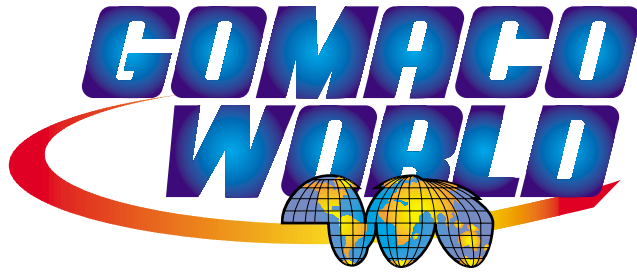


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GOMACO WORLD





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GOMACO World Editor Kelly Krueger at kkruieger@gomaco.com

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Slipforming Wall 60 Feet (18.3 m) Above the Mississippi River

On one of the walls in Gerdan Slipforming's office hangs a painting the company won during a silent auction for a community fund-raiser. The painting is a picturesque view of the Bill Emerson Memorial Bridge, a new suspension bridge connecting Cape Girardeau, Missouri, to East Cape Girardeau, Illinois. The painting was delivered to Gerdan Slipforming the same day they learned the company had won a bid to slipform the bridge's parapet and safety railing.

The new \$100 million cable-stayed suspension bridge over the Mississippi River replaces an older bridge that could no longer handle the traffic demands of the area. The Missouri Department of Transportation (MODOT) estimates that 14,000 vehicles cross the structure daily. That estimate is expected to increase to 26,000 vehicles per day by the year 2015. The new bridge was built with that demand in mind.

The Bill Emerson Memorial Bridge is 100 feet (30.5 m) wide and stretches 4000 feet (1219 m) across the river. Thirteen million pounds (5,896,800 kg) of reinforcing steel, 171 miles (275 km) of cable, and 243,688,500 pounds (110,535,245 kg) of concrete was used to build the four-lane bridge.

The deck of the bridge is 60 feet (18.3 m) above the surface of the water. The bridge towers that hold up the support cables are another 300 feet (91.4 m) tall.

Gerdan's responsibilities on the bridge included slipforming the approximately 8500 feet (2591 m) of safety barrier and 6000 feet (1829 m) of two different styles of median barrier. The company has always been

GOMACO owners and for this project they decided to purchase a new Commander III.

"I was a little leery of the new generation technology and one of my questions was, 'Am I going to have an argument with my operator about this new piece of equipment and him trying to learn it?'" Dan Driskell, project manager for Gerdan Slipforming, said. "Tom Held, my GOMACO salesman



Bridge Facts:

- The new bridge has four lanes of traffic and is five times wider than the old one
- 140 lights illuminate the white cables at night
- The bridge deck is 60 feet (18.3 m) above the water while the towers that hold the support cables are another 300 feet (91.4 m) above the deck

Constructing the bridge consumed:

- 13 million pounds (5,896,800 kg) of reinforcing steel
- 171 miles (275 km) of cable
- 243,688,500 pounds (110,535,245 kg) of concrete
- 15 million pounds (6,804,000 kg) of steel beams

from Fabick Tractor, said the only argument that I would have between my operators was who was going to operate the new one. Tom was right.”

Slipforming on the bridge began in early October 2003 on the three different types of wall. Different requirements for the approaches in the two different states created an added challenge.

“The job was bid as a MODOT project and was all done under MODOT specifications,” Driskell explained. “For some reason, though, there was a different profile for the median barrier on the Illinois approach. It was actually two safety barriers with a seven inch (178 mm) top and 16 inch (406 mm) base with a four inch (102 mm) gap in between the two.”

The Missouri-approach median barrier is 18 inches (457 mm) wide at the top, 36 inches (914 mm) at the base and 34 inches (864 mm) tall. A third profile, the safety barrier, measured 10.75 inches (273 mm) wide on top and 20 inches (508 mm) across the bottom.

“This project went very smooth for us and the machine has been picture perfect,” Driskell said. “On the bridge, we poured approximately 1100 feet (335 m) of the 18 inch (457 mm) wide median barrier per day.”

The concrete for the walls was a MODOT B1, 6.73 bag mix with air entrainment. Slump averages between .75 and one inch (19 and 25 mm).

“The machine started out picture perfect and just kept on going,” Driskell said. “Our finisher foreman, Chris Markham, told me he felt like he was stealing money from me. He said the finish on the wall is coming out so smooth and the machine is doing such an excellent job, the finishers have very, very little to do.”

All the finishers had to do was apply a light broom finish to the wall and cut the joints in. Once again, the two states had different requirements for the approaches. On the Missouri

side, joints were saw cut in one inch (25 mm) deep, every 35 feet (10.7 m). On the Illinois approach, joints were every 10 feet (3 m).

“This project went very smooth for us and the machine has been picture perfect,” Driskell said. “We poured approximately 1100 feet (335 m) of the 18 inch (457 mm) wide

median barrier per day on the bridge.”

The Bill Emerson Memorial Bridge was opened and operational by December 2003. Gerdan has moved on to their next projects but regardless of where they’re working or what they may be slipforming on, the company has certain guidelines they follow to ensure success.

“There are so many variables when pouring barrier wall that it’s like a snowball effect, one has to work before the other one will,” Driskell explained. “First and foremost, if your machine is not set up correctly, you’re not going to get a good product out of the machine. Setting the machine up is foremost important and you have to have the




Production averaged 1100 feet (335 m) of 18 inch (457 mm) wide median barrier per day.

knowledge to set the machine up or someone with experience to show you how. The mix design and the slump of the concrete can make or break the project and give you a good job or not. The other important factor is your operator. If you have an experienced operator who knows about pouring wall, then things go pretty smoothly.”

Gerdan is used to working on bridges. In the company’s 13-year

history, they have specialized in not only curb and gutter, but bridge parapet and median barrier. Slipforming on a suspension bridge, though, was a new experience for the company, one that they are more than willing to tackle again.

