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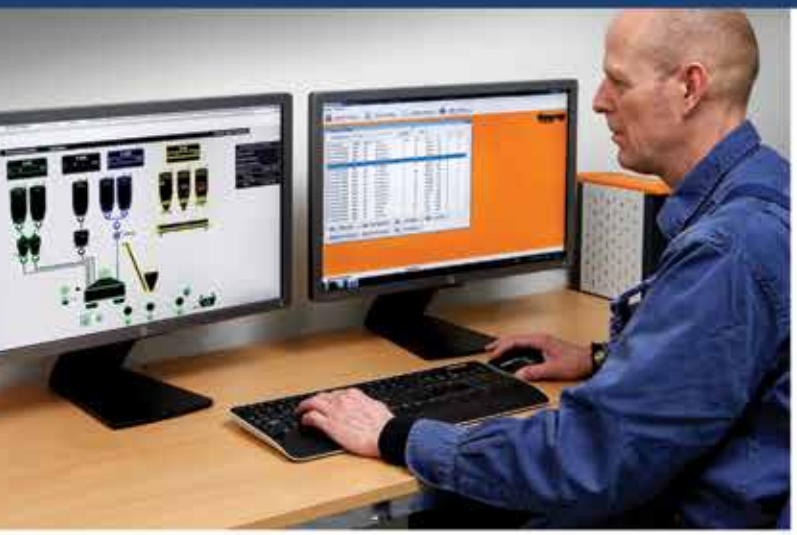

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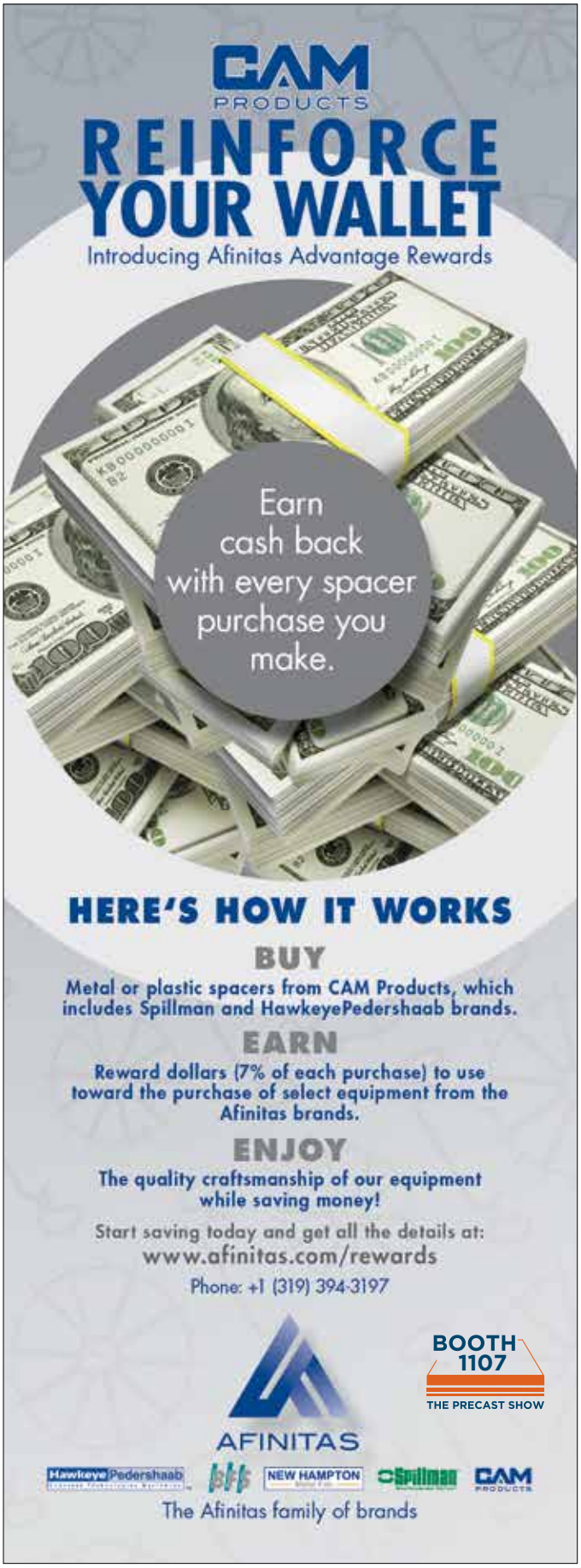

Questions from the **Field**

Questions from the Field is a selection of questions NPCA Technical Services engineers received from calls, emails and comments on blog posts or magazine articles on **precast.org**.

If you have a technical question, contact us by calling (800) 366-7731 or visit precast.org/technical-services.

Ron writes:

I have always complied with the vacuum testing requirements of ASTM C1227 and am looking at the water testing procedures for the first time. When section 9.2.2 of ASTM C1227 states that we must "refill the tank" after 24 hours, does that mean we have to pump all water out of the tank and restart?

NPCA Technical Services engineers answered:

Not at all. ASTM C1227 Section 9.2.2 standardizes the water pressure test with very succinct steps.

1. **Seal the tank** – This step refers to any seams in the tank, not the installation of a cover. If you are testing a monolithically poured septic tank, you would not have a seam to seal.
2. **Fill with water and let stand for 24 hours** – You should fill the tank to the operational level and then not disturb it for a full 24-hour cycle. During this time, the concrete surface may absorb water and slightly lower the water level.
3. **Refill the tank** – Any change in the water level during the first 24 hours of the test should not be interpreted as leakage or a lack of watertightness. In fact, a determination of watertightness at this stage of the test is premature and contrary to the specification itself. The slight change in water level during the first 24 hours is normal. Simply add water to the tank to return the water level to its previous level.
4. **Let stand for 1 hour** – After the 24-hour mark, the tank must hold the refilled water level for one hour. If the water level remains unchanged after 1 hour, then the tank passes the ASTM C1227 water pressure performance test.

Vacuum Test

Photo courtesy of Bartow Precast

Chris writes:

How are 3D-printed concrete structures reinforced?

NPCA Technical Services engineers answered:

3D printing of concrete is still a very new technology and research is ongoing on how to build these structures to perform as needed. There are several methods of reinforcement under consideration including fibers, hand or mechanically placed mesh or insertions of rebar during 3D layering. Another consideration is simply printing the concrete around existing, pre-assembled reinforcing. NPCA will continue to monitor this evolving technology to see if and how it rises to meet the stringent requirements of reinforced precast concrete structures. **PI**

Photo courtesy of DTE Energy

A Closer Look:

FLY ASH, SLAG CEMENT & METAKAOLIN

An in-depth look at mineral admixtures.

By Claude Goguen, P.E., LEED AP

Editor's Note: *This is the first article in a year-long series explaining common raw materials used in precast.*

Precast concrete manufacturers are always refining mix designs and production techniques to make high quality concrete. Luckily, modern technology provides many useful resources to accomplish this goal. Scientists have developed chemical admixtures that can reduce water demand, configure air bubbles to address freeze-thaw concerns, control shrinkage and protect steel from corrosion. In this article, we will look at mineral admixtures, most commonly referred to as supplementary cementitious material (SCM). These products did not originate in high-end laboratory test tubes but rather in landfills and nature.

