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Precast Inc. (ISSN 1940-9184 print, ISSN 1940-9192 online) is published bimonthly by NPCA.

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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.

22 For the LOVE of the Industry

David and Dan Zarraonandia, owners of **Pre-con Products**, choose to focus on enjoying their work and have reaped the rewards as a result.



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On the Cover:

The Hexa Block segmental foundation system is one of many unique products Pre-con has manufactured for the United States military.

photo by Pre-con Products

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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.

Lauren writes:

ASTM A706, “weldable rebar,” should not have to be used if welding practices are good with ASTM A615. Is this correct?



NPCA Technical Services engineers answered:

According to the NPCA Quality Control Manual for Precast Concrete Plants, “Reinforcing steel used for structural purposes may be welded as long as it is accomplished in compliance with standards set forth in the American Concrete Institute’s ‘Building Code Requirements for Reinforced Concrete’ (ACI 318) and The American Welding Society’s ‘Structural Welding Code – Reinforcing Steel’ (AWS D1.4).”

It also states, “Welding of ASTM A615 reinforcing steel is not generally an acceptable practice. According to AWS D1.4, the carbon equivalent for bars to be welded should be less than 0.45 percent for bars larger than #7 and less than 0.55 percent for #6 bars and smaller.”

Therefore, if ASTM A615 steel is welded, the carbon equivalent must be calculated and documented and the bars must be preheated, if necessary. Preheating guidelines are also set forth by AWS. You are correct if you calculated the specific weldability of the ASTM A615 rebar being used. If it meets the requirements of the carbon threshold, then you can weld it.

For more information about welding reinforcement, read the article “Hot Topic: Welding Reinforcement” from the March-April 2011 issue of Precast Inc. or “Welding Reinforcement Steel: AWS D1.4/D1.4M:2011” from Structure Magazine.

Umair writes:

Why does fly ash contribute to concrete strength after 28 days?

NPCA Technical Services engineers answered:

Fly ash helps increase strength development after 28 days – and in some cases months to years beyond 28 days – because of its reactions. When ordinary portland cement reacts with water, the products include calcium silicate hydrate and lime. CSH is the main contributor to concrete strength,

while lime’s strength contributions are negligible until it reacts with another material to produce CSH. Fly ash is a pozzolan and it reacts with the free lime to produce additional CSH. In the presence of fly ash, the lime can react to produce additional CSH. This can continue as long as the reactants are available in suitable quantities and other environmental factors are favorable.

Randy writes:

I am looking for the dimensions of the “bell” length and taper and taper length on concrete pipes.

I would think that it would be a standard, but maybe not, and that it varies by manufacturer of the pipe? I am in the process of designing a unique lifting device for which the intent is to help reduce the amount of time that workers would be down in the trench while installing the pipe.

NPCA Technical Services engineers answered:

Unfortunately, uniform or standard precast concrete joint dimensions do not exist within the North American market. As the industry grew, each individual company, and in fact even plant branches, purchased and used the joint forming equipment (headers for spigots, tongue and pallets for bells and grooves, etc.) they thought best. However, this has not been a large problem out in the field because it is rare for competing pipe manufacturer joints to be coupled together. The respective ASTM joint standards provide performance requirements along with design guidelines related to rubber



gasket deformation limits, maximum bell taper angles, etc. However, there are no requirements stating joint length or internal diameter dimensions.

For precast product joints, there are two distinctive types: a bulk or formed butyl, or bitumen sealant material within the annular space between the spigot and bell. These joints typically have a half-inch wide annular space and the taper of the bells and spigots can be large, 5 to 10 degrees. The depth, or length, of the bell socket typically varies from 3 to 5 inches. This type of joint is characteristically found on precast rectangular box culvert sections or non-circular pipe (elliptical or pipe-arch) culverts.

For circular concrete pipe, most manufacturers are using a rubber gasket joint configuration. The main difference is the annular space between the spigot and bell is a critical dimension. The high tolerances are required to ensure the proper gasket compression occurs within the design limits for both the centered and joint shear position. Additionally, the bell taper is typically limited to a 2-degree maximum in the event the pipe is not homed all the way and the gasket compression is not drastically reduced as the joint is opened. Because the compressed gasket exerts radial forces into the bell, the bell dimensions for gasketed joints need to be reinforced and thick enough to resist these forces. Consequently, gasketed joints typically have projecting bell profiles larger than the pipe wall outside diameter. That is until the pipe wall of larger pipe can be divided to incorporate a reinforced bell socket resistant to the various installed joint forces.

It would appear if your device is intended to have a reasonably tight fit into a precast concrete pipe or box section, it will need to be adaptable to many unique dimensions or be custom made. It should be noted that each manufacturer should have detailed dimensional drawings of their joint equipment being used. **PI**

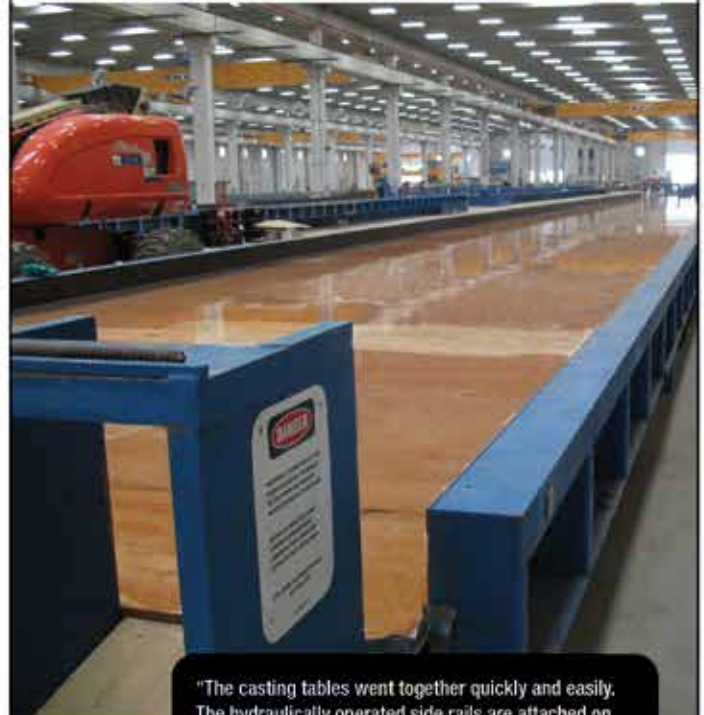
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Keeping Up With Precast Codes & Standards

A breakdown of **new codes** and **standards** that affect the precast industry.

By Eric Carleton, P.E.

The use of codes and standards is vital to the design and construction process. The intent of these material standards is to provide a minimum level of uniformity for the quality and performance of materials and products used.

In the United States, the most commonly referenced material standards for the precast concrete industry are from ASTM International for municipal and private sector work, and the American Association of State Highway and Transportation

Officials for public sector transportation projects. Canadian provinces reference products in accordance with CSA Group in addition to ASTM standards, which are not covered by CSA.

The design and fabrication practices for concrete are most notably recognized and developed within the codes and standards from the American Concrete Institute. In some cases, the standards and codes of each are intertwined. For example, ASTM C478, “Standard Specification for Circular Precast Manhole Sections,” references the “appropriate sections of the latest edition

of ACI 318 [Requirements for Reinforced Concrete Building Code]” when acceptance is based on rational design.

Each standard-making body is made up of interested regulators, government engineers and officials, design engineers, contractors, members of academia and industry experts. These individuals establish rules and bylaws to ensure uniform evaluation of proposed revisions to existing standards or development of new documents. Most material standards organizations, such as ASTM and AASHTO, have a minimum of one annual meeting where new standards or revisions can be proposed and enacted following ballot processes. Major ACI design or building codes are typically referenced in municipal and state ordinances and, consequently, revisions of these important documents tend to occur on regular specified cycles – typically three or five years. These extended code cycles provide ample time for any proposed revisions to have adequate public review, discussion and debate before adoption or denial.

ASTM UPDATE

ASTM International is comprised of many technical committees, but there are three of specific interest to the precast concrete industry: Committee C27 on Precast Concrete Products, Committee C13 on Concrete Pipe and Committee C09 on Concrete and Concrete Aggregates.

C27

The next Committee C27 meeting will be Dec. 5, 2017, in New Orleans, La.

Committee C27 work items of interest are:

- **WK38192**, “New Specification for Wet-cast Precast Modular Block Retaining Wall Units”
- **WK21780**, “New Practice for Minimum Structural Design Loading for Precast Concrete Burial Vaults and Graveliners”
- **WK31703**, “New Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures using AASHTO LRFD Design”
- **WK52521**, “New Terminology for Standard Practice for Performance Criteria for Storm Water Quality Devices”

C13

The next Committee C13 meeting will be Sept. 18-21, 2017, in Estes Park, Colo.

Committee C13 work items of interest are:

- **C1818-15**, “Standard Specification for Synthetic Fiber Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe”
- **WK47646**, “New Specification for Standard Specification for Production of Dry Cast Concrete Used For Manufacturing Pipe, Box and Precast Structures”
- **WK51281**, “New Practice for Standard Practice for Inspection and Acceptance of Reinforced Concrete Culvert, Storm Drain and Sewer Pipe”
- **WK53568**, “New Specification for Performance Based Manufacture of Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe”
- **WK56406**, “New Specification for Standard Specification for Precast Concrete Culvert, Storm Drain, and Sewer Pipe To Be Installed Using Trenchless Methods”

C09

Committee C09 meets twice per year during ASTM Committee Weeks. The next scheduled meeting is June 11-14, 2017, in Toronto, Ontario.

