Vol. 39, No. 2

GOMACO WORLD®

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ASR American Systems Registrar

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Photos courtesy of Wayss & Freytag Ingenieurbau AG unless otherwise noted CG-071125 D16

A *GOMACO Commander III slipforms inside one of two seven kilometer (4.3 mi) long tunnels that are part of the Finne Tunnel project between Leipzig and Erfurt, Germany.*

GOMACO Engineering and the Commander III's Expertise on a German Tunnel Project

A massive construction project has been underway deep in the heart of the Schnecktal valley area in Germany. From the surface, though, you would never be able to tell. The majority of the work is underground as a joint-venture team led by German contractor Wayss and Freytag Ingenieurbau AG builds the nearly seven kilometer (4.3 mi) long Finne Tunnel. After a few years of tunnel boring operations, the contractor is at work finishing the interior of the tunnel, slipforming first the tunnel's floor and then a walkway with their GOMACO Commander III.

Finne Tunnel is just one section of a new 123 km (76 mi) high-speed rail link between the cities of Leipzig and Erfurt, Germany. Initial construction on the twin-bore tunnel began in April 2008. Two tunnel boring machines (TBMs) worked at the same time boring the 10.8 meter (35.4 ft) diameter shafts. Peak TBM production rates reached up to 24.5 meters (80 ft) per day.

The high-speed trains traveling along the new route will reach speeds up to 300 kilometers per hour (186 mi / hr), capable of exerting huge pressure waves within the tunnel walls. Such high speeds and resulting pressure waves dictated the large external diameter of the tunnels. The internal, lined diameter is 9.6 meters (31.5 ft) and was formed using precast concrete lining segments or rings. They were cast on-site and each ring was two meters (6.6 ft) long, 450 millimeters (17.7 in) thick and weighed 12 tons. A total of 6822 rings were needed to line the new tunnels.

In September 2009, the first TBM "holed through." The second one followed it a few months later when it broke through in February 2010, six months ahead of schedule. Work was far from being completed, though.

"Because of the sequence, we were left with two circular pipes nearly seven kilometers (4.3 mi) long rather than tunnels," Gerhard Baumgartner, Segment Engineer for the Joint Venture, said.

It was time to start the slipforming phase within the tunnels.

Representatives from Wayss and Freytag worked with GOMACO International Ltd. to determine which paver would suit their tunnel applications. They chose the GOMACO Commander III. The versatile Commander III would first pave the tunnel floor in four-track mode. Then, it would be converted on-site to a three-track paver to slipform the tunnel's walkway.

The decision was also made early in the design phase to use the Leica Geosystems 3D control system. Setting and maintaining stringline within the tight confines of the tunnel would be nearly impossible, and the stringless system would alleviate those concerns.

"Stringline stakes would have had to be drilled inside the tunnel and would have considerably restricted machine and truck freedom of movement," Baumgartner said. "By using the 3D control system and the Leica total stations for machine positioning, it was possible to completely dispense with the commonly used stringlines in the tunnel."

The concrete for the various tunnel applications was provided by an on-site mobile batch plant with an eighty cubic meters per hour (105 yd^3) capacity and is located just outside of the tunnel entrances. They produced a dry, low slump concrete with a low percentage of cement.

"We had concrete with less cement because of the size and depth of the applications," Christian Korndörfer, Project Manager for Wayss & Freytag, explained. "The floor is over one meter (3.3 ft) thick. We didn't want the concrete curing process to generate too much heat inside the tunnel or result in any cracking within the concrete."

Delivering concrete to the Commander III within the circular

CG-071125 D15

The inside of the tunnel before the installation of the concrete floor...

CG-071125 D17

The Commander III's tracks were turned at 35 degree angles to pave inside the circular tunnel. The floor's profile was slipformed with a 720 millimeter (28.3 in) wide drainage channel.

Two Leica Geosystems' total stations, one to the left and one to the right, track the Commander III as it completes slipforming the concrete floor in the first of two tunnels on the project.

Photo by John Bowden CG-111016 D14

tunnel was also a concern that needed to be addressed before paving could begin. Wayss & Freytag wanted to use standard concrete trucks, but having them drive in reverse through the length of the tunnel to reach the paver would be too time consuming. There was also no room inside the tunnel for trucks to turn around.

They developed a two-part solution. The floor of the tunnel was paved in a special sequence. A weekly paving production goal of 1000 meters (3281 ft) was established, with an average paving goal of 250 meters (820 ft) per day. At the beginning of each week, the four-track Commander III was set up to pave 1000 meters (3281 ft) beyond the section of floor completed the week before. The concrete trucks drove in forward gear on the completed tunnel floor to a turntable at the end of the section. The turntable then rotated the three-axle trucks 180 degrees so they could drive in reverse to the paver, dump their load of concrete in front of the Commander III, and then drive out of the tunnel in forward gear. Between six to eight trucks carrying eight cubic meter (10.5 yd^3) loads of concrete transported the material to the Commander III.

"The tunnel floor is six meters (19.7 ft) wide," Korndörfer said. "In the circular tunnel, at its deepest point in the center, the floor was 1050 millimeters (41.3 in). We turned all four tracks on the Commander III to 35 degree angles so the paver could drive on the round walls."

The slipform mold was designed for a drainage channel in the tunnel floor. The channel measured 180 millimeters (7.1 in) deep and 720 millimeters (28.3 in) wide at the top tapering down to 540 millimeters (21.3 in) wide at the bottom.

An aeriel view of the tunnel entrances, before the second tunnel boring machine (TBM) "holed through." Peak TBM production reached up to 24.5 meters (80 ft) per day.

Photo courtesy of Leica Geosystems

CG-111006 D12

An excavator worked in front of the Commander III, spreading the concrete across the width of the tunnel.

A height tolerance of plus or minus 10 millimeters (0.4 in) had to be met on the new tunnel floor to ensure the accurate installation of the future track rail. Control measurements confirmed the new concrete tunnel floor was always within the specified height tolerances.

"The achieved vertical accuracy of plus or minus three millimeters (0.1 in) by far outperformed the required accuracy of a maximum plus or minus 10 millimeters (0.4 in)," said Baumgartner.

In total, 28,000 cubic meters (36,623 yd^3) of concrete was slipformed in each seven kilometer (4.3 mi) long tunnel to build the floor of the tunnels. Both production and quality of the finished product exceeded expectations.

The second phase of slipforming within the Finne Tunnel project involved Wayss and Freytag converting their Commander III to a three-track paver to slipform a walkway against one wall of each tunnel. GOMACO built a variable height, variable width walkway mold and hopper to accommodate the varying line of the tunnel.

"The line of the train track must be 100 percent accurate and its placement is considered sacred," Korndörfer said. "The walkway mold had to be able to accommodate the changing alignment of the tunnel, tunnel superelevations and other variations created when working inside a tube."

GOMACO engineers designed the mold and hopper with telescoping abilities. As the face of the tunnel wall changed, the mold compensated by telescoping in and out or up and down to change the size of the walkway and keep the profile in correct alignment to the train tracks. The telescoping feature also ensured the mold was always kept against the tunnel wall and the accuracy of the walkway placement maintained.

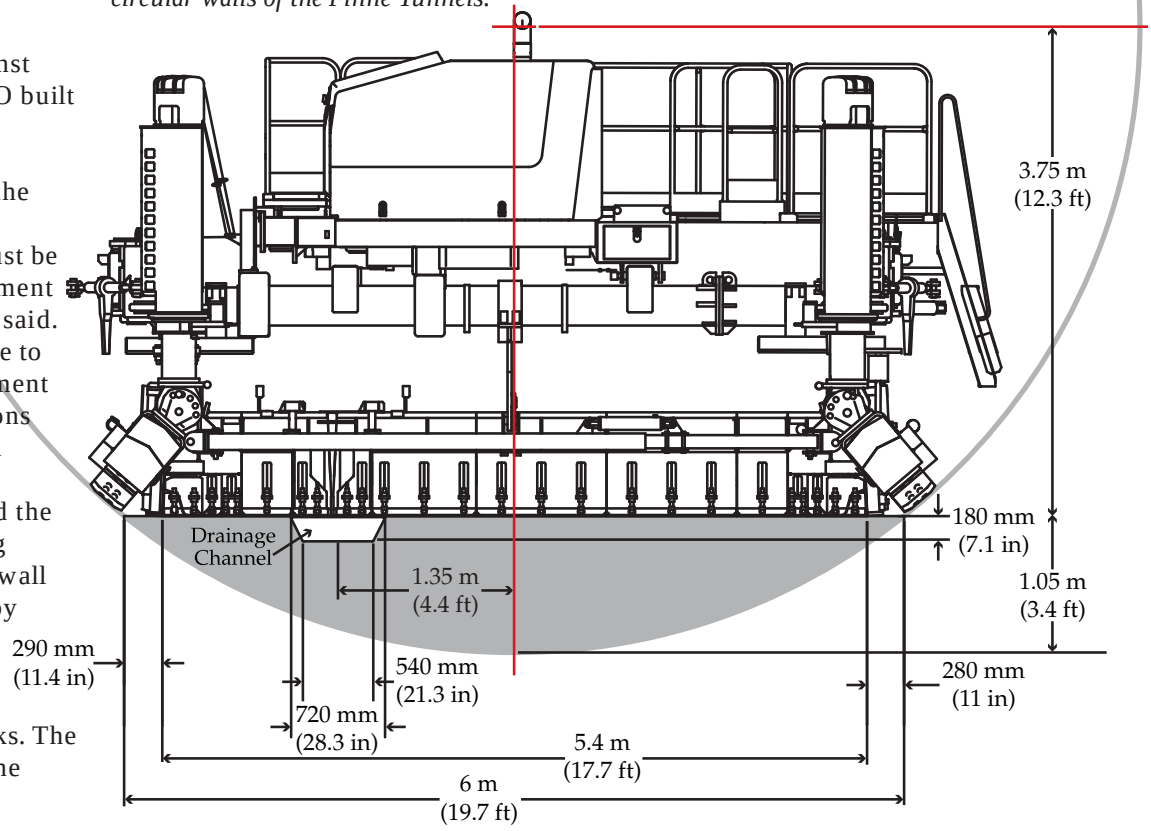
The top width of the walkway varied between 1.05 meters (3.4 ft) up to 1.75 meters (5.7 ft). Height of the walkway was variable also, from 600 millimeters (23.6 in) up to 950 millimeters (37.4 in). Hydraulic pressure-compensated cylinders controlled the changes.

