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INTERNAL CURING with Lightweight Aggregate

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NPCA is a trade association representing the manufacturers of plant-produced concrete products and the suppliers to the industry around the world.

20 Breaking Rank

The owners of **Garden State Precast** transitioned away from the familiar and into uncharted territory with the goal of improving the company and the lives of their employees.

CAMPAIGNING FOR PRECAST 2016

How to position **precast concrete** as the material of choice for specifiers.
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On the Cover:
One of Garden State Precast's custom culvert pieces is loaded for shipment. Inset: Owners Bill Morris, Gene O'Malley, Kirby O'Malley and Dan Morris.

photo by Kirk Stelsel

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Questions from the **Field**

Questions from the Field is a selection of questions **NPCA Technical Services engineers** received from calls, emails and comments on blogs or magazine articles on precast.org. *If you have a technical question that needs an answer, contact us by calling (800) 366-7731 or visit precast.org/technical-services.*

Asiddin writes:

Is it acceptable practice to insert the head of an internal vibrator at an incline? How does inserting the vibrator at an angle affect the concrete?

NPCA Technical Services engineers answered:

Stinger vibrators (internal vibrators) are designed for maximum effectiveness when inserted vertically into concrete. There are circumstances where casting thin elements will not allow this, so the vibrator head may be inserted at an angle or horizontally to keep it completely immersed. It is important the vibrator head does not move laterally while consolidating in this manner. Stinger vibrators should not be used to move concrete during placement.

If the vibrator is inserted at an angle, concrete consolidation can be compromised. Vibrator heads contain an eccentric weight that rotates at high speeds and exerts vibratory action perpendicular to the axis of the head. If the head is inclined, there is a risk the vibrator will not consolidate some portions of the concrete.

Seyyed writes:

What kind of solutions are available for improving production management? Do you know any precast plants who use radio-frequency identification?

NPCA Technical Services engineers answered:

Digitizing precast concrete product inventory can be a tough task. But like most automation, once it's in place and proper training is given, the payback is worth the time and effort. The U.S. is starting to use more advanced processes within the precast industry. And recently, we have seen some government agencies require RFID coding on precast concrete products.

For your continued research, we recommend visiting NPCA's website and reading the blog post "Change the Way You track Your Product," or the article "Inventory Control Comes of Age" from the March-April 2011 issue of Precast Inc. In addition, we suggest visiting precast.org/find to search and contact a supplier who has developed inventory and production control software solutions or a producer who uses the system.

Alex writes:

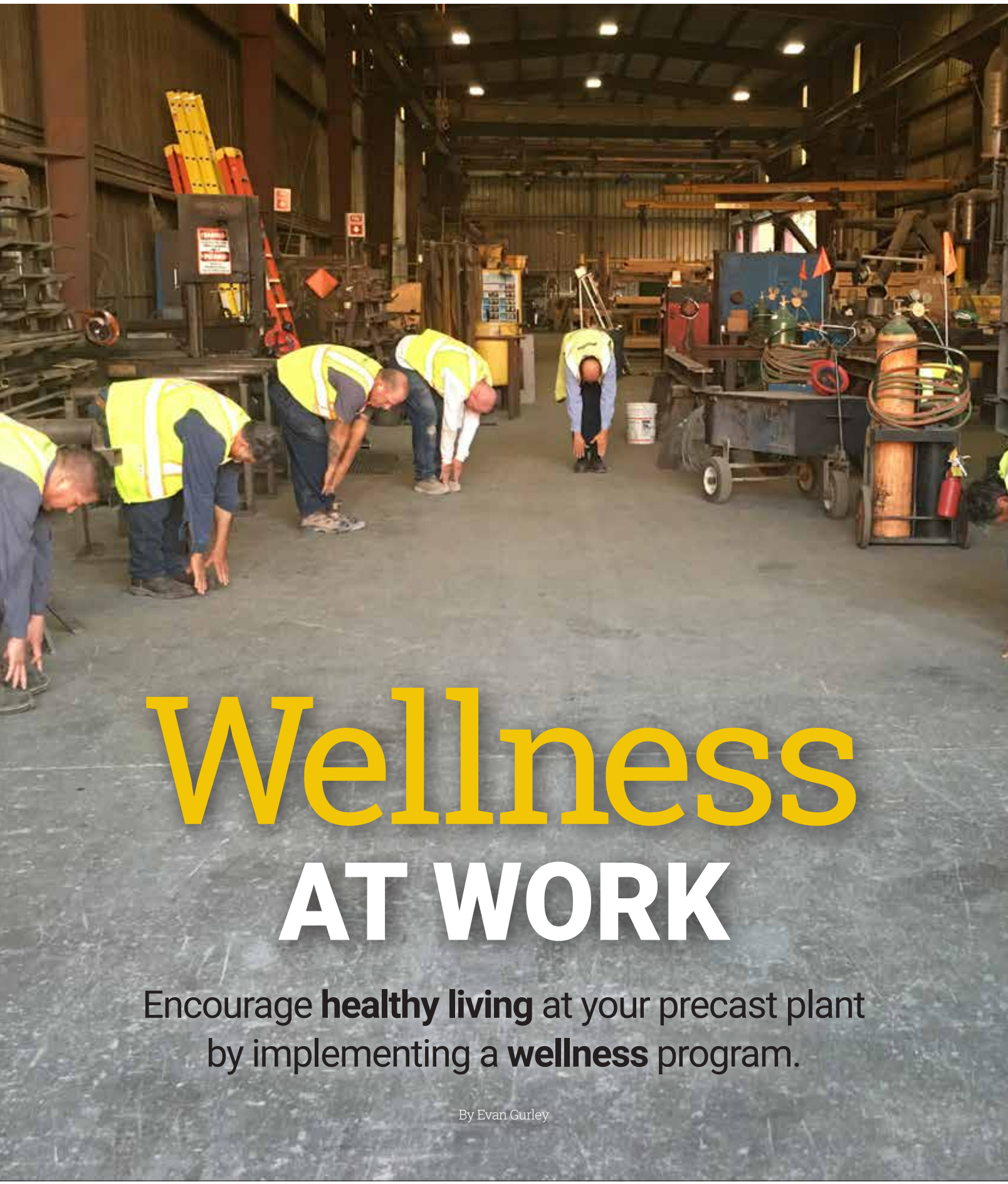
We want to reinforce a 60-inch diameter reinforced concrete pipe. The wall thickness is 6.75 inches. We want one layer of wire mesh for the outer reinforcement. For the inner reinforcement, we don't have the exact wire mesh, so we want to use two mats.

One is .24 and the other is .18 square inches per linear foot equaling .42, which is greater than the requirement. In ASTM C76, Section 8.1, "Circumferential Reinforcement," this is permissible. The wall thickness is less than 7 inches, but for "a line of circumferential reinforcement," you can use two mats. Is this correct?

NPCA Technical Services engineers answered:

You are correct. It is permissible to double up the welded wire reinforcement to obtain the minimum steel area requirement. As discussed, it is important to keep the two circumferential wires as tight together as possible and certainly within the tolerances provided within the standard. That standard states the (circumferential) layers shall not be separated by more than the thickness of one longitudinal plus ¼ inch.

It may be beneficial to use special steel layouts on large diameter higher strength pipe to save on the cost of heavy steel areas wasted in the compression zones of the pipe. This is accomplished by first rolling an inside "carrying cage" and then rolling quarter section "quad mats," which are tied to the carrying cage in the crown and invert tension zones. The idea is to optimize the steel usage. However, this "quad" method may be more labor-intensive than simply rolling two complete cages and binding them to meet the required steel area. It is important to verify any effect this new steel layout may have by conducting a three-edge bearing test and comparing it to other historical data you may have on a single line inside a cage pipe. **PI**



Wellness AT WORK

Encourage **healthy living** at your precast plant by implementing a **wellness** program.

By Evan Gurley

Employees at Jensen Precast in Fontana, Calif., stretch before the start of every work shift.

Photo provided by Jensen Precast

Talk to anyone who works in the precast concrete industry and they will tell you it's hard work and requires physical and mental toughness. Whether you're in the plant, behind a desk or at the job site, men and women who take on a career in the precast industry must meet stringent demands. With the strenuous conditions workers encounter in the precast industry, keeping workers safe and healthy is vital.

Most precasters have a safety program at their plant, but not every precast plant has a company wellness program in place to promote the overall health and well-being of employees. Concerns with costs, time and return on investment discourages them from developing a program. However, a successful wellness program prevents illness and injury, promotes health and productivity, and lowers health care costs.

WHAT IS A WELLNESS PROGRAM?

A wellness program is a health promotion activity or organization-wide policy designed to support healthy behaviors and improve health outcomes while at work. Employees are provided with the incentive, motivation and resources needed to maintain a healthy body that will help them perform their job better and remain injury free.

Results of wellness programs have proven the cost-benefit ratio is well worth the investment, even if the only investment is time and effort. Other potential benefits of employer-sponsored wellness programs include:

- **Reduced absenteeism and shorter recovery times for injuries.**
- **Reduced workers' compensation claims and health care costs.**
- **Increased physical endurance and morale.**
- **Increased plant production.**

Employers who implement a wellness program need to be persistent. Encouraging employee involvement in the planning can inspire creative ideas. Employers must communicate the benefits to workers and offer incentives for participation if it is not a mandatory program. A wellness program should be embedded in the organization's culture and aim to increase productivity, not interrupt it.

A PROGRAM THAT WORKS

Employer wellness programs used to mean simply offering gym memberships to employees, hanging posters on the wall in the break room about nutrition or encouraging people to use the stairs instead of the elevator. Now, more companies are using different strategies and incentives to promote health and well-being at their plants.

5 steps to Create an Effective Wellness Program

1. **Define** the program's **objective.**
2. **Determine** the specific **health problems** to address.
3. **Decide** how to **address** the health problems.
4. **Determine** how to **motivate** employees to participate.
5. **Track progress** and keep employees informed and motivated.

NPCA Producer Member Jensen Precast in Fontana, Calif., has implemented and fully embraced a low-cost wellness program called the Pre-Shift Stretch and Flex Wellness Program. Ruben Gallegos, safety manager at Jensen Precast-Fontana and National Precast Concrete Association Safety, Health and Environmental Committee member, said the program originated from management at the Jensen Precast-Lockeford, Calif., branch as an effort to decrease the company's injury frequency. The idea behind the program was to raise safety awareness, create a culture of employee bonding and open an opportunity for employee feedback. The Pre-Shift Stretch and Flex Wellness Program was then integrated into the company's safety and wellness program.

Gallegos provided some insight on how the daily program is run at the plant.

"We put together a detailed schedule with the times, the names of the responsible managers and the names of the employees starting at that particular time," Gallegos said. "We then developed and made several copies of instructional posters showing all the different exercises expected to be performed at the start of each shift and placed them at different stations across the plant. We require that a department manager/supervisor is in attendance

A wellness program promotes safety awareness, creates a culture of employee bonding and opens an opportunity for employee feedback.

Photo provided by Jenson Precast

for every session to lead the exercises and to try and identify any employees having a difficult time performing simple stretching.

"It is in fact mandatory for all production employees and managers to participate in the program before the start of each shift."

Gallegos said gaining buy-in from employees was challenging at the beginning, but as time progressed, employees found the stretching beneficial to their well-being.

"Now, our employees know the routine and get to the exercise site on their own without the supervisor having to round everyone up," Gallegos said.

Sam Ramos, a Jensen Precast-Fontana production employee, stated, "Warming up every morning is good for all of us. Stretching your hands and fingers, your arms and other muscles gets you prepared for work that day. It also helps you become more alert early in the morning."

