Vol. 39, No. 1

GOMACO WORLD

Vol. 39, No. 1

GOMACO WORLD

Please visit our Web site at
http://www.gomaco.com

GOMACO World magazine at
http://www.gomaco.com/gomacoworld

GOMACO World Editor Kelly Krueger at
kkrueger@gomaco.com

GOMACO World is published by GOMACO Corporation to inform readers of applied construction technology utilizing GOMACO equipment as well as innovations and concerns in the construction industry throughout the world.

Address all communications to *GOMACO World* Editor. If you do not receive *GOMACO World*, and would like a complimentary subscription, please contact GOMACO Corporation, PO Box 151, Ida Grove, IA, 51445, USA, 712-364-3347 or e-mail bwonder@gomaco.com.

GOMACO Corporation's Quality Management System Is ISO 9001:2008 Certified By The American Systems Registrar.

Quality Policy: We Shall Meet Or Exceed Our Customers' Expectations.

Short-Term Inconvenience Provides Long-Term Fix at New York's John F. Kennedy (JFK) International Airport

Photos by Ed Lampe HW-110931 D11

Tutor Perini Corp. had 120 days to build the bulk of the new 14,572 feet (4442 m) long, 200 foot (61 m) wide Bay Runway (13R-31L) at John F. Kennedy International Airport.

It's the runway reconstruction project that was felt around the world. John F. Kennedy (JFK) International Airport's main runway, the Bay Runway (13R-31L), was in need of repair. Its governing organizations intensively researched the best possible methods and procedures to either repair the aging runway or replace it. Flight delays resulting from a completely shutdown Bay Runway could potentially be felt across the world.

JFK International Airport serves 48 million passengers and 440,000 flights annually, with the total number of air passenger traffic expected to increase by 20 percent over the next decade. The Bay Runway handles about one third of the annual operations, including more than half of all departures. The newly rebuilt runway is expected to reduce delays overall by an estimated 10,500 hours per year.

Another interesting fact about the Bay Runway... at 14,572 feet (4442 m) long, it is one of only three in the United States long enough to land the NASA space shuttle. Rebuilding the runway efficiently and quickly was a major consideration in the preplanning phases of the project.

In a July 28, 2009, news release from New York Governor David A. Paterson, the scope of the project was laid out... *Construction on the Bay Runway, or Runway 13-31, will begin immediately as part of the second phase of the JFK Delay Reduction Program. The project will widen the runway from 150 to 200 feet (45.7 to 61 m) and will include a new drainage system, new electrical infrastructure, the addition of delay reduction taxiways and accommodations for future navigational aids.*

This investment in the Bay Runway takes advantage of an opportunity to make longer-lasting improvements to the Bay Runway - foregoing old-model asphalt for an 18 inch (457 mm) concrete overlay instead. The lifespan of concrete is nearly five times more than asphalt and will provide an estimated long-term savings of $500 million while reducing the need for ongoing maintenance.

The Bay Runway was first placed into service in 1947. The concrete runway was built on top of six inches (152 mm) of stone screenings, 150 feet (45.7 m) wide, 10,000 feet long (3048 m) and 12 inches (305 mm) thick. Various repairs and resurfacing have taken place since then. This new contract,

A GOMACO 9500 placer works in front of the four-track GP-4000 paver. Over 20 trucks hauled 12 cubic yards (9.2 m^3) of concrete to the paving site.

HW-110928 D17

though, would restore the runway to its original concrete build with a new 40-year expected lifespan.

Tutor Perini Corporation, based out of Sylmar, California, was awarded the Bay Runway contract and given just 120 days to complete the bulk of the project. Company officials immediately began looking for the most reliable and productive equipment to use in all phases of the reconstruction. For the concrete slipforming work, including the new runway, Tutor Perini Corporation executives Jack Frost, CEO of the Civil Group, and Steve Pavoggi, Operations Vice President, looked to GOMACO.

Ultimately, they chose both the GP-4000 and the GHP-2800 slipform pavers, with each model having certain benefits for the various aspects of the project. The GHP-2800 would also serve as a back-up paver for the GP-4000, which was a requirement written into the project specifications.

"We spent a lot of time planning out each aspect of this project," Damon Petrillo, Project Manager for Tutor Perini, said. "We even had back-up plans for our back-up plans. We knew we'd be paving 220,000 cubic yards (168,202 m^3) of concrete on the project. We talked with Len Rettinger, GOMACO's District Representative, a lot and from there we determined which paving train would be most applicable for this job."

Their main paving train included both a GOMACO 9500 placer and a PS-2600 placer / spreader in front of the four-track GP-4000 slipform paver with Auto-Float® and Leica Geosystems stringless guidance system. A T / C-600 texture / cure machine completed the paving train.

Before any work began on the Bay Runway, a test section had to be completed. The test section was new Taxiway KC, 1000 feet (305 m) long, 100 feet (30.5 m) wide, and 20 inches (508 mm) thick. The taxiway mimicked all of the same conditions as the runway, including excavation, milling, paving and more. It also gave the authorities and Tutor Perini a chance to test their concrete mix design and

HW-110932 D1

Taxiway KC was the test section, allowing Tutor Perini a chance to fine-tune their paving process before starting actual runway paving.