A finishing roller, mounted to the back of the mold, helped provide the finish to the walkway's surface and eliminate the need for handfinishing.

A service channel in the surface of the walkway profile was slipformed 85 millimeters (3.3 in) wide by 70 millimeters (2.8 in) tall. Lighting conductor strips will eventually be placed in the keyway, tested to make sure they are operational, and then covered and sealed. The keyway allows the strips to be removed and replaced as needed without damaging the profile of the walkway. A two percent cross slope across the top surface ensures proper water drainage off the walkway.

"The walkway was a much more challenging profile to slipform than the tunnel floor," Korndörfer explained. "It had to be placed with 100 percent accuracy and the Commander III slipformed the walkway very well. We had no problems and were able to

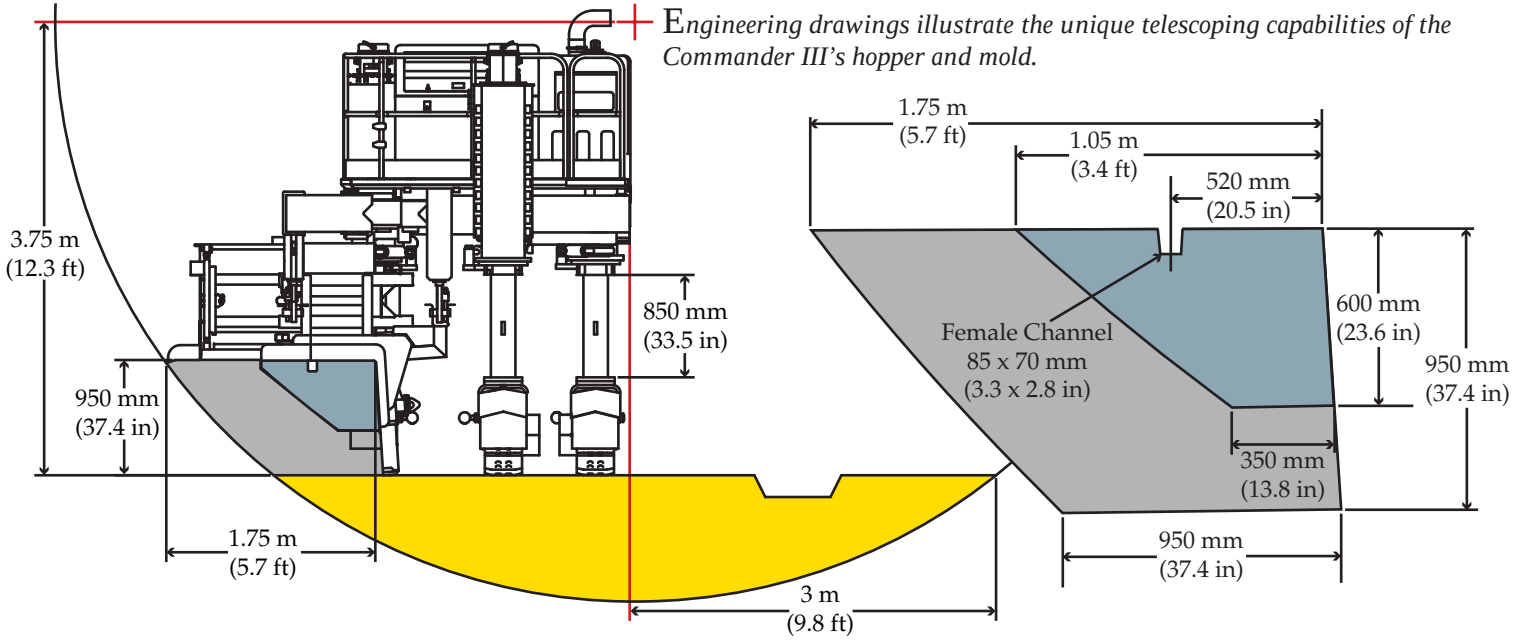
A drawing from the GOMACO Engineering Department illustrates the unique setup of the Commander III, with its four tracks turned at 35 degree angles to accommodate the circular walls of the Finne Tunnels.



achieve production rates from 170 to 200 meters (558 to 656 ft) per day.

"The problem with the tolerances in the walkway and the need for the walkway mold to change size was one of the biggest challenges we faced on the project. Our other challenge was the logistics of getting concrete into the tunnel. We were able to devise solutions for both problems and achieve a quality product. Our GOMACO with the Leica system has done a good job and worked well."

Wayss and Freytag is on schedule to complete their portion of the Finne Tunnel by the end of this year. Other contractors will then start work placing the track and installing the electrical and other systems. The entire Erfurt to Leipzig line will be operational in 2015 and will be part of a high-speed connection from Munich to Berlin, Germany. Ultimately, the line will run all the way from the countries of Scandinavia to Italy.



Engineering drawings illustrate the unique telescoping capabilities of the Commander III's hopper and mold.

The Commander III was converted from a four-track to a three-track machine to slipform the tunnel's walkway profile.

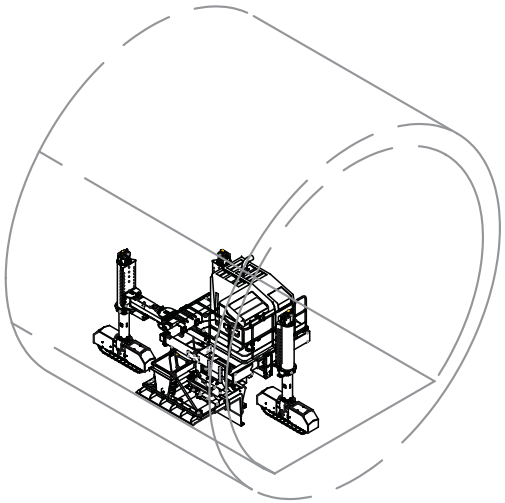


Photo by Rory Keogh CG-091011 D7

The walkway mold's telescoping ability allowed it to compensate for changes in the tunnel's alignment. The walkway mold could telescope up to 700 millimeters (27.6 in) in width and up to 350 millimeters (13.8 in) in height.

A *view from above shows the 4400's unique design with a u-shaped operator's platform for easy visibility and an unobstructed view of the entire paving operation.*

Photo by Rod Schneider CG-011124 D12

“Left” and “Right” Isn’t About Politics with the New GOMACO 4400 Working in Washington, D.C.

Photos by Kelly Krueger CG-011111 D11

The new 4400 is slipforming barrier wall flawlessly on Tavares Concrete’s projects around the Washington, D.C., area.

CG-011114 D17

The 4400 features the GOMACO exclusive G+ control system, which slides for either right-side or left-side paving.

CG-011118 D3

The right-side pour barrier wall is slipformed on top of a footer, right next to a new sound wall along the Capital Beltway.

Tavares Concrete Company has been a Virginia barrier wall specialist since the early 1990s. Their work keeps them on the roadways close to Washington, D.C., slipforming various profiles of bridge parapet and safety barrier in the heavily-traveled areas surrounding the nation’s capital. The large volume of traffic makes slipforming barrier wall challenging, from getting ready-mix concrete trucks on site, to worker safety, to tight clearance conditions created by working behind safety walls.

The introduction of the new GOMACO 4400 barrier machine earlier this year intrigued the owners of Tavares Concrete and they quickly decided they wanted one. They put the new 4400, serial number 913300-001, to work on I-495, the Capital Beltway, which is the 64 mile (103 km) long interstate highway surrounding Washington, D.C. They slipformed a single-faced barrier against an existing sound wall from the right side of the 4400.