Since the implementation of the program in January 2016, Gallegos said they even have been able to identify injuries that took place over the weekend on workers' personal time.

"On multiple occasions, we noticed employees not being able to do simple stretch exercises due to back strains and twisted ankles," Gallegos said. "When the supervisor approached the employees to ask if they had a problem, they admitted to have hurt themselves at home. This injury wouldn't qualify for a workers' compensation claim."

Gallegos is confident that the wellness program will continue to grow to positively impact all employees.

WHY YOUR COMPANY SHOULD BUY INTO WORKPLACE WELLNESS

Workplace wellness programs that support employees not only have a positive impact on employee morale, but also present a positive return on investment for employers too. Implementing a wellness program also gives employees a chance to make changes that will benefit their entire life.

SHARE HOW YOU PROMOTE WELLNESS AT YOUR PLANT

The NPCA SHE Committee is looking to highlight 2 to 3 additional wellness programs NPCA members have implemented at their own plants to show what others are doing to promote health and wellness and how it has benefitted your facility. Please contact Evan Gurley, NPCA technical services engineer and SHE committee liaison, for additional information at egurley@precast.org or (317) 582-2329. **PI**

Evan Gurley is a technical services engineer with NPCA.

INTERNAL CURING with Lightweight Aggregate

By Reid W. Castrodale, Ph.D., P.E.

Internal curing is rapidly emerging as an effective way to improve curing of concrete. It holds promise for producing concrete with increased compressive strength and reduced permeability and cracking, attributes that lengthen the service life of infrastructure products such as bridge decks. While most projects to date have been cast-in-place concrete, the process can also be applied to products manufactured in a precast plant.

Using prewetted lightweight aggregate in concrete reduces the weight of precast products and also provides internal curing.

WHAT IS INTERNAL CURING?

The Expanded Shale Clay and Slate Institute published the "ESCSI Guide Specifications for Internally Cured Concrete," which provides a good practical definition for internal curing: "Pre-wetted expanded shale, clay or slate lightweight aggregate is incorporated into a conventional concrete mixture to provide reservoirs of water within the concrete that slowly release the water after the concrete sets to provide internal curing to the mixture."[1]

The ESCSI Guide Specifications also state internal curing is accomplished by "... modifying a conventional normal weight concrete mixture ... by replacing a portion of the normal weight fine aggregate with prewetted fine or intermediate ... lightweight aggregate."[2]

WHAT IS LIGHTWEIGHT AGGREGATE?

Lightweight aggregate is typically a shale, clay or slate that has been expanded in a rotary kiln at temperatures as high as 2,200 F. This process has been used to manufacture structural lightweight aggregate in the U.S. since 1920.

ASTM C1761, "Standard Specification for Lightweight Aggregate for Internal Curing of Concrete," provides minimum physical requirements for lightweight aggregate, test methods for absorption and desorption, and a procedure for calculating the quantity of lightweight aggregate required for internal curing.

WHY USE LIGHTWEIGHT AGGREGATE?

Lightweight aggregate is used for internal curing because of its increased absorption, which can range from less than 10% to more than 30% depending on the type of aggregate and how thoroughly it has been prewetted. The higher absorption enables prewetted lightweight aggregate to carry water for internal curing. The moisture is not released from the aggregate until after the concrete has set and the pore size in the paste becomes smaller than the pores in the lightweight aggregate. The absorbed water does not affect the water-to-cementitious materials ratio. The addition of lightweight aggregate to a mix for internal curing will reduce the density of the concrete, but that is not the main goal. However, for precast products, weight reduction is an important benefit.

Any concrete mixture that contains lightweight aggregate provides internal curing if the aggregate has been prewetted prior to batching. However, this discussion is limited to using fine gradations of lightweight aggregate to modify a conventional concrete mix to obtain internal curing. Fine lightweight aggregate is used because its small size allows a more uniform distribution of the water-filled internal curing reservoirs in the concrete.

Other types of absorptive material have been suggested for use in providing internal curing. However, only lightweight aggregate is a structural material.

PROPORTIONING MIXTURES FOR INTERNAL CURING

The weight of prewetted lightweight aggregate required for internal curing, M_{PLWA}, can be determined using the following equation[3]:

$$M_{PLWA} = C_f \times CS \times (1 + A) / (A \times D) \quad \text{(Eq. 1)}$$

where:

M_{PLWA} = mass of prewetted fine lightweight aggregate needed per unit volume of concrete (lb/yd³ or kg/m³)

C_f = cement factor (content) for concrete mixture (lb/yd³ or kg/m³)

CS = chemical shrinkage of cement; usually taken as 7 lb/cwt or 7%

A = absorption of lightweight aggregate, expressed as a percentage of the oven-dry mass (%)

D = desorption of lightweight aggregate, expressed as a percentage of the absorbed water that is released by the aggregate in drying conditions compared to the total absorbed water (%)

For a particular lightweight aggregate, Equation 1 can be simplified to:

$$M_{PLWA} = C_f \times K \quad \text{(Eq. 2)}$$

where:

$K = CS \times (1 + A) / (A \times D)$

Using typical lightweight aggregate properties (CS = 7%; A = 15% and D = 95%), K = 0.565. Applying this to a concrete mix with a cement content of 564 lbs/yd³, M_{PLWA} = 564 x 0.565 = 319 lbs/yd³.

Once the weight of prewetted lightweight aggregate for internal curing is determined, the concrete mix is modified by reducing the volume of sand by the volume of prewetted lightweight aggregate, using the ratio of the specific gravities:

$$M_{RNWA} = M_{PLWA} \times SG_{NWA} / SG_{PLWA} \quad \text{(Eq. 3)}$$

M_{RNWA} = weight of sand to be replaced by prewetted lightweight aggregate

SG_{NWA} = specific gravity of sand

SG_{PLWA} = specific gravity of prewetted lightweight aggregate

The prewetted lightweight aggregate is then used very much like an admixture, except that the prewetted lightweight aggregate replaces a portion of the sand. This is illustrated in Figure 1, which shows relative volumes of constituents for a typical mixture. The conventional and internally cured mixtures are identical except for the volume of sand replaced with prewetted lightweight aggregate. For actual mixes, other minor adjustments may be required.

BENEFITS OF INTERNAL CURING

The main benefits of internal curing for precast products are reduced shrinkage, cracking tendency and permeability. These factors, which are discussed below, are important in preventing or delaying reinforcement corrosion. Other benefits of internal curing can also contribute to improved long-term performance of concrete:

- Reduced modulus of elasticity
- Reduced coefficient of thermal expansion
- More effective use of cementitious materials
- Reduced density
- Reduced curling and warping

REDUCED SHRINKAGE AND CRACKING TENDENCY

Reduced shrinkage of internally cured mortar mixtures was observed by researchers at Purdue University for sealed mortar mixtures, as shown in Figure 2.[4] The conventional mixture (blue line) experienced significant shrinkage in the first seven days. However, as sand was replaced with increasing quantities of prewetted lightweight aggregate, shrinkage was reduced or even eliminated. Percentages shown in the figure indicate the fraction of the total mortar volume occupied by the lightweight aggregate fines rather than the percentage of sand replaced. Reductions are most significant for low w/cm mixes, but benefits still exist for mixtures with ratios of 0.5 or greater.

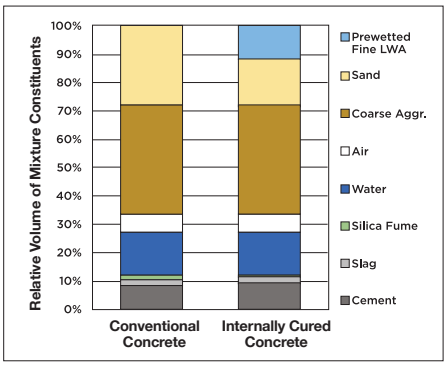


Figure 1. Comparison of Constituents for Conventional and Internally Cured Concrete Mixtures

Because of the decreased shrinkage, cracking in restrained concrete with internal curing is reduced or delayed, as shown in Figure 3.[4] In the figure, cracking occurs when strain suddenly decreases, as indicated by vertical lines. The conventional mixture cracked six days after mixing, while the internally cured mixtures cracked later or not at all. Factors other than reduced shrinkage also affect cracking tendency, such as the reduced modulus of elasticity and coefficient of thermal expansion.

REDUCED PERMEABILITY

Another important benefit of internally cured concrete is its reduced permeability as a result of improved cement hydration and an improved interfacial transition zone at the surface of lightweight aggregate particles. The better-hydrated cement provides a denser and less porous paste, while the improved interfacial transition zone restricts movement of fluids along aggregate particles. This is usually a major pathway for water penetration into conventional mixtures.

Resistivity data from two bridge decks constructed in 2010 with and without internal curing are shown in Figure 4.[5] Increased

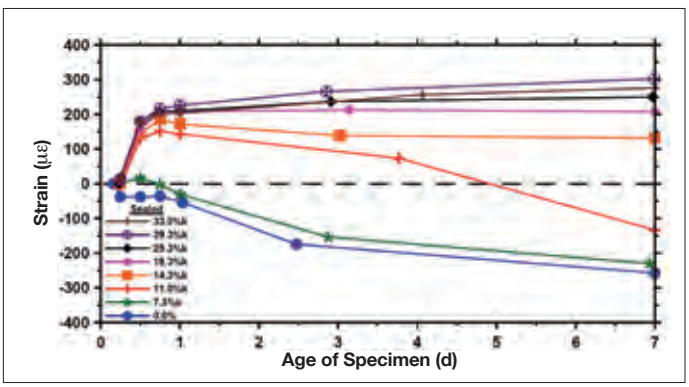


Figure 2. Free Shrinkage of Mortar Mixtures in Sealed Curing Conditions

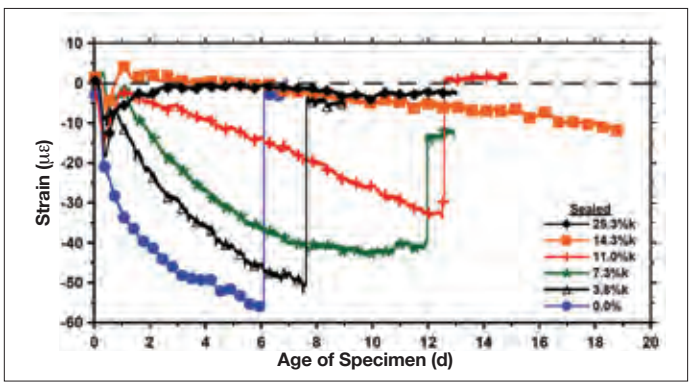


Figure 3. Restrained Shrinkage of Mortar Mixtures in Sealed Curing Conditions

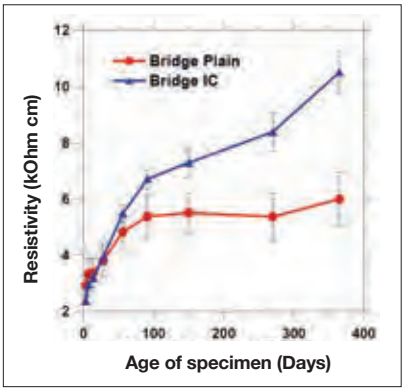


Figure 4. Surface Resistivity of Concrete Mixtures with Age

surface resistivity of concrete indicates lower permeability. The data show the internally cured bridge deck concrete (blue line) has significantly greater resistivity (lower permeability) than the conventional concrete mixture (red line). After one year, the internally cured concrete had 75% higher resistivity than the conventional concrete mixture. This large increase in surface resistivity should not be expected in all cases.