“Suspension bridges don’t require us to change how we approach the work that we do on them. It’s just interesting and amazing to listen to the

facts associated with them and the engineering involved,” Driskell said. “One fact that I found interesting... by the time the three inch (76 mm) concrete surface is poured over the precast panels and we slipform the two outside barriers and the median barrier on the bridge, the center of the cable span bridge will be two feet (0.6 m) lower than before those concrete items were put on it.” 



CG-100303 #10A



CG-100303 #12A

Gerdan is slipforming three different types and approximately 14,500 feet (4420 m) of wall on the new bridge.

The Commander III is putting such a smooth finish on the wall, the finishers have very little work to do behind the machine.



CG-100303 #16A

The old bridge is seen in the background as work continues on the new Bill Emerson Memorial Bridge over the Mississippi River.

Commander III –

Two brothers-in-law, Voyne Weaver and Joe Bailey, started their own construction business in 1960. Weaver Bailey Contractors Inc. focused on concrete slab work and driveways for residential developments in central Arkansas. The family-owned business grew and in 1967, incorporated and bid on their first highway project.

They made the switch to the GOMACO brand in 1986, when they had to slipform 60,000 yd² (50,166 m²) of taxiway and parking apron at Adam's Field Municipal Airport in Little Rock, Arkansas. They rented a GOMACO GP-3000 paver for the project and had such good success with it, they purchased the paver and have since changed their paving fleet over exclusively to GOMACO equipment.

The newest paver to join their fleet is a four-track Commander III ordered specifically for barrier work on I-30 south of Little Rock. The company has approximately 100,000 feet (30,480 m) of different types of barrier wall to slipform on the project. The most challenging aspect of the wall included a stretch that grew from 42 inches (1067 mm) tall to a height of 82 inches (2083 mm).

"This is the first time we've tried to pour wall with any height to it over a steel cage," Harold 'Woody' Woodward, paving superintendent for Weaver Bailey, said. "We really didn't know what to expect, but the Commander III is doing an extremely good job and we're really pleased with it."

Weaver Bailey is using a standard Arkansas Highway Department concrete paving mix design for the wall. The dry concrete has a slump of only .25 inch (6 mm).

"It's just a standard mix that we modified a little bit," Don Weaver, vice president of Weaver Bailey, said. "The regular Arkansas mix has a top-size rock of one inch (25 mm), but we increased that top size to 1.5 inch (38 mm). We went to bigger rock because we think it stacks up better and with the Commander III and its power, we knew it could handle it."

The concrete is delivered from Weaver Bailey's own central-mix batch plant in Bryant. End-dump trucks carry the mix to the job site and to an RTP-500 rubber-tracked placer.

"It's the tallest wall that we know of around this part of the country, and I don't think we could have done this wall out of ready-mix trucks from a regular concrete plant," Weaver said. "A ready-mix truck couldn't have gotten the concrete out to start with and they couldn't have kept up. The key to this project was slipping it with the central mix through the placer."

The RTP-500 also helped increase production on the project while handling large amounts of concrete.

"At the maximum height, 82 inches (2083 mm), we were averaging 2.5 feet (0.8 m) of wall per yard of concrete," Woody said. "It was just a large volume of concrete, but production averaged 18 inches (457 mm) per minute at the tallest section. As the wall came down in height, our maximum speed was three feet (0.9 m) per minute."

One of the most challenging aspects of the project was dealing with the steel, and Weaver Bailey worked closely with GOMACO to develop a mold to accommodate it.

"The steel was the biggest problem and GOMACO worked with us to develop a mold with a front that's



Powers Through a Tall Wall Section of I-30

hydraulic,” Weaver explained. “We can either open or close it depending on whether we’re pouring over a full cage of steel or just running vertical bars through it. GOMACO was very helpful working with us to design it, and it’s really unique.”

Nine vibrators mounted inside the mold consolidate the concrete. Behind the mold, workers straightened the wall, apply a broom finish, and spray cure the wall.

Work continues on their I-30 barrier project. In fact, the company just placed an order for another Commander III, sped out exactly like their first one, but also adding on a 10 foot (3 m) sidemount paving kit for shoulder work.


“I don’t think there’s another machine out there that will do this type of barrier work, with the steel cage and all,”

“I don’t think there’s another machine out there that will do this type of barrier work, with the steel cage and all,” Weaver said.

Weaver said. “GOMACO puts out a good product and we get great service from their local dealer, Clark Machinery Company. They’ll send out as many people as we need and their response is fantastic.”

Weaver Bailey Contractors specializes in highway paving, subdivision and curb and gutter work. Their high standards for quality on

their projects has earned them several state awards, and last year, a national award from the American Concrete Paving Association.

“It’s not only the equipment, it’s also the people we have out there in the field,” Weaver said. “Most of our crew has been together 10 to 15 years, they know each other and they’re extremely good at what they do.” 



CG-100305 D23



CG-100305 D25

A high volume of concrete was needed to slipform the wall. Weaver Bailey used end-dump trucks and an RTP-500 to keep the Commander III supplied.

The steel reinforcement was one of the most challenging aspects of the project and Weaver Bailey worked closely with GOMACO engineers to develop a barrier mold that could accommodate it.



CG-100307 D3



CG-100308 D23

The front of Weaver Bailey’s mold is hydraulic and can be opened or closed depending on what type of reinforcement the wall specification requires.

Buying, Financing, and Slipforming in Less Than a Week



Photo by Jim Hayward CG-120302 D13

On Monday, Michael Anthony Companies looked at buying a GT-3600. Wednesday they bought it and by Friday they were slipforming.

Michael Anthony Companies in Rialto, California, was toying around with the idea of upgrading their used Commander II to a new GT-3600. Michael Madrid, the company's president, researched curb and gutter machines and felt a GOMACO would be the only way to go.

His company put a bid in to slipform approximately 40,000 lineal feet (12,192 m) of A-style curb and 20,000 feet (6096 m) of curb and gutter on a new shopping center called Victoria Gardens in Rancho Cucamonga, California. His company won the bid and needed a new curb and gutter machine fast.

