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GOMACO WORLD

Stringless!

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GOMACO WORLD

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Stringless Curb and Gutter is Here!

Imagine... a GOMACO GT-3600 slipforming curb and gutter on a parking lot project. The parking lot has several islands built into its design with radii from 4.5 foot (1.4 m) down to 18 inches (457 mm). All of the radii on the islands are being slipformed with the GT-3600 and all of it is being done without setting any stringline.

The possibility is not left to the imagination anymore. Stringless curb and gutter is here!

The project is a parking lot for a new casino in the city of St. Louis, Missouri. Fred Weber, Inc., is slipforming approximately 14,000 feet (4267 m) of curb and gutter on the 50 acre (20.2 ha) lot. The curb and gutter's profile is 30 inches wide (762 mm), seven inches (178 mm) thick, with a six inch (152 mm) curb.

The GT-3600 is equipped with the Leica PaveSmart 3D for curb and gutter slipform pavers, an optional plug and play software program available on GOMACO equipment. For this project, the GT-3600 is equipped with a prism on the rear mast, which a Total Station uses for height control, and also a GPS receiver on the front mast, which is used for machine orientation. The GPS unit can be switched over for a second Total Station if the area doesn't allow GPS reception.

"We would figure on finishing only two islands a day with handforming," Billy Graves, Project Foreman for Fred Weber, said. "With GOMACO and Leica, we're doing eight a day. It's a big advantage for us and giving us some excellent production..."

Here's how stringless curb and gutter works: Data provided by the project engineer is converted into a surface model. The surface model is then uploaded into the Leica computer. The data can be imported from almost any CAD system. The Leica computer is then interfaced with the GOMACO G21 or optional G22 controller on the GT-3600. When it's time to start slipforming, the operator simply opens up a map of the project on the Leica computer and chooses where he wants to go. The computer has a toggle switch or touch-screen interface, so it's just a matter of pressing a button to chose where to pave. The GT-3600 is then moved into position.

The Total Station takes measurements off predetermined reference points to orientate its position. Then, it's aimed at the prism on the machine and along with the GPS, begins the tracking process. The operator only has to look at the Leica computer to know that the GT-3600 is positioned correctly to begin the curb and gutter pour.

When it comes to slipforming the tight radii on the project, the Leica system and the GT-3600 work together.

"The Leica system is connected to the GT-3600's G21 or G22 control system via the CAN (Controlled Access Network) cables, which are an integral part of each machine that

Photos by Tom Grell CG-070913 D6

Fred Weber slipforms parking lot radii with a stringless system on their GOMACO GT-3600 on a project in St. Louis, Missouri.

GOMACO produces," Kevin Klein, GOMACO's Vice President of Engineering/Research and Development, said. "The Leica system contains the design file for the project which the contractor is building. As the Leica instruments track the machine, the exact position of the machine is sent to the Leica computer and that exact position is then compared to the project design file. From there, the Leica system places any relevant steering and grade control information onto the CAN line for the G21/G22 control system to capture and use in steering the machine, as well as maintaining the proper elevation.

"The operator can focus on control of the travel speed of the machine, controlling the vibration, and concrete delivery. The machine controller will take care of steering and grade, by monitoring the inputs from the 3D control system."

Once an island is finished, the operator simply goes back to the map in the Leica computer, and chooses where he wants to go next. Or, for example, if an area isn't ready for paving yet, because the grade isn't prepared or some other factor, they can go anywhere else on the job site.

They are no longer dependent on stringline to dictate when and where they work. Workers on the project don't have to worry about the stringline... setting it correctly, bumping into it and creating errors, or the time and expense of placing and removing it.

Fred Weber's island production has drastically increased as well. Before, due to the expense of setting all of the pins required for tight island radii, they would have just handformed all of the islands.

"We would figure on finishing only two islands a day with handforming," Billy Graves, Project Foreman for Fred Weber, said. "With GOMACO and Leica, we're doing eight a day. It's a big advantage for us and giving us some excellent production. We're slipping the radii and the straight-aways and the Leica is doing a great job. We're averaging around 18 feet (5.5 m) per minute with no string."

CG-070910 D10

The operator chooses the island he wants to slipform next on a map in the stringless computer. Stringline no longer dictates the project phasing.

CG-070916 D7

The G21 controller on the GT-3600 works with the Leica computer and its tracking system to slipform the project's tight radii.

CG-070919 D14

The GT-3600 holds line and level on the curb and gutter in the straight sections of the project.

CG-070909 D18

The operator sideshifts the trimmerhead out of the way so the mold can slipform up to the point where the island's curb and gutter was started.

A BIG Project on a SMALL Island

A new two mile (3.2 km) long, four lane road is being built in the city of Honolulu on Hawaii's Oahu island. New roadway construction of this size for the island state is very uncommon. Most road projects are replacement or widenings, simply because there is no room to build new.

Goodfellow Bros., Inc., based out of Wenatchee, Washington, with an office in Kihei, Hawaii, won the bid to build the project. They had no previous slipform experience and no slipforming equipment. When they started the process of looking for a concrete paver, they knew they wanted a machine that was versatile, large enough to pave roadway, but also small enough to work in Hawaii's confined job-site areas. Ultimately, they chose the GOMACO four-track Commander III.

"We went with the Commander III because it will be more versatile on future projects," Matt Heahlke, Project Manager for Goodfellow, said. "We can use it for highway slipforming, barrier walls, curb and gutter... We won't have a large quantity job like this again. The projects will be smaller, more chopped up, and the Commander III is much more versatile for that."

Their new Commander III is currently slipforming on the new North/South Road, phase 1B, which includes approximately 2300 cubic yards (1758 m^3) of 10 inch (254 mm) thick concrete pavement. Work on the project began in January 2008 and it is scheduled for completion in January 2010.

CG-050904 D2

Goodfellow Bros. chose the Commander III to slipform a new two mile (3.2 km) long, four-lane road in the city of Honolulu on the Oahu island of Hawaii.

When Goodfellow was purchasing equipment for their new concrete paving venture, they also added an RTP-500 rubber-tracked placer and a T/C-600 texture/cure machine. The RTP-500 was purchased as a concrete placer, but the company has also been utilizing its long reaching capabilities to back-fill their Keystone® retaining and structural walls projects. It placed concrete for the first time on the brand

Photos by Jim Hayward CG-050903 D12

An RTP-500 rubber-tracked placer works from the haul road placing concrete on the grade and over preset dowel baskets.