FLY ASH

Mount Vesuvius supplied the Romans with the volcanic ash they used to construct aqueducts, sewers and buildings that still stand today. While the volcanic ash industry may no longer be focused on its potential as an SCM, we are fortunate to have other types of pozzolans at our disposal. A pozzolan is a siliceous material (or a blend of siliceous and aluminous materials) that will chemically react with calcium hydroxide (CH) in the presence of moisture to form calcium silicate hydrate (CSH), which is the compound responsible for quality concrete. This pozzolanic reaction differs from the hydration of ordinary portland cement (OPC). OPC is a hydraulic material, meaning it reacts chemically with water, and forms CH and CSH. CH is more of a byproduct in concrete and is prone to reactions with aggressive elements that may cause durability issues. Therefore, exchanging the CH formed by cement hydration for CSH makes the use of fly ash very appealing.

Using fly ash also enhances the economy and sustainability of the product by replacing a portion of OPC. That replacement can be up to

25% (by mass) of total cementitious materials, although higher levels have been used. Fly ash can be used as a separate SCM or used in a blended cement.

Fly ash particle size varies from less than one micrometer to more than 100 micrometers. Fly ash is primarily silicate glass containing silica, alumina, iron and calcium, but also includes magnesium, sulfur, sodium, potassium and carbon. The specific gravity of fly ash generally ranges between 2.0 and 2.8, lower than the specific gravity of OPC, which is 3.15. Consequently, we substitute up to 1 1/2 pounds of fly ash for every pound of OPC. To compensate for this additional material in a fixed volume of concrete, the amount of fine aggregate may be reduced to accommodate the additional volume of fly ash.

ASTM C618, "Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete," classifies fly ash into two types, based on calcium content. Class F fly ash has a low-calcium content (5%-10%) while Class C fly ash has a higher calcium content (10%-30%).

Class F fly ash has a carbon content less than 5% but sometimes as high as 10%. Class C typically has a carbon content of less than 2%.

How fly ash impacts fresh concrete

Using fly ash usually reduces water demand versus the same slump or spread concrete while using just OPC. However, at higher fly ash proportions, the water demand can increase.

Due to its spherical nature, fly ash tends to enhance workability of concrete and reduces bleeding. Fly ash can also impact air entrainment efficiency. Generally, when fly ash is added to the mix, more air-entraining admixture is required to achieve a specific air content because high carbon content will soak up the air entraining and can result in lower air contents. Because the impact on air entraining depends on carbon content, the effect is less evident with Class C fly ash than Class F.

Fly ash use can also slow down setting times, which can be problematic for reaching stripping strengths. This can be offset by using an accelerating admixture or a Type III cement.

Fly ash is the fine ash produced at coal-fire power plants that develops cementitious properties when mixed with cement and water.

How fly ash impacts hardened concrete

Strength gain with fly ash is similar to that of concretes made solely with OPC. However, there can be some additional early age strength gain, especially with Class C fly ash. The conversion of CH to CSH

also helps to reduce permeability, which increases concrete's durability in many situations, including high sulfate environments. Additionally, the added CSH from using fly ash can also chemically bind with the alkalis in the concrete and help resist alkali silica reaction (ASR).

SLAG CEMENT

Slag cement, originally known as ground granulated blast-furnace slag (GGBFS), is a byproduct from the production of iron. The blast furnace is used to refine iron ore into iron and the resulting components from the heating of ingredients are iron and molten slag. The iron is used to produce steel and the molten slag is converted to a cement-like material by rapidly cooling it with water. This rapid cooling creates glassy granules, which are ground into a fine powder. Slag is not a pozzolan like fly ash, but rather a nonmetallic hydraulic cement. Fortunately, it does consume CH by binding alkalis in its hydration products.

Slag cement is generally ground to less than 45 microns and has a specific gravity in the range of 2.85 to 2.95. Slag is generally used in higher percentages than fly ash, commonly constituting between 30% and 45% of the cementitious material in concrete, while some comprise as high as 70% or more of the cementitious material in a mix. ASTM C989, "Standard Specification for Slag Cement for Use in Concrete and Mortars," classifies slag by its increasing level of reactivity as Grade 80, 100 or 120. Grade 80 has a low activity index and is used primarily in mass structures because it generates less heat than OPC. Grade 100 has a moderate activity index and is most like OPC with respect to cementitious behavior and is readily available. Grade 120 has a high activity index and is more cementitious than OPC.

Slag cement begins in an iron ore furnace.

How slag impacts fresh concrete

Slag cement usually decreases water demand between 1% and 10%, depending on dosage. Like fly ash, slag cement will generally enhance the workability of concrete. However, its effect on the required dosage rate of air-entraining admixtures is variable. The impact of slag cement on bleed rates will depend on its fineness. Concretes containing ground slag of comparable fineness to that of the cement tend to show an increased rate and amount of bleeding than OPC concretes, while slag ground finer than cement generally reduces bleeding.

Similar to fly ash, the use of slag cement can slow down setting times. This can also be offset using an accelerating admixture or perhaps a Type III cement.

How slag cement impacts hardened concrete

The strength gain of slag concrete may increase compared to the same mix using only OPC. Slag cement in concrete will create a denser matrix, reducing permeability and enhancing durability when exposed to aggressive chemicals. This is especially true in high sulfate environments where some studies indicate concrete with ground slag has a sulfate resistance equal to or greater than concrete made with Type V sulfate-resistant OPC.[1] Slag cement can also reduce the potential for ASR by consuming alkalis in the hydration process and reducing their availability.

METAKAOLIN

Metakaolin is a natural pozzolan just like volcanic ash. Modern use of natural pozzolans dates back to early 20th Century public works projects, such as dams, where they controlled temperature rise in mass concrete and provided cementitious properties. In addition, natural pozzolans were used to improve resistance to sulfate attack and were among the first materials found to mitigate ASR.

The most common natural pozzolans used today – calcined clay, calcined shale and metakaolin – are processed materials, which are heat treated in a kiln and then ground to a fine powder.

Metakaolin is considered a special calcined clay and produced by low temperature calcination of high purity kaolin clay. The product is ground to an average particle size of about 1 to 2 micrometers. The specific gravity of metakaolin is about 2.5. Metakaolin is used in special applications where very low permeability, very high strength or both are required.

In these applications, metakaolin is used more as an additive to the concrete rather than a replacement of cement. Typical additions are around 10% of the cement mass. The reactivity of metakaolin is based on chemical composition and reactive surface. Highly reactive metakaolin has become available as a considerably reactive pozzolanic material in concrete.