On Monday, they visited their GOMACO distributor in California, Terry Equipment, and looked at a GT-3600, a stock machine at the distributor's lot. On Wednesday of that same week, they committed to buying

the machine and by Friday, they were pouring curb and gutter at the new shopping center.



Photo by Andru Small CG-050402 D2

"We had gotten really familiar with what's available on the market today for curb and gutter machines and we took a good look at the GT-3600 and thought it would best serve our needs," Madrid explained. "Once the contract was signed on the Victoria Gardens project, it was a no-brainer to make the purchase and meet the demanding schedule.

"Andru Small, from Terry Equipment, recommended that we finance the machine through United Bank of Iowa in Ida Grove," Madrid said. "Jennifer Conover at United Bank was very easy to work with, very aggressive and I got a very comfortable feeling and knew that she would serve us best. She did a very good job for us and we're looking forward to working with her in the future."

The GT-3600's purchase, financing

and start-up all happened so quickly, they're wasn't time to build a new mold for the project. The company simply modified an existing Commander II mold and attached it to their new machine.

"It was just a timing factor that didn't allow us to take the necessary steps. We had to become creative and aggressive and make it work," Madrid said. "We just added about eight to 12 inches (203 to 305 mm) to the hopper area. It was a very handy modification. We have since ordered all new molds."

Their first day on the project with their new GT-3600, they slipformed 4200 feet (1280 m) of A-style curb on the shopping center's parking lot.

"We were pouring over trucks in less than 15 minutes," Madrid said. "We were trimming at the same time

"We were trimming at the same time and this was a very rocky project. The machine just did a great job for us," Madrid said.

and this was a very rocky project. The machine just did a great job for us."

Concrete slump averaged two inches (51 mm) with a 2500 psi (20 MPa) mix. Finishing work behind the GT-3600 is kept to a minimum. Joints are hand-tooled into the curb immediately behind the machine every 10 feet (3 m).

"I believe the preparation of the ground and the setting of the line are all key factors that determine the

quality that you produce," Madrid said. "We like to strategize prior to actually pouring with the machine and make sure we're following the procedures and the correct process."

Michael Anthony Companies' strategizing is working well. The company was founded by Madrid in 1988 specializing only in concrete construction. Since that time they've branched out to become a site development contractor. Their GT-3600 will help with the concrete paving portion.

"The Commander II is a good little machine, but there's so much more our new machine can do," Madrid said. "The GT-3600 is a great machine and we're really excited about it and what it's going to do for our company."



Photo by Jim Hayward CG-120302 D1



Photo by Andru Small CG-050402 D6

The GT-3600 will be slipforming approximately 60,000 feet (18,288 m) of curb and gutter for the new shopping center.

Michael Anthony was trimming through some very rocky ground while slipforming the A-style curb.



Photo by Jim Hayward CG-120302 D4

A mold from the company's Commander II was modified to fit the GT-3600. Timing constraints didn't allow for a new mold.

Slipping Around Tourists and Tombstones



Photos courtesy of Tru-Form Construction CG-090308 #13A

A GT-3200 slipforms channel footing as part of the process of recreating the original curb and gutter in Mount Moriah Cemetery.

The historic town of Deadwood, in the Black Hills of South Dakota, is home to many stories and legends of the wild west. It's the town where Wild Bill Hickock was shot and killed by Jack McCall on August 2, 1876, while playing poker. In his hand were aces and eights, forever labeling that series of cards as a "dead man's hand." Wild Bill was buried in Mount Moriah Cemetery just a few days later.

Mount Moriah, today, is a national historic cemetery and is the final resting place of not only Wild Bill, but Calamity Jane and other notorious figures from history. The cemetery is open year round to tourists for both walking and bus tours. All of the

tourist traffic has been taking its toll on the aging roads and measures were taken last summer to repair them.

The new curb and gutter had to be built to look like the original to keep the cemetery historically accurate. This meant the new standing curb would have to be built on top of a channel footing. Plans originally called for the channel footing to be handformed, a task that would take at least three weeks. Timing on the project was critical and the general contractor couldn't allow that much time for the footing. They turned to subcontractor Tru-Form Construction Inc. in Black Hawk, South Dakota, to slipform the channel footing with their GT-3200.

"I'm sure there's no way you could have done this slipforming job at Mount Moriah with any other machine," Matthew Leon, president of Tru-Form Construction, said. "We're always looking for new things to do with our machine and we've never worked in a cemetery before. Normally, when dealing with tight clearances, you're talking about trees. On this project the tight clearances were trees, rocks and tombstones."

Clearances were sometimes an inch (25 mm) or less and a few times the GT-3200 had to be taken off-line and freehanded for short distances. There was simply no room for stringline and sensor wands in certain areas.



CG-090307 #15



CG-090308 #0A

Tight clearances and paving conditions created by the narrow roadway, trees and tombstones created some challenges on the project.

“Jon LaFramboise is my partner and machine operator, and he did a fantastic job on the project,” Leon said. “He’s had a lot of experience on the GT-3200 and this project would have been really difficult to accomplish with someone new to the machine.”

Tru-Form slipformed approximately 2330 feet (710 m) of the channel footing. The profile of the channel was 18 inches (457 mm) wide, six inches (152 mm) thick with a seven inch (178 mm) by three inch (76 mm) deep cutout.

Tight clearances weren’t the only challenge on the project either. Tru-Form had to deal with the narrow roadway, only 10 feet (3 m) wide in areas, and not wide enough for both the GT-3200 and a concrete ready-mix truck. They slipformed the project last summer during peak tourism time in the Black Hills. The cemetery remained open the entire time and the safety of the tourists in job-site working conditions was a major concern. A majority of the project was slipformed on grades up to 10 percent with several radii adding to the overall difficulty. Despite all the challenges, the project was slipformed in just two days.

