



By **Bill Wilson**
Editorial Director

Passing an audition

Beverly Hills welcomes CIR following successful job

The letters C, I and R are not going to appear as giant fonts stuck into the side of a mountain.

Hollywood will forever be Beverly Hills' claim to fame, but cold in-place recycling (CIR) has quickly developed a fan base in the affluent southern California city following a street-resurfacing project. The first attempt at CIR involved Canon Drive, Beverly Drive, Crescent Drive and Lomitas Avenue and saved the movie-star home base close to \$1.5 million when compared to remove and replace—and money was almost an afterthought.

After studying the effects of CIR in the cities of Chino and Moreno Valley, senior civil engineer Juan Martinez approached Deputy City Engineer Ara Maloyan to take a crack at the application because of its green impact and a reduction in public inconvenience.

"When he then threw in the cost savings, that just sealed the deal," Jim Emerson of Pavement Recycling Systems Inc., the recycling contractor on the job, told *ROADS & BRIDGES*

magazine. Sully Miller Corp. was the prime contractor. "Juan did his homework."

Some extra credit was offered in January 2011, when the City of Beverly Hills 2010 Street Resurfacing Project won a 2010 *ROADS & BRIDGES*/Asphalt Recycling and Reclaiming Association Recycling Award.

"We are real proud of it," Don Matthews of Pavement Recycling Systems told *ROADS & BRIDGES* magazine. "There are a lot of good projects out there and a lot of good contractors out there, and we hope everybody is raising the bar to make sure all of the recycling projects are done well.

"What we are so pleased about on this one was we had an owner that was committed to make it work, did everything right in respect to training and was out on the project. It shows you that there are no limitations with good communication and good logistical planning."

A top sub-base

The endless positives on this job got their start behind Caltrans' Just in Time Training, which requires the owner, recycling contractor

and general contractor to get together prior to construction and go over all of the specifications to the job to make sure there are no misunderstandings and everyone has the same expectations.

“We find the majority of the few projects that we do have problems are where there was not good pre-job training or coordination,” said Matthews.

Time was actually a gentle companion to the streets involved in the resurfacing project. The existing pavement had endured over 25 years of service and is believed to have received just a couple of preventive maintenance surface applications before it was in need of more extensive work. Emerson credits the longevity to a strong sub-base.

“Structurally it was built and built right,” said Emerson. “Beverly Hills probably spent the money back then to build the structure correctly.”

However, transverse, longitudinal and fatigue cracking was beginning to cover more ground, which is when Martinez decided to pitch his maintenance



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strategy, which also included a 5-in. mill-and-replace approach. In the end, however, CIR and its environmental and community friendliness won out. Not only did the procedure—which consisted of recycling 3 in. of existing pavement and adding a 2-in. rubberized hot-mix

surface course—offer a 79% reduction in greenhouse-gas emissions, but Martinez figured that it also would remove more than 2,600 three-axle dump trucks off the local city streets and highways and take just two weeks to complete.

“Once the city council heard the

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Other 2010 R&B/ARRA Recycling Award winners

Martin County Road 609 Reclamation Project

Martin County, Fla.

Cost: \$2,117,145

Length: 48,576 linear ft

% RAP Used: Up to 50%

Milling Depth: 7 in.

Cost Savings: \$900,000+

Type: Full-Depth Reclamation

Designer: Martin County

Engineering Department

Owner: Martin County, Fla.

Contractor: Hubbard Construction Co.

It's back to being called Road 609, not No. 609. Prior to work being done on this Martin County route, a local newspaper called it the worst road in the region. The existing roadway, which carried heavy trucks and agricultural equipment, was only 22 ft wide but was expanded to 24 ft during construction. Excess material was used to raise the elevation of flood-prone sections of the roadway up to 10 in. and also helped in the widening, which eliminated the need to haul off or bring in new material. The recycled base was overlaid with a 2.5-in.-thick Superpave surface course. The project is the largest single roadway in Florida to be publicly bid using full-depth reclamation.

reduction in traffic and construction time they were convinced," said Emerson. "And after the fact the feedback from the community was incredible. They were very happy about the fact that they could leave in the morning on a paved surface, go to work and come home on a paved surface."

Motorists also were glad that the project ended with their original windshields intact. A month prior to the CIR project, Martinez was involved in a 250,000-sq-ft, 3-in. mill-and-overlay project that had more than 160 calls and complaints, many for windshield claims, over a 12-day period. The CIR work did not produce a single windshield claim.

"There was a lot of money traveling

Reconstruction of U.S. Rte. 24

Astoria to Summum, Ill.

