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Advanced Concrete Technologies is the American Division of Wiggert & Co. GmbH and Würschum GmbH

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AmeriTex taps new Texas markets with advanced new plant

Hank Giles, Advanced Concrete Technologies (ACT), USA

Just six years after building its successful concrete pipe and box culvert plant in Seguin, Texas—serving the growing Austin / San Antonio markets—AmeriTex Pipe & Products began an even more ambitious project to tap into the thriving coastal Houston and east Texas regions. In early 2015, AmeriTex began plans for a new plant to be built on an 83-acre parcel in Conroe, Texas, just north of Houston. The AmeriTex management team, led by founder and president Kevin Thompson, considered every aspect of their successful Seguin operation and thought about how they could do it even better in Conroe. How could they make the new plant more efficient, more productive, and achieve even greater consistency in product quality?

At the heart of the AmeriTex Seguin operation are concrete pipe and box culvert production systems from Germany's Topwerk Group, Prinzing-Pfeiffer. The Seguin plant features a Radial Press RP 1225 for pipe from 12" to 48" (300 mm to 1200 mm) with lengths up to 8' and a Radial Press RP 1625 system for pipe from 12" to 60" (300 mm to 1600 mm) with lengths up to 12'. For larger pipe and box culverts, the Seguin plant uses a Variant 4000D twin-station system that is able to produce pipe from 27" to 144" (685 mm to 3658 mm) in diameter and up to 8' in length, and box culverts from 4'x2' (1200 mm x 600 mm) to 12'x12' (3600 mm x 3600mm) and up to 8' in length.

In Seguin, the two production areas are fed by dedicated mixers that supply fresh mix to the Radial Press and Variant systems via hundreds of feet of conveyor belts. The aggregate storage system is also fed by conveyor belts from a drive-over hopper at ground level. A weigh belt is used to collect and weigh aggregates below the storage bin system and move it to the appropriate mixer feed belts.

In planning the new Conroe plant (fig. 1), the AmeriTex team already knew it wanted to again use the same Radial Press and Variant production systems from Topwerk for reinforced concrete pipe (RCP) (fig. 2) and reinforced concrete box (RCB) culvert products (fig. 3). The team also decided to again use

Fig. 1: AmeriTex's new plant in Conroe, Texas, USA, features state-of-art dry cast production systems and the highest level of certification available, including the prestigious QCast and TxDOT certifications.

Fig. 2: A special hydraulic operated forklift attachment picks the jackets, opens and closes the seam and pallet retainers. This mold-stripping method affords tight spacing of green pipe. Here, dozens of green concrete pipes stand at attention in the curing area before being moved to the storage yard.

Fig. 3: Recently produced box culverts with variable lengths of 5' up to 8' are stacked in the storage yard awaiting delivery to various job sites.

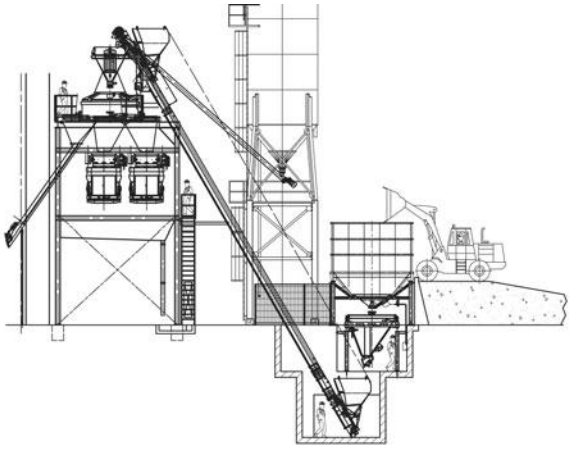

Fig. 4: A key difference between AmeriTex's original Seguin, Texas plant and its new Conroe facility is the choice of an ACT/Wigger MobilMat Mo 3450 concrete batching system.

Fig. 5: A four-compartment aggregate storage system holds up to 400 tons and is filled via frontend loader. Here, sand is loaded into one of the storage bins.

Fig. 6: An ACT/Wiggert traveling weigh batching system collects and weighs aggregates before dispensing them into one of two skip hoists, which lifts the load to its associated mixer.

the same support equipment, including reinforcement cage welding systems from Germany's MBK (mbk Maschinenbau GmbH), product handling systems from Probst GmbH and concrete curing systems from Kraft Curing Systems GmbH.