HW-041009 D12

The GOMACO GP-4000 slipforms a 25 foot (7.6 m) wide scab-on lane.

HW-110928 D11

Stringless systems allowed Tutor Perini to pave where they needed to, when they needed to.

HW-041009 D10

A GOMACO T/C-600 followed the paver applying a burlap drag and white curing compound.

paving methods.

"We spent a lot of time and a lot of money to ensure the success of the concrete mix design," Petrillo said. "It was a very difficult mix, in the sense that our top size aggregate was 2.5 inches (64 mm). The test section let us prove the mix was slippable and would achieve all requirements. When it came time to actually start paving the runway, the mix worked like a charm.

"This was also our first time running exclusively stringless and that was a bit of a learning curve for us. We got a lot of support from GOMACO and Leica and it all went pretty seamless. The test strip afforded us that opportunity to learn and figure it all out."

Thirteen of the 14 test lots earned six percent incentive payment, based on the statistical performance specifications. The 14th section earned full payment. Test section Taxiway KC was deemed a success.

The construction schedule was built to include three and one-half months between the completion of the test section and the beginning of the 120 day runway closure. During that time, a series of meetings were held to discuss the lessons learned while constructing the test section and perfecting their paving plan. Tutor Perini was also busy stockpiling their supplies, trucking in aggregates, cement and other raw materials.

Then, on March 1, 2010, the Bay Runway was officially closed for 120 days. By mid-March, Tutor Perini was paving concrete.

"Our concrete paving went very well," Petrillo said. "Keeping the concrete placement on schedule was the key factor for the project's overall success. The utilization of the Leica stringless system was one of many contributing components."

The GOMACO pavers were slipforming passes 25 feet (7.6 m) wide, so it required eight passes to slipform the 200 foot (61 m) wide runway. The

GOMACO pavers slipformed approximately 220,000 cubic yards (168,202 m³) of concrete, finishing the massive runway project ahead of the planned schedule.

HW-110925 D14

GP-4000 would work during the daylight hours on the longer paving runs. At night, while the GP-4000 went through cleaning and routine maintenance, the GHP-2800 worked on the shorter runs and fill-in sections of the project.

Concrete was produced by two on-site batch plants capable of producing over 6000 cubic yards (4587 m^3) per day. Slump for the sensitive concrete mix averaged approximately 1.5 inches (38 mm) at the paving site. Over 20 trucks, depending on which portion of the runway was being slipformed, hauled 12 cubic yard (9.2 m^3) loads of concrete to the paving site. The trucks would dump into the receiving hopper on the 9500 placer or the belt of the PS-2600 placer / spreader.

Smoothness specifications on the runway required a profile index with a two-tenths blanking band of 22 inches or less per mile (347 mm / km). Between 15 and 22 inches per mile (237 and 347 mm / km) was subject to a penalty reduction and over 22 inches (347 mm) required grinding. Straight-edge specifications allowed a 0.25 inch (6 mm) plus or minus grade differentiation in 500 feet (152.4 m). Tutor Perini easily achieved and exceeded both specifications.

"Both pavers achieved very similar results, especially when we had a steady supply of concrete," Petrillo said. "We incorporated an Auto-Float on both machines and for this type of paving, the Auto-Float eliminated a lot of hand-finishing work for us."

A GOMACO T / C-600 texture / cure machine followed the paver, applying a burlap-drag finish and spraying a concrete curing compound. Joints were placed every 25 feet (7.6 m), creating a total of 4900 squares, each 25 by 25 feet (7.6 m).

The runway reopened on June 28 with all navigational features, beating their required July 1 deadline. Total length was 10,925 feet (3330 m), requiring 160,000 cubic yards (122,329 m^3) of concrete. The early completion earned Tutor Perini a $5 million bonus. The remaining 3647 feet (1112 m) of runway was completed in the next few months with the total volume of work completed by mid-November 2010, one year ahead of their contractual schedule.

"This was such a unique project in so many aspects," Petrillo said. "We were all looking for the same result and we all wanted this to be a success. Through every single phase, we had complete cooperation from the Port Authority of New York and New Jersey, our subcontractors, suppliers, and consultants. That also includes everyone we worked with at GOMACO. We knew we had to pour concrete every day for this project to be a success."

Total length of the new runway was 14,572 feet (4442 m), requiring approximately 160,000 cubic yards (122,329 m^3) of concrete.

HW-110926 D4

The runway reopened early, beating the deadline, and earning Tutor Perini a $5 million bonus.