Committee C09 work items of interest are:

- **C1798/C1798M-16e1**, “Standard Specification for Returned Fresh Concrete for Use in a New Batch of Ready-Mixed Concrete”
- **WK35250**, “New Practice for Fiber Reinforced Concrete for Making and Curing Test Specimens in the Laboratory and Field”
- **WK2423**, “New Test Method for Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying”
- **WK51982**, “New Practice for Fabricating and Testing Specimens of Ultra-High Performance Concrete”
- **WK54619**, “New Test Method for Using Temperature as a Relative Indication of Time of Setting of Cementitious Mixtures”

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These committees are very active and many new standards have been developed in the past year. In addition, these committees have a number of work items, which may lead to new standards.

AASHTO UPDATE

AASHTO material and testing standards are developed by the Subcommittee on Materials. This committee consists of appointed state department material engineers who serve on a variety of specific technical sections that are responsible for products used on department of transportation projects. Specific technical sections that have material and test standards of interest to the precast concrete industry are 3b - Concrete Materials and Fresh Concrete Properties, 3c - Hardened Concrete Properties and 4a - Rigid Pipe.

Speaking for the Industry

As a precaster, you have direct control of many elements that affect your company's success. However, other factors such as codes and standards can supersede your best efforts at the plant level if they are not addressed.

Codes and standards can be national or local and dictate what products can be used on a project and how they are designed. For example, material standards affect how precast products are to be made and the minimum required level of quality, while testing standards provide specific protocols.

The committees that write these documents are comprised of a mix of owners, installers, designers, material manufacturers and trade group representatives. The standards they set are incorporated within a specific model design or building code. These model codes are then enacted into law as full codes.

NPCA and member participation within these committees is vital. NPCA professional staff members proactively work with top-level officials and serve on committees within national entities such as:

- [American Association of State Highway and Transportation Officials](#)
- [American Concrete Institute](#)
- [ASTM](#)
- [Canadian Standards Association](#)
- [Federal Aviation Administration](#)
- [Federal Highway Administration](#)
- [International Association of Plumbing and Mechanical Officials](#)
- [National Transportation Product Evaluation Program](#)
- [U.S. Army Corps of Engineers](#)

NPCA will remain dedicated to speaking for the industry and we hope you will also share your precast technical knowledge for the good of the industry. For more information on how to do this, contact Eric Carleton, P.E., NPCA director of codes and standards, at 317-208-6431 or ecarleton@precast.org.

The 4a Task Group recently published a document for the precast industry titled R-73-16, "Standard Practice for Evaluation of Precast Concrete Drainage Products." This is intended to be a guide document for DOT plant and field inspectors. It describes the evaluation of precast concrete pipe, box culverts, manholes, and drainage inlets and gives criteria for acceptable products and repairable products, as well as the rejection of defective products.

ACI UPDATE

ACI is comprised of seven primary committee groups of interest to the precast industry: 100 General, 200 Materials and Properties of Concrete, 300 Design and Construction, 400 Concrete Reinforcement and Structural Analysis, 500 Specialized Applications and Repair, 600 Certification and 700 Education.

The primary concrete structure design code, ACI 318, which falls under Committee 300 Design and Construction, had a major update and rewrite published in 2014 and was introduced to the public in 2015. Last year, another critical code, ACI 301, "Specifications for Structural Concrete," went through its code cycle with the document being published and introduced to the public.

Current ACI Committee 301 Chair Michelle L. Wilson said a new provision, which will affect precast aggregate suppliers, can be found in section 4.2.2.6, "Resistance to Alkali-Silica Reaction." It states, "unless otherwise specified or unless (structural) members are assigned to Exposure Class C0, use one of the three options below for qualifying concrete mixtures to reduce the potential of alkali-silica reaction."

This means that unless specified to not be tested for ASR, any concrete exposed to a wet condition must have the aggregates tested for ASR and comply with the required limits. Wilson also said personnel who post-tension precast components have additional certification requirements.

In addition, ACI 350, "Code Requirements for Environmental Engineering Concrete Structures," is undergoing its review and an update may be published in 2017. Lastly, Committee 600 is reviewing criteria and requirements to develop a special field certification for self-consolidating concrete.

STAY INFORMED

Standards and codes used in construction are constantly under review as technology and materials continue to change. It is important for precast concrete manufacturers to stay abreast of any major changes to material standards or design codes that affect the products they manufacture. The most direct way to stay informed is to join the respective standard-making associations and become involved in the process. In addition, NPCA technical services engineers will continue to participate on these and other important codes and standards bodies. **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.



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SCMs in Concrete

By Kayla Hanson

Editor's Note:

This is the first of a two-part series detailing the types of supplementary cementitious materials (SCMs) available and the role they play to enhance concrete strength.

Cement and water have been known as a fantastic combination for millennia. They combine, react and create paste, which is a critical component in concrete. Paste serves as the binder that holds aggregates in place and gives concrete its engineering properties, making it a reliable and versatile construction material. But even this dynamic duo of cement and water are better off as a trio, particularly in terms of cement, water and supplementary cementitious materials.

WHAT ARE SUPPLEMENTARY CEMENTITIOUS MATERIALS?

Supplementary cementitious materials are natural materials or industrial byproducts that exhibit cementitious behaviors when combined with either water or water and other compounds. Many of these products if not used for other purposes typically end up in landfills or other disposal areas. SCMs enhance the results of ordinary portland cement (OPC) hydration reactions in concrete and are either incorporated into concrete mixes as a partial replacement for portland cement or blended into the cement during manufacturing. SCMs augment cement's actions and can improve

fresh concrete characteristics, strengthen hardened concrete properties and reduce raw material costs.

SCMs produced as a result of industrial manufacturing processes include fly ash, slag cement and silica fume. Natural SCMs, created by applying regimented heating and purifying processes to certain minerals, include calcined shale, calcined clay and metakaolin.

HYDRAULIC VS. POZZOLANIC

Cementing materials fall into two categories: hydraulic or pozzolanic.

Hydraulic is a description given to a material that chemically reacts with water. Portland cement is hydraulic. When portland cement and water mix, the reactions produce compounds that build upon one another and interconnect to create a matrix of hardened paste.

The main products of cement hydration reactions are calcium silicate hydrate and calcium hydroxide (abbreviated CSH and CH, respectively). CSH is largely responsible for building concrete's most important engineering property – strength.

The term pozzolanic describes a material that displays little to no cementitious behavior when mixed with water alone. Alternatively, it chemically reacts and displays cementitious characteristics in the presence of water and other compounds. Pozzolanic substances act as cementing ingredients while consuming less-desirable material and contributing to the hardening cement paste matrix. The readiness and duration of the reaction over time is referred to as its pozzolanic activity. Similar to portland cement's reactivity and behavior, pozzolanic activity is also based on the source of

the material, its chemical makeup, the particle sizes and the material's Blaine Fineness.¹

FLY ASH BASICS

Fly ash is a pozzolanic SCM and a byproduct of coal combustion. It is most commonly produced by coal-fired electric power plants. Depending on the makeup of the coal from which it originates, fly ash is categorized as either Class C or Class F, in accordance with ASTM C618.² These categories are dictated by the amount of silicon dioxide, aluminum oxide and iron oxide in the ash, which influences the material's behavior in concrete.

Fly ash particles are mostly solid and spherical, but some are hollow shells that contain smaller solid spheres of fly ash. Particles range in size from less than 1 micrometer to more than 100 micrometers. The average size of a fly ash particle is about 10 micrometers, or 1/10 the thickness of a standard piece of printer paper. Only a small portion of particles exceed 45 micrometers.

"The particles are very fine," said Craig Wallace, technical director with Headwaters Resources. "The average size of a fly ash particle is about 1/10 the size of a particle of cement. By using fly ash you can increase the density of the cement paste. [The particles] fill the voids and increase the density of the paste, which makes it more impermeable."

In the presence of water, these fly ash particles react with CH produced by cement hydration and replace it with the stronger, more desirable CSH. As cement hydration continues, more CSH and CH is produced. As long as the reactants are available in suitable quantities and other environmental factors are favorable, fly ash will continue to react with CH and create more CSH, adding strength to the concrete matrix.

Fly ash is used as a partial replacement for portland cement at a rate of 15% to 40% by mass of cementitious material for Class C ash, and 15% to 25% by mass of cementitious material for Class F ash. In some cases, fly ash can be used in excess of 40% by mass of cementitious content.

Fly ash generally lowers air content in a mix design, requiring a higher dosage of air-entraining admixture. How much air-entraining admixture will be needed is highly dependent on the fly ash's carbon content, as well as its alkali content and fineness. According to Portland Cement Association's Design and Control of Concrete Mixtures, "Increases in alkali contents decrease air-entraining admixture dosage requirements, while increases in the fineness and carbon content typically require an increase in dosage requirements. A Class F fly ash with high carbon content may increase the required admixture dosage by as much as 5 times compared to a portland cement concrete without fly ash. A Class C fly ash with low carbon content typically requires 20% to 30% more admixture."

Good quality fly ash generally reduces water demand, similar to liquid chemical water reducers. The PCA document, "Optimizing the Use of Fly Ash in Concrete," states: "Although the exact amount of water reduction varies widely with the nature of the fly ash and other parameters of the mix, a gross approximation is that each 10% of fly ash should allow a water reduction of at least 3%."

It also states: "Coarser fly ashes or those with high levels of carbon generally produce a smaller reduction in water demand and some may even increase water demand."