“It was great, but that’s what I expected from GOMACO,” Eloi Lourenco, Vice President of Tavares Concrete, said. “The 4400 is very handy when you are working in close quarters in traffic. It’s a compact machine and doesn’t take a lot of room. And pouring from the right side makes things easier, especially with our ready-mix trucks, because we don’t need as much room to get them positioned and turned around.”

The barrier was 32 inches (813 mm) tall, nine inches (229 mm) wide at the top, with a 16 inch (406 mm) bottom width. It’s just one of several different profiles Tavares has slipformed with the 4400, from both the right and the left side of the machine.

“The process to switch sides is pretty simple,” Lourenco explained. “You just change the sensor cords to the side you’re going to slip on, tell the G+ controller you’re pouring on that side, change the slope and then the controller pretty much does the rest. We just have to sideshift the auger, slide it into place and it easily reaches either side.”

The 4400 is equipped with the exclusive GOMACO G+ control system. The design of the G+ system incorporates everything learned and perfected in the GOMACO G21 and G22 controllers and offers even more... more versatility, more user-friendly, more diagnostics and more languages. G+ has been designed for the world marketplace and has the ability to operate in multiple languages. The controller features a display with deviation meters on the run screen. Design simplicity includes multi-colored bar graph meters to indicate machine deviation, and assist the operator in fine tuning both grade and steer performance. Troubleshooting is fast and efficient with advanced system diagnostics showing a full, detailed explanation of the fault and its location, along with emergency stop location identification when one is triggered at any location on the machine.

The control console’s unique side-to-side sliding action allows it to be easily placed on the side of paving, or locked away in center position for storage or transport. The u-shaped operator’s platform and sliding console provide a 360 degree view of the entire paving operation at all times during the slipforming process.

“The GOMACO 4400 is a good machine for barrier and has been designed well for balance, stability, and sturdiness,” Lourenco said. “I am very happy with it and I would recommend it to other barrier contractors.”

CG-011110 D15

The 4400's auger was designed with the pitch and speed needed for transporting low-slump concrete. It also features four-way hydraulic positioning so it can be placed perfectly for optimal concrete receiving and delivery to the mold on either side of the paver.

"It's a pretty simple machine to operate," Lourenco said. "The G+ is very comparable to the G21 system we're running on one of our Commander IIIs, so we were pretty comfortable with this new control system from the start."

Tavares has transported the 4400 around to several different projects within their work radius. They've slipformed different profiles of wall from both the right side and left side.

"We use a concrete mix design with low permeability and low slump, usually around one inch (25 mm)," Lourenco said. "Less water creates a stronger wall, but can also be more difficult to slip. The 4400 hasn't had any problems with it at all and we're getting a beautiful finish. We're ruining our finishers because they're just taking it easy back there behind the machine.

"Production is pretty good, too. Our ready-mix trucks carry 10 cubic yard (7.6 m^3) loads and we can empty that truck out in 20 to 30 minutes."

Tavares Concrete is currently at work on Interstate 66 with their 4400, slipforming over and resurfacing existing barrier wall.

"We're getting compliments from all over the place on the quality of our work on this job," Lourenco said. "It's all done at night because it's a very high traffic road. Everything has to be off the road by 5 a.m., so every day we disconnect our barrier mold from the machine and hook it back up again to slipform the wall. The Hook-and-Go barrier mounting system makes that easy for us. We can hook the mold up and go again in about five minutes.

"The GOMACO 4400 is a good machine for barrier and has been designed well for balance, stability, and sturdiness. I am very happy with it and I would recommend it to other barrier contractors."

CG-011109 D20

The new 4400 is a four-track barrier paver built for stability and symmetry to slipform right-side and left-side pour barrier and parapet walls.

CG-011106 D14

Tavares Concrete used one of their existing barrier molds on their first pour with the new 4400.

Concrete Pavement Returns to the State of Alabama

Interstate 59 through the state of Alabama was originally paved with concrete in the mid 1960s. Nearly 50 years later, the original concrete has far surpassed its life expectancy and is in need of replacement. The Alabama Department of Transportation (ALDOT) looked at different alternatives to replace an 11 mile (17.7 km), four-lane section of the interstate through Etowah County. They developed the alternative of an unbonded, 11 inch (279 mm) thick concrete overlay that would be slipformed over the existing roadway.

Concrete contractors from across the United States bid on the project, which would be the first concrete overlay in Alabama. Hinkle Contracting Corporation, based out of Paris, Kentucky, specializes in heavy civil construction and concrete paving projects, won the bid and began work in the summer of 2010. It's the first concrete project to be let in Alabama since the early 1980s and Hinkle Contracting had officials from across the state and the country watching the success of the project. Smoothness, edge and thickness specifications with large disincentive penalties added to the project's challenge.

"This job has the most stringent ride specifications we've found anywhere in the country," Jim Peace, Operation's Manager for Hinkle's Concrete Paving Division, said. "This project uses the zero-blanking band and anything measuring over a 20 per tenth of a mile segment is penalty. To earn bonus, we have to get 10 and below, with about $400,000 worth of bonus to be earned. There are $3.5 million worth of penalties available on the project if we hit between 20 and 50. If grinding is needed, it's only allowed from 25 feet (7.6 m) on either side of the header. If we wouldn't be able to correct the smoothness to under 50 with 25 feet (7.6 m) of grinding, we'd be required to remove the entire 528 foot (161 m) long segment.

"So far we've paved 10.5 miles (16.9 km) of the project's northbound lanes and our overall average is under a 20 on the zero-blanking band."

From the first days of paving on the project, Hinkle Contracting and their paving crew worked and experimented with different elements to create the smoothest ride possible. Different variables they looked at included types of stringline, distance between stringline rods and holders, draft of the paving mold, concrete

"This has been both an interesting and a challenging project for us," Peace said. "We've paved 528 foot (161 m) segments with numbers down in the fours and fives on the zero-blanking band. Everybody is liking the ride we're producing."

Hinkle Contracting is slipforming a concrete overlay on Interstate 59 in Etowah County with their GOMACO paving train. The project features the zero-blanking band for measuring smoothness, and Hinkle's overall average has been under a 20.

Photos by Kelly Krueger HW-051112 D12

Project specifications require a one eighth of an inch (3 mm) edge form tolerance be met.

HW-051111 D8

slump, size of the concrete head in front of the paver, and all processes that can influence pavement smoothness on a concrete paving project. They equipped their two-track GP-2600 paver with two paver-mounted GSI® (GOMACO Smoothness Indicator) units. The GSI units provided on-the-go instant feedback as Hinkle personnel worked to fine-tune their paving operation.

"We spent three days tweaking... tweaking the draft, the feed, the slump and more," Peace explained. "We would make notes as we made changes and just kept tweaking until we reached where we needed to be. The instant feedback from the GSI was a good thing. It gave us the knowledge of what the concrete was doing in regards to the changes we were making. We could see right on the GSI screen mounted on the back of the paver what was happening with our concrete."

The concrete mix design specified for the project is a very porous, very coarse mix that proved challenging to

HW-051103 D19

Two paver-mounted GSI units were instrumental in helping Hinkle Contracting fine tune their paving operation. The GSI provided on-the-go feedback of pavement smoothness as Hinkle tweaked various aspects of their paving operation.

slipform. Slump averages 1.5 inches (38 mm).

"We have to run the concrete at a 1.5 inch (38 mm) slump because of the tolerances on the project," Peace said. "We have a one eighth of an inch (3 mm) edge form tolerance. If we don't comply, we have to do removal."

Concrete is produced on site by a mobile batch plant set up in the center of the project. The farthest haul the trucks have to make is only six miles (9.6 km). Federal highway regulations limit the weight of the loads the tri-axle trucks are allowed to carry. Up to 18 trucks haul 6.75 cubic yard (5.2 m^3) loads of concrete to the paving site.

The existing roadway underwent some full-depth patch repairs in areas where the concrete was in poor condition. Then, an overlay bond breaker was applied to correct cross slopes so the new concrete overlay could be applied.

The project allows no room for haul roads, so the trucks have to back up to the GOMACO PS-2600 placer / spreader and dump their load directly on the road. The PS-2600, working without the conveyor belt, spreads the concrete in front of the GP-2600 slipform paver. Baskets are placed on grade by hand every 15 feet (4.6 m).

The GP-2600 is paving 26 feet (7.9 m) wide and 11 inches (279 mm) thick. Hand-finishing work behind the paver is kept to a minimum.

"We're running straight edges across it, but we're not rubbing on it," Peace said. "If you have to rub on it, you've got problems that a finisher can't fix in the slab. My philosophy is if things aren't going right in front of the paver, there won't be anything right behind it. You have to do your work up front correctly to guarantee a good end product."

Concrete paving production

The project has no room for haul roads so concrete is dumped directly on grade in front of the GOMACO PS-2600 placer/spreader.

