PUTZMEISTER AMERICA, INC. AND ITS SPECIAL APPLICATIONS BUSINESS (SAB) GROUP ARE PROVIDING THEIR COMPLETE GLOBAL SYSTEMS APPROACH, INCLUDING THEIR PUMPING AND MATERIAL PLACING EQUIPMENT, TO THE HISTORIC PANAMA CANAL THIRD SET OF LOCKS PROJECT (THIRD SET OF LOCKS). THE THIRD SET OF LOCKS WILL CREATE A NEW THIRD LANE OF TRAFFIC ALONG THE CANAL, DOUBLING ITS CAPACITY AND ALLOWING MORE TRAFFIC AND LONGER, WIDER SHIPS TO PASS THROUGH.

EQUIPMENT FOR THE PROJECT INCLUDES TWELVE TELEBELT® TB 130’S, ONE TELEBELT TB 200, THREE 58-METER BOOM PUMPS, ONE 52-METER BOOM PUMP, AND FOUR THOM-KATT® TK 40 TRAILER PUMPS.

Equipment from Putzmeister has been on site at the Panama Canal since August 2010. In addition to the six Telebels® that have been working at Third Set of Locks since the beginning of the project, in fall 2012 Putzmeister sent one of its newest, large-scale Telebels to the site. The Telebelt TB 200 offers a multitude of advantages that make it a better conveying system for high volume projects than what is currently available in the market. It offers an increased working range and superior jobsite maneuverability, with a 200-foot (61m) horizontal reach with its four-section boom arm.

Putzmeister has also sent six additional Telebelt TB 130s, which is the model that was first being used at Third Set of Locks. In addition, four Thom-Katt® TK 40s, three 58-Meter and one 52-Meter Truck-Mounted Concrete Boom Pumps are on the project.

The combination of the new group of equipment will be used to place the 1,400-foot (427m) long by 108-foot (33m) wide by 60-foot (18m) deep floor and walls of the canal, as well as in the construction of on-site batch plants and living quarters for construction workers.

“We’re working closely with the Panama Canal Authority and the Third Set of Locks team to meet its date for completion on August 2014, which is 100 years after the initial locks on the Canal were opened,” says Dave Adams, Putzmeister America’s President and CEO. “Our equipment currently on site is performing impeccably and we’re happy to be sending additional machines to continue work on the project.”
The Canal’s History

It was first determined in the 1930s that the most effective and efficient way to increase the Canal’s capacity was to construct a third set of locks with larger dimensions than those of the locks built in 1914. The United States initiated the construction of the Third Set of Locks in 1939 to allow the transit of commercial and war ships that exceeded the size of the existing locks. The expansion was halted in 1942 because of the outbreak of World War II.

Interest picked back up again and studies in recent years by the Panama Canal Authority (ACP), the owner/developer of the project, pointed to the same solution as was deemed in the 1930s, that a larger, third set of locks would be the most suitable, profitable and environmentally responsible way to increase Canal capacity and allow the Panamanian maritime route to continue to grow.

Why The Third Set of Locks Are Needed

There are four objectives the ACP has put forth for this project, and they include, making long-term growing and sustainable contributions to the Panamanian society through the payments the Canal makes to the National Treasury; maintaining the Canal’s competitiveness as well as the value of the Panama maritime route to the national economy; increasing the Canal’s capacity in order to capture the growing demand with the appropriate level of service for each market segment; and increasing the Canal’s productivity, safety and efficiency.

Project Scope

- Construction of two 1,400-foot (427m) long by 180-foot (33m) wide by 60-foot (18m) deep lock facilities. One will be in the Atlantic side and one will be in the Pacific side of the Canal. Each of the locks will have three chambers, and each chamber will have three water reutilization basins. The basins will allow the third set of locks to reutilize 60 percent of water in each transit and use seven percent less water per transit than each of the existing lock lanes.
- Construction of access channels for the new locks and widening existing channels.
- Deepening of existing navigation channels and the elevation of Gatun Lake’s maximum operating level.

Project Management

The design-build contract for the project was awarded to Consortium Grupo Unidos por el Canal, which is made up of four companies: Sacyr Vallehermoso S.A., Impregilo S.p.A., Jan De Nul n.v. and Constructora Urbana, S.A.

Putzmeister Global Resources’ Involvement

Bob Weiglein, Telebelt division manager for Putzmeister America, traveled to Milano, Italy, where he was introduced to the chief commercial officer (CCO) of Impregilo S.p.A. (Impregilo) by the president of Putzmeister Italy to discuss what material placing solutions Putzmeister’s SAB could offer for The Third Set of Locks.

“SAB is a partnership between Putzmeister Shotcrete Technology, Putzmeister Pipe Technology and Maxon Industries, Incorporated,” says Weiglein. “This partnership offers a complete systems approach that offers all products to all projects around the world to customers in the tunnel and mining, dams and power generation, transportation, and marine and offshore industries.”
In the meeting it was expressed that flexible, maneuverable and mobile material placing systems were key because of the job site’s unstable terrain.

“The water table is very low on the Atlantic side of the Canal,” explains Weiglein. “There is a lot of water and there have been land slides. The Pacific side is all rock.”

After the meeting in Italy, SAB and Agreconsa, Putzmeister’s local dealer for 24/7 parts, service and support in Panama, worked together to determine what system solutions would be ideal for various components of the project.

“Agreconsa is a well respected distributor who has been in Panama for seven years and takes great pride in the sale and service of Putzmeister equipment,” says Weiglein. “They are committed to Panama and it’s economy, and work together with us to provide exactly what customers need.”

There first was a need to place concrete and gravel for the project’s batching and crushing plant’s foundation.

