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It's no accident that Capital Precast of San Marcos, Texas – just north of San Antonio – has achieved consistent growth despite numerous challenges. Founded by a husband and wife, both Texas A&M engineering graduates, the firm has attracted, grown, and retained a loyal customer base thanks to a proven philosophy: the customer comes first. Founded in New Braunfels, Texas, in 1997 by Ash and Renee Wineinger, Capital Precast has steadily grown from a one-person shop to a 65-employee enterprise (see figure 1) with a new 50,000 square foot facility in San Marcos (see figure 2). Along the way, the company has remained true to its original business plan. "We've never just been order takers," says Capital Precast founder and president Ash Wineinger. "The approach we live by is value added. Each of our top sales staff and production managers have an average of 20-30 years of precast industry experience. We review plans, make recommendations, and own an order from start to finish. The key to complete satisfaction is making certain that ultimately we're producing the right product with the highest possible quality." The firm has even done well during less-than-ideal economic times, including the Recession. It helps that the firm serves the San Antonio/Austin market, which has proven to be more than economically resilient. In fact, San Antonio has been called one of the most recession-proof cities in the U.S. The area is home to a wide range of economically dependable industries, including 31 colleges and universities, major military bases, and medicine/biosciences. In fact, education, military, and government employed a third of the city's workers in 2012.

■ Hank Giles,
Advanced Concrete Technologies (ACT), USA ■

Capital Precast originally produced two small precast inlets and a meter box. Today, the firm produces dozens of variations of storm sewer products, electrical and communication manholes, sanitary sewer manholes (see figure 3), meter vaults, grease traps, and aerobic and non-aerobic septic tanks. The firm began life using only ready-mix concrete, but soon built a small facility in

New Braunfels and added a two-yard ribbon mixer. "We began with just three forms, and one long year after another, we slowly accumulated more capability and capacity," Ash notes. "As we got bigger, we had to again rely on ready-mix to meet our production needs. Growing at the right pace is always a challenge. I never wanted to grow too fast, but sometimes you experience growth spurts and you can't fully control it." What about the Recession? "Our strategy was to pick up market share during the recession period," Ash says. "We got a little

more aggressive with our marketing. Our competitors seemed to slump off a little on service when times got tough. We did the opposite. We stepped it up a notch. Yes, our pricing did have to be a little more competitive, but our value-added approach was the real difference. It was a challenge juggling the need to provide the right price with our overall service-oriented approach." By 2011, the local economy had improved so much that the firm's management team decided the time was right to go all in and invest in a new facility. In early 2012, the



Figure 1: A portrait of a growing family. The Capital Precast staff and management gather in front of aggregate bins for a group photo. The firm has grown from a one-man operation to more than 60 employees since it opened its doors in 1997.



Figure 2: The new 46-acre Capital Precast facility in San Marcos, Texas, provides room for growth. The 50,000 s.f. production building features multiple bridge cranes and an ACT MobilMat batching system, allowing the use of SCC mix for products ranging from junction boxes and inlets to electrical manholes and septic tanks.



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Figure 3: A large manhole base is ready for yarding. Consistent, high quality SCC provides high quality finish and the highest possible strength with lower overall production cost.



Figure 4: Inside view. The centrally located ACT MobilMat Mo3450-4-PCS (left) supplies SCC mix to all areas of the 50,000 s.f. production floor via several overhead bridge cranes equipped with multiple crane buckets.

Inset photo (lower right) Capital Precast crane operator Jose Lopez guides SCC from crane bucket into a manhole form. The use of consistent, high quality SCC provides for a quieter, safer production environment.

firm purchased 46 acres in San Marcos, about two miles from the New Braunfels plant. The buying didn't stop there. A few months later, Capital Precast bought out a smaller precast, Hill Country Concrete in nearby Kyle, TX. The acquisition brought new products and additional experienced personnel to Capital Precast.

The firm needed a larger facility where it could consolidate its operations and continue to grow. Capital Precast broke ground on the new facility in San Marcos in mid-2012 and, at the same time, it went shopping for a new concrete batch plant. Capital moved into the new facility in 2013; however, since a batch plant had not yet

been selected, it used ready-mix in the meantime.

While the firm got by on ready-mix, the usual challenges of relying on ready-mix for precast production became more and more burdensome as product demand continued to increase. "For starters, TX DOT is not really happy with ready-mix—it's just not precise enough," Ash observes. "Everything fluctuates and making corrections is approximate. The truck is a barrel drum mixer with little real control. Plus or minus can be pretty large at times."