The GOMACO four-track Commander III is the perfect-sized paver for Hawaii's limited project area. It also offers the extra versatility that

"Overall, our rideability is very smooth," Heahlke said. "This is Goodfellow's first concrete slipform paving job and we're very impressed with the GOMACO equipment. We're definitely in the concrete paving business for good. We can't wait to get more projects."

Production averages 120 cubic yards (91.7 m³) per hour during the longer paving runs.

new road.

"This is virgin construction through old sugar cane fields," Heahlke explained. "The road is the new corridor servicing the future University of Hawaii West Campus and also the Department of Hawaiian Homelands Housing Development. It's extremely rare to have brand new road construction, because it's such a limited area to begin with."

Goodfellow is using the RTP-500 to place concrete onto the untreated permeable base. Dowel baskets are placed every 12.5 feet (3.8 m) for the transverse joint. The concrete is a 650 flex mix design and provided by local producer, Island Ready-Mix. Dump trucks carry 10 cubic yard (7.6 m³) loads of concrete and dump into the RTP's hopper. Concrete slump averages two inches (51 mm).

The Commander III is set up to slipform each lane at 12 feet (3.7 m) wide, 10 inches (254 mm) thick. Production on the longer stretches of pavement averages around 120 cubic yards (91.7 m³) per hour during an eight-hour paving shift.

All of their paving is being done at night. It allows Goodfellow complete control of the batch plant to ensure they get the volume of concrete

Goodfellow Bros. was looking for in a slipform paver.

CG-050904 D18

CG-050905 D10

The Commander III paves each of the four lanes of the new roadway 12 feet (3.7 m) wide and 10 inches (254 mm) thick.

necessary to feed the paving operation. It also creates cooler working conditions for the crew, while eliminating the worry of the concrete curing too fast and cracking because of extreme temperatures.

The Commander III is also being used to slipform the 8.5 feet (2.6 m) wide concrete shoulders.

A T/C-600 texture/cure machine, set at 16 feet (4.9 m) wide between its two tracks, follows behind the Commander III. It applies the state of Hawaii required AstroTurf drag, transverse tining, and SINAK® lithium spray cure.

The state also has smoothness requirements. Hawaii utilizes the California profilograph and two-tenths blanking band to measure their project's smoothness. A reading of a 10 or less ensures 100 percent pay on the project. Goodfellow has had no problems achieving good rideability.

"Overall, our rideability is very smooth," Heahlke said. "This is Goodfellow's first concrete slipform paving job and we're very impressed with the GOMACO equipment. We're definitely in the concrete paving business for good. We can't wait to get more projects."

CG-050905 D12

A T/C-600 texture/cure machine, set at 16 feet (4.9 m) wide between the tracks, follows the paver pulling an AstroTurf drag, and applies a spray cure and a transverse tine.

A *Commander III four-track slipforms a new one kilometer (0.6 mi) long runway extension on the international airport in Botswana.*

Runway Work on Botswana's International Airport

The country of Botswana in southern Africa is trying to diversify its economy. They hope to do that by increasing tourism. But to do that, first they need an airport capable of handling the larger passenger jets. Last year, the country began expansion work on their Sir Seretse Khama International Airport in Gaberone.

The project, when finished, will include a new state-of-the-art terminal building, new taxiway, and a one kilometer (0.6 mi) extension to the existing runway to bring it into compliance with international requirements. The new airport expansion will increase the airport's current average of 120 passengers per hour at peak, up to 870 passengers per hour.

Wilson Bayly Holmes-Ovcon Ltd. (WBHO) was awarded the contract that included paving the runway extension. It would be their first concrete slipform paving project, and careful consideration was given to which pieces of equipment they would purchase. Ultimately, they chose the GOMACO brand and worked closely with representatives from GOMACO International Ltd. and Meckow, GOMACO's distributor for South Africa. WBHO's choice for the airport, and future slipform projects, was the GOMACO four-track Commander III and T/C-600 texture/cure machine.

CG-080911 D2

P*aving passes were 4.5 meters (14.8 ft) wide and 320 millimeters (12.6 in) thick.*

"The Commander III was the one universal paver that we saw," Terry Beckermann, Director of Roads and Airport Divisions in Botswana for WBHO, said. "It allows us to pave the various widths of the airport project and do barrier and other applications on future work."

Part of the purchase agreement included on-site training with the paving equipment. Service representatives from GOMACO taught hands-on classes, and test pours were conducted on an auxiliary apron at the airport. When it was time to start paving the actual

runway, WBHO was confident in their slipforming abilities.

"The GOMACO training was very helpful and we learned a lot from them," Beckermann said. "They taught us how to do things right and how to avoid making costly mistakes."

The Commander III paved the runway's passes at 4.5 meters (14.8 ft) wide and 320 millimeters (12.6 in) thick. Concrete was supplied by two on-site batch plants and hauled to the paving site by dump trucks carrying eight cubic meter (10.5 yd^3) loads.

The concrete mix included large aggregate, up to 37 millimeters (1.5 in) in size, and slump averaged 30 millimeters (1.2 in). The trucks dumped the low-slump concrete directly on grade and an excavator was used to spread the concrete in front of the Commander III.

Dowel baskets were placed on grade at five meter (16.4 ft) intervals. Paving production during an eight hour work day averaged between 300-400 cubic meters (392-523 yd^3) of concrete.

An Auto-Float® on the back of the Commander III finished the slab and was followed by a burlap drag. The T/C-600 texture/cure machine applied a broom finish and white spray cure to the new runway.

Paving during the summertime in Botswana presented challenges to the project with extreme heat and severe thunderstorms. When work began at 5 a.m., it was already 31 degrees C (88°F). WBHO painted the subgrade white to help reduce the absorption of the sun's heat by the dark subbase surface. By mid-afternoon, the aggregate at the batch plants was just too hot to maintain a quality mix. Paving was finished by 1 p.m. because of the heat, and also the tendency for afternoon thunderstorms to hit the area and potentially damage any pavement.

A series of tent structures approximately 140 meters (459 ft) long were used to protect the new concrete from the sun and rain. Sixty meters (197 ft) of the tents could be pulled along using the texture/cure machine, while the rest were moved forward by workers. Despite the extreme heat, no concrete was lost on the project.