“We had to pour on the job twice because of logistics and getting the concrete trucks in and out of the job site,” Leon explained. “The road was only 10 and 12 feet (3 and 3.7 m) wide. It took some effort to coordinate the trucks. What we had to do was order our mud ahead of time and all of the trucks were sent to the turn-around loop in the back of the cemetery. Basically, we had all of them in there ahead of the GT-3200. They were stacked up in order so they could back around the turn-around loop and get to us.”

“I’m sure there’s no way you could have done this slipforming job at Mount Moriah with any other machine,” Matthew Leon, president of Tru-Form Construction, said.

When the road narrowed to only 10 feet (3 m) wide, they had to bring in a skid steer. There simply wasn’t enough room for both the paver and the trucks. The concrete trucks unloaded into the skid steer’s bucket before it was dumped into the GT-3200’s hopper.

“Some of the project was pretty steep, a 10 percent grade or more, with several different radii to maneuver around,” Leon added. “We’ve done a 2.5 foot (0.8 m) radius on a parking lot before so these larger ones weren’t too big of a deal. When we set our pins, we feel that the closer together we can get them, the better, especially in a radius. It makes a nice smooth radius with the machine and in Mount Moriah, our pins were very close. They’d be five feet (1.5 m) apart at times and only 12 inches (305 mm) apart on some of the radii and tight clearances.”

The biggest challenge on the project, though, was the tourists. Mount Moriah Cemetery remained open to walking tours while Tru-Form was working.

“They were curious and just wanted to see what we were doing,” Leon said. “It’s a lot different than having a closed job site. We had to pay extra attention to safety with backing the concrete trucks in and out, keeping tourists out of our wet channel and being careful with the historical markers. We didn’t want to disturb anything we weren’t supposed to.”

The channel curb was slipformed with a state of South Dakota 4000 psi (30 MPa) concrete mix. Slump averaged two inches (51 mm).

“We just let the machine do the finishing work,” Leon said. “It was coming out so nice that we didn’t need to do anything else to it. I just talked with the


job superintendent and he said they didn’t have any trouble setting their standing curb in our channel footing. He was happy with the way the project turned out and happy customers are good customers.”

With work complete at Mount Moriah Cemetery, Tru-Form Construction is looking forward to other challenging projects. The company averages between 25,000 to 35,000 feet (7620 to 10,668 m) of curb per year with their GT-3200.

Tru-Form’s guidelines for completing quality projects are simple.

“You have to work closely with the general contractor and the supplier of your concrete,” Leon explained. “Have all of your stringline set properly before you start pouring and make sure your grade is accurate so you’re trimming just the right amount. You want to do your homework ahead of time and be prepared for what you’re going to get into because you don’t want to have to make adjustments in tight spots.”

Owning a GOMACO curb and gutter machine is helpful, too.

“For such a small machine, the GT-3200 is really versatile,” Leon added. “That machine has been good for our company and very reliable. Tru-Form Construction is very pleased with the service and the products from GOMACO.” 



The cemetery remained opened to the public and Tru-Form had to take extra precautions to keep tourists safe.


WORKING OUT ON **THE NORTH FORTY**



The North Forty, in farming lingo, is the landowner's upper 40 acres on the farm. Denver, Colorado's, North Forty is more far reaching. It involves the removal, reconstruction and widening of Interstate 25 north of Denver. Fourteen miles (22.5 km) of interstate will be rebuilt and widened from four lanes to six, while another 26 miles (41.8 km) will undergo an Environmental Impact study. The total area covered, a distance of 40 miles (64.4 km), stretches from Broomfield to Fort Collins.

Lawson Construction Company, based out of Longmont, Colorado, is currently at work rebuilding 7.5 miles (12.1 km) of the interstate. They are responsible for final trimming of the grade and all of the concrete paving, from ramps to shoulders to the actual interstate paving.

To accomplish this huge task, they have a wide array of GOMACO



trimmer, a GT-6300 for shoulder work, an RTP-500 placer, a GP-2500 for ramp work, a GP-3500, two T/C-600 texture/cure machines, and a GP-4000 paver with an In-The-Pan Dowel Bar Insertter (IDBI) for interstate paving.

“There are a lot of obstacles to this project,” Ken Lawson, president of Lawson Construction, said. “We have to work with traffic at all times and can’t interfere with the flow on the interstate. The Colorado Department of Transportation (CDOT) put a lot of constraints on access and haul routes, and we had to do a lot of advanced planning on how we were going to deliver concrete to the project. That was always a challenge for us on this project.”

Concrete delivery was just one of the many challenges Lawson faced on the project. They have to maintain access to exit ramps, which creates short paving runs in several areas, and rideability had to be constantly monitored. CDOT uses the one-tenth blanking band specification with a less tolerant bump margin. Cool Colorado temperatures required hot water be added to the mix to meet the concrete temperature specifications. Just simply managing a project of this size, too, creates challenges that have to be constantly dealt with to ensure the timely and successful completion of the project.

Starting at the very beginning of the paving process is grade preparation. A subcontractor was responsible for



Photos by Kelly Krueger HW-030404 D23

Lawson is paving 40.5 feet (12.3 m) wide, 13 inches (330 mm) thick with their GP-4000.



HW-030403 D20

CDOT utilizes the one-tenth blanking band on their projects and readings under 15 inches per mile (287 mm/km) earn bonus. On this section of pavement, Lawson's best reading was 9.4 inches (148 mm).



Photo by Dennis Ernst HW-030407 D12

The IDBI inserts 36 bars across the width of the slab. The bars are 1.5 inch (38 mm) in diameter.



Photo by Dennis Ernst HW-030407 D23

A GP-3500 with a strike-off blade attached to the outrigger works in front of the GP-4000 paver spreading the concrete.

building the State of Colorado Class-6 base. Lawson then uses their 9500, sensing off the paving stringline, to trim to the final depth.

"We'd rather our dirt contractor over-fill the grade instead of under-filling," Lawson explained. "The 9500 does an excellent job cutting and controlling grade. It's a monster when it comes to trimming and you can cover so much ground with that thing. It's a production animal."

Three different GOMACO pavers are at work on various sites across the project. The GT-6300 slipforms shoulders, sometimes stringless, when conditions are just too tight to set stringline.

