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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.*

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**Standard Precast's** can-do culture and experience help it meet customer needs.



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What you need to know to be in compliance with **OSHA's silica exposure rule**

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#### On the Cover:

*Standard Precast primarily pours stormwater, wastewater and utility products. The company started manufacturing box culverts in 2005 and now owns nine forms.*

photo by Sara Geer

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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, contact us by calling (800) 366-7731 or visit [precast.org/technical-services](http://precast.org/technical-services).*

**Asabee writes:**

**With concrete being a mixture of fine aggregate, coarse aggregate, cement and water, is the main cause of concrete volume increase due to the coarse aggregate?**

**NPCA Technical Services engineers answered:**

About 60% to 75% of concrete's volume is comprised of fine and coarse aggregates. Fine aggregates typically consist of sands or certain types of crushed stone, with most particles being smaller than 5 millimeters. Coarse aggregates are usually made of gravel, crushed stone or a mix of both. The majority of coarse aggregate particles are greater than 5 millimeters. ASTM C33 dictates gradation requirements for both fine and coarse aggregate. The

standard requires certain percentages of an aggregate sample (by mass) to pass through various sieve sizes. For example, Table 1 in ASTM C33 states that 100% of a fine aggregate sample must pass the 9.5-millimeter sieve, 95% to 100% of the sample must pass the 4.75-millimeter sieve, 80% to 100% must pass the 2.3-millimeter sieve, 50% to 85% must pass the 1.18-millimeter sieve and so on. The standard also states requirements for coarse aggregate sizes.

When we refer to volume change in concrete, we are talking about changes after the concrete is batched and placed. We are not talking about volumetric changes while materials are being added to the mix. Volumetric changes to concrete after placement and during its life can be caused by many factors. In fact, aggregates play a role in restraining volume change. It is the paste and its constituents that can contribute significantly to volumetric expansion and contraction. This is why water content, for example, is critical in this regard. The more water in the mix, the more chance for shrinkage.

**Shamik writes:**

**Is there a standard test method for fire rating checks of non-shrink grouted joints for precast buildings?**

**NPCA Technical Services engineers answered:**

The specific American Concrete Institute code regarding fire-resistant concrete is ACI 216, "Code Requirements for Determining the Fire Resistance of Concrete and Masonry Construction Assemblies." However, the code does not include language regarding fire rating testing of grout or grouted joints.

**Jerry writes:**

**We're pouring a column that is about 123 inches tall and will require about 2,761 pounds of concrete. The reinforcement cages will be made with #3, #5, and #7 rebar and steel plates. We'll use a 20-foot-long internal vibrator with a 1.25-inch-diameter head. How can we determine the right lifts or layers of concrete to obtain better quality vibration?**

**NPCA Technical Services engineers answered:**

Some important factors to consider are the type of concrete, the flowability of the concrete you're using, the placement and spacing of the steel, the total volume of the pour and the type of formwork you're using to frame this column. Concrete in columns is placed in lifts of various depths depending on



NPCA File Photo



the aforementioned factors, but generally the lifts range from about 12 to 24 inches. ACI 309, "Guide for Consolidation of Concrete," recommends that lift depths should not exceed 20 inches.

The key is to vibrate the first lift with the head of the vibrator all the way to the bottom of the form without touching the form. On subsequent lifts, insert the vibrator at least 6 inches into the previous lift to blend the layers together and avoid cold joints.

It also depends on the internal vibrator's specifications and at what amplitude and frequency the head is vibrating. This will affect the vibrator's radius of action. We recommend asking the vibrator manufacturer for details on correct use and best practices. Other articles found on precast.org, such as "Production Equipment" and "Top Precast Plant Operational Deficiencies Part 2," can also be used as references.

**JD Anderson writes:**

**I have a mix strength that exceeded 8,000 psi, twice what it's rated for. The structure is a pier crane column. Is too strong of a concrete mix a concern?**



**NPCA Technical Services engineers answered:**

Concrete that is breaking at twice the design strength is not necessarily a bad thing, but you should address a few items to ensure there are no major underlying issues.

First, you need to answer the following questions.

- Have you calibrated your strength machine in the past year?
- Are you breaking the cylinders at the rate in accordance with ASTM requirements?
- Are you using the correct end caps and neoprene pads?

Having a machine that is out of calibration, operated incorrectly or using incorrect equipment could lead to inaccurate readings. This is the first place to check to confirm you are in compliance.

The next set of questions to ask are:

- Are you using different materials in your concrete mix?
- Do you have a new cement, admixture or aggregate supplier?

Precasters sometimes use different suppliers for similar products and their strength readings have been greatly improved or reduced. And, the last question – has anything else in the manufacturing process changed? From casting to consolidation to curing, if any of these processes change, strength could be affected. **PI**

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# AIR

## Concrete's Helper

Know the differences between **beneficial air** and **detrimental air**.

By Eric Carleton, P.E.

**U**nless you're an anaerobic bacterium, you may need air to survive. You may know that, but did you know that air is also an important factor in determining concrete's durability? This is especially true for concrete that is exposed to freezing and thawing. Air in concrete is defined as air voids within the concrete matrix. But not all air is good air, and it's important for precasters to understand the difference.

### **DETRIMENTAL AIR**

During the concrete mixing process, mixer blades can introduce pockets of air into the batched concrete. These randomly spaced, large-diameter air pockets can be detrimental to concrete's quality by reducing available strength and creating surface defects (bug holes). Entrapped air voids also provide minimal durability benefit from internal water freezing and expansion cracking. Proper

Air entrainment in concrete caused by Sika Corp's air-entraining admixture.



concrete placement and consolidation techniques reduce large entrapped air pockets.

During the hydration process, the concrete matrix will produce a capillary pore system. These openings are very small (10 nanometers to 10 micrometers) and are defined as “the interconnected spaces between hydration products of hardened concrete.”<sup>1</sup> These capillary openings go through a series of changes from dry batching and the interfacing of cement particles to the introduction of water, cement reactions and the consequential plugging of most of the pores with hydration constituents. Capillary pores do not provide beneficial air openings to reduce water freeze/thaw destruction and are linked to permeability. Consequently, modern concrete mixes incorporate fine secondary cementitious materials or, when specified, integral water sealant admixtures to further reduce hardened concrete capillary pores.

### CREATION OF AIR-ENTRAINING ADMIXTURES

While entrapped air can be harmful to concrete, entrained air in the concrete matrix through chemical means creates beneficial bubbles. These bubbles are spaced not more than 1/5 millimeter apart and are about 1/10 millimeter in size. Entraining air creates billions of small bubbles within a cubic meter or yard of concrete, providing a perfect space to relieve stresses when water freezes within hardened concrete. This entrained air has proven very beneficial for concrete since its introduction to the industry in the 1940s. Like many great discoveries, it came about by accident. Individuals in New York began to notice some concrete mixes experienced little or no scaling or degradation, while others fared much worse. This led to the discovery that some mixes contained cement that inadvertently included petroleum products due to a bearing failure in the mill during the grinding process while other cement inadvertently contained animal fat. Both of these obscure additions added a surfactant to the mix and produced large amounts of small, uniformly spaced dense bubble configurations. Many decades of research and scientific advancements by academics

and members of the private industry has led to the creation of modern admixtures for air entrainment, which are a staple in most concrete mixes batched in cold climates.

Even manufacturers in warm climates have found value in air entrainment admixtures, including improvement in fresh concrete properties such as workability, reduced bleed water and aggregate segregation. Though today’s modern air-entraining admixtures still provide benefits, additional specific water-reducing admixtures are now available to precast producers. A potential detrimental effect of using an air-entraining admixture is a small reduction in long-term compressive strength. However, careful attention in trial batching with modifications to the quantity of cementitious materials and/or the addition of water-reducing admixtures negates these issues.

### AIR ENTRAINMENT AND DRY-CAST CONCRETE

Although wet-cast concrete benefits greatly from air entrainment, dry-cast or zero-slump precast concrete is an anomaly. Since dry-cast concrete has a very low water-cement ratio and requires a vigorous consolidation process, any air-entraining admixture and corresponding entrained air structure is eliminated. However, defying traditional wet-cast concrete performance, thousands of precast concrete pipes, box culverts and other drainage structures exposed to harsh freeze/thaw conditions have not experienced degradation, even in areas where road salt or tidal conditions occur. Until recently, no high-level research has been devoted to this phenomenon. It is speculated that the dry mix process produces capillary pores and unhydrated cement that are slightly larger than normal capillary pores produced within a wet-cast concrete paste. These openings may provide an avenue for the expanding water and allow for the corresponding stress relief.

### MANY VARIABLES

Though air-entraining admixtures have been used within the concrete industry for more than 75 years, they remain one of the most challenging and temperamental admixtures.



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# Air Entrainment REQUIREMENTS:

It is vital to satisfy all precast concrete air entrainment requirements expected by the specifying agency or owner. The NPCA Quality Control Manual for Precast Concrete Plants, Section 5.3.4, states precasters must test concrete production a minimum of once per day or once per 150 cubic yards produced, whichever comes first. During mix design revisions or batch modifications due to existing production conditions, the frequency of air testing may increase.

The manual also states, "Air content shall be determined by either the pressure method, ASTM C231, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method,' or the volumetric method, ASTM C173, 'Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.'"

Due to the relative ease of conducting the air test in accordance with C231 as compared to C173, most plants implement the C231 procedure. But both procedures provide accurate, reproducible results in evaluating the volume of air within the concrete mix.

One shortcoming when using the two air entrainment tests is they only provide the total volume of air. The total volume of air does not reveal the size of the bubbles. The bubble size is important for freeze/thaw durability, minimizing strength loss, minimizing bug holes and maintaining consistent air volumes between batches. The only means to quantify air entrainment quality (void size and spacing) is by cutting and polishing a hardened concrete sample and physically counting and measuring the air void matrix. The process procedures are detailed in ASTM C457, "Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete." This test can take days or weeks to determine a result, and as such, cannot provide a real-time analysis.

This problem provided a research opportunity for Tyler Ley, associate professor of civil and environmental engineering at Oklahoma State University. His team developed the Super Air Meter (SAM) as a way to enhance the C231 Type B test to not only measure the total air volume percentage in fresh concrete, but to also measure the size and spacing of the air-void system used. This test is outlined in AASHTO 118, "Standard Method of Test for Characterization of the Air-Void System of Freshly Mixed Concrete by the Sequential Pressure Method." The SAM testing apparatus is a C231 testing machine, but is modified to withstand higher internal testing pressures required for the test.

First, the concrete sample is placed, prepared and tested using the existing standard. In the next phase, multiple pressure testing is conducted similar to C231, but pressure is increased to 14.5, 30 and 45 psi. Concrete mix deformations are measured between the different pressure conditions and then a SAM number is calculated.

"A SAM number of 0.20 has been shown to correctly determine over 90% of the time whether the spacing between bubbles meets the recommendations of the ACI 201 Concrete Durability Committee."<sup>3</sup>

In 2013, the SAM was approved and is currently being evaluated by a Pooled Fund Study, which includes 16 different departments of transportation. Additionally, it is being used in 32 states, two Canadian provinces and three foreign countries.