HW-110931 D6

Photo courtesy of *Construction Equipment Guide* magazine OF-021101 D1

John F. Kennedy (JFK) International Airport

OPERATED BY: The Port Authority of New York and New Jersey, under a lease with the City of New York since June 1, 1947.
LOCATION: On Jamaica Bay in the southeastern section of Queens County, New York City. The airport is located 15 miles by highway from midtown Manhattan.
SIZE: JFK covers 4,930 acres, including 880 acres in the Central Terminal Area. The airport has more than 30 miles of roadway.
INVESTMENT: About $150 million was expended on original construction. The Port Authority has invested about $6.1 billion in the airport.
TERMINALS: JFK has seven operating airline terminals, surrounded by a dual ring of peripheral taxiways. More than 125 aircraft gates serve the terminals.
AIR TRAFFIC CONTROL TOWER: The 321-foot tower, which opened in 1994, includes state-of-the-art communications, radar and wind-shear alert systems.
PARKING: The airport offers customers over 18,000 parking spaces in a variety of locations.
CARGO: JFK is one of the world's leading international air cargo centers. Two cargo facilities totaling 430,000 square feet of warehouse and office space offer the latest in cargo-facility design. The airport has more than one million square feet of office and warehouse space dedicated to broker, freight forwarder and container freight station operators who do business within the New York/New Jersey region.
RUNWAYS/TAXIWAYS: Total runway length is nine miles. Taxiways total 25 miles in length. All runways have high-intensity runway edge lighting, centerline and taxiway exit lighting and are grooved to improve skid resistance and minimize hydroplaning.

Slipforming 63 Kilometers (39.1 mi) of Turkish Canal with a GOMACO GP-2600

Eren Construction Company, located in Ankara, Turkey, is at work slipforming 63 kilometers (39.1 mi) of canal. The work is the last section of a 221 kilometer (137.3 mi) long irrigation canal which will carry water from the Atatürk Reservoir into eastern Turkey to irrigate agricultural land. This final section of canal runs between the cities of Mardin and Ceylanpinar in eastern Turkey.

The irrigation project is a high priority for the Turkish government and they are pushing to complete the project quickly, but with high quality. It led Eren's officials to make major investments for the project, including the purchase of over 100 new pieces of equipment. For the concrete portion of the canal, Eren officials looked once again to the slipforming process. The company has had previous success slipforming canals in Turkey with their GOMACO four-track GP-2600 canal paver, and were prepared for the enormous length of this new canal contract. This time though, they would be introducing stringless control on their canal paver.

First, Eren Construction must excavate and remove 13 million cubic meters (17,003,358 yd^3) of earth, lay down two million cubic meters (2,615,901 yd^3) of fill material and then fine trim the canal. Excavation crews work during the daylight hours and the canal slipform paving crew works during the cooler night time temperatures.

Because of the government's interest in the project and their push to get the canal completed, Eren has looked at the most efficient ways of completing the project. They decided to make a major investment into stringless guidance, for their earth moving equipment and their GP-2600 paver.

The complications of paving by stringline in the darkness of night included the difficulty of setting the stringline with limited line of sight and the visibility of the stringline for workers and truck drivers delivering concrete. The conversion to the Leica Geosystems 3D system improved accuracy and eliminated any potential stringline problems.

Eren has three mobile batch plants set up along the length of the canal. They are using a standard slipformable concrete mix design, with the aggregate being produced by on-site mobile crushing plants. The concrete has a 30 MPa (4351 psi) strength, and slump averages 30 to 50 millimeters (1.2 to 2 in).

SL-021106 D15

The new canal is covered with fabric and wet cured for four days to prevent surface cracking potentially created by the country's hot daytime temperatures.

Photo by Chris Headworth HW-101009 D11

Concrete is metered down the slope by an auger. A system of baffles controls the concrete and keeps it from sliding down to the bottom of the canal.

The canal is 10 meters (32.8 ft) wide at the bottom, 28 meters (91.9 ft) wide across the top, with a 10.8 meter (35.4 ft) slope run, and 1.5:1 slope walls. The canal will accommodate a six meter (19.7 ft) water depth when complete.

Before slipforming takes place, the slopes are lined with a T-Grip geotextile fabric. The fabric keeps the underlying soil from absorbing any water, which would make it swell. The GOMACO four-track GP-2600 is slipforming the slopes of the canal in 10.8 meter (35.4 ft) wide paving passes. The concrete slopes are 150 millimeters (5.9 in) thick. Paving production averages 250 to 300 meters (820 to 984 ft) per day, depending on concrete delivery.

Finishers apply a float finish to the new canal from a work bridge mounted to the back of the GP-2600 paver. Joints are cut into the new canal at three meter (9.8 ft) intervals. The fresh concrete is then covered with fabric and wet cured for four days to prevent surface cracking from the hot temperatures.

Photos courtesy of Biscontin Engineering SL-021105 D12

A *surveyor checks the Total Station working across the canal from Eren's GOMACO four-track GP-2600 paver on the stringless project in Turkey.*

"We purchased the Leica stringless system for our paver because we wanted to remove all stringlines on the project and to make night paving easier," Yaşar Eren, Chairman of Eren Construction Company, said. "Paving at night makes it difficult to ensure that stringlines are correct or not. We did not have that worry with the stringless system. The system improved our production capacity and allowed us to work where and when we wanted. We also had cost savings from less surveying and time savings."