"Sometimes we just don't have

room for the stringline," Lawson explained. "We just run the paver on slope control and sensor off the new slab for grade control."

A GP-2500 paver slipforms the entrance and exit ramps. It's paving 25 feet (7.6 m) wide, which includes a 15 foot (4.6 m) driving lane and four and six foot (1.2 and 1.8 m) wide shoulders. An RTP-500 works in front of the paver placing the concrete over baskets.

Lawson's GP-4000 is paving 40.5 feet (12.3 m) wide while the IDBI inserts 36 bars, 1.5 inch (38 mm) in diameter, into the 13 inch (330 mm) thick slab. A GP-3500 spreads the concrete in front of the paver.

"We love to slipform pavement... as

wide and as long as we can go," Lawson said. "We poured 3140 yd³ (2401 m³) in eight hours on our last pour and we couldn't keep enough concrete in front of the paver."

Lawson has two mobile batch plants set up close to the job site to provide concrete for the project. The two plants are capable of producing 400 yd³ (306 m³) an hour. The concrete is batched out and transported to the pavers with end-dump trucks carrying 8 yd³ (6.1 m³) loads.

"Since we're pouring in March and Colorado temperatures are still pretty cool, we're adding hot water to our mix," Lawson explained. "The temperature spec is 50 degrees F (10 degrees C), but we shoot for

60-65 degrees F (15.6 to 18.3 degrees C) because it works better for our saw guys.”

Their concrete mix is a basic State of Colorado design with water reducer and air entrainment. Slump averages 1.5 inch (38 mm).

An Auto-Float® works behind the paver finishing and sealing the slab. A T/C-600 texture/cure machine follows applying a longitudinal tine and curing compound.

The State of Colorado utilizes the one-tenth blanking band for pavement smoothness. According to their specifications, 18 inches per mile (284 mm/km) is break even, with no reward or penalty given for the pavement. Anything under 15 inches per mile (237 mm/km) earns bonus.

“The one-tenth blanking band is

“We love to slipform pavement... as wide and as long as we can go,” Lawson said. “We poured 3140 yd³ (2401 m³) in eight hours on our last pour and we couldn’t keep enough concrete in front of the paver.”

pretty tight, and it picks up everything, even deep tining,” Lawson said. “This 7.5 miles (12.1 km) is a total profile index project where the state takes all the profilograph readings from one end to the other and averages them for your final result.

“We won’t have any trouble meeting specs. On this section of paving, our highest reading was 12 inches (189 mm) and our lowest was

9.4 inches (148 mm). That’s pretty good paving.”

Lawson’s \$65 million project on Denver’s North Forty is scheduled for completion in August 2004. After the mainline paving is finished, they have some 60 inch (1524 mm) tall offset barrier wall to slipform before their obligations on the project are fulfilled.


Editor’s Note: GOMACO would like to congratulate Ken Lawson and Lawson Construction Company for being named the 2003 Colorado Contractors Association (CCA) Contractor of the Year. CCA gives the award to the firm voted the best in safety, environmental excellence and service. 



Photo by Dennis Ernst HW-030407 D6

Concrete slump averages 1.5 inch (38 mm). Lawson feels it’s the ideal slump when working with an IDBI and inserting bars.

A GP-2500 is used for various paving widths on the projects entrance/exit ramps.



CS-030401 D26



CS-030401 D11

An RTP-500 places concrete in front of the GP-2500.



HW-030404 D2

A T/C-600 applies a longitudinal tining to the new interstate.



Eco Tech works on a new roadway with their new generation GP-2600. The full-width paving is slipformed with integral curb on both sides.



Making Ride with a New Generation Paver

Eco Tech Construction L.L.C. specializes in concrete slipform paving in the Des Moines, Iowa, area and surrounding municipalities. Rideability has to be met on a variety of smoothness indexes and Eco Tech chooses to pave with GOMACO equipment to meet the challenging specifications.

“We have municipalities that have smoothness specifications on all of their arterial streets, whether it’s a 35 or 45 mile (56 or 72 km) per hour zone or not,” Troy Jones, general superintendent for Eco Tech, explained. “Different municipalities will have different specifications, from urban standard to writing their own addendum. We’ve been really satisfied with our GOMACO pavers and the rideability we get from them. Ultimately, if you’re not concerned about the bumps you get, you should just as well buy another brand of paver.”

When it was time to add another new paver to their fleet, Eco Tech chose the newest paver in GOMACO’s line, the new generation GP-2600. The redesigned paver had several options that intrigued them, including the low-profile engine shroud, relocated vibrator controls, quieter operation, and the award-winning G21 digital operating system.

“The lower engine shroud and new operator’s console with the G21 controller stands out as two key things to help the operator,” Jones said. “We transport our pavers around the Des Moines area quite often and those two features also make it so much easier for loading and unloading. It’s definitely quieter, too. There have been many steps that GOMACO has taken to improve their pavers and make them more user friendly.”

The new paver was put to work on a project in Des Moines, building a new cul-de-sac road for the Rosewood development and the reconstruction of 38th Street, a main artery into the city of Urbandale.

The grade on the project is several feet below the haul road. The project also has to be slipformed over continuous steel reinforcing. The company brought in their PS-30 placer/spreader to work in front of the GP-2600.

“That PS-30 is really handy and we couldn’t have done this job without it,” Jim Cooley, paving supervisor for Eco Tech, said. “With good conditions, we can dump 10 yd³ (7.6 m³) a minute in that thing. It really makes the paving easy.”

The new generation GP-2600 is paving 26 feet (7.9 m) wide with six inch (152 mm) integral curb on both sides. The new roadway is 8.25 inches (210 mm) thick.

The concrete mix design is a standard State of Iowa C4 mix with a 4000 psi (30 MPa) strength. Concrete slump averages two inches (51 mm).

