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THE PRECAST SHOW

There are Five S's in Precast

BY TOM ENGELMAN | *Chairman, National Precast Concrete Association*

Everybody who runs a business knows that the economy is just kind of stumbling along, and will likely continue the pattern of slow or no growth for at least the next several months. With mergers and acquisitions on both the manufacturing side and supplier side of the industry, the precast concrete sector is still in consolidation mode.

It happens on the back side of a recession, especially in our sector, where much of the work comes from municipalities. A recession hits and a year later the state and local tax receipts decrease, and in response those sewer projects and other local infrastructure initiatives are put on the shelf. If you've been in the industry for any length of time, you've seen the cycle before. This time it's worse. As a result, the precast industry is getting leaner, with some companies going out of business and some producers combining operations.

Last year at the NPCA 46th Annual Convention in Coeur d'Alene, we heard from an expert on lean manufacturing, Paul Akers, who runs a multimillion dollar company with a passion for lean production. Akers lives his philosophy. During his keynote speech, he talked about making coffee. You can pour sugar and cream into a cup of coffee and then use a plastic stick or a spoon to stir it. Or, if you're living lean, you can put the sugar and cream in first and pour the coffee on top, providing a self-mixing action. You've saved a piece of plastic going into the landfill. It's a microscopic step, but multiplied hundreds of millions of times, it adds up to something.

There is no room for waste in our industry. We've got to think lean about everything to survive, and that's not a bad thing, because the result will be plant operations that are safer, cleaner and more profitable.

There is no room for waste in our industry. We've got to think lean about everything to survive, and that's not a bad thing, because the result will be plant operations that are safer, cleaner and more profitable. There are many ways to incorporate lean into your operation, and you can visit paulakers.net to see how he does it. There is a Lean Six Sigma movement that focuses on improving efficiencies, and there is a subset of Six Sigma, known as the "5 S" system that is particularly effective for precasters. You can find out more about Lean Six Sigma and the 5 S's online – literally thousands of websites are devoted to this topic.

The 5 S's are elementary principles that you're probably already practicing to some degree. But there's always room for additional staff training to drill the concepts home to your employees. Here's a basic look at the 5 S's:

- **Sort** – If you can't use it, get rid of it. If it is something you use, find a place for it and keep it in that place when not in use.
- **Straighten** – Organize continually throughout the day and make every step, movement, action in the plant count. The most frequently used tools, for example, should be the easiest to locate and reach.
- **Shine** – A step beyond just straightening, keep everybody's focus on the importance of maintaining equipment, keeping it clean and respecting your work area.
- **Standardize** – One of the advantages of precast over cast-in-place is our ability to produce identical products in a controlled environment, so standardization is the lifeblood of a precast plant. But are there office processes, cleaning processes or other work processes that can be standardized to improve efficiencies? Here's a suggestion: Ask your employees for suggestions and give prizes or rewards for the best ones.
- **Sustain** – It's more than just a "green" thing. Building a lean culture in your plant can save money through decreased use of fuel and electricity, fewer office supplies and longer service life of equipment. There are many ways to incorporate sustainable practices in your plant and many of these are common sense things that can become habits in a lean manufacturing culture.

The Six Sigma movement has been around for about 25 years, and giant manufacturers like Motorola and GE have built it into every facet of their culture. Lean Six Sigma emerged about 10 years ago as the natural evolution of the process. In an era where waste has become a four-letter word, it's simply smart business to get lean. What are your best lean ideas? You can share your ideas on the online version of this column at precast.org/blog.

Tom Engelman

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COVER STORY

Western Precast Concrete Inc.

Western Precast in El Paso, Texas, has been in the Feuerstein family since Robert Feuerstein founded the company in 1946. Under the leadership of his sons, Leo and David Feuerstein, the company has grown to 50 full-time employees who are part of what the brothers describe as a family. To them, every employee matters.

Story and photo by Kirk Stelsel

DEPARTMENTS

FEATURES

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Combating an Old Nemesis: Freeze/Thaw Cycles

This primer of tried-and-true mix and manufacturing strategies for preventing freeze/thaw damage is a timely review as we head into another cold-weather production season.

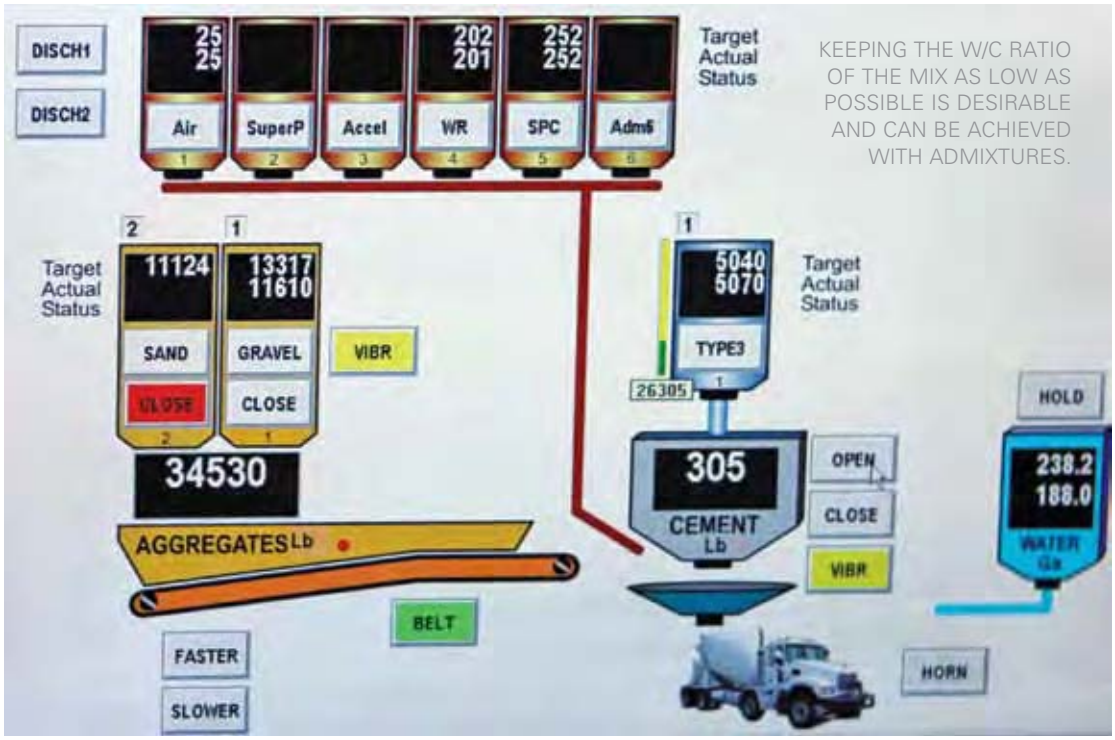
BY PHILLIP CUTLER, P.E.

If you are a precaster who resides in an area of the country where the potential for freezing temperatures is a way of life in the winter, it is likely that you have to deal with an old concrete nemesis: freeze/thaw cycles. We're all too familiar with its potential to harm precast or prestressed concrete structures.

What is the first thing that comes to mind when we think about freeze/thaw conditions? The obvious answer is our industry's best offensive tool: ACI 306R, "Guide for Cold Weather Concreting," with its recommended practical procedures for successful cold-weather concreting. And when ACI 306 pops into your mind, our next thought is: "Oh! Precast must never be exposed to multiple freeze/thaw cycles at a very early age (≤ 500 psi compressive strength) or during the beginning of the curing process." Right? Well, whether or not ACI guidelines were your first thought, let's review some fundamental freeze/thaw facts and strategies.

What the research says

According to industry research on concrete mixtures, the No. 1 culprit is too much water when facing cold temperatures when there is a risk of freezing. In our industry, "too much water" can exist in two distinct ways: at the time of mixing, and saturation (by any means) of the structure during post placement. In either case, too much moisture can create a freeze/thaw problem if not properly addressed. Precasters today have many more preventive options than in the past, but recommended precautions and strategies should be reviewed so that appropriate steps are taken to counteract the potential adverse effects of freeze/thaw conditions.



NPCA file photo

Three freeze/thaw precautions

1. Don't add too much water to your mix. Keep the w/c (water-to-cement) ratio as low as practical. The w/c ratio should be ≤ 0.40 for reinforced concrete exposed to deicing chemicals. Too much water can lead to excessive accumulation of bleed water, which is not desirable when conditions for freezing

may take place – especially for early-age concrete. A low w/c ratio can be achieved easily with today's technology by incorporating a water-reducing admixture or a high-range water-reducing admixture. The goal is to provide enough water for hydration to occur.

2. Remember that aggregates can add moisture. If your coarse aggregates are overly porous, they can retain moisture, and this water will tend to migrate out of the aggregate under freezing temperatures due to ice expansion. Generally speaking, it is usually not the aggregate that is the culprit. If aggregates are overly porous and exposed to freeze/thaw cycles, the typical proof will be exhibited by a pop-out on the surface of the structure. Although pop-outs can be caused by other conditions, moisture within the aggregate under freeze/thaw conditions would represent the major cause of this surface damage.
3. Understand how ice formation in concrete leads to deterioration. Ultimately, it is the pressure generated by the expansion of water as it freezes in the concrete matrix that can be detrimental. If excess matrix water is not abated, deterioration can result. As the water within the concrete begins to freeze, it expands and literally wants to push itself out of confined areas. If there is no room in the concrete matrix for this expansion and the ice pressure exceeds the localized tensile strength of the concrete, small microscopic cracks are generated. The cracks generated then become miniature pathways for external water intrusion into the concrete structure. Over time with multiple freeze/thaw cycles, the concrete exhibits visible deterioration under these exposure conditions.

NPCA file photo

THE USE OF SPECIAL ADMIXTURES CAN HELP IN THE FIGHT AGAINST FREEZE/THAW DAMAGE.

What can you do to enhance freeze/thaw durability in precast and prestressed concrete?

- Review cold-weather concreting procedures. First and foremost, precast production facilities should have adequate cold-weather procedures in their plant-specific quality control manual. Cold-weather procedures should be reviewed periodically so that everyone is aware of proper concrete manufacturing practices for cold-weather exposure.
- Use air-entraining and water-reducing admixtures. These admixtures counter the potential detrimental effects of freeze/thaw on precast concrete. We have already cautioned to keep the w/c ratio as low as possible (≤ 0.40) and to consider the use of water-reducing agents. The use of air-entraining admixtures is the next best approach for durable cold-weather concrete.

Speaking of air-entraining admixtures ...

Many precasters have likely heard the claim that air-entraining admixtures reduce precast concrete compressive strength. While this may be true under certain conditions and to some extent, any chemical or additive used in excess when proportioning a precast concrete mix design is not necessarily a good thing. Used in proper and reasonable proportions, air entrainment has been shown to provide excellent results for counteracting adverse freeze/thaw effects.

Air-entraining admixtures have been used successfully in appropriate amounts based on the desired slump range and/or nominal maximum aggregate size (see Table 6.3.3 from ACI 211.1, "Standard Practice for Selecting Proportions for Normal, Heavy-Weight, and Mass Concrete"). Proportioning guidelines for SCC (self-consolidating concrete) can be obtained from your admixture supplier and/or ACI 237, "Self-Consolidating Concrete."

The theory behind entrained air (artificially induced with chemical agents as opposed to entrapped air that is caused by the mechanical mixing of constituents) is to provide a microscopic void system within the concrete that allows ice molecules adequate space to expand under freezing conditions. Without the presence of these air voids, the expansive movement generated by the water-to-ice formation has no place to go. Expansion from ice formation and the internal pressure generated create microscopic cracks that continue to grow over time. As the frequency of freeze/thaw cycles increases, concrete may exhibit potentially severe deterioration.

Available technologies and a knowledgeable staff

The answer to the threats from our freeze/thaw adversary is clear: a producer who takes advantage of current mix design technologies and maintains a knowledgeable production staff. Use of quality materials and proven production practices and processes in precast concrete manufacturing plants will result in a strong, durable product for cold-weather service. ■

Phillip Cutler, P.E., is NPCA's director of Technical Services.

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ACI 201.2 Guide to Durable Concrete

5 Rules of Watertightness

NPCA file photo

Manufacturing specified watertightness in precast concrete products is straightforward if you play by the book.

BY CLAUDE GOGUEN, P.E., LEED AP

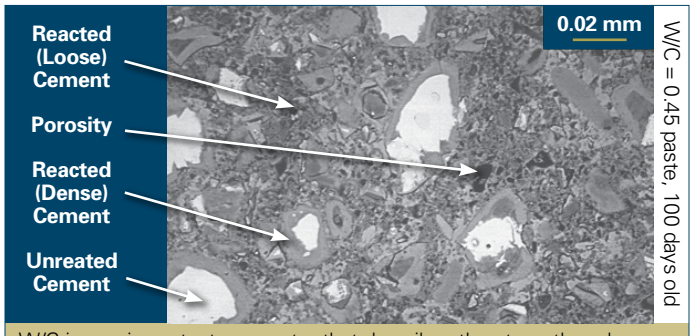
Dutch legend has it that there was once a small boy on his way to school who noticed a slight leak in a dike where the seawater trickled in through a small hole. Knowing that the dike held back the sea from flooding his village, the boy poked his finger into the hole and so stemmed the flow of water. Sometime later a passerby saw the boy and went to get help. Thus the villagers arrived, repaired the dike and sealed the leak.

We all learned this fable as children to teach us an important rule: Do the right thing. But it also taught us an important physics rule: A small trickle of water may soon become a stream, the stream can become a torrent, and a torrent can become the opening for the sea to come in and wash everything and everyone away.