COST OF INTERNAL CURING

Lightweight aggregate costs more than conventional aggregate because of the high temperature processing required to achieve expansion. Transportation costs are also usually higher because of the limited number of manufacturing facilities available in the U.S. An additional increment in cost for internally cured concrete may also be required to account for prewetting and testing the aggregate. However, the higher cost is a relatively small investment compared to the increased service life and other performance benefits of internally cured concrete.

Lightweight Aggregate Assists Precaster with Weight Reduction

Lightweight aggregates can be a useful material in precast concrete where weight reduction is a necessary consideration.

NPCA Producer Member Bartow Precast in Cartersville, Ga., uses Carolina Stalite lightweight aggregate to reduce the weight of large, custom-built utility vaults and grease interceptors easing installation. The aggregate allows the company to install the product with its own crane versus having the contractor source a crane company. This offers the precaster one more advantage on bids and keeps projects within budget and on time.

"The reduction isn't huge, but on a large product it could be up to 4,000 pounds less," said Josh Gaines, operations manager.

Gaines said before batching the concrete mix, Bartow wets the lightweight aggregate. The aggregate can reduce the weight of a large precast product from 150 pounds per cubic feet to 130 pounds, which is about a 13% reduction. More reduction can be achieved with lightweight sand, but Bartow only uses lightweight rock.

"When lightweight aggregate is added, the concrete weighs a little less, but is stronger," Gaines said. "The only downside is the aggregate is pricier than the aggregate we use daily."

Figure 5. Photograph of trial slabs on morning after placement.[7]

A STRIKING EXAMPLE OF THE EFFECTS OF INTERNAL CURING

In 2012, Denver Water Co. used lightweight aggregate to internally cure concrete for the floor and roof slabs of a 10-million-gallon water storage tank. Two trial slabs with conventional concrete and internally cured concrete were placed at the same time in the hot and dry environment near Denver. No curing compound was applied to either slab. A photo (Figure 5) was taken the morning after the concrete was placed. It shows the internally cured concrete is still moist, while the conventional concrete is dried out.

After the contractor discovered the internally cured mixture performed well and had more rapid strength gain with significantly reduced cracking, he asked to also use it to construct walls and columns. The owner plans to construct future tanks using internal curing.[6]

Aggregate porosity and angularity may create mixing challenges compared with conventional aggregate batching.

A NEW APPROACH FOR THE PRECAST INDUSTRY

Internal curing can aid in manufacturing more durable precast products, especially when used in conjunction with other sound production processes. Producers must also continue to practice proper quality control to assess aggregate moisture levels within the concrete mix design. Overall, internal curing provides the precast concrete industry with a new approach to reduce the risk of early-age cracking and increase the longevity and sustainable properties of precast products. **PI**

Reid W. Castrodale, Ph.D., P.E., president of Castrodale Engineering Consultants, is a structural engineering consultant who provides services related to prestressed concrete and lightweight concrete. He has more than 30 years of bridge-related experience in research, a bridge design firm, the Portland Cement Association, and the lightweight aggregate industry.

RESOURCES:

1 Expanded Shale Clay and Slate Institute. "ESCSI Guide Specifications for Internally Cured Concrete," Information Sheet 4001.1, ESCSI, 2012.

2 Additional information on internal curing can be found on the ESCSI website (escsi.org).

3 The equation is derived from the widely-accepted method in Bentz, D. P., Lura, P., and Roberts, J. W., Mixture Proportioning for Internal Curing, Concrete International, Vol. 27, No. 2, February 2009, pp. 35-40.

4 Henkensiefken, R., Bentz, Dale, Nantung, Tommy, and Weiss, Jason. Volume change and cracking in internally cured mixtures made with saturated lightweight aggregate under sealed and unsealed conditions. Cement & Concrete Composites, 2009. 31(7), pp. 427-437.

5 Di Bella, et al. "Documenting the Construction of a Plain Concrete Bridge Deck and an Internally Cured Bridge Deck," Report TR-1-2012, IN LTAP Center, June 2012.

6 Bates, Robert T., Holck, Erik, Dee, Miles, King, Michael. "Design and Construction of an Internally Cured Slab," SP290-05, The Economics, Performance and Sustainability of Internally Cured Concrete, Ed. Schindler, Grygar and Weiss, American Concrete Institute, 2012.

7 Expanded Shale Clay and Slate Institute, "Internal Curing: Helping Concrete Realize its Maximum Potential," Publication No. 4362.1, ESCSI, 2012.

CAMPAIGNING FOR PRECAST

How to position precast concrete as the **material of choice** for architects, engineers and other specifiers.

By Bridget McCrea

With the U.S. demand for precast concrete products expected to grow steadily through 2018[1], a wide range of architects, engineers and designers will be incorporating these products into their commercial, residential, industrial and government projects. For some, the choice will be clear-cut because they've used precast in the past and understand its many benefits. Others will need some additional education and nudging to make that move.

To reach the latter group, a growing number of precasters are putting time and effort into campaigns that help spread the word about the material's ability to reduce project time and cost, enhance quality and incorporate aesthetic finishes and designs. National Precast Concrete Association's Stormwater Management Committee spreads the word to specifiers through a free webinar that allows specifiers to obtain two continuing education hours. In addition, NPCA's Building Product Committee helped design a rendering where online visitors can navigate a business park and house to discover all the possible precast elements.

These efforts not only help spread the word about the value of precast, but also support the fast-track project schedules that everyone in the construction industry is working with today. As a result, specifiers lean toward choices that they're familiar with. And if precast isn't on that short list, it can be overlooked in favor of an alternate material.

"The challenging aspect of reaching specifiers is making the time to get out there and talk to them, and then getting them to make the time for it," said Greg Stratis, manager at Shea Concrete Products in Amesbury, Mass., and current NPCA Board of Directors Chairman-Elect. The good news is engineers and designers are receptive to the idea once they realize how beneficial precast can be for their project(s). "Overall, I find that engineers are very interested in what we have to offer."

Stratis recently conducted a professional development day addressing the importance of taking the time to reach out to specifiers. In many cases, the in-person or phone meetings he has with specifiers turn into educational sessions.

"It's surprising to me that not all engineers are familiar with what we would consider everyday precast knowledge," Stratis said. "They're generally pleased when we take the initiative and time to help them find innovative ways – using precast – to solve the difficult engineering problems that they're dealing with."

HELPING THEM DO THEIR JOBS

Stratis pointed out that reaching out to specifiers can be a time-consuming activity that doesn't always fit into the typical precast manufacturing firm's day-to-day agenda. However, it is a vital process that supports both company- and industry-based efforts to position precast as the building material of choice on many different types of projects.

In many cases, manufacturers assume engineers already know enough about various products to make a decision. Or, precasters think that specifiers are "way above them," and unreachable, Stratis said.

"They think the engineer is going to stump them with a question or a request, so they shy away from taking the proactive step and reaching out," he said. "They feel that engineers aren't folks that can be communicated with easily, but this is an incorrect perception."

Based on these apprehensions, Stratis says precasters will often avoid going into the field to meet with engineers.

"Occasionally, you might run into one engineer that might be set on a certain material type, and it's sometimes hard to convince him or show him that precast might be a better material for the project," Stratis said. "There are also times when precast isn't exactly the right fit for a certain application."

In many other situations, precast concrete is the right choice. The only way to determine this – and to get specifiers thinking along these lines – is to sit down and talk to them about possible solutions.

"A lot of times they're just looking for reinforcement and maybe for you to do a little bit of the work," Stratis said.

For example, an engineer might say, "Hey, I'd love to put this structure on this job site. What can you guys offer me?" Once Stratis and his team lay out the options, the engineer may turn around and ask them to draw up the plans and send over the AutoCAD drawings, which, in turn, can be dropped right into the specifier's plans. The engineer may also ask for facts, information, pictures and other supporting materials.

"It's **surprising** to me that not all engineers are familiar with what we would consider **everyday precast knowledge**."

– Greg Stratis, *Shea Concrete Products*

Photo provided by Shea Concrete Products

Shea Concrete Products hosted a professional development day where specifiers could earn six professional development hours.

Whatever the request, Stratis said his company will usually fill it, knowing it will enhance the chances of the engineer specifying its products.

BREAKING THE COMMODITIZATION MOLD

According to Greg Roache, president at Gainey's Concrete Products in Holden, La., the best way to sell products in the precast concrete industry is by having the products that specifiers need.

"When you can do that, good things happen to your company as a whole," said Roache, who would like to see more precasters adopt that mindset.

Over the last seven years, Gainey's has incorporated engineer/designer outreach into its go-to-market model to drive specifications. As part of that effort, Roache said the company was approved by its local engineering society to offer professional development hours. Engineers are required to earn these continuing education hours in order to maintain their licensing statuses. Gainey's then developed about 10 different learning modules/subjects that it offers to engineering firms via one-hour sessions that include lunch.

"By giving these talks, we help engineers get their professional development hours and in return they're listening to our infomercial," Roache said.

He said sessions are given by interesting and fun speakers who talk about subjects of relevance to engineers. In addition to these talks, the company also holds annual wastewater and stormwater conferences and has invested in a state-of-the-art training room that can accommodate up to 150 people.

"We hold all-day seminars in that room and engineers walk away from the experience having earned almost all of the PDHs that they need for the entire year," Roache said.

Inviting specifiers on site allows Gainey's to reach a larger audience and vastly expand its specifier agenda. In fact, Roache credits the latter with helping to boost steady, double-digit company growth over the last few years.

"Until you can truly differentiate your product line, why would anyone specify it?" Roache said. "You have to find a point of differentiation and start educating specifiers on that point."

Take manholes, for example. At Gainey's, points of differentiation on otherwise commoditized products include three different types of corrosion control and a number of unique features that make in-ground installation faster.

"It's about how our products go above and beyond the typical spec," he said.

GETTING THE WORD OUT

Today, precasters have many different tools for spreading

the good word about their products and about precast concrete in general. Websites and social media, for example, are just two channels for disseminating information and reaching engineers, architects and designers. Project success stories, case studies and customer testimonials can go a long way in helping specifiers select precast concrete as a material of choice.

"We've started using more case studies showing how our products are being used out in the field, and that's helped get more engineers looking at what we're doing here," said Cyndi Glascock, design manager at Gainey's Concrete. "When someone has already heard about you – or read about your work – it's easier to get them on your team."

Ultimately, Glascock said any precaster's focus should be on educating and sharing information versus just selling product.

"Manufacturers can get so busy making products that they forget that they have to understand their target audiences – and then let those audiences know why their products are the best choice," Glascock said. "If you don't put the time into this and help others understand what differentiates you, it won't really matter how good your product is. It won't get specified." **PI**

Bridget McCrea is a freelance writer who covers manufacturing, industry and technology. She is a winner of the Florida Magazine Association's Gold Award for best trade-technical feature statewide.

RESOURCES:

[1] constructionspecifier.com/u-s-demand-for-precast-concrete-products-to-exceed-12-billion-in-2018/

MATH *for Precasters*

By Kayla Hanson

From arithmetic and unit conversions to geometry, algebra and calculus, **MATH IS USED EVERYWHERE** in a precast operation.

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Henry Ford is credited with developing the first ever moving assembly line, which began rolling out Model T automobiles in 1913. This was a major advancement because it increased manufacturing productivity, improved efficiency and allowed interchangeability of parts. Today, this concept still serves as the foundation for most manufacturing processes, even in a precast concrete plant.