The Turkish government has allowed four years to complete the project, but Eren Construction estimates they will be finished in only two and one-half years. The early completion date is attributed to several factors on the project, including slipforming the concrete canal and the Leica Geosystems stringless guidance systems.

SL-021103 D1

T*he finished canal will carry water from the Atatürk Reservoir into eastern Turkey to irrigate agricultural land.*

A Really *Sweet*

Photos by Nathan Woodford HW-061008 D5

Opp Construction Company, based out of Grand Forks, North Dakota, with an office in Fargo, specializes in all kinds of paving applications, from curb and gutter and barrier wall to municipal and airport projects. They also work on the agricultural side of things and perhaps one of their more unusual slipform paving applications is concrete pads for sugar beets.

Opp Construction has a unique relationship with American Crystal Sugar Company, based out of the Red River Valley of North Dakota. Every year, American Crystal begins its full sugar beet harvest around October 1. Its members harvest 24 hours per day until finished. The sugar beets are placed in huge outdoor piles, covered, and allowed to freeze until they can be processed into sugar.

"The concrete pad is a better surface for stacking the sugar beets on and they've been hand-forming these pads for years," Greg Opp, President of Opp Construction, said. "We actually introduced the concept of slipform paving to American Crystal and they accepted our suggestions. They take a really scientific approach to the piles, as far as how high and how wide each should be."

Last year, Opp Construction decided it was time to add another slipform paver to their fleet.

"We mainly do municipal and agricultural-type paving and we wanted a paver that was fairly easy to move around and something that can do the type of work that we're doing," Opp explained. "We've got a really good GOMACO

The sugar beet pads are 1500 feet (457 m) long, 75 feet (22.9 m) wide, and 10 inches (254 mm) thick.

Project - Slipforming Sugar Beet Pads in North Dakota

distributor here in Swanston Equipment Company, and also Brad Barkema as our GOMACO salesman. We worked together to find a solution that fit our needs."

That solution was a two-track GP-2600 slipform paver and an RTP-500 rubber-tracked concrete placer. The company's first project with their new paving equipment was a sugar beet pad near Grand Forks. The new pad was 1500 feet (457 m) long, 75 feet (22.9 m) wide and 10 inches (254 mm) thick. The GP-2600 was set up to pave the pad in three 25 foot (7.6 m) wide paving passes.

Concrete was provided by a mobile batch plant, but due to the remote location of the project, it had to be set up 25 miles (40 km) away from the paver. Fifteen ready-mix trucks carried eight cubic yard (6.1 m^3) loads of the high fly-ash content mix. Concrete slump averaged two inches (51 mm).

"The 10 inch (254 mm) thick concrete was continually reinforced with #4 bars every 24 inches (610 mm) on center," Opp said. "American Crystal has engineered these over the years and this is the design that works best for them. We also had #5 tie bars, 36 inches (914 mm) long on 36 inch (914 mm) centers."

Very little finishing work is required behind the GP-2600. The new slab is broomed and a spray cure applied. Joints are placed every 12.5 feet (3.8 m) transversely and longitudinally to create a series of 12.5 foot (3.8 m) squares in the new pavement. Opp Construction completed the 4000 cubic yard (3058 m^3) project in three days, slipforming approximately 1300 cubic yards (994 m^3) per each 10 hour day. It took approximately two months to complete the entire scope of the project.

"We are really happy with the performance of our new GP-2600 paver and the men are smiling because they

HW-061008 D2

An RTP-500 rubber-tracked placer works in front of the GP-2600 paver.

don't have to work so hard anymore," Opp said. "Our operator is doing well with and liking the G22 controller on it."

A few of Opp's operators were able to attend a pavers class at GOMACO University in Ida Grove, Iowa, in preparation for the spring arrival of the new paver. The class gave them a first-hand look at the G22 control system, and covered the setup and operation, maintenance, and advanced diagnostics for their new GP-2600.

"We're pretty happy with the program they run at GOMACO University and our operators came back with some valuable information," Opp said.

The GP-2600 and RTP-500 went on to complete several other municipal and city street projects during last year's paving season. The RTP-500 was kept busy nearly every day on a variety of Opp Construction projects.

"The RTP has been a really good machine for us and we've used it almost daily since we bought it," Opp said. "We use it in front of our bridge deck finishers, for municipal street patching, water line replacements and short stretches of street. It's helped us eliminate a couple of guys in front and has been a very good investment for the company."

HW-061007 D11

Opp Construction's GOMACO RTP-500 rubber-tracked placer and two-track GP-2600 paver slipforms sugar beet pads.

Photo by Jim Dimig HW-061004 D1

Photos courtesy of J.D. Abrams CL-081003 D1

J.D. Abrams is using their GOMACO C-450 to finish the direct connectors on the massive Spur 601 Project near Fort Bliss in El Paso, Texas.