The occasional python also created a need for caution around the work site. Workers were distracted one day when a 3.7 meter (12 ft) long baby python was found at the end of the runway. Army and airport security services had to be called in to deal with the protected species of snake. The python was removed and released into a remote part of the bush so everyone would be safe.

"We are pleased with the results of the GOMACO paver," Beckermann said. "Airport officials did all the testing of the concrete and all the project specifications were easily met."

OF-020909 D2

Paving so close to the African Bush attracted an unwanted spectator. A 3.7 meter (12 ft) long baby python had to be removed from the job site at one point during the project.

CG-020904 D4

The new runway had to be protected from Botswana's extreme heat. A GOMACO T/C-600 applied a white spray cure directly behind the paver and tenting structures were used to shade the concrete to keep it from curing too fast.

Photos by Andy Linham CG-020904 D6

A GOMACO Paving Train Gets the Job Done With or Without an IDBI

"The computer on the IDBI makes setting up the bar spacing easy for the crew," Beem said. "We just program the spacing for the front-bar inserter, program the spacing for the dowel bars and where the joints are going to be, and the machine does everything itself."

John Carlo Inc., based out of Clinton Township, Michigan, just completed rebuilding a 6.2 mile (10 km) stretch of Interstate 94. They purchased a new GOMACO four-track GHP-2800 paver for the project and achieved some excellent production results. Carlo's ride is also being measured by one of the most challenging indexes in the industry, the International Roughness Index (IRI). The Michigan Department of Transportation (MDOT) utilizes the IRI for their smoothness requirement.

Carlo completed the first phase of the project, the eastbound lanes, last year paving over baskets. This year they added an In-the-Pan Dowel Bar Inserter (IDBI) to the GHP-2800 for the westbound portion of the project.

"The MDOT specification for ride quality requires an IRI of less than 75, which is a very tight spec in the IRI format," Chris Mondon, Concrete Quality Control for John Carlo, said. "On the east lanes of pavement, we obtained an IRI of 64.2."

IRI readings on the westbound lanes, using the IDBI, were also well under the requirement of 75. They averaged 69.8 for smoothness while inserting the bars to form the transverse joint on-the-go. Carlo's key to good concrete pavement is simple... keep the paver moving and eliminate any unnecessary stops.

"Our main goal is just to keep the paver moving at a constant speed," Jason Beem, Assistant Manager of the John Carlo Paving Division, said. "If the paver doesn't stop all day, we know we can reach our desired production. It also gives us our best chance at getting quality ride. When the paver has to stop, that's when we end up having problems. We try to keep a nice five to six foot (1.5 to 1.8 m) per minute pace, which keeps things simple for the operator and gives us the ride quality we're looking for."

They accomplished an excellent IRI result and superior daily production while inserting bars accurately with the IDBI. MDOT had officials on site and Carlo also had their own quality control technician conducting tests to ensure accuracy.

"We had a quality control technician on site doing depth checks every 100 feet (30 m) behind the paver," Beem said. "He's checking the depth of the bars and making sure we don't have any issues from that side.

"MDOT also required that we complete test headers at the end of the day. We would pave past our header point, inserting one transverse joint

Photo by Kelly Krueger HW-100816 D10

The GOMACO GHP-2800 slipformed the eastbound lanes over baskets. The paver is equipped with a detachable auger/strike-off.

Photos by Tom Bell unless otherwise noted HW-060906 D4

The westbound lanes of I-94 were slipformed with the GHP-2800 with IDBI placing the transverse joint, 24 bars every 14 feet (4.3 m).

with the IDBI. The next morning we came back, saw cut through that joint on either end of the bars and measured the vertical and horizontal tolerances. MDOT is very strict and we had to do this test for them five different times."

According to Beem, the DOT approved their work and didn't have any issues with the accuracy of the bar placement.

The new interstate is being built using 11 inch (279 mm) thick concrete on a 16 inch (406 mm) open-graded drainage course. Carlo's new GOMACO GHP-2800 paver is equipped with some special features. It has the new G22 digital controller, with the second language in Spanish. The paver is equipped with a detachable auger/strike-off, so Carlo can use the mold as either an open front or an auger/strike-off for extra versatility. The GHP-2800 is also equipped with a Minnich Auto Vibe Control System for vibrator monitoring. It's a required feature for Carlo's airport paving projects.

Paving on I-94 began last year when Carlo paved the first phase of the project, the two eastbound lanes of I-94. Their paving train consisted of two placer/spreaders, the GHP-2800

HW-060905 D5

A DOT test shows the bar in the proper horizontal placement with concrete compaction all around the bar.

HW-060905 D1

Test headers with the IDBI system inserting a transverse joint were saw cut through the joint and horizontal and vertical tolerances were measured for bar placement. John Carlo had no problems achieving bar placement accuracy.

HW-060910 D17

The GHP-2800, according to Carlo, is the perfect sized paver and helps make the company competitive in the highway-paving market.

paver and a new T/C-600 texture/cure machine.

"When we pave concrete, we like to dump off the haul road," Beem explained. "We don't like running trucks on the aggregate base because it can contaminate the stone. It also helps us to control our overrun, because we're not rutting or disturbing the aggregate base.

"We use two spreaders out in front, because it helps with production. On this first phase, we averaged around 250 cubic yards (191 m^3) per hour. We really try to push for 250 to 300 cubic yards (191 to 229 m^3) per hour."

An on-site batch plant, located on the south-end of the project, is capable of producing the 300 cubic yards (229 m^3) of concrete per hour to feed that kind of production. Tri-axle dump trucks carry 10 cubic yard (7.6 m^3) loads of concrete to the placer/spreaders in front of the paver. The concrete is an MDOT high-performance mix with three aggregates, and ground-granulated blast furnace slag that is used as a cement supplement in the concrete. Slump averages 1.5 inches (38 mm).

The GHP-2800 paver slipformed the first paving pass 24 feet (7.3 m) wide, which included a 12 foot (3.7 m) driving lane and 12 foot (3.7 m) outside shoulder. The second paving pass included the other 12 foot (3.7 m) lane with a five foot (1.5 m) wide inside shoulder for a 17 foot (5.2 m) wide pass.

