



Reap in the heart

Central Texas motorists enjoying smooth SH 130

In late August 2012, the crews working SH 130 were attaining astonishingly smooth placements of hot-mix asphalt (HMA) on segments 5 and 6 of the new central Texas toll route south of Austin.

There, two pavers were placing lifts of asphalt on new right-of-way in echelon—that is, side-by-side—to eliminate the longitudinal “cold” joint that forms when lifts cool between placements.

Also, compaction at the screeds was so efficient that the contractor was able to eliminate three rollers from the compaction train, saving time and money.

Texas-size speed limit

In Texas they do things big, and this new toll highway is no exception. Late last year SH 130 received national attention when a top speed limit of 85 mph was permitted on these southern sections, the highest speed limit in the U.S.

Since the repeal of the 55-mph national speed limit for U.S. highways in 1995, 34 states have individually raised their speed limits to 70 mph or higher on portions of their

roads, according to the Governors Highway Safety Association.

Other roads in the Lone Star State also have high speed limits, reported NBC News: On some highways in rural west Texas, drivers can legally cruise as fast as 80 mph, while Utah is the only other state in the country with posted speeds at 80 mph, on some portions of I-15, according to the Insurance Institute for Highway Safety.

Construction of SH 130 began in April 2009. Now open after a ribbon-cutting in late October, the toll route runs from I-10 near Seguin, just east of San Antonio, to SH 45 on the south end of the Austin metro area, near the Circuit of the Americas Formula 1 racetrack.

Lockhart, the famed “Barbecue Capital of Texas”—now a bedroom community for Austin commuters—sits midway on the route. With this new road, motorists can travel 90 miles of toll road and bypass I-35 congestion between Seguin and Georgetown for about \$12.

“SH 130 is an outstanding highway and a great example of how transportation solutions can be realized when government and the private sector work together on behalf of all Texans,” said Ted Houghton, chairman of



the Texas Transportation Commission. “Commuters and businesspeople traveling through central Texas no longer have to deal with congestion, and best of all, taxpayers did not get the bill.”

Firm commitment

The public-private partnership (PPP) toll road project was financed, designed and built by the SH 130 Concession Co. LLC, an independent company formed by Cintra US—a subsidiary of the Spanish transportation infrastructure developer Cintras—and Texas-based Zachry American Infrastructure. SH 130 Concession Co. also will operate and maintain the roadway for 50 years at no cost to the state.

“Together with our partners, Zachry and the SH 130 Concession Co. are committed to central Texas,” said David Zachry, Zachry Corp. president and CEO. “We’ve been a part of this community for a long time, and we look

forward to helping this region grow in the future.”

“Transportation is essential for states to stay economically vital,” said former federal highway administrator Mary Peters, who also serves on the concession company board of directors. “SH 130 demonstrates Texas leaders’ commitment to economic development.”

Per the agreement, the SH 130 Concession Co. provided the funds necessary to complete segments 5 and 6 of SH 130 from Austin to Seguin. Under the contract, the concession company invested a total of \$1.4 billion in the project to build that 41 miles of SH 130, including \$140 million in concession payments to the state for investment in the Texas Department of Transportation’s (TxDOT) Austin and San Antonio districts. It also will pay millions of dollars for right-of-way costs, thus lifting the financial burden from Caldwell, Guadalupe and Travis counties.

Double-wide paving

But America’s highest speed limit required a super-smooth wearing course.

“For the final course we put a Texas Type C aggregate mix with PG 76-22 binder,” said Luke Gries, quality control manager for Industrial Asphalt Inc., Austin, paving subcontractor for the prime contractor, Central Texas Highway Constructors. “Type C top size aggregate is $\frac{3}{8}$ in. in size.”

The 2-in. wearing course mix was being placed by the two pavers in echelon. Bottom-dump trucks were placing two parallel windrows of HMA, which were being picked up by two material-transfer vehicles, which fed the two pavers operating side-by-side.