Every employee in a precast plant, whether in the foreground or behind the scenes, plays a vital role in the plant's operations. Everyone depends on the person before him or her to perform their duties correctly, completely and with a specific level of attention to detail. If any role is disrupted, the entire system is affected. Disruptions to productivity that may first come to mind are concerns over materials arriving on time, inclement weather, employee turnover, equipment breaking down or job site readiness. However, one pressing issue that can linger in the background is math skills.

From arithmetic and unit conversions to geometry, algebra and calculus, math is used everywhere in a precast operation, yet many people simply survived their math classes and don't remember much of what they learned.

Math can be intimidating. The concepts depend on specific skills that can be confusing to learn in non-traditional settings such as in manufacturing or production applications. Also, the ability to apply these skills can get rusty if they're not used regularly. Despite the aversion sometimes directed toward the topic or the difficulties associated with acquiring some of these skills, knowing and learning math is invaluable in the precast concrete industry.

Unfortunately, indentifying employees who could benefit from having a refresher lesson or learning a new skill isn't immediately apparent. Certain needs may only be revealed when mistakes become more prevalent or when a costly pattern of errors develops. Some manual production practices that are crucial to manufacturing quality precast concrete products rely heavily on arithmetic skills.

"The **more you invest** in your employees, the **more your company receives** in return. In the end, when they know you care about them, **it shows** in their final work."

– Branielle Bergeron, *Precast Concrete Products of Maine*

Branielle Bergeron, general manager at Precast Concrete Products of Maine, attended the debut course at The Precast Show 2016 in Nashville, Tenn. She said employees at the plant use math every day from reading blueprints to setting up forms.

"We also use the volume calculations for figuring out how much concrete we will need to fill the forms," she said. "The topics in this class are very vital to our plant operations and to the precast industry."

Many sections in the NPCA Quality Control Manual for Precast Concrete Plants, such as reinforcement fabrication (Section 4.2.1), placement of reinforcement (Section 4.3.3), pre-pour inspections (Section 4.3), post-pour inspections (Section 4.6.4 and 4.6.5), fresh concrete testing (Section 5.3), moisture content tests (Section 5.2.2) and all quality control procedures and documentation are depend on a solid arithmetic foundation. These areas are also the source of many member inquiries.

Ensuring all plant personnel have the skills they need to perform their duties and contribute to their highest ability is a joint effort between employees and the employer. NPCA has developed resources to help

make this possible. The course Math for Precasters was created specifically to meet the needs of production and QC personnel. It is taught in-person at The Precast Show or students can take the class online at their own pace.

The course content progresses in difficulty, beginning with arithmetic essentials and working with negative numbers and advancing to adding, subtracting, multiplying, dividing and converting fractions. This solidifies the basic concepts upon which other skills are built. The material next covers percentages; decimals; algebra; unit conversions; geometry, area, volume and density calculations; and equation manipulation. Each section also includes real-world example problems with step-by-step solutions. Math for Precasters serves as a great preparation course for students prior to beginning NPCA's Production and Quality School courses.

"This class would be beneficial for the experienced employee needing a refresher and to the new employee first learning skills and procedures," Bergeron said.

Bergeron said the greatest outcome employers can receive by sending their employees to NPCA education courses is a sense of greater ownership in their employees' work.

"The more you invest in your employees, the more your company receives in return," she said. "In the end, when they know you care about them, it shows in their final work."

The next in-person course will be offered at The Precast Show 2017 in Cleveland, Ohio. Information about taking the course online can be found on the NPCA Online Learning Center. If you have any questions about the course, please contact Kayla Hanson at khanson@precast.org or (317) 582-2323. **PI**

Kayla Hanson is a technical services engineer with NPCA.

EXAMPLE COURSE PROBLEM:

The volume of a 4-inch-by-8-inch cylinder mold is approximately 0.0582 cubic feet. The density of the concrete inside the mold is 145 pounds per cubic feet. What is the mass of the concrete inside the cylinder?

$d = m / V$
$145 \text{ lbs}/ \text{ft}^3 = m / 0.0582 \text{ ft}^3$
$(145 \text{ lbs}/ \text{ft}^3) * (0.0582 \text{ ft}^3) = (m / 0.0582 \text{ ft}^3) * (0.0582 \text{ ft}^3)$
$8.8439 \text{ lbs} = m$
$\text{mass} = 8.84 \text{ lbs}$

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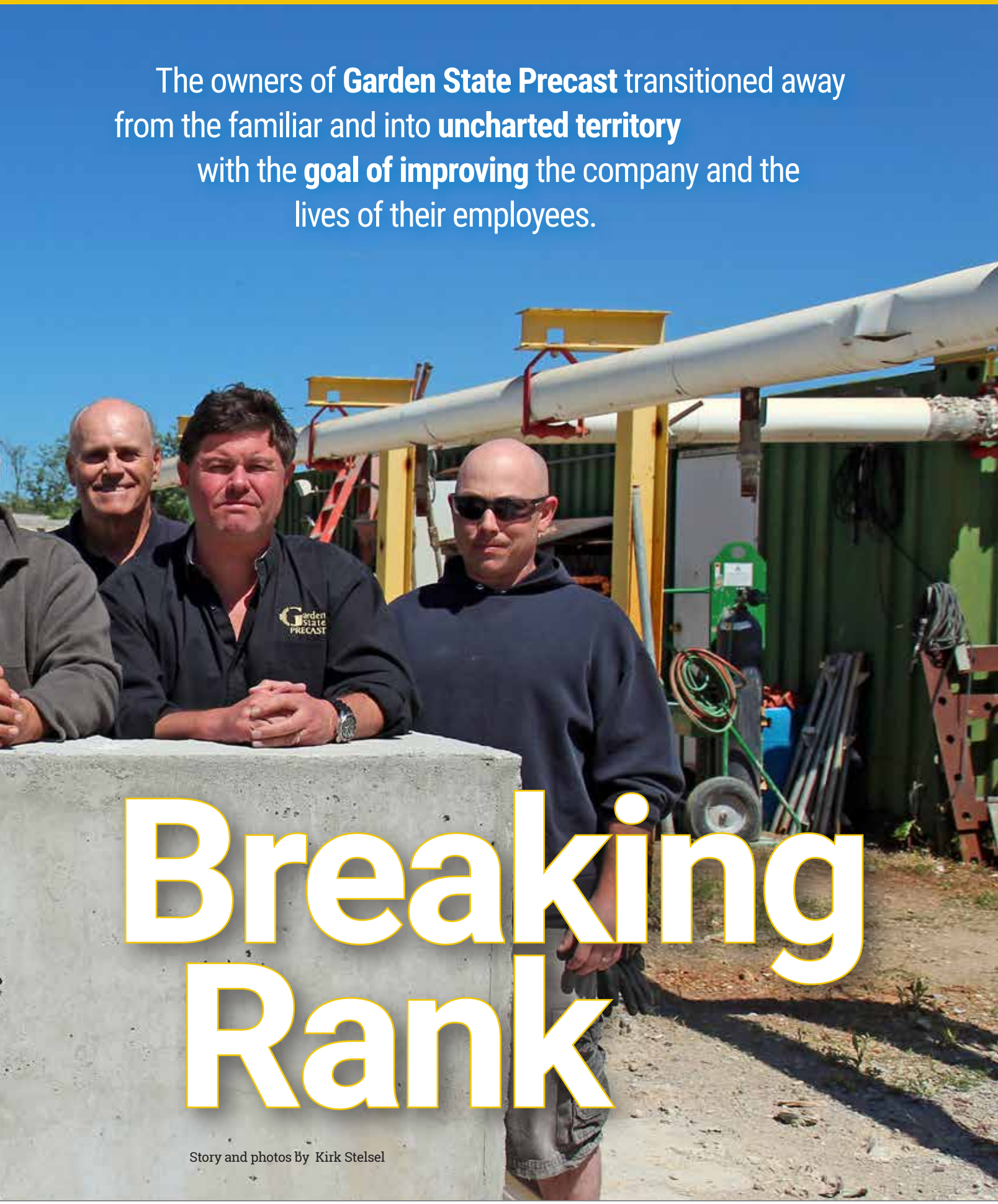
The employees of Garden State Precast succeed as a team and have built a solid culture based on trust and respect.

The owners of **Garden State Precast** transitioned away from the familiar and into **uncharted territory** with the **goal of improving** the company and the lives of their employees.



Breaking Rank

Story and photos by Kirk Stelsel

Custom structures are a vital part of the product mix for Garden State Precast.

Hardware stores are a fascinating study in economics. Entire aisles are filled with commodity products with little price differentiation between brands. But walk into the power tools, appliances or outdoor equipment departments and you'll find huge variations in pricing among non-commodity products.

In 2003, one job brought the advantages of non-commodity markets into sharp focus for Garden State Precast in Farmingdale, N.J., transforming almost everything about the company. But decades earlier, owners Kirby and Gene O'Malley and Dan Morris were just young men looking to make a living in an industry that afforded them a job and a decent paycheck.

THE JOURNEY BEGINS

When Kirby graduated from college in 1970, the economy was in a recession and job prospects were grim. His cousin secured him an interview with Steve McCloskey at Interpace Corp., a manufacturer of large-diameter prestressed pipe, but Kirby wasn't sure the work was right for him. Six weeks later and still without a job, Kirby's interest was reignited after McCloskey sweetened the deal.

McCloskey told Kirby he'd transfer him to the engineering

office in Parsippany, N.J., after a few years at the plant. He kept his word and became a mentor to Kirby. In addition, Interpace provided a job for Gene, who left college in pursuit of work after their father passed away. And it was there the two met Dan Morris, an employee in the production control department. Little did they know, the wheels had been set in motion.

FROM EMPLOYEE TO EMPLOYER

Interpace, which changed names several times, sent Kirby all over the country and world. Next, he followed some colleagues from Interpace out to California in the early '80s, where he worked for Hydro Conduit Corporation in the engineering department. But by the mid '90s, he started to grow weary of working for a large corporation. Meanwhile, he and Gene, who was general manager of a concrete pipe plant in Farmingdale, N.J., along with Morris, began discussing the future.

Gene knew Duncan Thecker, a local businessman also located in Farmingdale, who was interested in selling his dry cast plant. When Kirby approached him in 1997, everything clicked and it was just a matter of figuring out how to make the transaction work. Thecker wrote down what he wanted on a half sheet of paper, which Kirby still has today. They shook hands and put a plan in motion.

At first, the trio didn't have enough money, so Thecker put Kirby in charge of running the company until they did, with simple instructions to make it better for him. Morris joined about six months later. In about a year and a half, they secured the funds and purchased the plant. At that time, Gene joined the company as well. That was 1999, and from that moment on, the mad dash began.

"We had to hit the ground running because we didn't have any money," Gene said. "Everything we had was invested in the company. We worked every Saturday we could."

Volume became the name of the game. The three increased capacity and output greatly, tripling production in just two years. As the years went on, though, the grind of long days and weekends wore on everyone. The company was pouring 140-150 yards a day for mostly commodity products with low profit margins. It kept them going, but a new opportunity was about to strike.

Employees at Garden State Precast care about their work because they know their managers and the owners care about them.

GOODBYE COMMODITY, HELLO CUSTOM

In 2003, the company broke from its standard products and bid a custom box job for Route 23 in Newark. The competition consisted of cast-in-place producers rather than other precasters. Knowing this, the three nervously bid the job with a higher profit margin than they were accustomed to.