If that dike had been made of quality precast concrete, this legend wouldn't exist and the boy would have gone to school without fanfare. A good precaster would have known the seawall's intended use and would have followed industry guidelines to ensure a leak-proof and watertight dike.

Two "P's" of watertightness

"Watertight" is a term we often hear in describing many precast products. Whether above-ground or underground products, in many instances we want to prevent fluid from getting from one side of the concrete wall to the other. In



W/C is one important parameter that describes the strength and durability of concrete.

FIGURE 1 – POROSITY

Causes of low durability	Goals for producing high-quality concrete
High water-cement ratios (above 0.45)	Low water-cement ratios (below 0.40)
Inadequate cement content	More than 564 lbs cement/cu yd concrete
Inadequate air-entraining	Air entraining agent
Poor finishing	A well-graded, sound, nonporous aggregate
Inadequate curing	Inclusion of sufficient fines

FIGURE 2 – LOW DURABILITY CONCRETE VERSUS HIGH-QUALITY CONCRETE

making our structures watertight, there are two areas we're concerned with: the concrete itself, and joints and penetrations.

Let's start with the concrete. When discussing watertightness of concrete, we must consider the two P's: porosity and permeability.

Porosity is the ratio of the volume of openings (or voids) to the total volume of the material. It basically represents the storage capacity of the material. Concrete is inherently porous, although a sealer can be added to the concrete surface to prevent water penetration. It's practically impossible to make an absolutely nonporous concrete where water won't penetrate even a fraction of an inch. However, we can control the size and distribution of those pores and limit the penetration. The pores, which are tiny voids, reside in the cementitious paste (see Figure 1) and can be subdivided into two types: gel pores and capillary pores. The gel pores exist in every system and are part of the glue that forms around the aggregate to make concrete what it is. Gel pores are very small and not a real problem.

What we worry about are the capillary pores, larger pores that depend almost entirely on the water-to-cement (w/c) ratio. If too much water is in the mix, an excess will remain after hydration of cement, and that is what forms capillary pores. Depending on their size and distribution, these pores can be interconnected, influencing our second "P" – permeability.

Permeability is the measure of the ease with which fluids can flow through a porous material. Permeability is expressed in terms of speed (in./s or mm/s) as opposed to porosity, which is expressed in volume per volume (cu in./cu in. or mm^3/mm^3).

Permeability depends on other factors such as aggregate gradation and density. In high-quality concrete, infiltration is very slow, around the order of 3.94×10^{-11} in. / s (1.00076×10^{-12} m/s). To give you an idea of how slow that is, it would take about 4,800 years for water to breach a 6-in.-thick wall – well beyond the terms of your warranty for sure.

In order to control porosity and reduce permeability to make a "watertight" concrete, it's important to follow these five "Watertightness Rule Book" prescriptions: low w/c and the use of densifying admixtures; proper cement content;

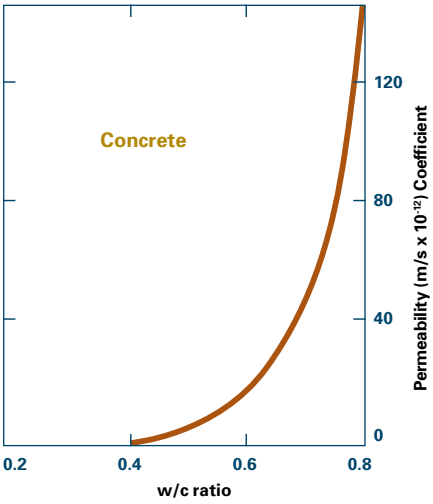


FIGURE 3 – EFFECT OF W/C RATIO ON PERMEABILITY

aggregate gradation; quality manufacturing processes; and execution of joints and penetrations.

Watertightness Rule #1: Use a low w/c ratio mix design

The w/c ratio is the most important factor in concrete design. The water content in a mix controls the moisture's rate of entry (which may contain aggressive chemicals) and the movement of water during the freeze-thaw process. Compare the leading causes of low durability versus high-quality concrete listed in Figure 2. A mix design for durable, watertight concrete should have a maximum w/c ratio of 0.45 and require a well-graded mixture of fine and coarse aggregates.

The more excess water in a mix, the lower the strength, durability and watertightness. Excess mix water results in capillary pores – entrapped air pockets in hardened concrete that will reduce its resistance to leakage. On the other hand, too little water can cause placement difficulties and undesirable effects such as honeycombing. The effect w/c ratio has on the watertightness of a concrete mix is illustrated in Figure 3.

Durability and densification can also be improved with admixtures. Many admixtures can be used to improve concrete's workability, durability and densification. In controlling our water content while trying to maintain workability, water-reducing agents can be used. Air entrainment agents produce near-microscopic independent bubbles that improve the watertight performance of hardened concrete. Air entrainment also improves concrete's freeze-thaw performance and overall durability in addition to easing the placement process.

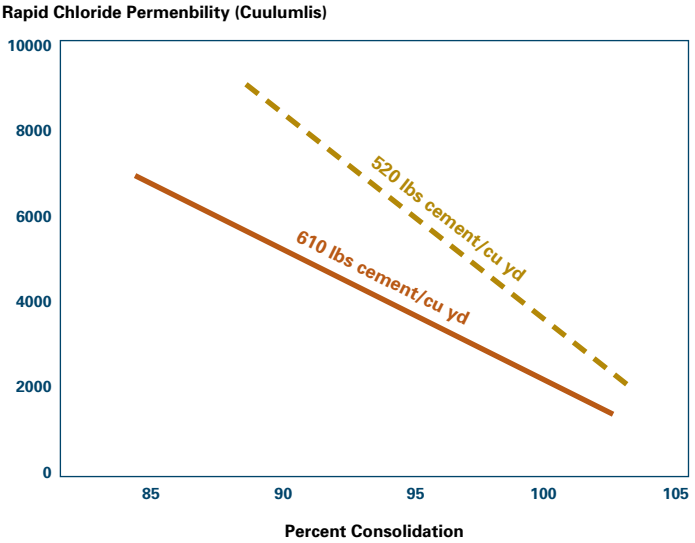


FIGURE 4 – CONSOLIDATION VERSUS PERMEABILITY

Watertightness Rule #2: Meet minimums for cementitious material

Rich concrete mixes provide a denser, more impermeable and superior finished product. Consequently, specifying that cement content not exceed a minimum amount is recommended. In the case of watertight structures, a minimum cement content of 564 lbs/cu yd is suggested (the effect of cement content on concrete permeability is illustrated in Figure 4).

Cement content or total cementitious content needs to be based on the guiding specifications, but generally cements with a higher fineness (> 600 m²/kg Blaine fineness) will benefit workability and reduce bleeding, both of which are beneficial for watertight concretes.

The use of supplementary cementitious materials such as fly ash, slag and silica fume can also increase concrete's density, thus reducing capillary porosity and permeability.

Watertightness Rule #3: Use well-graded aggregates

Gradation of the aggregates is a most important factor and should be of primary consideration. Shape and texture of the particles will also affect workability. Aggregate moisture needs to be accounted for when adjusting the mix design so that additional surface water from aggregates does not contribute to a more porous hardened product. Concrete mixtures that are not well-graded can permit water to pass through the finished structure as illustrated in Figure 5.

Rounded coarse aggregates are preferred, if available, as they can be more uniformly placed. Friable[1], non-sound aggregates may fracture in the mixing and placement process, compromising their integrity. Fine aggregate (sand) with a higher fineness modulus (> 2.8) is preferred, as it will provide the necessary coarser particles in the mid-range of the combined aggregate structure.

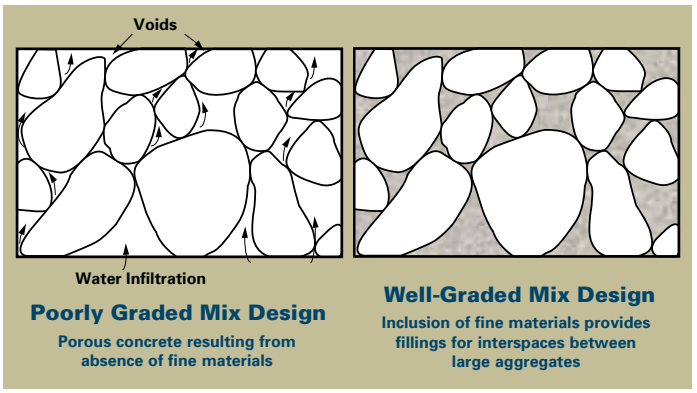
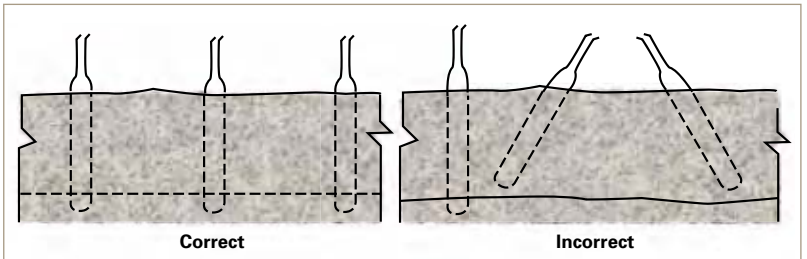


FIGURE 5 – PROPER GRADATION

Watertightness Rule #4:
Follow quality manufacturing processes

Quality concrete manufacturing processes are critical to the production of durable, watertight concrete products. Proper attention to important pre-pour activities such as maintaining prescribed mix proportions, form cleanliness, and specified reinforcement placement and minimum cover is very important. For concrete products permanently exposed to earth or moisture, increased concrete cover, as specified in ACI 318, is recommended to ensure the corrosion protection and proper bonding of concrete around the reinforcement. Adequate consolidation of freshly placed concrete is an extremely important factor to produce a high-quality, dense concrete. Added emphasis on consolidation is required for a desirable low w/c ratio concrete, as it requires a higher compactive effort (a summary of preferred practices is illustrated in Figure 6).

The degree of consolidation can have a marked effect on the watertightness of concrete. As illustrated in Figure 4, a 5% reduction in concrete consolidation can result in a 20% reduction in watertightness. This figure also shows that higher cement content improves watertightness. Defect-free surfaces produced by using smooth forms and appropriate release agents can considerably improve the impermeability of a precast concrete product. Concrete must be adequately cured if its optimum properties are to be developed. An adequate supply of moisture, either by covering or other means, is important to ensure full hydration and reduce the porosity level such that the desired durability is attained, as shown in Figure 7. Although a period of moist curing significantly reduces permeability, the effects of curing are less pronounced with lower w/c mixes.



Concrete with lower water-cement ratios requires greater compactive effort.
Vibrators should not be used to move concrete laterally.
Fresh concrete should be vibrated until all voids and entrapped air pockets are released.

FIGURE 6 – CORRECT VS. INCORRECT VIBRATION TECHNIQUES

Watertightness Rule #5:
Execute joints and penetrations carefully

A system is only as strong as its weakest link. Close

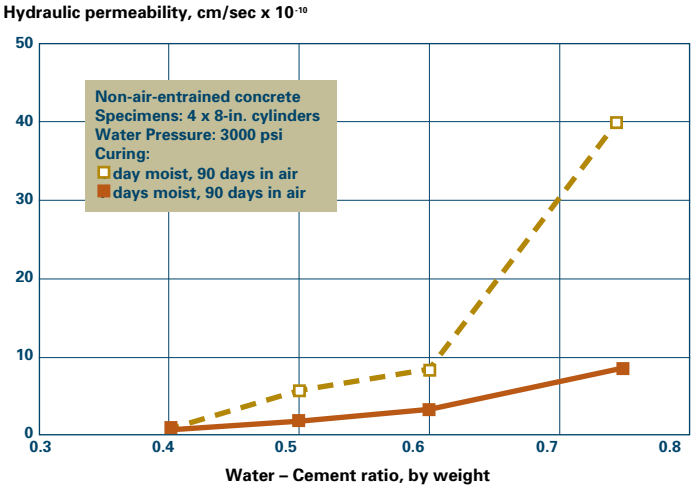


FIGURE 7 – RELATIONSHIP BETWEEN PERMEABILITY AND W/C RATIO DURING INITIAL CURING

attention to all jointed, connected and sealed areas is absolutely necessary to ensure watertightness. Potential differential settlements and thermal movements must be addressed in the design and manufacture of joints and penetrations.

Construction joints need to be adequately prepared and bonded to ensure a complete contact between two pours.

A well-cleaned and sound surface is very important. In watertight applications, waterstops should be used. In the case of connected surfaces – in a conventional two-piece buried tank, for example – the use of a preformed flexible sealant is recommended. When applying sealant, the concrete surface should be clean and dry. A simple method of determining the cleanliness of a mating surface is to draw a dark-colored cloth across the substrate and note any residue on the cloth. For the penetrations of service lines, seals should be selected that can accommodate any differential movements or settlements.

Little Dutch boy or precaster: Rules matter

Whether you're building a septic tank in Wisconsin or a dam in Holland, precast concrete products are well-suited for durable, watertight applications. The best strategy for manufacturing a durable, watertight concrete structure is to play by the book and pay close attention to all recommended concrete manufacturing and installation details. Like the legend of the little Dutch boy, the price of ignoring the rules can be enormous. ■

Claude Goguen, P.E., LEED AP, is NPCA's director of Technical Services.

[1] Friable means easily crumbled or brittle.

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Muddy Waters

As enforcement of regulations governing discharge from precast concrete facilities becomes more stringent, precasters need to update themselves on washout best practices and compliance methods.