The implication is that decreased water demand can provide the same slump using less water, or can increase slump when using the same amount of water.

"It decreases water demand to obtain the same workable slump," explains Wallace. "So if you get a 6-inch slump at 0.45 with cement, if you replace 25% of that cement with fly ash, you could obtain the same slump with about a 0.43 water to cementitious materials ratio."

A lower water-cementitious material ratio contributes to increased strength, durability, abrasion resistance, freeze-thaw resistance and density, as well as decreased porosity and permeability. For a given slump, fly ash concrete can also exhibit improved workability compared with OPC. This also translates to an increase in ease of placing, consolidating and finishing practices.

BLEEDING AND SEGREGATION

Using SCMs will generally decrease bleeding. The finer the cementitious material and the higher the SCM content in the concrete mix, the lower the bleed rate and bleed capacity. Fly ash's reduced water demand and increased fine particle content compared with OPC enables it to also decrease segregation. This makes fly ash beneficial for use in concrete made with aggregates having low levels of fines.

FLY ASH IS A **POZZOLANIC SCM** AND A BYPRODUCT OF COAL COMBUSTION. IT IS MOST COMMONLY PRODUCED BY **COAL-FIRED ELECTRIC POWER PLANTS.**

HEAT OF HYDRATION

Class F fly ash decreases heat of hydration, and in some extreme cases contributes to heat of hydration only half as much as OPC. This makes it extremely useful in mass concrete applications or in hot-weather concreting, where it's desirable to slow setting time and limit heat generation. Class C fly ash can either increase or decrease heat of hydration when compared with OPC concrete. This behavior is heavily dependent upon the ash's calcium oxide content and other chemical makeup. The type and amount of compounds within it affect the reaction rates, which affect the speed at which strength-building compounds are produced and the rate at which heat is generated.

EFFECTS ON HARDENED CONCRETE

Because fly ash affects heat of hydration and the rate at which cementitious reactions occur, the type of ash also affects setting time and early strength development.

"Precasters are somewhat limited in their ability to use fly ash because generally they like the concrete to cure in the forms for one day and strip the next. Sometimes fly ash doesn't contribute to strength gain in the first 24 hours," Wallace explains. "You have to

have the first reaction with cement and water. The byproduct of that reaction is CH, then you have the secondary reaction with the fly ash. That usually occurs after the first 24 hours.”

Class F, having a lower heat of hydration, increases setting time and produces lower early strength results. Because Class C can have varying effects on reaction rates and heat of hydration, it has little to no effect on setting time and early strength gain. It is important to note that short-term strength results in concrete produced with fly ash should not be taken as an indication of long-term strength or quality. Fly ash typically retards the rate at which strength is developed early on – particularly up to three days after casting – but enables strength to increase at a steady rate long after OPC concrete’s strength development slows or tapers off.

Fly ash’s contribution to long-term strength development is marked but varies depending on its class. In some cases, particularly with Class C, concrete strengths exhibited between 1 and 28 days can be comparable to those of OPC concrete. In most cases, however, fly ash concrete’s increased long-term strength becomes evident beyond 28 days, sometimes nearing 90 days or more.

When deciding whether or not fly ash is right for a particular application, it’s important to not only consider the type of product in which the ash will be used, but also the environmental factors the product will face in service, as well as the ambient temperature and weather conditions to which the concrete will be exposed during placing, finishing and curing. Is fly ash required by the project specification? Is it disallowed for any reason?

“A lot of precasters are required to use fly ash in their products if they are doing work for DOT projects. It’s actually a requirement in a lot of states because it can make concrete more durable,” Wallace said. “Generally, it decreases bug holes. It also makes finishes smoother.”

As with any new mix design, it’s necessary to determine how each ingredient will interact with one another, including admixtures or other cement types. Setting time and strength development also need to be considered as well as production, stripping and shipping timelines. All SCMs have advantage and disadvantages in different scenarios, so it’s important to consider the variety of options and possible outcomes associated with each one. **PI**

Kayla Hanson is a technical services engineer with NPCA.

RESOURCES:

- 1 A material’s Blaine Fineness measures the total surface area of the sample particles per gram (cm²/gram).
- 2 Not all fly ash conforms to ASTM C618.

REFERENCES:

- Portland Cement Association, Design and Control of Concrete Mixes, 16th Edition
“Use of Fly Ash in Concrete.” ACI Materials Journal 84.5 (1987)

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Forty perfect stacks of Jersey barriers stood ready for morning delivery when the new forklift operator lost control of the wheel. Lucky for Earl Nichols of Purdie Concrete, CNA's UL-certified Risk Control engineers had just shown him a new technique to make his stacks more stable and his operation more efficient. So instead of calling his independent agent to file a claim, Earl called his client to confirm delivery and arranged three more shipments for the week ahead. Solid work, Earl!

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OSHA 2016

TOP 10

A Guide to Safety in Your Plant

By Evan Gurley

Adherence to safety protocol is an essential aspect of everything that happens in a precast plant. When the Occupational Safety and Health Administration releases its list of the top 10 most frequently cited safety and health violations each year, it serves as a reminder to stay vigilant. The 2016 report was compiled from nearly 32,000 inspections of workplaces by federal OSHA staff.

“Every year the OSHA Top 10 serves as a guide for employers to address the biggest safety risks facing their employees,” said National Safety Council President and CEO Deborah A.P. Hersman.

Despite the warning the list provides, year after year OSHA inspectors see thousands of the same on-the-job hazards that can result in a fatality or severe injury. More than 4,500 workers are killed on the job each year, and approximately 3 million more are injured. According to the Bureau of Labor Statistics, 4,836 fatal work injuries were recorded in the United States in 2015, which was an increase from the previous year.

INCREASING CITATIONS AND FINES

Not only have the number of OSHA citations increased, so have the fines that go along with them. Under a provision in the congressional budget deal signed in November 2015, OSHA fines will increase for the first time in a quarter century. The legislation requires federal agencies to adjust their civil penalties for inflation, and, as a result, the Department of Labor has adjusted penalties for its agencies, including OSHA.

OSHA's maximum penalties, which were last adjusted in 1990, will increase by 78% and the agency will continue to make adjustments each year based on the Consumer Price Index. States that operate their own occupational safety and health plans are required to adopt maximum penalty levels that are at least as effective as OSHA.

The new penalties took effect Aug. 2, 2016. Any citations issued by OSHA on or after that date will be subject to the new penalties if the related violations occurred after Nov. 2, 2015.

Type of Violation	Current Maximum Penalty	New Maximum Penalty
Serious Other-Than-Serious Posting Requirements	\$7,000 per violation	\$12,471 per violation
Failure to Abate	\$7,000 per day beyond the abatement date	\$12,471 per day beyond the abatement date
Willful or Repeated	\$70,000 per violation	\$124,709 per violation

OSHA last updated guidance for determining penalties in the 2015 edition of the agency's Field Operations Manual, a handbook detailing the inspection and citation process. Gravity of the violation, size of the company, good faith effort to comply and history of previous violations are the four

factors that go into calculating exact fines. Before any other calculations are made, the gravity of each individual violation is determined:

- **High gravity violations** carried the maximum amount for serious, repeat and willful violations
- **Moderate gravity violations** carried penalties between 57% and 86% of the allowable maximum
- **Low gravity violations** carried penalties of 43% to 57% of the allowable maximum

Gravity-based penalties can also be reduced by several factors such as the number of employees, whether prior inspections found the workplace to be in compliance with OSHA requirements and if the employer had a safety and health management system in place.

2016 TOP 10

Patrick Kapust, deputy director of OSHA's Directorate of Enforcement Programs, unveiled the top 10 most frequently cited standards during the

National Safety Council Congress & Expo in Anaheim, Calif., in October 2016. OSHA's 2016 fiscal year most violated workplace standards are listed below and on the next page.

This list is identical to the 2015 list with the exception of Machine Guarding and Electrical-Wiring Methods, which switched positions. Kapust offered an approach to properly use the OSHA Top 10 data.

“Take the list and look at your own workplace,” he said. “These are the things OSHA is finding. Would they find these at my workplace? It’s a good place to start.”

It doesn’t take more than a momentary lapse in focus or judgement for a safety violation to occur. Employers must remain vigilant and train employees on safety best practices, as well as find ways to remind them during their everyday workflow. For more information on safety in the precast concrete industry, visit NPCA’s safety webpage at precast.org/safety. **PI**

Evan Gurley is a technical services engineer with NPCA.