How metakaolin impacts fresh concrete

Metakaolin generally has little effect on water demand at normal dosages; however, higher dosages can significantly increase water demand. Like fly ash and slag cement, metakaolin will generally enhance workability of concrete; yet, its effect on the required dosage rate of air-entraining admixtures is minimal. Metakaolin has little effect on bleeding and setting times. Metakaolin concrete tends to exhibit better finishability compared to other SCMs due to its creamy texture.

How metakaolin impacts hardened concrete

Metakaolin's reaction rate is rapid, significantly increasing compressive strength even at early age, which can allow for earlier stripping. Mixes with metakaolin at 8% of the total cementitious materials have produced concrete compressive strength increases of more than 20% in one day and 40% at 28 days.[2]

Air-entrained concrete containing about 10% of metakaolin by mass will withstand ingression of chloride ions and increases durability to repeated cycles of freeze-thaw.

Metakaolin in concrete tends to reduce the size of pores, which, consequently, leads to higher density and more resistance to aggressive chemicals. Furthermore, metakaolin improves concrete resistance to ASR and sulfate attack.

Sustainability considerations of fly ash, slag cement and metakaolin

The use of SCMs such as fly ash, slag cement or metakaolin in manufacturing precast concrete can contribute to the sustainability of a product or project. Using SCMs helps in terms of minimizing waste of resources and energy during construction. The use of blended cement or the replacement of OPC with industrial byproducts such as SCMs reduces the amount of clinker required per cubic yard of concrete. Less cement in the precast means less embodied energy and represents CO_2 emissions. When industrial byproducts such as fly ash and slag are used, they not only provide a sustainable option because of their reuse, but also improve concrete properties while reducing cost. Metakaolin has added advantages of lowering the processing temperature, providing a smaller embodied energy and reducing greenhouse gas emissions.

Modern use of natural pozzalans dates back to 20th century public works projects, such as dams.

While manufacturers continue their quest to make high quality concrete, they must consider the available options in their areas and be open to experimenting using different ingredients such as the ones discussed in this article. Using one or a combination of SCMs may significantly enhance durability of the precast concrete product and even provide economic benefits. **PI**

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

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2. Justice, J. M. and Kurtis, K. E., "Influence of Metakaolin Surface Area on Properties of Cement-based Materials", ASCE Journal of Materials in Civil Engineering, September 2007, Vol. 19, No. 9, pp. 762-771.

Standardizing Hatch Specifications

Pinpointing exact hatch needs to control costs.

By Alex Morales, M.Ed.

NPCA file photo

Precasters can receive a wide range of responses when shopping for utility hatches. You, or the project owner, may have preferences about its design features or operation, but meeting in-service strength criteria is independent from mechanisms for opening and closing the door. It's important to ensure you are comparing the exact same strength of hatches from different manufacturers with respect to the type and thickness of metal used that complies with project specifications.

Specifiers and owners need to be on the same page regarding the exact requirement of the hatch to help precasters bid more competitively. ASTM C1802-18, "Standard Specification for Design, Testing, Manufacture, Selection, and Installation of Fabricated Metal Horizontal Access Hatches for Utility, Water, and Wastewater Structures," seeks to accomplish that goal.

BACKGROUND

Access hatches can be made of varying performance strengths based on:

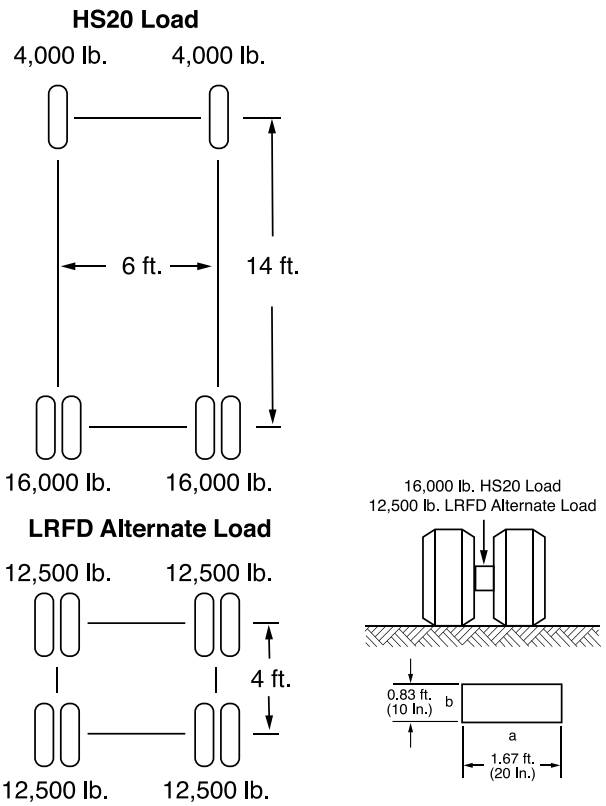
Type of material (aluminum, steel, cast iron, etc.)

Amount of material used to manufacture the hatch (thickness)

Added structural components within the frame and lids (frame configuration, added angle and channel shapes)

Specifying the exact load requirement of a hatch will help standardize the cost for owners and ensure proper performance throughout the life of the structure.

The load capacity of the hatch must coincide with the strength of the precast concrete unit for the entire structure to function properly and handle the anticipated live loads. The surface area of a hatch exposed to live loads, and the specific type of traffic, is important to address to prevent either over or under design.



NPCA graphic

AASHTO TRAFFIC RATINGS

The American Association of State Highway and Transportation Officials (AASHTO) publishes specifications and guidelines in highway design and construction throughout the United States. AASHTO Standard Specifications for Highway Bridges addresses load bearing requirements for manhole covers that had traditionally been applied to utility hatches. AASHTO has established the following categories for design truck loads for regular vehicular traffic:

H20/HS20 = 16,000-pound wheel load, 32,000-pound per axle

H25/HS25 = 20,000-pound wheel load, 40,000-pound per axle

A single-wheel footprint load analysis is appropriate for structures using hatches in highways that experience truck or semi-trailer wheel loads constantly. But, what about lanes of traffic where semi-trailer traffic is prohibited? Or in a drive-thru where large trucks can't fit? Although the industry standard for H20 loading is for highway traffic exposure, utility hatches are frequently found in areas where semi-traffic is prohibited. An H20- or HS20-rated utility hatch may be an overdesign for an application adding substantial unnecessary expense to the structure. Realizing this, some manufacturers may propose to install a hatch that meets the off-highway requirement of a particular application, while others may propose a hatch complying with H20 or HS20 requirements. Comparing these proposals will reveal a wide range in costs.

ASTM INTERNATIONAL LOAD LEVELS

If a utility structure was placed near a stoplight off the pavement in a grassy area that was periodically mowed with commercial equipment, it would rarely be exposed to actual traffic wheel loads (in the event a vehicle left the actual roadway). If that same structure was placed in a field away from traffic, it may never be subjected to traffic-rated live loads aside from the occasional lawn mower or maintenance pickup truck. Would these need to be specified the same as hatches in or next to the roadway?

