UDOT's First Double/Double

Western States Regional In-Place Recycling Conference
September 11 – 13
Ontario, California

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Problem: US-191; MP 12.5 to MP 21 aka The Cracks

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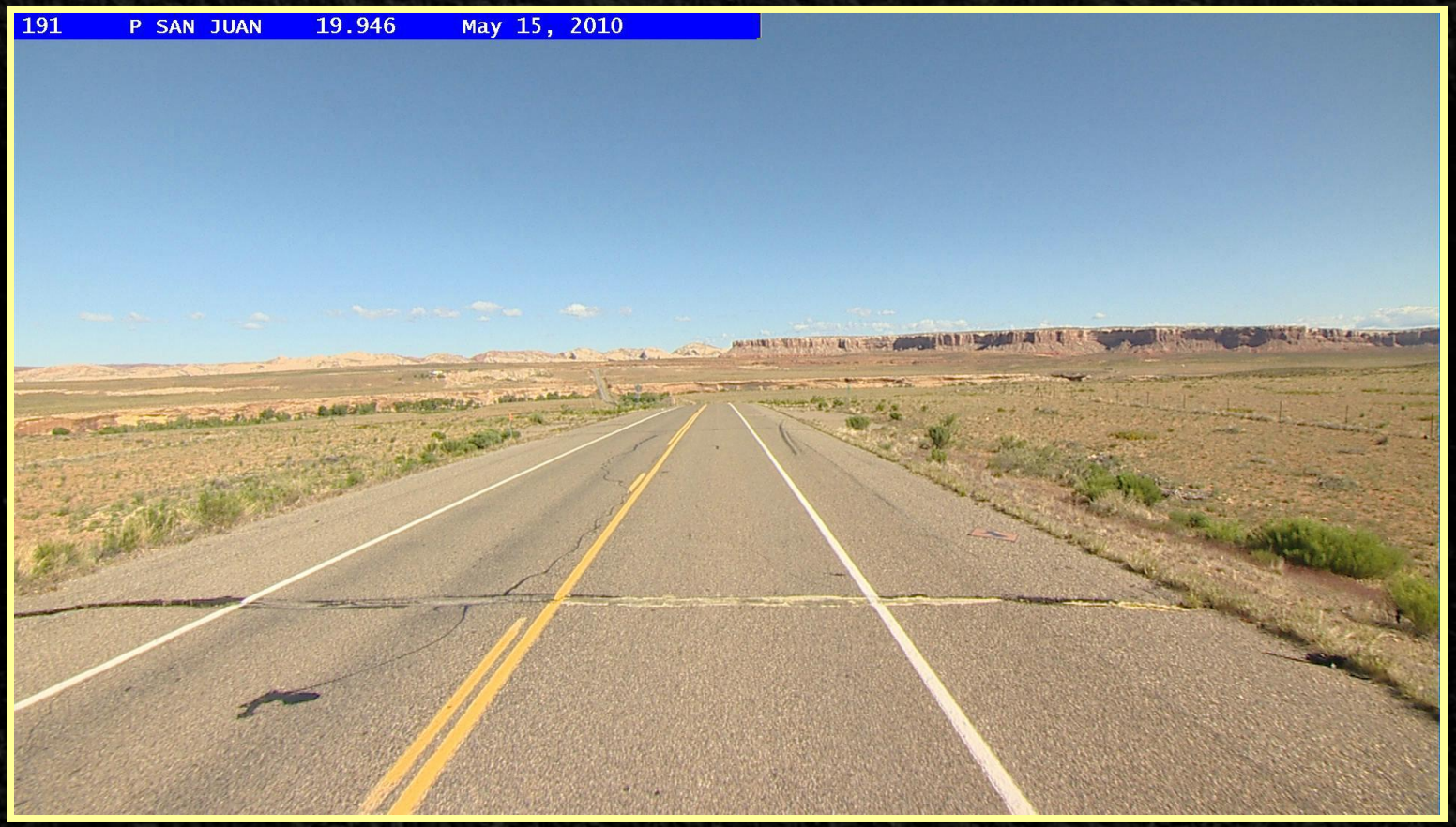