C-450 Flies High on the Spur 601 Project

The Spur 601 Project in El Paso, Texas, was unique for several reasons. It was a design/build project for a 7.5 mile (12.1 km), six-lane highway on the eastern side of the city. The new road will connect U.S. Highway 54 on the western edge, to the Purple Heart Memorial Highway (Loop 375) on the eastern edge, which will improve access to the U.S. Army's Fort Bliss and to the city of El Paso, including international ports of entry to the area.

The El Paso Master Transportation Plan reported this northeastern area has one of the highest growth rates in the city. Also, the U.S. Department of

Defense will increase troop size at Fort Bliss by 50,000 as part of their Base Realignment and Closure activities. Soldiers commuting to and from the base need a route to get there from the city quickly and efficiently.

Traditional funding for the massive project would not be readily available for another five to 10 years. J.D. Abrams L.P., an El Paso based developer, came forward with a design/build proposal with themselves as the contractor, and arranged for the financing of the project. The Texas Department of Transportation (TxDOT) accepted the innovative proposal and allowed construction to move forward. It's the state's first private-sector, pass-through financing agreement.

This is how the pass-through financing agreement works. TxDOT provided $55 million during the construction phase: $45 million in federal highway funds and $10 million from the city-owned El Paso International Airport. Abrams worked with the Camino Real Regional Mobility Authority to sell bonds to finance the project. The state of Texas is reimbursing J.D. Abrams from the state transportation fund with payments based on the total volume of traffic generated by the highway.

It is not a toll road and the state will not collect tolls. TxDOT will count the total volume of traffic on a daily basis and pay Abrams back based on the number. Once completed, TxDOT will make payments for 10 years, with a $35 million per year cap.

"The project was absolutely massive," Brian Chaffe, Structure Superintendent for Abrams, said. "For any company to take on the liability of a $367 million project is pretty rare. During the early design phase, we had 100 designers working in our offices here in El Paso, and during the bulk of the construction between 250 to 300 workers and 33 foremen were on the project. It was a lot to coordinate."

Chaffe and his crew's main area of concern was an elevated six-lane section that stretches from Chaffee Road to U.S. 54.

An aerial view shows the nearly completed project, with some portions opened to traffic.

"The main bridge on this stretch at its widest point was 144 feet (43.9 m) and at its narrowest was 118 feet (36 m) wide," Chaffe said. "It's a monster with 53 spans, two on/off ramps and four direct connectors. One of the direct connectors involved 22 spans, 80 to 90 feet (24.4 to 27.4 m) in the air. To look at it from the air, it looks like a squid with four tentacles and there's nothing straight. We didn't have any simple, straight pours."

Abrams brought in their GOMACO C-450 bridge deck finisher to work on the direct connector portion and also on other areas on the project. Their C-450 was working 30 feet (9.1 m) wide and finishing four inches (102 mm) of concrete on top of four inch (102 mm) precast concrete panels, forming an eight inch (203 mm) thick concrete deck.

Strict concrete specifications required most of their bridge pours to take place at night in the cooler Texas temperatures. Before any pour took place, Abrams' surveyors fine-tuned the C-450's rail. The C-450 completed a dry run over every panel making sure everything was in exact alignment and the correct deck thickness was maintained.

The project required a Class S, 3600 psi (25 MPa) concrete mix capable of achieving a four-day strength of over 4000 psi (27.6 MPa). Concrete had to arrive at the site at a temperature of less than 85 degrees Fahrenheit (29º C), but higher than 50 degrees Fahrenheit (10º C). And if the concrete was too hot, it had to be doused at the plant with liquid nitrogen to cool it.

Once the concrete reached the job site, a local pumping company used their 58 meter (190 ft) pump to place the concrete up to the deck. Concrete slump averaged between 5.5 to six inches (140 to 152 mm).

Several challenges in the bridge deck pours created added difficulty, with 15 degree skews that straightened over a series of spans, bridge beam deflections, 2.5 inch (64 mm) crowns that shrunk down to zero, and widths varying in the same span.

"In one span, we had a crown that didn't match up to either side... a trapezoid pour with a crown down the middle of it," Chaffe said. "Our C-450 has horizontal alignment and the ability to widen or retract to match the changing width. It's really a great machine for us and we ask a lot from it, especially on this project.

"My advice to project engineers is simple. Don't skew the span if you don't have to and don't make the width of the span change if you don't have to. Everything else isn't really going to bother us."

Production on the bridge spans averaged 70 cubic yards (53.5 m^3) per hour, with the best production reaching 102 cubic yards (78 m^3) per hour.

"After so many pours and so many square feet of deck production, it got to be like clockwork for our guys," Chaffe said.

As construction progressed, different phases of the Spur 601 project were opened up to the public. Abrams was given a 41-month schedule to obtain right of way, relocate utilities, and design and build the project. They finished on time on January 28, 2011. The state has already made their first payment to Abrams, and will continue semi-annual payments until January 2020.

Working Together to Achieve *Ultimate Smoothness* on an Iowa Highway

Photos by Randy Bach HW-111003 D8

Manatt's Inc., a paving contractor based out of Brooklyn, Iowa, just completed 12.5 miles (20.1 km) of a 13 mile (20.9 km) project. The onset of Iowa's harsh winter weather at the end of November had the company elect to finish the final 0.5 mile (0.8 km) of the project in the spring of this year.