1	<p>FALL PROTECTION (1926.501) 6,929 citations</p>	<p>This standard outlines where fall protection is required, which systems are appropriate for given situations, the proper construction and installation of safety systems, and the proper supervision of employees to prevent falls. It is designed to protect employees on walking/working surfaces (horizontal or vertical) with an unprotected side or edge above 6 feet in construction activities and 4 feet in general industry.</p>
2	<p>HAZARD COMMUNICATION (1910.1200) 5,677 citations</p>	<p>This standard addresses chemical hazards – both those chemicals produced in the workplace and imported into the workplace. It also governs the communication of those hazards to workers. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.1200(e)(1) Implementation of hazcom program 2. 1910.1200(h)(1) Training 3. 1910.1200(g)(8) Requirement to maintain SDS 4. 1910.1200(g)(1) Requirement to develop SDS 5. 1910.122(h)(3)(iv) Explanation of label received on shipping containers. SDSs including the order of information and how employees obtain and use appropriate hazard information
3	<p>SCAFFOLDS (1926.451) 3,906 citations</p>	<p>This standard covers general safety requirements for scaffolding, which should be designed by a qualified person and constructed and loaded in accordance with that design. Employers are bound to protect construction workers from falls and falling objects while working on or near scaffolding at heights of 10 feet or higher.</p>
4	<p>RESPIRATORY PROTECTION (1910.134) 3,585 citations</p>	<p>This standard directs employers in establishing or maintaining a respiratory protection program. It lists requirements for program administration; work site-specific procedures; respirator selection; employee training; fit testing; medical evaluation; respirator use; and respirator cleaning, maintenance and repair. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.134(e)(1) Medical evaluation for respiratory protection 2. 1910.134(c)(1) Respiratory protection requirement 3. 1910.134(f)(2) Respirator fit testing 4. 1910.134(c)(2)(i) Employer must establish a respiratory program 5. 1910.134(d)(1)(iii) The employer shall identify and evaluate the respiratory hazard(s) in the workplace

<p>5</p>	<p>LOCKOUT/ TAGOUT (1910.147) 3,414 citations</p>	<p>This standard outlines minimum performance requirements for the control of hazardous energy during servicing and maintenance of machines and equipment. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.147(c)(4)(i) General procedures 2. 1910.147(c)(1) Energy control program 3. 1910.147(c)(6)(i) Employer shall conduct periodic inspection 4. 1910.147(c)(7)(i) Training 5. 1910.147(c)(7)(i)(A) Each authorized employee shall receive training in the recognition of applicable hazardous energy sources
<p>6</p>	<p>POWERED INDUSTRIAL TRUCKS (1910.178) 2,860 citations</p>	<p>This standard covers the design, maintenance and operation of powered industrial trucks, including forklifts and motorized hand trucks. It also covers operator training requirements. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.178(l)(1)(i) Safe operation 2. 1910.178(l)(4)(iii) Evaluation for operator's performance at least once every three years 3. 1910.178(l)(6) Certification 4. 1910.178(p)(1) Truck repair and maintenance 5. 1910.178(l)(1)(ii) Training shall consist of a combination of formal instruction, practical training and evaluation of operator's performance
<p>7</p>	<p>LADDERS (1926.1053 (C)) 2,639 citations</p>	<p>This standard covers general requirements for all ladders. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1926.1053(b)(1) Portable ladder access 2. 1926.1053(b)(4) Shall be used only for the purpose for which they were designed 3. 1926.1053(b)(13) The top or top step of a step ladder should not be used as a step 4. 1926.1053(b)(16) With structural defects 5. 1926.1053(b)(22) An employee shall not carry any object or load that could cause the employee to lose balance and fall
<p>8</p>	<p>MACHINE GUARDING (1910.212) 2,451 citations</p>	<p>This standard covers guarding of machinery to protect operators and other employees from hazards, including those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.212(a)(1) One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards 2. 1910.212(a)(3)(ii) Point of operation 3. 1910.212(b) Anchoring fixed machinery 4. 1910.212(a)(2) General requirements 5. 1910.212(a)(5) Exposure of blades. When the periphery of the blades of a fan is less than 7 feet above the floor or working level, the blades shall be guarded
<p>9</p>	<p>ELECTRICAL WIRING (1910.305) 1,940 citations</p>	<p>This standard covers the grounding of electrical equipment, wiring and insulation. It includes temporary wiring and splicing, such as flexible cords and cables. The top five cited sections are:</p> <ol style="list-style-type: none"> 1. 1910.305(g)(1)(iv)(A) Substitute for fixed wiring of a structure 2. 1910.305(b)(1)(ii) Opening shall be effectively closed 3. 1910.305(g)(2)(iii) Flexible cords and cables (strain relief) 4. 1910.305(b)(2)(i) Covers and canopies 5. 1910.305(b)(1)(i) Conductors entering cutout boxes, cabinets or fittings shall be protected from abrasion, and openings through which conductors enter shall be effectively closed

10

**ELECTRICAL,
GENERAL
REQUIREMENTS**
(1910.303)
1,704 citations

This section covers general safety requirements for designing electrical systems. The top five cited sections are:

1. 1910.303(b)(2) Installation and use
2. 1910.303(g)(2)(i) Guarding of live parts
3. 1910.303(g)(1)(ii) Working space requirements
4. 1910.303(g)(1) Space about electrical equipment
5. 1910.303(f)(2) Each service, feeder and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose

How to Avoid INCREASED OSHA FINES

With OSHA's impending penalty increase, companies must develop a safety culture, use available resources and be prepared to ensure compliance success.

DEVELOP A SAFETY CULTURE – Develop a culture of safety where employees are encouraged to speak up, without fear of retribution, about potential safety hazards and concerns. Designate an employee or employee committee to conduct regular safety checks and implement training programs so that everyone is on the same page.

USE RESOURCES – Stay on top of current regulations by using the resources available on NPCA's safety webpage and on other industry resources, such as OSHA and NIOSH.

PREPARE – Develop a plan early. Everyone from management to employees should be prepared when

the time comes for an inspection. Consider conducting a surprise OSHA inspection to help set the stage for the real thing. Employers should also:

- ✓ Ensure safety programs are comprehensive and up to date.
- ✓ Ensure employees receive all necessary safety training, can demonstrate that they understood the training and that all training is well-documented.
- ✓ Assess the workplace for hazards and address any identified hazards as quickly as possible.



For more information about OSHA violations, and how to keep your employees safe, visit

osha.gov.

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DIVERSIFYING

to Meet **Regional Needs**

By Bridget McCrea

Precasters survive regional market demands by diversifying product lines.

Coca-Cola acquired a dairy and juice company in 2016, effectively extending the beverage giant's footprint in Africa and its product portfolio as a whole. That same year, General Motors decided to compete with Tesla in a race to introduce the first mass-produced electric vehicle with a range above 200 miles. And food manufacturer Nestle announced that – to address changing consumer preferences – it would add products that don't contain bioengineered ingredients to its U.S. food and beverage portfolio.

What do all of these companies have in common? They're doing what they can to meet the needs of their existing and target customer bases – a

strategy known as diversification. It's a strategy all manufacturers can benefit from, precasters included.

YOU DON'T BUY A GUCCI BAG AT WALMART

Diversification may be achieved in multiple ways. Adding new product lines is the obvious path. In some cases, the process involves product improvement while in others the company develops new marketing activities to promote goods.

At Garden State Precast in Wall Township, N.J., Engineering Manager Paul Heidt said he thinks about product diversification at least two to three times a week. In many cases, those efforts are



driven by the regional needs of the product owners, contractors, architects or engineers that the precaster works with.

“Oftentimes I’ll create project sketches that help customers figure out a different approach or save them money or time,” said Heidt, who recently helped city officials design a precast wall for a failing outdoor swimming pool.

“They asked us for a solution where they can, in just a month, completely put in a new swimming pool wall,” Heidt said. “This is a classic example of a working partnership focused on solving a real need.”

To solve the problem, Garden State Precast plans to manufacture the 200-foot-long wall in separate segments, assemble it on site, put the pool back together, and have it refilled and ready to use within the city’s 30-day time frame.

“Our portion will be installed in two days,” Heidt said.

Garden State Precast has also launched new product lines in response to “continued complaints from land management companies and engineers,” regarding cast-in-place projects that weren’t completed satisfactorily in the field.

“We also sell our expertise, and we open product lines based upon what we’re good at,” Heidt said.

For example, the company started making and has since sold roughly 14,000 linear feet of a drain system that’s rated for use in heavy-duty traffic.

“That product is now being used in loading docks, on sides of roads and in entranceways,” Heidt said.

“That’s just one example of how we respond to what people are asking us for.”

As he surveys the construction industry, Heidt said he couldn’t imagine not taking the time to meet the regional and/or specific needs and requirements of the company’s customers – even in cases where Garden State Precast isn’t currently manufacturing the product or product line in question.

“We have 17 competitors, and if all of us are making the same thing, is anyone making money at it?” Heidt said. “Probably not. If you want to be the supermarket where everyone just comes in and buys the cheapest thing, then that’s fine, but you don’t buy a Gucci bag at Walmart.”

BEAUTY IS IN THE EYE OF THE BEHOLDER

Recently, Rick Day has been working with more architects, general contractors and masons who, instead of following normal ASTM specifications regarding product strength and dimensions, are putting a bigger emphasis on appearances, finishes and amenities. This trend has pushed Day, president of Advantage Precast, in Keizer, Ore., to think harder about what his firm’s final products look like in addition to how they perform over time.

“Historically, we worked primarily with underground contractors and civil engineers, but that’s changed in recent years,” Day said. “We’re now talking a lot more about appearance and the ‘beauty is in the eye of the beholder’

Advantage Precast manufactured 70 pieces in multiple shapes to create city logos that were placed in precast sidewalk panels.



Photo courtesy of Garden State Precast

issues like sandblasting, colors and terrazzo finishes.”

For a city in Oregon, for example, the precaster just finished manufacturing a city logo in a terrazzo-type finish. Previously, the company manufactured planters for two other cities, both of which wanted custom aggregates and sandblasted, colored finishes.

“We cut our teeth on that project about five years ago in regards to architectural-type products,” Day said.

In another example of Advantage Precast’s ability to modify its existing products to meet a regional customer’s need, the company recently built an above-ground bird sanctuary that now serves as a tower for bird habitats.

“Audubon is putting 70 of these structures up and down the West Coast now,” Day said. “That’s just one example of a brand new concept spun out of an existing product.”

Garden State Precast’s new drain system solution is being used in multiple applications.