Eliminate conveyor belts

However, the AmeriTex planning team also viewed Conroe as an opportunity to make improvements. One of the goals of the AmeriTex team was to build the new plant with as few conveyor belts as possible. "Probably 80-90% of the clean-up tasks we do in Seguin are associated with the conveyor belts we use," notes Steve Bakonyi, AmeriTex vice president of production. "Conveyor belts can also break and need significant maintenance."

The AmeriTex Conroe planning team met with the Wiggert CEO Martin Wieland, and Max Hoene, the chairman of Advanced Concrete Technologies, Wiggert's American Division and service provider based in Greenland, New Hampshire.

The ACT/Wiggert batch plant not only features state-of-art mixers and advanced automation, but could also be built and equipped in a way that virtually eliminates conveyor belts. This type of compact plant layout (fig. 4) also offered efficient operation and lower start-up costs. For instance, aggregate bins could be fed by a conventional frontend loader (fig. 5), aggregates could be batched and weighed by a rail-mounted traveling weigh batcher (fig. 6), the mixers fed using skip hoists, and fresh mix delivered to pipe and culvert production systems via rail-mounted flying buckets (fig. 7).

Members of the AmeriTex planning team visited the Wiggert research and manufacturing facility in Germany, as well as several plants in the U.S. that used ACT/Wiggert mixing and batching systems. "One of the most impressive things about our visit to other facilities that were using ACT/Wiggert batch plants was how efficient and clean the systems were," recalls AmeriTex's Bakonyi. "And, the manufacturers we visited had nothing but good things to say about their experience with the systems. The ACT/Wiggert batching system seemed to be a better fit for us in many ways."

Choosing a new path for batching and mix delivery

The AmeriTex planning team chose an ACT/Wiggert MobilMat Mo3450-4-WCS batch plant (fig. 8) for the new Conroe plant. The batch plant is centrally located in order to feed both wings of the plant equally. The system is protected by an all-weather structure that still provides access to aggregate storage in the yard. The new plant includes the following features and components:

- Two Wiggert HPGM 3450 high shear, planetary counter-current mixers, which each provide three-cubic-yard output at a rate of about 2.5 minutes per batch. All plant components were delivered preassembled, tested and ready to crane into place upon delivery.
- Four automatic flying buckets with hydraulic clamshell-style bottom discharge gates supply fresh dry cast concrete mix to each of the four production systems: two Topwerk Radial Press pipe machines and two Variant box culvert production systems. The flying buckets run on rails using four independently powered electric motors and wheels. Bar codes and bar code readers provide real-time information to the flying bucket control system to enable the flying buckets to accurately negotiate curves and elevation changes in the track (fig. 9).
- Each mixer is equipped with three discharge gates for full redundancy. The primary gates discharges into an awaiting flying bucket delivery system and a third gate is available to discharge into alternative delivery systems such as a forklift mounted bucket, self-propelled cart, or ready-mix truck.
- A four-compartment aggregate bin storage system with 400-ton total capacity is charged by frontend loader. Bins feature galvanized cone sections for long life and low cost of ownership. A single traveling weigh batcher is used to collect and weigh sand and gravel and deliver it to the waiting skip hoists for transport up to the mixers. The weigh batcher is equipped with a Hydrotester probe (fig. 10) to automatically measure and correct for the moisture content of aggregates.

Fig. 7: One of four flying buckets is poised below its mixer discharge gate awaiting the next batch of fresh dry cast mix.

Fig. 8: Compact, modular design of the ACT/Wiggert MobilMat Mo 3450 batching system takes up very little space and is easily housed in a weather-tight structure at the AmeriTex Conroe plant.

Fig. 9: A view from above the flying bucket track shows how the course can be configured to accommodate almost any system layout.

Fig. 10: Here, the weigh batching bucket (in blue) stops below one of the aggregate bins. The device mounted across the bucket is an ACT/Wiggert Hydrotester probe that measures the moisture content of every aggregate and automatically compensates batch weight for aggregate moisture measurement. Moisture is measured by a HydroMat probe in the mixer to automatically compensate for measured moisture content in order to maintain water/cement ratio that the user has defined in the concrete recipe.