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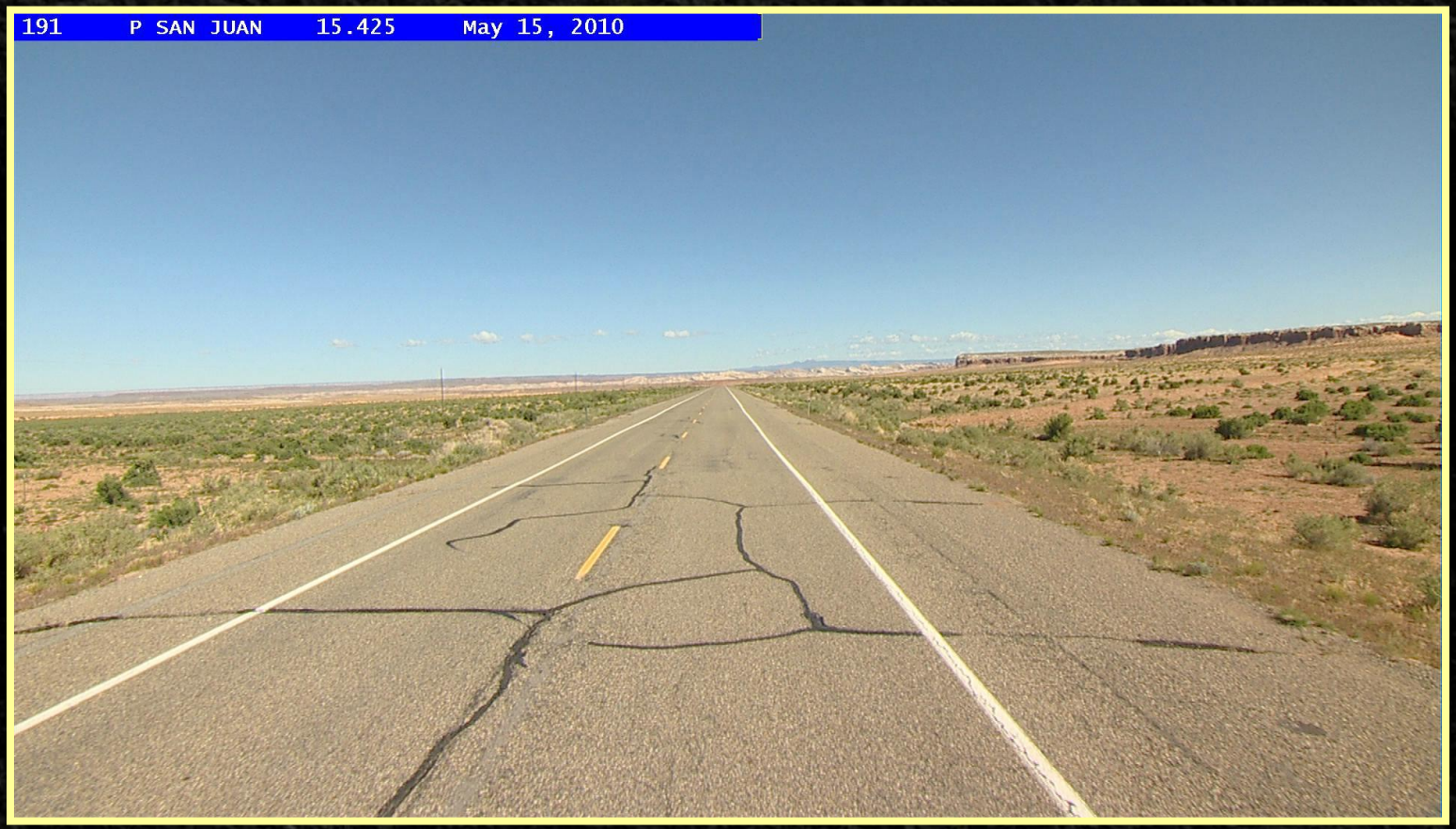