ASTM C1802-18, "Standard Specification for Design, Testing, Manufacture, Selection, and Installation of Fabricated Metal Horizontal

Table 1

LOAD LEVEL	AREA OF USE	DESIGN LOAD AND ALLOWABLE DEFLECTION
Load Level 1	**Light Pedestrian Load** Restricted to walkways and other areas that are totally inaccessible to all vehicle traffic	150 pounds per square foot/300 pounds on a 5.5 inch x 5.5 inch area; deflection limited to span/200 (not to exceed 3/16")
Load Level 2	**Pedestrian Load** Restricted to pedestrian and light maintenance vehicle use and are inaccessible to all other vehicle traffic	300 pounds per square foot/600 pounds on a 5.5 inch x 5.5 inch area; deflection limited to span/200 (not to exceed 3/16")
Load Level 3	**Light Vehicular Traffic** Restricted to parking spaces accesible only to passenger vehicles and protected areas within close proximity of roadways	8,000 pounds on a 10 inch x 10 inch footprint without dynamic (impact) load/80 pounds per square inch on top plate surface; deflection limited to span/250 (not to exceed 3/16")
Load Level 4	**Occasional Truck Traffic** Restricted to parking spaces and protected areas within close proximity of roadways	16,000 pounds on a 10 inch x 20 inch footprint without dynamic (impact) load/80 pounds per square inch on top plate surface; deflection limited to span/250 (not to exceed 3/16")
Load Level 5	**Off Street Truck Traffic** Restricted to unrestricted parking lanes and alleyways where traffic speed is limited to 15 mph	16,000 pounds on a 10 inch x 20 inch footprint with 30% dynamic (impact) load/104 pounds per square inch on top plate surface; deflection limited to span/300 (not to exceed 3/16")
Load Level 6	**Two-lane Vehicular/Truck Traffic** Restricted to two-lane streets with a maximum posted speed limit of 35 mph	16,000 pounds on a 10 inch x 20 inch footprint with 33% dynamic (impact) load/106.4 pounds per square inch on top plate surface; deflection limited to span/800 (not to exceed 3/16")
Load Level 7	**Full Traffic** For use in multi-lane roadways with a maxiumum posted speed limit of 70 mph	16,000 pounds on a 10 inch x 20 inch footprint with 33% dynamic (impact) load/106.4 pounds per square inch on top plate surface; deflection limited to span/800 (not to exceed 3/16")
Load Level 8	**Occasional Aircraft Loads** For use in unpaved runway safety zones only	75,000 pounds with 250 psi tire pressure without dynamic (impact) load, or the specific airport design criteria; deflection limited to span/800 (not to exceed 3/16")
Load Level 9	**Aircraft Loads** For use in taxiways and aprons, not for use in runways	75,000 pounds with 250 psi tire pressure with a 33% dynamic (impact) load and a 0.70 gravity breaking load, or the specific airport design criteria; deflection limited to span/800 (not to exceed 3/16")
Load Level 10	**Special Equpment Loads** Such as mining equipment, port equipment, cranes, and earth-moving equipment	The axle load, the axle spacing, tire width, and tire pressure to be provided by the purchaser; a 33% dynamic (impact) load shall be utilized; deflection limited to span/800 (not to exceed 3/16")

Access Hatches for Utility, Water, and Wastewater Structures," provides a variety of loading options to fit the actual condition. As seen in Table 1, the specification ranks load levels from Load Level 1 for light pedestrian loads to Load Level 10 for special equipment loads.

Load Levels 1-3 are all below the H20 loading of 16,000-pound duel wheel loads. They are designed for areas with only pedestrian traffic or lightweight vehicles, like golf carts or four-wheelers. An H20 loading requirement would be considered an overdesign in these applications.

Load Levels 5-7 include the 16,000-pound H20 wheel load as defined by AASTHO specifications. However, these load levels also include an impact factor that is not part of the AASHTO Bridge Design Specification requirement. The load levels are differentiated by whether or not the structure is placed in an actual two-lane highway. The impact factor and allowable deflection when loaded differentiates these load levels.

Above Load Level 7 are several levels for specialty situations, such as airport, or special construction and industry installations. In many of these instances, an H20 loading might be considered an under design.

CONTROLLING COSTS

With each increase in ASTM C1802 load level, the cost of a fabricated metal hatch will increase the total cost of a structure. You could be looking at a wide range of quotes if some fabricators are adhering to an H20 requirement, which doesn't include an impact factor, and others are aware of various ASTM C1802 load levels. It's a situation ripe for comparing apples to oranges.

Ultimately, the owner or specifier will determine what load level is required. While the H20 loading requirement is well understood, many owners don't necessarily understand that a heavier, stronger hatch may also require a stronger, more expensive precast unit so the entire structure performs as intended. Precast structures requiring utility hatches could be overdesigned for lower ASTM C1802 load level applications, which increases costs and makes precast options less competitive.

Precasters and hatch suppliers are wise to **work together** to educate specifiers on **ASTM C1802** load levels.

PARTNER WITH SUPPLIERS

Precasters and hatch suppliers are wise to work together to educate specifiers on ASTM C1802 load levels. The best practice is to begin the hatch selection process in the project specification stage. This will ensure a structure properly meets the in-service requirements rather than needlessly overdesigning underground structures installed away from highway traffic loads. Specifiers who define underground structures that require fabricated metal hatches by load level can ensure they are getting a hatch designed for their particular situation and can better control costs while avoiding unnecessary overdesigns. **PI**

Alex Morales, M.Ed., is NPCA's director of workforce development.

Combating Safety Complacency

How to **minimize safety incidents** at your precast concrete plant due to complacency.

By Mason Nichols

A top priority for every precast concrete plant is keeping all employees safe every day. But employees themselves can unknowingly work against this with complacency, which is a self-satisfaction, or confidence, accompanied by unawareness of actual dangers or deficiencies. When we repeatedly perform a task with success, we develop confidence. This confidence often leads to accomplishing bigger and better things, but it can also lead to unintentional workplace accidents and injuries. Luckily, there are steps you can take to ensure team members' confidence doesn't devolve into complacency.

SAFETY AS A VALUE

Slips, trips, falls, struck-by incidents, caught-in/between – safety risks are found everywhere in a precast concrete plant. The only way to eliminate all risk is to send everyone home and shut down the plant. Clearly, this is not a viable business plan. Safety managers at precast plants are, instead, tasked with finding ways to mitigate risk and protect workers. For Mike Cunningham, environmental, health, safety and sustainability compliance manager for Oldcastle Infrastructure in Telford, Pa., this means supporting a sustainable safety culture of continuous improvement through refining existing programs and rolling out new initiatives.

According to Cunningham, Oldcastle structures its safety program to include several key elements that combat complacency. First, the expectation of safety is not just the responsibility of leadership and safety managers, but instead, of everyone throughout the company. Next, safety is programmed into every decision made, from ordering equipment to hiring vendors, implementing new processes and everything in between. Finally, the company drives risk assessment and corrective action as key components of its approach because safety issues in the plant are a reality.