HW-051104 D20

Federal highway regulations limit concrete loads to 6.75 cubic yards (5.2 m^3). Up to 18 trucks haul concrete to help keep the paving train moving at a slow, steady paving speed.

HW-051111 D17

averages 2000 feet (610 m) per paving shift. Production is limited because of the small loads the trucks are allowed to haul and the Hinkle crew always strives to keep their paver moving at a slow, steady crawl. Also, hand setting both the longitudinal and transverse baskets on grade while paving takes additional time and labor for the paving crew.

Quality of the concrete is constantly being tested and measured, both with the ride requirement and with core testing. Each 528 foot (161 m) segment is cored in six different places, with six inch (152 mm) diameter cores. Cores are used to test the concrete strength and depth of the concrete, with anything over a 0.25 inch (6 mm) deviation in depth requiring removal and replacement.

A GOMACO T/C-600 texture/cure machine follows the paver. The new roadway is transverse tined and sprayed with a white curing compound.

"This has been both an interesting and a challenging project for us," Peace said. "We've paved 528 foot (161 m) segments with numbers down in the fours and fives on the zero-blanking band. Everybody is liking the ride we're producing."

A Commander III is slipforming the new concrete shoulders on I-59. One will be eight feet (2.4 m) wide and eight inches (203 mm) thick. A second shoulder will be four feet (1.2 m) wide and six inches (152 mm) thick. Once shoulders are completed, the new 11 mile (17.7 km) northbound stretch of interstate will be opened up to traffic. Then, the southbound lanes of the interstate will be closed so reconstruction can be completed.

HW-051113 D5

Hinkle Contracting is achieving excellent rideability numbers on Alabama's zero-blanking band smoothness specification.

Rideability from a Mechanic's Point of View–

David Ford has been a mechanic working with GOMACO equipment for Hinkle Contracting for the past six years. All total, he has over 40 years of experience in the construction industry and with concrete paving equipment. He offers the following insights, from a mechanic's point of view, for achieving excellent ride on a zero-blanking band project.

Stringline–

The equipment is designed for pins every 25 feet (7.6 m) and will take care of any little swag between those pins. We tried moving the pins closer and it didn't work. We also switched to a different cable, one that doesn't stretch so badly and isn't affected by daytime to nighttime temperatures. We keep a person out in front of the machine and it's his job to constantly check the string.

Keeping guys out of the stringline was a problem, too. We had training for our finishers and laborers and stressed the importance of staying away from the stringline.

Machine Setup–

It takes a lot of work, a lot of planning, and a lot of good people, because setup is the most important thing to get the quality of concrete that we're getting.

Vibration–

We use a vibrator monitoring system on our paver and it helps us. Over vibration hurts you just as bad as not enough consolidation. Usually, we try to run our vibrators around 8500 VPMs, and that gets a good ride and good consolidation.

Incorporating the GSI into the Paving Process–

The GSI units mounted to the back of the paver helped us 100 percent, as far as the setup and the ability to get the rides we need. It helps you to get the fine points out of the machine and takes all of the guesswork out of it. I would recommend it for anyone who's in the business.

Before, we'd take our level and a ruler and square the paver up. The GSI takes that out. It will show you when you start how you'll want to run the front of the pan and where to run to get the best ride. It just takes all of the guesswork out. We knew what we needed to get for ride on this project and the GSI helped us get it.

Concrete Slump–

When we'd see a deviation on the GSI screen, 90 percent of the time there wouldn't be any adjustment to the equipment. Once we got the equipment set to what the GSI wanted and got the profile in the pan that we wanted, it was usually the slump of the concrete that created deviations. You have to keep a good, consistent slump, because we could see plain as day when the slump started changing in the concrete and it most definitely changed behind the machine.

Clean Equipment–

It is my job to see that the equipment is in good shape and kept in good shape. Tom and Henry Hinkle want their equipment to look good and not see it dirty and covered in concrete. They'll spend the extra time and labor to keep it clean. I am a firm believer in a clean machine. If it's not clean, you're not going to get a good job.

Beating the IRI with Smooth Paving on an Ohio Highway

U.S. Route 24 was a two-lane highway through northwest Ohio. It's a major shipping route, with trucks representing one third of the total volume of traffic. Safety of residential travelers was becoming a concern with such high truck volumes, so the Ohio Department of Transportation (ODOT) developed a plan to expand U.S. 24 into a four-lane divided highway. Work is currently underway on a 16 mile (25.7 km) stretch between Napoleon and Toledo, Ohio. Shelly & Sands Inc., based out of Zanesville, Ohio, is the contractor responsible for the concrete paving on the project.

Photos by Kelly Krueger CG-071112 D18

HW-071104 D15

Shelly & Sands Inc. is paving Ohio's U.S. Route 24 with their GOMACO paving train, which includes a GHP-2800 with IDBI. The project uses the IRI to measure smoothness and Shelly & Sands has achieved some outstanding results and earning incentive.

A total of 245,000 cubic yards (187,317 m^3) of concrete will be slipformed on the highway expansion project. Shelly & Sands is using a variety of GOMACO equipment, including a PS-30 placer / spreader, four-track GHP-2800 paver with IDBI, and a T / C-600 texture / cure machine for the mainline paving. A four-track Commander III with an IDBI attachment is slipforming the project's eight entrance / exit ramps.

"Basically, we have 16 miles (25.7 km) of new four-lane divided highway," said Paul Singleton, Project Superintendent for Shelly & Sands. "We're slipping the roadway 24 feet (7.3 m) wide with the GOMACO GHP-2800 with IDBI and we're placing a 12 foot (3.7 m) and a four foot (1.2 m) shoulder with our other GOMACOs. We started the project last September and should be finished by the first of next year."

Shelly & Sands' contract doesn't require completion until the end of 2012. Mainline paving will be finished this season, one entire year early while quality has been maintained throughout the entire project. ODOT has rigid specifications for both bar placement accuracy with the IDBIs and also project smoothness. They use the International Roughness Index (IRI) to measure pavement smoothness, requiring numbers between 60 to 70 for 100 percent pay. Anything under a 60 earns incentive.

"This has been our first major project utilizing the IRI and it's created some challenges and also had us reevaluate some of our methods," explained Brian Little, Concrete Superintendent for Shelly & Sands. "Two of the changes that we implemented was the use of a placer / spreader in front of the paver and we also modified our Auto-Float® on the back of the paver. We used to dump two trucks at a time in front of the paver, and we'd go from a big head of concrete to sometimes hardly any at all. We also don't start and stop the paver as much with the placer / spreader out front. It all helps achieve smoothness when you're paving under the IRI specification.

"We're doing pretty well with it. We've been averaging numbers in the upper 50s and low 60s. We've even had numbers in some good-sized sections in the high 40s and mid-50s. We're pretty happy with that."

The concrete for the project is produced on-site by Shelly & Sands' mobile batch plant. It produces two different mixes, depending on the

An orange paint dot marks the insertion spot of the independent IDBI attachment's dowel bar for the transverse joint.

CG-071117 D15

temperature. Normal temperatures require an ODOT Class C mix with 550 pounds (249 kg) of cement with a water reducer. When temperatures warm up, the mix is changed to 385 pounds (174.6 kg) of cement with 165 pounds (74.8 kg) of slag. Concrete slump averages one to 1.5 inches (25 to 38 mm).

The plant's production averages 350 cubic yards (267.6 m^3) per hour with 25 trucks carrying 11 cubic yard (8.4 m^3) loads of concrete to the paving train.

Shelly & Sands' 2002 four-track GHP-2800 with IDBI is paving 24 feet (7.3 m) wide and 11.5 inches (292 mm) thick. The IDBI is inserting 24 bars, on-the-go, every 15 feet (4.6 m) to form the new highway's transverse joints. The 1.5 inch (38 mm) diameter bars are 18 inches (457 mm) long and placed on 12 inch (305 mm) centers across the width of the slab.

"ODOT is on site every day checking and verifying the placement and accuracy of our bars," Little said. "Everything has been right where it should be, and we haven't had any problems at all with the placement of the dowel bars."

Shelly & Sands' new GOMACO T/C-600 texture/cure machine follows the paver applying a longitudinal tine and white spray cure to the new concrete. Paving production on the project averages 2800 cubic yards (2141 m^3) during a 12 hour shift.

The eight entrance/exit ramps on the project are being slipformed 16 feet (4.9 m) wide, 11.5 inches (292 mm) thick with Shelly & Sands' 2010 four-track Commander III with an independent IDBI attachment.

Before the new IDBI attachment, dowel baskets had to be placed on grade by hand during paving. The process required more laborers, materials, and time to finish a single ramp.

"We do a lot of ramp work," Little explained. "Very rarely is there any room for a haul road, so we were always putting baskets down by hand as we paved. This IDBI attachment just makes everything better.

"You don't have to worry about getting your baskets placed right and the IDBI attachment is a lot quicker... it takes less people, material costs go way down with a straight dowel bar versus a basket, and we achieve higher production."