## SOME ITEMS TO CONSIDER ARE:

- An increase in cement fineness will decrease air content.
- High-cement content mixes will reduce air content compared with low-cement content mixes.
- Round fine aggregate is favorable to air entrainment.
- It is important to add air-entraining admixtures with initial mix water or directly to fine aggregate.
- Dry coarse aggregates can soak up air-entraining admixtures, reducing dispersion and effectiveness.
- Mix changes from crushed stone to gravel or vice versa will affect your air entrainment.
- Dusty coarse aggregate will decrease air content.
- Water softeners can increase or decrease water content depending on the air entrainment composition.
- Hot concrete temperatures may reduce air content by 25%, while cool concrete temperatures less than 75 degrees Fahrenheit can increase air content up to 40%.
- Increasing the use of fly ash with high carbon content will decrease the amount of entrained air.
- Oil and grease inadvertently added to the mix may either increase or decrease air entrainment depending on the admixture's composition.
- Other admixtures, particularly superplasticizers, can either increase or decrease the amount of air entrained.<sup>2</sup>

## BENEFICIAL AIR ENTRAINMENT INVOLVES EVERYONE

The list above establishes the importance of developing good working relationships with concrete admixture suppliers. However, precast manufacturers must still understand their mix constituents and processes if they expect to achieve consistency with the air content of their batched concrete. Quality control and production should consider forming teams to consistently test and identify changes in air entrainment and concrete mixtures and be prepared with a plan to minimize the variables and causes leading to any needed mix adjustment.

For more information on air entrainment or air-entraining admixtures, contact NPCA Technical Services at (800) 366-7731 or visit [precast.org/technical-services](http://precast.org/technical-services). **PI**

*Eric Carleton, P.E., is NPCA's director of codes and standards. He is also an ASTM Award Merit recipient and currently serves as vice-chairman of ASTM C13, Concrete Pipe.*

## RESOURCES:

1 Automated Air-void System Characterization of Hardened Concrete: Helping Computers To Count Air-Voids Like People Count Air-Voids-Methods for Flatbed Scanner Calibration, 2008, pages 17-20 By Karl Peterson

2 [precast.org/2017/01/sequencing-mix-design/](http://precast.org/2017/01/sequencing-mix-design/)

3 Super Air Meter, [superairmeter.com](http://superairmeter.com)



Photo courtesy of Super Air Meter, LLC



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# SCMs in Concrete:

## Slag Cement

By Kayla Hanson

**Editor's Note:** This is the second article in a series detailing the types of supplementary cementitious materials (SCMs) available and the role they play in concrete's strength.

Today, both producers and consumers are on an endless hunt for fast, affordable, high-quality and green solutions. Whether it's newer concepts like Amazon Dash for instant ordering; car-share programs in congested cities; or simply growing popularity of existing ideas like reduce, reuse and recycle, people everywhere and in every industry are playing a part. The precast industry is no different. This outlook

and proactive behavior has resulted in new solutions to manufacturing challenges, even if the solutions come from existing materials like slag cement.

According to the Slag Cement Association, some of the quantitative benefits of using slag cement or ground granulated blast furnace slag in concrete include improved workability and finishability, higher compressive and flexural strengths, improved resistance to aggressive chemicals, improved durability and reduced life cycle costs.

For this reason, Phil Lapp, plant manager at Faddis Concrete Products in Downingtown, Penn., said in 2016 his company started using slag cement instead of fly ash to manufacture 90% of their products. He said many departments of transportation are making slag cement a requirement for mitigating alkali-silica reactivity, a form of concrete deterioration that occurs when certain aggregates react with alkalis in portland cement. No difficulties were noticed after the switch, and he wants to leave producers with one important message.

"Don't be afraid of it," he said.

### MANUFACTURING SLAG

Slag is a byproduct of smelting iron ore as part of the steel manufacturing process. Iron and many other types of metal ores found organically are impure and contain traces of other materials or metals. Heating iron ore in excess of 2,700 degrees Fahrenheit melts the metal and separates the pure iron from the impurities in the ore.

Together, the impurities and the other materials in the furnace create slag. Molten slag floats above the denser molten iron. The liquid slag is isolated and quenched in water to quickly cool it, resulting in a hard, rock-like substance with a surface resembling glass.

The cooled and dried slag is ground into a fine powder, resulting in small, rough, jagged particles. Portland cement may then be blended directly with it to create slag cement. Slag can be used in its powdered form and can be added to the mixer during batching as a separate cementitious component.



Slag cement manufacturing begins in an iron blast furnace.

Photo courtesy of Slag Cement Association and St. Mary's Cement



## POZZOLANIC REACTION

Slag cement will undergo pozzolanic reactions when it is combined with both water and an activator such as calcium hydroxide (CH) or sodium hydroxide. The pozzolanic reactions commence as soon as sufficient CH or sodium hydroxide is produced from the cement hydration reactions. As slag cement, water and CH react, CH is consumed and calcium silicate hydrate is created, adding strength and durability to the growing paste matrix.

Like other supplementary cementitious materials that are produced as industrial byproducts or co-products, slag cement's chemical composition varies depending on the parent materials that are used in producing the iron and other substances in the kiln from which the slag originated. Slag's behavior in concrete is determined primarily by its chemical makeup.

## SLAG CHARACTERISTICS AND REPLACEMENT RATE

Ground slag particles are approximately the same size as or slightly smaller than portland cement particles. Most slag grains are less than 45 micrometers in length or diameter, which gives the particles a greater surface area per unit volume compared to portland cement. Despite the material's angularity and rough texture, incorporating slag cement into a concrete mix can reduce water demand due to the smaller particle sizes. Similar to how optimal particle packing among well-graded aggregates can help increase concrete's strength and durability by reducing the number and size of void spaces, the same is true of the components that make up concrete's paste. Incorporating finer cementitious particle sizes, such as with using partial slag cement replacement, enables the cement and SCM grains to pack closer together. To an extent, this can help reduce water demand. In cases where SCM particles are drastically finer than cement (for example, silica fume), the total surface area of material is significantly greater than cement, resulting in increased water demand.

## PRODUCTION CONSIDERATIONS

Slag cement is typically used at a replacement rate between 30% and 50% by mass of cementitious material. However, in some unique scenarios, slag cement can account for up to 80% of the total cementitious material.

An advantage of slag cement is its consistency and uniformity in manufacturing. This can lead to enhanced predictability and repeatability.

Concrete made with slag cement generally has a decreased water demand but an increased level of workability. According to the Portland Cement Association, "The effect of slag cement on bleeding and segregation is generally dependent on its fineness. Concretes containing ground slags of comparable fineness to that of the portland cement tend to show an increased rate and amount of bleeding than plain concretes, but this appears to have no adverse effect on segregation. Slag cements ground finer than portland cement tend to reduce bleeding."

Concrete's air content is typically unaffected by slag cement. A cementitious material's carbon content can cause changes in the fresh concrete's air content, but slag is devoid of carbon. The lack of carbon helps lower fluctuations and unpredictable variability in entrained air.

# Slag Cement

## Specifications and Classification

- **ASTM C989, "Specification for Slag Cement for Use in Concrete and Mortars,"** identifies three slag cement classifications. Grade 80, Grade 100 and Grade 120 indicate low, medium and high levels of activity, respectively, in relation to 7- and 28-day compressive strengths. The grades and their levels of activity or reactivity are indicative of the proportions of active compounds in the slag, including silica, calcium, alumina, magnesium and iron. Because the iron ore smelting process is closely monitored and controlled, there is little variation in slag characteristics.
- **ASTM C595, "Standard Specification for Blended Hydraulic Cements,"** dictates how slag cement is used in producing various blended cements.
- **ASTM C1157, "Standard Performance Specification for Hydraulic Cement,"** provides guidelines for slag cement performance.
- **ACI 233, "Slag Cement in Concrete and Mortar,"** addresses slag cement use in concrete as a supplementary cementitious material used in conjunction but not blended with portland cement.

## SETTING, STRENGTH DEVELOPMENT AND DURABILITY

Since pozzolans extend the hydration process, concrete made with slag cement can exhibit a lower heat of hydration, slower set times and lower early age strength. However, at 28 days the strength results displayed by slag cement concrete can exceed those of ordinary portland cement concrete. Concrete made with pozzolanic SCMs can continue to gain strength well beyond 28 days, although the rate of strength development steadily slows over time. Slag cement concrete not only boasts increased compressive strength, but also improved flexural strength. This is largely attributed to increased paste density and improved paste-aggregate bond.

Slag cement concrete's lower heat of hydration is beneficial in mass concrete applications and in cases where avoiding excessive concrete temperatures or cold joints is a concern.

Concrete made with partial slag cement replacement also generally exhibits decreased permeability, absorption and alkali-silica reactivity. Slag cement usage in concrete also helps boost corrosion resistance and resistance to sulfates.

## USE WITH CARE

When adding slag cement to a mix design, it's imperative to not only consider the positive results the new material will have, but also how the material could impact the behavior of other staple mix components and how other ingredients might affect the slag cement. As with any SCM, it's also important to consider the type of product slag cement will be used in, the environment the product will be exposed to, and the conditions the concrete will face during placing, finishing and curing. **PI**

*Kayla Hanson is a technical services engineer with NPCA.*

## REFERENCES:

Portland Cement Association, *Design and Control of Concrete Mixes*, 16th Edition  
Slag Cement Association, [slagcement.org](http://slagcement.org)

Preventing overhead crane accidents requires that workers recognize hazards in the plant and follow safety precautions.



# Respect Your OVERHEAD CRANE

**Proper training and maintenance ensures employee safety and can lengthen the life of your precast plant's overhead cranes.**

By Evan Gurley

**O**verhead cranes are the workhorses that aid in increased productivity and growth for precasters across the country, but they attract little interest until they are inoperable or fail. However, statistics show there are inherent hazards that occur during normal work settings. A crane can be a very dangerous piece of equipment, and most injuries or even deaths from accidents can be attributed to several basic hazards.

Crane accidents are often a direct result of negligence or a lack of adequate operator training or experience. Overhead crane training is a key concern for industries that depend on such equipment, including the precast concrete industry.

The Occupational Safety and Health Administration estimates that 249 reported crane accidents from 1997-2007 cost the construction industry and general industry nearly \$500 million, and that's just the upfront costs. In addition, nearly 70% of the





accidents could have been prevented by proper training and roughly 75% occurred during routine job activities that require specific training to prepare employees.

### SAFETY REQUIREMENTS

The owner/user must install, inspect, test, maintain and operate a crane or associated lifting equipment in accordance with the applicable volume of the American Society of Mechanical Engineers standard B30, OSHA regulations, National Fire Protection Association code 70, National Electric Code, and local regulations and laws. It is also the responsibility of the owner/user to require all personnel to read and comply with the instruction manuals furnished by the crane manufacturer or associated lifting equipment, and the applicable portions of the national safety requirements.

If the crane or associated lifting equipment is installed as part of a total lifting system, it is also the responsibility of the owner/user and associated personnel to comply with the applicable ASME B30 volumes that address the other equipment used in the system.

### TRAINING

OSHA and ASME both require that crane operators are adequately trained to operate an overhead crane. While OSHA does not require operators be certified by a recognized and accredited organization, qualification training for individuals operating overhead cranes is required.

