



Concrete Plant International
North America Edition

www.cpi-worldwide.com

USA OCTOBER 5
2015

SPECIAL PRINT | CONCRETE TECHNOLOGY

Modernized Jessup plant strengthens CP&P regional position



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In February, Concrete Pipe & Precast, LLC, based in Ashland, Virginia, USA, fired up a new, automated batching system at its Jessup, Maryland, plant. The 70,000 square foot production facility experienced an equipment failure in its aging batch plant last October. “Thankfully, the breakdown occurred at the beginning of the winter, which is typically a slower period and that gave us an opportunity to rebuild it with many improvements” notes John Blankenship, CP&P operations manager. CP&P was formed in 2012 as a joint venture between Americast and Hanson Pipe & Precast to provide the competitive Mid-Atlantic region with a complete line of concrete pipe and precast products. “We used ready mix until we could get back on our feet. It did the job, but I would not wish that experience on anyone.”

The Jessup plant, one of 13 in the CP&P portfolio, was built in the 1950s and produces approximately 500 tons a day of round and horizontal elliptical concrete pipe, ranging in size from 15 inch (381mm) to 72 inch (1800mm) diameter, in profile and o-ring gasket joint styles. The plant also produces flared end sections, a range of box culverts sizes, and specially designed pipe for jacking, deep fills, and lined sewer pipe.

Pipe production systems at Jessup include the HawkeyePedershaab PipePlusPlus, PipePro XT, Single Station Model 144 VUP large pipe system, and ROCO and VROC automated product and ring handling sys-

tems. Prior to October 2014, the plant relied on two horizontal ribbon mixers located at the base of a 110-foot tall batching tower.

A batch of challenges

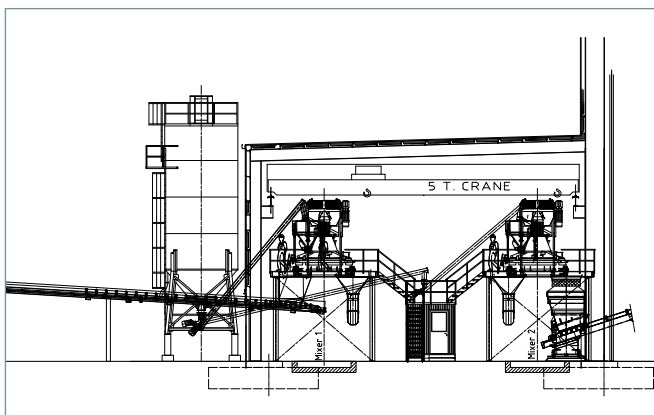
The original batching system relied on gravity to batch mix components down to the mixers. The height of the batching structure made it difficult to maintain the system and the manual nature of the operation made it highly labor intensive.

“We needed a full time operator and it took four or five staff to clean the mixers after every shift,” says Blankenship. “The biggest

problem we had with our old mixers was reliability and mix consistency. It was essentially manual control and therefore we were continually having to adjust flow rates and settings to meet acceptable concrete batch tolerances.”

While the Jessup plant relied on a proven mix design, the battle to get the water/cement ratio just right, combined with manual batch operation, led to under yielding and high cement usage, which frequently resulted in quality problems.

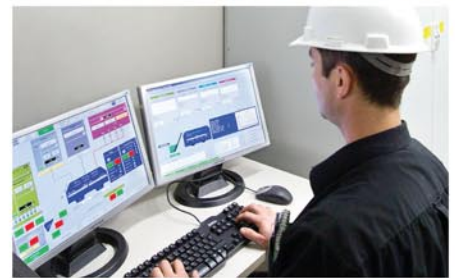
“If the mix was too wet or too dry, the result was waste,” explains Blankenship. “The pipe has to cure overnight before we can remove the spigot ring and bell pallet. If the



Engineers from Advanced Concrete Technologies (ACT) visited the CP&P Jessup, Maryland, USA, precast plant within days after a major malfunction caused a shutdown of the plant's original batching system. The ACT team worked with CP&P to design a new batch plant solution with a compact footprint. The design fit within the existing infrastructure and provides consistent high quality concrete to the plant's HawkeyePedershaab precast production lines.