They are building the new section of Highway 30 in Marshall and Story counties in Iowa with their GOMACO paving equipment, including a PS-2600 placer / spreader, two-track GP-3000 paver, four-track GHP-2800 paver, and a T / C-600 texture / cure machine. The new concrete highway is 26 feet (7.9 m) wide, 10 inches (254 mm) thick, and slipformed in one paving pass.

The Iowa Department of Transportation's (IDOT) specifications for pavement smoothness utilize the zero-blanking band with both incentive / disincentive pay built into the contract. Profile indexes on roadways with speeds greater than 45 miles per hour (72.4 km / hr) require a measurement of 26.1 to 40 inches per mile (411 to 630 mm / km) for full pay. Anything under 26 inches per mile (410 mm / km) earns incentive pay, with greater incentives offered as the numbers go lower. Anything over 40.1 inches per mile (631 mm / km) is penalized with a disincentive, and even higher numbers require corrective measures.

"When we go to work, we have 60 guys on the project who want to pave perfect every time, including the paving crew, plant personnel, and trucking," Kevin Hogan, Paving Superintendent for Manatt's, said. "Every single day we follow the same procedures in order to achieve smooth rides. We set up our paver the way we're taught in the GOMACO manuals, with a few of our own steps added. Everyone on site knows the steps and it's all about communication and organization."

It was Manatt's continuing goal of always achieving the perfect pavement that had them agreeing to work with GOMACO controls engineers and research and development personnel on their Highway 30 project. Manatt's had achieved 75 percent full incentive pay on the first seven miles (11.3 km) of the project.

They equipped their 2004 model-year GHP-2800 paver with GOMACO's new 5400 series mold and a rear-loading, front-inserting 5400 series

Manatt's Inc. worked closely with GOMACO engineers and research and development personnel to maximize smoothness results on Iowa's Highway 30 project.

bar inserter. Manatt's also upgraded the paver's G21 to a G22 controller to test new software upgrades. Improvements from the G21 to G22 include a new display with high-resolution deviations meters on the run screen. The meters display possible machine deviations in multi-colored (green, yellow and red) bar graph meters. They also assist the operator in fine tuning both grade and steering performance on the paver. The G22 also features new, proprietary smooth paving software which detects and eliminates any stringline hits and rod and knot bumps.

GOMACO engineers worked closely with Manatt's personnel during the testing. Two pan-mounted GSI® (GOMACO Smoothness Indicator) units on the GHP-2800 would constantly monitor the paving results. The process began the first day with Manatt's using their standard settings on the G22 and recording the results. The second day, GOMACO's Controls Engineering Manager Mark Brenner adjusted the sensitivities. Then, on the third day, the new G22 software was installed and used for fine tuning the paver.

"With every step that we move forward with our controls development, our ultimate goal is to make machine operation less complicated for our users while improving paving accuracy," Brenner said.

The software, available for G22 and G+ control systems, has been designed in-house by GOMACO's controls

HW-111002 D10

The GHP-2800 is equipped with the new GOMACO 5400 series mold that features a spreader plow mounted on the paver frame T-rail.

Manatt's five miles (8 km) of profilographed pavement averaged 17.95 inches per mile (283 mm/km) in the left wheel tracks and 17.72 inches per mile (280 mm/km) in the right wheel tracks after the G22 with new, proprietary smooth paving software was installed on the paver.

HW-111004 D5

"With every step that we move forward with our controls development, our ultimate goal is to make machine operation less complicated for our users while improving paving accuracy."
-- Mark Brenner, Controls Engineering Manager for GOMACO

experts who understand concrete paving. Before this new software, the operator working at the control console would need a person on the ground watching for leg movement while going through the threshold calibration procedure. The groundman would communicate movement to the operator and the operator would set and record the threshold and the process would be repeated for each leg of the paver.

"With this new software we have one-touch calibration for the elevation threshold," Brenner explained. "The operator holds a button down and has instant feedback from any movement of the leg displayed on the G22's screen. One person is making the adjustments from on top of the paver. We have eliminated an extra person from the set-up procedure. When that is done, the operator can then set the paver up to pave either stringline or stringless, and using the green, yellow or red deviation meters go through the process of high-definition tuning."

From the first day of operating with the new G22 software to the end of the project, Manatt's rideability readings continued to improve. Profilograph readings were taken using Manatt's high-speed profilograph.

After approximately five miles (8 km) of new concrete roadway was slipformed with the new G22 software and GSI monitoring capabilities, Manatt's averaged 17.95 inches per mile (283 mm / km) in the left wheel tracks and 17.72 inches per mile (280 mm / km) in the right wheel tracks. The haul road was located on the right side of the GHP-2800 paver. On IDOT's pavement pay chart, pavement segments averaging 22 inches per mile (345 mm / km) or less earn maximum incentive pay. In the state of Iowa, that equals an incentive of $950 per 0.1 mile (0.16 km) segment per lane.