OSHA and ASME also both state that the individual must be designated, qualified, trained and capable to identify hazards and have the authorization to take corrective action if and when necessary.

### PROPER TRAINING IS IMPORTANT

Overhead crane training gives equipment operators a solid foundation on health and safety standards, preventive maintenance and proper procedures for safely operating overhead cranes. Those supervising the use of cranes can greatly improve workplace safety by targeting the hazards that cause the most accidents. Basic training and hazard prevention measures can help eliminate these hazards. It is

## NUMBERS TELL THE STORY

U.S. Bureau of Labor Statistics reports:

90%

of crane accidents are caused by human error.

80%

of all crane accidents are attributed to operators exceeding the crane's operational capacity.

50%

of U.S. crane accidents that have injuries result in fatalities.

Source: Bureau of Labor Statistics, Crane-Related Occupational Fatalities, Fact Sheet 2009 Take Special Care when Using Cranes, ENVIRONMENT, SAFETY & HEALTH SAFETY BULLETIN.



Employees working around overhead cranes should always wear proper head, foot, hand and eye protection.

## Overhead Crane Safety Tips

- **You are responsible for safe operation.** You must be trained and authorized before operating any type of crane.
- **Know the capabilities and limitations** of the crane, the weight and characteristics of what you'll be lifting and the area in which the lift is to be performed.
- **Be familiar with crane-related terminology** to discuss jobs with your co-workers and effectively communicate to maintenance any issues that need to be addressed.

important to ensure the safety of all personnel who may be in the immediate areas where cranes are being operated, not just the riggers, signalers and operators.

Workplace safety involves more than complying with a few safety rules. Everyone must be involved, including management, supervisors and the production crew. All employees have specific safety responsibilities and must understand the responsibilities of their specific work areas. Hazards are the primary cause of most accidents, so hazard prevention is what brings about a safe workplace.

As it relates to cranes, a hazard is present in three forms:

- **Dormant** – an undetected hazard created either by design or crane use.
- **Armed** – a dormant hazard that has become armed and ready to cause harm during certain work circumstances.
- **Active** – an armed hazard triggered into action by the right combination of factors. At this point, it is too late to take any preventive action to escape injury or avoid death.

James Kehres, division sales manager of EMH in Valley City, Ohio, said the best hazard prevention practice precast plant employees can perform is to respect the dangers associated with overhead cranes.

“I’ve seen plant workers pick up loads and walk under a suspended load or see them walk into the danger zone, not realizing the danger they are putting themselves and others around them in,” he said.

Kehres stated training can help to instill that respect more, but challenges may arise.

“Precasters can absolutely train their employees in-house, but have to make sure training is extensive and in-depth,” he said. “From my experience, I’ve seen quite a bit of turnover in the precast concrete industry with overhead crane operators. This really makes it challenging for precasters to properly train workers as they continuously cycle in and out.”

### MAXIMIZE YOUR OVERHEAD CRANE USE

Operators should perform daily inspections at the beginning of each shift. If any damage or malfunctions are noted during the daily inspections or during operation, the operator must advise the appointed person so corrective action can be taken. If corrective action has not been completed by the end of the shift, the crane must be tagged out with an “out of order” sign and the next shift operator must be told that corrective action is required.

### DAILY CHECKS INCLUDE:

- ▶ **Verify the crane or hoist is not tagged out.**
- ▶ **Check the load block to ensure all sheaves are running freely and sheave covers/guards are in place.**
- ▶ **Inspect the hook for the following:**
  - Safety latch (in place/operating correctly?)
  - Is the hook bent or twisted?
  - Has the throat opening increased?
  - Check the bowl conditions
  - Check the rotation of the hook
- ▶ **Inspect the wire rope to ensure it is lubricated and that none of the following conditions exist:**
  - Kinks
  - Broken or cut strands
  - Bird caging
  - Corrosion
  - Core protrusion
  - Crushed sections of rope
- ▶ **Inspect the following:**
  - Control device
  - System conditions
  - Runway
  - Bridge, trolley and hoist connections
  - Mainline conductor bar system
  - Operational functions

In addition to daily inspections, OSHA also requires periodic inspections of overhead cranes. OSHA defines a periodic inspection as “a detailed visual and operational inspection whereby individual components are examined to determine their conditions.” The periodic inspection can be performed quarterly and is based on service, environmental and application factors as determined by a qualified person or as outlined in Table 1. For a more detailed list of inspection recommendations on safety tips, such as periodic inspections and rigging selection, visit the online article at [precast.org/overhead-crane-safety](http://precast.org/overhead-crane-safety).

ASME B30.2 Service Class	Number of Shifts Operated Per Day		
	1 Shift	2 Shifts	3 Shifts
	Frequency of Inspection		
<b>Normal</b>	ANNUAL	ANNUAL	ANNUAL
<b>Heavy</b>	ANNUAL	SEMI-ANNUAL TO ANNUAL	SEMI-ANNUAL
<b>Severe</b>	QUARTERLY	QUARTERLY	QUARTERLY

Table 1: Periodic Inspection Chart (as required by OSHA)

Cranes are useful and powerful tools that need to be treated with respect. Any mistake with a crane – small or large – can have serious consequences, including property damage, injury or loss of life. Knowing how to use the equipment properly and following established policies and procedures is critically important. **PI**

*Evan Gurley is a technical services engineer with NPCA.*



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Working For You

- [All About NPCA](#)
- [How to Join NPCA](#)
- [How to Recruit](#)

### NPCA Certification Requirements

Official Entities Requiring Certification

- [Federal Agency Administrators](#)
- [DOTs](#)
- [State DOTs](#)
- [Municipalities](#)
- [Local Governments](#)
- [U.S. Army Corps of Engineers](#)
- [U.S. Department of Health & Human Services](#)

### Impact on the Industry in 2017

Having difficulty converting a job to precast? Need NPCA Certification included in the specification? NPCA professional staff member [Rick Anderson](#) can help.

Convert a Specification

2	5	298	0	0
Specifications & Standards	Specifications & Standards	Specifications & Standards	Specifications & Standards	Specifications & Standards



# Silica Exposure Control Plan: NPCA Has You Covered

NPCA and PCI partner to produce **silica exposure control manual** and **occupational health plan** to meet OSHA requirement for new rule.

NPCA Staff Report

One of the key elements of the Occupational Safety and Health Administration's new rule on silica exposure is the requirement that all plants have a written exposure control plan on file. The detailed plan should describe the company's approach to protecting its workers from harmful exposure to airborne silica particles.

For precast concrete plants in the United States, that plan must be in place by June 23, 2018. The compliance date for construction originally scheduled for June 23, 2017 – has been pushed back to Sept. 23, 2017.

While the OSHA rule has been challenged in court and could be delayed, the National Precast Concrete Association and the Precast/Prestressed Concrete Institute are proceeding on the assumption that the compliance dates will go into effect and that NPCA and PCI member companies must comply next year.

The two associations partnered on the creation of an exposure control manual specifically for precast plants. It is available as a free download to NPCA and PCI member companies. Nonmember companies can purchase the manual by contacting NPCA.



Producing a precast-specific exposure control manual for respirable crystalline silica that will meet OSHA's compliance standards is no small task, according to Ty Gable, NPCA president. The NPCA-PCI Silica Manual, prepared by the Law Office of Adele L. Abrams, provides an extensive exposure control and occupational health plan. The manual includes 10 sections over 644 pages.

"To research and compile a manual of this nature from scratch would cost an individual company thousands of dollars," Gable said. "That's why NPCA and PCI partnered on this extensive technical document. We want to ensure our members have access to an OSHA-compliant plan."

While the compliance date is still 12 months away, Gable said that the time to start preparing is now.

"If you haven't had your air quality monitored recently, it's a good idea to have that done now by an industrial hygienist to establish a baseline," Gable said. "Check with your insurance company. Many insurance companies will provide that service for free or for a small fee.

"If they don't provide the test, they may be able to

**"If you haven't had your air quality monitored recently, it's a good idea to have that done now by an industrial hygienist to establish a baseline."**

– Ty Gable, NPCA president

put you in touch with a testing company."

It is also a good idea to review your operational policies to see if there are ways you can mitigate air contaminants by simply changing a few procedures, Gable said. Norwalk Concrete Industries, for example, banned dry cutting and grinding at its plant last year as one of its environmental policies.<sup>1</sup>

## NEXT STEPS

For those looking for additional information, OSHA has an extensive website devoted to the respirable crystalline silica rule that includes background, fact sheets, frequently asked questions and other resources.<sup>2</sup> Precasters can use this resource to begin training their production personnel through toolbox talks and other methods, Gable said. NPCA members can download the Silica Manual by logging in to the myNPCA site and visiting the NPCA Shop. **PI**

## RESOURCES:

1 [precast.org/2016/07/prepare-early-oshas-silica-exposure-regulation](http://precast.org/2016/07/prepare-early-oshas-silica-exposure-regulation)

2 [osha.gov/silica](http://osha.gov/silica)

## KEY PROVISIONS of the New OSHA Silica Rule

OSHA issued its final rule on workers' exposure to respirable crystalline silica on June 23, 2016, and set compliance dates one year in the future for construction sites and two years in the future for general industry. The old OSHA standard fixed the permissible exposure limit for respirable crystalline silica at 100 micrograms per cubic meter of air, averaged over an eight-hour shift. The new standard cuts the PEL in half.

Much of the exposure can be managed with engineering controls, which can be as simple as controlling dust by wet cutting, providing adequate ventilation and providing respirators when needed.

The NPCA-PCI Silica Manual provides detailed descriptions for conducting an exposure assessment for each employee who might be affected, determining respiratory protections, complying with medical surveillance provisions, recordkeeping and many other details that are required under the rule.

According to OSHA ([osha.gov/silica](http://osha.gov/silica)), these are the key provisions of the rule:

- **Reduces the PEL** for respirable crystalline silica to 50 micrograms per cubic meter of air, averaged over an eight-hour shift.
- **Requires employers to use engineering controls** (such as water or ventilation) to limit worker exposure to the PEL; provide respirators when engineering controls cannot adequately limit exposure; limit worker access to high exposure areas; develop a written exposure control plan, offer medical exams to highly exposed workers, and train workers on silica risks and how to limit exposures.
- **Provides medical exams** to monitor highly exposed workers and gives them information about their lung health.
- **Provides flexibility to help employers** – especially small businesses – protect workers from silica exposure.



## NEW OSHA SILICA STANDARD

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- + Lower associated costs
- + Reduce potential silica exposure to workers and surrounding environments



# Making Manufacturing **RELEVANT** *for the* **Next Generation**

**As the labor market tightens up and manufacturing falls to the backburner as a career choice, manufacturers are developing new ways to recruit and retain their next generation.**

By Bridget McCrea

A few years ago, the management team at Kistner Concrete Products realized that its traditional employee recruiting approaches weren't meeting the company's needs. Like many precasters, the Lockport, N.Y.-based manufacturer settled for prospective employees that fell into its lap, said Michael Kistner, vice president and owner. The company didn't give much regard to the potential sources that it could be tapping into.

"We decided that we wanted to be more selective about finding workers instead of just settling for whatever came along," Kistner said.