Oldcastle's safety methods are robust, but despite the company's thoroughness, complacency must still be proactively addressed. As Cunningham explained, complacency can be difficult to eliminate because it seems to be built into our DNA.

"Honestly, I believe it's just human nature," he said. "After you become acquainted with the work environment and get used to it, that's when complacency can set in. And that's with any organization."

So how does Oldcastle address complacency? For Cunningham, it's about having the right mindset and making safety more than just a priority.

"Priorities are based on what's important to you at the time; [safety] is more of a value," he said. "It's something that's consistent no matter what – even when a machine is down, and we'll be behind schedule."

For safety to become more than a priority, Cunningham suggests safety managers at precast plants focus on two key areas: consistency and employee engagement.

Consistency means ensuring safety is always a part of the conversation, which can be accomplished by beginning every event, including administrative meetings, project kick-offs, morning huddles and more with a discussion about safety. A common question Cunningham expects his team members to ask is, "What hazards will be present that you need to be aware of in order to protect yourself?" If employees begin each day by asking this question, safety has a better chance of remaining top of mind, reducing or even eliminating complacency.

The second piece, engagement, ties into Cunningham's belief that safety is the responsibility of the entire team.

"Getting employees involved in the process is crucial," he said. "It's important to train them to identify a risk and know how to mitigate that risk in their daily operations. We want them to get out there and help with the risk identification process by looking for potential hazards."

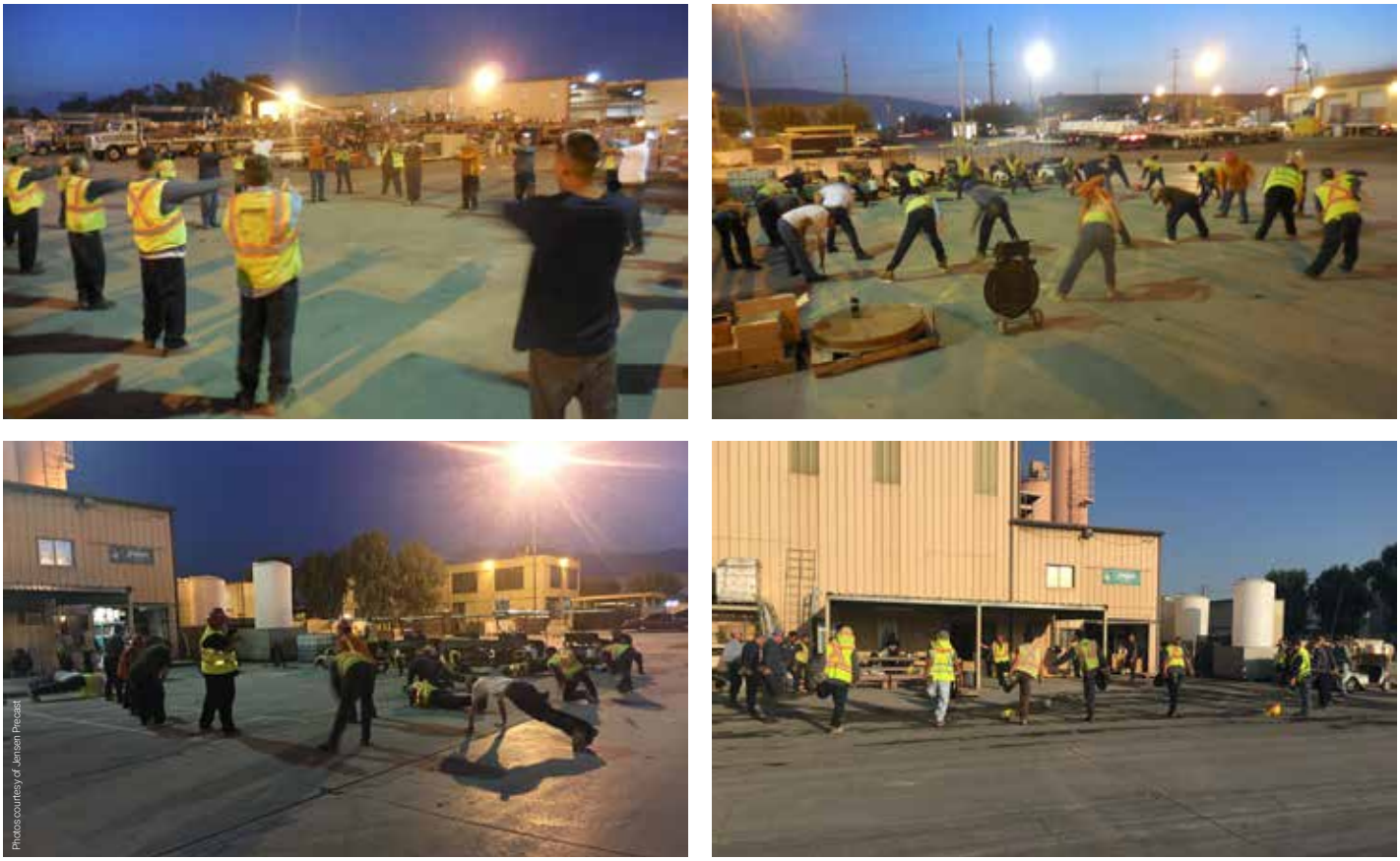
Encouraging employees to be on the lookout for potential safety risks means team members will look out for one another. And when every team member is diligent about protecting everyone else, complacency is no longer an option.

SAFETY AS EMPOWERMENT

Like Cunningham, Ruben Gallegos, safety manager for Jensen Precast in Fontana, Calif., believes consistency is imperative for developing a sound safety approach. Gallegos and other members of Jensen's safety team meet daily with the company's foremen to discuss what safety issues they have witnessed and which have been addressed. Common questions include, "What do we need to pay attention to?" and, "What have you corrected in your work areas?" The company requires foremen to present at least one area of concern at each meeting. As Gallegos said, if a foreman has nothing to report, then that individual simply isn't looking.

In addition to facilitating open conversations, Gallegos supports Jensen's safety program by performing a daily inspection of his facility for hazard identification, developing the programming for the company's monthly safety training, and putting together consistent safety and environmental reports. Jensen's safety team also engages in a safety conference call each month with plant mangers and general managers to discuss what issues the company is experiencing at each location. In this way, Gallegos can learn about what other branches are doing that could benefit his location and vice-versa. The company even conducts daily safety toolbox talks along with wellness sessions during each of its shifts.[1]

Gallegos attributes complacency to employees who haven't experienced a recent accident and have developed high levels of comfort in their positions. Additional issues also arise among employees



To reduce safety complacency, employees at Jensen Precast in Fontana, Calif., stretch before the start of every work shift.

> **"Getting employees involved in the process is crucial. It's important to train them to understand what risk is and how to mitigate that risk in their daily operations. We want them to get out there and help with the risk identification process by looking for potential hazards."**
>
> – **Mike Cunningham**, *Oldcastle Infrastructure*

who go unnoticed performing tasks in an unsafe manner.