BY EVAN GURLEY

Disposal of wastewater from batching operations at precast concrete plants is a growing issue for the precast concrete industry. As today's precasters know, they cannot do things the way their grandfathers did. With stricter quality control standards and environmental regulations, producers must rely on creative, cost-effective compliance methods. In an effort to comply with these standards and regulations, minimize waste and reduce operating costs, proactive precasters have developed methods for treating and/or recycling concrete process water.

What defines "process water"?

Simply put, stormwater comes from the sky; anything else is likely process water. Process water is often related to coring operations and washout, but may also include stormwater that collects a measureable amount of cementitious materials from areas surrounding the production facility. Stormwater, on the other hand, is water that has not come into contact with source material. When stormwater mixes with process water, it all becomes process water. Stormwater can add pollutants to the facility's discharge flows. Therefore, it makes sense to separate process water from stormwater whenever possible.

Concrete washout or process water is a slurry containing metals potentially toxic to plants and animals. Process water contains dissolved solids including: sulfates and hydroxides from cement; grease; oil and form release agents from equipment; small quantities of other chemicals associated with concrete production; and derivatives from chemical admixtures.[1]

Process water is naturally corrosive with a high *pH*.[2] *pH* is the numerical measure of acidity, with a scale ranging from 0 to 14 (see Figure 1). A high *pH* is said to be alkaline, while a low number is acidic. A *pH* of 7 is neutral. A safe *pH* range for aquatic life is between 6 and 9, and an acceptable range for plant life is between 6 and 7. Process water, however, is alkaline with a *pH* of around 12.

Who regulates wash water?

The U.S. Environmental Protection Agency (EPA) monitors and limits types and magnitudes of the waste products a site is allowed to discharge into U.S. waters. Local sanitary and sewer authorities set limits for *pH*, total suspended solids (TSS) and chemical composition for discharged process water.

Production plants adjacent to lakes and streams will need to obtain a National Pollutant Discharge Elimination Systems (NPDES)[3] permit, which is usually administered by the state.

Some states have industry-specific permits that cover the discharge of stormwater and process water from precast plants. The ready-mix industry's

concrete wastewater was curtailed by revisions made to the Clean Water Act in 1987, changes that include runoff from ready-mix plant yards and construction sites.

In a perfect world, precast plants would use a zero-discharge manufacturing process (recycling all process water). Leading precasters in the industry are striving for this goal, but total recycling of concrete process materials is often cost-prohibitive. Larger organizations are often able to absorb this additional expense.

Four methods to meet process water regulations

1. Lower the *pH*. Numerous systems and methods are available to reduce the *pH* of process water. A liquid with a high *pH* can be neutralized or returned to the safe range in a number of ways. For example, adding hydrochloric acid or sulfuric acid to the process water will return a slurry mixture to a neutral or safe range. Use great caution when using acids, as it is easy to overshoot the neutral range to a low and unsafe *pH*.

pH neutralization can also involve the use of solid or compressed carbon dioxide (CO_2) gas. Neutralized stormwater may be discharged to surface waters under the General Construction NPDES permit, but this water must be managed to prevent any discharge to surface waters. Advantages of bubbling CO_2 include:

- Rapid neutralization of high *pH* water
- Cost effective and safer to handle than acid compounds
- Self-buffering, so overdosing to low *pH* levels is unlikely
- Readily available

Process water's volume, temperature, neutralizing agent and required discharge level will all have to be taken into consideration when adjusting the *pH*, so consultation with a chemical engineer is advised. Whatever neutralization method is chosen, all equipment must be handled in accordance with OSHA.

2. Recycle process water by the book. In 1978, ASTM C94, "Standard Specification for Ready-Mixed Concrete," was revised to permit the use of wash/process water as mixing water in concrete. The Portland Cement Association (PCA) also assents to the use of wash water for mixing concrete that meets a maximum of 50,000 ppm TSS. Using different stipulations, AASHTO M157, "Standard Specification for Ready-Mixed Concrete," lists criteria for using process water in the design of a hydraulic cement concrete. While ASTM, PCA and AASHTO all allow the use of wash/process water in the design of hydraulic cement concrete, impurity limits must be met. ASTM C94 maximum limits are:

- Chloride (Cl): 500 ppm
- Sulfate (SO_4): 3,000 ppm
- Alkalies (Na_2O): 600 ppm
- Total solids: 50,000 ppm

Since the late '70s, ASTM C94's process water standard remained unchanged until ASTM Subcommittee C09.40 on ready-mixed concrete developed new standards and test methods for water used in the production of hydraulic cement concrete. ASTM C1602, "Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete," was a standard developed by Subcommittee C09.40. ASTM C1602 summarizes this specification as follows:

"This specification covers mixing water used in the production of hydraulic cement concrete. It defines sources of water and provides requirements and testing frequencies for qualifying individual or combined water sources. Mixing water shall consist

What to do if you discharge process water:

Obtain appropriate NPDES permit coverage. Failure to do so can result in significant penalties. NPDES permit requirements may include:

- Regular discharge monitoring for pollutants, such as ***pH***, TSS, total dissolved solids and other pollutants
- Monitoring and reporting results
- Requirements to treat to ensure limit compliance of process discharges, such as ***pH*** reduction and solids removal
- Inspections, recordkeeping and documentation requirements
- Strict regulatory oversight

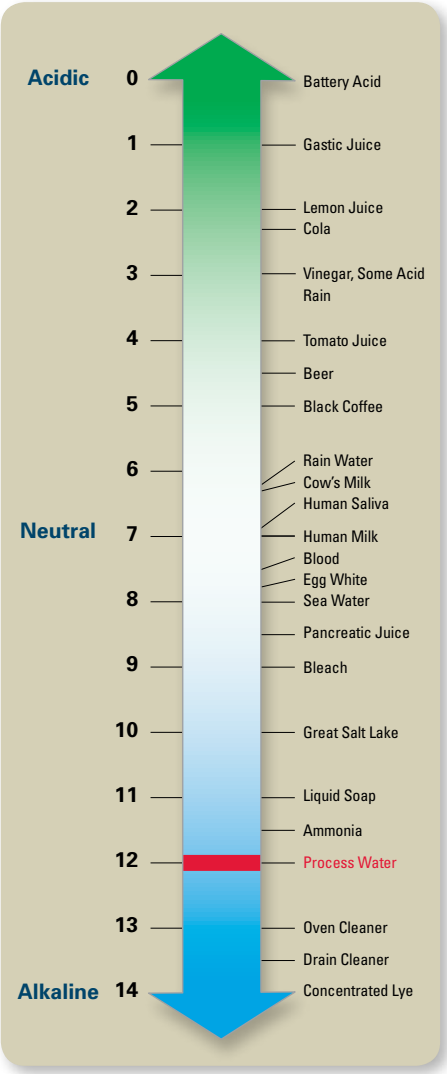


FIGURE 1. A NUMBER OF COMMON MATERIALS AND THEIR CORRESPONDING *pH* IS SHOWN.

of: batch water, ice, water added by truck operator, free moisture on the aggregates, and water introduced in the form of admixtures. Potable and non-potable water is permitted to be used as mixing water in concrete. The following are concrete performance requirements for mixing water: compressive strength and time of set. Density of water shall be tested or monitored with a hydrometer. Optional chemical limits for combined mixing water are given for: chloride, sulfate, alkalis, and total solids."

ASTM C1602 further states that when qualifying the use of process water, all required tests should be performed at the highest TSS in the total mixing water anticipated during production. TSS equal to or less than the level qualified by testing may be used in mix water. At a minimum, concrete compressive strength and set time should be evaluated and compared to a control mix using 100% potable or distilled water. Compressive strength should be within 90% of the control mix, and the set time should not decrease by more than one hour or increase by more than 1.5 hours.

Recent research performed at the National Ready Mixed Concrete Association's Alfred H. Smith Research Laboratory concluded the following when using process water in the design of hydraulic cement concrete:

- Water demand will increase as TSS increase and the process water ages.
- Water demand increases due to the fineness of the hydrating cement particles.
- Initial set time increases due to the increase in the amount of hydrated cement and calcium hydroxide.
- Compressive strengths are similar to mixes made with potable water.
- Concrete durability is similar to mixes made with potable water.

It should be noted that not all DOTs have accepted the idea of using process water in mixes.[4]

Various automated commercial systems for recycling process water are available. Some precasters have opted to design and install their own systems, providing a cost-effective solution for handling/recycling process water. Design of a customized recycling system requires persistence and patience. It is vital to do your homework, purchase and maintain the right equipment and properly train employees, particularly for high TSS fluids.

3. Explore stabilizing admixtures.

The use of stabilizing admixtures can circumvent the necessity to remove wash water from the batching system, allowing the water to be reused for mixing additional concrete. The amount of admixture added depends on the amount of wastewater in the mixer and on the schedule for reuse of this water. These admixtures momentarily stop the hydration process, putting the cement in a dormant state wherein the cement in the process water will not harden into concrete nor will it adhere to the inside of the mixer. The stabilized water is then calculated into the next mix of concrete. The downside to stabilizing admixtures is their additional cost.

4. Pretreat discharge water.

Requirements for discharging process water into local sewers vary among authorities having jurisdiction. Often the requirements for discharge into local sanitary sewers are less stringent than those required by the EPA and often allow for higher ***pH*** limits, a less onerous requirement for the precast concrete industry.

Local sanitary sewer departments often set TSS limits and may even allow for a ***pH*** as high as 10 for the discharge of concrete process water. These relaxed requirements often can be met by utilizing one of the following systems:

- Settling ponds
- Detention/retention systems
- Mechanical reclaiming units
- Precast concrete grit separators
- Holding tanks
- Sloped pits that flow into larger settlement tanks and, if necessary, a dosing tank (for ***pH*** adjustment)

These systems vary in size depending on the amount and content of process waters. Some plants will divert all wash water, coring water and even stormwater into one system, while others may use a number of smaller systems throughout their production operations.

Where can I find additional help?

- Your plant environmental officer
- National Precast Concrete Association
- Your state environmental protection agency's water pollution control department
- U.S. EPA

Compliance isn't an option

Compliance with more restrictive environmental regulations for plant discharge streams is a difficult but necessary task. Precasters must stay up to speed on a vast assortment of rules, permits and regulations for any concrete manufacturing process outflow that might cause pollution. But finding that affordable long-term solution for handling your plant's process water will ensure peace of mind should a surprise inspection of your facility occur – especially one that comes with an environmental inspector eager to list every instance of noncompliance.

Evan Gurley is technical services engineer with NPCA.

References:

www.epa.gov

Portland Cement Association (PCA)

ASTM C94

ASTM C1602

NRMCA

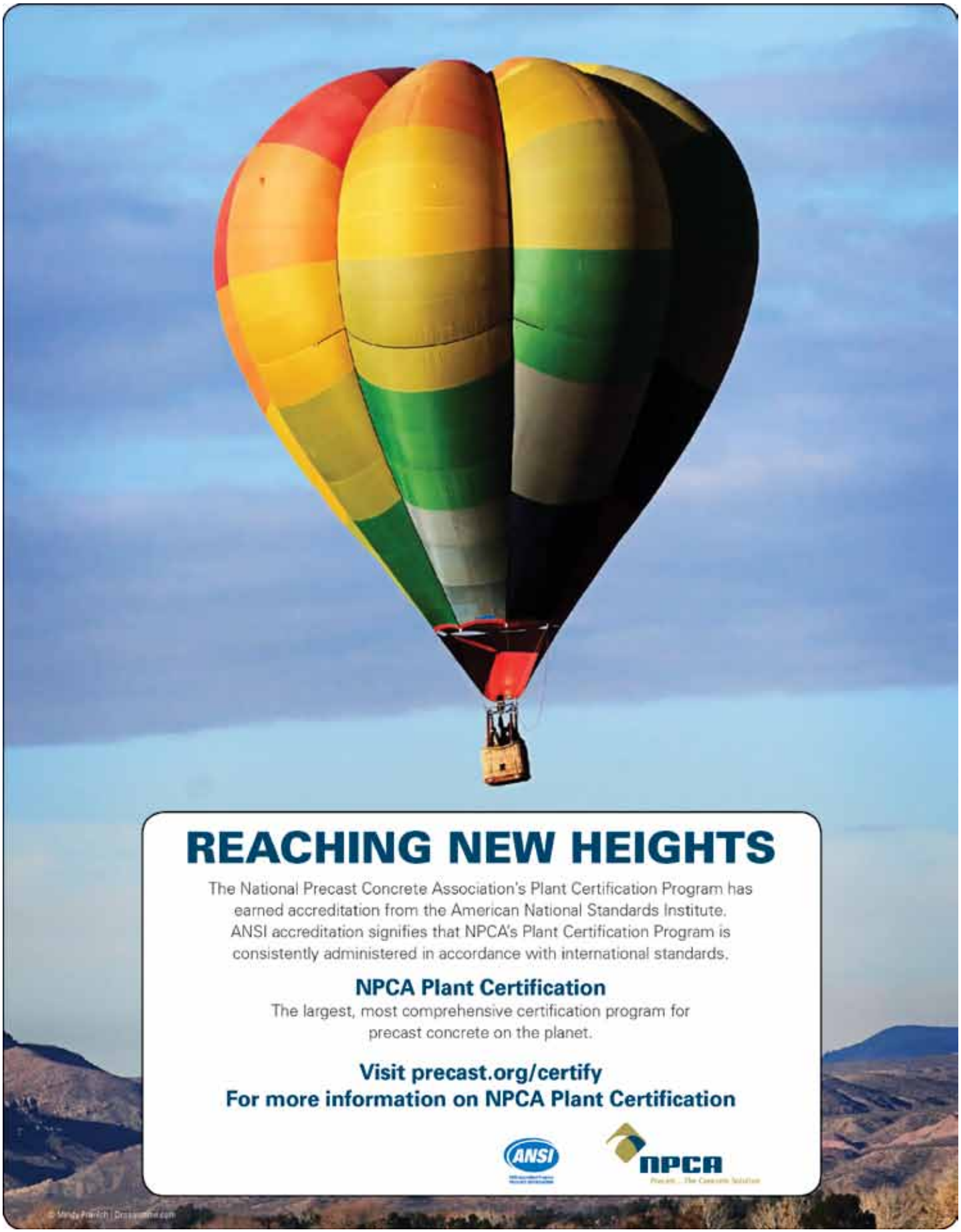
Environmentally Friendly Solutions for the Disposal of Concrete Wash Water from Ready-Mixed Concrete Operations.