And with that, the company took on a new approach to recruiting and training the new generation of precasters.

As part of this new commitment to making precast cool again for new recruits, Kistner planned a more intentional approach that includes reaching out to vocational schools, community colleges and universities in its area. This grassroots strategy was based on the knowledge that such institutions were veritable sources for new employees, sales reps, managers and even company leaders.

For example, last year the precaster invited Orleans/Niagara BOCES Building Trades students to tour its facility and get an inside look at what goes on in a precast manufacturing plant. Focused on preparing students to enter the construction field and/or continue their education at a post-secondary level, the Building Trades program helps students get hands-on with tools and

equipment; learn the theoretical aspects of carpentry, masonry and plumbing; and develop an understanding of common structures, their parts and relationships to one other.

Building Trades teacher Matt Anastasi said his students loved how Kistner compared the precast operations to "working in a big Play-Doh factory."

"They really enjoyed the tour and watching the employees manufacture the products. Mr. Kistner was great with our students," Anastasi said in the newspaper article, "Kistner Concrete Products Share Expertise with Building Trade Students."

"All of them thought he would make a great boss. I really can't thank him enough for investing his time with our classes.

"I am sure we have students who would love to work for him."

That last comment is music to Kistner's ears. In fact, it's why his company reworked its recruiting strategies in the first place. He says the BOCES effort kicked off with a letter to the school's Work Based Learning Coordinator, Jackie Coyle, who was very receptive to the idea of getting students out into the real-world work environment. Kistner brought along a PowerPoint presentation that he typically uses when talking to engineering groups, thinking that its "cool factor" would engage students and make them want to learn more about precast concrete manufacturing.

"When I do presentations like that one, I really try to enlighten the audience because I know a lot of the people have no idea or conception of what precast even is," Kistner said. "Most times, I get reactions like, 'Oh yeah, this is actually pretty cool.'"

He said he weaves in messaging about modular construction and talks about how it's the future of precast and construction as a whole.

Kistner has made similar presentations for area community colleges and universities, both of which serve as a recruiting resources for his firm.

"It's a great way to spark interest," Kistner said.

These and other efforts to align Kistner Concrete with current students and recent grads are paying off. Since implementing the new approach, the company has already hired an Engineer





**50%** OF MILLENNIALS SAID  
THEY'D CONSIDER TAKING A JOB WITH  
A DIFFERENT COMPANY FOR A RAISE OF  
20% OR LESS. *(Source: 2016 Gallup poll)*

Press-Seal Corp. initiated a "make manufacturing cool again" program to promote manufacturing jobs to students and recent college graduates.

in Training and at least four construction workers, welders and carpenters via the school programs that it's aligned with.

"They're all quality employees because we vetted them rather than taking whatever came to us through word-of-mouth referrals or employment agencies," Kistner said.

The EIT, for example, attended one of Kistner's university presentations and is now working toward his Professional Engineer designation. And while he admits that this approach takes decidedly more effort than simply sitting back and waiting for new recruits to discover precast on their own, he said the effort is well worth it.

"I've done a bunch of presentations that basically take about a half a day at a time, but we're very happy with the results because we've been able to change the culture of our organization to having people who want to be here, versus just having employees who are here by [default]," he said.

### **DOING BATTLE IN A TIGHT LABOR MARKET**

Earlier this year, the number of Americans filing for unemployment benefits dipped to 234,000, the lowest number since 2013. With anything less than 300,000 indicating a healthy labor market, the number of filings represented a 43-year low, as well as a further tightening of the labor market and potentially faster wage growth. The U.S. labor market is now at or close to full employment, with the unemployment rate at 4.8%, according to a Reuters report.

Skilled workers are especially hard to find right now – a reality that precasters are realizing and reacting to. In fact, nearly 2/3 of small businesses are spending more time training workers than they were a year ago, according to a survey by The Wall Street Journal and Vistage International.

In "Skilled Workers are Scarce in Tight Labor Market," Wall Street Journal's Jeffery Sparshott writes, "That could give more Americans access to skilled manufacturing jobs as companies invest



## NPCA Foundation Linking Precasters to Students

For 28 years, the NPCA Foundation has been closing the gap between students and their knowledge of the precast concrete industry through its scholarship program. Today, the Foundation is enhancing that work through activities such as providing students and professors with free passes to The Precast Show in conjunction with NPCA, sponsoring the American Society of Civil Engineers National Concrete Canoe Competition and linking students to internships at NPCA member companies

NPCAF is collaborating with the PCI Foundation to create an internship program template that will allow members to develop customized internships at their facilities. The template will be available later this year.

NPCA and NPCAF also encourage members to reach out to their local high schools, vocational schools, colleges and universities to offer plant tours and serve as guest lecturers. This helps students learn more about the many career opportunities within the industry.

NPCAF has tools to help you attract and keep talent in your workforce. If you would like more information, call us at (800) 366-7731.

the time and resources to bring in less-experienced workers.

“As a result, some firms are casting a wider recruiting net and landing workers with fewer relevant skills.”

With the new presidential administration promising \$1 trillion in new, national infrastructure improvements over the coming years – and estimates running quite a bit higher – Dean Wolosiansky, general manager at Lindsay Precast’s Ohio Division in Canal Fulton, said the need for skilled workers in the precast industry could become even more pressing.

“As the economy grows and as our infrastructure needs expand, the number of available manufacturing jobs is also going to increase,” Wolosiansky said. He sees real challenges ahead for precasters that are trying to recruit millennial employees who now make up the largest part of the American workforce. With a high interest in technology, finance and other sectors that offer desk jobs, these younger workers don’t necessarily have manufacturing careers high on their wish lists.

“Basically everyone who is coming out of school thinks having a successful career means sitting at a computer,” Wolosiansky said. “The question is, how do you shine a light on the fact that manufacturing is actually a very secure job, and that infrastructure is always going to be in high demand? That’s our challenge as precasters.”

That responsibility falls squarely on the shoulders of the precasters themselves, said Wolosiansky, whose firm has made an organization-wide commitment to recruiting for itself and for the precast industry as a whole. Commitment starts with a flat corporate culture that finds everyone from the administrative employees to sales reps to the production team focused on corporate pride, open communications and making employees a part of important decisions.

“The new generation of workers has a tough time with hierarchy and this whole model of ‘We’re in it together,’ seems to go a long way,” Wolosiansky said.

Lindsay Precast also has an established referral program that encourages current workers to invite their friends and family into the fold.

“We really try to promote a sense of family and friendship,” said Wolosiansky, whose team also uses social media and other online tools to seek out good candidates, knowing millennial recruits are particularly apt to use these channels for job searches.

“We’ll go on Facebook to find people whose background would be suitable for this type of job while also working to promote a sense of accomplishment and pride in our company via social media,” Wolosiansky said.

He said the strategies are working well for Lindsay Precast, which has seen big improvements in its recruiting results over the last few years.

“Everyone here understands that we’re operating in a changing marketplace,” he said. “From the owner of the company straight through to the individual employee, we all have to be adaptive and be focused on changing before we find ourselves in a tough spot.”

### IT STARTS AT YOUR FRONT DOOR

John Kaczmarczyk knows that manufacturing is pretty far from the typical high school, vocational school or college grad’s mind right now. In fact, it’s probably not even running a close second to the technology, finance and creative jobs that most millennials are vying for. This presents a real problem for manufacturers that need skilled workers and are watching their veteran employees head off into retirement at an alarming clip.

As director of operations for Press-Seal Corp. in Fort Wayne, Ind., Kaczmarczyk is concerned.

“Thirty years ago there was something called shop, woodworking, welding, and auto body at the high school and vocational school levels,” he said. “Those skill sets aren’t even promoted anymore.”

To offset this challenge and shine a brighter light on the viability of a manufacturing career, Press-Seal initiated a “make manufacturing cool again” program about five years ago.

As part of that effort, the company has embedded itself in the community at the high school, community college and university level, knowing that those institutions serve as incubators for the workforce of tomorrow.

Central to this is a commitment to tell the industry’s story, focusing on the great advancements manufacturers have made over the last decade and the many apprenticeship and co-op

opportunities available in the field.

Press-Seal also called on its local school board to find out how it could do a better job of promoting manufacturing jobs to students and recent grads.

“We partnered with one particular school that was within a five-mile radius of our plant and created a program of recognition for Press-Seal with that institution,” Kaczmarczyk said.

That meant participating in job fairs at the school and holding open houses for both students and parents.

**“How do you shine a light on the fact that manufacturing is actually a very secure job, and that infrastructure is always going to be in high demand?”**

**That’s our challenge as precasters.”**

– Dean Wolosiansky,  
Lindsay Precast



Kaczmarczyk sees parental participation as a key driver in Press-Seal's recruiting success over the last five years.

"We know that at the kitchen table the [manufacturing] conversation has been lost over the years, so we have to instill a buy-in," he said. "That has to happen at the family level."

According to Kaczmarczyk, Press-Seal's efforts are paying off in the form of lower staff turnover and greater retention of existing, skilled labor and qualified next-generation employees.

"We actually now have a backlog of people through our local community, which has come to recognize the PS logo and what we stand for and represent," said Kaczmarczyk, who tells other manufacturers to kick off their own recruiting efforts by taking an introspective look at their own facilities, workforces and corporate cultures.

"Before you kick off your initiative outward, start right at your front door," he said.

## BLOCKING AND TACKLING 101

Ira S. Wolfe, president at Success Performance Solutions, a recruiting and employee selection firm in Lehigh Valley, Pa., has seen firsthand the struggles that today's manufacturers are dealing with. Like Kistner, Wolosiansky and Kaczmarczyk pointed out, the image of manufacturing just isn't what it was 20 or 30 years ago.

"A lot of manufacturers are tackling a 21st-century problem with 19th-century tools and it's not working out very well for them," Wolfe said.

Wolfe said one of the first things precasters can do is accept the fact that manufacturing can be a dirty job, particularly to a millennial who may have had his or her heart set on becoming a designer, IT professional or architect. However, precast concrete manufacturing actually incorporates all those passions into one rewarding career that produces very tangible results. A \$1 trillion national infrastructure improvement plan, for example, would incorporate new bridges, highways and utility infrastructure – all of which require precast.

To get these points across, Wolfe tells manufacturers to focus on rebranding precast as a truly cool and rewarding career track. And remind candidates that precast isn't just down-and-dirty plant work – it also requires good project management, sales and accounting professionals.

"It's not just manual labor anymore and people need to know that," Wolfe said.

Finally, Wolfe said precasters should consider their current employment and advancement pathways, knowing that the new generation of workers will want to know what lies ahead for them five, 10 or 15 years down the road. NPCA offers one pathway to advancement for employees in the precast industry with the Production & Quality School and the Master Precaster certificate program. Developed in conjunction with industry experts, producers, departments of transportation and academia, the curriculum helps employees new to the industry and those with precast experience advance their careers. Providing a career path is particularly critical for the millennial generation, 50% of which said they'd consider taking a job with a different company for a raise of 20% or less, according to a 2016 Gallup poll.

For now, Kistner plans to continue with his two-pronged approach (presentations and on-site visits) to help get more next-gen employees interested in manufacturing.