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- What to do with this section?
- Started discussions with various manufactures on solutions.
- Needed to be able to bridge these cracks with as much material as possible
- Started thinking about our success with CIR Projects
- Contacted a local CIR contractor about the ability to go 6” deep
- Discussion of Central Plant Recycle (CPR)
- Received “Buy In” from Region Senior Leadership
- Started the process of designing UDOT’s first Double/Double
- CIR/CPR Specification

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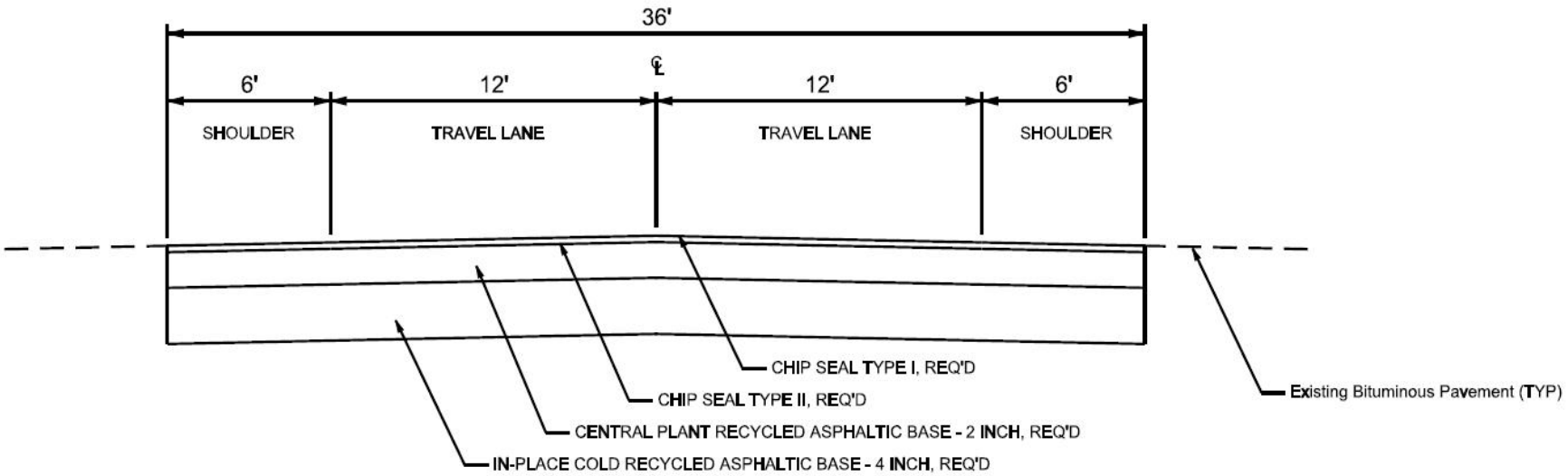
Initial Pavement Strategy:



TYPICAL SECTION #1

- Maximum Compaction
- Switched to a 3” CIR / 3” CPR after Bid

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Development of CIR/CPR Specification

SPECIAL PROVISION

PROJECT #

SECTION 02968S

IN-PLACE AND CENTRAL PLANT COLD RECYCLED ASHPALTIC BASE WITH SOLVENTLESS EMULSION

Add Section 02968S

PART 1 GENERAL

1.1 SECTION INCLUDES

A. In-place Cold Recycled Asphaltic Base: Mill existing asphalt material to required depth and width. Mix with emulsified asphalt, quicklime slurry, and water according to approved Mix Design. Place to line and grade and compact.