“I use an eight inch (203 mm) thick pavement as my starting/stopping point for slump,” Jones said. “If we’re eight inches (203 mm) and above, we’ll average two inches (51 mm). If we’re at seven inches (178 mm) or below, we’ll average 2.5 inches (64 mm), because the taller you get with an integral curb, the more top heavy it gets with wetter loads.”

Finishing work behind the paver is kept to a minimum.


“Joints are placed every 15 feet (4.6 m) and we do the standard mopping, texture everything, and put a coat of cure on it,”

Cooley said. “This new paver has just worked great right out of the gates. It’s quieter and the operator has more visibility over the whole project. It’s just an all-around great package.”

Eco Tech purchased their first GOMACO, an 8500 trimmer, in 1977. Four years later, they added a GP-2500 paver and it’s been nothing but GOMACO pavers ever since. The company credits their equipment, along with careful job-site preparation, as the key to good rideability numbers.

“I think the most important thing a contractor can do is allow themselves enough time to thoroughly and properly go through the machine, give it a dry run without any material and look for any inconsistencies in your track-pad line,” Jones said. “You just have to take the time to double-check exactly what they teach you at GOMACO University about the necessary prep work.”

GOMACO University, according to Jones, is a valuable learning tool. Many of Eco Tech’s employees have attended some of the University’s week-long classes. Jones himself has attended nine times.

“Every time you go there, you pick up at least one thing,” Jones explained. “If there’s 10 to 15 ready-mix trucks sitting there and there’s something wrong with the machine... what are you going to do? That one thing you’ve learned might save your company several thousands of dollars if it can solve the problem at hand.” 



Eco Tech works in several different municipalities, each with differing smoothness specifications. Their GOMACO pavers help them meet the rideability spec.

“The lower engine shroud and new operator’s console with the G21 controller stands out as two key things to help the operator,” Jones said.



The redesigned operator’s console and low-profile engine shroud allow ultimate operator visibility over the entire job site.

HW-110309 DT7

HW-110307 D9

— The New Bangkok International Airport — is Slipformed Exclusively with GOMACO Equipment

Work is currently underway on the New Bangkok International Airport (NBIA) in Thailand. The project, scheduled for completion in September 2005, has been in the planning stages for many years and is finally becoming a reality.

The new airport has been named Suvarnabhumi (pronounced soo-wan-na-poom) or “the golden land” by King Bhumibol Adulyadej himself, and will feature 6,060,280 ft² (563,000 m²) of passenger terminals, 120 parking bays and 51 contact gates. After the first phase of construction, the new airport will be capable of handling 45 million passengers and three million tons of cargo per year operating 76 flights per hour on the two runways.

Suvarnabhumi is located in the Bangphli district of the Samut Prakarn province of Thailand, just 15.5 miles (25 km) from downtown Bangkok. Don Muang, Bangkok’s current international airport, is the 22nd busiest airport in the world and the busiest in Southeast Asia. Thirty million passengers pass through Don Muang annually, stressing the airport’s capacity to the maximum. Don Muang will become a domestic-only airport once Suvarnabhumi opens.

A large part of building the new international airport is the five apron areas covering 4,936,437 ft² (458,595 m²). Six international consortiums bid the concrete paving project with the winning tender going to the IOT Joint Venture. The venture comprises three companies: Italian-Thai Development Public Company, Ltd. (ITD), Obayashi Corporation and Takenaka Corporation. ITD is in charge of the concrete paving for the aprons and operating the equipment.

The company had never worked on an airport or used a concrete slipform paver. ITD researched their options in the concrete slipform paving market and ultimately turned to GOMACO International’s Tim Nash and GOMACO’s distributor in Bangkok, Metro Engineering & Machinery Company, Ltd. (MEC). All of the



Photos courtesy of MEC HW-040405 D1

The new international airport has been named Suvarnabhumi or “the golden land” by the King.



HW-040405 D21

The new airport is scheduled to open September 29, 2005.



HW-040406 D14

The IOT Joint venture is currently at work with two new generation GP-2600s slipforming five aprons at the airport that will cover a total area of 4,936,437 ft² (458,595 m²).



Photo by Tim Nash HW-050410 D2

A T/C-400 works behind the paver applying a horizontal tine and spray cure.

concrete paving on the new international airport will be slipformed exclusively with GOMACO equipment.

“NBIA is a very high-profile project in our country and one of great importance,” Somkiat Wattanalaowit, vice president (equipment control) of ITD, said. “As this is ITD’s first airport job, our decision to go with the GOMACO/MEC paving team came down to three factors: MEC’s local support team, GOMACO’s 40 years experience in concrete paving and a slipform paving mold that we believe to be the most suitable in the industry for airport construction.”

ITD chose GOMACO’s newest paver for their project, the new generation GP-2600. The GP-2600’s reputation for superior rideability results, easy operation with the G21 digital operating system, quiet operation and job-site mobility made it an easy choice. A

“The ability to adjust the vibrators on-the-go and the mold for edge slump is invaluable,” Keienburg, ITD’s paving consultant, said.

PS-2600 placer/spreader, two new generation GP-2600 two-track pavers and two T/C-400 texture/cure machines were put to work slipforming the aprons.

“It’s a unique experience for ITD and all concerned,” Tim Nash, Asia-Pacific district manager for GOMACO, said. “It’s the first slipforming on an airport in Thailand. It’s ITD’s first time using a mainline paver and, in addition to the the paver, ITD has invested in mechanization of the whole paving


process, from concrete supply all the way to surface texturing and application of the curing compound. ITD is the first company in Southeast Asia to invest and employ this full complement, state-of-the-art paving train on a paving job.”

The width of the new slabs varies between 16.4, 18 and 19.7 feet (5, 5.5 and 6 m) wide with a consistent depth of 17.7 inches (450mm). Longitudinal joints have bars that are 0.6 inch (16mm) in diameter and 3.3 feet (1 m) in length on 9.8 inch (250 mm) centers. The specifications did not call for continuous steel reinforcing, instead the aprons have transverse bars every 16.4 feet (5 m) with transverse expansion joints every 328 feet (100 m). No keyway is slipformed into the edge of the slab.