Cost: \$8.9 million

Length: 20,150 ft

% RAP Used: 66%

Milling Depth: 2 in.

Cost Savings: \$250,000

Type: Cold In-Place

Designer: Illinois DOT

Owner: Illinois DOT

Contractor: R.A. Cullinan

Pavement originally constructed just after the Great Depression had finally fallen on hard times. The pavement was in extremely poor condition and was scheduled to be milled and overlaid, but the Illinois DOT later decided to go with CIR on about 12,000 ft. It was the first CIR project performed on an IDOT-maintained section with a single-unit recycling train and only the second of its kind the agency had ever done. Due to the extreme condition of the pavement, extensive full-depth patching was necessary to correct sections that had completely failed or vaulted. In order to have adequate material to process, it also was necessary to add approximately 120 lb/sq yd of aggregate ahead of the recycling train. A 2-in. lift of HMA binder was placed following the CIR process to protect the pavement until the final surface is complete in the fall of 2011.

on this road," claimed Matthews. "At one point we were totaling up the dollars in vehicles. We were getting several million dollars in about 20 minutes. We are not used to that kind of money passing so close to your train, and you think about the potential that could go wrong and the uproar. This turned into a very good project politically and we were very proud to be a part of that."

Rolling out green carpet

In order to get the CIR mix right, cores and samples of the existing pavement were taken on-site and sent to Asphalt Pavement and Recycling Technologies Inc. (APART), which is an independent AASHTO-approved testing

lab. Core data indicated the existing asphalt pavement at a varied depth from 4.5 to 7 in. over a Class 2 base. The cores were then cut to the specified recycling depth of 3 in., crushed and mixed in the lab to determine the optimum emulsion to be added for the best performance. It was determined that 3% Western Emulsion PASS R per dry weight of reclaimed asphalt pavement (RAP) would be applied. The bulk specific gravity was 128.5 lb/ft. The maximum theoretical gravity was 2.418. The Marshall stability cured specimen AASHTO T245 (1,250-lb minimum) was 3,305 lb, and the Marshall retained stability AASHTO T245 based on moisture conditioning (70% minimum) was 76.2% while the raveling potential was 4.6%.

With the ideal mix in hand, Sully Miller Corp. and Pavement Recycling Systems Inc. arrived at the site on Aug. 9, 2010. A Caterpillar PR-1000 milling machine chewing at a minimum width of 12½ ft served as the main locomotive to the recycling train. The machine towed the CRM-2X recycling plant and the emulsion trailer. The RAP was transferred via conveyer belt to the vibrating screen decks of the CRM-2X, where it was crushed and screened to meet the specified 1-in. minus gradation. The processed RAP was then weighed via a belt scale tied to a microprocessor that controlled the emulsion pump via a mass flow meter. All material, after being thoroughly mixed in a dual shaft pug mill, was deposited into a windrow for pickup and transfer to a Cedarapids 562 asphalt track paver for placement.

When the contractor wanted to pave at 16 ft wide, particularly when dealing with bicycle lanes, an auxiliary milling machine, positioned about 200 ft in front of the Cat PR-1000, was used. The auxiliary mill deposited asphalt millings into a windrow that was picked up by the Cat PR-1000 primary milling machine.

A 2,000-ft-long test strip on the first day of construction was used to determine the rolling pattern. The pattern was established for a maximum field density attainable. The first pass was executed by an Ingersoll-Rand DD-110 steel double-drum roller operating in a static mode. The machine then shifted to vibratory

mode for two passes before a Caterpillar PS-360B pneumatic roller moved in for four passes. Density was checked with a nuclear density gauge, and all tests needed to fall within a density range of 95%-105%. A total of 19,500 tons of RAP was used along with 585 tons of the PASS R emulsion.

At a minimum of every 3,000 sq yd (lot), a maximum-size field gradation was conducted for the duration of the project. All recycled material had to pass through a 1-in. screen. Other field gradations, conducted on every third lot, involved running wet gradations through a No. 4 sieve.

Once the recycling process was complete, which took eight days, crews returned to place the 2-in. asphalt rubber hot-mix surface course, which was supplied by Blue Diamond Materials. The mix design called for ½-in., Class D2 aggregate and a PG 64-10 asphalt binder. Crumb rubber was added at a minimum of 20% of the asphalt binder.

Maintaining uninterrupted traffic was



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CIR is now a permanent fixture of road maintenance in the city of Beverly Hills' arsenal. According to Emerson,

Martinez plans to go with CIR on 25 future projects across the area.

"When the job got started you had a city and homeowners that, when they realized what [CIR] was, was really supportive of it and willing to follow the traffic control," said Matthews. **R&B**



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