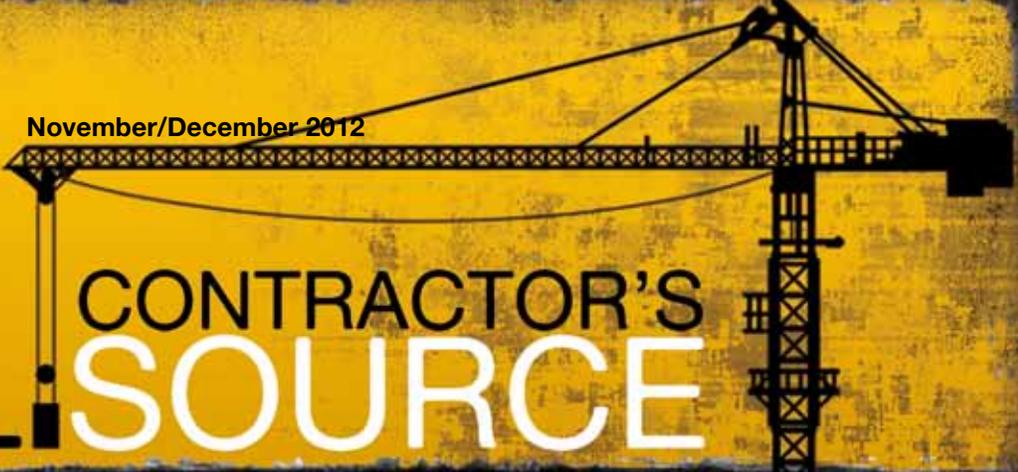


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TOOL SOURCE



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Helping you be ready for better times ahead

Clair D. Urbain
Editor/Publisher

As 2012 comes to a close, we're seeing specific market segments showing some new-found and badly needed life. In my conversations with contractors, distributors and suppliers, there is a sense of a new rhythm in the world of construction. I am seeing growing optimism and new strategies to compete in a market that's making a steady climb out of the pits of the Great Recession.

Contractors and the distributors that serve them are hungry for information that can help them get positioned for better times ahead; they have told us so in our latest reader research study, and they also told us which information sources are most helpful to them.

Here's what they told us:

Information source	Somewhat/Extremely helpful
Trade magazines like <i>Contractor's Tool Source</i>	94%
Trade magazine web sites like <i>www.ctsmag.com</i>	84%
E-newsletters like <i>CTS@Online</i>	73%
Construction distributors	85%
Tool manufacturer ads and websites	81%

We also asked readers how helpful our magazine is in their quest for tools and supplies and if we help them work more safely and productively. A whopping 95% said *Contractor's Tool Source* magazine is somewhat or very helpful in their efforts.

We thank you for your vote of confidence and will strive to continue to offer information that helps you get positioned for better times ahead.

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Cover: An Enerfab worker communicates with the crane operator to position the skirt for a stainless steel fermentation tank at the CJ Bio Americas plant under construction near Fort Dodge, Iowa. Photo: Clair D. Urbain



November/December 2012 Vol. 4 No. 6

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Growing a different kind of plant

By Clair Urbain

As the new CJ Bio Americas lysine plant springs up in the middle of an Iowa cornfield, soil conditions and relentless Plains winds challenge the construction process.

Still, the fast-track project remains on schedule, thanks to good communication, planning and innovative execution.

Photos: J.H. Findorff and Son, Clair Urbain

West-central Iowa has long been known for its gently rolling fields of corn and soybeans that make an agronomic patchwork quilt as far as they eye can see. The windswept, dark, rich soil, made up of predominantly glacial till, is excellent for growing corn and soybeans.

But it's not very good at growing every type of plant, especially the manufacturing kind. Soils excellent for crops don't often make excellent foundations for heavy-duty, high-volume processing facilities.

The plant, owned by CJ Bio Americas, a subsidiary of CJ Cheil Jedang Corp., one of South Korea's leading food and consumer products manufacturers, is a state-of-the art fermenting and refining facility to produce as much as 100,000 tons of lysine annually. Lysine is an

amino acid used in livestock feed that dramatically reduces the need for other protein sources and improves rate of gain. It could meet nearly a third of the lysine demand in the United States.

"The plant is part of an agricultural industrial park being developed by the City of Fort Dodge," says Michael Pascucci, site manager for Heery International Inc., the construction manager on the 65-acre, \$320 million project just west of Fort Dodge, Iowa.

It's part of a biorefinery campus that processes one of the area's most plentiful products – corn – into ethanol as well as various byproducts.

The plant will rely on a Cargill corn milling plant just south of the facility for feedstock and process steam.