“We are quite happy with the new generation GP-2600,” Wichien Roongrujirat, project manager for IOT Joint Venture, said. “With regard to the 29.5 feet (9 m) capable GP-2600 two track being chosen over a Commander III or a smaller competitive model for 19.7 feet (6 m) paver, we felt that the extra horsepower and heavier machine would be an advantage when paving 16.4 to 19.7 feet (5 to 6 m) wide and 17.7 inches (450 mm) thick on a very aggressive paving schedule. We also like the maneuverability of the two-track paver on the apron works compared to a four-track machine.”

Paving 16.4 feet (5 m) wide, daily production averages approximately 3281 feet (1000 m) per paver in a 13-hour shift. Concrete slump averages 1.2 inches (30 mm).

“The ability to adjust the vibrators on-the-go and the mold for edge slump is invaluable,” Uwe Keienburg, ITD’s paving consultant, said. “The consistency of concrete slump required for slipform paving is sometimes difficult to achieve out of the batch plant so the edge slump adjusters make it convenient for us to adjust for the clean, 90-degree edge that we’re required to have. Also, with the ability to accept a higher slump range, we’re able to increase our paving production. My goal is to get up to 3281 feet (1000 m) every day.”

Paving on Suvarnabhumi started in April 2004 and should be finished by May 2005, on track for the September 29, 2005, opening of the airport. 

Hot temperatures, strong winds and a concrete mix design high in cement caused the new slabs to dry out quickly. To prevent this from happening, they were immediately covered. 19



The width of the new slabs varies between 16.4, 18 and 19.7 feet (5, 5.5 and 6 m) wide. All of the slabs are 17.7 inches (450 mm) thick.



Photo by Tim Nash HW-050413-D3

Photo by Tim Nash HW-050410 D3



Photos by Kelly Krueger, CC-090313 D12

Dormark Construction slipforms 34 inch (864 mm) tall parapet wall with their Commander III on two bridges near Holly Springs, Iowa.

Quality & Patience Rules Parapet Projects

Dormark Construction, based out of Grimes, Iowa, specializes in slipforming bridge parapet. They have a GT-6300 with a barrier mold and they travel with their machine across Iowa and four of the surrounding states. Just last year, they purchased another machine, a Commander III, and it's been working non-stop pouring wall ever since.

The Commander III, according to Dormark, is an ideal machine for wall work and they utilize many of the machine's features. A steady, smooth working speed, All-Track Steering and Selective Steer are just a few of their favorites.

"The Commander III is just an excellent machine," Russ Vetter, concrete paving superintendent for Dormark, said. "For us, it's not how fast it can go, but how smooth it is at low operating speeds. When you're pouring a barrier, you're going at a particularly slow rate and this machine is incredibly smooth at a slow speed."

On a recent project near Holly Springs, Iowa, the company slipformed parapet for two separate bridges, approximately 600 feet (183 m) of parapet. The wall is a state of Iowa standard 34 inch (864 mm) tall parapet over continuous steel reinforcing.

Stringline setup is an important aspect of their work and Dormark has developed a unique method for measuring its placement.

"Normally you're told to set the stringline off the edge of the bridge," Vetter explained. "What we do is measure off the inside bar of our steel. Once it's set, we go back and eyeball the string and make it straight. This way the steel stays centered in the wall and the machine is pouring the

wall so it will follow that steel and keep it in the center."

Their sensor placement also varies from the norm. They prefer to run their sensor ahead of the front leg instead of positioning it in front of the mold.

"Having the sensor in front makes that track stay on line that much better and the less that track has to work, the better off we are," Vetter said.

They use a state of Iowa D-57 concrete mix that contains 15 percent Type-F fly ash and a percentage of water reducer to help increase the air content. Slump averages 1.25 inches (32 mm).

Speed isn't a factor in completing their work and the production rate doesn't dictate their standard of quality.

"We did a 44 inch (1118 mm) full median wall in Des Moines recently and we averaged 1400 feet (427 m) in a 12-hour day," Vetter said. "It's really not how fast you can go or how much production you can get down in a day, it's the quality of the work that you put out. You don't want to go any faster than your finishers can keep up with or any faster than your concrete supply."

They also need a machine on their projects that is easy to maneuver. Once one side of bridge parapet is slipformed, the machine has to be taken off line, turned around, put back on line, and be ready to pour the second side. Most of the time, this maneuvering has to be done in tight conditions with little room to move.

"Selective Steer is an invaluable use on this Commander III," Vetter said. "We can turn the machine around on a dime and All-Track Steering gets us back on line in no time. Crab steer, rear steer, front steer... the

machine just steers itself up to and on the stringline.”

Work behind the machine is kept to a minimum. Workers apply a broom finish and apply curing compound. No expansion joints are necessary on these two bridge decks near Holly Springs because of their short lengths.

The bridges were finished in less than two days and the Commander III was loaded up and headed towards its next project in Des Moines. No matter what the size of the project they're slipforming, Dormark has a few simple rules that they follow every time to ensure success.

“You have to take the time to know your job site in advance... what it looks like, logistics of it, getting your ready-mix trucks in, scheduling your concrete, and knowing if there are going to be any obstacles that will come into play,” Vetter said. “Little things like that can add up to big things in the end. Working with a GOMACO machine is fantastic, too. GOMACO builds an outstanding product.”



CG-090311 D26

CG-090317 D29



Dormark positions their sensor ahead of the front leg instead of positioning it in front of the mold. They feel that because of its placement there, they get a much better product out the back of the mold.



CG-090313 D20

CG-090314 D13



The Commander III's Selective Steering allows Dormark to maneuver the machine around tight job-site conditions.

Slipforming at New Heights

Complete General Construction in Columbus, Ohio, has owned GOMACO machines since 1970. They've tackled several challenging projects and successfully completed them. Last summer, they started work on a project that would take them to new heights on I-670 through downtown Columbus. The contract called for approximately 16,000 feet (4877 m) of barrier and parapet walls, including 420 feet (128 m) of 93 inch (2362 mm) tall wall with no caged-steel reinforcing.

