



By Dan Brown
Contributing Author

Smoothing it out

Regular, even roads benefit commuters and DOTs

Research studies have shown that smooth asphalt pavements are a “win-win.” Not only does the public want smooth pavements to drive on, they last longer.

That’s why state transportation departments commonly measure pavement smoothness, apply a specification to it and award bonuses or charge penalties based upon it. Although the National Asphalt Pavement Association (NAPA) does not use smoothness as a specific criterion for judging its Quality in Construction Awards, the projects presented here all won just such an award—presented last January at NAPA’s annual meeting.

Plus, the asphalt contractors who built these projects all used an electronic grade-control system to control the screeds on their pavers.

The bottom line is that they achieved excellent smoothness ratings in the process.

A big one

When the L.L. Pelling Co. paved a 30-mile stretch of I-380 in Johnson County, Iowa, the two-year project was one of the largest asphalt contracts ever let by the Iowa Department of Transportation. In fact, the \$15.5 million project required 183,655 tons of hot-mix asphalt.

The existing pavement was a continuously reinforced concrete pavement with a 4-in. asphalt overlay. The longitudinal joints were raveled badly and required repair. So Pelling bought a 1-ft-wide Wirtgen milling machine, milled out the centerline joints and the right edge joints and filled them back in with hot mix.

Working at night under traffic, Pelling used two milling machines working in echelon to remove 2 in. of asphalt from the four-lane divided highway. Paving followed, with a

Cedarapids CR561 paver fed by a Cedarapids MS3 transfer vehicle.

"The transfer vehicle assured us of continuous movement by the paver," said Brett Finnegan, vice president at L.L. Pelling. "That way the transfer vehicle helps with smoothness and eliminates segregation."

The paver worked up to 18 ft wide, with its screed controlled by a Topcon System 5 controller and noncontact ski on one side. A cross-slope controller maintained screed control on the other side.

The noncontact ski is suspended from one side of the paver and has four transducer heads that "read" the surface beside the paver. With that surface as a reference, the transducers send messages to the electronic grade-control system controller.

The controller does the math by averaging the readings from the four trackers, that way the length of the ski averages out the highs and the lows in the reference grade or pavement. In turn, the controllers send messages to the hydraulic valve that controls the paver's

tow-point cylinders, which automatically raise or lower the screed. The skis "take out the highs and lows" of the reference grade and produce a more consistent basis for pavement depth.

Working under traffic

Pelling paved the left lane of the interstate first, then backed up and finished with the right lane the next night. "The ski read off the previous night's paving," said Finnegan. "Then we paved another 2-in. lift. We used the ski for both the intermediate lift and the surface course."

Pelling ran two Sakai 850 double-drum rollers in the breakdown role. Following them was a Dynapac pneumatic-tired roller and an Ingersoll-Rand DD 118 finish roller running in static mode.

Working close to traffic presented a challenge. I-380 in that area is a commuter route between Iowa City and Cedar Rapids. "It seemed like we had bumper-to-bumper traffic just about every night, and then it would let up

from about midnight to 3 a.m.," said Finnegan. "We had to be off the road by 7 a.m. The Iowa DOT was happy with our ability to get into the project and get off the road in time."

The Iowa DOT awards smoothness bonuses based on a zero blanking band on the California profilograph. Deviations per mile of 0 to 10 in. will get you an A rating; from 10 to 11.5 in. earns you a B rating, and so forth to the D range of 13.6 to 15.5 in.

"We ran pretty steadily in or near the B range, at about 11.5 in. per mile of deviation from the zero blanking band," said Finnegan. "We earned 38 to 40% of the total maximum incentives available. We're finding that when we pave over full-depth asphalt, we get better smoothness numbers than when we pave over concrete."

Picking up the windrow

Knife River Materials used belly dump trucks and a windrow pickup machine to pave 12 miles of TH 92, a

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Research studies have shown that smooth asphalt pavements are a “win-win.” The asphalt contractors who built the award-winning roads in this story share one thing in common: They all used an electronic grade-control system to control the screeds on their pavers.

two-lane highway in Polk and Clearwater counties, Minn. The paver was a Blaw-Knox 5510 with a Topcon System 5 controller to control the screed.

It was a high-production paving project; Knife River averaged about 5,000 tons of hot mix per day. The paver charged along at 64 ft per minute, said Jeremy Ganske, general manager for the contractor, which is based in Bemidji, Minn.

For the TH 92 project, Knife River ran two 40-ft-long Topcon noncontact skis, one on each side of the paver.

“With the noncontact skis, you’re not dragging a ski, so it’s easy to switch sides when you switch lanes,” said Ganske.

The results were excellent indeed on TH 92. Knife River earned 77% of the available ride bonuses from the Minnesota DOT. How did they achieve smoothness? “We pay attention to

details, we have the right equipment and great operators,” said Ganske.

The schedule for TH 92 was a challenge. The project involved some grading and culvert work as well as concrete curb and gutter. “It was a challenge to get everything done in the 23 days,” said Ganske. “We had a number of different crews working in different places.”

Sister projects

For two mill-and-fill projects in Florida, APAC Southeast-First Coast Division used Topcon controllers on both the milling machine and the paver.

“The projects were like sisters,” said Wayne Sweet, operations manager for the Jacksonville, Fla.-based contractor. “One was on I-10 in Baker County and the other was on I-75 in Suwanee County. I-10 was 9 miles of four-lane

highway, and I-75 was 5 miles of six-lane roadway.”

APAC started milling on I-10 late in 2008 with a Roadtec milling machine. A Topcon noncontact ski on one side controlled the cutting height, and a slope controller maintained control on the other side.

The contractor used a material transfer vehicle and a Roadtec 190 paver on both projects. For the I-10 project, a 2-in. lift of hot mix was laid first, followed by a ¾-in. open-graded friction course. The paver moved along at about 28 to 29 ft per minute, said Sweet.

Smoothness results were excellent. On I-10, APAC averaged 4.2 or 4.3 ratings with 5 as perfect on the laser profiler. “The minimum is 3.9; below that you get penalized,” said Sweet.

For I-10, the jobsite was 55 miles from the asphalt plant, so APAC used 26 triaxle dump trucks to haul asphalt. “To achieve smoothness, we coordinated everything to provide a consistent flow of material,” said Sweet. “The plant, the trucks, the Shuttle Buggy and the paver were all working at the same rate to produce a consistent result.

Smoothness is easy to talk about and not so easy to perform. Sweet put it well when he said everything needs to be coordinated so that the crews work as one team—the plant crew, the truck drivers and the paving crew. **R&B**

Brown is a freelance writer based out of Des Plaines, Ill.



PRODUCT SPOTLIGHT

Mixing station

CS Unitec’s new HIPPO PortaMix PMH70X mixing station is the ideal unit for mixing, transporting and pouring mortar, concrete and patching materials at the jobsite. Air-filled tires navigate over rough, uneven terrain. This unit mixes up to 15.5 gal of material with an 1,800-watt, two-speed motor (140 and 470 rpm). Its balanced, easy-tilt cradle allows accurate placement of material. It also features reverse motor mounting for “alongside” mixing in smaller containers. An optional pneumatic-powered mixer also is available.

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