[1] The most common derivatives of chemical admixtures are: ethanolamine, diethanolamine, formaldehyde, K-naphthalene sulfonate, and benzene sulfonic acid.

[2] pH, an abbreviation for "potential of hydrogen," is a measure of the acidity or alkalinity of a solution.

[3] EPA's website, www.epa.gov, has pertinent information about the NPDES and/or your state's requirements for the discharge of process water into local waters.

[4] For more information on process water used in mix designs in your state, visit concretereclaiming.com/results-of-state-dot-washout-water-position/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Bridging the Distance

How precasters can gain an edge – and save money and time – by using distance education to train the troops.

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BY BRIDGET McCREA

When the time came to get employees trained and up to date on the latest trends, information and expertise for their positions, Kerkstra Precast Inc. of Grandville, Mich., traditionally sent those individuals out to different locations around the country. There, the employees would attend classes, sit in on seminars and participate in workshops. This continuing education strategy took the staff members away from their jobs for days at a time and it was expensive.

"Between the hotel, the airfare and the rental cars, it was a pretty costly endeavor," says Mark TenHarmsel, the manufacturer's quality control manager. When the National Precast Concrete Association developed its Online Learning Center and began offering Production and Quality (PQS) Level I and II instruction – along with various industry-specific webinars – in a 24/7, distance education format, Kerkstra Precast signed up.

"We saw the online option as a great way to get technical, ongoing education for our staff without having to send any of them out, away from their jobs for days," says TenHarmsel, who has taken both the PQS I online and the PQS II webinar. "When we saw the announcement for the PQS II webinar and course, we signed up right away."

TenHarmsel says being able to work through the material on his own time and at his own pace has been one of the major rewards of online learning. With PQS I, for example, he did the reading, watched the videos and took a test after each chapter. "The PQS II was a bit more technical and was presented by a 'live' instructor online (via webinar)," says TenHarmsel. "I was able to ask questions (by typing them into a live, online chat box on his computer screen); it was more interactive."

TenHarmsel and several other Kerkstra Precast employees have also participated in NPCA's online webinar, "The Do's and Don'ts of Placing Reinforcement." This course takes a holistic and simplified approach to understanding how reinforcement works in concrete, what type works best in a given situation, and how placement and consolidation play a huge role in producing a reliable product. "We allocated one lunch period to this hour-long webinar," TenHarmsel explains. "Our entire production staff participated in that one."

The fact that NPCA has chosen to make some of its continuing education options available online in an affordable, user-friendly format is a step in the right direction for the industry, says TenHarmsel. "As a quality control guy, I think it's fantastic that an authority like NPCA is telling everyone how things need to be done," says TenHarmsel. "It's not just me telling our staff how to change things or do things a certain way. They're hearing it right from the horse's mouth."

The online movement

The growth in online education is on the rise across the board, and instruction in the manufacturing space is no exception. Rewind 10 years or so, and the only way aspiring or existing

employees could further their education was by heading into a classroom for hours of lectures and testing. The process was time consuming, to say the least, and required the students to leave their day-to-day duties and allocate that time to learning in a classroom setting.

Thanks to the Internet, many of those courses are now being taught online to professionals who can work at their own pace, and from the comfort of their own keyboards. Manufacturers have also stepped up to the plate by using the Internet (or their own intranets) for internal training, thus reducing the amount of time spent in the face-to-face learning environment.

Shea Concrete Products of Amesbury, Mass., is one of them. According to Gregory Stratis, manager, the manufacturer has used online learning for the PQS courses and is now looking at having multiple employees begin work on their Master Precaster certifications by taking the online PQS I and PQS II webinar. "I have a bunch of staff members who are interested in the Master Precaster, but flying them all over the place to attend the classes in person would be too expensive," says Stratis. "Virtual education definitely makes that process easier and more affordable."

In the past, Stratis says he picked one or two key employees to attend the classes in person, and then relied on them to share their newfound knowledge with the rest of the team. "It worked, but obviously if someone takes the class themselves, they learn more and stand a better chance of retaining the knowledge," says Stratis. To get employees on board with the online learning, Shea Concrete Products paid staff members to take the distance education on their own time. In other cases, a group of employees convened at a designated time during work hours to participate in live webinars.

Stratis sees distance education as a viable alternative to sending workers around the country to attend sessions in person. "The more educated our employees are, the better off our business is as a whole. But we can't take 10 guys out of production for a week to attend a class," says Stratis. "Using the web, we can efficiently get everyone educated and up to speed with new innovations, trends and methods right from their own computers."

The drawbacks to online learning are few, according to Stratis, who points to the inexpensive projectors (to allow multiple employees to participate in webinars as a group) and other minimal equipment investments as the only added costs, outside of the course fees. "We're doing a webinar tomorrow, and we have three projectors set up at three different plants," says Stratis. "For us to gather 40 employees from those plants for classroom instruction would be pretty unrealistic, but the online education option allows us to do that in a much more cost- and time-effective manner."

Growing in popularity

Online learning isn't exactly new. Colleges and universities have used it for years, usually calling it "distance learning." Put simply, instead of making the daily trip to school to sit at a desk and listen to a professor lecture, students – typically adults with families and day jobs – could access their lessons through a number of different mediums including television, videoconferencing, CD-ROM and the Internet.

Companies and individuals alike have caught on to the convenience and cost savings associated with such learning formats, particularly during this challenging economy when every penny counts and time really is money. According to the Distance Education and Training Council (DETC), an estimated 8 million Americans are currently enrolled in distance learning programs and enjoying the format's flexible study schedules, self-paced courses and technological advancements. Enrollments in online courses and degree programs increase by about 25% annually, according to the DETC's most recent numbers.

Online learning has advantages over face-to-face instruction when it comes to teaching and learning, according to the U.S. Department of Education (DOE). In a recent study, the DOE

Here's the Lineup

NPCA's complete online course catalog is available at precast.org. Here's a quick overview of some of the organization's current offerings:

- **PQS (Production and Quality School) Level I** is NPCA's flagship course, and is the perfect starting point to provide plant personnel with the fundamentals of quality precast concrete manufacturing. *(14 hours)*
- **PQS Level I – Refresher** is designed for those who have completed PQS Level I and are looking to brush up on the fundamentals of quality precast concrete production. This class satisfies the five-year continuing education requirements for PQS Level I certificates due to expire. *(4 hours)*
- **(Webinar) The Do's and Don'ts of Placing Reinforcement** takes a holistic and simplified approach to understanding how reinforcement works in concrete, what type works best in a given situation, and how placement and consolidation play a huge role in producing a reliable product. *(1 hour)*
- **(Webinar) How Much Can You Lift ... Safely?** Proper lifting procedures can be a matter of life and death both in the precast plant and in the field. This webinar explores common mistakes that can be costly both financially and physically. *(1 hour)*
- **(Webinar) PQS Level II – Technical** is designed for plant personnel who are responsible for the design and interpretation of drawings, product setup or quality control in the plant. *(12 hours)*
- **(Webinar) Pre-Assessment Plant Deficiencies for NPCA Certification** reviews 10 of the most frequently violated NPCA QC Manual requirements as found in pre-assessment audits and plant certification inspections. *(1 hour)*

found that students who took all or part of their instruction online performed better, on average, than those taking the same course through face-to-face instruction.

Leo Feuerstein, operations manager at Western Precast Concrete Inc. in El Paso, Texas, says the manufacturer's employees have participated in numerous distance learning opportunities over the past few years. Recent courses included the NPCA's manhole and rebar replacement webinars, as well as PQS I and PQS II. Previously, Feuerstein says the company would send one person to take the classes in person, and then "come back and try to reach the staff" with the newfound knowledge.

"The online options have made it much easier to educate more of our staff members without the airplane, hotel and other travel expenses," says Feuerstein, who sees the growth in online learning as a positive trend for the precast concrete manufacturing industry as a whole. "It makes it very affordable for plants to be able to instruct larger numbers of workers and to get them certified across a wide range of specialties and courses."

Feuerstein, a self-proclaimed "old schooler" who enjoys the face-to-face experience that the classroom instruction affords, says the ability to interact with instructors via phone, email or online chat helps create a more collaborative environment online. "The fact that you can attend a webinar, ask questions and get your answers back within minutes goes a long way in creating an interactive environment online," Feuerstein explains. "Knowing that the instructors are there to answer those queries is great."

More online learning ahead

DETC's most recent distance education survey reveals a strong outlook for the distance education market, which is expected to continue growing in the coming years. The organization sees higher education – including traditional, on-site schools – turning to distance education as a "mainstream delivery medium." TenHarmsel says his company plans to use the medium even more in the future as it strives to keep its staff "ahead of the curve" and up to speed on new innovations, methods and applications.

"We like the flexibility of being able to take courses and attend webinars online, and I don't see that changing," says TenHarmsel. "Signing up on the web, getting the education online, and doing any related testing right from our own computers is a big plus."

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.

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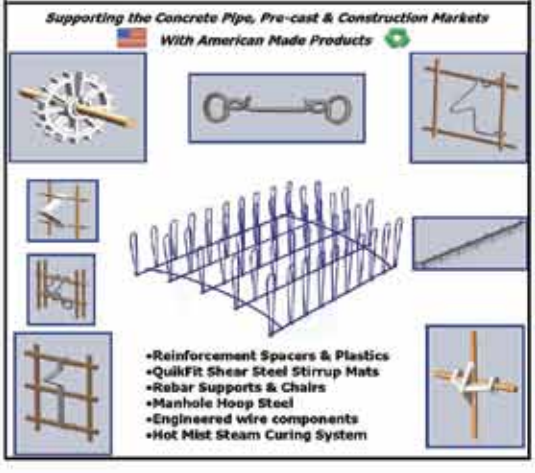

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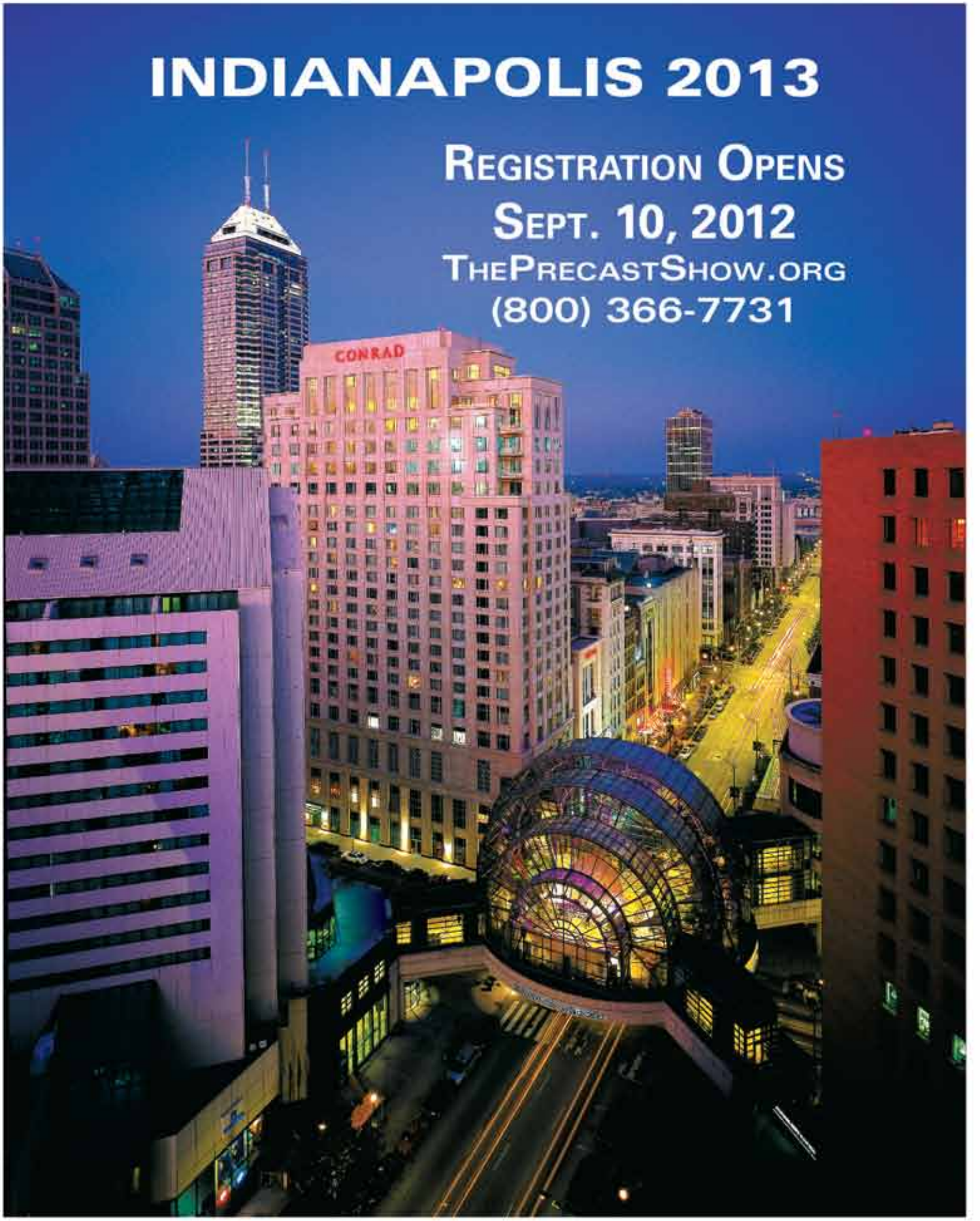

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FAMILY MATTERS

WESTERN PRECAST

– IS ALL ABOUT –

the people

STORY AND PHOTOS
BY KIRK STELSEL

DAVID (LEFT) AND LEO (RIGHT) FEUERSTEIN WITH THEIR STEPFATHER, JOHN KRAMER

LEO AND DAVID FEUERSTEIN STRIVE TO ENSURE THAT EVERY EMPLOYEE FEELS AS THOUGH THEY ARE A PART OF A FAMILY – A FAMILY THAT WAS STARTED MANY DECADES AGO.