The IDBI attachment is placing 16 bars on 12 inch (305 mm) centers across the width of the ramp. Transverse joints are placed at 15 foot (4.6 m) intervals.

"It's working great, both the


HW-071103 D1

The four-track GHP-2800 with IDBI is paving 24 feet (7.3 m) wide, 11.5 inches (292 mm) thick. The IDBI is inserting 24 bars every 15 feet (4.6 m) on-the-go for the transverse joints.


HW-071102 D14

Shelly & Sands uses a placer/spreader to keep a consistent amount of concrete in front of the GHP-2800 paver, which helps them achieve smooth rideability numbers.

HW-071103 D18

A new GOMACO T/C-600 texture/cure machine applies a longitudinal tine finish and white spray cure to the surface of new U.S. Route 24.

Commander III and the IDBI attachment," Johnny VanDyne, Paving Crew Foreman for Shelly & Sands, said. "The switch to the IDBI's new G+ controls has been pretty much flawless and the operator did great with it. Production has been fantastic, too. On a typical 700 cubic yard (535 m^3) ramp, it would have taken us 12 to 14 hours for setting dowel baskets, tie bars and paving. With this new machine, we have about five hours in total slipping it.

"Accuracy of the bar placement has been wonderful, too. We show the inspectors right off the bat how we string it and get our depth and then we'll dig up some of the placed bars here and there for them to visually check them. All of the testing has been great."

The Commander III is also equipped with a front-mounted bar inserter and two hydraulic, sidemounted bar inserters. A number five bar, 18 inches (457 m) long, is inserted every 26 inches (660 mm) by the front-mounted bar inserter for the longitudinal joint. Tie bars are inserted into both sides of the new ramp on 18 inch (457 mm) centers with the hydraulic side bar inserters.

"Before the Commander III with IDBI attachment, each one of these ramps would have been an all day project for us. Now, with the new GOMACO machines, we can slip each one in approximately five hours, using two to three less laborers on the crew," Little said. "It works out great and you can use it everywhere."

Shelly & Sands does plan to use it everywhere for their projects. They have 70,000 cubic yards (53,519 m^3) of four-lane divided highway in Athens, Ohio, to finish up. After that, it's on to Columbus, to start a 280,000 cubic yard (214,077 m^3) rehabilitation project on Interstate 270.

A front-mounted bar inserter on the four-track Commander III places a number five bar for the ramp's longitudinal joint every 26 inches (660 mm).

CG-071106 D9

CG-071119 D14

Shelly & Sands can pave ramps in half the time now with their new Commander III with IDBI attachment.

CG-071111 D18

Hydraulic sidemounted bar inserters shoot tie bars into both sides of the new ramp on 18 inch (457 mm) centers.

Stringless Overlays Only Four Inches (102 mm) Thick with the GOMACO GHP-2800

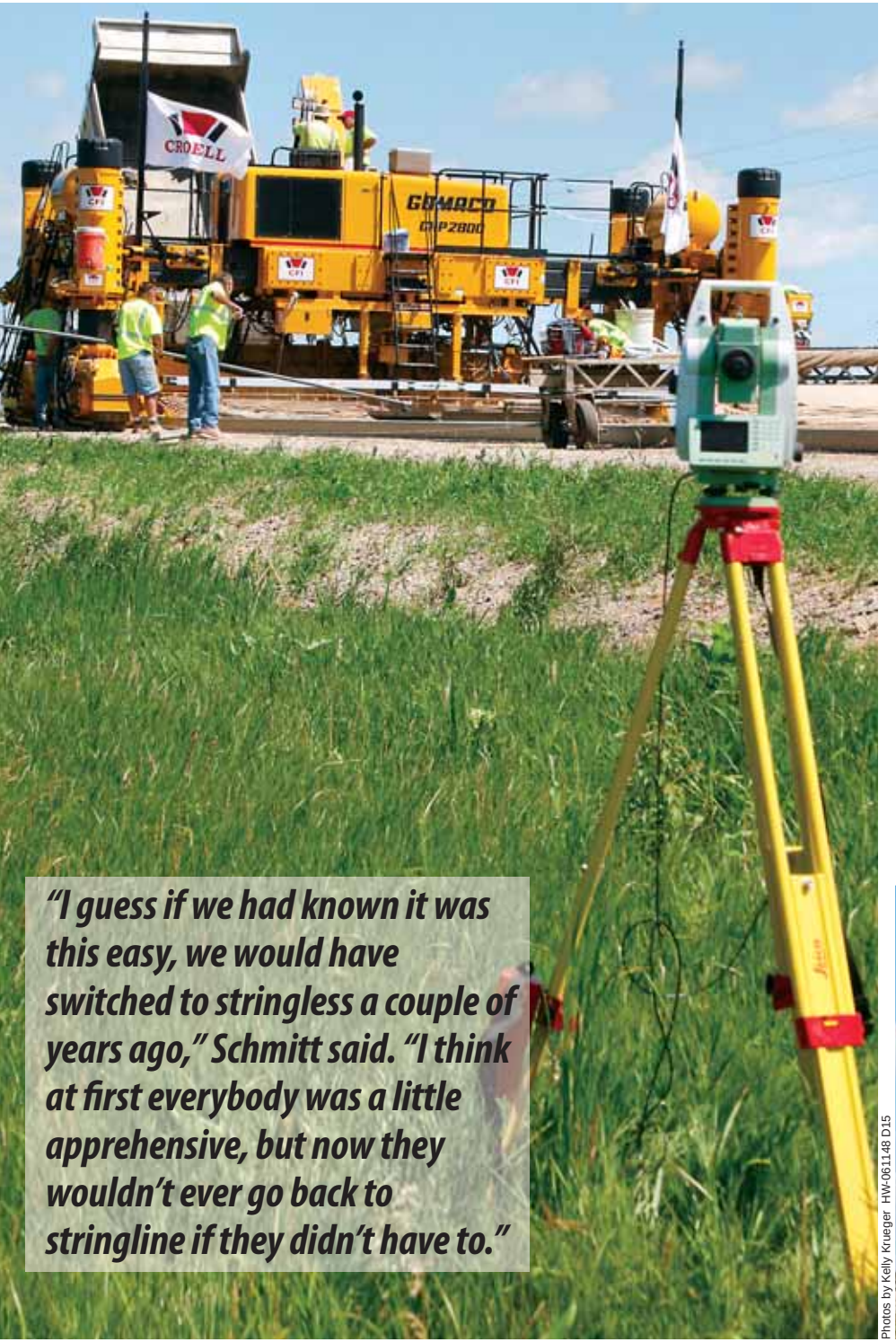
Concrete overlays have a long history and a proven success in the state of Iowa. Mitchell and Worth counties in north central Iowa have led the way. In the past three years, they have put down approximately 150 miles (241 km) of four inch (102 mm) concrete overlay. Concrete Foundations Inc. (CFI), based out of New Hampton, Iowa, has slipformed almost 50 miles (80 km) of the counties' overlays, including 32 miles (51.5 km) this paving season near the town of Osage.

CFI has its roots in the state of Iowa and in concrete. Their parent company, Croell Redi-Mix, was created by Roger Croell in 1965 with one concrete plant in Lawler, Iowa. They now have over 65 plants in six states and in 1999, decided to enter into the concrete paving market by purchasing Concrete Foundations Inc. They started out handforming sidewalks and driveways and grew into mainline paving. Today, the company specializes in concrete work, from driveways to interstate paving.

"The four inch (102 mm) overlay is unique to the state of Iowa," Tom Schmitt, General Manager for CFI, said. "The Iowa Concrete Pavement Association has been really involved with the state and with the counties promoting concrete. We've been experimenting with saw cutting, mix design and different things to create an overlay that will last 25 to 30 years."

CFI has slipformed most of the overlays with their GOMACO two-track GP-2600 paver. This season, the company added the Leica Geosystems stringless system and a new GOMACO four-track GHP-2800 paver to their inventory. Both were put to work on the project near Osage.

"I think you have to spend the money and keep up with the industry otherwise



"I guess if we had known it was this easy, we would have switched to stringless a couple of years ago," Schmitt said. "I think at first everybody was a little apprehensive, but now they wouldn't ever go back to stringline if they didn't have to."

CFI is using four Leica total stations on the overlay project. Production on the project increased by 1000 feet (305 m) of paving per day with the introduction of the stringless system.

Photos by Kelly Krueger HW-061148 D15

HW-061153 D16

you're going to fall behind and you're going to fall behind quick," Schmitt said. "That was part of the reason we wanted the stringless system. The second reason was rideability. This project isn't a smoothness job, but we have ones that are and we wanted something to handle Iowa's zero-blanking band requirement for rideability."

The switch from stringline to stringless and from the two-track GP-2600 to four-track GHP-2800 went flawlessly.

"Our guys were leery of the new stringless system and when I told our mainline paving operator we had purchased it for our pavers, the first thing he said was, 'You know I'm not very good on computers. I don't like them.' I reassured him that I didn't think he would have any problems. Within a day and a half, we were all comfortable with it.