"What I've seen is when an employee does something that's unsafe and doesn't get called out on it or isn't caught, that employee will continue performing that action," he said. "And, when an employee does something that doesn't end up in an accident – even if it's a near miss – they will continue doing that action until they are stopped."

This is a major problem, but as Gallegos explained, it can be solved by providing team members with the right tools and empowering them to always be on the lookout for one another. To combat complacency, Gallegos and the rest of the safety team encourage all employees to identify and address issues in the plant as they see them. This approach has worked quite well, and on several occasions, Gallegos himself has been called out for his own hiccups.

He also explained that by empowering employees to look out for one another, team members won't just get involved – they will take ownership of safety.

Beyond empowerment, the plant in Fontana has also implemented an incentive program in which the entire team is rewarded for extended periods of safety success. If the plant hits at least 60 days without an accident, the facility is treated to lunch. Typically, this is done quarterly, so if there are no incidents in a quarter, everyone benefits.

Ultimately, Gallegos explained employees at Jensen consistently feel valued because they know they are the organization's biggest asset.

"We could have all kinds of customers buying our products, but if we didn't have the employees to make it, guess what? No business," Gallegos said.

STRIVING TOGETHER

There isn't an exact science to eradicating safety complacency at your precast plant. However, if left unchecked for too long, the negative impact on your company and employees can be devastating. There are many steps you can take to counteract the effects of complacency, including a commitment to your employees' well-being, consistent reminders about the importance of keeping safety top of mind, incentive programs and more. No two approaches will look the same, but as Cunningham explained – and as Gallegos suggested – everyone must be involved.

"Each organization will be different, but we're all striving to get to the same place," Cunningham said. **PI**

Mason Nichols is a Grand Rapids, Mich.-based writer and editor who has covered the precast concrete industry since 2013.

REFERENCES:

1 https://precast.org/2016/09/wellness-at-work/

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THE PRECAST SHOW

Photo courtesy of Lees Precast

Inaugural Precast Days

RAISES AWARENESS OF PRECAST CONCRETE

By Kirk Stelsel, CAE

Anyone who has hosted guests knows doing it well is no easy task. It requires planning, more planning, thoughtful execution and follow up. While hosting takes time, when done well the results are worth the effort.

With NPCA's support at the national level, nearly 30 plants across the country hosted their communities as part of NPCA's inaugural Precast days in October. NPCA worked with the Canadian Precast/Prestressed Concrete Institute, who shared information and best practices from the Precast Days event it has conducted for years.

The results are impressive. Plant participation far exceeded the original goal of 10. As a result, more than 1,400 teachers, students, engineers, contractors and specifiers visited a precast concrete plant and left more knowledgeable about the industry and solutions it provides locally.

MAKING CONNECTIONS

When Allen Lee of Lee's Precast committed to participating in Precast Days, he knew the company would need to work hard getting the word out. A cursory glance at a map reveals that Aberdeen, Miss., where the plant is located, is far from any major cities.

As a board member of the local chamber of commerce, Lee knew the power of local connections and sought to use them as a springboard. He started by having employees personally invite local specifiers and reached out to his chamber cohorts and invited them to come see the plant.

The personal invites were well received. Chamber members felt a connection with two career tech centers in the county would be fruitful and facilitated the introduction. Leaders from those schools took their own tours. They, in turn, went back and met with their teachers who set up trips to the plant as part of Lee's Precast Days event.

Lee decided to split the event into two days, one focused on students and teachers and the other on designers. In two days, the plant hosted more than 70 individuals. He said the engineers were impressed by not only the complexity of manufacturing quality precast concrete products, but also how easy it is for a precaster to change a product to meet a need they had. After teaching them about the plant and the products, the conversation centered around questions about how to handle unique situations on site and Lee's employees were able to address those.

"They didn't realize the flexibility of the design, they thought it would be a lot harder," Lee said. "They had maybe been by plants, but they were shocked by what we all do and how easy concrete can be adapted to work in different projects."

On the student side, the big takeaway was future employment opportunities. Jeff Brooks, director of the Monroe County Career and Technical Education Center, said students were surprised there is a thriving industry right in their county. He said when arriving at the plant they thought concrete was only used to make sidewalks, but the tour showed them the precast industry is much more. They saw the industry included engineering, welding and many other skills they were learning in school.

"We showed them submittals and a takeoff from a project and talked about the engineering, the plans and job sites we see, and what the structures look like on the ground," Lee said. "They saw how big the products are, how deep they can go, how they protect us, and they were impressed. We also gave them some historic facts on concrete from a construction standpoint and that was big for them."

The visit led to talks of ongoing relationships and ideas for enriching partnerships further, including not only welcoming students in once or twice a semester, but potentially creating a competition between the two career tech centers. A goal for the future is to get more collegiate students involved. Lee said he was glad it worked out the way it did.

"We love the fact that NPCA is putting a big emphasis on this because it's good marketing for everybody involved in the industry," Lee said. "It's a great opportunity for local schools to get their students involved and for kids in our community to come in and look at our operation, and the same goes for the engineers. We don't have lunch and learns like this once a month like some plants and we figured once we've done it, we'll want to do more of it, which we do."

While this was Lees first time conducting an open house, other precasters who had experience conducting open houses also particpated.

"It was exciting that we had both companies experienced in hosting these types of events participate, as well as a number of plants that were newer to open houses," said Marti Harrell, vice president of technical services and professional development for NPCA.

DIFFERENT CITIES, SAME RESULTS

Approximately 2,500 miles away, Ron Sparks, general manager of Columbia Precast Products in Woodland, Wash., held a two-day Precast Days event of his own. As immediate past chairman of NPCA's Outreach Committee, which conceived the idea, it was a no brainer

Photo courtesy of Lee's Precast

Photo courtesy of Lee's Precast

for his plant to be involved and opening their doors to specifiers is something they have done many times in the past.

"We had a day that was focused on high school and college level students and then the second day focused on a hot topic in our market, microbial induced corrosion, or MIC," Sparks said. "We geared our second day around that with an educational seminar and we focused on local specifiers, mainly cities. Sam Lines with Concrete Sealants came out to speak and we also got BASF and Master Builder's here to do presentations on the basics of concrete for the students."

The company had 70-plus people come through, thanks to its sales team "going out in force" to promote the event. The team met to decide who was talking with whom, and then put the plan into action. Sparks said the key is putting in the effort to get the word out. Like Lee, he feels it's a grassroots, boots-on-the-ground type of event.

For the students, the company's primary goal was to teach them what can be manufactured in a precast plant and to let them know the

plant employs a wide variety of positions. For the engineers, the message was focused on solving their problems and being a partner, not just a supplier.

"We wanted them to know there's more behind the curtain," Sparks said. "There's a lot more than meets the eye for any company, precast or not – you only see the sign out front and don't really know what's going on behind the sign. The employees get some ownership in it and are proud to show off what they do for a living."

