

Choosing Cold In-Place Recycling (CIR) using foamed asphalt saved time and money.

The biggest advantage using this process was the shortened construction time and keeping the road open to traffic.

Compared to conventional reconstruction methods CIR saved over \$2.5 million or 37%

100% of existing material was recycled "in-place"

Almost a month of construction time saved

With only routine maintenance this road should last 20 years.

The completed section has similar structural numbers as reconstruction

BACKSTORY:

In the summer of 2019, Cold In-Place Recycling (CIR) with foamed asphalt debut for the first time in Oregon. The original estimated reconstruction cost was \$6.7 million. Using CIR saved almost \$2.5 million in construction costs, reduced construction time and increased the structural integrity of the road for long term benefits.

Juntura Cutoff is a 7.5 mile section of rural road connecting to central Oregon highway U. S. 20. This short spur is the primary access for the EP Minerals Diatomite mine, a major employer and an important tax base for both Malheur and Harney counties. Keeping the road open during reconstruction was a major consideration in selecting CIR.

Funding for this project was provided by a combination of Oregon DOT, both counties and private funds from the mining company.

PROBLEM:

Located 58 miles east of Burns and 56 miles west of Vale, Oregon, Juntura Cutoff road is in a remote area of the state.

Over the past several years, heavy truck traffic from the mine caused serious damage to the road, including deep cracking, pot holes and in some areas total failure of the existing asphalt surface.

The conditions were beyond routine maintenance requiring a search for an alternative process with the limited funding available.

“ One of the hurdles to overcome when introducing a "new" technique to an agency that has not used it before is to give them a sense of confidence that the project will turn out as planned. ”

— Mike Robinson PE, Mike Robinson LLC

SOLUTION:

Preliminary design for the project included comparisons of Full Depth Reclamation and CIR. A final design was completed by engineering firms Anderson Perry, Ferguson Surveying and Engineering, The Wallace Group and Mike Robinson LLC. Once the designs were submitted to the owners for review, the owners selected to use CIR with foamed asphalt to accomplish the task. CIR with foamed asphalt was new to ODOT but is being used in other states with good results (as early as 1956 in Iowa).

The design called for 2.5% PG 58-28 asphalt binder heated to a minimum of 330 degrees, 1% cement and 2% injected water to achieve the optimum foaming properties. A spreader truck spread the cement ahead of the recycling train. Cement is typically added as an active filler to help disperse the foamed asphalt droplets, improve indirect tensile strengths, reduce curing times allowing earlier opening to traffic. Eight inches of existing asphalt along with a portion of the underlying road base would be milled and mixed (full lane width) with a Roadtec RX 900E Rotomill equipped with a computerized metering system and expansion chamber, followed by a 25 ton pad-foot roller compactor, used in both vibratory and static mode to begin the compaction process. A motorgrader would start the final shaping and grading while followed by a double steel drum roller accomplishing the finish rolling.

The original schedule and specification called for placing the final 2.5 inches of PG 64-28 HMA within seven days. It ended up being about a month and the CIR held up very well during this period even though the contractor opted to not place a prime coat. The road was maintained during this period with water until it could be paved.

The project team was impressed with how forgiving and durable the recycled material was.

Note: Oregon DOT referred to the above process as CIREAM, the Ontario, Canada Ministry of Transportation's acronym for CIR with expanded (foamed) asphalt. The project does not neatly fit into ARRA's definitions of CIR or FDR. The pavement was pulverized with a single unit CIR machine due to the minor amount of underlying materials but was placed and compacted using typical FDR procedures due to the depth of cut. An experienced contractor will alter his process and procedures to meet the specification requirements and provide a high quality product.

PHOTOS:



Juntura Cutoff with Portland Cement spread ready to be put in the mix



Compaction on Juntura Cutoff



Grading and compaction



Keeping the road open during construction