Leo and David Feuerstein are home when they walk through the front door of Western Precast's office every morning – literally.

That's because the building that now houses the company's office staff was once the Feuerstein family's home. Leo's office was his grandmother's living room, and the drafting room was the family's living room.

Whether intended or not, the symbolism is incredibly apt, because Leo and David strive to ensure that every employee feels as though they are a part of a family – a family that was started many decades ago.

WESTERN PRECAST'S PATRIARCH

Leo and David's memories of their father, Robert (Bob) Leo Feuerstein, are limited. Bob, founder of Western Precast in El Paso, Texas, passed away in 1971 while working at the business he loved. He had just come into the office from working in the yard and collapsed.

To understand that moment, however, requires one to look back 25 years earlier to the year Bob started the company – 1946. After leaving the military, he saw an opportunity in the concrete pipe industry and started what was then known as Western Concrete Works. Bob's company manufactured 3-ft sections of pipe that ranged in diameter from 4 in. up to 15 in., as well as a variety of ornamental products.

There were no quality control protocols, crane trucks or office staff back then. In David's office hangs a sign that says, "Out in plant, come on out" – the actual sign Bob hung on the office door while he worked in the yard.

When the company's one-line rotary phone set off a buzzer installed in the yard, it would often ring 20-plus times before Bob could finish what he was doing and go take an order. The company's biggest asset was a leader who worked hard and cared deeply. According to Leo, his father worked from sunup to sundown six days a week, so it was never a surprise to find him working in the yard, which is where he was on that April day in 1971.

ROBERT (BOB) LEO FEUERSTEIN

The day started no differently than any other, but an Army service injury – suffered during WWII and long since healed over – aggravated a blood clot that broke loose, went up and stopped his heart. Bob was just 58 years old. Leo was in third grade, David in pre-kindergarten, and their mother instantly became a widow with sole ownership of a company she knew little about.

WESTERN PRECAST EMPLOYEES ARE ABLE TO POUR CONCRETE INTO THEIR FORMS OUTDOORS, THANKS TO THE WEATHER IN EL PASO.

FROM MOTHER TO SONS

Mildred Feuerstein-Kramer didn't know how she was going to run Western Concrete Works, but the one thing she knew was that she had to keep the company in the family.

"When my dad died, she very quickly had to just come to work and figure it out," Leo said. "She spent the next 15 years keeping the gates open. It was a small operation, but she kept six or seven men employed and it was enough for her to be able to make a living."

When Mildred remarried, her husband John Kramer stepped in to help run the business as general manager, and as Leo and David grew up, they grew within the family business as well. It started as early as grade school with tasks like pulling weeds and picking up trash. As time went on, both got into pouring, learned how to run the batch plant, and worked as welders and crane operators. John Kramer managed the business as general manager for the next 15 years and now serves as president of the company.

Leo joined the company full time after he graduated from St. Mary's University in 1984, and David joined

QUALITY – BY – ASSOCIATION

Western Precast has been an NPCA member since the '80s, but lately Secretary/Treasurer Leo Feuerstein has been ramping up his staff's involvement for a variety of reasons.

Leo and Richard Alvarado, Quality Control Manager and Assistant General Manager, sit on NPCA committees, and Leo frequently gathers staff in the company's conference room for NPCA-hosted webinars. He also engages staff in NPCA's Production and Quality School courses. To him, education eliminates ignorance, which he feels leads to frustration and blame. He also believes it inspires employees to go after the things they are afraid of, which is the only way to achieve more.

"As I've become more educated in NPCA, I've found I want to take more classes," he said. "It really isn't in my job description to do this, but I want to do it and I want my employees to do it."

Involvement with NPCA is nothing new for Leo or his brother David, though. Leo remembers going to his first convention in 1984 and the company has been certified since 2001 – a program in which he finds great value.

"Having DOTs purchase from NPCA Certified Plants has been a wonderful opportunity for Western Precast," he said. "We don't have to worry about a plant that just started up and is using inferior materials trying to undercut us. This is what NPCA certification brings to the table: greater opportunity."

Sales manager John Franklin has found value in the opportunity to learn from other companies over the years. He admits that when he joined Western Precast 17 years ago he was very myopic, and didn't think or worry about anything outside of the company. Using the information NPCA and fellow members offer has helped educate and enlighten him on the industry.

For Alvarado, involvement in NCPA has put his career on the fast track, from newbie to an integral part of management in just seven years. "For me, I can't even fathom what I'd be doing right now if not for NPCA and joining the committee and getting to network," he said. "The information is there – all you have to do is go out and look for it."

soon after in late 1987. Together, they began taking the company to new heights. When Leo and David took over, they started phasing into heavy underground industrial, including manholes up to 12 ft and then utility vaults for electrical and telecommunications and drainage inlets. The company was finding its niche in underground infrastructure.

The decision has proven to be the perfect sector for the company. With the City of El Paso, TXDOT, New Mexico DOT and Mexico all within range, along with the second-largest Army installation in the United States, there's no shortage of work. About 1990, the company did its first storm/sewer project for the City of El Paso and was so proud of the results it was soon bidding state work. Prior to that point, all city and state sewer inlets had been cast in place. Over the past 20 years, the company has trained the highway department and the City of El Paso that precast is the better choice.

BROTHERLY LOVE

Growth has not always been easy, but it's always been done together. When Leo started, there were two other precasters in El Paso. Over the years, Western Precast emerged as the only one to stand the test of time. "I'd like to think we've survived because of our tenacity, our hard work and our dedication," Leo said. "Things like improving our quality by being a part of the NCPA Certification Program, while the other two plants did not become a part of NPCA and didn't follow a certification program."

As the company progressed, Leo and David purchased newer equipment, and the manufacturing process became more and more refined. It started with quality trucks that would enable them to transport larger products. "Buying our first QMC crane truck was a major milestone," Leo said. "We now have five QMCs, two Manitex and one JLG crane truck operating full time, but I remember the day we got our first QMC. It enabled us to build bigger products and set them at the job site for the customers, and being able to offer the full service was big."

Along the way the company also purchased forms to get into new product lines and to replace old, worn-out forms that, as David put it, "just didn't work."

WESTERN PRECAST UNDERWENT A BATCH PLANT UPGRADE WITH ACT AS PART OF THE PRECASTER'S CONTINUOUS IMPROVEMENT EFFORTS.

"About four or five years ago, we went to Marks Metal Technology and bought several 10-ft ID and 12-ft ID manhole forms," Leo said. "We've been very happy with Marks Metal Technology and their forms.

"We also acquired our first 6-by-12 form last year for the electric and telephone company work from Quinn (now a part of Besser). They make fantastic forms. If you have a quality form, it's a lot easier to make a quality product."

The most recent addition was a brand-new batch plant from ACT. The quality control department is now monitoring materials down to a 1% tolerance level across the board, and they can track exactly how much material they're buying. This is a stark contrast to earlier years.

"In the old days, we had a gentleman we called the 'mix master,' David said. "As the mixer would turn, he'd stick his hand in and get a little bit and look at it, taste it, hit it on a pole and then give it his approval that it was ready to pour."

Today, Western Precast's mixes are advanced and precise. Admixtures from Euclid are a line item on the budget, because with the proper admixtures the plant can be sure it gets the overnight and the seven-day breaks it's looking for.

"The technology that we've been able to put in place has been amazing," Leo said, "and going through the new batch plant installation through ACT, they were fantastic to work with."

Through long hours and perseverance, Leo and David have grown their customer base and have enjoyed doing it together.

"I love my brother and I enjoy working with him and my family," Leo said. "You feel as though you have a responsibility to your

THE METRO PROGRAM IS PART OF THE COMPANY'S EFFORTS TO ENSURE EVERY EMPLOYEE FEELS APPRECIATED.

family to carry on a tradition, so it's important to me."

David agreed and added, "From where we started, Leo and I had the dirt we're standing on and now we have a business that actually produces quality precast products."

EXTENDED FAMILY

When Leo and David talk about family, they're not just talking about their immediate family. To them, anyone who works for Western Precast is part of an extended family.

One way of showing their employees they care is a profit sharing program where long-term employees who retire can receive checks for up to $100,000. Another, the Motivating Employees Through Recognition Onsite, or METRO program, is used to reward, recognize and inspire employees. The program won the 2012 Pinnacle Award competition at The Precast Show in Orlando last March for the most innovative management program among NPCA member plants.

Leo and David acknowledge employees using an annual awards ceremony, wall of honor and monthly newsletter. The company also hosts a variety of annual events like its Halloween and Christmas parties and has regular catered lunches. Other benefits include flu shots, a $10 a month gym membership, bonuses and much more.

"My brother and I want to make everyone feel important," Leo said, "to not only feel, but to know that they're important. The staff that I work with are my brothers and sisters."

The culture that Leo and David have instilled has created an environment conducive to long-term employment. In fact, a majority of the management staff has 10-plus years of tenure, some with many more.

General manager John Franklin came to Western Precast to "kill some time" while he figured out what he wanted to do with his life. Now, 17 years later, he can't imagine being anywhere else. He has remained with the company for many reasons, but none are more important than the confidence Leo and David place in their managers.

Franklin sees it as a show of trust, and it influences the way he manages his employees. For him, the Western Precast family means a place where he can be himself and do his work in his own way.

"They don't want rubber stamps here," he said, "so they know that when you give an opinion, you're not giving it to be a pain but because you believe in it. That's the way I see family, I'm able to tell them what I think."

Another employee who came to Western Precast with no intentions of long-term employment is quality control manager and assistant general manager Richard Alvarado. After five years as an Army Ranger and two deployments in Iraq, he decided his next move was a career in law enforcement. When he walked into Western Precast to apply while he waited to get into the police academy, he didn't even know precast concrete existed. That was seven years ago.

Richard began in dispatch, but thanks to the

THE WESTERN PRECAST YARD OFFERS MANY PRODUCT TYPES AND A NICE VIEW OF THE FRANKLIN MOUNTAINS IN THE DISTANCE.

AN EMPLOYEE FINISHES A RECENTLY POURED FORM.

empowerment given to employees, he began learning new skills and eventually found himself leading quality control.

"If you do your job well, they inspire confidence," he said. "I've never been told I couldn't go and start learning new departments, or start getting involved in aspects of the daily business that weren't under my job title. I think that feeling like I'm part of a family is part of the reason I've stuck around.

"Genuinely, I can say that John, David and Leo are my friends and my family, and I care for them. I don't know that you get that in a lot of industries."

Western Precast's other tenured employees include 27 years from production manager George Rodriguez, 26 from special box foreman Jesus Garcia, 21 from shipping manager Alfredo Torrez, 17 from manhole foreman Angel Najera, 16 from personnel and safety director Sergio Arvizu, 16 from box foreman Ruben Rodriguez, eight from office manager Paulette Brown and six from dispatcher Billy Watters.

"I have to believe that these guys are part of the family and that they have my best interest in mind," Leo said. "When you talk about family, these people are my family."

"I think, really and truly, we as a company have always pushed the family values," David added. "We treat every employee here as an individual and we do consider them family."

GROWING THE SEED

For Leo and David, the opportunity their parents provided and the obligation they feel to their family – immediate and extended – drives them every day. A picture of their father that hangs just inside the front door is a reminder to both of them of where it all started.

"He left us the seed, the nucleus, to try and do something with it and it's important for me to try and make him proud," Leo said. "I want to believe that my dad would be proud that 41 years later we're still here and we're stronger than ever."

"I think my father would be shocked to see how far we've come," David added. "My feeling is that he would put his stamp of approval on the way the business has gone, and I think he would have enjoyed seeing that it's stuck around this long and that family is still running it." PI

Kirk Stelsel is NPCA's director of Communication and associate editor of Precast Inc. *magazine.*

Want to see more from our visit to Western Precast? To view additional photos or to read the magazine online, simply visit http://precast.org/western, or scan this QR code with your smart phone or tablet.

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Exaggerated Claims: How Does a Precaster Respond?

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Competition in the marketplace is a good thing, and may the best product win – but when research data are used out of context, a reality check is in order.

BY SUE McCRAVEN

During really bad snowstorms, when temperatures hover around 32 F and cars spin off the highway, just staying on the road is a nerve-racking challenge. Maneuvering in behind a giant scraper/salt truck that is shooting out deicer salt and sand is not a bad strategy for staying alive when the concrete pavement is iced over. But wait! Isn't that calcium chloride ($CaCl_2$) that the scraper truck is spewing all over the concrete surface? And doesn't material research data prove that concrete mortar dissolves when soaked in a pure (liquid brine) $CaCl_2$ solution?