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Fast emergence

The speed at which this plant is popping out of the ground is fast enough to raise the envy of the area's best farmers who count on quick emergence to get their crops off to a profitable start. Ground was broken in March 2012, on the facility that in total will cover 330,000 sq. ft. in 13 separate buildings. The site is scheduled to be fully operational by September 2013.

"We are on schedule to meet that, but it will be a challenge throughout the project. Very little in this plant would be considered as off-the-shelf equipment. Much of it is extremely customized and more than 140 components are being custom-built at facilities in France, Belgium, Korea and other countries. Some equipment components are so large they are being assembled on site and put in place before the ironworkers begin assembling the buildings' frames.

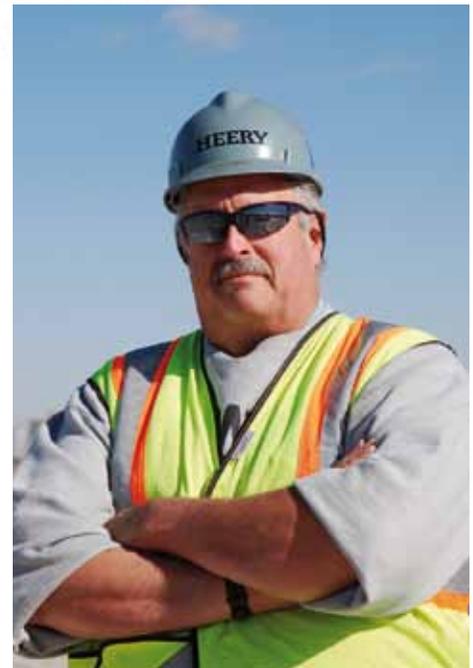
"Wherever possible, the owner is authorizing construction of critical components if there is a possibility of getting them built before they are needed. The delay of delivery or installation of any component could delay the entire project," he says.

"The fermentation and the refinery buildings will be the largest on the site and will house a vast array of custom-built and proprietary processing equipment. From the start, the weight of that equipment necessitated extensive ground improvement and piling work," Pascucci says.

Extensive site work

The glacial till soils, which are excellent for growing the crops that feed the plant, aren't much good for supporting the heavy loads of the processing equipment that will run throughout the facility. The site's elevation was raised 5' to meet the plant's extensive plumbing and piping layout as well as better handle water runoff. "The excavation contractor, PCI, hauled 420,000 cu. yd. of fill from a site five miles away to raise the elevation. It took approximately 30,000 truckloads to haul in the fill. PCI crews used 30 trucks and ran 12 hours a day, six days a week. Terracon tested soil compaction regularly to assure we had consistent bearing capacity throughout the site," Pascucci says.

"Structural designers found that we needed to install 3,100 16"- diameter



Mike Pascucci, senior associate site manager for Heery International, Inc. says good communication between all prime contractors as well as innovations in construction on the jobsite are key to keeping this fast-track project on its timeline.

auger cast piles 100' or 50' deep to support the weight of the fermentation and refinery buildings," says Pascucci. "Berkel & Company installed the deep foundations and we found the auger cast piles to be very straightforward and efficient. There were very few cases of piles not reaching their design depth. Also, on buildings with less load, Peterson Contractors, Inc. installed more than 3,000 rammed aggregate piers (RAP) to support the concrete foundations pads in lieu of the auger cast pile system."

Once the pilings were in place under the fermentation and refinery buildings, concrete formwork began. The 22,000 sq.-ft. fermentation building and the 100,000 sq. ft. refinery building each required a 3" mud mat followed by a 2'-thick mat foundation slab of 3,500 psi concrete, which is reinforced with a grid of #7 rebar placed 10" on-center at the top and bottom of the mat.

The schedule has the pours taking place every two days, completing

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More than 3,100 16"-diameter x 100' or 50' deep concrete pilings were poured to support the foundations of the fermentation and refinery buildings.

Photos: Clair Urbain, Heery International, MACO



Crews prepare to lift the skirt of the first of six fermentation tanks into place; the tank's base and dome (foreground) come in as two stainless steel components that are welded into one piece after their delivery to the jobsite. This dome is the base of the tank and will be flipped and placed into the skirt. The rest of the tank, which is also assembled on site, will be placed on the inverted dome base.



Winds sweeping across west-central Iowa continually challenge tank crews as they assemble and place fermentation tank components.



All anchor locations are double-checked with lasers and data recorders that send information directly to a Total Station. This allows anchor locations of +/- 1/4" tolerance.

11,000 sq. ft. sections that need 1,000 to 1,200 cu. yd. of concrete, says Pascucci. "The contractor, Jay-Ton Concrete Construction, found a way to make these pours quickly and accurately."