IF YOU’RE NOT GROWING, YOU’RE DYING

Situated in Los Angeles, Armen Alajian knows a thing or two about adapting to his customers’ needs and keeping his company’s products fresh and relevant. Hit hard by the most recent recession, he said ARTO Brick and California Pavers in Gardena, Calif., made the decision to take its existing product mix out to a more diverse, national audience.

“We knew that if we weren’t growing, we were dying, so we made a conscious decision to stay alive by adapting to the market’s wants and needs,” Alajian said.

As part of that commitment, ARTO also expanded geographically.

“We took a product line that was popular in L.A., Texas, and Arizona and threw it against the wall for the entire country and then started to grow by pure muscle, and by being new and available in those national markets,” Alajian said.

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As a result, ARTO Brick went from having just 90 dealers in three states to having 500 nationwide. The precaster also honed its go-to-market strategy by making products that appeal to women. While some basic staples don't change much from year to year, Alajian said the precaster regularly adjusts its decorative products to meet the changing preferences of its female customers. This isn't always an easy task for a firm that serves a national audience.

"What's popular in L.A. isn't always popular in the Midwest," Alajian pointed out.

For example, while Arabesque shapes are still in style in the latter, they are starting to fall out of favor in areas of California. Colors also matter, Alajian said. The phrase "gray is the new white," has now turned into "black is the new white." To adapt, he said ARTO regularly evolves its product offerings.

"It comes in cycles, with most of the design elements being based on trends of the local market," Alajian said. "As precasters, we all need to offer the basics, but we also have to realize that there is a community that needs to produce a certain product, make an item that meets a certain code or that otherwise adapts to the needs of its regional buyers."

"As precasters, we all need to offer the basics, but we also have to realize that there is a community that needs to produce a certain product, make an item that meets a certain code or that otherwise adapts to the needs of its regional buyers."

– Armen Alajian, ARTO Brick

YOU DON'T GET THERE OVERNIGHT

In business since 1906, Wilbert Precast of Spokane, Wash., has taken a slow-but-steady approach to product diversification.

"We're probably one of the best examples of how a mom-and-pop precast manufacturer goes from solely making septic tanks to producing a wide variety of products for a broad range of customers," said Dan Houk, CEO. "But you don't get there overnight."

You do get there by taking steady steps, reinvesting in your company and not being afraid to take a little risk along the way, Houk added.

Wilbert Precast has taken bold steps to ensure that it's always meeting and exceeding customer expectations for new and innovative products. In 1997, for example, a sales rep who had extensive expertise in cast iron manhole sales approached Houk, asking him if Wilbert Precast would be interested in adding that product to its lineup.

"We weren't making manholes at the time," Houk said. "He said, 'If you want to develop a new product line, I'm your guy.'"

Wilbert Precast hired the sales pro and the rest, as they say, is history.

"We bought manhole forming equipment and all of the latest and greatest machinery at the time and then used it – and the expertise of our new sales rep – to start a brand new product line,"

Houk said.

The precaster took a similar jump when it built a new plant in 2003 and started producing Redi-Rock retaining walls. In this case, the product was introduced to support

Wilbert Precast's light pole bases loaded and strapped for delivery.



Photo courtesy of ARTO Brick

ARTO Brick updates its decorative products regularly to meet changing preferences.

the new plant. Today, Wilbert Precast is one of the largest Redi-Rock manufacturers in the country.

To precasters that may be reluctant to just jump in and start a new product line, introduce a new product or build a new plant, Houk said his best advice is to do your homework first.

"Know what the market is able to absorb, and/or if something about the current provider is lacking," Houk said. "Then, be bold and fearless. For us, it's just been a long trudge of being consistent with what we do and doing it at a very high level." **PI**

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

RESOURCE:

1 businessdictionary.com/definition/product-diversification.html



Photo courtesy of Wilbert Precast



FOR THE LOVE OF THE INDUSTRY

By Kirk Stelsel, CAE

DAVID AND DAN ZARRAONANDIA, OWNERS OF **PRE-CON PRODUCTS**, CHOOSE TO FOCUS ON ENJOYING THEIR WORK AND HAVE REAPED THE REWARDS AS A RESULT.





Pre-con uses mobile gantry cranes to move its increasingly large products around the yard.

Do you ever think about the importance of enjoying what you do for a living? If your career spanned 45 years and consisted of eight hour days every weekday, it would add up to roughly 93,600 hours on the job. Looking at it that way adds perspective on the role our careers play in our lives.

This outlook is a driving factor in the business decisions David and Dan Zarraonandia, owners of Pre-con Products headquartered in Simi Valley, Calif., have made while running their family business. It's incredibly important to them that working at Pre-con be enjoyable, challenging and rewarding for both themselves and their employees.

RECENT REINVESTMENT

Walking around Pre-con's property, it doesn't take long to realize the Zarraonandias have a lot of irons in the fire and are constantly adding more. Directly behind the office is the dry-cast pipe plant they erected in the late '80s and the manhole production

area. While these are standard precast products, nothing is basic at Pre-con. The company works with more than 20 cities in the Los Angeles area alone, and each has its own specifications. Understanding the idiosyncrasies of each agency has become a specialty of Pre-con, keeping its products in high demand.

Inside the pipe plant, you get a taste of the many upgrades the Zarraonandias have made in the past three years. A relatively new 3-yard pan mixer feeds an automated control system they updated for the first time since the plant was built.

"Last year, we upgraded our control panel to the new Besser control system," Dan said. "This was the final step in a long line of improvements we've made to RCP production as we transition to rubber gasket pipe."

Just outside the pipe plant, an employee fabricates pipe reinforcement on a cage welding machine they added last year. Next to him, an employee is busy coring manholes on yet another newer piece of equipment.

“LAST YEAR, WE **UPGRADED** OUR CONTROL PANEL TO THE NEW **BESSER** CONTROL SYSTEM. THIS WAS THE **FINAL STEP** IN A LONG LINE OF **IMPROVEMENTS** WE’VE MADE TO RCP PRODUCTION AS WE **TRANSITION** TO RUBBER GASKET PIPE.”

– DAN ZARRAONANDIA



Photo courtesy of Precon Products



Photo courtesy of Precon Products

Beyond that, workers are manufacturing the company’s many different wet-cast vaults, pump stations and specialty products, including box culverts, precast paving slabs, stormwater filtration products and three-sided bridge structures. Pre-con manufactures pump stations as large as 12 feet in diameter monolithically and 18 feet as a segmented product. It has poured vaults as large as 11 feet by 26 feet. To lift the heavier pieces, the Zarraonandias invested in a 30-ton mobile gantry crane years ago and recently added a 50-ton model. To track all of this inventory, they also started using a bar code system in 2016.

These investments allow the company’s employees to work more efficiently and to work on challenging new projects.

The last stop on the property is a seven-acre parcel David and Dan recently purchased to add to their original

10 acres. They have big plans for the new property.

“Eventually, we’re going to collect 100% of our water from the facility using a large infiltration basin here with our new stormwater detention system,” David said. “We’ll be managing about two million gallons of water but we won’t have a discharge. The goal is 100% water capture and 100% infiltration or harvesting.”

READING THE MARKET

The Zarraonandias have been busy adding land and equipment, as well as a second plant in Suisun City, Calif., but they have also been working on new product lines to meet the evolving needs of the marketplace. Some are one-off or have a limited market, but others will play a major role in the long-term success of the company.

For the past few years, the major focus has been on bringing its stormwater detention system called Storm

A new cage welding machine from MBK is one of the many upgrades Pre-con has made in recent years.



Photo courtesy of Pre-con Products

**“WE’VE BEEN DOING
THIS FOR A LONG
TIME SO WE’RE
LOOKING FOR
SOMETHING THAT’S
GOING TO BE BOTH
ENTERTAINING AND
CHALLENGING.”**

– DAVID ZARRAONANDIA

Prism or SP360 to the market. They foresee exponential growth potential in the stormwater detention market and recognize that one job can require hundreds or even thousands of pieces.

“We designed the product and then we hired Delta to do the engineering and Marks Metal helped to refine the mold,” David said. “The goal was to make a really simple mold and have one mold that can be used for every piece. I don’t think we can say enough good things about the guys from Marks Metal and they’re just as excited about working on new and interesting projects.”

The low impact development or LID system is patent pending and has a variety of configurations, including heights from three to eight feet in a single setup. Stacked, the system can reach 16 feet. The floor can be closed or open, depending on whether the goal is detention or infiltration. Other configurations include baffles, desilting sections, oil barriers and individual cell isolation.

The Zarraonandias’ first underground installation was a test run at their plant following a successful 120,000-pound load test and engineering approval from Delta. Next is an installation at a local university and then they’d like to look at opportunities around the country.

“We have high hopes for this,” Dan said. “We’re going to be looking for precast partners around the country similar in size, culture and technical ability to join with us in taking this nationwide.”

SAN NICOLAS ISLAND

Many of Pre-con’s most innovative products have come as a result of its work with the military, particularly for the United States Navy on San Nicolas Island. The Navy uses the island for weapons testing and logistic support for the missile test range. Over the past several years, Pre-con has constructed missile launch pads, water tanks, water lines, buildings, paving and foundations.

The Zarraonandias see great potential in their new stormwater detention product.

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Windmill bases are just one of the unique products Pre-con has manufactured for the U.S. Navy.



“IF YOU FOCUS ON QUALITY AND DOING GOOD FOR YOUR CUSTOMERS AND YOUR EMPLOYEES, GOOD THINGS WILL HAPPEN OVER TIME.”