Choosing the right batch plant took longer than expected. There were many choices and comparing one plant with another was not apples to apples. The Capital Precast team spent about six months pouring over specifications, spreadsheets, and talking to vendors and their customers. The decision came down to three top vendors.

Like most firms, Capital looked at a range of options and costs for its new batch plant.



Figure 5: Capital Precast plant operator Daniel Ybanez stands on the mixer platform of the plant's new MobilMat batching system. The Wiggert HPGM 3450 planetary counter-current mixer uses three high speed mixing stars equipped with a total of nine paddles to deliver three cubic yards of consistent SCC mix every few minutes. An automatic mixer cleaning system uses motorized rotating nozzles and high pressure water to clean the mixer in about 10 minutes.



Figure 6: Modular mixer platform for new MobilMat Mo3450-4-PCS batch plant is craned into place under the direction of Ash's brother Mason Wineinger (bottom right) just outside Capital Precast's new 50,000 s.f. facility in San Marcos, TX. MobilMat plant components are pre-wired, pre-plumbed and tested at the factory and make installation and start-up smooth and fast.



Figure 7: Four-compartment aggregate bin base section and weigh belt conveyor arrive as pre-tested modular unit for easy installation. Galvanized cones shown here provide extended life and lower operating costs. Ash's father Bill Wineinger (at left) helps direct the operation.

The selection team considered the lowest bidder; however, the difference in cost was not enough to go that route. After all, the batch plant is the core of the business and the goal was to produce high quality SCC. The firm's previous batching system, a two-

yard ribbon mixer, was labor intensive because it required an operator to stand over the mixer all day to ensure reasonable accuracy. The operator had to know what to do if it was raining that day, or particularly cold, or unusually dry.

Ultimately, Capital Precast chose a MobilMat Mo3450-4-PCS batch plant from Advanced Concrete Technologies (ACT). "A big part of our decision to go with ACT was their overall approach," Ash notes. "They are more of a partner than a vendor. ACT president Max Hoene and his team spent time with us going over design and layout ideas for positioning our new batch plant in the existing structure. Their approach was much like ours—value added. They gave us exactly what we needed and saw it through from start to finish."

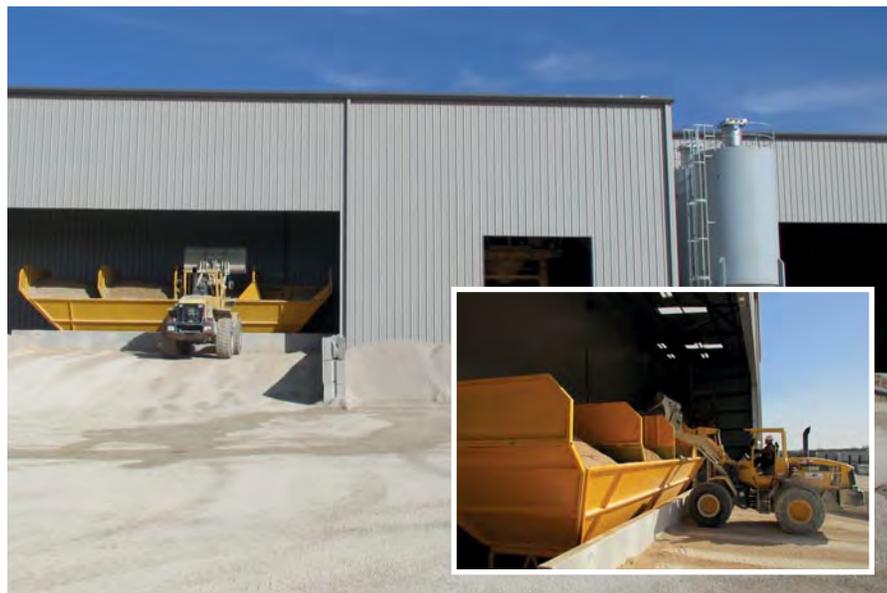


Figure 8: Capital Precast's new MobilMat batching system is installed just outside the main production facility, and enclosed for all-weather operation. Two 1,800 cu ft silos, at right, store Portland cement and fly ash, necessary for SCC production. Inset photo (lower right) a front-end loader charges the four aggregate bins with sand and stone.

Capital Precast's new batch plant was built in Germany by Wiggert & Co., fully assembled in modules, pre-wired, pre-plumbed, and tested prior to shipment. Upon delivery to the Capital's San Marcos facility, ACT engineers were on hand to assist the firm in installation, startup, and training.