The concrete crews are using Mako FinCap screed supports and efficiently strike the concrete with a Lura Lightning Strike roller screed. The FinCap screed supports are easy to install and accurately and securely support screed pipe. The final screed pipe height is fine-tuned by screwing the FinCap screed support up or down to the proper level. "Our specs call for floor flatness and levelness of Ff/Fl 35/25 and they are consistently beating that with Ff/Fl of better than 55/35," says Pascucci.

Before the pour, anchor bolt locations are double-checked with

a laser system and a Total Station that records every measurement so they can be verified before the pour takes place. "With so many pieces of customized equipment in the plant, anchor installation must be exact. We are achieving a tolerances of +/- 1/4" instead of the usual +/- 3/4" for structural steel anchor bolts," he says.

Almost BIM

Proponents of Building Information Modeling (BIM) would think a plant with this complex level of plumbing, piping and electrical connections would be an excellent candidate for 3D modeling and plan development.

"We are not technically using BIM. We are using 3D modeling to identify issues, but we are building off of 2D documents," he says.

As construction manager, Heery and

others are working with Primavera Project Planner P6 to schedule work. Additionally, the prime contractors meet weekly to discuss work flow, schedules and potential conflicts. "We are also always having spontaneous meetings to discuss work sequence and iron out any conflicts between the trades. We are very careful to select prime contractors that have done this type of work before and have demonstrated their ability to communicate. Gray Construction is the general contractor on this site and has proven to be very good at coordinating between the other prime contractors," says Pascucci.

Email and smart phones greatly enhance the productivity on the jobsite, says Pascucci. "It really opens up the ability to communicate with

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Screed pipe sits on top of the Mako FinCap screed supports. The precise placement of the supports makes it easy to hit floor flatness and floor levelness (Ff/Fl) that meets or exceeds specs. "Our specs call for floor flatness and levelness of Ff/Fl 35/25 and they are consistently beating that with Ff/Fl of 50/35 or better," says Pascucci.

Workers install the Mako FinCap screed supports. By fine-tuning their height, the screeders can quickly and accurately strike the poured concrete.

Concrete crews finish up one pour section that began at 1 a.m. Most pours are completed by 11 a.m.; the schedule calls for a pour of this size every other day to remain on the tight construction schedule. The sections are typically 11,000 sq. ft. and require 1,100 to 1,300 cu. yd. of concrete that's prepared at an onsite mix plant and transported to the pour by trucks, then placed with a concrete boom.



everyone. With many of our meetings being spontaneous, it's important to get changes out to others who are affected. It's eliminated a lot of surprises," he says.

With the advent of tablets and other personal computing devices, Pascucci sees even greater potential for incorporating technology into the building process. "We are looking at Vela Software so we can run our punch lists on an iPad. It's another way to track progress and prevent problems," he says.

Vela Software offers the Autodesk BIM 360 Field program that runs on tablets and mobile devices. It claims the system can automate field processes and distribute plans and drawings, saving time for the users, and overall, for the project.

On-site assembly

"One of the most interesting things about this project is the scale. Everything is big. For example, the

underground cooling tower piping is 36" in diameter. The new city sanitary sewer is 48". The processing plant and the fermentation buildings are 90' tall with four levels inside each building. The six stainless steel fermentation tanks are 48' tall and 25' in diameter. They are so large that Enerfab, the tank contractor, bends the stainless steel at its Cincinnati, Ohio, plant and does final assembly on site," he says.

Russell Peak, Jr., Enerfab field engineer, concurs. "The tanks are made with food-grade 304 stainless steel. The bottoms and tops of the fermentation tanks are rounded, and were completely fabricated at our plant in Ohio, then cut in half so they could be transported."

At the site, each tank bottom will be placed in a support skirt, then the tank wall and top section will be installed on top of them and welded in place.

"The tank walls are also assembled on site. The horizontal welds are all robotically welded and all welds

x-rayed to assure there are no deficiencies," says Pascucci.

Tank installation timing is critical because they must be installed before the building frame is completed. "Our biggest challenge in placing these tanks is the wind. The wind seems to never slow down out here, and we have had to delay lifts because of wind. We often have to preheat the steel before welding because of the wind and weather," Peak says.

As winter weather approaches, Pascucci hopes that several parts of key buildings will be enclosed before snow flies. "Getting a warehouse completed will make it easier for us to store supplies on site during the winter months and we already have some key components stored offsite so they are ready to install when the time comes. Even through the winter, we must continue working to meet our September startup date," Pascucci says. "We must keep up our pace, and I think we can do it." ♦