- Wiggert WCS Control system automatically integrates all components of the MobilMat batch plant, including mixer, aggregate weighing and dispensing, cement silos, water/cement ratio, and admixtures. The WCS Control uses a PC and PLCs to provide consistent quality concrete and point-and-click ease of use. WCS provides AmeriTex with real-time access to production statistics and reporting for material consumption, inventory, and maintenance scheduling.
- Hydromat in-mixer microwave moisture probes automatically measure mix moisture and correct final batch water to maintain consistent W/C ratio for each batch. The WCS Control allows user-definable pre-water to satisfy aggregate absorption, important for dry cast production. The controls also allow the correct percentage of reclaimed water, if available.
- Two 1,000 BBL (4,000 cu ft) double-wall split silos store Portland cement and fly ash to enable AmeriTex to produce dry cast concrete as required. The silos are fitted with anti-over-fill protection systems, and accurate real-time level monitoring. The silos are equipped with a dust collection system that features 265-sq. ft. cartridge filters, and an automatic 'air-shock' cleaning system.
- The two mixers and the four flying buckets are equipped with automatic high-pressure cleaning systems that use high pressure water to clean out mix residue and buildup in about 10 minutes. This enables the firm to perform cleanup on breaks, between shifts and at the end of each day. Hand operated lances allow spot cleaning and cleaning outside of mixer, chutes and flying buckets whenever necessary.

Saving hundreds of labor hours

One of the major advantages that the ACT/Wiggert batching system provides to the Conroe plant is in time saved on clean-up and maintenance. The automatic washout systems on the mixers and four flying buckets saves clean-up crews about an hour and half every day in labor per crew member—that's hundreds of hours per year in labor savings.

By using flying buckets instead of hundreds of feet of conveyors to move dry cast mix to production areas, the firm avoids having to clean conveyor belts and drive mechanisms, as well as cleaning up spillage from the floor under conveyors.

"We've reduced our clean-up time by about 75 percent," notes Bakonyi. "The time we save every day not only saves on labor, but it allows us to extend our production time by up to an hour—that's significant. With flying buckets there is literally no mess. You don't lose a single rock from the mixer to the production area. With conveyors, the mix sticks to the belt. The belt needs frequent adjustments and mix begins to dry out when it's spread out on a belt."

Expansion made easy

Almost everything about the AmeriTex Conroe plant is built for expansion. The mixer area, which currently has a two-mixer platform is built with a foundation capable of handling an additional two-mixer platform if the need arises. The weigh batcher used to gather, weigh and deliver aggregates to the two mixers runs on an overhead rail, much like the flying bucket mix delivery system, and can be extended to serve additional mixers with a simple programming change.

The same is true for the flying bucket mix delivery system. Currently, each production system—two Radial Presses (fig. 11) and two Variant systems (fig. 12)—is serviced by its own flying bucket for fresh mix. The same flying buckets could be extended out to service one or more additional production stations if required with very little additional effort or expense. And, at 100,000 sq. ft of floor space, the Conroe plant offers plenty of room to add additional Topwerk Radial Press and Variant systems, or almost any other production system that may enable the firm to meet new market demands.

Plant construction took determination

With the land in hand and plans firmly in place, construction of the new AmeriTex plant in Conroe seemed to be a project on rails in 2015; however, Mother Nature had something else in mind.

"It turned out to be one of the wettest years on record," recalls Rocky Lorenz, AmeriTex vice president of operations. His assertion is backed by weather records. For example, Houston's Bush Intercontinental Airport, not far from Conroe, received more than 70 inches of rain, and nearby College Station received nearly 60 inches.

"The wet weather made the project even more challenging than it would have been otherwise," Lorenz continues. "All of our vendors were very understanding and responsive. If we were working on something late on a Saturday night, or some other odd hour, we could call Topwerk or ACT and someone would answer."

One call solves it all

Responsive service was another top reason cited by AmeriTex in choosing the ACT/Wiggert batching system for its new Conroe plant, and a key reason AmeriTex continues to use Topwerk, Prinzing-Pfeiffer. "One of the key benefits we see in the ACT/Wiggert systems is that they make all their own equipment," Bakonyi emphasizes. "It's a turnkey system, so you're not dealing with a different vendor for the mixers, the conveyor belts, the controls, and so on. If we have a problem, we can call them 24x7 and be put in touch with someone from their team who can help us."

Fast and thorough

According to Bakonyi, the fast, consistent mixing action of the ACT/Wiggert HPGM mixers has resulted in reduced mix times and improved compressive strength. "Our goal is to hit our design strength within three days, which allows us to ship product at that point," he says. "The mixing action of the ACT/Wiggert mixers is so consistent and thorough we can hit our design strength even sooner. That gives us the flexibility to reduce our cement usage if we choose to, especially in combination with our steam curing system."