B. Central Plant Cold Recycled Asphaltic Base: Mill, haul, stockpile, size and blend – emulsified asphalt, quicklime slurry, water and RAP according to approved Mix Design. Haul processed material back to origin and place to line and grand and compact.

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Advertisement, Bid, & Construction

- Advertised: September 16, 2010
- Bid Open Date: October 19, 2010
- Awarded to Aggregate Industries (Frehner Construction)
  - Chose Coughlin Company to do the CIR Operation
- Bid 69 Calendar Days
- Construction began April 12, 2011

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Construction:

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Results

- Project Completed in 54 Calendar Days
- Total Project Funds Expended: $3.6 M
- Distress Indices Improvement

2011	2010
RIDE = 83.19	RIDE = 46
Env Crack = 95.41	Env Crack = 56.2
RUT = 74.97	RUT = 70.3
OCI = 88.22	OCI = 65.3

- Heavy Truck Traffic Is Increasing

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Results

Asphalt Recycling Section

By Dan Brown, Contributing Editor

A milling machine leads off the cold-in-place recycling train, followed by a mixing trailer, which is followed by an emulsion tanker and a paver.

Going Deep with COLD

How do you cold-recycle the top 6 inches of a 9-mile stretch of rural asphalt roadway for just $5 million? In several stages, says the Utah DOT. And they did just that this spring on US 191 near Bluff.

The first stage involved milling 3 inches of asphalt and stockpiling the reclaimed asphalt pavement (RAP) at a central plant location. In the second stage, Coughlin Co, St. George, Utah, cold-recycled – in place – the second 3-inch lift and added lime slurry and emulsion in the process. The third stage entailed rejuvenating the stockpiled RAP with emulsion and lime at the central cold plant, then paving it back. A double chip seal completed the process.

By comparison, just overlaying the pavement with 6 inches of hot mix would cost $5 million, says Kirk Thornock, asset management engineer for UDOT's Region 4. That would not include any milling or trucking.

The thought process

Block cracking on this section of US 191 was severe. Over the years, cracks had grown wider and deeper. Some of them reached up to 10 to 12 inches wide and extended to the full depth of the 12-inch-thick asphalt, says Thornock. Fortunately for traffic, most of the cracks were longitudinal. "It was a very rough road for the traveling public," says Thornock.

A few years ago, the Utah DOT named a budget figure of $5 million to fix the road. Several companies had tried to fill the cracks with some type of mastic or cement. "Every one of them failed," says Thornock. "Plus, the prices for milling and filling those areas with mastic or some type of asphalt got out of hand, even for that simple type of work."

Meanwhile, Utah has had success with cold-in-place recycling (CIR). "So I started thinking about cold recycling to help bridge these cracks, knowing this would not be an end-all solution, but a very good alternative," says Thornock. "I noticed that the Nevada DOT had incorporated central (cold) plant recycling into their spec, and the Utah DOT had not tried that yet."

Thornock wanted to rehabilitate the pavement as deeply as possible – a minimum of 6 inches. Limited funds prevented milling 6 inches deep, then filling back with a hot-mix overlay. And cold-in-place recycling could only go 4 inches deep in one step.

Initially UDOT considered milling 2 inches off and then doing a 4-inch CIR. But UDOT officials discussed that with contractors and other team members. They decided that to mill off 3 inches, then cold-recycle 3 inches would be a superior solution. "One, we would get better compaction on 3 inches," says Thornock. "And, secondly, the 3-inch lift would help to get the moisture out of the cold-in-place material faster."

Frehner Construction won the bid to handle the CIR and repaving process. Frehner selected Coughlin for the cold recycling and opted to self-perform the paving work. Coughlin used two Roadtec RX-900 milling machines for the initial 3-inch milling. Once that was complete, the CIR could begin, says Darren Coughlin, owner of the company.