"We thought, 'Wow, we're going to charge this guy a lot of money for this,'" Kirby said. "We were scared we were going to charge this guy that much for it but after he put it in the ground he said, 'Boy that saved me a whole lot of money.' That's when we realized that had to be our niche."

The three owners now could see

A strong quality control process is a vital part of the culture at Garden State Precast.

they were "driving themselves nuts" competing with other precasters on low profit commodity items. The management team switched its focus from increasing revenue to increasing the bottom line. The company shrank in size but increased in profitability and improved in nearly every other facet.

"What we do now is less yards and better quality and safety," said Mike Vergona, plant manager and a 13-year employee. "To me, after 10-11 hours the guys aren't as productive or as safe."

A big factor in custom work is the engineering and estimating department. Paul Heidt, engineering manager, helps ensure the right projects are bid accurately and that everything flows smoothly to production. Heidt is a holdover from Duncan Thecker Precast and is responsible for most of the custom pricing and all of the quoting. His department sees 3,000 to 5,000 projects a year, of which it releases 300 to 400 to production. Those jobs are the bread and butter but they have to be done right, a fact that is not lost on Kirby.

"It costs us a lot to make these products and with quality and engineering the liability is great," he said. "If we make a custom product, it's all on us. Everything has to fit together."

The company also manufactures Stone Strong retaining wall products and still manufactures light pole bases, manholes and catch basins. It pours some products in steel forms, including an upcoming culvert job in a form recently ordered from Wieser Form Fab. However, when it comes to custom products, it relies on aluminum panels from Western Forms. According to Kirby and Vergona, panel forms give the company the flexibility to pour almost any product. They even consult with Western Forms on projects such as a custom 3-sided culvert design for a recent bridge replacement project on U.S. Route 206 in Hammonton, Atlantic County. Garden State has worked with the New Jersey Department of Transportation for the past three years to design the project.

Garden State Precast manufactured 40-foot-wide culvert sections for a bridge replacement.

The culverts, about 40 feet wide and approximately 68,000 to 75,000 pounds each, will replace two bridges spanning over Clarks Creek and Sleepers Brook. Each section has 399 structural inserts and includes two special corner corbels to support the bridge approach slabs as the weight of the footings over time compress the earth below. When completed, the job will include 22 pieces. Each piece takes about an hour and a half to pour and a day and a half to build. The company's consistency and accuracy on projects like this keep customers coming back.

"After we've done this type of work with someone, they're not going anywhere else," Gene said. "It's not just a promise we can do it, we've proven it. Right now we have a number of bids out for jobs where they said, 'Can you precast this?' and we're trying to increase that."

Today, nearly 50% of what leaves the yard is custom. Thanks to owners who are accessible day and night, products that are delivered correctly and on time, and a policy to make things right for the customer, that percentage continues to rise. That same philosophy of dedication and care applies internally as well.

EMPLOYEES FIRST

After the engineering and estimating department has done its work, it all comes down to production. There, Vergona ensures employees do the job right and on time, but he doesn't lose sight of the fact that they have lives outside of work. Gene describes it as an "employees first" approach and said if you take care of the employees, then plant safety and the customers will be taken care of as a result. Employees receive needed time off for things like attending a kid's game or personal issues and have the opportunity to have a good work/life balance. The owners know Vergona will do anything









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A Garden State Precast employee moves product across the yard.

he can to help his people while maintaining their respect.

"I think Mike is one of the best guys at running a crew that I've ever been around," Morris said. "He treats it like a family but he keeps them in line too. That's a unique quality."

"You won't go out there and see two guys talking or sitting down," Gene added. "Mike respects them and that's the biggest thing."

Chris Tyler, assistant plant manager, oversees production of standard products and said Vergona is "as loyal as they come." It's clear that culture trickles down. Tyler, like the others, takes great pride in the product the company manufactures and the way in which they do it.

"We make the product look nice, even the stuff that goes underground, by taking the time to make it that way," he said. "We care and have a mindset where it's not just making a product or getting production done; you're doing a service. The product and doing the job right come first, but it's more than just a place to go to work.

"They're a part of the community that is Garden State Precast."

Kirby is no longer at the plant every day, but his connection with the employees remains a priority. He has daily calls with Vergona and Heidt, as well as the accounting and quality control departments, even though he's confident everything would run smoothly without a call. That's because he cares greatly for those who come through the front gates each morning.

"They're here to provide for their families and we respect that," Kirby said. "We take the responsibility that God has given us very seriously. The decisions we make affect lives, so we don't take it lightly."

The net effect is a thriving plant that employs approximately 70 people focused on quality and has gone more than 650 days without a loss-time accident. The company is forward thinking and stays on top of trends and technologies thanks to its involvement in the industry as a whole and its willingness to see the more global perspective.

GAINING PERSPECTIVE

Garden State Precast has been involved with NPCA for many years. In 2002, it became the first NPCA certified plant in New Jersey. Kirby served on the Board of Directors and as chairman in 2010. He will become chairman of the NPCA Foundation Board in 2018. Heidt has served on the NPCA Board and continues to serve on committees. Garden State employees frequently take advantage of NPCA webinars and in-person educational courses at The Precast Show.

The O'Malleys and Morris even brought a vendor to the association. Years ago they hired James and Magda Muka, general software developers at the time, to write custom software for Garden State Precast to manage all facets of the plant. What the Mukas developed became the basis for the Titan II Precast Management System software now found in precast plants across the country. That's just one of the many influential connections plant personnel have made.

"The biggest thing about NPCA is networking," Kirby said. "We've

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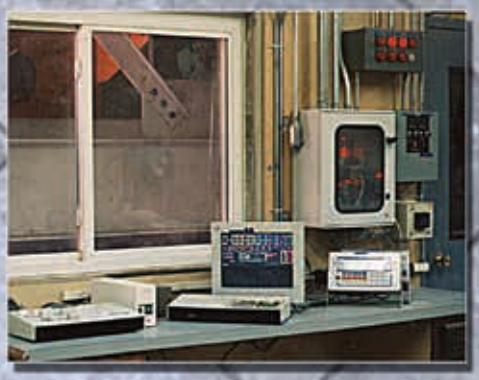

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Production employees carefully put together the panel forms prior to pouring the custom products.

got problems they've got in California or Colorado, so getting together with people in the industry is really what matters to us."

"The certification program helps a lot too," Morris added. "There's so many items, it's tough to keep your focus on all of them. When we have someone come in to check us, it helps."

ENDURING DEVOTION

The O'Malleys and Morris have been in the industry their entire careers, but remain passionate. Innovating, overcoming challenges and providing a living for their employees keeps them driven.

"You have to be willing to take a chance," Kirby said. "If you don't try things, it's never going to work. We want to change everything every day."

Owners who care, dedicated employees and a focus on customization add up to make Garden State Precast anything but a commodity in the precast concrete industry. **PI**

Kirk Stelsel is NPCA's director of communication and marketing.

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Photo provided by Andrew Nashawaty

(Left to Right) Craig Hoffman, Andrew Nashawaty and Justin Hoffman. The Hoffmans are the third generation to own Scituate Concrete Products.

Voices from the Field

ANDREW NASHAWATY

One precaster's **involvement** in committees and the plant certification program **makes an impact** at Scituate Concrete Products.

By Andrew Nashawaty

Having grown up in the precast industry, I jumped at the opportunity to write an article for Precast Inc., a publication I've read for years. I was asked to write a non-technical, quality-based article through the eyes of a longtime National Precast Concrete Association member. Topics I want to discuss include how to prepare your certified plant for an NPCA plant audit and the positive experiences I have gained as an NPCA Product Committee member.

The first time I heard about NPCA was in 1979. I was 5 years old and my parents, Richard and Judi Nashawaty, were preparing to attend the convention. Nowhere else in 1979 could they gain a national perspective on all issues. They owned Ray Precast in Marshfield, Mass., which is now known as Scituate Concrete Products. The pride they had as NPCA members astounded me. The logo was placed everywhere – on precast products, pads of papers and even cigarette lighters. Yes, I said cigarette lighters. Can you imagine your company giving those away in 2016? But their favorite part of being members was the people.

My father always told me, "These are some of the best people you will meet," and that statement is still true today. His favorite person to talk to about the precast industry was Ted Coons, president of Spillman Co. Ironically, I found myself 37 years later sitting next to Ted during a recent QA committee meeting in Indianapolis sharing industry stories and felt the exact same way as my father after the meeting. It's amazing how things come full circle!

A PRECAST VALUE

While growing up in a precast plant, I quickly learned manufacturing processes as well as the strengths, weaknesses and value of our products. My parents sold Ray Precast, and after nine years away from the industry, I returned in 1997 to work for Scituate Concrete Products and Scituate Concrete Pipe, owned by Richard and Bill Hoffman.

In 2006, I was put in charge of quality assurance and plant certification for both companies. My first task was to join the NPCA Concrete Pipe Committee, since that was the best way to get involved and learn about upcoming updates or changes to the NPCA Quality Control Manual for Precast Concrete Plants. So, I contacted NPCA, filled out an application and months later was appointed.

PREPARING FOR AN AUDIT

Being a part of the NPCA Plant Certification Program has helped us hold both companies accountable when it comes to maintaining a higher standard. Now working for third-generation owners Justin and Craig Hoffman, it has improved our overall quality, keeping us compliant with department of transportation regulations. DOT certifications are typically tied directly to having an NPCA plant certification. Our production practices have improved and our products reflect the improvement. We also stay informed on industry news, updates and changes and continue to grow our relationships with other precasters and vendors by attending NPCA events, classes and plant tours.

Preparing for an NPCA plant certification audit can be a worrisome task. However, once policies and procedures are in place, certification can be a manageable endeavor as long as your staff is diligent and mindful of its importance. Here are some tips that may help your staff prepare for your annual NPCA audit:

- **QC meetings and communication.** The most important thing you can do to prepare for an audit is have the quality control department meet on a weekly basis, if not more often, to discuss NPCA and DOT responsibilities. This is a great way to hold everyone accountable because it takes the focus of the entire staff to ensure quality is consistent.
- **Testing and calibration calendar.** A calendar is a must-have to remember annual testing, calibration dates, watertightness tests, the manhole step test, absorption, scale calibration, testing equipment calibrations, admixture dispensers and more. Remembering everything in your head leaves too much to chance.
- **QC stations.** Setting up QC stations in each department is very helpful. This ensures all the proper pre-pour and post-pour protocols, structural drawings, reinforcing placements, steel information and overlaps are easily accessible for any employee.
- **List critical sections.** Make sure your staff is well aware of what a critical section is and what it is not. It's the difference between passing and failing an audit.
- **Industry education.** Have employees attend PQS courses, NPCA live classes, plant tours, ACI Concrete Field Testing Technician – Grade 1 and other courses your local DOT may require. Employees feel a sense of pride and connection to the company the more you invest in them.
- **Monthly and annual certs.** If you receive certs for cement, fly ash, aggregates, etc., keep records updated on a monthly basis. Train the staff to stay diligent and follow up if they don't receive them from the supplier. It's up to you to get them.

Production Manager CJ Scott and Yard Foreman Greg Bonney perform a pre-pour inspection.

- **Layers in your QC staff.** Creating layers in your QC staff may be one of the best things you can do for your company. This avoids gaps or confusion when QC staff members are out or no longer with the company.
- **Keep your staff aware of previous deficiencies.** By fixing your previous deficiencies and not letting them happen again, your score will improve each year.
- **Technology.** Use the latest technologies to save paperwork. Doing so may also increase the QC manager's time on the floor inspecting product. Plus, some DOTs may soon require electronic filing, so you may want to put it on your radar.
- **Look at your finished product.** By simply looking at your finished product, you should be able to identify repeated defects in your form and fix them before they become a bigger problem.
- **Auditor etiquette.** Address your employees about being respectful to anyone who visits the plant, but definitely be mindful and respectful of DOT, OSHA and NPCA auditors.