– DAN ZARRAONANDIA

“Precast concrete has been the key to our success on San Nicolas Island,” David said.

Due to its remote location 61 miles from the coast, it’s a challenging place to work. Contractors must barge all materials at a hefty price tag and it’s difficult to account for potential challenges, let alone deal with them. Yet Pre-con found a niche working in these conditions and has proven to be a valuable partner for the Navy. The jobs helped carry the company through the recent recession and will continue to play a big role going forward.

One product Pre-con has manufactured for the Navy is the Hexa-Block foundation system it conceptualized for United States Marine Corps communication towers. As it turns out, Hexa-Block lent itself to use on the island as well. The blocks are cast with conduits for threaded reinforcement that is post-tensioned to create a monolithic footing structure. The threading allows the owner to disassemble the system and relocate it in the future. For this project, each of the seven hexagonal sections weighed in excess of 40,000 pounds – for a total weight of more than a



Photo courtesy of Precast/Prestressed Concrete Institute

quarter million pounds.

“The Hexa-Block product was developed as a modular foundation system for 200-foot-tall lattice towers in the remote deserts of Arizona.” David said. “For this project, we told the Navy, we can take that same concept, make the blocks bigger, put all the close tolerance bolts into the center Hexa-Block and the adjacent post-tensioned perimeter blocks are additional counterweight.”

Pre-con has also manufactured unique precast windmill tower bases for the island. The bases are 16-foot, tube-type



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footings with 100 post-tensioned bolts passing through two pieces of concrete. The tower sits on top and everything is bolted together. David and Dan continue to look for anything new or different – especially projects that are normally poured in the field – for both the challenge and the higher profit margin. Some may develop into long-term products, others will just be one-off projects.

“We’ve been doing this for a long time so we’re looking for something that’s going to be both entertaining and challenging,” David said. “I’ve been doing this for about 38 years and I’m just as excited every day to come into work, but a lot of it’s because I’m trying to create a new, challenging thing to work on. If we can make a profit and have fun doing it, that’s great.”

“WHAT WE GOT FROM OUR FATHER IS HOW TO DEAL WITH PEOPLE. THAT’S TOUGH – YOU CAN’T GET THAT EDUCATION FROM GOING TO SCHOOL.”

– DAVID ZARRAONANDIA

PAYING IT FORWARD

Speaking with employees like Ruben Garcia, an 18-year veteran of Pre-con who was critical in getting the company into products beyond pipe and manholes, it’s clear the ideal of making the work fun and caring for each other is pervasive. The respect everyone holds for the industry, the company, each other and the customers comes from the top down and was passed along to David and Dan by their father, Don, who started the company in 1963.

“As I think back about our father, he had a real affinity and respect towards the underground contractor, his customers he worked with,” David said. “What we got from our father is how to deal with people. That’s tough – you can’t get that education from going to school and Danny got the same thing.

“We watched our father and how he dealt with employees and customers, and how he solved problems and challenges.”

This mindset pervades many of the business decisions the brothers make. They recognize making a profit is the difference between providing a living for themselves and their employees and closing the doors, but it’s not the only factor.

“We like what we’re doing, we’re respected in the industry, people like us and we make great products,” David said. “There is way more to this



Photo courtesy of Marks Metal



Photo courtesy of Pre-con Products

Above: Marks Metal manufactured a custom form for Pre-con's new stormwater detention product.

Left: James Baker is a 27-year employee of Pre-con and oversees the recently upgraded pipe plant.



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"I'VE BEEN DOING THIS FOR ABOUT 38 YEARS AND I'M JUST AS EXCITED EVERY DAY TO COME INTO WORK, BUT A LOT OF IT'S BECAUSE I'M TRYING TO CREATE A NEW, CHALLENGING THING TO WORK ON."

– DAVID ZARRAONANDIA

game than just the profit. We could have made choices all along the line that would have been more profitable but it wouldn't be the same type of business, it wouldn't be the same interaction and we wouldn't feel the same about going into work."

This attitude extends to their interactions with fellow precasters. Dan is the former chairman of the California Precast Concrete Association and sees a strong precast industry as a benefit to all producers. This mindset is, again, passed down from their father.

"Growing up, we had two or three competitors when we were just making manholes and I never remember my father saying one negative thing about any of those guys," David said. "He was always friendly with them and we've always gotten along with our competitors."

"You're better off having good companies in the industry that are doing well to protect the industry because that makes the industry better," Dan added, repeating something his father once told him.

TIME WELL SPENT

The musical "Rent" is famous for quantifying a year as 525,600 minutes. That's the allotment. Nothing changes the rate at which those minutes are spent and there's no way to save them. The Zarraonandia brothers have chosen to try to make the most of their minutes for themselves, their employees and their customers by doing quality work and enjoying the process.

"If you focus on quality and doing good for your customers and your employees, good things will happen over time," Dan said. "You have to love it just for the industry you're in and the people you're around."

Love for the industry, their company, their products and their people – that is the legacy the Zarraonandias choose to leave. **PI**

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



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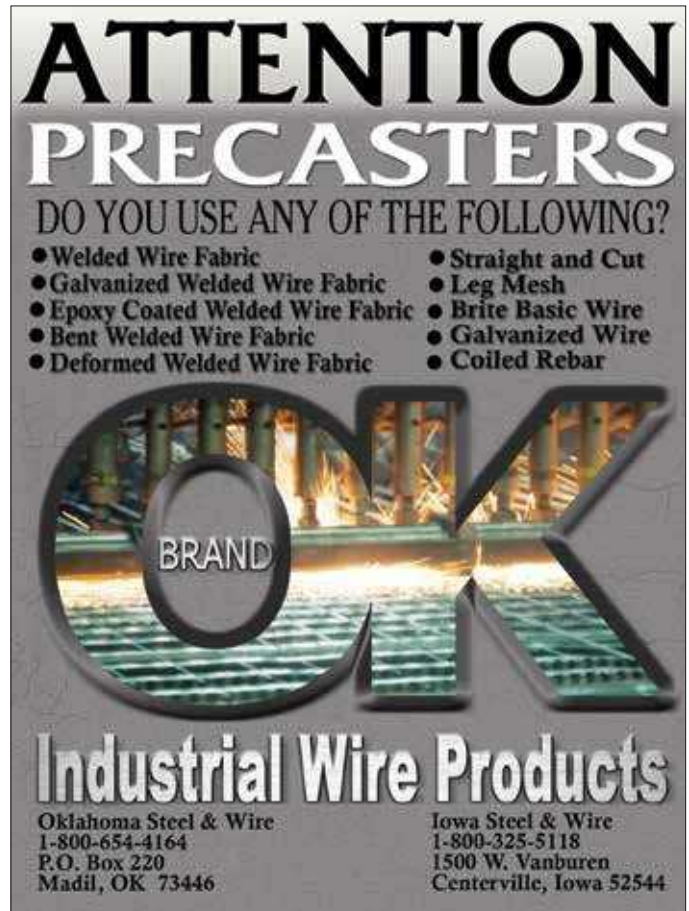
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A bioretention system mitigates surface runoff at Levi's Stadium in Santa Clara, Calif.

© Wellscor/templets | DyanHartne.com

Green Infrastructure Looks Great in GRAY

By Claude Goguen, PE., LEED AP

When we construct roads and buildings, it disrupts a sensitive ecosystem. Not only are we displacing fauna and flora, we are disrupting the hydrologic cycle. Stormwater surface runoff increases with every added roof and concrete or asphalt surface. Less stormwater is absorbed into the soil and more is conveyed to collection systems.

When sewers were first built, they could handle the amount of stormwater runoff. However, as development expands, systems are now pushed beyond their capacity. One of the main consequences of this is combined sewer overflows that convey both wastewater and stormwater. Under normal conditions, the combined system transports the water it collects to a sewage treatment plant before discharging it to a water body. During heavy rains or snow melt, the volume of stormwater and wastewater can sometimes exceed the system's capacity. When this occurs, untreated stormwater and wastewater discharges directly into nearby streams, rivers and other water bodies. It's hard to imagine raw sewage flowing directly into our rivers

and lakes, but according to the United States Environmental Protection Agency, this causes major pollution concerns for nearly 800 cities.

As a result, cities are mandated to address these CSOs as quickly as possible. There are many strategies to address CSO management that may involve precast concrete structures. One strategy that is gaining popularity in urban areas is to employ green infrastructure to mimic nature by storing and soaking up stormwater runoff near the source. Precast concrete is well-suited for this green infrastructure.

HOPPING ON THE GREEN INFRASTRUCTURE TRAIN

The U.S. EPA defines green stormwater infrastructure as "a cost-effective, resilient approach to managing wet weather impacts that provides many community benefits. While single-purpose gray stormwater infrastructure – conventional piped drainage and water treatment systems – is designed to move urban stormwater away from the built environment, green infrastructure reduces and treats stormwater at its source while

delivering environmental, social and economic benefits.”

This green infrastructure trend hasn't simply caught on. It's growing by leaps and bounds and presents a potential product line for precast concrete producers. Commonly used terms for green stormwater infrastructure systems include rain gardens, and bioretention or bioinfiltration cells. These are shallow, vegetated basins that collect and absorb runoff from rooftops, sidewalks and streets. Planter boxes or filtration planters can often be used to function as rain gardens. There are also bioswales, which are vegetated or mulched channels that provide treatment and retention as they move stormwater from one place to another. Vegetated swales slow, infiltrate and filter stormwater flows. As linear features, they are well-suited for placement along streets and parking lots.