A front-mounted bar inserter on the GHP-2800 inserted a #5, 30 inch (762 mm) long straight bar every 23 inches (584 mm). Side-mounted bar inserters on the back of the paver inserted #5, 30 inch (762 mm) long bent bars every 18 inches (457 mm). Dowel baskets were placed on grade at 14 foot (4.3 m) intervals to form the transverse joint.

A GOMACO Auto-Float®, followed by a wet burlap drag mounted to the back of the paver, provided the final finish to the concrete slab. A T/C-600 texture/cure machine applied a white spray cure and longitudinal tine.

Paving on the eastbound lanes of Carlos' I-94 project was completed late last year. Work on the westbound lanes

HW-060907 D19

Two placer/spreaders work in front of the paver. Carlo never wants th

Photo by Kelly Krueger HW-100813 D14

A T/C-600 texture/cure machine applies a white spray cure and longi

ne paver to stop, a key to help them achieve good rideability results.

tudinal tine to the new eastbound section of Interstate 94.

HW-060907 D14

The IDBI inserts 24 bars at 12 inch (305 mm) spacings across the pavement. Each bar is 18 inches (457 mm) long.

was started in the spring of this year. This second phase of paving included the IDBI on the GHP-2800 paver.

"On mainline highway jobs using the IDBI, we can save a significant amount of labor and materials by not having to buy and set baskets," Beem said. "Even with the initial costs of the IDBI, after a few large highway projects, it pays for itself."

The GHP-2800 paved the westbound lanes of I-94 in a 24 foot (7.3 m) wide pass, which included both 12 foot (3.7 m) driving lanes. The five foot (1.5 m) and 12 foot (3.7 m) wide shoulders and various other ramps on the project were slipformed with a GOMACO four-track Commander III.

Carlo's new IDBI inserted 24 bars at 12 inch (305 mm) spacings across the width of the pavement. Each bar was 1.25 inches (32 mm) in diameter, 18 inches (457 mm) long and epoxy coated. The bars were inserted 5.5 inches (140 mm) into the depth of the new road at 14 feet (4.3 m) intervals to form the transverse joint.

"The computer on the IDBI makes setting up the bar spacing easy for the crew," Beem said. "We just program the spacing for the front-bar inserter, program the spacing for the dowel bars and where the joints are going to be, and the machine does everything itself.

"The GHP-2800 is the perfect sized piece of equipment to be competitive in the highway-paving market," Beem said. "Add the IDBI to the paver, and it's all we'll use on multi-lane, multi-mile highway projects."

Carlo is the prime contractor for rebuilding I-94, connecting St. Clair County to Macomb County, Michigan. I-94 goes on to cross St. Mary's River, which is the international dividing point between Canada and the United States. The international crossing at Port Huron, in St. Clair County, is one of the busiest in North America.

Slipforming Curb and Gutter for the Athletes of the World

Niko Projects Inc. has been a family-owned company since 1980, specializing in slipformed concrete curb and gutter and sidewalk projects in the Nanoose Bay area of British Columbia, Canada. The three brothers, Stan, Harvey and Gary Kuramoto, purchased their first GOMACO Commander III in 1981. Ever since then, it's been nothing but Commander IIIs for the Kuramotos' projects.

"Versatility and quality are an important part of our operation," Stan Kuramoto, an owner in Niko Projects, said. "We pride ourselves on being efficient and the industry leader, and that's why we use a Commander III in our operations."

Niko Projects is currently working on a project that will soon have the focus of the world's attention on it. They are slipforming 10,000 lineal meters (32,808 ft) of curb and gutter in Whistler, British Columbia, the host mountain resort of the 2010 Vancouver Winter Olympics.

CG-020908 D17

An inukshuk, a stone sculpture used by Canada's Inuit people as directional landmarks, watches over the construction. It has become the symbol of the Vancouver 2010 Olympic games.

"We are constructing the infrastructure road works for the future housing of the Athletes' Village," Kuramoto explained. "It will be where all the participants and support staff will be housed during the 2010 games. Once the games are done, the housing will be used for workers of the Whistler and Blackcomb Mountain resorts, as there is quite a shortage in the area."

The project required four different curb profiles, two of them unique to Whistler. The profiles are designed to minimize damage to the face of the curb that could be potentially caused by the blades on snow plows when removing snow.

The four profiles are: Type "A" with a 600 millimeter (23.6 in) wide gutter and 300 millimeter (11.8 in) tall curb; Type "B" with a 600 millimeter (23.6 in) wide gutter and 250 millimeter (9.8 in) tall curb; flat curb that is 600 millimeters (23.6 in) wide and 200 millimeters (7.9 in) tall; and swale curb that is 600 millimeters (23.6 in) wide and 200 millimeters (7.9 in) tall in the center of the valley with two steel rebar inserted.

The concrete is 32 MPa (4641 psi), with five to eight percent air added,

Photos courtesy of Niko Projects Inc. CG-020907 D18

Niko Projects slipformed four different types of curb and gutter as part of the 2010 Winter Olympics Athletes' Village.

CG-020907 D16
CG-020908 D16

Bear tracks in Niko's curb and gutter are allowed by the project inspectors. They have to take extra precautions on the job site though, to ensure they don't do anything to attract the bears' attention.

water reducer, fly ash, fine and coarse sand, and glacial water. The base material utilizes rock that had been blasted out earlier in the project. It is crushed on site and then placed on grade.

"It creates a very hard base for us, but the Commander III has more than enough power to get through it," Kuramoto said. "We trim and pour on all of the profiles except for the swale curb. On that, we pretrim, back up on the stringline, sideshift the trimmerhead out of the way, and slip the swale curb feeding the two strands of steel through holes that we created in the front of the mold.

"The ability to lift and swing the trimmer has saved us many hours on this job. It also allows us to reduce the amount of handforming we have to do. Due to the different areas of phasing we have to complete, we have a lot of areas where we have to slipform up to existing curb that we've done earlier. We only have to move the trimmer out of the way to connect to the existing, and that saves us time and labor."

Production averages well over one kilometer (0.62 mi) per day, even with the constant mold changes caused by four different profiles.

Working conditions are crowded and Niko is constantly working around other contractors trying to complete their work. Added precautions on the site also have to be taken to avoid wandering bears.