"We're creating interest and interaction with those presentations, and then getting people in the door to experience the environment here firsthand," he said. "The process takes some persistence and time, but it definitely works." ■

*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 [www.onboes.org/news.cfm?story=1817&school=0](http://www.onboes.org/news.cfm?story=1817&school=0)
- 2 [reuters.com/article/us-usa-economy-unemployment-idUSKBN1501MF](http://reuters.com/article/us-usa-economy-unemployment-idUSKBN1501MF)
- 3 [gallup.com/businessjournal/197234/millennials-job-hopping-inevitable.aspx](http://gallup.com/businessjournal/197234/millennials-job-hopping-inevitable.aspx)



For more information about Precast University and the Master Precaster program, visit [precast.org/precastuniversity](http://precast.org/precastuniversity)

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# CREATING Innovative Solutions

*by Sara Geer*

**Standard Precast's**  
can-do culture and  
experience help it  
meet customer needs.

Standard Precast manufactures a variety of precast concrete products for various applications in its nearly 110,000-square-foot facility.





hen a customer calls a precaster about a construction project, they are generally directed to the sales department. If the problem is urgent and sales cannot provide a quick solution, it can leave the customer feeling

uncertain. At Standard Precast in Jacksonville, Fla., this is never the case. About a half dozen or more office employees are ready and willing to help a customer in need, no matter the level of complication or the timeline involved. Providing quality customer service has always been top of mind for every staff member and has helped maintain the company’s position as a leading manufacturer of stormwater, utility and sanitary precast concrete structures in northeast Florida. The company has established the reputation that if a product can be made from precast, they will pour it.

“One thing that makes this company different than our competitors is we’re unique, quick, can build our own forms and always adapting,” said Russell Smith, president. “And we’re very customer oriented. I tell all our people that the customer is always right, unless they aren’t, but that rarely happens.”

### EXPANDING THE MOM-AND-POP BUSINESS

Carl Peterson, a pipe salesman, and his wife, Barbara, opened Standard Precast in 1965. Peterson was already familiar with the products and wanted to find a way to standardize the structures, since everyone at the time was building them out of brick. He teamed with an underground contractor to start the business until he was able to own it outright.

Smith said he joined the business around 1970 when his brother introduced him to the Petersons. The first precast product poured was a 48-inch-diameter manhole on a 14-foot-by-20-foot pouring slab. About seven years later, Smith and Peterson built a precast plant on two acres of undeveloped land along Phillips Highway south of Jacksonville. The plant had state-of-the-art equipment and production could pour about 30 yards a day. Smith said operations went smoothly until early 2005 when the property became too expensive for the company to stay. Carl Peterson had retired, so it was up to Barbara Peterson and Smith to make an urgent decision to either move or sell the business.

“It took about 3 or 4 months of intense discussion, but we decided to build our current plant,” Smith said. “We moved out here July 2005. Around that time, we also successfully completed the biggest box culvert job we’ve ever had.

“Everything went so well that we held a big party for everyone and fed the entire neighborhood.”

The most recently added fabricated form is an 8-foot-tall hydraulic mono form for producing 72-inch-diameter manhole structures in one piece.

Standard Precast now employs nearly 100 people and can pour a maximum of 300 yards of concrete a day.

Due to Barbara Peterson’s recent health issues, Smith had to once again think hard about the company’s future. In 2013, he picked an employee board to run the company, which freed him to spend time on big projects. One recent project was picking the right partner to buy the company – someone who shared his business values. Smith and the board sorted through about 50 interested buyers and eventually chose to meet with Sam Seraphim of New York City-based private equity firm WoodLake Group. The firm and its partners, Aavin and Diamond State, officially acquired Standard Precast in December 2016.

“Standard has a great management team, but Russell also runs a very tight ship,” Seraphim said. “I’ve seen other precast companies, but was impressed with how well he runs the company and the teamwork that is in place.”

### FAR FROM BEING ‘STANDARD’

The “standard” in Standard Precast applies to the company’s continued efforts to simplify all drainage and sanitary infrastructure standards and specifications in Florida. Standard Precast played an active role in the formation of the Precast Concrete Structures Association of Florida, a non-profit

“One thing that makes this company different than our competitors is we’re unique, quick, can build our own forms and always adapting.”

– RUSSELL SMITH, Standard Precast president



group that unites local precasters and department of transportation officials toward this goal.

According to Chip McGehee, sales manager, the only standard products poured are 4-foot-diameter manholes, riser and cones. Otherwise, every component manufactured is customized to fit the project need. Customers regularly contact the precaster to manufacture specialized products with unique configurations and dimensions due to the company's ability to solve problems and perform in-house steel form fabrication.

"For the most part, if the job is complicated, has to be right the first time, the timeline is short, we'll do 80% to 90% of that work," McGehee said. "We often do the stuff the other precasters won't touch."

These advantages not only benefit the customer, but aid in the creation of new products. For example, Standard Precast built 80 custom precast bridge barrier wall tops for Florida Department of Transportation to place on the Interstate-295 Beltway project between the Buckman Bridge and I-95 in Jacksonville.

"You've seen them on bridges, the barrier is in the center dividing northbound and southbound traffic and in between you have a 3-foot or 4-foot concrete barrier," McGehee said. "Underneath those, there are inlets and, historically, the DOT poured them within about 2 feet, 18 inches on top because the slats on each side will be different."

**"We often do the stuff the other precasters won't touch."**

**– CHIP MCGEHEE, sales manager**

Since no one was pouring the product for FDOT at the time, local general contractor Superior Contracting contacted Standard to do the job. Now, the company sells the product everywhere.

"We invented our own product and the DOT loves it because they can precast it and move on," McGehee said.

The precaster's quick thinking also resulted in adding a simple 2-foot-by-2-foot precast concrete area drain to its drainage product offerings. Local contractors and apartment complex developers wanted an alternative to plastic. The plastic drains were being destroyed prior to installation from construction forklift and truck traffic. The high replacement costs spurred the need for a product that was durable in this specific work application. Listening to customers' concerns, Standard Precast custom-built a form to produce a precast concrete alternative. Now, the demand is beyond what they expected.

"It's actually created a problem for us," McGehee said. "We custom-built the one form and now we could use three or four more forms for it. It's becoming very popular."

Similarly, the company has also seen a spike in demand







Left: An aggregate bin system was built so production could pour a maximum of 300 yards of concrete a day.

Below: Randy Lindsay, quality control manager, ensures the company follows the highest standards for producing quality stormwater, wastewater and utility precast products.

Below: Nearly 100 employees work at Standard Precast. The company holds a reputation in the community for providing top-notch customer service.



NECA file photo



NECA file photo



Right: The employees at Standard Precast take pride in responding quickly to local contractor and engineer needs.

Below: Sam Seraphim (front) of New York City-based private equity firm WoodLake Group acquired Standard Precast in December 2016.



for square manhole grade rings, another recently added product. A contractor contacted the company in early 2016 to first manufacture the product as a favor. Other contractors saw it and requested it as well. Standard Precast's Superintendent David Orbe said for a while production could not manufacture the product fast enough.

"We had four little forms just to do this one," Orbe said. "So, we custom-built a form that produces 20 a day – 10 4 inch and 10 3 inch. Now we can keep up with them."

This adaptability helps them to sell new products ahead of the competition, which is the ultimate advantage. However, this wouldn't be possible without the high-caliber people employed.

### BUILT TO LAST

According to multiple staff members, finding quality workers who have a desire to embrace a career in the precast industry is a constant battle. Yet, when a person is paired with the right job and given the proper tools and creativity to grow, great things happen. Many employees at Standard Precast have remained with the company for 30-plus years, some even longer, and most started from the bottom. Dennis Effinger, maintenance, is the brains behind the company's ability to do in-house form design and fabrication. He learned his welding expertise from another employee, who is now retired.





“We think outside the box here when we can and try to do things the other precasters sometimes don’t.”

– DENNIS EFFINGER, maintenance



“We had a worker that was the best welder anyone had seen and he taught Dennis everything he knew,” McGehee said. “Now, Dennis can weld just about anything and he also knows the math behind designing the forms using CAD.”

The production team couldn’t be happier to have Effinger’s skills because he helps make their jobs easier and more efficient. His most recent fabricated form is an 8-foot-tall hydraulic mono form for producing a 72-inch-diameter manhole structure in one piece. The form includes adjustable extensions and inserts. Orbe also wants him to build a 60-inch mono form.

“Dennis made my life easier building these forms,” Orbe said. “He uses antique machines to do incredible things to roll the steel. He believes in getting all the use out of a piece of equipment.

“That’s the way we do it here. If the contractor needs it and it’s going to be a commodity, we’ll build the forms for them.”

As a result, the company saves money and sells more product. His innovative spirit helps improve day-to-day production processes as well. The company owns four Tucker trucks ranging from 8 to 12 years old. According to Orbe, the older trucks initially didn’t come with a lid to hold the batched concrete and engine protection to keep concrete from seeping in. After learning about production’s problem, Effinger figured out a solution and fabricated

a steel lid and engine hood.

“I try to fix things before they break or build things when needed,” Effinger said. “We think outside the box here when we can and try to do things the other precasters sometimes don’t.”

Standard Precast has the capability to fabricate steel forms for specialty products in-house, which provides customers cost-saving solutions.

## THE NEXT STEP

All these components – long-time workers, in-house fabrication and problem solving – have not only kept Standard Precast strong for 52 years, but are also the foundation for the company’s bright future. The new management is already searching for acquisitions to expand the company by 2018.

“The plant is in good shape and we are ready to take the next step,” Seraphim said.

Smith said the company never entertained the thought of expanding more because it was content with its current size. The new outlook means the doors are opening to even greater possibilities, new products and new work, all while maintaining its status as a great place to work.