The ACT/Wiggert MobilMatMo2250 batch plant, equipped with twin HPGM 2250 planetary countercurrent mixers, was installed in the CP&P Jessup precast plant in February. Cement and fly ash silos are outside the production building and feeding both ACT/Wiggert HPGM planetary mixers via screw conveyors. The twin mixers provide consistent, high quality concrete for dry and wet cast production. A centrally located control room was precast by the CP&P Salem plant. The ACT/Wiggert mixing batching plant services multiple HawkeyePedershaab PipePro, PipePlusPlus and VUP production lines, which produce a daily average of 500 tons of precast concrete pipe and other products.



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Skip hoists, loaded by transfer conveyor, are used to deliver aggregates to each of the ACT/Wiggert HPGM 2250 countercurrent mixers. At right is a three-compartment aggregate storage bin with weight belt below and at left is one of two mixer platforms.

mix is too dry we run the risk of under filling, and if the mix is too wet you get wall slump/ripples and develop circumferential cracking. The result is rejects and waste."

Focus on commitment

Of course, no company ever wants to experience a major equipment breakdown, but in the case of the Jessup plant, this came at an "opportune" moment of sorts. CP&P, the product of a joint venture and multiple acquisitions, was just about to launch a company-wide quality improvement and identity building program—"Commitment 2016".

A key focus of the new program is to provide customers with "relentless platinum grade quality" in products and services. The Commitment 2016 program roll-out started in January at all 13 CP&P plants. The firm's Commitment 2016 committee provides ongoing guidance and direction to help each plant to develop and implement processes and practices that will ensure platinum grade quality. The selection of a new batching system for the Jessup plant took on new importance in light of the Commitment 2016 program. The selection team considered several proposals from leading batch system providers.

Past experience guides decision

"We are committed to our customers and meeting their needs and that requires a reliable, highly consistent batching system," Blankenship emphasizes. "We already had extensive experience with batch plants from Advanced Concrete Technologies (ACT).

We have installed eight of them across CP&P and other companies I've been associated with."

Blankenship, a 30-year industry veteran, notes that it was initially difficult for him to accept the approach used by ACT and its German partner, Wiggert & Company. "My early experience in this industry was with a company where we built much of the equipment ourselves," Blankenship says. "We did not buy complete, turnkey systems. We'd buy the parts and put them together or fabricate our own conveyors, hoppers and mixer platforms, for example."

Over the years, Blankenship's opinion of

ACT/Wiggert's approach—pre-wired, factory tested, turnkey batch plants—evolved. "Having installed and used several ACT/Wiggert plants in the last 12 years, I've come to appreciate that there are many advantages to their methodology," he observes. "The standardization and best-in-class approach means we get a batch plant that not only produces high quality concrete consistently and reliably, but when we do need service it's easy to get and parts are readily available. They know their systems so well because of the fact that their designs are modular and use similar standardized components."



Jessup batch plant installation includes a low-profile 195-ton three-compartment aggregate storage system, including weigh belt conveyor, from ACT/Wiggert. Hydrotester moisture sensors located below each aggregate bin, combined with microwave probes in each mixer, enable the PCS control system to consistently and accurately maintain the correct water/cement ratio for every batch.



One of two mixer platforms, each equipped with an ACT/Wiggert HPGM 2250 two-cubic-yard (1500L) planetary counter-current mixer, receive aggregates from a skip hoist (left) and cement and fly ash screws (right). Each mixer is equipped with two discharge gates, one for dry cast and one for wet cast and clean out using an automated high pressure mixer cleaning system.

ACT engineers visited the Jessup plant in early November 2014, just a few days after the batch plant breakdown to assess the situation and begin to design a new plant that would fit into the existing plant infrastructure. The Jessup production team

wanted the new batching system to fit inside the existing building for all-weather operation and easier maintenance. As the Jessup plant was relying on ready mix deliveries to meet its production needs, the company needed the new ACT/

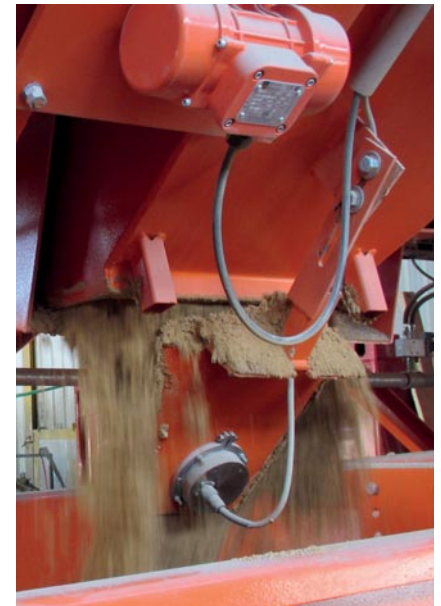
Wiggert batch plant in shortest possible delivery time. Wiggert was able to shift production at its factory in Germany and accommodate the rush order almost immediately. The plant was produced, tested and delivered within six weeks of the order.