How the train works

Two milling machines led off the CIR train. The first was a Caterpillar PR-450 that upcut a pass 7 feet wide and left RAP in a windrow for the second milling machine, a Roadtec RX-900 that cut a pass 12.5 feet wide. By overlapping a bit, the two machines could cut an 18-foot-wide pass. Quicklime slurry, at the rate of 1.5 percent, was added in the cutting chamber of the Roadtec mill.

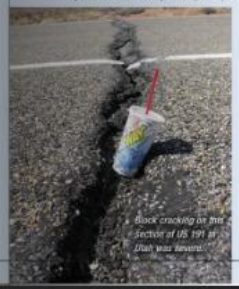
Working in a down-cutting mode, the RX-900 feeds RAP directly into a Roadtec RT-500 mixing trailer. The mill's conveyor places the RAP onto a JCI double-deck screen that measures 5 feet by 14 feet in size. Fully 100 percent of the material is screened to 1.25 inches minus. Oversize RAP runs through a Telsmith impact crusher aboard the mixing trailer. A return circuit runs RAP from the crusher back over the screen.

Material that passes the screen drops onto the 42-inch-wide belt with a weigh bridge on it. The weigh bridge sends a signal to the blending computer that adjusts the flow of emulsion – at a rate of 2 percent – to the pugmill mixer located in front of the machine. After a full mixing cycle, the rejuvenated RAP is discharged onto the roadway in a windrow. Roadtec says the belt scale system provides accuracy to within plus or minus 1 percent.

The construction team used Central Utah Testing and Inspection for mix design. The solventless emulsion used came from Ergon Asphalt and Emulsions.

With a windrow pickup machine, Frehner picked up the recycled asphalt and paved it back down with a Blaw Knox paver working 18 feet wide. Compaction followed, with two double-drum rollers and a pneumatic tired machine. "It turned out to be a really great project," says Coughlin.

Once Coughlin finished the in-place recycling, the company adapted the Roadtec RT 500 mixing trailer for central plant operations. "Basically we added a mini-hopper and a couple of more belts so we could feed it with our wheel loader," says Coughlin. The cold recycling plant added lime slurry and solventless emulsion to the RAP – in the same amounts as for the in-place recycling. Belly-dump trucks hauled the material back to the road, and Frehner paved and compacted it. Following compaction, Frehner applied a fog seal to the recycled mat. Construction started in early April and was complete by early May.



Block cracking on this section of US 191 in Utah was severe.

It's a low-volume road, Thornock says. "We should see a 20-year design life," he notes. "The only caution is that we still don't have a great base under the road. So the cracks can reappear, and the key for us is to treat those cracks faster than we did in the past. That was the main culprit before; the cracks were not treated quickly enough." ❖

Photo courtesy of Bergkamp

The Mobile Stockpile takes up just one lane of space and holds 21.5 cubic yards of aggregate.

Take the Stockpile to the JOBSITE

Traditionally, contractors applying surface treatments on pavements require multiple pavers, which often act as haul trucks for more than 70 percent of the job. The truck-and-paver rigs must make multiple trips between the off-site material stockpile and the jobsite to reload with material.

But now Bergkamp Inc., Salina, KS, has introduced the Mobile Stockpile, a fully-mobile material transfer trailer that increases the time pavers spend on paving instead of hauling. The unit reduces costs, simplifies job management and minimizes overweight truck citation risks. It eliminates the need to find off-site stockpiles – one of the biggest challenges that pavement preservation contractors face.

Standard trucks bring aggregate and emulsion directly from the supplier and load the Mobile Stockpile, which is located on the jobsite. Then, truck-mounted slurry seal or microsurfacing pavers can easily connect to it and be fully replenished with material on-site in less than 10 minutes.

Because this static stockpile is on site, multiple long-distance trips are eliminated. That way, fewer pavers can do more work in less time. The results: better allocation of workers, fewer pavers per job, less paver idle time and reduced fuel costs.

By using standard dump trucks to load the Mobile Stockpile with aggregate, and tankers for emulsion,

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QUESTIONS???

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