"If you understand paving, profiles and grades, you'll understand stringless paving. It's almost like riding a bike, once you learn it, you don't forget it."

The new unbonded concrete overlay is 22 feet (6.7 m) wide. Concrete is placed directly on the existing asphalt surface of the roadway. The surface only has to be swept clean before the C3WRC20, two aggregate mix is dumped on it. Concrete slump averages 0.5 to 1.5 inch (13 to 38 mm).

"We hire a survey company to build the project profile for our stringless," Schmitt explained. "They give us a good, smooth profile that we load into the computer. After that, we only have to turn the paver on, hit start and run. Stringless has really simplified things. We don't have to worry about stringline anymore and all the things that can happen to it... guys tripping on the line, trucks backing over the line, guys eyeballing the line for accuracy."

CFI has seen increased production with fewer men needed for stringline maintenance and setup. Five laborers who normally worked with the stringline are now used elsewhere during the paving process. The lack of stringline also allows them to focus more on quality and production rather than stringline maintenance.

"We started out with the Leica on our GP-2600 and actually increased our production by 1000 feet (305 m), paving close to 6000 feet (1829 m) per day," Schmitt said. "Then, when we started up with the GHP-2800, production increased to 6600 feet (2012 m) of paving per day, with our best day reaching 8400 feet (2560 m) in an 11 hour shift."

They also noticed areas where the quality of their pavement could be improved, for instance on their shoulders. A subcontractor built the 32 miles (51.5 km) of shoulder on the overlay project. When the shoulder is weak and trackline a little soft, the profilometer is showing minor deviations in the trace.

"Trackline is a huge variable," Schmitt said. "Once we get onto a hard grade where the trackline is good, our readings are virtually flat. Our four-track machine handles the variables in the trackline a lot better, too."

The GOMACO GHP-2800 is pulling burlap for a burlap drag finish behind the paver. Finishers work behind the paver with bull floats before a texture/cure machine applies a longitudinal tine and white spray cure.

The switch to stringless has been a great decision for CFI, and one without regrets.

"I guess if we had known it was this easy, we would have switched to stringless a couple of years ago," Schmitt said. "I think at first everybody was a little apprehensive, but now they wouldn't ever go back to stringline if they didn't have to. The guys are comfortable with the Leica system and the GHP-2800 and GOMACO has done a really good job of providing support for both."

The operator inputs information on the touch-screen interface of the Leica computer.

HW-061151 D3

Transverse joints in the new four inch (102 mm) thick, 22 feet (6.7 m) wide overlay are every six feet (1.8 m), and longitudinal joints are every 5.5 feet (1.7 m).

HW-061147 D20

The new overlay was placed on the existing asphalt roadway, four inches (102 mm) thick. For a visual reference, that's the exact height of this picture below.

HW-061149 D18

A GOMACO Paving Train Overcomes Challenges on the New Doha International Airport

The country of Qatar, located on the Persian Gulf, developed a master plan to build a new replacement airport in their capital city of Doha, the New Doha International Airport, in 2003. Their goal is to have a facility capable of handling 50 million passengers, two million tons of cargo, and 320,000 aircraft landings and take-offs each year by 2015. Phase one of the aggressive project is scheduled for completion early next year.

The Tayseeir Contractors Company Joint Venture, including Consolidated Contractors International Company (CCIC), is one of the many contractors on-site finishing their share of the first phase. CCIC has been at work slipforming approximately 100,000 cubic meters (130,794 yd^3) of new concrete aprons on the airport with their new GOMACO paving train.

Photo courtesy of Kevin Robinson HW-081101 D1

A GOMACO PS-2600 placer/spreader, four-track GP-2600 paver and T/C-400 texture/cure machine at work on the New Doha International Airport in Qatar.

Their paving train includes a PS-2600 placer / spreader, four-track GP-2600 slipform paver with an Auto-Float® attachment, and a T / C-400 texture / cure machine.

Challenges abounded on the project, including an airport design plan which did not consider slipform paving, daytime summer temperatures averaging 40 degrees Celsius (104 degrees F), a crew new to slipforming, and varying paving widths and depths... all while working around hundreds of other contractors trying to complete their portion of the project.

The challenges caused CCIC and their Concrete Paving Manager Kevin Robinson to look at the project differently as they worked to maximize the utilization of their GOMACO paving train.

"The project was just an obstacle course with us having to go over or around lamppost bases, fire hydrants, fuel pits, electrical pits and all the other different types of pits," Robinson said. "We really had to be on top of our game and keep everything carefully coordinated and planned so we could put concrete on the ground every day with the GP-2600. That was our goal, to always get concrete on the ground. We were able to achieve that goal, even if we only paved 200 cubic meters (262 yd^3) that day."

CCIC slipformed the new airport's aprons on a 100 millimeter (4 in) thick asphalt base applied over a rock subbase. The Portland Cement Concrete

Obstacles in the new apron, such as lamp post bases and electrical pits, created logistical challenges for CCIC while working on the airport project.

Photo by Andy Linham HW-101003 D5

Daytime high temperatures would reach up to 54 degree Celsius (129 degrees F), requiring much of the slipform paving to be accomplished at night during cooler temperatures.

Photo by Andy Linham HW-101003 D6

Photo courtesy of Kevin Robinson HW-081101 D7

The GP-2600 with Auto-Float® paved at various widths and thicknesses. Six meters (19.7 ft) wide and 550 millimeters (21.7 in) thick were the maximum paving dimensions.

Photo courtesy of Kevin Robinson HW-101001 D1

CCIC has slipformed approximately 100,000 cubic meters (130,794 yd³) of concrete aprons on the new international airport in Doha, Qatar.

(PCC), without air entrainment, was produced on site by three different mobile batching plants with the capacity to produce 100 to 110 cubic meters (131 to 144 yd³) of concrete per hour. Slump averaged between 25 to 35 millimeters (1 to 1.4 in).

Concrete was delivered to the paving site by dump trucks carrying eight cubic meter (10.5 yd³) loads. The trucks dumped their load onto the belt of the PS-2600 placer/spreader working in front of the GP-2600 paver. Or, when project logistics didn't allow enough room for the PS-2600, concrete was dumped directly on the grade.

The GP-2600 paved a maximum of six meters (19.7 ft) wide on the project and up to 550 millimeters (21.7 in) deep. Baskets were placed on grade every six meters (19.7 ft).

"There was a grated water trench just inside the aprons that varied in size in different areas, so we had to alter the width of the paving equipment nine different times to suit the design," Robinson said. "On any other project we'd be able to pave 2000 cubic meters (2616 yd³) per day, but this one was just so difficult. The most we ever accomplished was 856 cubic meters (1120 yd³). It's all due to the difficult areas of design, which would have up to 20 headers and footers per shift, as we paved around the various obstacles."

A T/C-400 texture/cure machine followed the paver applying a burlap drag finish, transverse tine and white spray cure. Contraction joints were sawed into the new slab every six meters (19.7 ft). Expansion joints were placed every 75 meters (246 ft).

"The paving crew when we first started were very inexperienced, but now I would rate them as good as anyone I know," Robinson said. "The GP-2600 performed very well through all of it and the crew learned quickly how to work on and around the GOMACO equipment. We met all of the tolerances specified by the engineers and the paver laid the concrete as flat as you can get. I'm really proud of the concrete we produced in such challenging conditions."

CCIC is currently finishing up their portion of the concrete pavement at the New Doha International Airport. Some hand pours and a few other details are all that is left to complete. The GOMACO paving train and Robinson have already moved onto another project, Muscat International Airport in Muscat, Oman. The GP-2600 is at work slipforming approximately 140,000 cubic meters (183,112 yd³) of stands and aprons as part of the airport's expansion project.

New Doha International Airport (NDIA) Facts:

- The current airport handles 4.2 million passengers a year, whereas the new airport will be able to handle 12.5 million passengers a year after the first phase is completed.
- NDIA will be approximately two-thirds the size of the city of Doha and 12 times larger than the old airport.
- Over half of the area of the new airport (located on the Persian Gulf) will be built on land reclaimed from the sea, amounting to 28.2 square kilometers (10.9 mi²).
- Land reclamation required more than 62 million cubic meters (81,092,938 yd³) of "fill" to complete.
- Thirteen kilometers (8.1 mi) of new armored seawall protect NDIA.
- Contractor congestion was created as everyone worked at the same time to complete an 85 meter (279 ft) high control tower, a 510,000 square meter (609,955 yd²) passenger terminal with 40 gates, one cargo terminal, a 150,000 square meter (179,399 yd²) aircraft maintenance center, a separate terminal for the Emir of Qatar, and other facilities.
- When fully completed, NDIA will be able to service six A380-800 super jumbos simultaneously. The airport will be the first in the world purposely built to accommodate these aircraft.