How soil absorbs the water will dictate the planter's size and type. Some are bottomless, allowing water to filter through. Others have a bottom that treats and retains runoff water before discharging it into the sewer system.

According to the City of Portland, Ore., special attention should be paid to the structural waterproofing if the planter is constructed adjacent to building structures. Infiltration planter areas should be clearly marked before site work begins to avoid soil compaction and sedimentation to preserve infiltration capacity during construction. No vehicular or foot traffic, except that specifically used to construct the facility, should be allowed within 10 feet of infiltration planter areas.

GREEN STORMWATER INFRASTRUCTURE SUCCESS STORIES

Ranson revitalized

The U.S. Department of Transportation awarded Ranson, W.Va., federal funding as part of its “Green Corridor Revitalization” project to improve a 1.5-mile stretch of Fairfax Boulevard, a two-lane road providing residential access and parking. In addition to adding trees, sidewalks, a center landscaped median and new street furniture, the project scope implemented cost-effective and sustainable stormwater management techniques. This was an important feature since the community is located in the Chesapeake Bay watershed.

The stormwater management initiative included installing bottomless precast concrete filtration planters along the western edge of the southbound lane along Fairfax Boulevard. Each planter, manufactured by Midwest Block & Brick in Bridgeton, Mo., has a geo-membrane liner to prevent concentrated infiltration points at the installation site. Perforated underdrains and an overflow inlet also help to accommodate large stormwater events.

The precast concrete planters consist of a segmental planter wall and curbing system. The modular system allows the filtration planters to expand and contract in size and shape based on block-by-block conditions and stormwater capture needs.

The precast concrete system can be built in a day versus a week with cast-in-place concrete. In addition, the modular system can be



removed and reused. It can also be reconfigured to accommodate changes to size and shape – based on localized needs – and repaired if accidental damage occurs.

Levi's Stadium stormwater solution

The bioretention project at Levi's Stadium in Santa Clara, Calif., home to the San Francisco 49ers, provides an excellent example of a simple runoff mitigation system that uses the power of nature to achieve its purpose. Ghilotti Construction and second-phase contractor Turner-Devcon built a bioretention project to handle runoff for more than five acres of concrete.

A large construction project such as a major league sports stadium can include significant expanses of runoff-generating hardscape. A solution to drain the area and treat the runoff was the project's goal. To meet the needs, designers selected a low-impact development solution that was also aesthetically pleasing. The modular bioretention system collects runoff and treats it using natural biofiltration, and includes attractive landscaping elements and customizability.

PRECAST CONCRETE IS THE IDEAL SOLUTION

Landscape architects, urban planners and designers are devising innovative ways to manage stormwater runoff while adding beautiful elements to the area. With ease of installation, durability and versatility, precast concrete is the ideal material for these green infrastructure elements. **PI**

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

Midwest Block & Brick produced segmental precast planters installed along Fairfax Boulevard in Ranson, W.Va.

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Precast Lighthouse

Provides Stunning Great Lakes View

By Mark Crawford



Greg Druzvik always dreamed of owning a grand home on a cliff overlooking the ocean. When it looked like that scenario wasn't in the cards, he did the next best thing – he built his dream home on a cliff overlooking Lake Erie. The most unique and striking feature of his new residence is a precast concrete lighthouse. Standing more than 40 feet tall and attached to the house, it provides a sweeping, ocean-like view of the shoreline near Sheridan, N.Y.

AN UNUSUAL HOME FEATURE

A retired ironworker and jack-of-all-trades who never backs away from a good construction challenge, Druzvik first tried to build the lighthouse himself. He poured 12 feet of the base with a slip form, but the job was just too difficult to finish. Inspired by an 8-foot-diameter precast concrete manhole he had seen on a job site, Druzvik wondered if some of those manholes, stacked vertically, could be the tower for the structure. He visited Kistner Concrete Products in Lockport, N.Y., to see if the company could provide him with four 10-foot-diameter manholes – conveniently the diameter of his tower. If so, he planned to stack them on top of each other and fasten them together to create a 32-foot tower.

“He came in with plans drawn up, which he wanted me to look at,” said Michael J. Kistner, vice president of Kistner Concrete Products. “He needed 10-foot-diameter manholes with multiple weld points. It looked good on paper, but I ran it by our engineer to make sure it was wind resistant.

“Once we got the go-ahead on that, we told Greg we could do the project.”

Clarence J. Conrad, sales engineer and project manager for Kistner Concrete Products, added that Druzvik presented them with a well-thought-out plan.

“It was his idea to create the tower by stacking four manholes end on end – a creative, but also very simple, solution for what he was trying to accomplish,” he said.

THE PRECAST SOLUTION

Kistner Concrete Products manufactured 8-foot-high, 18-ton manhole sections to create the 32-foot vertical structure. The manholes were designed to provide enough weld points to resist the strong winds that can blow along Lake Erie.

“Even at a weight of 18 tons per section, if not properly secured they could be easily toppled by strong winds,” Conrad said.

The precast concrete manholes were manufactured with standard manhole molds. The units were custom manufactured with sets of matching weld plates at the tops and bottoms of all sections to allow for the welding of straps to provide structural continuity.

“Partial openings in the manholes were also provided to help with handling,” Kistner said.



Photo courtesy of Greg Druzvik

Druzvik had a crane ready to float and set the four manhole units when they arrived. He also field-cut a door opening at the base of the bottom unit to serve as the entrance to an interior spiral staircase that would climb to the top of the lighthouse. The owner then built a 15-foot-tall turret section and used a crane to place it on top of the tower.

HOME SWEET HOME

Since construction, Druzvik has built a widow's walk around the top of the tower. The lighthouse is still a work in progress that will keep him busy for months to come. Other planned features are iron stairs and railings, a door to the widow's walk, mahogany and cherry wood walls and trim, a vaulted, conical roof and the spiral staircase. Druzvik also applied the first 10 feet of stone veneer on the outside of the tower. When finished, the lighthouse will be the perfect spot to catch a sunrise or sunset over the lake.

What impresses Kistner the most about the project is the creative, out-of-the-ordinary application of a standard precast concrete product.

“It was his [Druzvik’s] idea to create the tower by stacking four manholes end on end – a creative, but also very simple, solution for what he was trying to accomplish.”

– Clarence J. Conrad, *Kistner Concrete*

“People don’t realize what they can do with standard components, with some creative thinking,” Kistner noted. “We made an impressive, unique structure with precast components, which would have been much more difficult and labor-intensive to cast in place. Very few modifications were required to adapt the precast manholes for this project.

“And, it saved the owner considerable time and money.”

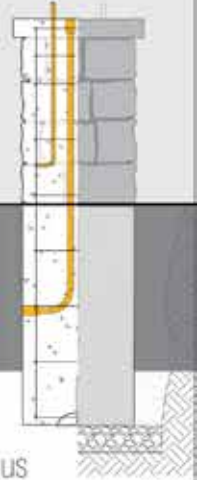
For many people, their dream home’s defining feature is a pond, a tennis court or a swimming pool. For Greg Druzvik, it was a lighthouse.

“It just goes to show that, when we put our heads together, we can work with customers to come up with an innovative solution, using standard products, that turn their dreams into reality,” Kistner said. **PI**

Mark Crawford is a Madison, Wis.-based freelance writer who specializes in science, technology and manufacturing.

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Unexpected OPPORTUNITIES

Concrete canoe competition provides **transformative** experience for a mechanical engineering student.

By Mason Nichols



DeFuria (front of canoe, far left) competed at the 2016 Ohio Valley Student Conference with YSU's concrete canoe team.

College is a time of excitement and anticipation for many students, and the knowledge acquired, lessons learned and friends gained are invaluable. But sometimes, it's the unexpected experiences along the way that have the most impact.

For Miranda DeFuria, a mechanical engineering student at Youngstown State University in Youngstown, Ohio, that unexpected experience has been participating on the school's

concrete canoe team. As a freshman, DeFuria was unsure whether she wanted to major in civil or mechanical engineering, so she attended an American Society of Civil Engineers meeting early in her first year to help make a decision.

"When I went to the meeting, the current president took me down to the basement, where the 2013 canoe was stored," she said. "As soon as I saw it, I was like, 'This is really cool! I have to get involved.'"

DeFuria was immediately intrigued by the discovery that concrete could float. Despite her excitement, she didn't join the team right away, believing that her limited experience wouldn't offer much to the group. After a few months, she worked up the confidence to change her mind and she became team captain one year later.

DeFuria learned that being on the concrete canoe team involved plenty of responsibility. Between canoe conception and race day, the team must develop a hull design, craft and refine a mix design, place concrete and reinforcement, and come up with an aesthetic approach for the vessel. Then, the team prepares for competition by practicing for the race with canoes from previous years. The teams also complete a design paper, oral presentation and display booth that ties in with their theme.

"It involves a lot of work, but it's definitely a good application of what you learn in class," DeFuria said. "It's a lot of fun, too."

Participating on the team has also allowed her to better understand the properties of concrete. As a result, she's learned more about the basics of the building material, including how to perfect a mix design for optimum performance and appearance on race day. This year, the team will use a combination of gray portland cement, expansive cement, silica fume and fly ash for their entry.

"As soon as I saw it, I was like, 'This is really cool! I have to get involved.'"

– Miranda DeFuria

For a chance to compete in the ASCE Concrete Canoe National Competition later this year, the YSU team will have to qualify by placing first in their regional event. The team can also head to nationals by placing second, but for that to happen, the path becomes a bit more complex. Last year, regional competitor Western Kentucky University placed among the top five teams at the national competition. If WKU earns first place in this year's regional competition, then the

team earning second place would also qualify for the national event.