What's the deal here? Does this mean $CaCl_2$ always deteriorates concrete? Does this prove that precast concrete paving slabs and CIP concrete pavements are a poor choice for our roadways? Here's where we all need to stay calm and view the facts. A reality check is in order.

Reality check

For the precast concrete producer, what does our dicey driving example tell us about using out-of-context research data to trash competing products in the marketplace? Common sense tells us that statements about the corrosive effect of $CaCl_2$ on concrete need to be based on reality: the history of concrete pavement's in-service performance and its proven durability in cold-weather regions where deicing salts are routinely applied to roadways. More importantly, research database claims of concrete deterioration need to be understood in context with the specific mix design used in research studies. Without knowing the water-to-cement (w/c) ratio, compressive strength, air content, presence/absence of permeability-reducing materials, and cement type that led to the test data, we cannot apply these same data willy-nilly to the real world, where it would appear that $CaCl_2$ and concrete are engaged in a weird wintertime harmony.

FACT: Real-world field performance has shown that air-entrained concrete pavement does not need added protection from deicers.

As the dust settles at this point in our discussion, it should become clear that using out-of-context research data to digress into deceptive claims about the durability of any competing construction material or product – precast concrete or otherwise – is a waste of time and energy that makes everyone look bad. And we look particularly bad to potential customers who are turned off by the defensive posturing of claims and counterclaims.

Research realities: two examples

So let's get down to a more specific example of taking research data out of context. Let's say material research data indicate that concrete mortar deteriorates in solutions of acids[1] or oils at high concentrations and in conditions of continuous exposure. This result should come as no surprise to anyone if,

in fact, the 1 in. x 1 in. x 4 in. mortar samples tested had w/c ratios ≥ 4.0 and a mix design with no silica fume or admixture to increase concrete impermeability. Do these research results prove, for example, that the precast concrete grease interceptor in service at our local Freddy's Fried Chicken restaurant/grease outlet will deteriorate rapidly?

Another research report[2] may use graphic photos of deteriorated 6 in. x 6 in. x 30 in. concrete beam samples exposed to sulfur-rich soils in Sacramento, Calif. These photos are properly used to demonstrate the visual inspection system (used since 1940) to apply a numerical rating system (from 1 to 5) to identify degrees of deterioration (1 = looks pretty good, 5 = sweep it up).

Yes, these graphics can be a bit startling to those unfamiliar with the basis of this research protocol. Setting the gory photos aside, this study reports that air entrainment and a low w/c ratio, in particular, "was an overriding factor in sulfate resistance." Does this mean that all precast concrete used in contact with sulfur-rich soils will disintegrate?

Stay calm & view the facts: three steps

An informed precaster's response to derogatory database claims from competitors should be based on the following research realities:

1. First, it is important to note that researchers often use "the upper end of the possible range of concentration for each chemical agent" in their testing, because they want to discover what happens at "extreme" conditions. Researchers are curious by nature, and the upper limits of what is possible in the laboratory make for interesting data, graphs and reports – but these individual high-range data points are not intended to describe typical precast performance in actual field conditions.
2. Secondly, research reports should be assessed in their entirety, with reasonable perspective, and not reduced to a belligerent discourse on a few exhumed data points. For example, most concrete material research summaries on the effects of aggressive chemicals on mortar will usually conclude with a statement indicating it might be a pretty good idea to increase curing time and decrease the w/c ratio. This part of the conclusion has perhaps more relevance to reality than isolated data that reflect extreme test conditions. The same industry study[3] that talks about "slow disintegration of concrete exposed to vegetable oils" also lists more than a half dozen protective treatments that mitigate chemical attack. The first tried-and-true defense, however, is designing impermeable concrete based on an informed mix design.
3. Finally, the important questions for the precaster to ask about any laboratory study on concrete deterioration are: "Were the research samples, exposure levels and corrosive-element concentrations representative of quality precast concrete products under typical service conditions? Does the research data represent today's precast concrete mix designs that meet industry codes[4] for corrosive environments – durable concrete produced with low w/c ratios, the recommended type of cement, perhaps 5% silica fume, and other technological advances in admixtures and SCM[5] to increase impermeability?"

FACT: In the end, durability (a long service life) is all about concrete mix design for specific exposures.

Always focus on field performance

A measured, positive and consistent precaster response to unfounded claims of product deterioration must refocus these discussions to precast concrete's actual performance and durability in the field, how precast works in the real world. Are customers happy with the durability and proven service life of precast concrete products? Yes. What do customers like about precast concrete?

Customers prefer precast concrete, because it has a proven history of strength, durability and structural integrity, and it can stand up to adverse conditions for decades of reliable service without replacement or repair. Precast concrete is the proven premium product that arrives on site as a structural element with its strength intact. Precast concrete underground products, for example, will not deflect, warp, crack or break in service like other materials[6] where actual product performance, structural integrity and service life depend in large part on the whims of the local contractor in complying with specified installation procedures, including proper soil-lift heights and backfill compaction. After all, "proper installation procedures" usually take more time – and time is money.

So bring on the research data and, as they say in the military, "man up." The precaster's response is a calm, confident and consistent reality check for the naysayers in this highly competitive marketplace: "Let's just focus on product performance in the real world. And may the best product win." PI

Sue McCraven, NPCA technical consultant and Precast Solutions *editor, is a civil and environmental engineer.*

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Reference 1. ACI Committee 318 Report, "Building Code Requirements for Reinforced Concrete and Commentary," ACI 318/318R, American Concrete Institute, Farmington Hills, Michigan, 2005, 436 pages.

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Reference 5. Stark, D., "Durability of Concrete in Sulfate-Rich Soils," RD097, Portland Cement Association, Skokie, Illinois, 1989.

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[1, 2, 6] See Reference 6

[3] See Reference 3

[4] See Reference 1

[5] Supplementary Cementitious Materials

green PIECE

Sustainability Awards:

Spotlight Your Company

BY CLAUDE GOGUEN, P.E., LEED AP

In keeping up with the demands of the construction industry, many NPCA members have adopted sustainable practices in their purchasing, manufacturing and shipping operations. Our industry has benefited from their actions, and it is in this spirit that the Sustainability Committee has created the NPCA Sustainability Awards. The inaugural NPCA Sustainability Awards are to be announced at The Precast Show 2013 in Indianapolis.

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

The awards will be divided into the following four categories:

Producer Members

Best Project Entry – Precast product being used in its final design purpose that contributes to the sustainable attributes of the project.

Best Company/Plant Entry – A practice that is performed by the company in doing business specifically at the precast manufacturing plant, showing improvement in sustainable practices.

Associate Members

Best Product Entry – Product being used in its final design purpose in the manufacturing or performance of a precast concrete product, and that is beneficial to the overall level of sustainability of that intended precast concrete product.

Best Company/Plant Entry – A practice that is performed by the company in doing business specifically at its plant or facility location that shows an improvement in overall sustainable practices.

Each category will have one winner while the other approved entries will receive honorable mentions. All approved entries will be profiled on a display at The Precast Show 2013, on NPCA's website at precast.org, and in upcoming *Precast Solutions* and *Precast Inc.* publications.

The Sustainability Award Judging Panel will be comprised of three Sustainability Committee members, and two outside experts from academia and industry who are nominated by the Sustainability Committee and who will be selected based on their knowledge and credentials in sustainability.

Submittal themes

The theme for each award entry submittal will be "sustainability." The broad scope of sustainability covers environmental, social and economic issues. Examples of topics worthy of award entry consideration include, but are not limited to:

- Energy management
- Recycling
- Water-use reduction
- Production-waste reduction
- Substitution of non-renewable materials
- Minimization of packaging
- Vehicle efficiency
- Biodiversity and conservation
- Environmental product declarations
- Employee training programs
- Employee social support programs
- Community liaison
- Support of local organizations
- Supply chain initiatives

Many of these topics are focused on environmental impact. As much as possible, entries should cover the social, economic and environmental benefits of the entry project – although, in many cases, the focus will concentrate on only one aspect of sustainability.

Entry criteria

Points will be awarded based on the following criteria:

1. **Benefits** – What are the benefits of the project to the company, the community and/or the environment?
2. **Innovation** – The originality of the project/product in terms of subject and/or approach.
3. **Wider Applicability** - Points will be earned if the idea can be applied to other member companies.
4. **Employee Participation** - Employee participation in the project will gain further credit.

Entry guidelines

Any number of entries may be submitted from a company, provided they cover a different or unique aspect of the company or job site. Each entry project or practice must have been initiated (in the case of an operational practice) or completed (in the case of a project) within five years of the submittal deadline. Any one entry may be submitted a maximum of two times; however, if a submittal wins the Sustainability Award upon its first entry, it is no longer eligible.

Entries are limited only to members of the National Precast Concrete Association. Those submitting award entry applications must be members of NPCA in good standing as of the time of award entry submittal, and at the time of the awarding of the Sustainability Awards.

Each entry will be considered for the award only if it includes the following:

- An executive summary that provides an accurate representation of the project that can be used after the awards as a basis for promotional purposes. This summary must not exceed 200 words.
- The body of the submission must not exceed 1,000 words and must refer to the four criteria outlined above.
- All entries should be supported by appropriate, high-resolution photographs or illustrations. Graphics may be saved separately as JPEG files (limit of 10 photos).
- The entry form must be signed by a director of the company.

The entry form can be downloaded from NPCA's website at precast.org/sustainability.

Deadline and submission contact details

The deadline for submittal of an award entry application is **Nov. 1, 2012**. All entries must be submitted to:

Sustainability Award Submittals
National Precast Concrete Association
1320 City Center Drive, Suite 200
Carmel, IN 46032

The Sustainability Committee is proud to have this opportunity to recognize those pioneers in our industry that have adopted sustainable practices. By shining the spotlight on these producer and associate members, it is the committee's hope that their initiative and leadership will inspire others to follow and, therefore, contribute to the sustainability of precast concrete products.

Claude Goguen, P.E., LEED AP, is NPCA's director of Technical Services.

The 2013 QC Manual

What can NPCA Certified Plants expect in the 10th Edition of the Quality Control Manual?

BY PHILLIP CUTLER, P.E.

The NPCA Quality Assurance Committee, which met in June during Committee Week in Indianapolis, has once again set a course toward timely changes and improvements to the requirements in the NPCA Quality Control Manual for Precast and Prestressed Plants, and to propel the NPCA Certification Program forward by voting to raise the bar on quality.

The Committee members made a number of editorial changes. For example, they corrected an error in language under the prestressed requirement of Section 1.1.3, and amended the last paragraph of Section 4.1.5 under "Machine Made or Dry-Cast Products" to read, "If nonconforming product is discovered, the plant shall immediately correct all nonconformances."

Also, the Committee made a number of minor changes to add flexibility in some of the requirements for next year. A good example of this type of change will appear in the first paragraph of Section 1.1.1, which now states that for prestressed plants, "A licensed Professional or Structural Engineer must be on staff or under contract to perform and review design calculations, provide guidance for stress sequences and provide repair guidance."

The Committee members voted unanimously to add notations for all applicable AASHTO and CSA standards that apply alongside the existing ASTM standards. They noted that an increasing number of certified plants face these specifications regularly in contract language and/or documents, and while the NPCA program provides for this contingency when a plant faces more stringent specifications, it is not always interpreted as a more stringent set of standard documents. So, to accommodate all instances and eliminate the ambiguity, the Committee added the flexibility to the program that will recognize the companion standards documents. This change will also expand the manual's appendix.

Major change effective January 2013

Primary and backup Quality Control personnel of certified plants will be required to hold a current certificate for PQS next year. The language under Section 1.1.3, "QC Personnel Training," will be modified to read "Plant QC inspectors and assigned backup inspectors shall hold current certificates of completion for NPCA PQS and ACI Concrete Field Testing Technician – Grade 1." This change in language stipulates that recertification for both PQS and ACI Concrete Field Technician – Grade 1 will occur every five years. Applicable PQS courses meeting the five-year renewal will be noted in the commentary of this section.

Plant QC personnel with expired PQS certificates will have until January 2013 to take the PQS - Refresher course, which is now available online via NPCA's website at precast.org.

Under Critical Section 4.3.3 "Positioning of Reinforcement," the Committee felt that clarification was necessary to assist plants in adapting the requirements to their operations. The section was rewritten as follows: "Verification of the reinforcing steel for conformance with the design shall be performed and documented on a minimum of one (1) reinforcing steel cage or 3% of each production run daily, whichever is greater, chosen on a random basis by QC personnel for each product category produced in the plant. At least one cage shall be checked when a shift change occurs during the course of a production run. These reinforcing steel checks shall be maintained in the plant records for a minimum of three (3) years."

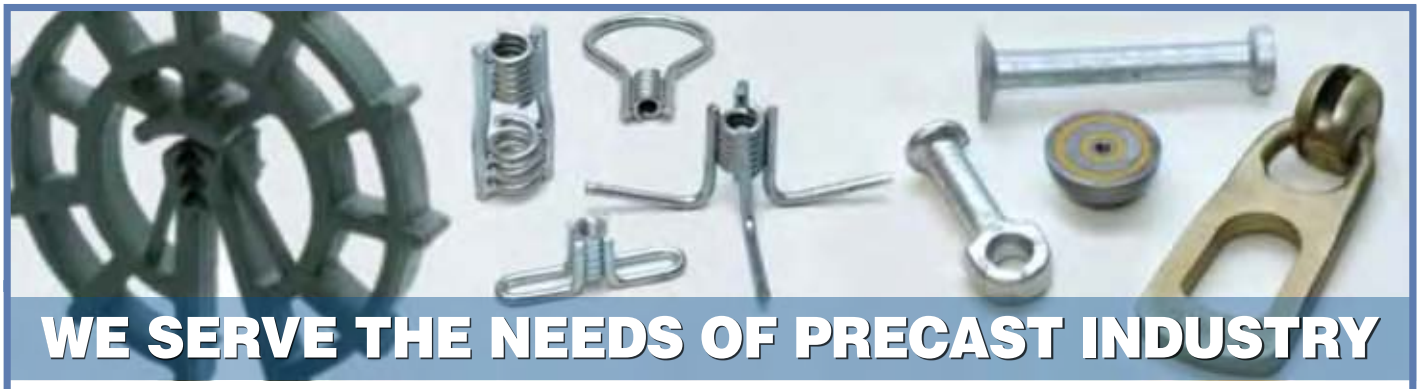
In addition, the Committee decided to modify all of the reinforcing steel checks throughout the manual from a frequency of "3 pieces or 3%" to "1 piece or 3%, whichever is greater." This change was proposed to streamline all inspection criteria for certified plants.