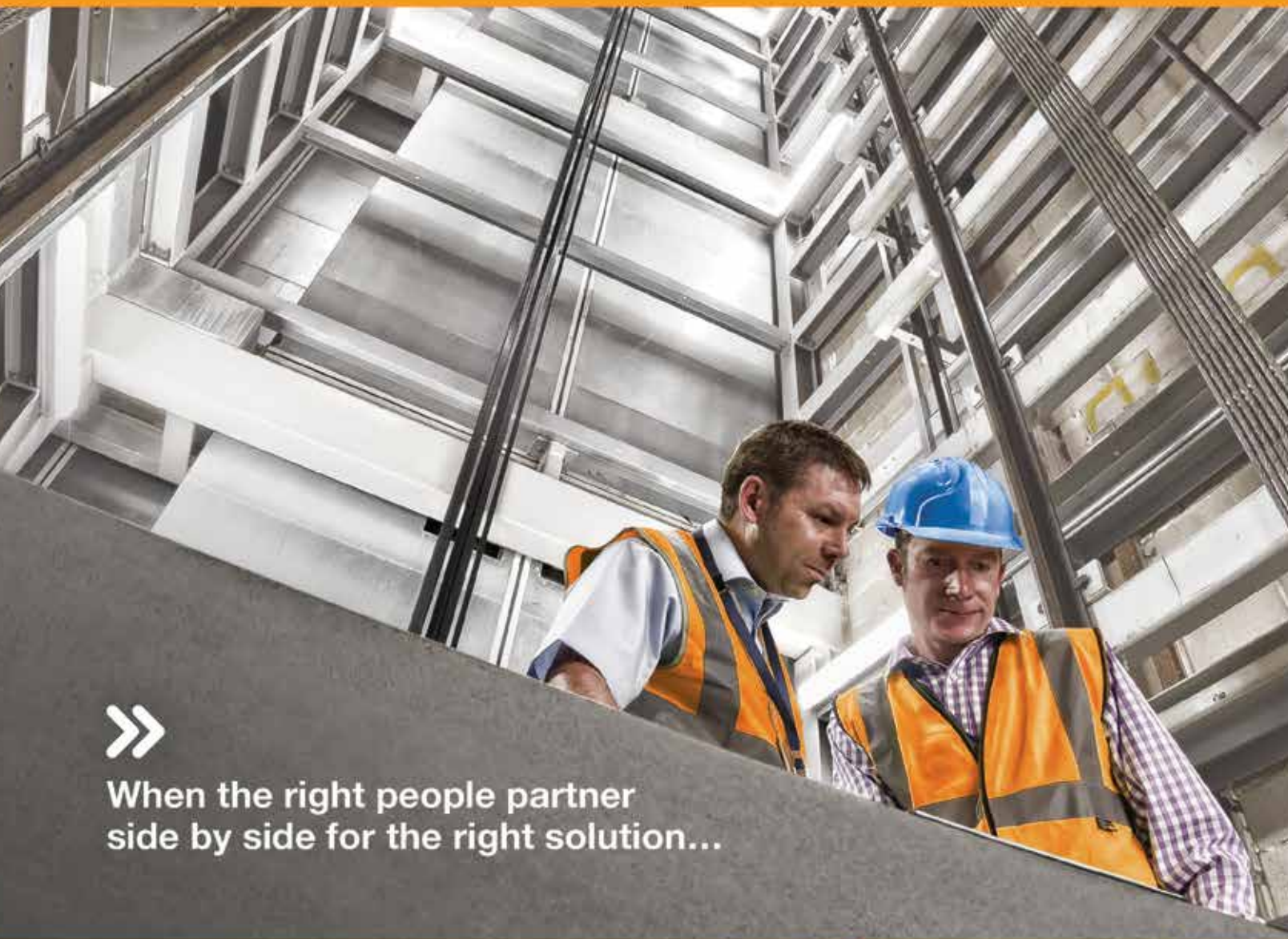
“It’s hard to get a job in this office or even outside,” Smith said. “I have many people who drive an hour or more just to come to work here. We have great employees.

“So hopefully, if you check back in a year, we’ll be expanded. I’m excited to see what happens when we do.” **PI**

*Sara Geer is NPCA’s internal communication and web manager, and is managing editor of Precast Inc.*



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CarbonCure Technologies provides technology that allows producers to sequester carbon dioxide in concrete products.

# Turning the Table on CO<sub>2</sub>

CO<sub>2</sub> could become an **important ingredient** for manufacturing **durable** and **sustainable** precast concrete.

By Claude Goguen, PE., LEED AP

**T**ake a deep breath and exhale. Your breath produced about .0001 pounds of carbon dioxide, a colorless gas, that is essential to life on earth. CO<sub>2</sub> is formed when one atom of carbon combines with two atoms of oxygen and is produced by a wide variety of natural and man-made sources. We use it in products ranging from fire extinguishers to soda. It's even used to create the “pop” in Pop Rocks candy.

CO<sub>2</sub> is a primary greenhouse gas that makes the earth habitable, but in increasing amounts it can also cause global warming by trapping the sun's radiant energy in our atmosphere.

However, some companies are making progress in harnessing CO<sub>2</sub> as an ingredient in concrete.

## CO<sub>2</sub> AND CONCRETE

CO<sub>2</sub> in the earth's environment is constantly being released and absorbed in a continuous cycle. Concrete plays a role in that cycle, as CO<sub>2</sub> is released during production of cement in two ways: the calcination process where limestone is heated creates a direct emission of CO<sub>2</sub>, while burning fossil fuels to heat the kilns contributes indirectly.

Concrete can also absorb CO<sub>2</sub> and store it in a process known



Photo courtesy of CarbonCure Technologies



CarbonCure was used to construct Ambassadors' corporate office and bus service center in Halifax, Nova Scotia.

as carbonation. Over time, carbonation usually results in the slow reduction of the concrete's pH. The rate of absorption of CO<sub>2</sub> depends on the environmental conditions surrounding the structure and the concrete's porosity.

#### USING CO<sub>2</sub> TO MANUFACTURE CONCRETE

For many years, technology has existed to capture waste CO<sub>2</sub> from large point sources such

as fossil fuel power plants. This process is often referred to as carbon capture and sequestration. The captured CO<sub>2</sub> is kept from entering the atmosphere by depositing it in large underground geological formations. Once CO<sub>2</sub> is injected deep underground, it is trapped in minute pores or spaces in the rock structure. Impermeable cap rocks above the storage zones act as seals to ensure the safe long-term storage of CO<sub>2</sub>.

Researchers are working on finding other ways to store and use the waste CO<sub>2</sub>. CarbonCure Technologies of Dartmouth, Nova Scotia, claims injecting it into fresh concrete not only makes the concrete "greener," but can also make it stronger. The company found putting purified and liquefied CO<sub>2</sub> into concrete during mixing converts the CO<sub>2</sub> to a solid mineral and captures the gas within the concrete. When CO<sub>2</sub> is added to concrete while mixing, it reacts with water and cement and converts into calcium carbonate minerals. CarbonCure claims that the nano-sized calcium carbonate minerals act as a nucleation site for the hydration reaction, giving concrete its strength. They go on to state that ready-mixed concrete producers see an average strength improvement of approximately 10% when comparing concrete injected with CO<sub>2</sub> to ordinary concrete. Also, compressive strength improvement enables ready-mixed concrete producers to optimize mix design, which typically includes reducing cement content.

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Carbicrete, based in Montreal, Quebec, goes a step further and uses CO<sub>2</sub> to create a cement-free concrete. Carbicrete uses steel slag, a byproduct from the steel industry, as the primary binder and injects CO<sub>2</sub> into wet concrete. The company claims that products made in this fashion meet all the same specifications as cement-based concrete products, yet have lower material costs and increased durability. Due to the absence of portland cement and the sequestering of CO<sub>2</sub>, Carbicrete states it manufactures a carbon-negative concrete product which absorbs more CO<sub>2</sub> than is produced.

## Some companies are making progress in harnessing CO<sub>2</sub> as an ingredient in concrete.

Another version was created by a team of researchers at UCLA. Their product, called CO<sub>2</sub>NCRETE, uses a binder system based on calcium hydroxide (hydrated lime), which is mixed with aggregates and admixtures to form shape-stabilized building elements. The captured CO<sub>2</sub> is combined with the mixture via a carbonation reaction to form a solid building component. These

elements are similar to Legos® and can be rapidly assembled to construct buildings, bridges and other infrastructure. The researchers even predicted this material could be used by 3-D printing machines.

All three technologies are semi-finalists in a \$20-million global competition, called NRG COSIA Carbon XPRIZE, to develop breakthrough technologies that convert CO<sub>2</sub> emissions from natural gas and power plant facilities into products with high net values.

### WHAT THIS MEANS FOR PRECAST

CarbonCure is the only technology that has gone to market and is primarily used in masonry and ready-mix industries. A representative from Carbicrete presented to NPCA's Sustainability Committee at the The Precast Show 2017 in Cleveland and stated the sustainable benefits alone of any of these products would be a huge asset for the precast concrete industry.

Not enough is currently known to predict impacts on cost and performance. NPCA will continue to monitor progress to determine quality and durability. For the time being, we can continue to breathe easy knowing that good old-fashioned precast concrete is still the material of choice in terms of performance and sustainability.

If you have any questions about this or any other sustainability-related topics, contact Claude Goguen, director of sustainability and technical education, at [cgoguen@precast.org](mailto:cgoguen@precast.org) or (317) 582-2328. **PI**

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

#### RESOURCES:

[CarbonCure Technologies, carboncure.com](http://CarbonCureTechnologies.com)

[Carbicrete, carbicrete.com](http://Carbicrete.com)

[UCLA, newsroom.ucla.edu](http://UCLA.newsroom.ucla.edu)

[CO<sub>2</sub>NCRETE, co2upcycling.com](http://CO2NCRETE.co2upcycling.com)

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# ALL BOXED IN

**Precast box culvert proves to be the perfect product to overcome multiple challenges while fixing a historic storm drainage line.**

By Shari Held

Photos courtesy of Tim Smith, construction inspector of City of Bangor, Maine



**O**n Nov. 16, 2016, in Bangor, Maine, a huge sinkhole swallowed a lamp pole and a portion of a recreational trail. Its sudden appearance could seem supernatural to some. After all, Bangor is Stephen King territory – the horror fiction writer based his fictional town of Derry, Maine, on the city of Bangor.

But there’s nothing mysterious about this sinkhole. A portion of the city’s storm drainage line collapsed, creating a sinkhole about 8 feet wide and about 20 feet deep.

The original lines constructed in the 1870s, consists of 5-foot-by-7-foot granite culvert. Later, 60 feet of timber box culvert was added, which feeds directly into the Penobscot River. The line failed at the juncture where timber met granite due to rotting timber sections.

The line provided storm drainage for a large portion of the city and served as an emergency sewer overflow. It needed to be reopened quickly to prevent potential flooding. Precast proved to be the best solution for replacing the old timber sections.

## CHALLENGES GALORE

Unfortunately for the city, the Davis Brook Outfall project was anything but simple. In fact, it was uncommonly complex for numerous reasons.

The failure site is near many other structures:

- A combined sewer overflow building
- The Davis Brook Storage Facility, a long series of 8 foot-by-9-foot box culvert used for sanitary storage
- The 42-inch Penobscot Interceptor sewer pipe, part of the main sewer along the river
- The Bangor Landing Coal Tar Remediation project of 2010. The remediation project used 6-foot-by-7-foot precast box culvert to extend the culvert to attain the desired back-slope grade.

“We had to be careful during the excavation that we didn’t disturb any of these older projects,” said John Theriault, city engineer.

In addition, the site was also once part of the Maine Central Railroad.

“Soils on this site have been deemed impacted and contain contaminants related to railroad use,” said Tim Smith, construction inspector with the city. “Any excavated material had to remain on-site and be capped with a minimum of six inches of cover soil material.”

As if that weren’t enough, workers had to contend with the depth of the excavation, frigid temperatures, ice and up to 14-foot-tall tides from the Penobscot River. At high tide, the entire area is underwater.

“Each one by itself wasn’t necessarily a game stopper, but there were many different things that impacted the project,” said Barney Silver, owner of Lou Silver Inc., the contractor for the project. “I think the challenges are what made the project highly interesting.”





Workers had to contend with the depth of the excavation, frigid temperatures, ice and up to 14-foot-tall tides from the Penobscot River. At high tide, the entire area is underwater.

### PRECAST UP TO THE CHALLENGE

“Our first inclination was to use box culverts to take care of the problem,” Theriault said. “But we had to weigh all the other alternatives such as using a slip lining, 5-foot-diameter HDPE pipe or heavy-duty polyethylene pipe. In the end, what it came down to was we knew from previous experience that 6-foot-by-7-foot precast box culverts would do the job.”