On the East Coast, Mohamed Mahgoub, Ph.D., P.E., FACI, associate professor and program director for the School of Applied Engineering and Technology (SAET) at the New Jersey Institute of Technology, took 15 students to Garden State Precast for its open house and they all walked away impressed. The students are all a part of the Concrete Industry Management (CIM) program at the school.

"I always promote the precast industry to my students and was looking forward for them to see how precast is manufactured," said Mahgoub. "The big takeaway was that they were impressed by how everything was so precise and according to the plan and they wanted to know about internships. They also liked that in the precast industry they finish things very fast.

"For example, they can pour 100 panels in a day and take them to the site. I am telling everyone that the future of the industry is precast. Expedited construction is the future."

Mahgoup said Garden State Precast had all of its employees available and made the attendees feel special by breaking groups into about five or six each to personalize the experience. He said they discussed every detail and answered all questions with a smile on their faces.

Joel Sheets, vice president and general manager with Tindall Corporation and current chair of NPCA's Outreach Committee, is pleased with this year's results and excited for the future.

"This event was all about outreach to the community, including students and educators, engineers and other specifiers, and owners, and to educate and open our doors to them to see what we're about," he said. "Our goal as a committee was simple, to ensure more people out there are familiar with what we do and what we have to offer. It was outstanding for the first year with nearly 30 plants participating and we hope we top that by a longshot next year."

CREATING A LASTING IMPRESSION

For the plants that put in the work to get the right people to their event, the opportunity to educate community members and show them first-hand what the plants do was invaluable. The participants in the 2019 Precast Days event are now more knowledgeable about the industry and its products, and understand why precast concrete manufacturers are able to provide quality products, how those products can meet their needs, and that their local precaster will work hard to please its customers.

"If you've never done this before and want to do it in the future or for next year's event, utilize the tools the outreach committee is providing you," Sparks said. "It's really not that difficult, you just have to put effort into getting the word out. If you're willing to get out there and tell people about it, you'll get people to your plant." **PI**

Kirk Stelsel, CAE, is NPCA's vice president of communication & public affairs.

The Value of Relationships

RELATIONSHIPS ARE THE HEART OF **PRETECH CORPORATION'S** GROWTH AND SUCCESS.

Article and photos by Matt Werner

Bill Bundschuh knows the precast concrete industry is a competitive place. But he also knows nobody will beat his company at cultivating and maintaining relationships, which has fueled Pretech Corporation for the past 26 years.

BUILT ON RELATIONSHIPS

Bill likes to joke that he conned his dad and father-in-law to lend him money to start his own company in 1993 before conning his brother Bob into being his business partner. It was a small operation, sitting on 1.5 acres of land with about 1,500 square feet of production space.

The size of the operation didn't matter to Bill, though, since he had big visions, and, thanks to one of the first relationships he cultivated, the company began to grow.

Pretech typically worked seven days per week. A local utility contractor started stopping by the plant on Sundays to talk shop.

"Finally, he gave us a job that had nine inlets on it," Bill said. "He told us he needed five the first day and four the second day, and I told him we could only make three a day. So, he goes, 'Okay, I need three the first day, three the second day and three the third day.'"

Pleased with the product – and the relationship – the contractor started giving the company more work. The contractor could tell Pretech was going to stay for a while and gave Bill two rules – keep working hard and be honest.

"He told me he'd give us all the work we could do," Bill recalled. "If he ever gave us too much, he'd take some away, but if we could handle more, he'd give us more.

"He was true to his word except if I told him we couldn't get the work done, he'd say, 'Oh, sure you can.'"

Careful attention was given to each step of engineering, production and the transport process to help build a positive reputation for the new company. For instance, they would manually load up grade rings into a pickup truck, place foam between them and deliver them to job sites by themselves to ensure none

Courtesy of Pretech Corp.

Pretech Corp. manufactures quality precast sanitary, storm, drainage, electrical and specialty products for its customers in the construction industry.

Bill, right, founded Pretech Corp. with his brother Bob, and his brother Mike, second from left, started at the company in 1996. Now, Bill's children Ryan and Kaitlynn are involved with the company.

Pretech added a fully automated Schlusselbauer pipe plant to their operations.

"YOU CAN ALWAYS BE BEAT ON PRICE. YOU CAN LOSE EVERY JOB ON PRICE, AND THAT'S WHY WE HAVE TO SELL BASED ON RELATIONSHIPS. OUR NICHE IS OUR RELATIONSHIPS."

– Bill Bundschuh,
owner

would be damaged.

"Now, we may or may not have brought the guys in the field beers, but we got to build relationships with those guys," Bill joked. "We gave our time to the guys out in the field so then they'd tell their bosses, 'Hey, go out and buy from Pretech; they took care of us last time.'"

PROVIDING VALUE

Bill knows the numbers and knows he's not the lowest bidder on a project, yet that doesn't really matter to him if you have the right relationships.

"You can always be beat on price," he said. "You can lose every job on price, and that's why we have to sell based on relationships. Our niche is our relationships.

"It's the value that we add, and that's different for every contractor. A guy won't pay you just because you're his buddy. But if you build that trust and he knows you're going to take care of him, that's a big part of it."

Bill said they will redesign products, make things differently, show a contractor how to make something precast instead of cast-in-place and more to provide value.

"We'll precast a space shuttle," he joked. "I wouldn't fly in it, but if you give us something to do, we'll figure out how to do it."

That mindset permeates throughout the company. Bill's brother Mike started at Pretech in 1996 on a temporary basis and is now the vice president of operations.

According to Mike, it's not just about having that relationship but how you deal with problems that build trust and lead to more business.

"If somebody has a problem in the field, you've

got to take care of them," he said. "We fix it, then we'll worry about who's going to pay for it. It's about keeping the guys in the field happy.

"As long as those guys aren't complaining about it being a bad product or being behind schedule, that's the biggest thing."

Even things as simple as answering a phone call with live voice and conducting face-to-face meetings provide value and help build a relationship.

"With all the technology, what's becoming difficult to do is staying in touch with your customers and keeping that relationship going," Bill explained. "[Technology has] taken a lot of relationship building out of our industry, and that's what we really push. We want our salesmen to go out."

GETTING THROUGH THE DOWNTURN

Bill can still remember the day in 2009 when Mike came into his office and told them they didn't have any work. Confused, Bill asked him if he meant they didn't have any work

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"THEY TREAT US LIKE FAMILY AND HELPED ME OUT IN A LOT OF WAYS. BILL'S ALWAYS GOT AN OPEN DOOR, AND HE TREATS EVERYBODY LIKE A FRIEND."

– Jeremy Haskin, *plant manager*

approved or no work at all. Mike had to tell him – they had no work at all.

The economic downturn hit everyone hard, but it hit Pretech like a ton of precast. For years, Bill watched his company grow 20% every year. They added new buildings, new office space and even an automated Schlusselbauer pipe machine.

"I could owe somebody $100,000 and only have $10 in the bank and not be worried," Bill said of his pre-downturn mindset. "The downturn beat that out of me."