(Information courtesy of airport-technology.com)

RCC Success on an Ohio Industrial Loop Road

GOMACO's RTP-500 with RCC (roller-compacted concrete) screed recently completed a successful test project in New Albany, Ohio. Complete General Construction Company used the GOMACO RTP-500 with RCC screed to finish a two mile (3.2 km) long industrial loop road. The new road was finished in paving passes 15 feet (4.6 m) wide and eight inches (203 mm) thick.

"We've seen an increase in our RCC paving in the last few years," said Jeff Thompson, Vice President of Paving Operations at Complete General. "Private, city and county organizations are using it for their industrial roads, industrial parking lots, truck docks, and other projects. RCC is very cost competitive with asphalt and it lasts longer."

The strictest requirement on any RCC project is density and the ability to achieve the proper density with the paver. The project required a minimum density of 85 percent behind the paver. Anything under an 85 would cause the paver to be removed from the project site. GOMACO's RCC screed achieved densities between 85 and 89 percent. Then, after the RCC was roller compacted, it achieved densities between 99 and 102 percent.

"It's a nice machine," Thompson said. "Mostly, what we're looking for is the paver's ability to achieve density behind the screed, because that's the most important thing with these pavers."

GOMACO's RCC screed is also equipped with telescoping capabilities to slipform variable widths, from 10 to 19.3 feet (3.1 to 5.9 m).

"That's an important key to competing with asphalt... to be able to adjust that screed like an asphalt paver," Thompson said. "It gives you the ability to pave multiple widths, without any time consuming changes."

The RCC screed features independent 14 inch (356 mm) dual augers to spread the material. A high-compaction, dual tamper bar system with variable speed control provides the necessary initial compaction for uniform density and strength across the pavement. The variable control of vibration to the screed ensures proper compaction and finish to the surface. The screed is capable of paving variable slab depths with a hydraulic crown adjustment to meet the project's design specifications. Grade or elevation for the GOMACO RCC screed can be controlled through the tow point cylinder in several ways, including 3D stringless, laser, sonic, stringline or manual. The screed was also designed for serviceability. All of the RCC screed's wearable items were designed for fast replacement. For more information, please visit www.gomaco.com / rtp500.

Photos by Tom Bell CS-071102 D2

GOMACO's RCC screed produces a sharp edge on the new roadway.

CS-071101 D17

The GOMACO RTP-500 with RCC screed achieves density on a roller-compacted concrete project in New Albany, Ohio.

A worker makes adjustments on-the-go from the RCC screed's work bridge.

CS-071102 D1

A 3D Quiz: *You're Familiar with GOMACO 3D. True or False?*

HW-051123 D2

A *GOMACO paving train with 3D controls on both the PS-2600 placer/spreader and GHP-2800 at work near Cary, North Carolina.*

HW-061146 D7

Total stations set up on a 3D project.

3D paving is growing more popular on job sites around the world. How familiar are you with the stringless system? Please take our quiz and see how knowledgeable you are and also learn more information about GOMACO 3D.

GOMACO is still in the testing phase with 3D on our paving equipment.
FALSE Twelve years ago GOMACO first recognized the potential of 3D and began testing 3D on our equipment. Today, GOMACO equipment with 3D is being successfully used on projects all around the world and in a variety of applications, including grade trimming, curb and gutter tight radii, tunnel floors and walkways, airport runways and aprons, highways, interstates, concrete overlays, municipal projects, safety barriers, golf cart paths, and more.

GOMACO has been involved with 3D since it's inception, working closely with the major system developers, including Leica Geosystems, TOPCON Positioning Systems, Inc., and Trimble. Our Research and Development team is not adapting our controls to work with 3D like other paving manufacturers. We have developed our controllers along with 3D technology to offer the seamless 3D paving package that we have available for sale today.

3D may improve rideability on paving projects.
TRUE 3D eliminates the human error that can be involved with setting a physical stringline. 3D works from a digital model with a virtual stringline, which is a constant that cannot be physically changed.

"During paving, trucks or workers can accidentally hit the line causing stringline movement and errors in paving," Kevin Klein, Vice President of Research & Development/Engineering, said. "Conventional stringline is prone to displacement. Relying on a physical string measured and 'eye-balled' by workers for set up and accuracy can build error into the paving."

Potential error is also eliminated from other sources. For example, any potential error from the surveyor's grade control stakeouts is now gone.

3D is more difficult to set up than conventional stringline.
FALSE 3D technology is not more difficult to set up. Contractors no longer have to deal with the hardware of traditional stringline... the clamps, stakes, string, and the manpower necessary to set the stringline on both sides of the slab for the entire distance of the project. When working with stringline, workers are needed to monitor and maintain the line during the paving operation. Then, at the end of the day, a crew has to go out and gather and store all of the hardware.

Total stations should not exceed 250 feet (76 m) in distance apart when paving for rideability.
TRUE "For rideability, we'll set our total stations every 250 feet (76 m)," Kevin Ackley, GOMACO's 3D Support Specialist, said. "And for high production paving, we recommend four total stations on site. "

Two total stations are always working with the paver, shooting at the two prisms mounted on the paver. This is the paver's elevation and alignment control. A third total station can be used to verify grade behind the paver. The fourth one is for leap-frogging, the process of switching from one total station to the next as the paver works forward and out of range.

Line of sight is very important for the total stations to the paver.
TRUE Obstacles, such as trucks or workers, between the line of sight of the total station and the prism on the paver will cause signal loss.

It's not just physical objects that can affect that line of sight. Caution must also be taken when paving in fog or areas with poor air quality. Care must also be taken in regards to the sun. Total stations cannot be aimed directly into the sun. The resulting glare can cause signal loss. Strategically placing the total stations can lessen or eliminate the effects of fog or sun glare.

3D paving accuracy can be affected by high winds.
TRUE It's important on windy days to make sure the total stations are not set up so wind hits them broadside, and to anchor the tripods well, possibly add weight to the tripod with sandbags, and position the total stations at closer intervals.

The total stations, Leica's for example, have two subsystems that work to guarantee the accuracy of a measurement. One is the AutoTargetRecognition (ATR) lock threshold that monitors the quality of the ATR's prism following. It makes sure the prism is reliably locked onto and tracked. It helps prevent inaccuracy potentially caused by high winds pushing or vibrating the total stations, fog, dust or heavy rain.

A second feature, the dual-axis compensator, acts as a level and ensures the total stations haven't been shaken out of level or knocked over by wind or other things. If a total station is up to 0.1 degrees off vertical, it will compensate automatically in the measurements for that inaccuracy.

Some paving products require a "black box," but GOMACO equipment does not.
TRUE GOMACO has pioneered stringless paving and digital paver control systems. Our controls and programming software seamlessly interact with 3D. With the Leica Geosystems 3D, for example, a Leica computer is mounted to the paver. It is connected to the GOMACO controller by cable and the two work together to control the paver. The Leica computer computes the input from the total stations and prisms, compares that information to the project design model, and then outputs the elevation and steer commands to the GOMACO controller.

3D allows paving flexibility on the job site.
TRUE Not only does it increase flexibility, it also improves job-site logistics, such as not having to work around or be limited by stringline; no restrictions in getting concrete trucks in and out of the site; easier to pave in tight clearance conditions because extra room for stringline is not needed; and the contractor has the ability to pave anywhere on the project at any time.

"Another important advantage is a quicker move-in and move-out on construction projects," Klein noted. "For instance, if you're constructing a median barrier under traffic, and the contract only allows you to work during the evening from 9 p.m. until 5 a.m. before you are required to open the road for morning rush hour. This system saves time by not having to set stringline before the machine can start producing barrier. And you do not have to tear down stringline before opening up to traffic."

3D technology is still changing and progressing.
TRUE GOMACO is always striving to create a better paving system. And stringless technology is going to continue to change at a fast rate.

"Contractors need to expect that there is going to be continued advances in this technology," Klein explained. "I like to compare it to buying a cell phone. If you wait, you know you're going to get something newer and better six months from now. But you also can't wait forever, because you will get left behind in this competitive market. Despite the changing technology, our contractors tell us they wished they had made the move to stringless paving earlier than they did.

Sonic sensors are being used on GOMACO texture/cure machines to eliminate the need for stringline on slipform paving projects.

HW-061116 D14

FT-041102 D9

A *GOMACO 9500 trims with 3D on a new highway project near Reno, Nevada.*

They understand the industry is changing and they don't want to be left behind. They also understand that stringless is nothing to be afraid of or intimidated by. They just have to understand concrete paving..."

"It's also a matter of getting into the game, so to speak," said Ackley. "A contractor who has purchased a 3D system this year already has a season of 3D paving experience. He's used the system, is comfortable with it and can start next season with this experience. That's a huge advantage over someone who hasn't used 3D yet."

More features continue to be integrated into the system, too. For instance, 3D can now be used to control the firing of an accessory like sidebar inserters and IDBI. Different stringless systems are also available for placer / spreaders and texture / cure machines.