“We used the pavers in echelon to get a hot joint between the two lanes,” Gries said. “The hot joint was specified by the owner and we were paving 40 ft wide, with a 22-ft pull outside and an 18-ft pull on the inside,



Left: The 2-in. wearing course mix was being placed by the two pavers in echelon. Bottom-dump trucks were placing two parallel windrows of HMA, which were being picked up by two material-transfer vehicles, which fed the two pavers operating side-by-side.

Below: On SH 130, the pavers used were getting extremely smooth placements, which far exceeded the Minnesota IRI measurements. SH 130 specs required an IRI of 60 or below.



including a 6-ft inside shoulder and 10-ft outside shoulder.”

The echelon paving is important in attaining a super-smooth pavement because it all but eliminates the cold longitudinal joint. Differences in the temperature and mat plasticity can form an improper bonding of the fresh HMA with the cooled asphalt lane, reported the North Central Superpave Center at Purdue University, and this subsequently causes the longitudinal joint to possess a significantly lower density than the rest of the pavement. Then, over time, a longitudinal crack usually occurs between the asphalt mats, permitting the intrusion of water, increasing roughness and potentially limiting the life of the pavement.

Below the wearing course on SH 130 is a 7-in.-deep leveling course with $\frac{3}{4}$ -in. top aggregate size and PG 64-22 binder.

“On the upper end of the project, because of sulfates in the soil, that lift

is 8 in. deep," said Jerry Jaeger, field manager for Industrial Asphalt. Below that lift is a lime-treated stabilized subgrade of various depths, depending on the presence of deleterious materials.

Low scores earn praise

The modern measurement of pavement smoothness is the International Road Index, or IRI, which is descended from the inches-per-mile measurement as compiled by the California Profilograph. However, the California Profilograph and profile index do not reflect the "riding comfort" of a roadway; instead, the IRI is tuned into the wavelengths that cause humans to feel discomfort ("body bounce" and "axle hop").

The IRI was first recommended as a standard for roughness measurements at the International Road Roughness Experiment conducted in 1982. FHWA has required states to measure IRI on the National Highway System every year since 1993, and the findings are reported to Congress. According to the presentation "Introduction to the International Roughness Index" at the Minnesota DOT Bituminous Smoothness Training

Workshop, April 2007, the average IRI on Minnesota interstates is 87 in. per mile, while the average IRI on Minnesota noninterstates is 105 in. per mile.

On SH 130, the pavers used were getting extremely smooth placements, Jaeger said, which far exceeded the Minnesota IRI measurements. SH 130 specs required an IRI of 60 or below, but the Vögele Super 2100-2-placed pavements were well below that threshold.

"We were getting 20s and 30s IRI readings," Jaeger said. "I've seen that before with quarter-mile stretches, but we're at 41 miles of continuous overlay. It's exceptional."

"The IRIs that we got are unbelievable," said Brian Swift, superintendent for Industrial Asphalt. "We were getting anywhere from 26 to a 37, and the requirement is 60." Smoothness was being augmented by the Vögele Niveltronic system utilizing 50-ft skis. Two skis were used on the 18-ft paver, and one on the 22-ft paver.

"We could not have gotten this level of smoothness without these pavers," said Gary Doty, vice president, Central Texas Constructors LLC. "I have never

seen anything like it. Just before we opened to traffic, a driver from Hennessy Performance attained 220 mph attempting to set a new land-speed record for street-legal cars. He did not set the record as the car he wanted was not available, but said it was the smoothest pavement he'd ever driven."

Seeing the density

The compaction elements in the screeds were attaining such density that the contractor was able to eliminate three rollers from the compaction train. At the screed, on the coarse Type C wearing course, Industrial Asphalt was obtaining 88 to 90% density, with the breakdown roller taking it to 93, with a target of 91 to 95.

"You could see the density when you walked on it," Jaeger said. "After a while we were able to eliminate two breakdown rollers and a finish roller. Any time you are able to drop equipment you save on diesel fuel, labor and wear-and-tear." When visited, for the two pavers, Industrial Asphalt was using two breakdown rollers and three pneumatic rollers. **AT**



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