Weather and tidal considerations also favored the installation of precast culvert sections.

“They could be installed fairly efficiently in the short increments of time allowed by 12-foot tides,” Smith said. “We also felt they could best be joined with the existing granite and provide the best long-term structural support.”

The ready availability of the precast culvert was another positive

factor. The project needed 10 sections.

“We had the pieces in stock, on the ground and available for delivery whenever they were ready to start working,” said Will Eisworth, project manager for American Concrete Industries in Veazie, Maine.

According to Eisworth, these precast sections are used as commercial tanks for fire suppression, cisterns or septic holding tanks as well as box culvert. Each section weighs about 10 tons and measures 6 feet tall by 7.5 feet long, with a 7-foot inside span. The inside features two bolt pockets placed in the floor. Two additional bolt pockets are positioned on the top of the outside of each section.

“As you tighten the bolt, it pulls the pieces together and holds them together,” Eisworth said. “Obviously, the dirt around them will hold them together as well, but it’s an added precaution.”



“We were virtually running around with 5-gallon buckets trying to throw enough sand on areas where people were walking so people didn’t slip and get hurt.”

– Barney Silver, *Lou Silver Inc.*

### Preparation is Key

Before excavation could begin, the sinkhole needed to be stabilized. The contractor removed the lamp pole and electrical conduits as well as the rotted timber and debris from the box culvert to open it up. Dealing with the 42-inch Penobscot Interceptor sewer pipe, which ran almost directly over the failure point, was one of the project’s biggest challenges.

“This was an important piece of our infrastructure and it was being compromised by the sinkhole,” Theriault said.

Workers initially secured it with steel I-beams and chain binders. Later, the sewage line was bypassed to an existing box culvert and the line was temporarily isolated.

Excavation began in January 2017. Before workers could lay new culvert at the new elevation, three sections of precast box culvert from the 2010 project also had to be removed. Workers broke the sections into pieces to remove them. The final grade was also unknown until excavation began.

“It could go one direction, or after digging for a couple days, it could go in another direction,” Silver said. “We had to be flexible.”

In all, 2,000 cubic yards of material was excavated. Next, the contractor had to determine what equipment could place the 20,000-pound sections, given the conditions. A crane could do it, but the amount of river ice on the ground – up to four feet at times – meant it had to be large. Silver asked American Concrete Industries for a single section to test using a Model 349 Cat Excavator.

“We discovered we could set the 20,000-pound concrete box culvert 35 feet from the center of the machine, which would be 25 feet from the tracks,” Silver said. “Using the Cat Excavator became a much easier, cleaner and quicker way to get those boxes down in the ground, because we only had between two or three hours of working time on each tide.”

### Tough Conditions

Another issue was finding how to connect the precast sections to the

original granite sections. The granite was far from smooth and even.

“In some areas they touched, and in other areas there was as much as a foot or 18 inches between the concrete and the granite,” Silver said. “That was as close as we could get them.”

In the end, workers drilled into the granite and the adjoining precast component, inserted dowel rods and poured a concrete connecting piece between them. On Jan. 31, workers set the first three box culvert sections. They could only work when the tide was at its lowest point.

“Each time they set box sections they had about three hours of stone grading and setting time before the tide would get too high to efficiently do either,” Smith said. “The boxes were set at 0.5% slope from the existing granite to the final location of the outfall.”

Workers constantly battled the weather. Temperatures dropped to as low as 3 degrees Fahrenheit and it was a challenge to break up the ice along the riverbank.

“We were virtually running around with 5-gallon buckets trying to throw enough sand on areas where people were walking so people didn’t slip and get hurt,” Silver said.

Installation occurred during four early morning low tides and four late morning low tides. The biggest portion of the project was completed in February. The city of Bangor now has a functioning storm line that will likely last for another century or two.

### A Job Well Done

Despite the many challenges, the project was completed quickly, efficiently and safely. The CSO building and the Davis Brook Storage Facility were undisturbed. The 42-inch Penobscot Interceptor sewer line wasn’t damaged by the sinkhole and the bentonite cap on the Bangor Landing Coal Tar Remediation project wasn’t compromised.

“I think the project came out well for everybody,” Silver said. **PI**

*Shari Held is an Indianapolis, Ind.-based freelance writer who has covered the construction industry for more than 10 years.*



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# The Coach: JON MAXWELL

For Arrow Concrete's **Jon Maxwell**, the true power of NPCA's Master Precaster program lies in knowledge transfer.

By Mason Nichols



Jon Maxwell at Arrow Concrete Products in Granby, Conn.

"I'd like all my crew leaders to become **Master Precasters**. If I get these guys going in the next two or three years, Arrow Concrete will **benefit greatly** from it."

– Jon Maxwell

**H**eading into the 38th mile of a grueling cycling workout, Jon Maxwell and his trainer could see the end ahead. Maxwell, a high school football player with aspirations of playing in the NFL, pumped every ounce of energy through the pedals of his new bike. He wanted to finish strong, just like he always did as a defensive tackle on the football field.

Suddenly, everything went black.

Maxwell woke up in the hospital. The locking mechanism on one of his tires had given way, causing an accident that resulted in severe damage to his knee. At 17, his football career was over.

But everything was not lost. Just a few years earlier, Maxwell started his first job in the precast industry. His father helped him get the position, which consisted of applying stucco to precast concrete steps. When the accident altered his plans, Maxwell decided to shift focus. He began pouring all the determination he had applied to football directly into his newfound passion for working with precast.

"I loved waking up at 4 a.m. and getting to work," he said. "And then, as I moved up the ladder, the work became even more enjoyable. I kind of brought football into it, but I wasn't a player anymore, I was a coach."

Over the course of the next three decades, Maxwell's work in the industry took him to Massachusetts, Maine, Vermont, Alabama and Louisiana. Along the way, he worked for a variety of precast manufacturers. He also spent time with a design firm, which allowed him to enhance his communication skills and see precast production from a different perspective.

In 2011, Maxwell secured a position with Arrow Concrete Products in Granby, Conn., where he currently works as the plant manager. There, he met the Burkhart family, including Kurt, president, and Jennifer, vice president of operations. Maxwell said Jennifer convinced him that he should enroll in Precast University and begin his work toward earning the Master Precaster designation.

"I had taken the first Production and Quality School



class before joining Arrow Concrete," he said. "But Jennifer said to me, 'Is [the Master Precaster program] something you'd like to do?' And of course, I hopped all over it."

For Maxwell, Precast University represented the next logical step in his career. He had already obtained plenty of precast knowledge, but the courses, which cover everything from basic production techniques to leadership and beyond, served as a capstone to his wide technical expertise. Plus, he knew completing the courses and earning his gold hardhat would make his family proud.

As he worked through the classes, Maxwell developed an appreciation for many of the program's instructors, including NPCA professional staff member Claude Goguen, who is also a Master Precaster.

"He's just a great teacher," Maxwell said. "If you don't understand something during a class – whether it's a webinar or in person – he helps. I couldn't say anything bad about that man."

Maxwell also developed an affinity for instructor Greg Chase, who taught him the importance of the mantra, "If you always do what you've always done, you'll always get what you've always got."

Maxwell now thinks more critically about every project before it begins.

"I find myself stepping back for a minute and thinking, 'Is there a better way?'" he said. "I even ask my guys this question.

I believe there are always better ways to do things, and I tell them that just because we've done things a certain way in the past doesn't mean it has to stay that way."

Maxwell's knowledge transfer to coworkers has likely been his biggest takeaway from becoming a Master Precaster. By passing the information he's learned in the classroom along to others, he's returning Arrow Concrete's investment each day he's in the plant.

"I wanted to take everything and bring it back to my crew leaders so that they could help their workers," he said. "You can go and learn all of this information, but keeping it inside won't get you anywhere. It's not going to help you as a plant manager."

Today, Maxwell coaches those around him with the tremendous expertise he's gained through his years on the production floor and through Precast University. And in the future, through the support of the Burkhart family, he hopes to spread that coaching mentality throughout the plant.

"I'd like all my crew leaders to become Master Precasters," he said. "If I get these guys going in the next two or three years, Arrow Concrete will benefit greatly from it." P1

*Mason Nichols is the managing editor of Precast Solutions magazine and is NPCA's external communication and marketing manager.*



For more information on NPCA's Master Precaster program, visit [precast.org/precastuniversity](http://precast.org/precastuniversity)

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# HACKING

## of PRECASTERS on the Rise

By Sara Geer

**EDITOR'S NOTE:**

Precasters who shared their personal experiences for this article were not named due to ongoing investigations and privacy concerns.

It's late on a Friday night and you sit at your desk to respond to emails you didn't have a chance to read during the week. You open your laptop, connect to the server and all you see is a single message on your screen. It reads, "Warning! Your files have been encrypted." Next, you receive a text message saying the same thing. Suspicious, you start clicking files critical to your business operations and every single one is encrypted with an unbreakable code. Now alarmed, you open an email you first thought to be spam.

It reads, "Your personal files have been encrypted with a private and unique key generated for this server. To receive the key to decrypt the files, you must visit this webpage, follow the directions to purchase bitcoins<sup>1</sup> and submit the payment within one week. If time runs out, the key will be destroyed and you won't be able to recover your files."

If this scenario sounds familiar, then you are part of a growing group of precasters who have experienced a cyber crime. Cyber crime is one of the fastest growing threats to modern business. One attack can put operations on hold



for days, weeks or even months, which can be detrimental to business and incredibly expensive. While there are common types of cyber crimes – identity theft, phishing scams and telephone hacking to name a few – threats and extortion are gaining popularity with cyber criminals. According to Symantec’s 2016 Internet Security Threat Report<sup>2</sup>, ransomware attacks increased by 35% from 2015 and 43% of all cyber crimes have been carried out on small businesses. “Why small businesses?” you might ask. You don’t have information anyone else would want, right? That data is really important to someone – you. And small businesses have less resources to fight back.

### RANSOM TESTIMONY NO. 1

One precaster shared with National Precast Concrete Association that when their company got hit by a ransom attack in late December 2016, it felt like a “mind game” the attackers played on the entire staff. More than half of the computers in the office were locked, all files were encrypted and many employees received lengthy extortion emails and text messages. At first, they didn’t know what to expect.

“You don’t know if they will physically come in, blackmail you or demand more money,” they said. “At the beginning, you don’t know what they are going to do.”

The company filed a report with local law enforcement, but the precaster still had unanswered questions. When an internet crime complaint report was filed with the FBI, they found out the hacking group that attacked them was infamous and responsible for many other attacks. For this reason, the precaster contacted the local district attorney and had a team of investigators take the computers to a forensic lab for more testing. The results revealed that the cyber criminals tricked an employee and tapped into a cloud backup remotely, which in hacking slang is gaining access through the “back door.” Luckily, the precaster had another backup of the backup and restored the encrypted files, so nothing was lost. However, due to the attack, office operations required a change.

“We’re putting out fake emails more and asking employees to spot the difference,” they said. “That way they can’t be easily tricked to open something or click on a link that will install ransomware onto their computer. It takes only one person in the company to fall for something, so you have to train.”