"We always have different variables popping up while we pave, from temperature variations, concrete slump changes, to everything else," Hogan said. "The new G22 and the GSI work together to help us overcome those variables and solve any problems immediately. It's a huge asset for a contractor to have. Before, if we were getting questionable numbers, we didn't know until 24 hours later when the ride report was output from the profilograph readings. Now, the GSI is

The new 5400 series bar inserter is rear loading and front inserting. Workers load the inserter, capable of holding up to 50 bars, from the work bridge on the back of the paver.

HW-111004 D2

HW-111008 D5

Manatt's was inserting a #4, 30 inch (762 mm) long bar every 36 inches (914 mm) with their new center-mounted 5400 series bar inserter on the GHP-2800 paver.

"There's so much precision there now in the small adjustments. We didn't change our paving method, just the technology behind it."
-- Kevin Hogan, Paving Superintendent for Manatt's Inc.

constantly tracing throughout the day and alerts us to any imperfections. It eliminates a lot of guesswork.

"It's a very simple process, too, from calibrating our machine each morning to setting up the GSI. That much technology and information can be overwhelming, but Mark Brenner was easy to work with and easy to learn from and now it's all just an easy fit for us. There's so much precision there now in the small adjustments. We didn't change our paving method, just the technology behind it."

Paving production on the Highway 30 project averaged approximately 3800 cubic yards (2905 m^3) per day, with several days averaging over 4000 cubic yards (3058 m^3). Manatt's had their mobile batch plant on site mixing the IDOT approved concrete mix. Concrete was delivered to the job-site in trucks carrying eight cubic yard (6.1 m^3) loads. The trucks dumped onto the belt of the GOMACO PS-2600 placer/spreader working ahead of the paver.

The paver's 5400 series bar inserter placed a 30 inch (762 mm) long, #4 bar every 36 inches (914 mm) into the 10 inch (254 mm) thick concrete slab. A burlap drag was applied behind the paver, followed by the GOMACO T/C-600 applying the texture and curing compound.

"Our last six miles (9.7 km) of paving on the project this season just kept getting better and better," Hogan said. "We earned 92 percent of our smoothness incentive pay and on the entire 12.5 miles (20.1 km) we earned 86 percent. We were producing a really nice slab."

HW-111010 D16

Two paver-mounted GOMACO GSI units monitor the smoothness in each driving lane. The information is instantly displayed and reviewed on a single touch-screen mounted on the side of the GHP-2800 paver.

HW-111007 D10

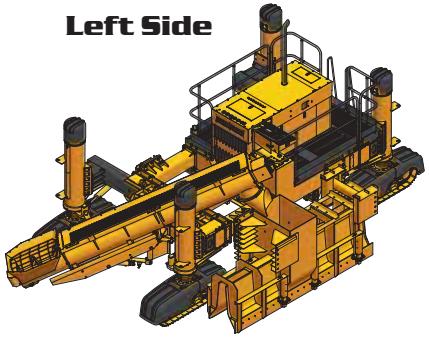
Introducing the All New GOMACO 4400, the Ultimate Barrier Machine!

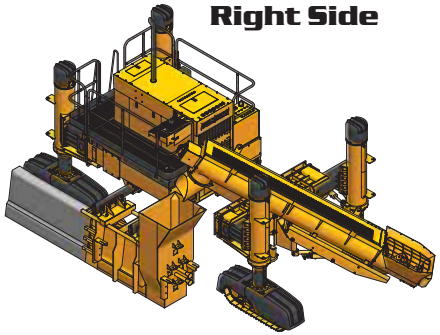
CG-011110 D9

The all-new 4400 slipforms right-side retaining wall next to a new sound wall along Interstate 95, a major roadway leading into Washington, D.C.

GOMACO Corporation proudly introduces the all new 4400, which features a totally new frame design for right-side and left-side slipforming. Its new Glide control console slides from side-to-side, for ultimate operator control and visibility of the paving operation. It features GOMACO's proprietary G+ control system, which is positively simple to understand and capable of operating in multiple languages.

The new 4400 was built around the design concept of a left-side and right-side slipforming capable machine with symmetric steering and minimal set-up changes for switching profiles from side-to-side. It has the new GOMACO Barrier Hook-and-Go mold mounting system to quickly mount barrier molds up to 39.4 inches (1000 mm) tall on either side of the machine. For barrier taller than 39.4 inches (1000 mm) or existing barrier molds, an optional GOMACO side-mount attachment is available. The GOMACO barrier mold itself is designed for proper vibration and consolidation of material, with the GOMACO-exclusive trailing stainless steel for superior finishing.





The barrier machine features the new 4400 series auger with the pitch and speed designed specifically for transporting low slump concrete. Its four-way hydraulic positioning capability allows the auger to be placed perfectly for concrete receiving and delivery to the mold on either side of the machine.