Regardless of the results of her final competition, DeFuria said she has benefitted from her unexpected experience as both a contributing member and eventual captain of YSU's concrete canoe team.

"I've definitely learned more leadership skills, because I didn't really have a big leadership position before," she said. "I've also learned to be more confident. Personally, this has been one of the most rewarding projects I've been involved in during my college career.

"I hope any type of engineering student gets involved." **PI**

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



Photo provided by Miranda DeFuria

Youngstown State University's canoe entry, "Fortis" at the 2016 Ohio Valley Student Conference.

Start Planning!

The NPCA Foundation seeks to increase awareness of the precast concrete industry among students enrolled in architecture, engineering and construction-related programs.

For the second straight year, NPCAF will serve as a sponsor of the American Society of Civil Engineers Concrete Canoe National Competition. The event, which features teams from schools across the U.S. and Canada, will take place this year at the Colorado School of Mines in Golden, Colo.

This year, NPCAF awarded 13 concrete canoe scholarships to:

- University of Evansville, *Evansville, Ind.*
- Fairmont State University, *Fairmont, W. Va.*
- Florida A&M University-Florida State University College of Engineering, *Tallahassee, Fla.*
- Indiana University-Purdue University Fort Wayne, *Ft. Wayne, Ind.*
- Milwaukee School of Engineering, *Milwaukee, Wis.*
- North Carolina State, *Raleigh, N.C.*
- University of Notre Dame, *Notre Dame, Ind.*
- Oregon State University, *Corvallis, Ore.*
- University of California San Diego, *La Jolla, Calif.*
- South Dakota School of Mines and Technology, *Rapid City, S.D.*
- University of Texas at Tyler, *Tyler, Texas*
- Washington State University, *Pullman, Wash.*
- Youngstown State University, *Youngstown, Ohio*

The scholarship funds will help offset costs associated with the team's canoe construction and related travel expenses.

NPCAF Scholarship Applications Due March 30

The deadline to receive NPCA Foundation undergraduate and graduate scholarship applications is March 30, 2017. Starting this year, undergraduate students are required to complete a minimum of 320 hours each academic year as an intern at an NPCA member company to receive payments for years two, three and four. Please share this scholarship information with your employees, family, friends and industry network. Applications are available at precast.org/scholarships.

NPCA Staff Updates

NPCA Staff Report

KIRK STELSEL EARNS CERTIFIED ASSOCIATION EXECUTIVE CREDENTIAL



Kirk Stelsel

The American Society of Association Executives has announced that Kirk Stelsel, director of communication and marketing at NPCA, has earned the designation of Certified Association Executive. The designation is the highest professional credential in the association industry. Candidates must complete a minimum of 100 hours of specialized professional development, possess five

years of qualifying nonprofit experience and pass a rigorous comprehensive exam covering association management. About 20% of ASAE members achieve the CAE designation.

“This professional designation is quite noteworthy and requires intense focus and hard work,” said Ty Gable, NPCA president and a longtime CAE. “We are extremely proud to have Kirk here contributing the expertise that comes with the industry’s designation.”

For the latest NPCA news, visit precast.org.

NPCA WELCOMES NEW STAFF MEMBERS: PAM FINNIGAN AND MELISSA SHETTERLY

Pam Finnigan started at NPCA in August 2016 as the finance department assistant. She provides administrative support to the finance department with respect to invoicing and payment processing. She also manages the NPCA Shop and supports the administrative functions of the office. Finnigan earned her bachelor’s degree from Denison University. Before coming to NPCA, she worked as an administrative assistant at Washington University School of Law in St. Louis, Mo.



Pam Finnigan

In October 2016, Melissa Shetterly started as NPCA’s new administrative assistant. She provides general office support and manages membership renewals and dues balance reports. Shetterly earned a bachelor’s degree in English at Principia College and a Master of Arts at Wayne State University. Before coming to NPCA, she worked as an executive assistant for a dermatologist’s office in Rochester, Mich. **PI**



Melissa Shetterly



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, 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!**

2017 NPCA WEBINAR Schedule

DATE	TOPIC	INSTRUCTOR	PRICE
March 16	OSHA's Final Rule on Crystalline Silica: What You Need to Know	Bradford T. Hammock, Attorney at Law	\$89 Per Location
April 13	Tips for Vacuum Testing Septic Tanks	Claude Goguen, P.E., LEED AP	\$89 Per Location
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.

* 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.

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?

JANUARY/FEBRUARY CHALLENGE QUESTION:

A form for a round manhole flat slab top is 6 feet in diameter, 12 inches thick and contains a 30-inch diameter round blockout. A total of 90 feet of conventional #6 reinforcing steel was used to make the rebar mat inside of the form. If the total amount of concrete used to fill the form was 3,414.84 pounds, what is the concrete's unit weight?

ANSWER: 147.896 lb/ft³

WINNER: Brandon Malott, QC manager, Coreslab Structures (LA) Inc.

6 STEPS TO GET STARTED ON Crane Certification

1 MARK YOUR CALENDAR

The requirement goes into effect Nov. 10, 2017.

2 STAY INFORMED

Check precast.org often to get the latest information on the new OSHA mobile crane operator certification requirement.

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

- CIC (craneinstitute.com)
- NCCCO (nccco.org)
- NCCER (nccer.org)

4 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

5 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.

6 DON'T WAIT

Instructors and exam proctors' scheduled 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. ❏



To help your mobile crane operators prepare for the crane certification exams or to register for NPCA-hosted crane training and testing, visit precast.org/cranes.



Madrid, Spain, Hosts BIBM Congress 2017

The international precast concrete industry will meet in Madrid, Spain, during the 22nd BIBM Congress, May 17-19, 2017. BIBM Congress 2017 is organized in collaboration with IPHA, the International Prestressed Hollowcore Association.

Precast concrete producers and suppliers will meet with industry professionals, politicians and academics from all over the world to discuss current challenges, new concepts and future visions. Thirty-five speakers from 15 different countries will present on topics such as sustainable production, sustainable markets and market development for the precast industry. In addition, a trade exhibition with more than 80 exhibitors will be available to provide planning, design, production and installation solutions for modern precast concrete structures.

Registration for attendees and exhibitors can be completed online at bimbcongress.eu.

BIBM Congress 2017

bibm Congress 2017

17th - 19th May 2017
 Madrid Marriott Auditorium
 Hotel & Conference Center
 Madrid, Spain / España

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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.



NPCA PRODUCER HOSTS BUILDING TRADES STUDENTS

Kistner Concrete Products in Lockport, N.Y., hosted building trades students from Orleans/Niagara BOCES. Senior students from both the Orleans and Niagara Career and Technical Education Centers met with owner Michael Kistner and toured the facility. The students were able to observe Kistner's quality control and manufacturing processes.

SKIP FRANCIES ANNOUNCES RETIREMENT FROM A.L. PATTERSON

Skip Francies, president of A.L. Patterson's precast division, retired from the company on Dec. 31, 2016. With nearly 50 years of experience in the



Skip Francies

precast industry, Francies leaves a legacy as one of the industry's experts in lifting and handling. He has delivered numerous lifting and handling safety presentations for precasters and association training courses.

PRESS-SEAL ACQUIRES J-K POLYSOURCE

Press-Seal Corp. acquired J-K Polysource, Inc. of Sparks, Nev., Dec. 31, 2016. J-K Polysource has been Press-Seal's long-term partner servicing customers in western North America. Keith Womack, former J-K president, has accepted the position of western division manager with Press-Seal. All staff with J-K have been retained going forward.

BLYTHE COONS JOINS SPILLMAN AS SALES REP

Blythe Coons has joined Spillman Company as a sales representative. Her primary sales responsibilities will be in the Midwest, Mid-Atlantic and New England regions. Coons has a bachelor's degree from Haverford College, a master's degree from Middlebury College and a Master of Fine Arts from Rutgers University.



Blythe Coons

She is the daughter of Ted and Lynn Coons and the granddaughter of Bill and Barbara Coons, who were among the cofounders of NPCA in 1966.

NAWKAW CORP. INTRODUCES POTASSIUM SILICATE STAIN

Nawkaw Corp. has introduced a new formula using inorganic binders based on mineral silicate. Potassium silicates give a coating higher water resistance and a lower tendency for efflorescence and delamination. NawTone-K is designed to create a UV-resistant, long-lasting and color-stable surface for concrete. It is a mineral-based formula that is nonflammable, nonhazardous and has zero VOC content. This formula is also resistant to algae, mold and soiling.

JBM SOLUTIONS, INC. ANNOUNCES EXPANSION INTO INDIANA

JBM Solutions, Inc. is pleased to announce that JBM75 materials and technology is now approved for use by the Indiana Department



of Transportation. Indiana joins other cold-weather markets such as Minnesota, Illinois, Wisconsin, Ohio and Tennessee. JBM75 is currently available through the following NPCA member companies: Crest Precast Concrete, Mack Industries, Precast Solutions and Utility Concrete Products.

GARDEN STATE PRECAST ANNOUNCES PROMOTION

Garden State Precast of Wall Township, N.J., announced the promotion of Paul Heidt to vice president.



Paul Heidt

Heidt has worked at Garden State for 24 years. He started working as a production manager and currently is the engineering manager. His new role will include communicating full time with engineers and the construction community about the advantages of precast concrete. **PI**

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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

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