### RANSOM TESTIMONY NO. 2

On the other side of the United States, another precaster was struck by a ransomware attack in 2016. Employees came in one morning to discover that an error message opened each time files were accessed. Inside each directory folder was a “Read Me” file with a three-sentence paragraph explaining the files had been encrypted and payment needed to be sent to decrypt.

“We are a small company with 30 employees, so you don’t expect to get hit by that,” they said.

After performing a few Google searches with keywords

and phrases to determine the origin of the attack, the precaster found out many other companies had a similar experience. Also, the attack tracked back to a cyber-criminal group in Asia. Luckily, the precaster did not need the encrypted files and was able to run normal operations. From that point forward, a third-party information technology company was hired to secure all files and install anti-hacking software.

### ASSUME THE UNEXPECTED

The two key pieces of advice both precasters have for fellow precasters is to “back up” and “assume it will happen.”

According to Steve Aveline of Innovative Network Solutions in Indianapolis, Ind., mitigation starts with management taking an active stance to encourage employees to be security conscious and cautious of suspicious links, whether in an email or online. Other preventative action items to consider include:

- ▶ **Have a written IT policy on file.**
- ▶ **Use third-party antivirus, malware and adware scanning software.**
- ▶ **Use complex passwords to lock files and documents.** For example, lluv3\$0ccer is a complex password that is considered easy to remember, but is hard for a hacker to guess.
- ▶ **Be actively engaged in the backup/restore selection and ongoing validation process.** Ensure the backup has multiple levels of redundancy and local and off-site file-level backups for user and group shares. Backups need to be validated with restores. In other words, test your backups regularly to make sure they are working.

Common signs to look for when a cyber attack occurs are random browser windows opening, strange redirects to unfamiliar websites and abnormal application or software behavior. If you do notice these, the best course of action is to disconnect all wired and/or wireless network connections and contact management or your IT department immediately.

### BE PROACTIVE

It is always wise to have proactive conversations with your IT provider to make sure you are on the same page. If they are not prepared with good answers on how you are being protected, you can make needed adjustments before it’s too late.

*Sara Geer is NPCA’s internal communication and web manager, and is managing editor of Precast Inc.*

### RESOURCES:

- 1 Bitcoin is a digital currency created and exchanged independent of banks and governments.
- 2 2016 Internet Security Threat Report, [symantec.com/security-center/threat-report](http://symantec.com/security-center/threat-report)



The two **KEY PIECES** of **ADVICE** both precasters have for fellow precasters is to “back up” and “assume it will happen.”

# 5 STEPS TO GET STARTED ON Crane Certification

## 1 STAY INFORMED

Check [precast.org/cranes](http://precast.org/cranes) often to get the latest information on the new OSHA mobile crane operator certification requirement.

## 2 CONTACT AN ACCREDITED CERTIFICATION ORGANIZATION to start the registration process for certification exams

- CIC ([craneinstitute.com](http://craneinstitute.com))
- NCCCO ([nccco.org](http://nccco.org))
- NCCER ([nccer.org](http://nccer.org))

## 3 DEVELOP YOUR TRAINING PLAN to prepare your operators

- Identify training vendors in your area
- Work with an accredited certification organization to identify partners that provide preparatory training classes
- Invest in online prep classes
- Create a study group

## 4 COLLABORATE WITH OTHER PRECASTERS

Consider partnering with your regional association or other precasters in your area to host training and examinations to take advantage of volume discounts.

## 5 DON'T WAIT

Instructors and exam proctors' schedules are quickly filling up. As the deadline draws closer we anticipate it will be harder to find openings in crane prep training courses and proctors to administer written and practical exams. **PI**



For the latest information and to help your mobile crane operators prepare for the crane certification exams, visit [precast.org/cranes](http://precast.org/cranes)





# 2017 NPCA WEBINAR Schedule

DATE	TOPIC	INSTRUCTOR	PRICE
May 18	From Ash to Slag: A Guide to Supplementary Cementitious Materials	Claude Goguen, P.E., LEED AP	\$89 Per Location
June 15	Reducing Concrete Permeability: Does Your Concrete Hold Water?	Kayla Hanson	\$89 Per Location
July 13	Best Practices When Using Fiber Reinforcement	Claude Goguen, P.E., LEED AP	\$89 Per Location
Aug. 17	Troubleshooting Your SCC	Paul Ramsburg	\$89 Per Location
Sept. 14	How to Become the Smartest Person in Your Plant: Calculating the Center of Gravity	Claude Goguen, P.E., LEED AP	\$89 Per Location
Oct. 19	How Your Local Manufacturing Extension Partnership (MEP) Can Help You Pay to Train Your Employees	TBD	\$89 Per Location
Nov. 2	Alternate Types of Cement	Evan Gurley	\$89 Per Location
Nov. 7, 9, 14, 16*	PQS II – Technical**	Claude Goguen, P.E., LEED AP	\$495 Per Person
Dec. 7	Sales and Marketing Alignment: A Key to Revenue Growth	TBD	\$89 Per Location

NPCA conducts **webinars** throughout the year, providing precasters with **vital education** for all facets of running a precast plant.

All webinars begin at noon Eastern.

For course descriptions and registration, visit [precast.org/2017webinars](http://precast.org/2017webinars).

\* Attendance at all sessions is required for PQS II webinars.

\*\* Due to the advanced math concepts covered in PQS II – Technical, students are required to take and pass NPCA's PQS II Technical Math Prep course as a prerequisite for this course. The math prep course is offered as a free webinar to students interested in enrolling in PQS II – Technical. Students must complete the webinar and pass the exam by Tuesday, Oct. 31, to participate in this course.

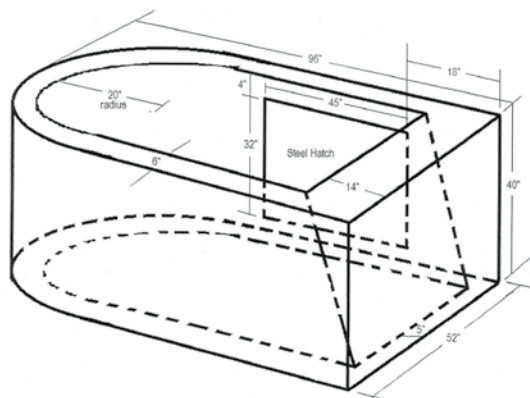
# Think you know your stuff?

## Prove it by answering the following question.

Send your response to Kayla Hanson, technical services engineer, at [khanson@precast.org](mailto:khanson@precast.org), and if yours is the correct answer (chosen randomly from among all correct answers), you will receive one free admission to one of our 60-minute webinars presented in 2017. We will accept one answer per person. **Good luck!**

### Challenge Question:

Find the center of mass of the following figure.



#### MARCH/APRIL CHALLENGE

**QUESTION:** The sling you're using to lift a product makes a 60 degree angle with the top edge of the product. If the vertical distance from the top of the product to the sling hook is 72.75 inches, and assuming the hook is centered over the product, what is the approximate length of the product?

**ANSWER:** 7 feet



# 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](mailto:sgeer@precast.org).



### MCT GROUP APPOINTS NEW OPERATIONS DIRECTOR

MCT Group announced the appointment of Marianne Johnson as director of operations. Johnson was an 11-year operations director for Sicoma North America, supporting high-intensity planetary and twin-shaft mixers. She will work out of the MCT-USA office in Tampa, Fla.



### A.L. PATTERSON IS NOW ALP SUPPLY

A.L. Patterson announced it has evolved its brand and changed its name to ALP Supply, effective March 1, 2017.

The new name pays homage to founder Albert Lester Patterson. It represents the company's key values to provide the personal service found in privately owned, family-based businesses with the added support of advanced technological capabilities.



### IWI GROUP LLC HIRES NEW REGIONAL MANAGER

Michael Baez joined iwi group LLC as regional manager for the Southeast U.S. territory. Baez worked with Cresset Chemical Co. as vice president of marketing and sales for more than 12 years, serving the precast industry on the equipment and chemical side of the business.

He is actively involved in the Precast/Prestressed Concrete Institute, National Precast Concrete Association, and regional and national organizations in the U.S. and Canada. Baez looks forward to working with the construction industry and helping companies obtain equipment, consulting and design solutions.

### BESSER ADDS TO PIPE & PRECAST SALES TEAM, AWARDS FIRST PIPE INDUSTRY SCHOLARSHIP

Pat Voinis, of Pat Voinis and Associates, has joined the Besser Co. sales team as an independent sales agent primarily promoting products and services for the pipe and precast product line throughout the United States. His coverage will supplement the sales team and will integrate into the current sales structure. Voinis is an industry veteran with more than 30 years of concrete products experience.



Pat Voinis

Ryan Suszek, Besser Co. vice president—Pipe & Precast, awarded Joe Pelica the first \$2,500 Besser Pipe Industry Scholarship. Pelica is a second-year mechanical engineering technology student at Delta College in Bay City, Mich. The presentation was made during the ACPA Annual Meeting in Hilton Head, S.C.



Ryan Suszek awarded Joe Pelica the first Besser Pipe Industry Scholarship.

### EMH INTRODUCES MODEL LS LOAD-STABILIZED HOIST

Engineered Material Handling has introduced the new Model LS Load-Stabilized Hoist for transporting loads quickly, securely and safely. The new rope-tensioning design and reeving configuration reduces load swing during quick starts and stops. The EMH





LS Load-Stabilized Hoist

Model LS is best for steel coil and mesh handling, container trading, bucket or grab applications, and precise positioning.

The hoist is available as a single girder side-mounted hoist with capacities up to 12.5 tons or a double-girder hoist with capacities up to 25 tons. Each hoist is equipped with separate load ropes to keep the load securely and safely in position.

### GCP UNVEILS NEW TECHNOLOGIES FOR PRECAST MARKET

GCP Applied Technologies, formerly known as Grace Construction Products, previewed its Pieri architectural precast product portfolio and AIRtrac air management system at The Precast Show 2017 in Cleveland, Ohio.

The Pieri portfolio offers a complete line of specialty architectural products, including form release agents, sealers and in-form surface retarders – all designed to create and protect architectural precast concrete finishes.

GCP also displayed the AIRtrac air management system that measures and monitors the total air content and temperature during batching. The system is designed to reduce challenges when producing and delivering high-quality precast concrete. The AIRtrac technology provides data monitoring and detailed dashboard reports – both from the batch plant and remotely via a mobile app. **PI**



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Cone Form



Quick Strip Roll Back Base Form



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Roll Back Box Form



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# CALENDAR OF Events



**Oct. 12-14, 2017**  
**NPCA 52ND ANNUAL CONVENTION**  
Loews Atlanta Hotel  
Atlanta, Ga.



**Feb. 22-24, 2018**  
**THE PRECAST SHOW 2018**  
Colorado Convention Center  
Denver, Colo.



**Oct. 4-6, 2018**  
**NPCA 53RD ANNUAL CONVENTION**  
Omni Providence Hotel  
Providence, R.I.



**Feb. 28 - March 2, 2019**  
**THE PRECAST SHOW 2019**  
Kentucky International Convention Center  
Louisville, Ky.



For the most up-to-date information about NPCA events, visit [precast.org/meetings](http://precast.org/meetings)

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