The use of a weigh bucket to batch aggregates and skip hoists to feed the mixers enables the ACT/Wiggert batching system to operate in 'priority mode' during high volume

Fig. 11: The AmeriTex Conroe plant, completed in September 2016, features two Topwerk, Prinzing-Pfeiffer Radial Press packerhead style systems, including the RP 1225 for pipe 12"- 48" and RP 1625 for pipe 12" - 60" with variable lengths from 4' up to 8'.

Fig. 12: The command pedestal for the Topwerk, Prinzing-Pfeiffer Variant 4000 E dry-cast machine is shown in the foreground.

Fig. 13: Production of high quality concrete pipe is achieved by the counter-rotation pressing tool on the Radial Press, which imparts precise and tension-free reinforcing cage embedment. Here, a just-completed pipe is ready to be moved to the curing area by forklift truck.

Fig. 14: Controls for both Radial Press systems are consolidated in one command center for single operator control.

production periods. For instance, while a batch is mixing, the ingredients for a second batch can be waiting in the skip hoist, and a third batch can be waiting in the weigh bucket. This enables nearly uninterrupted batching and continuously available fresh mix for pipe, box culvert, or other products.

"This priority mode with the ACT/Wiggert batching system is probably about 30% faster than a system based on conveyor belts," Bakonyi notes. "While batch mixing times between our Seguin and Conroe systems are very similar, we can produce more when needed in Conroe by having batches pre-weighed and ready to go in the mixer."

Certified fresh

The privately held AmeriTex is vertically integrated to a large extent, including its own distribution and delivery arm, known as Pipeline Trucking, Inc. With nearly 80 trucks, the trucking subsidiary ensures customers get the most responsive and timely delivery service possible.

In addition, both AmeriTex Seguin and Conroe plants have been certified according to QCast and TxDOT standards. The QCast plant certification program was established by the American Concrete Pipe Association and imposes a 124-point inspection process covering the inspection of raw materials, finished products, handling/storage, as well as performance testing and quality control documentation.

Proven quality and output

The AmeriTex Conroe plant began production operations in September 2016 using nearly the same Topwerk Radial Press packerhead style systems (fig. 13&14) and Variant central core vibration systems (fig. 15&16) as the firm's Seguin plant. One significant change in production equipment is the use of two Variant systems—a Variant 4000E for pipe 30" up to 120" and box culverts 4'x2' up to 12'x12' and Variant 6000E for pipe 60" up to 144" and box culverts 5'x5' up to 14'x14'—in Conroe versus the one Variant 4000D system used in Seguin.
Variant systems operate on a Siemens S7 PLC, which can store all production parameters for every box or pipe size. Vibration frequency is adjustable and modifiable, depending on filling height and product type. For input and storage of program parameters and full visualization of machine run, there is an integrated Siemens/Simatic HMI display. The controls are also equipped with a new error diagnosis system, and all stored variable data are protected against power interruption.

Fig. 15: Box culvert fabrication utilizes adjustable mold jackets and adjustable base pallets. The configuration equips AmeriTex with a wide range of capability, from variable box culverts, to large O-Ring joint pipes, arch or elliptical pipes.

Fig. 16: An adjustable cross beam is used to move a box culvert form system into place over a reinforcing cage and pallet base in preparation for the move to the Variant production system.

Quick change now possible

Production is enhanced even further when it comes to pipe diameter changes on the new Radial Press systems in Conroe. The Topwerk Quick Change System (QCS) allows fast, semi-automatic and safe changes of pipe dimensions (fig. 17). The QCS system consists of specific control programming, and several special frames for each pipe size to hold the pressing tool, spigot former, working table, and reduction ring. The new QCS system in use in Conroe has reduced the change-over time from one pipe size to another from 90 minutes to about 30 minutes.

"The new quick change system allows us to make multiple size changes in a day if necessary," notes AmeriTex's Rocky Lorenz. "It's just one more factor that allows us to meet our customer's needs by producing the highest quality products in the shortest possible lead time. All of our systems and all of our efforts that have gone into the Conroe plant support those objectives." ■

Fig. 17: The elements of the Topwerk, Prinzing-Pfeiffer Quick Change System are shown here. The new QCS system reduces pipe size change time from 90 minutes to 30 minutes or less, enabling multiple pipe sizes to be easily produced in a single shift.

Fig. 18: A product tipping system from Topwerk can safely handle products weighing up to 24 tons. This system enables the Conroe plant to reorient products in preparation for transport to the storage yard. This system reduces or eliminates product damage associated with tipping and is safer than other tipping methods such as the use of a sand pit.

FURTHER INFORMATION

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