"This particular site was formerly a dump site, so this has been the bear's domain a lot longer than ours," Kuramoto said. "There are strict rules on where you can keep your lunch and how you dispose of your garbage on the job site. The inspectors don't allow graffiti, but don't mind us leaving the bear paw prints in our fresh concrete curbs."

Niko's work on the project is scheduled for completion later this year. As the world tunes in to watch the 2010 Olympic games, the Kuramoto brothers will know they slipformed a quality project in challenging conditions.

"We have tried to remain unique in a niche market, from a white curb machine to business cards shaped in a curb profile," Kuramoto said. "People on the streets know us as the 'curb guys' because they see us all over town. Niko has stuck with GOMACO because we know it's a brand we can rely on and trust. We've been a part of each other's family since 1981."

Editor's Note: *Gary Kuramoto stopped by our World of Concrete 2009 stand with photos of this project on a USB flash drive. He described it in detail and with great enthusiasm and we enjoyed visiting with him that day. Always feel free to send me your high-resolution photographs from your slipforming projects. We enjoy seeing GOMACO equipment at work, because no two job sites are ever alike.*

CG-020907 D17

The Commander III pretrims for a section of swale curb, which has two steel rebar inserted into it through the front of the mold.

CG-020908 D13

Niko's curb and gutter production averages over one kilometer (0.62 mi) per day with their three-track Commander III.

Photo by Jason Reitz CL-030903 D5

Kriger's boat ramps began seven feet (2.1 m) below water level. A coffer dam had to be built to keep the river back.

The C-450 Finishes a Project Nobody Else Wanted to Tackle

Kriger Construction Inc., based out of Dickson City, Pennsylvania, was the only contractor to bid on a Luzerne County project to build a new park with boat and kayak ramps/ launches along the Susquehanna River. The Susquehanna River is notorious for its rapidly rising and falling water levels. The first 40 feet (12.2 m) of the two new ramps would be built below the water level. It was a challenge most contractors were afraid of tackling.

The ramps, themselves, would be 40 feet (12.2 m) wide, 110 feet (33.5 m) long, and built on a 10 percent slope as required by the Pennsylvania Fish and Boat Commission.

"While researching the project, we spoke with several people in the industry about the best way of finishing the ramps and they all recommended GOMACO," James Marzolino, General Superintendent for Kriger Construction, said. "We chose the C-450 because of the width and the thickness of the concrete being placed and the grade it was being placed at. We felt a cylinder finisher would give us the quality we wanted and a better end-product."

Work on the project was planned around the river. When the water level was at its lowest, Kriger moved their crews in and worked double shifts to complete the project. The first phase involved building the coffer dam to hold the water back. Sheets of PZ-27 piling were driven into the river bed at approximately 25 to 30 feet (7.6-9.1 m) deep, or 2.5 times the depth of the water, to form the coffer dam.

After the dam was built, grade was prepared and two mats of heavy gauge wire mesh was placed on grade. Rails for the C-450 were set and the finisher was placed on the rails. Two GOMACO service representatives were on-site assisting with set-up of the C-450, training and guidance on the first pours.

"The service reps were a big help, because we didn't have any experience with the GOMACO product," Marzolino said. "We spent some time with them just going over the machine, learning about it, what precautions to take, and just general operation of the machine. They were a

"While researching the project, we spoke with several people in the industry about the best way of finishing the ramps and they all recommended GOMACO," James Marzolino, General Superintendent for Kriger Construction, said.

big help."

Kriger completed each ramp in two pours, 55 feet (16.8 m) long, 40 feet (12.2 m) wide, and eight inches (203 mm) thick. The concrete and concrete pump were supplied locally by Pocono Transcrete. The mix was a 4000 psi (27.6 MPa) design with a four inch (102 mm) slump for pumping.

To help accommodate the steep 10 percent slope of the ramps, Kriger outfitted their C-450 with an all-wheel drive system and 36 inch (914 mm) bogies with cupped wheels. Then, as an added safety precaution, the C-450 was attached to a winch and a D5 dozer. Kriger never had to utilize the extra precaution.

The C-450 is equipped with double-drum cylinders and misting spray bar to provide the ultimate finish. The C-450's automatic advance moved the machine forward 12 inches (305 mm) automatically on each pass.

"We were dealing with some pretty tight finishing tolerances," Marzolino said. "It had to be under 0.25 inch (6 mm) over a 10 foot (3 m) distance. The C-450 easily accomplished that requirement."

Each of the two pours was accomplished in under five hours, from start to finish. Specifications required a heavy broom finish on the new ramp, and joints were saw cut on 10 foot (3 m) centers the day after the pours. Twenty-eight days after the final pour, the ramps were opened up to the awaiting public.

The ramps are part of the public boat launches on the North Branch of the Susquehanna River for the city of Wilkes-Barre and the surrounding communities. The project included not only the ramps/launches, but also a two acre (0.8 ha) parking area, a bioretention garden and 1800 square yards (1505 m^2) of earthwork.

Kriger Construction has more work planned for their new C-450. Their next project is finishing two bridge decks in Luzerne County, Pennsylvania.

Photo by Jason Reitz CL-030902 D13

The Susquehanna River can rise and fall rapidly. Work on the ramps was planned around a time when the river level was low.

Photo by Jason Reitz CL-030903 D16

Kriger's C-450 has an all-wheel drive system with cupped wheels to help deal with the ramp's steep 10 percent slope.

Photo by Ed Lampe CL-030905 D11

The C-450 was attached to a winch and a dozer as a safety precaution. The extra precaution was not needed on the pours.

Photo by Ed Lampe CL-030905 D9

The ramps were finished in two pours, each 55 feet (16.8 m) long and 40 feet (12.2 m) wide.

Slipforming Eases a Complicated Project

Photos and drawings courtesy of Extrudakerb CG-060914 D5

Extrudakerb slipforms a unique profile of barrier wall in Belfast, Northern Ireland.

Slipforming was the easy part of this project. It was the logistics, engineering time, mold profile development, and numerous other factors that were almost overwhelming. Extrudakerb, a contractor based out of Doncaster, England, recently completed a project that was 12 months in the planning phase. It involved the engineering of a new concrete barrier system capable of accommodating up to 1.2 meters (3.9 ft) of roadway level differences.