Interior HPGM mixer features long-wear replaceable plating and countercurrent high shear mixing tools.



Each of three aggregate bins are equipped with dual batching gates for fast/slow precision batching performance.



ACT/Wiggert Hydrotester aggregate moisture probe

Factory preparation saves installation time

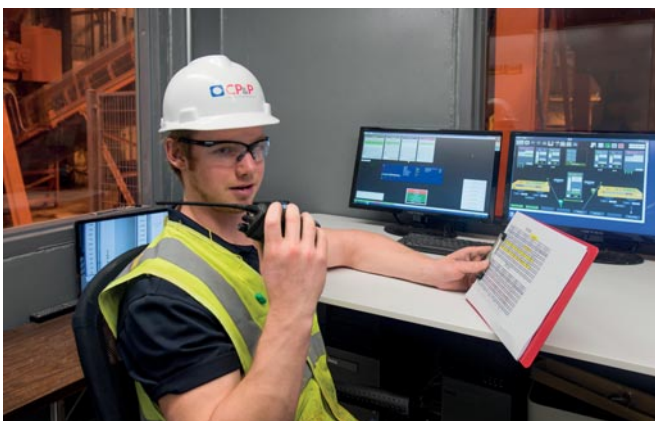
“Because we’d already installed several ACT plants in the past, we were very familiar with the process,” says Blankenship. “One of the big benefits with the ACT/Wiggert system is that they are ready to install when delivered. They prepare the wiring harnesses in Germany based on our layout plans. Ordinarily, that part of an

installation can be a nightmare. Trying to get electricians on site looking at drawings and pulling wires can be time consuming and costly. With the ACT system, it comes ready to plug and play.” The Jessup batch plant team reused some of the old plant to save money and time. The original 60-year old aggregate conveyor system, for instance, was shortened and used with the new batch plant. The drive-over truck hopper with grizzly grate,

as well as the aggregate-distribution shuttle belt, were also reused.

The ACT/Wiggert MobilMat batch plant includes the following features:

- Twin Wiggert HPGM 2250 high shear counter-current planetary mixers can each produce 48 cubic yards per hour of dry cast concrete and provide optimal cement dispersion promoting higher initial strength and consistent mix production.



Batching system operator Curtis Ramer uses radio to communicate with production team. The intuitive dual-screen PCS Control shows real-time status of batching system. Integrated Hydromat moisture measurement and compensation system provides automatic batch water correction. Windows-based controls electronically record batch history, inventory usage, provides maintenance reminders, and recipe management.



The outer mold for a flared-end pipe is lowered into position on the HawkeyePedershaab PipePlusPlus precast production system. In the background, a worker tends to a newly cast 60-inch precast pipe in preparation for its rotation into the pressheading station. The PipePlusPlus system allows multiple products to be produced simultaneously to match customer needs. The PipePlusPlus and other production stations in the CP&P Jessup facility are supplied with fresh concrete by the ACT/Wiggert batching system.

- Automatic high-pressure washout system in both mixers saves cleaning time, increases mixer life, and extends the production day.
- PCS Control System is PC based, providing an intuitive, color coded real-time display of batching progress. The user-friendly system integrates process supervision, production reporting, inventory tracking, and recipe management, with plant maintenance, and costing functions. The PCS system provides a performance edge by combining speed, accuracy, flexibility, and connectivity in one system.
- Hydromat microwave moisture probe built into the mixer enables precision water/cement ratio calculation and automatic batch water adjustment.
- Hydrotester moisture probes in aggregate bins automatically compensate batch weights for variations in aggregate moisture content.
- Three-compartment aggregate storage system holds approximately 195 tons non-heaped capacity and are located indoors for all weather protection. The bins are loaded by a conveyor from an exterior ground-level bunker where aggregates can be dumped from a truck. The aggregate is automatically directed to the correct bin by a shuttle belt.
- Two silos are located outside the building—a 450-barrel fly ash silo and a 700-barrel cement silo enable efficient mix design.

