zeyher
Managing Editor

We have all probably dripped water into a pan of very hot oil on the stove and been startled by the violent, cracking sizzle. That is analogous to what happens when you spray water into 475° liquid asphalt.

When the cold water hits the hot liquid asphalt inside the cold in-place recycling (CIR) machine, the asphalt foams. That foamy asphalt was a critical part of the CIR process used by the city of San Jose to recycle the old, deteriorated pavement of Monterey Road. The \$2.68 million recycling project won a 2013 ROADS & BRIDGES/Asphalt Recycling and Reclaiming Association Recycling Award and also won a bronze rating from the Greenroads Foundation as the first Greenroads-certified project in the state of California.

The first step in recycling the 2.06-mile section of old pavement on Monterey Road on the southeast side of San Jose was to pulverize it and mix it with 1% of cement spread on the old pavement in front of the CIR machine. The cement contributes the very fine particles needed to get the best compaction of the recycled product.

Monterey Road is a remaining part of the old El Camino Real constructed by Spanish settlers generations ago from San Francisco all the way to Mexico. The modern pavement—4-6 in. of asphalt over 8 in. of concrete—had suffered “heavy raveling, large block cracking and some base failure here and there,” John Burchfiel, principal construction inspector for San Jose, told ROADS & BRIDGES.

The current Monterey Road was considered one of the worst pavements in the state, with a condition index between 40 and 50 on a scale where 100 is best. It is a four-lane urban arterial collector.



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"I think the main advantage is that you're using existing material that's on the street," said Burchfiel. "There's no truck traffic coming in and hauling off thousands of tons of material. There's no truck traffic hauling back in thousands of tons of new material from virgin quarries or virgin aggregate."

"After the CIR is done, one of the advantages is that that will present a consistent section throughout the whole segment," Ricardo Morales, project manager for the San Jose Infrastructure Maintenance Division, told ROADS & BRIDGES. "That's really beneficial for the structural integrity of the road."

The recycling machine milled up 4 in. of the existing asphalt.

Rising index

"We have a materials lab, and they do structural analysis on our streets," Burchfiel explained. "Through their analysis, 4 in. was enough to stabilize the street to give us a

traffic index of 10. Basically it means the road is strong enough to hold the current traffic."

The recycling machine also has hose lines connecting it to the hot-asphalt truck rolling in front of it and the water truck ahead of the liquid-asphalt truck. It mixes the ground-up pavement with the foamed liquid asphalt until all of the ground-up particles are coated with fresh asphalt (2.5% of virgin foamed asphalt by weight) and places it back down on the roadway using the screed at the back of the machine.

The general contractor on the project was Pavex, a division of Graniterock Construction, Watsonville, Calif. The CIR subcontractor was Fonseca McElroy Grinding Co. Inc.

Rolling along behind the CIR train were three compactors—all of them with steel drums and all of them vibrating—performing a typical breakdown-, secondary- and finish-roller scheme.

"You have a breakdown roller, and he's

making sure he's getting the initial compaction right as it's coming out from behind the paving screed," Burchfiel explained. "And then you have secondary rollers. That's where you're getting most of your compaction. And then you have a finish roller back behind that is just smoothing everything out, getting all the creases out, any marks that are in it out and doing any final compaction if necessary."

One of the nice things about CIR is that the surface can be opened to traffic soon after it is compacted.

"Typically what we're finding is it takes about two hours to get full compaction, several passes rolling," said Burchfiel. "After they densify the material what we like to do is we shoot a thin layer of fog seal, which is an emulsified asphalt—it's an oil and water mixture—and then they sand that, and that sort of locks the surface in place. After the sand is put on there, we've seen traffic being put on there in two to three hours, with no deformation."



Double recycled

The recycled base was topped with a 2½-in. rubberized hot-mix asphalt overlay. It is a gap-graded asphalt specification with 20% ground-up tire rubber added.

“That does improve the durability of the asphalt surface,” Burchfiel said. “So you get a double benefit. You use up the old tires in the dumps, and it improves the performance of the asphalt concrete.”

“We usually design these roads for 10 years plus,” added Morales, “with the expectation that we are not going to revisit this road in the next 10 years.”

After that, the San Jose Infrastructure Maintenance Division will perform maintenance—spot patching and sealing—as needed.

Monterey Road was San Jose’s first use of CIR, but it was not the last. The city has already done half a dozen more projects using the CIR technique and plans more for the future, depending on research to determine whether the given street is suitable for CIR.

One factor the city takes into account is finances.

“After the CIR and after the overlay, the cost seems to be lower than a conventional overlay project,” said Morales. “So right now we are experiencing some savings as far as the cost.”

In fact, CIR saved the city 23% over conventional-paving methods. The city is set up to save even more in the future, because Monterey Road was designated a perpetual pavement by Greenroads.

The perpetual-pavement designation contributed to Monterey Road’s Greenroads certification. Also contributing was a custom credit for work-zone safety, because the project recorded no reportable safety incidents in the work zone. The project team also retrofitted LED street lights with dimmer controls to reduce light pollution and save energy. In all, the project team completed 14 Greenroads credits and all 11 project requirements.

Make a sizzle

The bronze certification award was presented to San Jose Mayor Chuck Reed and the project team at a July 8, 2013, city council meeting.

You could say Monterey Road’s asphalt sizzled once when the cold water made it foam and sizzled again when the world of green construction found out about it. **R&B**

For more information about this topic, check out the Asphalt Channel at www.roadbridges.com.

Above: The CIR machine mixes the ground-up pavement with the foamed liquid asphalt until all of the particles are coated with fresh asphalt (2.5% of virgin foamed asphalt by weight) and places it back down on the roadway using the screed at the back of the machine.

Below: Monterey Road was San Jose’s first use of CIR, but it was not the last. CIR saved the city 23% over conventional-paving methods. The city is set up to save even more in the future, because Monterey Road was designated a perpetual pavement by Greenroads.