The "Plant Terms and Conditions" language was also modified such that any actions, probations, appeals and issues with inspections begin from the date of the inspection within the given calendar year of the program. More specifically, Section 6.2 will read "45 calendar days from the date of inspection." This change was also implemented to streamline member understanding and certification program management processes.

There were a number of changes proposed in other chapters and sections of the manual that will eventually be realized in program requirements. However, most of these will be to clarify existing language or to provide new guidance on emerging technologies in precast concrete production.

For more information, contact me at pcutler@precast.org or (317) 571-9500, or toll-free at (800) 366-7731.

Phillip Cutler, P.E., is NPCA's director of Technical Services.



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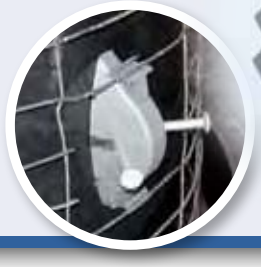

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WHERE WERE YOU ON 9/11?

SOMBER BLACK ARCHITECTURAL PRECAST CONCRETE WALL PANELS AND BENCHES LEAD VISITORS ALONG THE CRASH PATH AT THE FLIGHT 93 MEMORIAL *Photo by Sara Hillegas, P.E., USACE*

Tracing the crash path of Flight 93 in a Pennsylvania field, a dramatic new national memorial makes us pause and remember the heroism of the passengers who selflessly fought against terrorism.

BY SUE McCRAVEN

Each of us has an indelible memory of where we were that Tuesday morning when we first heard the news of passenger jets crashing into New York's Twin Towers and the Pentagon. I was in a small basement office across the street from a cemetery when the radio broadcast caused me to stand still with shock and disbelief. Most of us needed more than one viewing of televised videos of the Manhattan skyline before we could comprehend the unbelievable: Our homeland had suffered a large-scale terrorist attack.

Later came the news of passengers on United Airlines Flight 93 using cell phones to call loved ones to say their flight from Newark to San Francisco was highjacked. The passengers tried to regain control of the aircraft, causing the Boeing 757 to crash into a Shanksville, Pa., field, just 150 miles northwest of Washington, D.C. All 40 passengers and crew plus the four highjackers were killed on impact. Flight recorders revealed that the heroism of the passengers who fought back prevented the plane from reaching its probable target, the U.S. Capitol, just a 20-minute flight from the crash site.

The Flight 93 Memorial

The U.S. Army Corps of Engineers (USACE), Pittsburgh District, was hired by the National Park Service, project owner and site manager, to provide construction management services for a memorial commemorating the heroism of the passengers and crew. After two years of construction, the Flight 93 Memorial was completed and dedicated in September 2011.

As visitors travel along the custom pavement that traces the gouged path of the plane as it plowed into the earth, they come to the names of those who perished, elegantly etched into white Vermont marble. This inspiring

IN THE MEMORIAL WALL, SIGNATURES ON A USACE HARDHAT RECOGNIZE THE PITTSBURGH DISTRICT'S CONSTRUCTION MANAGEMENT TEAM. *Photo by Bryan Ciccocioppo, USACE (www.lrp.usace.army.mil)*

PRECAST CONCRETE WALL SECTIONS ARE SHOWN IN THE ROYAL STONE PLANT. *Photo by Bruce Felix, Arrow Kinsley Joint Ventures*

MARBLE-CLAD PRECAST SECTIONS FOR THE FLIGHT PATH WALL, SHOWN IN THE ROYAL STONE PRODUCTION PLANT. *Photo by Bruce Felix, AKJV*

ARCHITECTURAL PRECAST CONCRETE WALL SECTIONS ARE BEING PLACED WITH A CRANE. *Photo by Bryan Ciccocioppo, USACE*

memorial, designed by Paul Murdoch Architects of Beverly Hills, Calif., impels visitors to reflect on the last moments of life for the men and women aboard Flight 93 as the pilotless plane plummeted, upside-down, out of the blue sky on that terrible morning.

Let's roll!

Sara Hillegas, P.E., a hydraulic engineer with the USACE, Pittsburgh District, one of two construction management representatives on the project, explained some of the details of the memorial's precast concrete elements. "The precast architectural concrete, cast by Royal Stone of Williamston, Mich., was trucked in 20-ft sections to the project site, and crane-lifted into place by a crew of three to four workers to form the Memorial Wall and base for the Memorial Walkway benches. The architectural precast contains black granite aggregate, black sand, is stained black and sealed to give it a matte finish. The concrete work on site took tremendous coordination and scheduling between multiple subcontractors and suppliers."

The Flight 93 Memorial gives rise to the legendary acts of a few brave Americans who thwarted the hijackers' mission and prevented the certain deaths for many others had the plane reached its intended target.

Sue McCraven, NPCA technical consultant and Precast Solutions *editor, is a civil and environmental engineer.*

People & Products is a forum where NPCA members and nonprofit organizations can share inormation 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 NPCA. Attn: Precast Inc. magazine, 1320 City Center Drive Suite #200, Carmel, IN 46032 or email them to rhyink@precast.org.

Oldcastle Precast Inc. acquires assets of U.S. Concrete California precast operations

Oldcastle Precast Inc. has announced that it has reached a definitive agreement to acquire key assets of U.S. Concrete's six precast concrete operations in California.

The acquisition will strengthen the Oldcastle Precast presence in the important western U.S. market and provide a leading position in the storm and sanitary sewer market in Northern California, while adding to the company's already solid statewide positions in the utility, transportation and structural business, says the company.

U.S. Concrete's precast operations consist of Central Precast Concrete Inc., San Diego Precast Concrete Inc. and Sierra Precast Inc. U.S. Concrete considers the divestiture a major milestone in the strategic positioning of the company.

Jensen introduces new products

Jensen Precast, based in Sparks, Nev., has placed new products on the market: the Verti-Set Box Culvert and a new line of handholes and traffic pull boxes.

Verti-Set is a "no tug" style of precast concrete monolithic box culvert that is set vertically allowing for faster installation and cleaner joints. Traditionally, the four-sided monolithic box culvert has been the standard in the industry for applications such as road crossings, utility trenches and drainage culverts. However, installation is tedious and time consuming, because setting the pieces requires tugging the joints together with a pulley system. The "tug up" operation frequently drags sub-grade materials into the joint, which can compromise the sealant and leave large joint gaps that allow infiltration of water and bedding materials.

To combat these challenges, Jensen Precast has produced the Verti-Set Box Culvert, a style of cantilever wall box culvert with a bottom and two sides with a top that is cast separately and put into place after the base structure is installed. The three-sided design allows for the culvert to be installed vertically and dropped into place, rather than tugged. Not only does it save numerous hours in the field, it also provides cleaner, tighter joints with significantly lower chances of infiltration, says the company.

Verti-Set Box Culvert is available in spans from 4 ft to 12 ft, and heights from 4 ft to 12 ft. To see a video, visit YouTube and search for "Verti-Set."

JENSEN'S METER BOXES AND HANDHOLES

Jensen has also announced that it is now manufacturing its own line of handholes and traffic pull boxes used by electrical, water and communications utilities.

To manage its new Handhole and Meter Box Division, the company has brought Ken Hazleton on board. He brings with him more than 45 years of experience in the precast concrete pull box industry. Having worked for the area's largest producers of handholes and meter boxes, Hazleton is a familiar face throughout the Southwest with utilities, agencies, municipalities, contractors and engineers who have been relying on his expertise over the years.

JENSEN PRECAST'S VERTI-SET BOX CULVERT

The initial rollout consists of traffic rated pull boxes with steel lids, including the LockLid brand of traffic rated lids, in five standard sizes. It will also consist of non-traffic handhole boxes with a variety of lids including the LockLid brand. All the metal lids for the handholes and traffic boxes, including the LockLid brand, are manufactured by Jensen MetalTech, a division of Jensen Precast. They are available in diamond plate as well as TraxPlate, a patented slip-resistant surfacing process exclusive to Jensen MetalTech.

For more information, contact Marcia Neese, marketing and communications manager, at (775) 352-2709 or mneese@jensenprecast.com.

Spillman now represents Teksam in U.S. and Canada

Bo Stenumgaard, managing director of Teksam, and Theodore W. Coons, president of Spillman Company, have announced that Spillman is now representing Teksam as a sales agent in the United States and Canada, except for the province of Quebec.

Teksam, founded in 1979 in Hantsholm, Denmark, as an engineering company, now supplies machinery and technology to the precast concrete industry worldwide. Its goal is to provide reasonably priced, high-quality equipment assembled from standard components to match customer requirements. Teksam's complete product line, from Grade Ring Machines to Dry Cast Box Culvert equipment, is engineered and produced for longevity, says the company.

Spillman is a 64-year-old manufacturer of custom steel forms for the precast, prestressed and concrete pipe industries.

Located in Columbus, Ohio, it sells throughout North America. Spillman also sells a wide range of plastic rebar accessories, production hardware and a complete range of EZY-STRYP magnet side rails, magnets and accessories.

For more information, call Theodore W. Coons at (614) 444-2184 or toll-free at (800) 44-FORMS, or email him at tcoons@spillmanform.com.

Americast and Hanson Pipe & Precast announce agreement

Americast Inc. and Hanson Pipe & Precast LLC have signed an agreement to form a new joint venture company to be known as Concrete Pipe & Precast LLC (CP&P). The new company will consist of selected Americast and Hanson operations and will manufacture, market and sell a complete line of concrete pipe and precast products in much of the mid-Atlantic and southeastern United States.

CP&P will have manufacturing facilities in Ashland, Chesapeake, Hanover, Harrisonburg, Roanoke and Salem, all in Virginia; Martinsburg, W.Va.; Jessup, Md.; Dunn and Oakboro, N.C.; Barnwell, Charleston and Summerville, S.C.; and Rincon, Ga. Americast and Hanson will have equal interests in the venture.

As the construction industry has been severely impacted by the adverse economic conditions over the past five years, the partnership will enable a more efficient, sustainable company positioned to succeed in a dynamic marketplace, says Americast.

Hanson added that the joint venture in these selected markets will allow the combined operations to remain competitive and strong in today's evolving marketplace while ensuring that their customers and the communities they service receive quality concrete products.

Americast Inc. is a wholly owned subsidiary of Eagle Corp., a diversified building products company based in Charlottesville, Va. The company specializes in the design and manufacture of a complete line of concrete pipe and precast products for commercial and residential applications.

Hanson Pipe & Precast LLC is the largest manufacturer of concrete pipe and precast products in North America. The company has a network of manufacturing facilities and delivery capabilities that span the continent.

Besser adds customer service rep

Ron Scherer has joined the Besser team as customer service/product development representative. In his position, he will be working with producers around the globe. He will apply his experience with all brands of production equipment, his knowledge of plant operations including mix design optimization and maintenance, to produce higher quality products and improve operational effectiveness and plant profitability.

RON SCHERER

Scherer, a graduate of the University of Minnesota – Duluth, has more than 20 years of extensive experience in the concrete products industry, the last eight as a manufacturing improvement

specialist with Oldcastle APG. In this role he was responsible for improving all aspects of manufacturing at Oldcastle APG facilities throughout North America and Canada.

For more information about Besser equipment, visit www.besser.com.

Spancrete hires new director of operations

Spancrete, a designer, manufacturer and distributor of precast, prestressed concrete products and solutions, has hired Scott Galke as director of operations for its Valders, Wis., plant.

SCOTT GALKE

Galke, a Wisconsin native, recently served as the director of operations at Metromont Precast in Greenville, S.C. Prior to his tenure at Metromont, Galke was the operations manager at Shockey Precast Co. in Virginia and also held other general manager roles.

For more information about Spancrete, visit www.spancrete.com.

New J-J Hooks barrier passes demanding crash tests

Easi-Set Worldwide, based in Midland, Va., has announced that its highly successful J-J Hooks safety barrier system has successfully passed both bolted-down and pinned-down MASH (Manual for Assessing Safety Hardware) Test Level 3 crash tests, outperforming other comparable systems, says the company. The tests were performed by the Texas Transportation Institute, College Station, Texas, a nationally recognized certified testing facility.

Prior to these tests, more than 41 states/provinces and eight countries have approved the free-standing J-J Hooks temporary barrier for use on their highways. This temporary barrier successfully passed NCHRP 350 TL3 tests in the 1990s, qualifying it for approval as an alternate to existing state/provincial standard barrier designs. Easi-Set is identifying this barrier as J-J Hooks/NCHRP.

EASI-SET'S J-J HOOKS BARRIERS DURING CRASH TESTS

The development and successful testing of the anchored J-J Hook design now allows Easi-Set's licensed producers to offer highway authorities a complete family of barriers meeting all highway application requirements. The anchored J-J Hooks design (dubbed J-J Hooks/MASH) incorporates an enlarged J-Hook, additional reinforcing to absorb the higher impact loads, and patented deflection-limiting blocks.