The 4400 features a Cummins QSB3.3, 99 horsepower (74 kW), Tier 3 diesel engine. The engine is power-optimized for fuel efficiency and approximately 18 hours of continuous barrier slipform paving. The high-capacity cooling package was designed for noise reduction and provides one of the quietest working platforms in the industry. The new G+ control system coordinates the speed of the hydraulic fan with engine and hydraulic oil temperature. The tractive system on the 4400 features super low, allowing for the minimum speed and slow, smooth crawl necessary for a vertical wall. The new G+ speed dial turns to adjust in one percent increments and speed display feedback allows for smooth, precision paving speed control.

Its unique GOMACO U-shaped operator's platform, with vibration isolation, puts the operator comfortably on top of the action. The U-shaped platform and side-to-side sliding console accommodate right-side and left-side pour and provide a 360 degree view of the entire paving operation. Safety is first in all of GOMACO's design considerations. The 4400 features track guards and ground level emergency stops to keep everyone safe while working around the machine.

GOMACO around the world

CL-121002 D4

Stiler S.A. *finishes a fill-in lane with an 80 to 120 millimeter (3.1 to 4.7 in) crown with their C-450 on a street project in Montevideo, Uruguay.*

CG-091005 D3

Coffrages Dunasso 2001 Inc. *slipforms stand-up curb on a new development project in Cowansville, Quebec, Canada.*

SL-111008 D10

An SL-450 *is at work on the Melbourne Water Canal Project in Melbourne, Victoria, Australia, for the B.P.L.-Fitzgerald-Staps consortium of contractors.*

HW-101007 D7

Ikiz Insaat Turizm Ve Tic. Ltd. Sti *slipforms a scab-on lane with their four-track GP-2600 paver on an airport project near Ankara, Turkey.*

SL-011114 D9

SL-011113 D5

Coffman Specialties has reconfigured their All-American Canal paver into a full-prism paver and is slipforming a new canal project in Sacaton, Arizona. The water stop machine and work bridge are also being used on the canal. For more information on the All-American Canal project and equipment, please refer to GOMACO World, Volume 36, Number 2.

CG-101001 D4

Marcon Concrete LLC slipforms stringless curb and gutter with their GOMACO GT-3600 in Meridian, Idaho.

Al Musban slipforms stand-up curb with their new GT-3200 curb and gutter machine in Jeddah, Saudi Arabia.

CG-011125 D3

KNR Construction Ltd. uses their Commander III to slipform a stand-up curb along a new roadway in Bijapur, a city in the state of Karnataka, south of Mumbai, India.

HW-101015 D8

Mak-Yol Cengiz Adi Ortakligi slipforms an airport project with their four-track GP-2600 in Kahramanmaraş, Turkey.

GOMACO CORPORATION
POST OFFICE BOX 151
IDA GROVE IA USA 51445

www.gomaco.com

Morrison, Ackley & Schaeding Join GOMACO to Create In-House 3D Group

GOMACO has been the worldwide leader in stringless paving since its inception 12 years ago when the first 3D road in U.S. history was paved. GOMACO has worked closely with leading manufacturers offering stringless systems to help develop and perfect the concept for slipform paving.

"We have invested over a decade in research and field testing on the 3D stringless guidance system, and today almost every paving application has been proven on projects around the world," Kent Godbersen, Vice President of Worldwide Sales and Marketing, said. "Now we have an obligation to take the next step in supporting our customers with service and the development of GOMACO 3D."

GOMACO Corporation has created a new, in-house department for 3D controls. Three new employees, Matthew Morrison, Kevin Ackley, and Chad Schaeding, have been hired for the department, with Morrison acting as the new manager of the GOMACO 3D Machine Controls Group. Morrison and Ackley previously worked for Leica Geosystems. Schaeding is a recent Purdue University graduate with a Master's Degree in Engineering with an emphasis on Geomatics.

"GOMACO's partnership with Leica Geosystems and our work with Topcon and Trimble have clearly established GOMACO as the front runner in 3D controls," Kevin Klein, Vice President of Engineering and Research & Development, said. "As our competitors are now starting to follow our lead, it is time for us to take this to the next level. Our goal is to design and implement our own proprietary system which will be able to utilize instruments from whatever manufacturer that our customers choose."

The focus of the new group will be sales, service and support of 3D machine controls and also the development of GOMACO's future proprietary 3D controls which will be an integral part of the company's standard machine controller.

"There are over 100 stringless units on GOMACO machines in the field, and Matt and Kevin have worked with the majority of our customers in the set up and training of these systems," Godbersen said. "Matt and Kevin are part of a small, elite group of specialists that are familiar with stringless paving and we are pleased to have two of the premier experts in 3D concrete paving in the world join the GOMACO team."

HW-080916 D6

GOMACO now sells and supports Leica Geosystems for stringless applications on GOMACO products.

GOMACO has also entered into a new business relationship with Leica Geosystems. The two companies have entered into a definitive OEM value added reseller agreement. Under the terms of the agreement, GOMACO will sell, install and support Leica Geosystems' Concrete Paving System for GOMACO products.

"This announcement with Leica Geosystems is evidence of our commitment to our customers in not only getting them the latest technology available, but also supporting that technology throughout the paving process," Godbersen said.