- Sustainability features include: high efficiency electric motors to reduce power consumption and extend plant life, grey water recovery system enables recycling of mixer wash water; and dust collection system maintains a clean work environment.

The ACT/Wiggert plant components were delivered in early February and it took about four weeks to get everything installed, integrated and fully operational. "The foundation was done, conduit in the floor, and we created our own precast control room," notes Blankenship.

"We were ready to go when the batch plant equipment arrived. Training was easy. We have a young computer savvy supervisor, Curtis Ramer, who was already familiar with the ACT system from when he worked at our Chesapeake facility. Our Jessup plant manager, Anthony Gentile, also had previous experience having supervised an ACT batching system at our Hanover location."

A touch-screen remote call station was added to the PipePro XT production system, enabling the PipePro operator to select the batch size and make other adjustments if needed. A more basic laser-level call station was added to the PipePlusPlus system, which is located closer to the control room.



A four-pack of reinforced concrete pipes, produced on a HawkeyePedershaab PipePro XT production system, are demolded in the curing area at the CP&P Jessup facility. The plant produces an average of 500 tons of precast pipe daily.



The aggregate conveyor (at right), reused from the previous batch plant, is supplied from an existing charge hopper. Aggregates are deposited into one of three compartments in a 195-ton indoor aggregate storage bin system. The 70,000 square foot Jessup, Maryland, facility produces a mix of round and horizontal elliptical precast concrete pipe, as well as box culverts and other precast products.

The Wiggert HPGM mixers are equipped with dual discharge gates. One gate is used exclusively for dry cast and the other for wet casting large diameter pipe and other special projects such as flared end sections. The wet cast gate is also used to discharge residue from the automated washout system. This system is saving the plant up to eight hours a day in clean-up labor.

Back in action

“It’s like night and day,” Blankenship notes. “Our old batching system required constant attention and adjustment on every batch. The new ACT/Wiggert system almost runs itself. We have one operator for the entire batching system. We’ve seen a 20 percent reduction in man hours per ton through reduced overtime and other labor efficiency savings.”

The old batching system at the Jessup plant was not able to store any batch records. Unless the operator remembered to print out a ticket for each batch, there was no record of the batch. The ACT PCS controls electronically records the details of every batch and tracks material inventory, providing reminders when bins or silos begin to run low.

Moisture control is also automatic. “We went ahead and put moisture probes in every aggregate bin so we know exactly

how much water we’re getting with the aggregates. That gives us the proper yield every time and the water/cement ratio is always spot on. The probe in the mixer precisely maintains correct water/cement ratio.”

Improved moisture control has led to near-perfect mix consistency. “It used to be we’d hit our mark about 90 percent of the time and have to manually adjust the moisture to correct any errors,” Blankenship continues. “Now, we’re hitting the mark nearly 100 percent of the time, and that consistency is reflected in our quality and product appearance.”

Now that batching consistency and accuracy is improved, the Jessup production team has been able to produce mix designs exactly as specified. “The biggest benefit is consistency and reliability in batching,” Blankenship notes. “We can very easily adjust batch sizes to match what we’re making at any given moment. That way we get the freshest concrete just-in-time. On the PipePro, we’re running 1.5 yards³ per batch and on the PipePlusPlus it’s 1.75 or 2 yards³ depending on what we are running.”

Uninterrupted batching has resulted in a reduction in production machine wait time from more than an hour per day to less than five minutes. The Jessup plant is able to achieve its target compressive strength of 4,000 to 6,000 lbs per square inch with



From left to right, ACT president Max Hoene, CP&P operations manager John Blankenship, Jessup plant manager Anthony Gentile, Plant Superintendents Dana Allen and Curtis Ramer, and Maintenance Supervisor Mike Frey.

less cement thanks to the high shear mixing action of its ACT/Wiggert mixers and the accuracy of its PCS computer control system.

“The biggest benefit with our new batch plant is product quality improvement,” he emphasizes. “The consistency of the concrete we produce is so much better than before, the resulting quality is reflected in every aspect of our operation. We get consistent, accurate batches all day long with no interruptions—it’s great!”

FURTHER INFORMATION



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