It could be the tallest barrier wall ever slipformed without steel reinforcement at 93 inches (2362 mm).

"The most difficult aspect of the project had to be just trying to decide to slip the wall or handform it," Jeff Thompson, concrete division manager for Complete General, explained. "It was a gamble for us. The wall design was a modified Ohio Department of Transportation 50 inch (1270 mm) single-slope, center-line barrier wall. In this tall section, it grew from 73 to 93 inches (1854 to 2362 mm) and we determined that it was actually more cost effective to slipform it than to handform and pour it."

The company had experience slipforming wall, just nothing this tall. In fact, very few companies have experience with extremely tall walls. Complete General went to Indiana to consult with CRI Construction. The Indiana contractor successfully slipformed 104 inch (2642 mm) tall wall over steel reinforcing with their Commander III (*GOMACO World Vol. 28, No. 3*).

Complete General would be using the company's old work horse, their Commander IV, to slipform the wall.

"The Commander IV is the oldest paving machine we have right now and we just love it," Joe Kuhn, concrete



Photos courtesy of Complete General CG-020403 #1



CG-020403 #3



CG-020403 #4



CG-020403 #5

Complete General slipformed what could be the tallest section of barrier wall without steel reinforcement. The wall is 93 inches (2362 mm) tall.

superintendent, said. "It's just been so versatile for us and you wouldn't believe how many different operations we've been able to use it for. I knew it was the machine for this wall.

"The biggest thing on a project like this is the concrete. You have to communicate with your supplier and make sure everyone's on the same page about the low slump, the consistency of the slump and the timely arrival of the trucks. You have to take into consideration that the machine and mold are a gimme. They're going to work, so the concrete is the only variable."

They used an old-fashioned concrete mix design with no chemical additives, just a consistent low slump of 0.5 inches (13 mm). Ready-mix trucks were limited to 8 yd³ (6.1 m³) loads, too.

"It helped with slump control," Thompson explained. "Unloading the trucks took 15 to 20 minutes and it took a truck and a half to go through the mold, so you basically had one-half hour that

the concrete was sitting in the mold before it came out the back. The smaller loads could be controlled a lot better."

A total of 10 vibrators worked to consolidate the low-slump concrete inside the mold. Complete General had all of the vibrators rebuilt before the pour, just to eliminate any potential problems on the pour.


The tall wall section of the project was slipformed in two days, moving at a production rate of only four inches (102 mm) per minute.

"We didn't set any land-speed records on this pour," Thompson said. "It just took so much concrete to go 12 inches (305 mm) and we figured 12 inches (305 mm) of the new wall had to weigh two tons. It was slow, but we couldn't have handformed and poured it in two days."

"It moved at a snail's pace but we sure got a good product out of our GOMACO machine," Kuhn added. "When you're standing next to a 93 inch (2362 mm) piece of fresh concrete slipped out, it's something to see. It really is."

Complete General finished the entire wall project successfully and have since moved on to other challenges. This year they'll be slipforming 102 inch (2591 mm) wall, this time over steel reinforcing.

"The Commander IV is just a nice machine and we'll probably own ours forever," Thompson said. "We've had great success with all our GOMACO products. On this wall, everything went off without a hitch and we had no problems slipforming any of the wall. In fact, I think we could add another 10 to 12 inches (254 to 305 mm) to the tall wall."

Editor's Note: If you know of anyone who has slipformed non-reinforced barrier wall taller than this, please contact me at kkrueger@gomaco.com. 



Astaldi S.P.A. (left) is at work in El Salvador on a whitetopping project with their GT-6300.

CG-050404 D4

CL-030402 D17



Mota & CIA S.A. finish a canal near Belmonte, Portugal, with their CP-650.



A four-track GHP-2800 slipforms a new highway in Guangzhou, China.

HW-050401 D31

CG-040401 #24



Miller Brothers dealt with some tight clearances while working on a cattle barn floor in Casa Grande, Arizona. The company used their GT-6300 to slipform the floor while applying a longitudinal groove.



Shandong Water Engineering Corp. is at work on the South Water Diverted North Project in Jinan City, Shandong province, China. The entire canal is 497 miles (800 km) long.

SL-050401 D32

HW-010406 D5



Condotti slipforms a runway (above) for a new airport in Aqaba, Jordan. They're using a four-track GP-2600 with Auto-Float® and a T/C-600 texture/cure machine.



Tru-Form Construction (left) finishes a new roadway with their new generation C-450. The new road leads to Wind Cave National Park in the Black Hills of South Dakota.

CL-050402 D1



EG-040402 D6



EG-040404 D18

GSI® - In Testing and In the Field

The GOMACO Smoothness Indicator (GSI®) was one of 68 road profilers that took part in the Federal Highway Administration's "Profiler Round-Up" study in April. The profilers were tested on two separate tracks in Blacksburg, Virginia, and Newville, Pennsylvania. The study, which was performed by the University of Michigan Transportation Institute, will compare the different types of profilers to help improve methods for verifying their results.

The GSI is unique to other profilers with its ability to measure the smoothness of both wet or cured concrete slabs. It can be mounted to either the back of the paver or the GSI framework and can record up to eight traces per pass. Any irregularities in the slab are identified, their location recorded by a distance tracking encoder, and contractors can then repair the concrete surface while it's still in the plastic state.

In the photo to the right, a GSI is mounted to the back of a GP-2600, in the center of the paver, slipforming on an airport project in Cherokee, Iowa. GOMACO will soon begin a research project with Iowa State University where four GSI units will be mounted on the back of a GP-3000 paver.

The GSI took part in the Federal Highway Administration's "Profiler Round-Up" in April. Sixty-eight road profilers were compared and verified on two different test tracks, one in Blacksburg, Virginia (top left), and the other in Newville, Pennsylvania (top right).



The GSI, mounted to the back of a GP-2600 and in the center of the paver, monitors pavement smoothness on an airport project in Cherokee, Iowa.

HW-050412 D6

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