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Pavement Recycling Systems

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Above: PRRS CIR Train consists of a cement-spreading unit, followed by a Wirtgen 380 CRi full-lane milling machine, a pugmill recycling unit, and a 26-ton oil tanker truck. The process is efficient and cost effective with the production of two lane-miles per day.

By Brian Hoover, Senior Editor / Photos provided by Pavement Recycling Systems, Inc.

Route 127 was added to the state highway system in 1933. In 1964, state highway renumbering defined SR 127 from I-15 to the Nevada state line, a designation that has remained unchanged ever since. Route 127 originates northbound, connecting Interstate 15 in Baker to State Route 373 at the Nevada line. It traverses the vicinity of Death Valley National Park's eastern boundary, passing near California 190 and Death Valley Junction. Classified as a Rural Minor Arterial, this route serves as an integral connection between southeastern California, Nevada, and other rural highways.

Caltrans scheduled specific segments of State Route 127 for rehabilitation, encompassing two sections located approximately

seven miles apart in Inyo County. These individual sections were designated by Postmile Marker 21.0 to 34.5 and Postmile Marker (PM) 41.8 to 49.4, respectively. Caltrans awarded the Partial Depth Recycling project to Hat Creek Construction for \$15,409,904, and Hat Creek Construction, in turn, enlisted the services of Pavement Recycling Systems, Inc. (PRRS) to carry out the Partial Depth Recycling (also referred to as Cold In-Place Recycling (CIR) by other agency standards). The engineered process recycles 100 percent of 3 to 5 inches of the existing asphalt and combined with an asphalt overlay in the rehabilitation of the pavement.

This is not the first time Caltrans has elected to utilize PDR on State Route 127, and the State has recognized that highways such

as SR 127 offer an ideal setting for maximizing the value of Partial Depth Recycling (PDR). In fact, Caltrans has performed four PDR projects over the past eight years on individual segments of SR 127. A closer look reveals that the PDR work near Shoshone skipped the section of SR 127 between PM 34.5 and PM 41.8. This is because that segment was actually rehabilitated using PDR back in 2016. That same year, PDR was utilized in rehabilitating PM 0.0 to PM 21.0 in Inyo County, the segment leading into the beginning of this project. In San Bernardino County, two segments of SR 127 were also rehabilitated using PDR in 2015, from PM 3.0 to PM 10.5 and PM 37.7 to PM 41.5. In total, approximately 60.7 miles of SR 127 have been recycled using the PDR



Above: Pavement Recycling Systems' Wirtgen 380 CRi full-lane (12.5 feet) milling machine grinding and conveying existing RAP material into the recycling unit.

process since 2015, or nearly 67% of the 91 miles that make up the entire stretch of the highway.

Josh Kennedy, who has been with PRS for over three years, currently holds the position of Branch Manager for the Renew Division in the Western United States. The Renew Division is responsible for promoting and implementing CIR and Roller Compacted Concrete (RCC) Solutions for the company. According to Kennedy, many agencies, including Caltrans, regularly utilize the CIR (Partial Depth Recycling) method when rehabilitating pavements in remote locations. "Because CIR recycles the existing asphalt pavement to perform as an asphalt base course during the rehabilitation process, it is an extremely cost-effective solution,

often resulting in costs that are as much as 40 percent lower than the structurally equivalent pavement section constructed with less sustainable remove and replace methods. CIR reduces and, at times, eliminates the exporting of milled asphalt material to the remote jobsite," says Kennedy. "Reducing or eliminating the construction-related truck traffic associated with remove and replace pavement rehabilitation methods can also reduce GHG (Greenhouse Gas) emissions by up to 80%. Reducing construction-related truck traffic and its interaction with the traveling public in a remote area that is three to five hours away is also a major safety factor to consider."

Kennedy explained that the State Route 127 Shoshone CIR Project aims to rehabilitate the

pavement by grinding and simultaneously recycling the highway pavement followed by overlaying the segments with hot mix asphalt material. One section of SR 127 was designed to be recycled at a depth of three inches, while the other section required a four-inch recycled depth solution. "The CIR train consists of several units, beginning with a specially engineered cement spreading unit located on a flatbed trailer and pulled by a semi-truck. The self-made unit contains a water tank and a 25-ton cement silo, and the cement is applied at 0.6 percent by weight. The spreader operation is then followed and pushed by our Wirtgen 380 CRi full-lane (12.5 feet) milling machine. The milling machine uses its conveyor to transport the milled asphalt into the pugmill



Left: Hat Creek Construction following the CIR Train on State Route 127 project utilizing their Bomag MS2 pickup machine and their Terex-Cedarapids 552 Asphalt Paver.

Below: Front angle of the PRS CIR Train recycling the asphalt pavement on State Route 127 near Death Valley National Park.

recycling unit, which incorporates screen decks to ensure proper material sizing,” elaborated Kennedy. “The recycling unit handles all the crushing, screening, and injection of the recycling agent, which, per the engineered mix design, is applied at 2 ½ percent emulsion. The last unit in the CIR train is the 26-ton oil tanker that stores and distributes the emulsified recycling agent. The fully recycled asphalt material is finally laid out in a windrow, at which point, Hat Creek Construction crews pick up, pave, and compact the recycled asphalt material. The completed recycled section is subsequently overlain with a three-inch HMA cap and put to service the two-lane highway.”

The State Route 127 Shoshone CIR Project started on April 3, 2023, and was completed on May 9, 2023. PRS’s \$3.1 million contract included the use of CIR throughout, except for the bridge decks that had thin areas of HMA. These sections underwent a mill and fill application, while all other pavement sections were recycled. “Because CIR recycles existing asphalt materials through established engineering and construction practices, the process improves safety while reducing construction costs and construction-related community impacts. CIR is utilized throughout the state and beyond



Right: PRS using a Wirtgen supplemental milling machine to pre-grind outside edge of asphalt pavement to increase paving width to 16 feet.

Below: Finished recycled pavement section on State Route 127.



to rehabilitate pavements in both rural and urban areas,” emphasizes Kennedy. “Finally, our 8-person crew performed brilliantly, and it is important to recognize their efforts. We thank everyone for another job well done, with special recognition to our Superintendent, Pat Waldron, and our Foreman, Dave Zewe, as well as to Hat Creek’s field crew and management personnel.”

Pavement Recycling Systems, Inc. is currently involved in multiple CIR projects, including a job in Yellowstone National Park, where they are rehabilitating a roadway located close to Old Faithful. From airport runways to public roadways, Cold In-Place Recycling’s

performance has been tested and proven to be a powerful, economical strategy for rehabilitating asphalt pavement sections. For more information on PRS and its pavement rehabilitation solutions, please visit www.pavementrecycling.com or call 800-966-7774. **Cc**