GOMACO has its own in-house 3D controls department.
TRUE GOMACO has been involved with the development of 3D machine controls for concrete paving for over 12 years. Our 3D controls department provides sales, service, and support of Leica Geosystems' concrete paving products on our equipment. GOMACO is committed to providing the leadership in 3D technology for the paving industry.

Do you have questions about 3D? Or would just like to talk to a 3D paving expert? GOMACO's stringless professionals will be in the GOMACO booth at World of Concrete 2012 in Las Vegas, Nevada. GOMACO will be in booth #C5054 in the Central Hall of the Las Vegas Convention Center in Las Vegas, Nevada, from January 24-27.

District Manager Kendall Kelly Announces his Retirement for the End of 2011

K*endall Kelly will retire the end of this year.*

B*ryan Beck will join the GOMACO sales team in 2012.*

Kendall Kelly, a GOMACO employee for more than 38 years and our Southwest United States District Manager for the last 35 years, has announced he will retire at the end of the year. Bryan Beck, GOMACO's Production Manager, will be joining the sales team and will be responsible for most of Kelly's territory. The territory will include: eastern Wyoming, Colorado, New Mexico, Nebraska, Kansas, Oklahoma, Texas and the western majority of Arkansas. Jim Hayward, GOMACO's Western District Manager, will now be responsible for the state of Arizona. Vinnie Miller, GOMACO's Southeast District Manager, will take over responsibilities for the state of Louisiana.

"Ken has been a pillar in our industry for over 38 years and is highly respected for his concrete paving knowledge, and has a professional reputation across the United States with our customers, dealers, and trade associations," said Kent Godbersen, GOMACO's Vice President of Worldwide Sales and Marketing. "We will definitely miss his talents and expertise, but look forward to continued years of friendship and wish Ken the best in his retirement."

Kelly started at GOMACO on September 17, 1973, in the Hydraulics Department. He transferred to the Service Department two months later, and worked there until becoming the Southwest District Manager in 1976.

J*im Hayward will be District Manager for the state of Arizona.*

V*innie Miller will become District Manager for Louisiana.*

Beck joined GOMACO in 1999, and has been involved in the Cylinder, Manufacturing Engineering, and Purchasing Departments. He was named GOMACO Production Manager in 2007.

GOMACO will continue to offer our extensive knowledge in concrete paving and experience in working with the needs of paving contractors. Our entire sales, engineering, and service management team, along with our distributor network, are prepared to support the customers and relationships that have been established through the years.

2012 GOMACO University Class Schedule

GT-3600: January 16-20, January 30-February 3, March 12-16 at the University. A four-day course covering the controls, setup and operation, maintenance and advanced diagnostics.

Three-Track GT-6300: March 5-9 at the University. A four-day course covering the controls, setup and operation, maintenance and advanced diagnostics.

Three-Track Commander III: February 13-17, February 20-24 at the University. A four-day course covering the controls, setup and operation, maintenance and advanced diagnostics of the three-track machine.

Four-Track Commander III & GT-6300: February 6-10 at the University. A four-day course covering the controls, setup and operation, maintenance and advanced diagnostics of the four-track machine.

Trimmers: January 24-27, March 6-9 at the Paving Center. (Class begins on Tuesday.) Three-day course covering the controls, setup and operation, maintenance and advanced diagnostics.

Two-Track and Four-Track Pavers: January 30-February 3, February 6-10, February 13-17, March 19-23, March 26-30 at the Paving Center. A four-day course covering the controls, setup and operation, paving to profilograph specifications, maintenance and advanced diagnostics.

IDBI: February 21-24, February 28-March 2 at the Paving Center. (Class begins on Tuesday.) A three-day course covering the controls, setup and operation, maintenance and diagnostics.

3D Stringless Paving: February 27-March 2. A four-day course covering the setup, operation, machine calibration, and troubleshooting on 3D stringless controls. Our 3D specialists will cover Leica Geosystems software, total stations, data collection, and essentials for stringless paving with GOMACO pavers.

Note: Additional classes will be scheduled as required.

Although classes are designed for machines equipped with the G21 and G22 control systems, issues and questions concerning the Network, Micro and Analog control systems will be addressed as required.

For further information, please contact: GOMACO Training Department, GOMACO Corporation, PO Box 151, Ida Grove, IA, 51445-0151, Phone: 800-831-2320 or 712-364-3347, or by e-mail: gomacou@gomaco.com.

Students can register online or print out forms at
www.gomaco.com / university

OF-1011153 D3

GOMACO University combines classroom learning with hands-on shop time for a complete educational experience during the training course.

GOMACO's 2012 Show Season Begins the End of January

CV-011110 D9

GOMACO's booth was full of equipment and customers during World of Concrete 2011.

WORLD OF CONCRETE® January 24-27, 2012 in Las Vegas, NV

We understand you're looking for opportunities in today's construction market. GOMACO wants you to know we are here to help! Come to World of Concrete and visit with us about your special equipment needs for large, small or unique projects in 2012. We'll have our paving experts in the booth, ready to talk with you. Our equipment display will include the new two-track GP-2400 paver and 4400 barrier paver, both featuring the G+ multi-language control system. GOMACO will be in our same location in the Central Hall of the Las Vegas Convention Center.

Visit our home page, www.gomaco.com, for a link to the World of Concrete Free Registration site.

INTERMAT April 16-21, 2012 Paris, France

The new 4400, with right-side and left-side pour capabilities, will be in the GOMACO stand and ready to be showcased to the international market at Intermat 2012. GOMACO will be in the American Pavillion at the Paris-Nord Villepinte Exhibition Center in Paris, France, from April 16-21, 2012.

The 4400 barrier paver was built for the international market and features GOMACO's exclusive G+ control system, with the ability to operate in multiple languages.

GOMACO around the world

CG-081105 D9

Tarcutta Hume Alliance reversed the tracks on their four-track Commander III so the machine could travel backwards while keeping the controls in forward. The side-mounted shoulder is paved two meters (6.6 ft) wide and 240 millimeters (9.4 in) thick in Tarcutta, New South Wales, Australia.

CL-071101 D7

A C-450 finishes a residential road 7.6 meters (24.9 ft) wide by 250 millimeters (9.8 in) thick for contractor Bao Quan in Vihn Yen City, Vietnam.

CG-061101 D5

EPC Paving Brasília slipforms a new bus route with their four-track Commander III in Brasília, Brazil.

SL-061101 D1

Camter finishes a portion of the São Francisco Canal with their SL-450 cylinder finisher in Floresta, Brazil.

CG-051113 D20

A Curb Cadet extrudes curb around a radii for Asfalt og Maskin A/S in Bergen, Norway.

HW-051119 D3

A test pour with the GP-4000 paver and Leica Geosystems stringless controls went well for Baulderstone Hornibrook Pty Ltd in Bulahdelah, New South Wales, Australia. They are now slipforming on the Pacific Highway upgrade project by Bulahdelah.

CG-071102 D17

Brycon Construction Ltd. slipforms curb and gutter with their GT-3600 on a rehab project in Halifax, Nova Scotia, Canada.

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The First International 4400's Slipforming Versatility on the Tropical Island of Mauritius

The small tropical island of Mauritius, located just east of Madagascar and the African continent, is working to improve its infrastructure and roadways as tourism rates continue to rise. Colas Maurice, an island-based contractor, introduced slipform concrete paving to Mauritius last year with a GOMACO Commander III. This year, as the company's workload continues to increase, they've added another slipform paver to their inventory, the new GOMACO 4400 barrier machine.

The left-side and right-side pour capable 4400 was immediately put to work on several different projects, including right-side pour barrier wall, right-side pour 500 millimeter (19.7 in) tall slotted drain, and left-side pour U-channel. They will slipform approximately 8800 meters (28,871 ft) of 500 millimeter (19.7 in) tall U-channel. The 4400's Hook-and-Go mold mounting system with U-channel mold is sideshifted out and vertically lowered to slipform the profile below the existing grade of the roadway.

CG-041116 D7

The 4400 slipforms left-side pour U-channel, 500 millimeters (19.7 in) tall, below grade next to an existing roadway.

CG-051101 D4

Colas Maurice introduced slipform paving to the island of Mauritius last year with a GOMACO Commander III. This year they purchased a new 4400 to slipform various applications from the right-side and left-side of the paver.

Christian Plasse with Colas Maurice notes that some of the things they liked most about the machine included the ease and speed you can switch from the right-side to the left-side pour configuration, the telescopic positioning and quick attachment of the mold, the stability of the machine, and the smooth and accurate functioning of the automatic grade and steer systems using the G+ controller.

"They are extremely happy," Bryan Schwartzkopf, GOMACO's Director of International Sales, said. "They also liked the production of the auger, the absence of machine vibration for the operator, how quietly it runs, the great visibility from the operator's platform, and the side-to-side movement of the control panel, as well as the ability to lock the control panel away and out of sight."

Colas Maurice's 4400 is the first to work internationally. To read about the first domestic 4400, please turn to page eight in this issue of *GOMACO World*.