SAB and Agreconsa proposed using six Telebelt TB 130 telescopic belt conveyors for that portion of the project. Impregilo accepted the proposal.

“The reason the Telebelts were the ideal equipment choice for this portion of the job was because they do not need to be permanently mounted to the ground or a super-structure,” Weiglein comments. “In the event the equipment had to move due to changing terrain conditions the TB 130’s quick setup and tear down provides that flexibility and mobility that Impregilo expressed was a necessity on the job site.”

“Another benefit of the Telebelt is that multiple types of material can be placed with one piece of equipment, and in the same day,” explains Peter Mamopulakos. “Since both concrete and gravel are being placed on the site this feature is an invaluable asset. The Telebelts are true multi-taskers.”

Don Matthews, Putzmeister’s field service technician for Telebelts, went out for the first two weeks the Telebelts were on site to help start up the equipment, and ensure the customer had everything they needed.

“We always send one of our field service technicians out on new start ups for customers to ensure there is nothing in question for the customer and they feel comfortable operating their new piece of equipment,” says Weiglein. “For this project, Don is on site once every quarter to check in with the customer.”

**Telebelts and Thom-Katts**

After the initial use of the TB 130’s in the rough conditions of the Panama Canal job site, six more Telebelt TB 130’s were ordered for the Third Set of Locks. The additional Telebelts have helped the team stay on track with an aggressive pour schedule.

“The Telebelts are true multi-taskers and have been crucial in laying the foundation for this project,” says Lucio Donadi, service manager for Agreconsa. “With their help, we are quickly finishing the bottom portion of the new locks.”

Putzmeister’s first TB 200 to come off the manufacturing line has been working on the Gate Lock Head and Lock Wall Structure on the Pacific side of the project. With a reach of 200 feet (61m), belt width of 24 inches (610mm), and high capacity output of up to 6 yd³/min (4.60m³/min), it is being used to reach the tallest portion of the 60-foot (18m) deep lock facilities.

The TB 200’s four-section boom retracts to 74-feet, nine-inches (22.80m), providing an expansive working range. Its movement is smooth and controlled, due to its precision boom slewing control with positive stopping power. The advanced boom design with modern lattice structure made of extruded steel tubes is extremely strong, yet lightweight.
Working in conjunction with the Telebelts, six Putzmeister Jumbo Troughs are also at Third Set of Locks serving as surge hoppers for consistent concrete placement. Four Thom-Katt TK 40 shotcrete machines are also on site, being used to stabilize excavation work on both the Atlantic and Pacific sides of the project.

“While excavating the job site, it is essential to stabilize the soil walls to ensure safety moving forward,” explains Donadi. “The efficiency and ease of use of the TK 40s have been highly beneficial in this process.”

Maneuvering Challenging Terrain

While Telebelts have been used for the bottom of the locks, three Putzmeister 58-Meter and one 52-Meter Truck-Mounted Concrete Boom Pumps were brought in to help build the walls. Two boom pumps are working on each side of the project. The terrain at the Third Set of Locks has been one of the most difficult aspects of the project.

Overall, the construction team has been pleased with how the equipment has managed to maneuver the rugged terrain. “All of the Putzmeister equipment has been performing to our expectations under the difficult conditions,” says Donadi.

“However, when we have encountered any challenges, the service and support from Putzmeister has been excellent.”

Bearing a Difficult Load

In addition to the land conditions, the concrete mix used at Third Set of Locks also has proved tough to work with. One of the main mixes used to create the foundation for the locks is a Mass Aggregate, with an aggregate size from 1.5-3 inches (38-76mm), which is an extremely hard-wearing concrete and can be rough on equipment.

“Telebelts have proven to be the ideal equipment for this job, as they can place multiple types of material,” explains Donadi.

Another type of concrete, called Marine, is a pumpable mix that is being used with the boom pumps. The Marine concrete is a special mix used for any part of the locks that comes into contact with water. In addition to compressive strength and contraction, the concrete had to be formulated to guarantee at least a 100-year life span with low permeability. This is to ensure the imbedded rebar is not reached by water, which would cause it to corrode.

“The boom pumps have worked great for placing the marine concrete” says Donadi. “The Ergonic® Boom Control has been especially helpful because it allows us to set parameters that control the movement boom.”

“Putzmeister’s standard hard-chromed material cylinders, as well as exclusive multi-piston cup design, ensure a longer life of the components, less downtime and lower parts cost,” adds Weiglein. “This results in reliable pumping of hard-wearing concrete in tough conditions like we’ve seen here at the Canal.”
Demanding Pour Schedule

The sheer size of the Third Set of Locks project has added unique difficulty to the placement of the massive amount of concrete. A large number of pieces of equipment and workers are being used to place the concrete, creating a fairly congested job site.

“The target monthly average of concrete to be pumped is approximately 110,000 cubic yards (100,000 m³) at each side of the project, says Donadi. “We are placing concrete somewhere on site 24-hours-a-day. We’re pleased that the Putzmeister equipment has stood up to the challenging schedule.”

Due to the demanding pour schedule, equipment needs to be moved often. “The ease of set up of the boom pumps has been beneficial, as well,” Donadi adds. “With so many moving parts on site, having equipment that is easy to maneuver is a huge time-saver.”

“On one of the toughest projects ever attempted, machines working under difficult conditions, day and night, bearing a hard-wearing concrete mix require the highest quality engineering and reliability to move the project forward. With innovative technology, 24-hour local support, spare parts on site, and service technicians in the field, Putzmeister has brought incredible value to our team.”

Construction at Third Set of Locks started in late 2007 and the target date for completion is August 2014—100 years after the initial locks on the Canal were opened.