"The ACT batch plant is fully integrated, not just a bunch of components delivered to our site with an instruction manual," Ash says. "Except for our admixture dispensing system—which is tied into the ACT plant control systems as well—every other part of the batch plant is provided by ACT. The only thing we provided was the prepared site, electricity, water, and compressed air. If anything else goes wrong, we make one

phone call and ACT is there to help us." Capital Precast's MobilMat Mo3450-4-PCS batch plant is positioned along an outside wall of the of the crane way near the center of the facility (see figure 4) in order to more efficiently supply concrete to all production areas and minimizing crane travel. The MobilMat plant is protected by an enclosure for all-weather operations. The new plant includes the following features and components:

- ACT MobilMat Mo3450-4-PCS modular plant is equipped with the HPGM 3450 high shear, planetary counter-current mixer (see figure 5), which provides three-cubic-yard output. Components such as aggregate bins with weigh belt, mixer platform, and mixer stand came preassembled, tested and ready to crane into place upon delivery (see figure 6).
- Swing chute on mixer allows the system to feed multiple crane buckets efficiently. Additionally, the swing chute allows mixer washout water to be captured in a pit and the water reclaimed for production.
- Four-compartment aggregate bins (see figure 7) with 200-ton capacity. Capital Precast opted to charge the bins with a frontend loader (see figure 8) to start; however, future plans include conversion to an automated drive-over truck dump hopper that would allow automated aggregate charging. Bins feature galvanized cone sections for long life and low cost of ownership.
- Hydrotester aggregate moisture probes, located in two sand bins (see figure 9), are used to automatically adjust batch weight in order to maintain mix design and batch yield.
- PCS Control automatically integrates all components of the MobilMat batch plant, including mixer, aggregate weighing and dispensing, cement silos, water/cement ratio, and admixtures. The Wiggert high shear planetary mixer with PCS Control is a powerful combination. PCS Control uses a PC and PLCs to provide consistent quality concrete and point-and-click ease of use (see figure 10). This provides Capital Precast with real-time access to production statistics and reporting for material consumption, inventory, and maintenance scheduling.
- Hydromat in-mixer microwave moisture probe automatically measures mix moisture and corrects final batch water to maintain consistent W/C ratio for each batch. The PCS Control allows user-definable pre-water to satisfy aggregate absorption, important for SCC production. The controls also allow the correct percentage of reclaimed water, if available.
- Two 450 BBL (1800 cu ft) silos store Portland cement and fly ash to enable cement Capital to produce SCC concrete. The silos are fitted with anti-overfill protection systems, and accurate real-time level monitoring.
- Remote call station with touch screen interface is mounted adjacent to the crane bucket charging station. The crane operator can specify recipe, batch size, and call a batch remotely from this station.
- Automatic high-pressure automatic mixer cleaning system enables mixer clean-up in less time (see figure 11). A clean out cycle is run at break times and lunch to prevent concrete buildup. Hand operated lances allow spot cleaning and cleaning outside of mixer, chutes and crane buckets at the end of the day. "I've never had a mixer this large; I can only imagine the time it would take to clean it manually," Ash notes. "If we're running it during the



Figure 9: Sand is batched onto the weigh belt conveyor under the four-bin aggregate storage system. ACT Hydrotester microwave probes are installed in the sand bins to accurately measure and compensate for moisture content. The MobilMat PCS Control HydroMat system automatically accounts for aggregate moisture in calculating required total water for proper W/C ratio, so critical in SCC production.



Figure 10: The Capital Precast team checks batching operation statistics in the control room located on the production floor. The PCS Control integrates all batching systems and provides point-and-click ease of use. Recipe recall, material inventory tracking, batching history, maintenance scheduling, and much more are provided by the PC-based control system.



Figure 11: Paddles, arms, and side scrapers are protected by user-replaceable polyethylene guards that extend the life of mixer parts and liner. Automatic washout system uses 3D water jet geometry to reach all areas of the mixer interior, removing most concrete build-up.