The project was on Junction 3 to 4 of the M2 expressway in Belfast, Northern Ireland. Extrudakerb, along with their Irish partner, Highway Barrier Solutions, won the contract to design and build a central reserve concrete barrier, retaining wall and concrete drainage system.

"It was one of the most complex jobs that we've ever had," James Charlesworth, Director of Extrudakerb, said. "We originally planned for the entire project to take four months to complete, but thanks to some superior planning and organization, we finished four weeks early."

The project required Extrudakerb to set up a local office in Belfast. They transported eight truck loads of equipment, including a four-track Commander III and seven paving molds, across the Irish Sea. Extrudakerb even purchased mini-busses to transport their workers between England and Belfast. The crews worked two full weeks and then had one long weekend off.

The Commander III four-track was set up to pour on the right side, so ready-mix trucks could travel with the flow of traffic. It eliminated the need for the trucks to turn around in the confined space of the site.

The first slipforming steps on the project involved the drainage system. Extrudakerb slipformed either a v-channel or a 300 millimeter (11.8 in) diameter slot drain with their Commander III. Approximately 4500 meters (14,764 ft) of concrete drainage system was slipformed.

The concrete barrier system and retaining wall was next. It was, by far, the most complicated aspect of the

project, and required some unique engineering solutions.

"We developed a concrete barrier system and retaining wall to accommodate carriageway level differences of up to 1.2 meters (3.9 feet)," Charlesworth said. "The concrete structure needed to meet the structural requirements of a carriageway retaining wall and that of the foundation for a Britpave concrete barrier system.

"The overall width should not exceed one meter (3.3 ft), and a standard barrier has a footprint of 542 millimeters (21.3 in). However, street lighting had to be sited within that central reserve, and that's where the challenge was."

When roadway differences were less than 300 millimeters (11.8 in), Extrudakerb slipformed a wide concrete step barrier with a trough for the cable. The wide barrier had a 942 mm (37.1 in) base, a top cap that was 600 millimeters (23.6 in) wide, and was 900 millimeters (35.4 in) tall. Steel reinforcing cable was inserted into the front of the mold at 300 millimeters (11.8 in) and 450 millimeters (17.7 in) from the top of the wall.

Concrete was supplied by local producer, Cemex, and was delivered to the site by ready mix-trucks carrying six and eight cubic meter (7.8 and 10.5 yd^3) loads. The mix was a grade C35 with air entrainment and polypropylene fibers that complied with Britpave specifications. Slump averaged 20 millimeters (0.8 in).

When roadway levels exceeded 300 millimeters (11.8 in), Extrudakerb would first slipform a single-sided step barrier with a 499 millimeter (19.6 in) base, 200 millimeter (7.9 in) wide top cap, and 900 millimeters (35.4 in) tall. A concrete in-fill was placed between the new wall and the existing roadway to accommodate the height difference before the second wall could be slipformed.

The second wall was standard Britpave step barrier with a 542 millimeter (21.3 in) wide base, 200 millimeter (7.9 in) wide top cap and 900 millimeters (35.4 in) tall. It had steel reinforcing fed into the mold 150 millimeters (5.9 in) and 300 millimeters (11.8 in) from the top of the wall.

"Production averaged around 20 cubic meters (26.2 yd^3) per hour on the wide step barrier," Stewart Cousins, Technical Manager for Extrudakerb, said. "Outputs peaked at 25 cubic meters (32.7 yd^3) per hour and with that, we exceeded our previous daily production records."

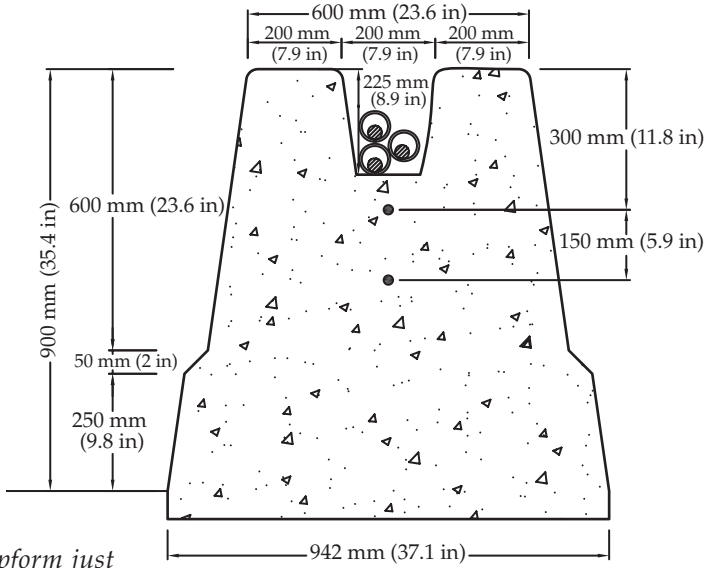
CG-050017 D13
CG-060914 D16

The slot drain had a diameter of 300 millimeters (11.8 in) and was slipformed over a plastic, inflated tube.

CG-060914 D13

Extrudakerb slipformed the wide step barrier when the differences in roadway heights was less than 300 millimeters (11.8 in).

CG-060914 D8



The wide step barrier required 0.7 cubic meters (0.9 yd^3) of concrete to slipform just one meter (3.3 ft). The sheer size and dimensions of the wall are illustrated in the drawing.

A large amount of hand-forming work was required on the project as well as slipforming. Extrudakerb manufactured their own steel formwork to create transitions between the twin barrier to the wide barrier. Formwork transitions were also needed between the walls and the concrete bridge piers and sign gantry bases.

