

When Stringless Paving Carries the Day



GOMACO

Improved accuracy and savings of labor and materials leads this contractor to stringless concrete paving.

“We’re ahead of most contractors, just because we have the guts to try stringless concrete paving and succeed with it,” says Brandon Kendall, general paving superintendent for Ideker Inc., a St. Joseph, MO, paving contractor.

And it does take some guts to lay out \$600,000 for nine robotic total stations and machine-control equipment for a motor grader, trimmer, and paver. “I think that sooner or later, this is what everybody is going to be using,” says Paul Ideker, an owner of the company that bears his name. “Last year we were looking at buying a new paver and new trimmer, so it made sense to go into stringless all in the same deal.” Ideker bought a PaveSmart 3D automated machine-control system from Leica Geosystems, which uses two robotic total stations to control his concrete paver.

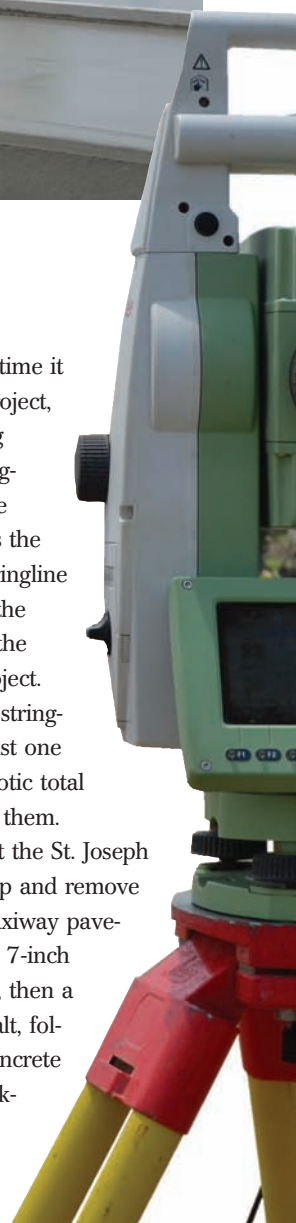
We caught up with Ideker and his paving crew just after they started paving an 8,717-foot-long taxiway at Rosecrans Memorial Airport, which is just outside St. Joseph, MO. Working under a \$6.95 million contract with the city of St. Joseph, Ideker was removing and replacing the entire taxiway.

Stringless concrete paving offers several benefits, say Ideker and Kendall. For one, it’s more accurate than stringline. Based on experience from 180,000 cubic yards of concrete last year—on two Missouri highways and an airport project in Kansas City—Ideker says he has turned in some excellent profilograph numbers. With the Leica system, a crew can trim base stone to accuracies of five- to eight-thousandths of a foot—and get the same accuracy on a concrete slab, says Kendall.

Plus, the stringless system saves labor. Ideker estimates that it shaves at least

10% from the overall time it takes to complete a project, compared with driving stringline and placing stringline. And naturally, the stringless system saves the labor of a two-man stringline crew, which must set the line multiple times in the course of a paving project. By contrast, the Leica stringless system requires just one worker to run the robotic total stations and backsight them.

Ideker’s first task at the St. Joseph airport was to break up and remove the existing 22-inch taxiway pavement. It consisted of a 7-inch base layer of concrete, then a 1-inch course of asphalt, followed by a 14-inch concrete overlay on top. A truck-



mounted guillotine breaker broke down the pavement and a Caterpillar 330 excavator picked up the spoils.

Next Ideker brought the subgrade up to its proper elevation using two Caterpillar 613 paddlewheel scrapers. A Wirtgen stabilizer worked in a 10-inch-deep application of fly ash to stabilize the subgrade. Ideker used a Caterpillar 140 grader to shape the subgrade, and compacted it with a Bomag sheepsfoot roller. “We checked the grade with our Leica rover and robotic total station,” says Danny Holyfield, project superintendent. Phase 1 of the project—for 3,450 feet plus 400 feet on another taxiway—required fly ash over 20,787 square yards.

A 6-inch layer of permeable cement-treated base (CTB) came next. The contractor used a Cat D7 dozer with a Jersey spreader box mounted on the front to distribute the base material across the grade. “After we spread the CTB, we had two hours to have it trimmed and cured,” says Kendall. “It had to reach 650 psi in seven days.”