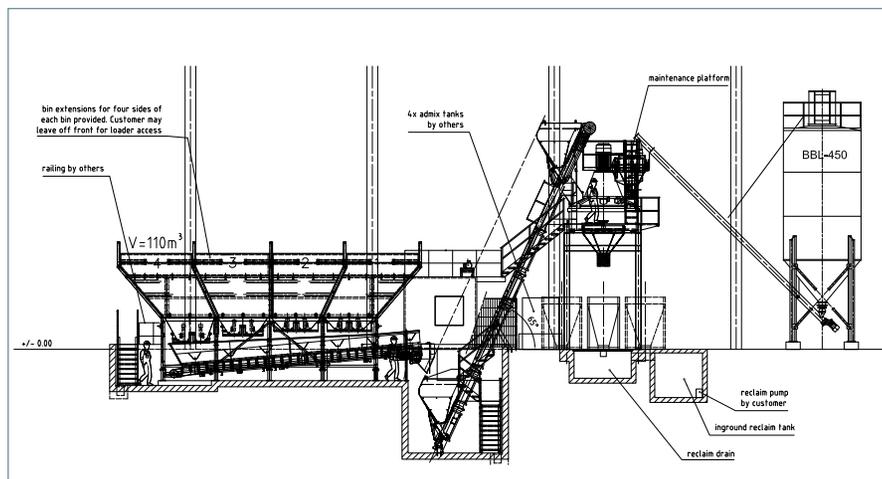


Figure 12: Capital Precast batch plant elevation view shows four-compartment aggregate storage at left with weigh belt below; skip hoist for moving aggregates up to mixer, mixer platform, and two silos for cement and fly ash, at right. The mixer discharge swing chute can fill multiple crane buckets in succession. The three-cubic-yard HPGM 3450 planetary counter-current mixer can provide SCC batches at approximately 3.5 minutes per batch.

day, the residual water goes right in the next batch and the system compensates for it automatically. Unlike other washout systems we looked at, the ACT spray heads are independently powered- they don't depend on water pressure to move them."

Results/Usage

The ACT design team worked closely with Capital Precast to create the most efficient

and effective plant layout (see figure 12). The ACT process, derived from hundreds of global projects, relies on input from the customer and takes into account the customer's pre-existing plant structures and processes. ACT provides a turnkey plant design that ensures performance, installation speed, and fast time-to-production. Installation and start-up was straightforward, with ACT engineers on site to orchestrate the process. While Capital Precast was happy that the turnkey ACT batch plant was easy to install,

it was even happier to learn how easy it is to operate and service. "What's really nice is the follow-up support we get from ACT," Ash notes. "The follow through from ACT gives us a very comfortable feeling, something we didn't feel with some of the other vendors we considered. Whenever we get in a bind, we can call ACT and they can remotely support our system and identify any problems."

Capital Precast operated for nearly a year at its new San Marcos facility using ready-mix. Now that the firm is batching its own concrete, and seeing the following advantages:

- it takes less time to produce more product - no waiting on ready mix trucks.
- there's flexibility to change mixes at any point throughout the production day,
- batching is extremely accurate and consistent,
- waste is reduced, and
- stripping strength and 28-day strength is greater - regularly exceeding the target strength of 5,000 psi and hitting in excess of 7,000 psi at 28 days.

The accuracy and automation of the batching system ensures that Capital is using the minimal amount of cement and other cementitious materials to achieve the highest possible strength (see figure 13). Like many, Capital Precast struggled initially with getting the right blend of raw materials for SCC; however, once it had it dialed in, the firm enjoyed the benefits of producing high quality SCC concrete at the lowest possible cost.

Precise automated control and easy recipe recall enables Capital to change mix designs as often as needed, even from batch to batch (see figure 14). This comes in handy because different products require slightly different mix designs or the pre-caster may be pouring late in the day and decide it wants a mix with greater early stripping strength.

"Operating our new batch system is definitely a different experience from our old mixer," Ash notes. "We used to have to stand over the old mixer and visually see what was happening and make adjustments on-the-fly. Now, our automated con-



Figure 13: Crane operator Jose Gonzalez pours SCC from a crane bucket into a communication vault form. SCC is poured into a single spot on the form and allowed to flow naturally, saving time and requiring no vibration.



Figure 14: Centrally located ACT MobilMat batching system in background, with control room just to its right. A crane bucket stands ready to receive the next batch of SCC. Three bridge cranes are used to reach all areas of the production floor. PCS Control enables automated batching control that frees staff to focus on other plant operations.

control room is down on the plant floor (see figure 15). It's a little like flying an aircraft by instruments only. Our displays show us exactly what's happening, but you have to trust the automated system and know that what it displays is what you're going to get."

Going forward, the firm now has the ability and space to handle any product that the market demands. The steady growth the firm has enjoyed will be less stressful in the future. "We've got the most experienced staff, the most accurate and flexible batching system, lots of room for growth—all this makes it even easier to adhere to our value-added philosophy." ■



Figure 15: Capital Precast general manager Chad Holden (left), founder and president Ash Wineinger (center) and plant manager Joe Deal, inspect a freshly poured storm water inlet top. The new batching system (in background) provides consistent, high quality SCC for fast pours with no vibration required.

FURTHER INFORMATION



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