NPCA audits are a great tool for management to gauge staff's work as well. It's a true team effort and involves the entire staff. The main thing I tell our employees is they should treat an auditor similar to how they would like to be treated themselves.

NPCA COMMITTEE EXPERIENCE

I'm very lucky to have served on NPCA Product Committees since 2006. I've met great people and learned so much about the industry, the QC Manual and audits by getting involved. I believe it is the strongest part of the association because you work side-by-side with other precasters and suppliers to try and solve industry-wide problems. This is the best way to learn about the association.

In 2006, at my very first NPCA committee meeting, I was extremely nervous. I was 32 years old and intimidated by the experience of the people at the table. Ron Craig called the meeting to order and after the antitrust paperwork was filled out, said, "The first order of business is, where are we going to dinner tonight?" After a good laugh by everyone, we got right into serious, meaningful business. I remembered my dad's statement, "These are some of the best people you are ever going to meet." It was true because Ron, who I thought was intimidating at first, as well as Jim Skinner, Bill Bundschuh and Randy Beelman became some of my closest NPCA member friends.

A WEALTH OF KNOWLEDGE

Whether it's attending committee meetings, walking The Precast Show floor to look at the latest industry products or seeing self-consolidating concrete poured in person for the first time on a plant tour, NPCA has given me a wealth of knowledge and many great experiences. And there are a couple things that will always be true – the industry will continue to grow, people will continue to make this industry great and Ted will always be up for a great conversation. **PI**

Andrew Nashawaty is the compliance officer at Scituate Concrete Products in Marshfield, Mass., and Scituate Concrete Pipe in Scituate, Mass.

The NPCA Sustainability Awards are displayed and presented at The Precast Show.

Your Sustainability Committee to the Rescue

An update on the NPCA Sustainability Committee's agenda and how it benefits the precast concrete industry.

By Claude Goguen, P.E., LEED AP

In the past few years, superhero movies have dominated the big screen. The premise may differ, but every movie has the same basic plotline: A new threat emerges, and the hero finds a way to thwart it and protects the citizens from harm.

Instead of picturing the superheroes standing with hands on their hips and capes fluttering in the wind, imagine a lean, green fighting machine called the National Precast Concrete Association Sustainability Committee ready for action. Then a call for help! "Someone is asking for environmental information on a product!" Fear not, concerned member, the sustainability committee has you covered.

The sustainability committee is currently comprised of five dedicated members who have environmental product declarations ready for use on your next project. The committee is working to ensure your customers are aware of and educated about these EPDs and how to use them. In addition, they are writing a guidance document on the new LEED v4 program taking effect Oct. 31, 2016, and developing a sustainability webpage template that members can take and edit to fit their particular market. Also in the works is the creation of educational courses on sustainability and resiliency for members and specifiers to take live at NPCA events and via webinar.

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Sustainability Awards

Are you doing something at your plant to save time and energy, effectively use resources and reduce waste? You may be a prime candidate to walk on the stage at The Precast Show and accept a coveted Sustainability Award.

The goal of this program is to reward excellence in sustainable products, practices and operations within NPCA membership, and to publicize the overall progress of the precast concrete industry toward sustainability.

The awards are divided into four categories:

PRODUCER MEMBERS

- **Best Project Entry** – Precast product being used in its final design purpose that contributes to the sustainable attributes of the project.
- **Best Company/Plant Entry** – A practice that is performed by the company in doing business specifically at the precast manufacturing plant, showing improvement in sustainable practices.

ASSOCIATE MEMBERS

- **Best Product Entry** – Product being used in its final design purpose in the manufacturing or performance of a precast concrete product, and that is beneficial to the overall level of sustainability of that intended precast concrete product.
- **Best Company/Plant Entry** – A practice that is performed by the company in doing business specifically at its plant or facility location that shows an improvement in overall sustainable practices.

Each category will have one winner while the other approved entries will receive honorable mentions. All approved entries will be profiled on a display at The Precast Show 2017, on NPCA's website at precast.org, and in upcoming Precast Solutions and Precast Inc. publications.

The deadline for submittals is Dec. 1, 2016.

Contact Claude Goguen at cgoguen@precast.org or 317-582-2328 with any questions.

Finally, they are looking ahead at how to continually improve sustainability in the precast concrete industry. In other words, this committee is busy preparing for the inevitable: a construction industry that increasingly demands sustainably manufactured materials and transparency in how those materials were made.

Jesse Wingert of Concrete Sealants presented a 2016 NPCA Sustainability Award to Grant Fraser of Laurel Steel at The Precast Show 2016 in Nashville, Tenn.

COMMITTEE HISTORY

Since 2008, sustainability committee members have served mostly as prognosticators in a mysterious domain. Is sustainability a passing phase? How will the industry adapt and how will it affect NPCA members? There was very little expertise and guidance, but there was a need. A relatively new program called LEED was gaining traction and some members were being asked to contribute. As a result, the committee created resources and an online calculator to determine LEED credits. Many members have since used these resources.

In order to better gauge trends in green construction, NPCA joined a group of other concrete related associations – the Concrete Joint Sustainability Initiative – to focus specifically on sustainability. NPCA has participated in this group for many years to anticipate how the concrete industry is conforming to the sustainability movement. Through time, one thing became evident: Specifiers wanted more information on the life cycle of materials. This led to the creation of a precast concrete life cycle assessment in 2010. This document, developed by NPCA, Precast/Prestressed Concrete Insitute and Canadian Precast/Prestressed Concrete Insitute, contained information on environmental impacts due to material extraction through processing, manufacturing, distribution, use, maintenance, and disposal or recycling of precast concrete structures. The partnership with other associations proved valuable in the years to come. NPCA, PCI and CPCI have formed the North American Sustainable Plant Program and are creating exciting new resources for both specifiers and producers. This would not have happened without the foresight of the 2008 NPCA Board of Directors and the hard work of members.

WHAT'S ON THE COMMITTEE AGENDA?

The sustainability committee met recently during the International Concrete Sustainability Conference in Arlington, Va. Attending the conference was helpful for the committee because it enabled members to take a pulse of the sustainable construction industry and look into the future.

EPDs

The committee is currently working to educate specifiers and members on the precast concrete EPDs. Webinars were presented earlier this year and NPCA will also be raising awareness at the upcoming Greenbuild International Conference and Expo in Los Angeles. For more information on these EPDs, visit precast.org/epds.

LEED v4

The new LEED v4 system goes into effect on Oct. 31, 2016. It already has been in use, but this date marks the last day for using LEED v3. The new LEED program is vastly different. Precast can still contribute to obtaining credits, but through different means.

To help members through this transition, the committee is currently creating a LEED v4 guidance document explaining how precast concrete products contribute to the new system.

Sustainability website

Spreading the word about the sustainable and resilient properties of precast concrete has always been a challenge for the sustainability committee. They maintain a page on the NPCA website that expands on these points, but not every engineer or architect may visit it to get this information. Instead, they may seek the information from local precast manufacturers. However, this presents a problem. Many producer websites do not highlight sustainability. The committee's solution it to create a sustainability web page template that can be copied, edited and attached to an existing member website. Member products are sustainable for many reasons, and these are worthy facts to brag about! Visit precast.org/sustainability for more information.

Sustainability Awards

Since 2013, 44 entries have been submitted by 29 member companies for the NPCA Sustainability Awards. Fifteen of these entries have won in their respective category. The sustainability committee is responsible for managing this awards program, which means soliciting entries, finding judges and making adjustments to the program as needed. For the 2017 Sustainability Awards, the committee has made a few adjustments to the points in order to make them more applicable to the specific entry catagories. Entries for the 2017 Sustainability Awards are now being accepted (see the sidebar for more information).

IN PROGRESS

Looking ahead, the committee continues to search for ways to help companies save money and resources by reducing waste, energy and water usage. Committee members are also working to create simple tools to help producers measure their impacts and progress and adjust processes.

Much has been done, but much more is to come. These five committee members are dedicated in advancing the precast concrete industry one company at a time. The sustainability committee urges you to advance your sustainability efforts by visiting precast.org/sustainability, opening a resource and doing your own research, or attending a live seminar or webinar. The committee and NPCA's professional staff are ready to help you take that next step. Just call for help and the league of sustainability heroes will once again work to save your day!

For additional questions or comments, please contact Claude Goguen, director of sustainability and technical education, at cgoguen@precast.org or at (317) 582-2328.

Claude Goguen, P.E., LEED AP, is NPCA's director of sustainability and technical education.

For more information on the awards, past entries and the current entry form, visit **precast.org/sustainability-awards**

Don't Jump to Any "RASH" CONCLUSIONS

The following contribution includes the opinions of the author. If you would like to submit your thoughts on an issue affecting the precast concrete industry for a future Point of View column, please send an email to npca@precast.org.

Understand **what causes rashes** in the concrete industry and **how to prevent them**.

By Bob Waterloo

Think about summer in a concrete precast or pipe operation. The weather turns warm, the workflow quickens and all of a sudden there is an increase of rashes among some of your production workers. Coincidence? Perhaps not. Rashes are a fairly familiar occurrence in the precast concrete industry and there are many potential causes.

It is easy to see why rashes occur more frequently when the weather turns warm. With warmer weather, we start to sweat. Long sleeve shirts come off in favor of cooler clothing, exposing more skin. Sweat acts as a magnet for anything airborne, and, as we know, precast operations can generate a lot of dust. Some of those airborne particulates may include concrete and/or cement dust that naturally ends up on our skin. This is often how rashes occur.

There are a number of materials in a precast plant that could cause rashes, such as cleaning chemicals, curing compounds, sealant, fly ash and other concrete mix additives. Safety data sheets for all materials should be kept up to date and new employee orientation should include stressing the importance of being aware of the materials and chemicals they are working with and how to avoid unsafe contact. While just about any type of chemical can cause a reaction, in the precast industry cement burns are also often an issue when cement and wet concrete are handled improperly. *(See "Preventing Cement Burns" in the Jan-Feb 2016 issue of Precast Inc. to learn more.)*

WHAT ABOUT FORM RELEASE?

There is a common misperception that form release agents cause rashes too, but that is not necessarily true and may come from a time when form releases were quite different. Prior to 1999, the most common carrying agents in form releases were diesel, kerosene and fuel oil. Improper handling of those old-style form releases could have caused rashes.

That all changed with the passage of Volatile Organic Compounds regulations in September 1999. In response to the regulations, form oil composition changed. Today, most carrying agents in form release agents are now mineral (seal) oils. While these new compounds could cause skin reactions if left uncleaned or unattended over an extended period of time, the risk would be considered minimal compared with other products used in the precast and pipe industries. Modern form release products are much more environmentally friendly and as a result they pose less of a problem when exposed to skin.

HOW TO AVOID THE RASH

As with many environmental issues at the plant, continuous education of employees is the key to keeping rashes at bay. The NPCA Safety, Health and Enviornmental Committee recently developed training materials available at precast.org that can be incorporated into safety training and toolbox talks.

Visit precast.org and type "skin protection" into the search box near the top of the page for links to two new SHE Committee publications on the topic.

In talking with managers at a number of larger precast plants, the consensus was that that cement, cement dust and concrete were the primary causes of rashes in the workplace. In all cases, personal hygiene, including regular changes of clothing worn at work and the washing of exposed areas of skin, were considered to be the most important steps to avoiding skin problems.