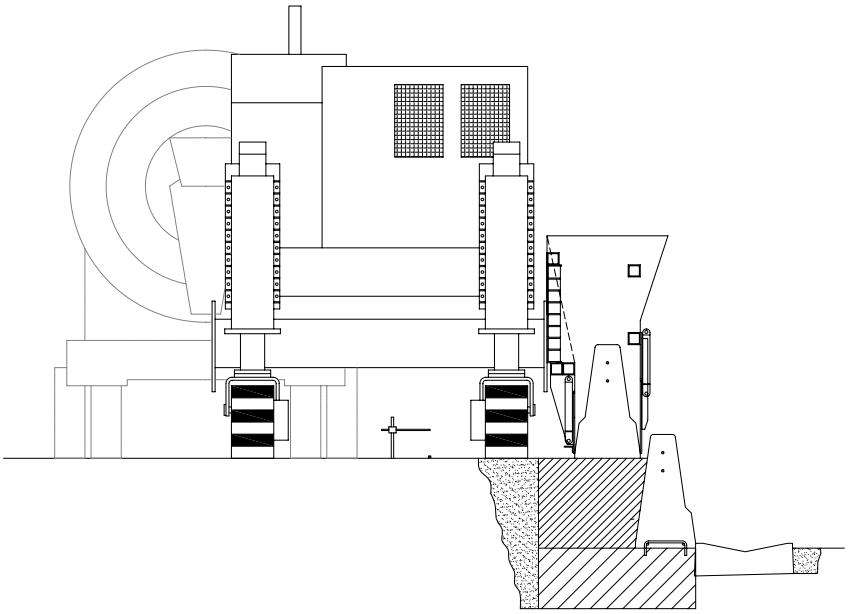
"The formwork dictated the project because it took longer than the machine slipforming," Cousins said. "It all had to be carefully coordinated so there were no big delays waiting on formwork to be released at the end of the project."

Another major concern was creating light column buildouts for street lights. Gaps were left in the second barrier wall for light column locations. Pre-fabricated reinforcement cages and anchoring bolts were installed in those gaps. The area between the two barrier walls was filled with concrete. Then, prefabricated formwork was placed and used to construct the column and build-out to hold the street light.

In total, over 8000 cubic meters (10,464 yd^3) of concrete was used to complete the barrier on Junction 3 to 4. Extrudakerb completed all of the work in just three months, four weeks ahead of their planned completion schedule.

CG-060914 D1

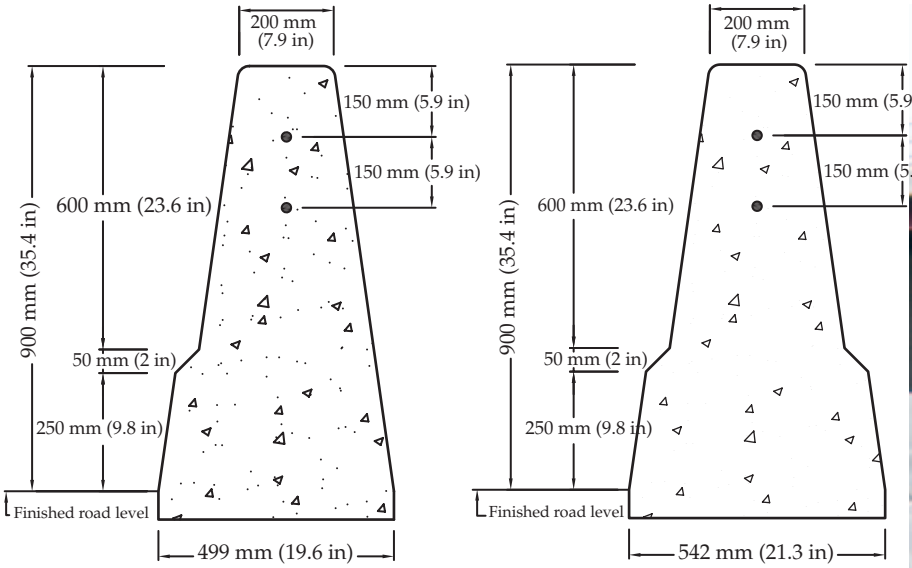
The first step of the project required slipforming a drainage system, with either a v-channel or slot drain.



The complicated sequence of the project is best shown in this illustration.

CG-060914 D10

Extrudakerb poured off the right-side with their four-track Commander III on all of the different profiles on the project.



Drawings illustrate the two types of Britpave step barrier used to slipform the areas where the roadway height exceeded 300 millimeters (11.8 in).

CG-060915 D16

The finished wall shows the hand-formed concrete support for the street lamps and bridge pier approaches.

7728 Cubic Yards (5908 m³) One Day's Production Rate!

A phenomenal single-day production rate was recently accomplished with a GOMACO paving train at the O'Hare International Airport in Chicago, Illinois. Walsh Construction Company is at work on the airport slipforming a new runway. In a single day, they slipformed 7728 cubic yards (5908 m³) of concrete with their GOMACO equipment during a 12.5-hour shift.

Two on-site batch plants worked continuously to keep ahead of the paving spread. Thirty-nine end-dump trucks carried the concrete to the paving site. Concrete was placed over dowel baskets and cans for runway lighting.

Photo by Andy Bazan HW-080908 D5

Two GOMACO 9500s placed concrete on grade in front of the PS-2600 which was placing and spreading the concrete in front of the GHP-2800 paver.

The trucks dumped their loads into two 9500 placers and a PS-2600 placer/spreader working in front of the paver. A GOMACO two-track GHP-2800 paver slipformed the new runway 21 inches (533 mm) thick and 25 feet (7.6 m) wide. Production averaged 618 cubic yards (472 m³) per hour under the watchful eyes of project superintendents Mike Osika and Dennis Entwistle.

Both the PS-2600 placer/spreader and GHP-2800 paver were equipped with the Leica PaveSmart 3D system, eliminating the need for stringline on the project. The string-free site eliminated a lot of hassles with 39 concrete trucks continually driving through the site, laborers at work in front of and behind the paver, and various other personnel coming and going.

Photo by Jason Reitz HW-080917 D1

Thirty-nine end-dump trucks were needed to keep the average paving production at 618 cubic yards (472 m³) per hour.

Photo by Jason Reitz HW-080916 D6

A GOMACO PS-2600 placed and spread the concrete in front of the two-track GHP-2800 slipform paver.

Photo by Tom Phillips HW-080907 D5

Walsh slipformed 7728 cubic yards (5908 m³) of concrete in a 12.5-hour day at the O'Hare International Airport in Chicago.

The Future Has Begun To Favor Concrete Over Asphalt

Paving dynamics continue to shift in concrete's favor as oil prices, changes in refining practices, and increasing emphasis on life-cycle cost continue to widen the gap between the cost of asphalt and concrete, according to a report, white paper, and Webcast released by PCA (Portland Cement Association).