The contractor trimmed the CTB with a GOMACO 9500 trimmer equipped with a Leica machine-control system. A robotic total station, positioned within 500 feet of the trimmer, could “read” the trimmer’s position. Then the total station communicated the actual position of the trimmer back to a computer onboard the machine. The onboard computer contained a digital terrain model of the proper base grade for the project, and the computer could compare the trimmer’s actual position to the design model. Based on the differences between the actual

One of two robotic total stations from Leica Geosystems helps guide the paver.

position and the design grade, the Leica system adjusted the steering and cutter elevation of the trimmer. “We could trim the subgrade to accuracy of less than one-hundredth of a foot,” says Kendall.

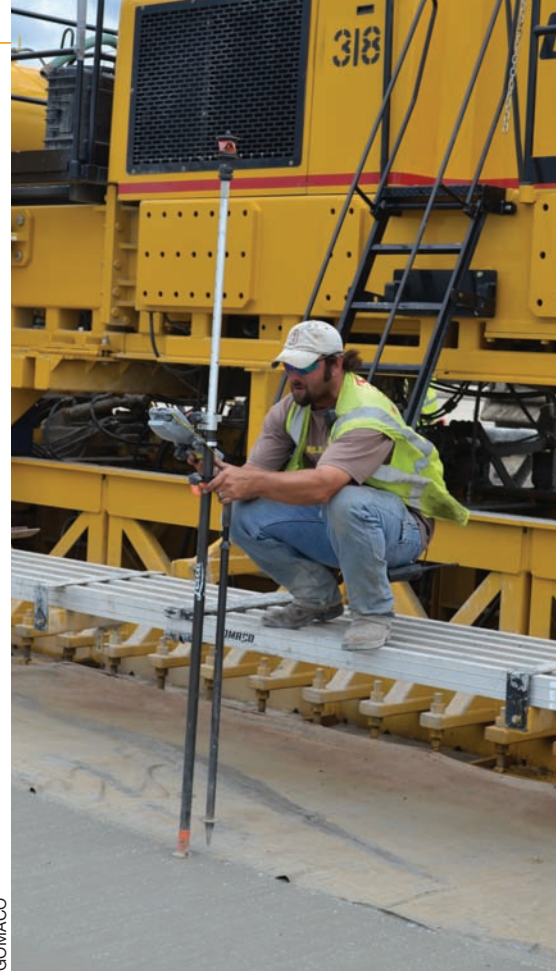
Stringless paving works much like the trimmer, except it takes two robotic total stations to work with the GOMACO GHP 2800 paver. The paver has two prisms that have a precise relation to its pan. For paving, Ideker actually uses three robotic total stations, two in front and one in back to check the as-built elevation of the concrete slab. The three total stations are lined up alongside the grade, and when the paver approaches the middle station, the contractor takes the rear total station and leapfrogs it to a point about 500 feet in front of the paver. That total station then takes over controlling the paver.

Just as with trimming, a computer onboard the paver compares the actual position of the paver with design position in the digital terrain model. On the St. Joseph airport project, the big four-track paver paved a 14-inch-thick slab 25-feet wide. So it took two passes with the paver to cover the 50-foot width of the taxiway. “With the robotic total stations we get accuracies to within five-thousandths of a foot,” says Kendall.

At the airport, the contractor hauled 1.5-inch slump concrete to the project with eight tandem-axle dump trucks, each hauling approximately 10 cubic yards. Concrete was provided by a Rex Model S batch plant set up on site. The plant had a 12-cubic-yard mixing drum. “Yesterday we ran in excess of 200 cubic yards per hour,” says Kendall.

The three projects Ideker performed last year with the Leica stringless system were:

- An 8-inch concrete overlay on 16 lane-miles of Interstate 35 near Holt, MO. On that project the contractor equipped a Wirtgen milling machine with a Leica machine control system and milled out 10 inches of asphalt in one pass.
- A 12,000-cubic yard project at the Charles B. Wheeler Airport in downtown Kansas City.
- On Route 13 in Johnson County, MO, the contractor placed 9.5 inches of concrete on 8 miles of two-lane pave-



A technician for Ideker checks slab elevation.

ment using the GOMACO GHP 2800. Ideker and his crew are completely convinced of the value of the stringless Leica system. “The accuracy helps you with all your material overruns,” says Holyfield. “It saves a significant amount of material. We don’t use extra cement-treated base or extra concrete or extra anything. Our owners are on the cutting edge of technology.

“The Leica system is very user friendly,” Holyfield adds. “We have a paving foreman out here who has been building roads for more than 40 years, and he learned the system quickly. It’s a system for all ages.”

Adds Ideker: “I think that’s a credit to the Leica system that our foreman Roger picked it up so quickly. When we got the system, I figured we would have to have more of a survey crew to operate it, but our guys have picked it up quickly. It makes us realize how antiquated stringline is.”

Author Daniel C. Brown writes on topics related to construction and safety.