OSHA considers contact dermatitis an occupational illness and states that any skin disorders lasting beyond 48 hours should be recorded with a separate entry on the OSHA 200 form. **PI**

Bob Waterloo is technical sales manager, Concrete Release Agents, Hill and Griffith Co., based in Indianapolis.

10 Ways to Help Protect Employees from Skin Rashes:

1. **Continually stress the importance of personal hygiene.** Frequent washing of exposed areas should be done regularly during the day. Washing of hands should be done before putting on gloves and after taking them off.
2. **Constantly remind production staff that they are working with chemicals** and that certain precautions must always be taken when working with portland cement.
3. Concrete and cement dust will permeate clothing. **A daily change of clothing should be a regular habit.** Clothes should be changed at work so as to not introduce cement residue into the car or home.
4. Employees will often use plant air to blow the dust off their clothes. It will clear off the surface dust but the **compressed air will also "push" some of the dust through the clothing,** making more skin contact inevitable.
5. **Use protective clothing,** especially gloves, whenever possible.
6. **Dry exposed skin thoroughly after washing.**
7. **The use of moisturizing creams** will keep hands and skin supple.
8. **Remove any wet cement from clothing.**
9. **Don't wear jewelry at work.**
10. **Employees should be instructed to let their supervisor know immediately** if they are experiencing a skin issue. Any persistent skin problem should be reported to a physician.

The NPCA Safety, Health and Environmental Committee recently developed training materials available at **precast.org** that can be incorporated into safety training and toolbox talks. Search for "skin Protection."

Tanzanian Ties

Precasters build a **different kind** of infrastructure **9,000 miles** from home.

By Bob Whitmore

Editor's Note:
"Giving Back" is an article series about NPCA members who are doing extraordinary things in their local communities, across North America and throughout the world. If you would like to nominate an NPCA member for a future article, please contact Sara Geer (sgeer@precast.org).

The precast concrete industry is focused on building infrastructure with an amazing array of products that are often extremely large, enormously heavy and exceptionally long-lasting. With their roots in precast, Randy and Melanie Lindsay-Brisbin are building infrastructure of a different kind in a country far, far away.

Nearly halfway around the world in Tanzania, a country just below the equator on the eastern edge of Africa, Randy and Melanie are building. Not with large concrete structures, but with basic human interactions. Randy, vice president of Lindsay Precast in Colorado, and Melanie, whose parents founded Lindsay Precast in Canal Fulton, Ohio, 55 years ago, have built a community of friends in Tanzania over the past five years. Now they are sharing their expertise with Tanzanians to help solve problems that plague many developing countries.

Like the precast business that Melanie's parents Roland and Linda Lindsay started many years ago, what began as a small venture has blossomed into much more.

Their involvement in Tanzania started innocently enough. As their two children, Jenna and Luke, were approaching high school graduation, Randy and Melanie made them a promise.

"We told them they could plan a trip as a graduation present pretty much anyplace – with some parental veto power," Randy said. "Luke had been pondering what he wanted to do, and through a mutual friend here in Colorado Springs one summer we met a gentleman who was a Lutheran pastor from Tanzania."

Pastor Ringo was making his first trip outside of his home country.

"We had him over to our house and he and Luke really hit it off," Randy said. "During the course of the visit, he made Luke promise to come visit him and his family someday in Tanzania."

A TREK TO TANZANIA

When it came time to pick his graduation trip, Luke settled on Tanzania. In 2011, Luke and his parents paid a return visit to Pastor Ringo, whose congregation lives in the Moshi district in northern Tanzania. The area receives some tourism as a gateway to safaris and Mount Kilimanjaro. However, the country is mostly rural and

underdeveloped. In some remote villages, the appearance of three white Americans was indeed a spectacle when Randy, Melanie and Luke first visited.

"That first trip, when we were up on the mountain staying with families, we were literally the first white folks or the first Westerners many of those people had ever met in person," Melanie said.

During the first visit, Randy and Melanie were inspired by the welcoming nature and genuine warmth of the Tanzanian people.

About a year later, one of their local hosts, Rev. Dr. Fredrick Shoo, an assistant bishop with the Evangelical Lutheran Church in Tanzania, visited Nebraska. Randy and Melanie made the trip from their home in Colorado Springs to see him.

"We were talking with him about wanting to go back and we were not sure what would work," Melanie said.

"What do you know how to do?"" Dr. Shoo asked.

"I know concrete," Randy said.

"I'm a social worker," Melanie added.

"We need all of that!" the assistant bishop replied.

Since that time, Melanie has made eight trips to Tanzania to work with women's groups. Randy has visited seven times, including their most recent trip this summer. Their son Luke, who now has a doctorate in physical therapy, joined them this summer, along with his girlfriend. Other friends and family have joined on various trips to the community where Melanie and Randy are known as Mama and Baba Luka. The family is treading carefully, though. They always act in concert with local churches and community organizations. Melanie, who has a master's degree in social work with expertise in crisis counseling, works with Rev. Faustine Kahwa, director of women's programs for the ELCT, to organize seminars for women in the church.

Last summer, their daughter Jenna joined Melanie in the training. Jenna had just earned her master's in social work and presented information on reproductive health, Melanie said.

"The rate of AIDS transmission in Tanzania is still very high, and young women are at high risk, so learning about the virus and how it is transmitted and how to avoid it is critical," Melanie said. "We did some very specific training with the women in the group, who were youth teachers. We were teaching them things that they could teach their youth."

NET(WORKING) WOMEN

In the Tanzanian culture, women work practically non-stop. They are responsible for fetching wood and water, cooking and cleaning and taking care of the family's domestic needs, and often still work outside the home. They rarely get a moment to themselves, so the workshops provide a change of pace, Melanie said.

"One of the most powerful things in these workshops is that the women just get an opportunity to be together and network and make connections and learn new information together. It offers them a time and space to develop their profession and develop their best practices together," she said.

While Melanie has been involved with women's groups, Randy has been exploring practical ways to ease the challenge of everyday life in the village, such as making cooking less of a burden. Tanzanian women typically prepare the family meal on an open fire, he said.

"Three stones with a fire in between. You set your pot right

Above: (left to right) Randy and Melanie Lindsay-Brisbin have been building relationships in Moshi district in northern Tanzania for the last five years.

Melanie has made eight trips to Tanzania to work with women's groups.

Randy and Melanie's son Luke launched the family's involvement in Moshi with a graduation trip to Tanzania.

To learn more about the Lindsay-Brisbin family's efforts in Tanzania, visit **Facebook** and search **@MamalukaTZ** to find the Mama Luka & Baba Luka – Together With Tanzania pages.

on the three stones," he said. "Much of the cooking is done inside the home. The women often have a baby tied to their chest or on their back, so the mother and the baby are exposed to all the smoke and the fumes.

"All that smoke inside the home often leads to respiratory and vision issues."

A basic cooking stove can provide a major quality of life improvement.

There may be a solution to this common problem. As they were learning more about the country, Randy and Melanie connected with a group called Childreach Tanzania, which has a family energy project devoted to identifying affordable forms of energy for cooking and lighting. Back in Colorado Springs, Randy found a cooking stove designed and tested by the Paradigm Project.

"It's a very simple and efficient design that uses 50% less firewood and has 70% fewer emissions," Randy said.

The time savings and health benefits of the stove can provide a big quality of life improvement.

"Often the women will spend more than half of their day walking to areas where they can find firewood. So by burning 50% less wood, you invest less time and energy in finding wood," he said.

Randy has been working with Childreach Tanzania to supply a small number of the stoves to local women for testing and also provided a few to the "roadside restaurants" in the region.

"It was very exciting," he said. "People loved them."

But the idea is not to just give away stoves. The concept is to build infrastructure by finding a Tanzanian partner who would create a business of selling and servicing the stoves.

"It really works best where it can be set up as more of an entrepreneurial model where people make investments – have skin in the game so to speak," Randy said.

"From kind of a selfish perspective, the work we do here and the work we do over there makes our **lives richer and better**. It brings **more joy** to us. These are things that we all do for each other."

– Randy Lindsay-Brisbin

PRECAST VAULTS IN THE FUTURE?

While these efforts are a world apart from running a precast concrete business in the states, a more direct linkage may be coming soon. Randy and Melanie's friend Dr. Shoo, who is now the bishop for the ELCT, has an idea for a side business for the church, Randy said.

"They are very interested in looking into precasting burial vaults," he said. "Right now, people are buried at home in their backyard or on the farm. A hole is dug and they wait for people to come to mix some concrete and line the hole.

"Then they have to wait longer for the people to come back and form the lid – a dome really – over the crypt site. It's a long process and the casket is there the whole time."

Dr. Shoo has his hands full with administering to his church's more direct needs, so the precast venture is on hold, but one thing's for sure – the Lindsay-Brisbin family isn't going away any time soon. They now have long-term relationships and a strong commitment to the country.

"Probably one of the greatest things we've gotten out of our work and travels to Tanzania is just the relationships we've developed," Randy said. "These can be lifelong relationships. I fully expect that we'll be making some trips to Tanzania to go to friends' kids' weddings some day."

NUNS FIGHTING SNAKES

It is not uncommon in the developing world for an aid group to swoop into a country, do a project and leave. Randy and Melanie were recently invited to visit a school that a group of Lutheran nuns had purchased from a large church group.

"A church came in and built this big campus and then they abandoned it," Melanie said. "It was empty for a few years."

Because the church group did not build relationships and create an infrastructure, when they left, the school failed. The nuns came in with the intent of staying.

"They literally fought snakes bigger than their arms to take their property back and now they have 60 students at least," Melanie said. "They are living there and teaching them."

One of the ways Randy and Melanie plan to continue building the human infrastructure is through a nonprofit foundation they created called Together With Tanzania.

"We use it as a conduit for sending money to Tanzania for these projects we do," Randy said. "The idea behind Together With Tanzania is that we are working in partnership with people there. We're working with them to identify needs and find out what the appropriate solutions are."

BUILDING COMMUNITIES

The work in Tanzania is a natural extension of the acts of giving back that Randy and Melanie have been doing as volunteers with multiple organizations in the Colorado Springs area for many years.

"From kind of a selfish perspective, the work we do here and the work we do over there makes our lives richer and better," Randy said. "It brings more joy to us. These are things that we all do for each other.

"It's what makes it a community in Colorado Springs, or at the National Precast Concrete Association, or in the United States, or in a global community. We're doing these things to build relationships, to help each other, to understand each other and make the best of what we can with our time in this world."

And though they didn't know it 55 years ago, it started with Roland and Linda Lindsay, working hard to turn a small excavating service into a precast concrete business that continues to grow and evolve in its sixth decade.

"Part of the reason we're blessed to be able to do this work today is because of what my mom and dad did," Melanie said. "They started out in a small town and started a business that they saw a need for. They filled that need and worked endlessly and were very successful.

"That's a huge part of why we can do this at the level we can right now, so we also see that impact from their lives." **PI**

Bob Whitmore is NPCA's vice president of communication and public affairs.

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NPCA Foundation Round-Up:

Scholarship Winners, Concrete Canoe Competition

By NPCA Staff

In 2016, The NPCA Foundation awarded eleven scholarships to undergraduate and graduate students pursuing studies related to civil engineering, architecture and construction-related curricula. The scholarship provides financial aid and increases the student's awareness of the many benefits precast concrete products can provide the specifying community. The 2016 scholarship recipients are listed below.