The report, "Update: Paving, The New Realities," written by PCA chief economist Ed Sullivan, compares the cost for one mile of standard two-lane roadway calculated with estimating software used by state departments of transportation (DOTs). Six years ago, asphalt held a $120,000 initial bid cost advantage versus a concrete-paved road. Today that situation has reversed completely. Concrete now enjoys the initial bid advantage—to the tune of $82,000. PCA estimates that by 2015 concrete paved roads will enjoy a $500,000 initial bid cost advantage over asphalt– roughly a 41 percent savings.

Concrete offers dramatic savings for cash-strapped state governments. "Given the supply challenges facing asphalt and the need to repair and expand the nation's infrastructure, if all roads in 2015 were paved with concrete, state governments would save $37.5 billion in initial paving costs," remarked Sullivan. "During the road's life cycle, the savings resulting from paving with concrete compared to asphalt would total nearly $55 billion."

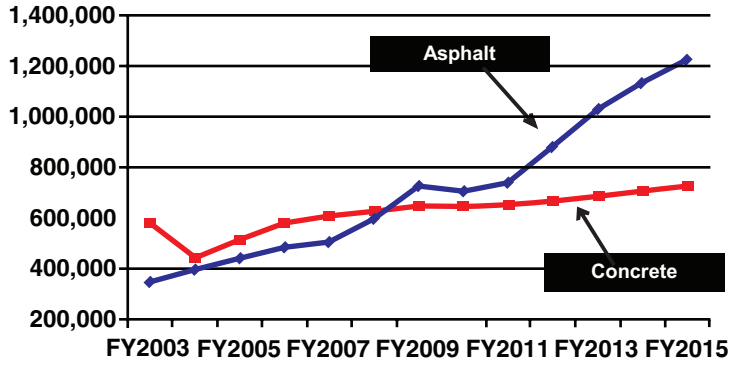
PCA's economic research department was recently named the most accurate overall forecasting group by the Chicago Federal Reserve.

You can read more about this topic, and see the web cast at http://www.cement.org.

Projected:

Initial Bid Concrete Vs Asphalt Paving Costs

Per Two Lane Road Mile - Urban



Source: PCA estimates using Wispave (Wisconsin DOT paving cost software)

WORLD OF CONCRETE®

Booth #C5168, GOMACO's Same Location at World of Concrete 2010

"When the going gets tough, the tough turn to World of Concrete." It's the 2010 theme for World of Concrete, which will be held February 2-5, at the Las Vegas Convention Center in Las Vegas, Nevada. GOMACO will be there showcasing our latest product innovations. Come see us in the Central Hall to discuss the world's choice in concrete paving technology. Sales, engineering, research and development and other GOMACO personnel will be in the booth ready to discuss your upcoming projects with you and the GOMACO equipment necessary to make your project successful and profitable.

Now is the time for you to be making plans to attend the 2010 show. Space always fills up fast in Las Vegas so you need to get your hotel rooms and plane reservations secured as soon as possible. Please visit the show's web site at: http://world of concrete.com for more informaton.

The American Concrete Pavement Association (ACPA) is offering free admission for the exhibits and discounts on classes. Go to their link: http://registration.experient-inc.com/ShowWOC101/Default.aspx?SourceCode=A14 or visit their site at http://www.acpa.org to register for the show and take advantage of the savings.

bauma 2010

Stand #1210/3, GOMACO's Same Location in the Open Air Area F12

GOMACO will once again be located in the Open Air Area F12, Stand #1210/3, at Bauma 2010. The international exhibition will run April 19-25 at the New Munich Trade Fair Centre in Munich, Germany.

The exhibition will feature more than a half million square meters (5,382,131 ft²) of exhibition space. Please be sure to stop by the GOMACO stand and visit with our experts about your upcoming projects. We'll be ready to help you out with your airport paving, railbed construction, highway projects, canal work or any other unique application you may have planned.

Visit the exhibition's web site at http://www.bauma.de for more information. The site can help you prepare for your trip. The application documents are availabe for downloading in the five major languages of the world. It features a budget planner to help manage trip expenses. Maps are also available to help you get to the exhibition by airplane, train or personal vehicle.

Make your hotel and air fare reservations today and plan on joining us in Munich for the 2010 Buama show!

OF-070902 D1

Opp Construction in Grand Forks, North Dakota, has proudly decorated some of the tailgates of their work trucks with a picture of the company's GOMACO GT-3600 slipforming sidewalk.

CG-080902 D7

Patstroy Ead Lovetch slipforms water canal with their three-track Commander III in the countryside near Lovetch, Bulgaria.

GOMACO around the world

CG-070932 D5

Orascom slipforms a unique profile of curb and gutter on a project in Abu Dhabi, United Arab Emirates.

CG-070922 D4

Aktel slipforms a new water canal, with their four-track Commander III, to irrigate rice fields in Kesan, Turkey.

HW-070905 D4

STAIP Ltd. slipforms an airport project with their two-track GP-2600 paver in Oujda, Morocco. The paving passes were 7.5 meters (24.6 ft) wide and 330 millimeters (13 in) thick.

HW-080912 D8

The Turkish Air Force conducts some test pours with their new two-track GP-2600 slipform paver prior to start up on their project in Turkey.

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Polymer Paving on a Project in Sacramento, CA

C.C. Myers Inc., based out of Rancho Cordova, California, took on the challenge of rebuilding a portion of Interstate 5 through downtown Sacramento. The two mile (3.2 km) section of roadway was expected to take 305 days to rebuild. Myers accomplished the task in only 35 work days.

Part of the project's early completion was due to the use of polymer concrete overlay slipformed with a GOMACO four-track Commander III. Polymer concrete has a higher strength and faster curing rate than regular concrete, which allowed Myers to schedule pours closer together while still being able to move equipment on the new polymer roadway.

Work was carried out through the I-5's "Boat Section," which was built below the water level of the nearby Sacramento River. Water had started leaking through the old roadway and was causing major cracking that needed to be repaired.

I-5 is a critical artery through the city of Sacramento. It carries an average of 190,000 drivers daily, or an average of 9000 vehicles per hour during commute hours.

Polymer concrete is part of a group of concretes that use polymers to supplement or replace cement as the binder.

CG-120807 D6

CG-120805 D13

The polymer concrete is mixed on site by a specially-designed truck to assure the mix achieves maximum performance.

CG-120807 D15

The Commander III was equipped with a 5000 series mold with pan vibrators mounted inside the mold to vibrate the polymer mix.