The J-J Hooks/NCHRP and the J-J Hooks/MASH barriers connect seamlessly to each other. Both designs are available in cross sections commonly used on existing highways.

For more information, visit www.jjhooks.com and www.easiset.com. For technical questions, contact Moffette Tharpe, director of Easi-Set Worldwide, at (540) 439-8911.

Dayton Superior broadens availability of concrete industry mobile apps

Dayton Superior has announced the recently released mobile application Dayton Superior Calculator App, now available in the iTunes App Store for iPhone and iPad users. Previously, the app was released only in the Android market. The company's other mobile app, Dayton Superior Searcher, was released in both the Android market and the iTunes App Store.

Dayton Superior's two apps are the Dayton Superior Searcher, which provides users with detailed information about the company's products, and Dayton Superior Calculator, which allows customers to easily determine the amount of grout and epoxy required to cover a variety of shapes.

For smart phone users, both apps include a feature where a touch on Dayton Superior's telephone number within the app will connect immediately to customer service.

For more information and downloading, visit www.daytonsuperior.com/Apps or go directly to the Android Market or iTunes App Store and search for Dayton Superior.

Spin Screed selected to finish North America's widest bridge

Spin Screed Inc., a manufacturer of power roller screed systems based in Quincy, Ill., was chosen to add the finishing touches to more than 1,000

BRIDGE SEGMENTS FOR THE PORT MANN BRIDGE

precast bridge segments for North America's widest bridge, and the longest bridge in Canada.

The Port Mann Bridge, a $3.3 billion project near Vancouver, British Columbia, is comprised of more than 1,000 precast bridge segments, all of which are being finished by Spin Screed.

For more information about Spin Screed Inc., visit www.spinscreed.com.

LiftOne to represent Yale forklifts in central Tennessee

LiftOne LLC has become the authorized dealer for Yale Materials Handling Equipment in the Tennessee markets previously serviced by KMH Systems. LiftOne has announced its intent to purchase certain new Yale inventory and aftermarket parts from KMH Systems Inc. KMH presently is an authorized dealer of Yale forklifts in portions of central Tennessee, Ohio and Indiana.

LiftOne is an authorized dealer of Hyster brand forklifts in portions of Tennessee, North Carolina, South Carolina, Alabama and Georgia.

For more information about Yale, visit www.yale.com.

ALL promotes father/son managers at ALL Canada Cranes & Aerials Ltd.

JASON AND BOB HANNA

The ALL Family of Companies has announced father-and-son promotions at ALL Canada Cranes & Aerials Ltd., based in Mississauga, Ontario. Jason Hanna, former operations manager for ALL Canada Cranes & Aerials, has been named general manager and is responsible for the day-to-day operations of all four Canadian branches. Robert (Bob) Hanna, Jason's father and former general manager of ALL Canada Cranes & Aerials, has been named vice president of Subsidiary Operations – Canada, overseeing all corporate operations in Canada.

Bob is specifically charged with advancing sales and bridging opportunities between the branches.

Contact ALL Canada Cranes & Aerials at (905) 795-1090 or toll-free at (800) 989-4845. For more information about ALL Erection & Crane Rental Corp., visit www.allcrane.com.

Two custom rubber and plastic leaders combine

Universal Rubber & Polymer Ltd. has announced the completion of its acquisition of Dybrook Products Inc. Universal is an operating company of The Cypress Companies in

Akron, Ohio, and Dybrook is a leader in custom molded and extruded rubber products serving the automotive, industrial, commercial, energy and other markets. When coupled with Universal's established strengths in extrusion (both rubber and plastic), molding, secondary operations and overseas sourcing, customers will enjoy the enhanced capabilities of a more proficient supplier.

Nearly all Dybrook personnel will be retained by Universal and will initially continue to work at Dybrook's Warren, Ohio, facility to ensure a seamless transition for customers. In time, Dybrook's leased facility will be consolidated into Universal's Middlefield, Ohio, location approximately 30 minutes away.

Immediate customer benefits of the combination include redundancy and backup, more capacity and enhanced capabilities.

For more information, visit www.universalpolymer.com.

GSE Environmental featured on "World's Greatest! ..."

GSE Environmental, a global manufacturer and provider of geosynthetic lining products and services, was featured on the popular "World's Greatest! ..." television show on the ION Television Network. GSE's selection for the show was based on the company's position as the global leader in providing environmental solutions to its customers after the show's production company, How 2 Media, conducted several interviews with key professionals in the industry, says the company.

How 2 Media sent a film crew to GSE's corporate headquarters in Houston to get the story behind the growing company. The episode aired June 11, June 18 and June 25, and it can be viewed online at www.gseworld.com.

ASCC calls for Decorative Concrete Awards entries

The Decorative Concrete Council, a specialty council of the American Society of Concrete Contractors, has announced its fifth annual Decorative Concrete Awards. The competition is open to DCC members and nonmembers.

Entries are invited in the following categories: overlays, cast-in-place – stamped and special finishes, stained, polished, countertops, vertical application, concrete artistry, multiple applications, graphics and epoxy/polyaspartic flooring. With the exception of countertops, two awards may be given in each category, for projects 5,000 sq ft and smaller and projects larger than 5,000 sq ft. Submittals are judged on craftsmanship, aesthetics, functionality and creativity.

The deadline for submittal is Oct. 1, 2012. The awards will be presented at the World of Concrete 2013. For more information, visit www.ascconline.org or call (866) 788-2722.

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NPCA CALENDAR

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

Meeting	Location	Date
NPCA 47th Annual Convention	Ritz-Carlton – New Orleans	Oct. 3-6, 2012
The Precast Show 2013	Indiana Convention Center – Indianapolis	Jan. 11-13, 2013
NPCA 48th Annual Convention	The Homestead – Hot Springs, Va.	Oct. 9-12, 2013
The Precast Show 2014	George R. Brown Convention Center – Houston	Feb. 13-15, 2014
The Precast Show 2015	Orange County Convention Center – Orlando, Fla.	March 5-7, 2015

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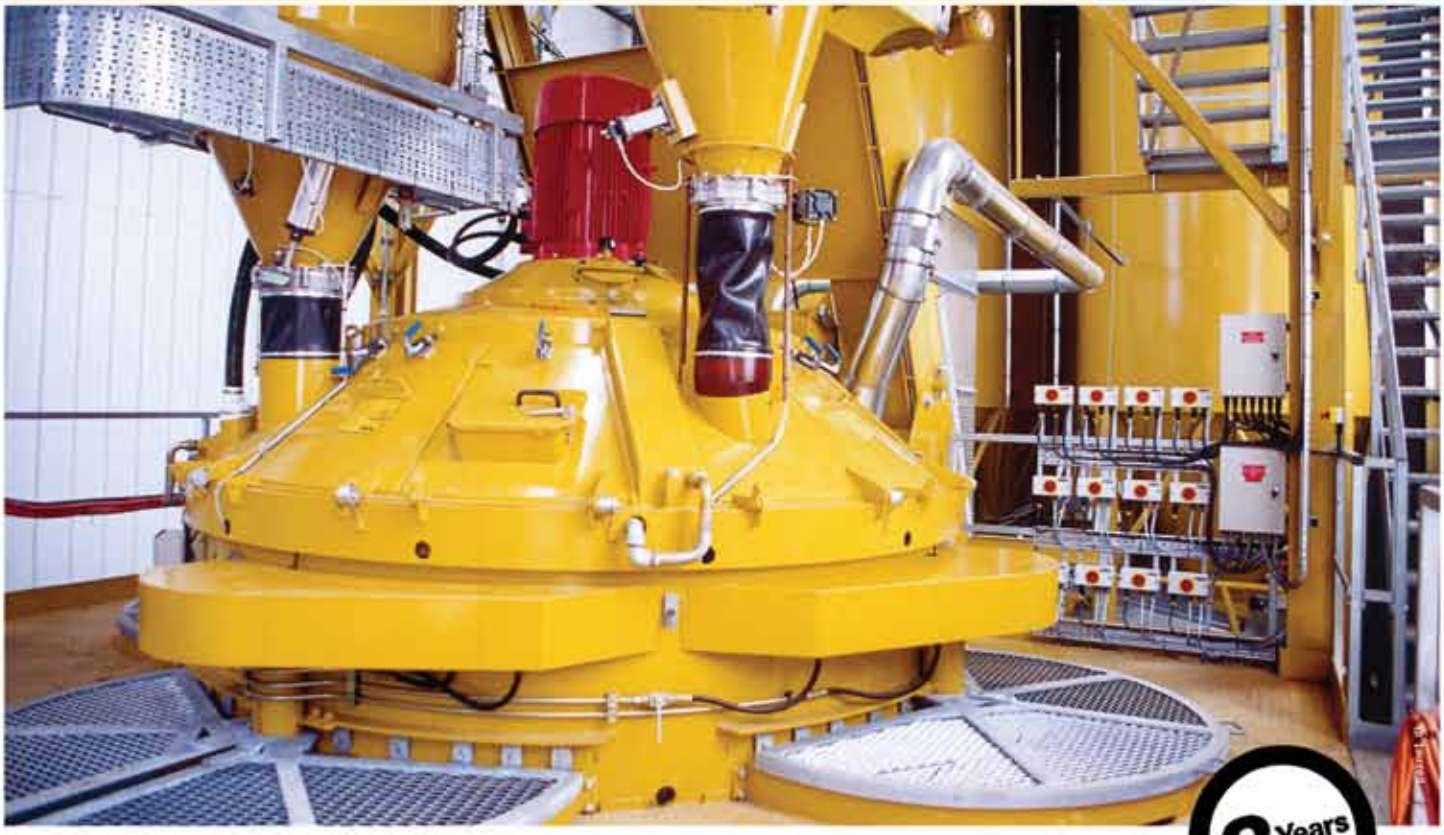

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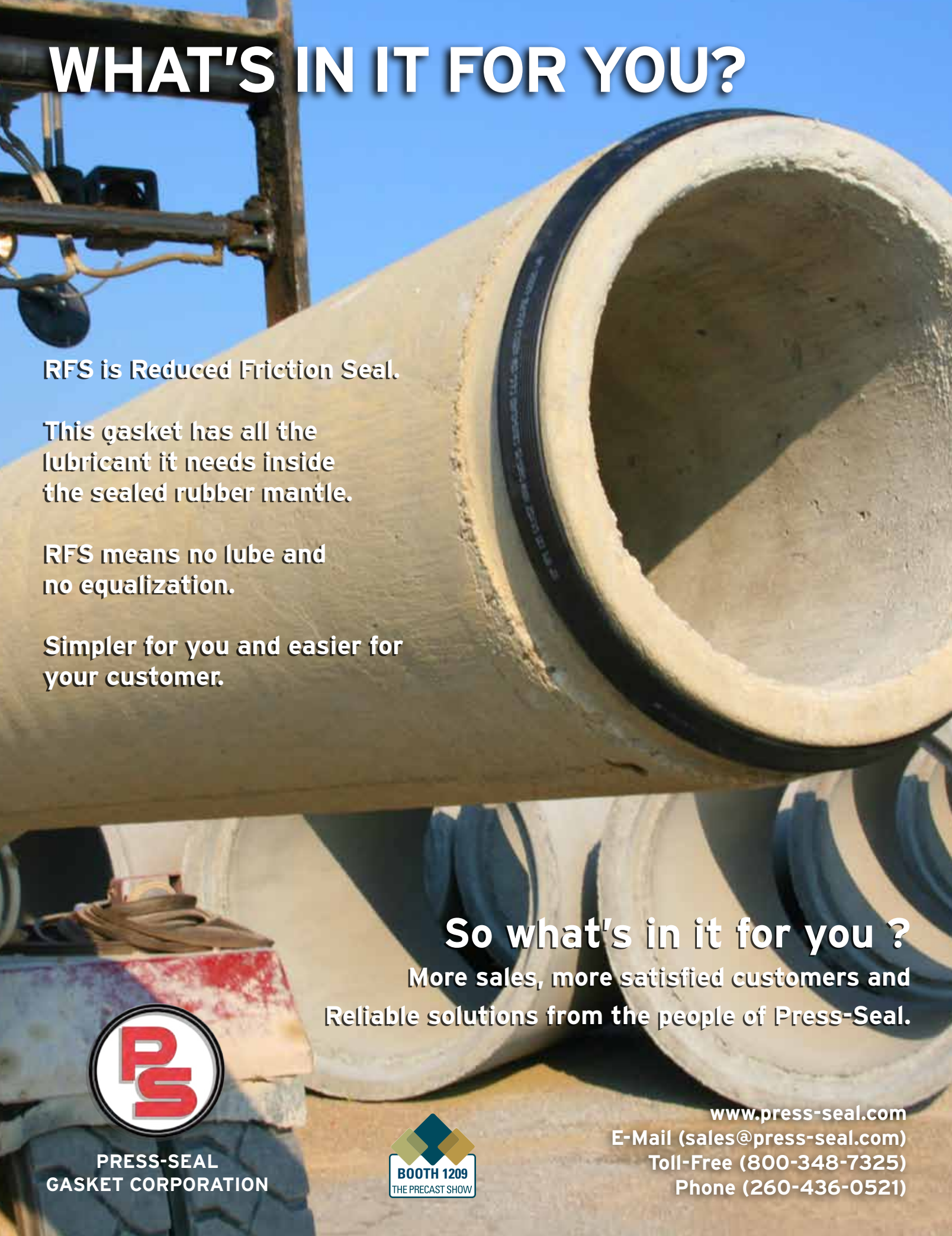
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