2016 NPCAF SCHOLARSHIP RECIPIENTS

Undergraduate Students

Aiden Blake
School: University of Tennessee
Major: Architecture
Sponsor: Michael Kusch, Sherman-Dixie Concrete (Forterra Pipe & Precast)

Caitlin Brady
School: Drexel University
Major: Architecture
Sponsor: Brent Dezember, StructureCast

Leland Brandon
School: Louisiana Tech University
Major: Engineering
Sponsor: Lisa Roache, Gainey's Concrete Products

Jase Galt
School: Montana Tech of the University of Montana
Major: Construction Engineering
Sponsor: Sam Lines, Concrete Sealants Inc.

Sean Hahn
School: Illinois Institute of Technology
Major: Civil Engineering
Sponsor: Kevin Johnson, Welch Brothers

Kearney Holst
School: Flathead Valley Community College
Major: Engineering
Sponsor: Tom Anderson, Glacier Precast

Cole Pilgrim
School: Texas State University
Major: Concrete Industry Management
Sponsor: Dirk Franz, Tricon Precast

Bradley Ruga
School: Rowan University
Major: Civil Engineering
Sponsor: Matthew Hicks, Northeast Precast

Abigael Weller
School: Drury University
Major: Architecture
Sponsor: Aaron Ausen, Dalmaray Concrete Products

Not Pictured

Gavin MacWilliam
School: University of Alabama
Major: Civil Engineering
Sponsor: William MacWilliam, Universal Precast

Graduate Student – Daneen S. Barbour Scholarship

Steven Gyarmaty
School: Illinois Institute of Technology
Major: Structural Engineering
Sponsor: Mark Wieser, Wieser Concrete Products

BONUS FUNDS for scholarship recipients

Students who have been selected as scholarship recipients can secure additional funding for their education through NPCAF's PQS initiative. To earn an additional $500, students must successfully complete Production & Quality School Level I, a class that is part of the Precast University curriculum. The course, which covers basic topics in the precast concrete industry, is offered online. After taking the class, students must pass a test to be awarded the funds.

Chris Lomaka, a recent graduate of the College of Architecture and Urban Studies at Virginia Tech, participated in the program earlier this year. He said taking the class provided him with a comprehensive overview of precast concrete and additional insight into the industry. The funds also helped him focus more on his schoolwork and less on his budget as he worked toward completing his degree.

With the PQS initiative for scholarship students, NPCAF hopes to deepen students' understanding of precast concrete products, further connecting them to the industry.

École de Technologie Supérieure of Montréal, Que., won first place at the ASCE Concrete Canoe National Competition.

ASCE CONCRETE CANOE NATIONAL COMPETITION

As part of its efforts to have a wider impact on students enrolled in architecture, civil engineering and construction-related programs at North American universities, NPCAF served as a silver sponsor in this year's American Society of Civil Engineers Concrete Canoe National Competition. The event, held June 9-11 at the University of Texas at Tyler, featured 21 schools vying to be crowned the winner of "America's Cup of Civil Engineering." In the end, École de Technologie Supérieure of Montréal, Que., took home the first place prize, which included a $5,000 scholarship, a trophy and, of course, bragging rights.

About 400 students from the competing schools spent thousands of hours researching, designing, constructing and racing their concrete canoes. The results of their efforts were then judged according to the quality of their design papers, visual displays, oral presentations and more.

According to Marti Harrell, executive director of NPCAF, the foundation's involvement in the event will lead to students becoming more aware of the precast concrete industry.

"What we're hoping to do is use the concrete canoe national competition as a springboard for becoming better connected with the schools," she said. "It's a long-term vision that we think will have profound effects moving forward."

Claude Goguen, P.E., LEED AP, director of sustainability and technical education, served as a judge at the event. He was impressed by the quality of work that all students put into their entries.

"The presentations, the canoes, the quality of the canoes and even the training they put into the paddling – the students doing all of that plus going to school renewed my faith in the future of the engineering industry," he said.

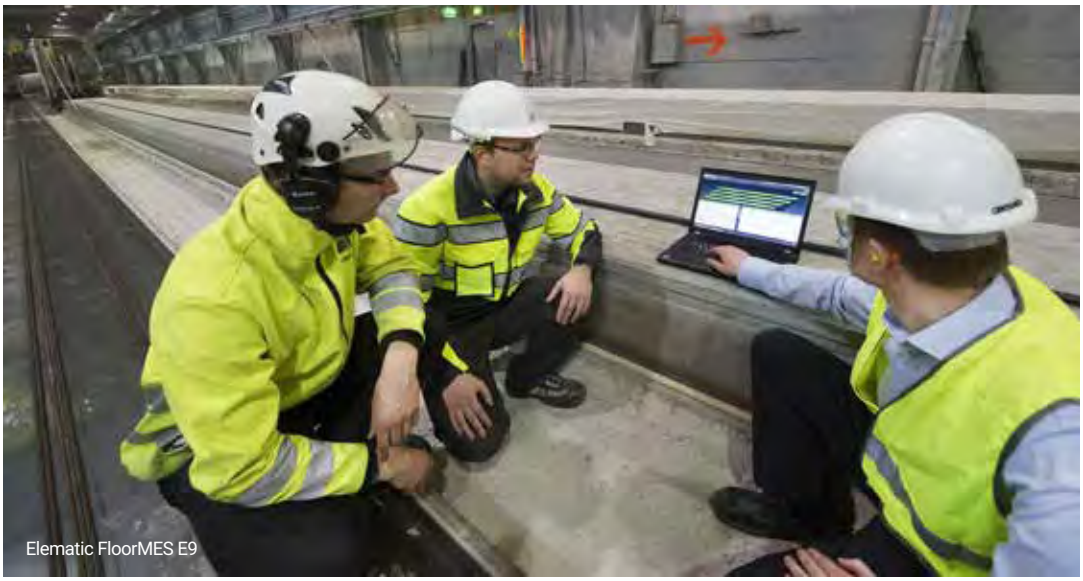
The NPCAF Board of Directors voted in June to continue sponsoring the national competition. The board also agreed to reach out to participating schools in the future to provide grants for funding canoe construction. According to Harrell, this will further instill precast as a premier building material with students.

"It's all about strengthening that understanding and awareness of precast concrete, getting us into schools and getting the students more familiar with us," she said. **PI**

People & Products

People & Products is a **forum** where NPCA members and nonprofit organizations can **share information** on new products, personnel promotions, acquisitions or service announcements **concerning the precast concrete industry**. Items are printed on a space-available basis.

For possible inclusion, send your press releases and photos to sgeer@precast.org.



Elematic FloorMES E9

ELEMATIC FLOORMES E9 OPTIMIZES PRECAST HOLLOWCORE PRODUCTION

Elematic released the FloorMES E9, a hands-on tool for supervising and planning precast floor production.

The automated system optimizes and balances hollowcore slab production plans and schedules. In addition, the system monitors the work process and compares it to the original plan. The main objectives of the system are smooth, continuous production and low operational costs.

OLDCASTLE ANNOUNCES JOINT VENTURE WITH MODULE X SOLUTIONS

Oldcastle Precast announced a new joint venture with Module X Solutions, an industry leader in modular building systems. Module X Oldcastle will manufacture protective modular buildings for the telecommunications, petrochemical, oil and gas, fiber regeneration and solar industries.

The joint venture will offer diversified products and services to projected growth industries while leveraging joint processes and economies of scale to gain market share.

IWI GROUP PORTA-PIT EASES WASHOUT WASTEWATER DISPOSAL

iwi Group designed the Porta-Pit Washout Water Treatment System to safely capture and contain wastewater and lower the pH.

The Porta-Pit is a cross-linked, polyethylene industrial plastic bin with a metal frame for support. It is designed to hold about 330 gallons of washout water and/or concrete solids. Once full, a forklift or loader can be used to flip the bin upside down to empty. The forklift runners and steel halo protect it during use and prevent wear and tear. A form-fitting custom lid that seals is also available that provides site security, protects from rainfall overfilling and allows for transporting when full if necessary.

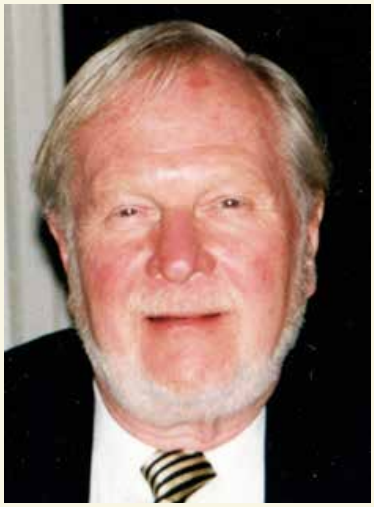
iwi Group Porta-Pit container

REX VAULT SERVICE CELEBRATES 60 YEARS

NPCA Producer Member Rex Vault in Newton, Ill., celebrated 60 years of service in August.

As mentioned in the Precast Inc. article "Small Town, Big Ideas," the company was founded in 1956 by Roland Clark and named after a vault brand in existence at the time called Rex Protex. In 1971, Rex Vault joined Doric as a licensed vault dealer and then joined Norweco in 1982 as a licensed distributor of aeration products for the tanks. In 1983, the company was incorporated and in 1995 current owner Mark Bolander took over.

TOM LENDRUM PASSES AT 88: INDUSTRY PIONEER AND FORMER NPCA PRESIDENT



Tom Lendrum

John T. (Tom) Lendrum, 88, former National Precast Concrete Association president and one of the early leaders of the precast concrete industry, passed on July 17.

For many years, Lendrum headed Norwalk Concrete Industries, a company founded in 1906 as a licensor of its patented burial vault and mold equipment. After serving as an officer in the Korean War, Tom joined his father in the business in 1960 and helped it grow and diversify over the years. He was one of the leaders in the creation of ASTM Committee C27 in 1972, a group that continues to develop standards today that play a critical role in the design and specification of precast concrete products.

Lendrum served as NPCA's 10th president in 1975 and was presented with the Robert E. Yoakum Award in 1976 for his service to the industry. In 1993, he passed the ownership of Norwalk Concrete Industries to his sons, John Lendrum and Jeff Malcolm, who continue to run the company today.

CALENDAR OF Events

Sept. 28 - Oct. 1, 2016
NPCA 51ST ANNUAL CONVENTION
Renaissance Austin Hotel
Austin, Texas

March 2-4, 2017
THE PRECAST SHOW 2017
Cleveland Convention Center and
Hilton Cleveland Downtown
Cleveland, Ohio

February 22-24, 2018
THE PRECAST SHOW 2018
Colorado Convention Center and
Hyatt Regency Denver
Denver, Colo.

For the most up-to-date information about NPCA events, visit **precast.org/meetings**

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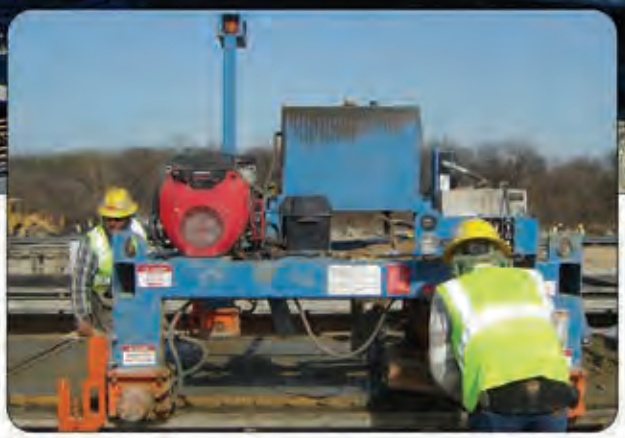

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