Pretech went from 60% of their business being housing developments in 2008 to having none in 2009. Adding more heartbreak to the situation, Bill's father, who helped found the company and was always around to bounce ideas off of, got sick.

"It was two blows at one time, and I think we could have weathered the storm better had he been around," Bill said. "We just went from my knowledge and his knowledge combined to where it was just me."

But, thanks to those earlier relationships, Pretech was able to get through those difficult years. Suppliers Bill had been doing business with would extend credit or deadlines to pay. Contractors he knew would pay ahead of time because they knew Pretech needed help. But as the company began to turn around, so did Pretech, with more business coming back online, and the pipe machine continuing to pay dividends.

Bill will also be quick to mention dedicated employees helped them through the Great Recession. Having good relationships with plant floor employees is important to Bill, and it results in having many long-time plant employees.

Jeremy Haskin, the plant manager for the dry cast division, has been with the company for 21 years.

"They've always been good to me and given me a lot of opportunities," he said. "They treat us

By treating their employees like family members, Bill has been able to keep many long-time plant employees.

Courtesy of Pretech Corp.

"THE KNOWLEDGE [GAINED] FROM PEOPLE IN NPCA BETWEEN VISITING PLANTS AND JUST BEING INVOLVED IS PHENOMENAL."

– Bill Bundschuh, *owner*

like family and helped me out in a lot of ways. Bill's always got an open door, and he treats everybody like a friend."

POISED TO GROW

After the recession, Bill's dreams of being a giant operation with four plants went away, but he still sees growth on the horizon from expanding into new markets to increasing product lines and automation.

His children, Ryan and Kaitlynn, are heavily involved with the company now and are there to help take the business into the future and challenge their dad along the way.

"They had their set way, but when Ryan and I came in, it's a new generation and new technology," Kaitlynn said. "We're pushing them to change. When I came in, it was all paper and pencil, but we're trying to switch gears to keep up with everyone else."

Ryan also mentioned the companies his dad has had relationships with for years are also being passed down to the next generation, with more relationships being developed between the kids.

"A lot of contractors, their sons are taking over, and they're coming from the same boat we are," he noted. "They're tech driven. So, we're starting to see some of the old methods fade out, and we still keep our relationships up with them."

The relationships Bill has cultivated with fellow NPCA members has helped the company grow too.

"We buy the best products out there, but a lot of it is driven by relationships we have with our reps and salesmen," he explained. "We do a lot with that and depend on that. The knowledge [gained] from people in

(Top photo) Pretech Corp. has been recognized by the Kansas City Star newspaper, The Business Journal and other industry publications for its dedication and commitment to quality. (Left photo) Pretech Corp. manufactured a bridge for Parkville, Mo.

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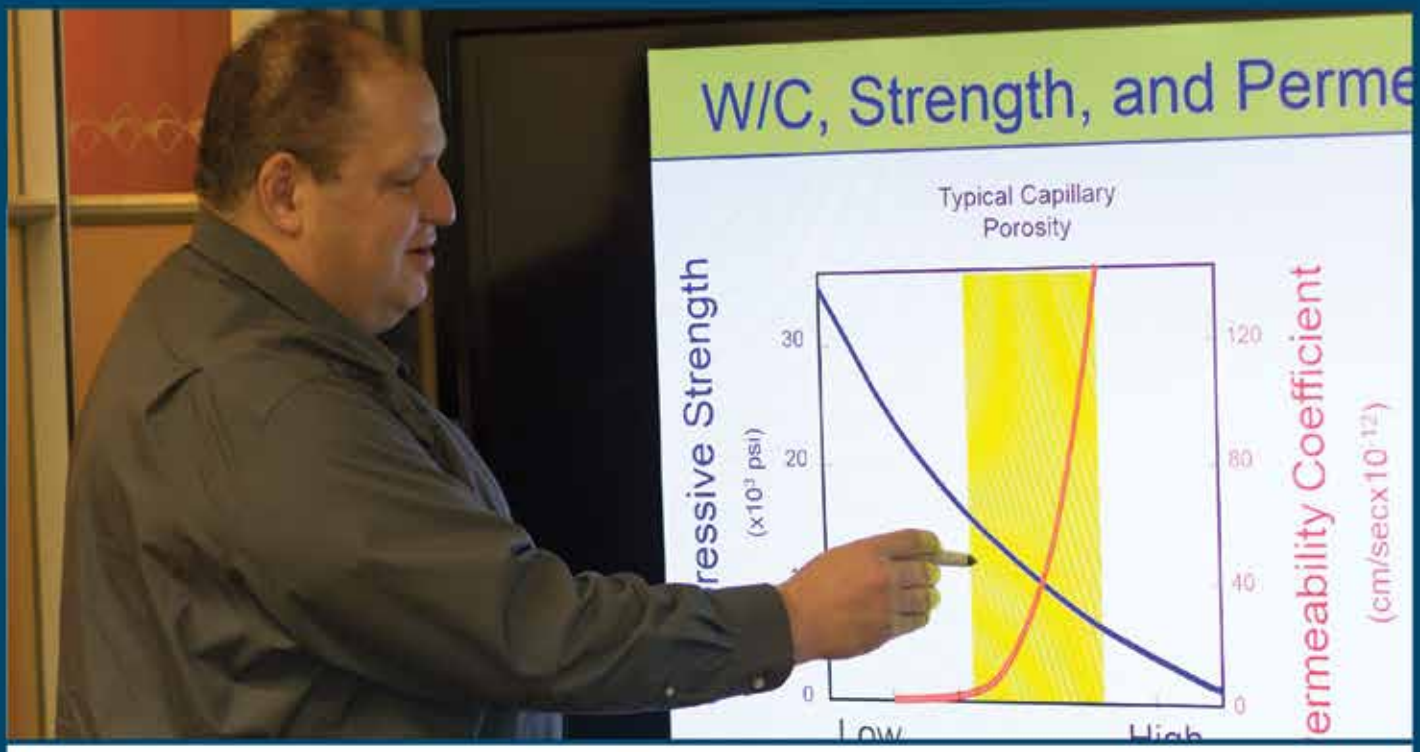
Workers transport a box culvert, which will be used for an Army Corps of Engineers project in Kansas City.

NPCA between visiting plants and just being involved is phenomenal.

"The relationships are just as important as all of the things at The Precast Show. Getting to know fellow members in the bar in the evening is just as important as the show itself for us."

And that's what it all boils down to for Bill – relationships. Whether it's bringing some beer out to the guys in the field or strengthening communication between generations of employees, Bill knows the value of building and maintaining relationships and sees it every day when going to work. **PI**

Matt Werner is the managing editor of Precast Solutions magazine and is NPCA's communication manager.



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April 9	Taking Your Small Precast Company to the Next Level
May 14	Troubleshooting SCC
June 11	Custom Structures: Tips for Panel Forms, Blockouts and Production
July 9	Diversifying and Expanding Product Lines with Minimal Disruption
Aug. 13	How to Influence the Standards that Govern Your Daily Work: A Guide to ASTM
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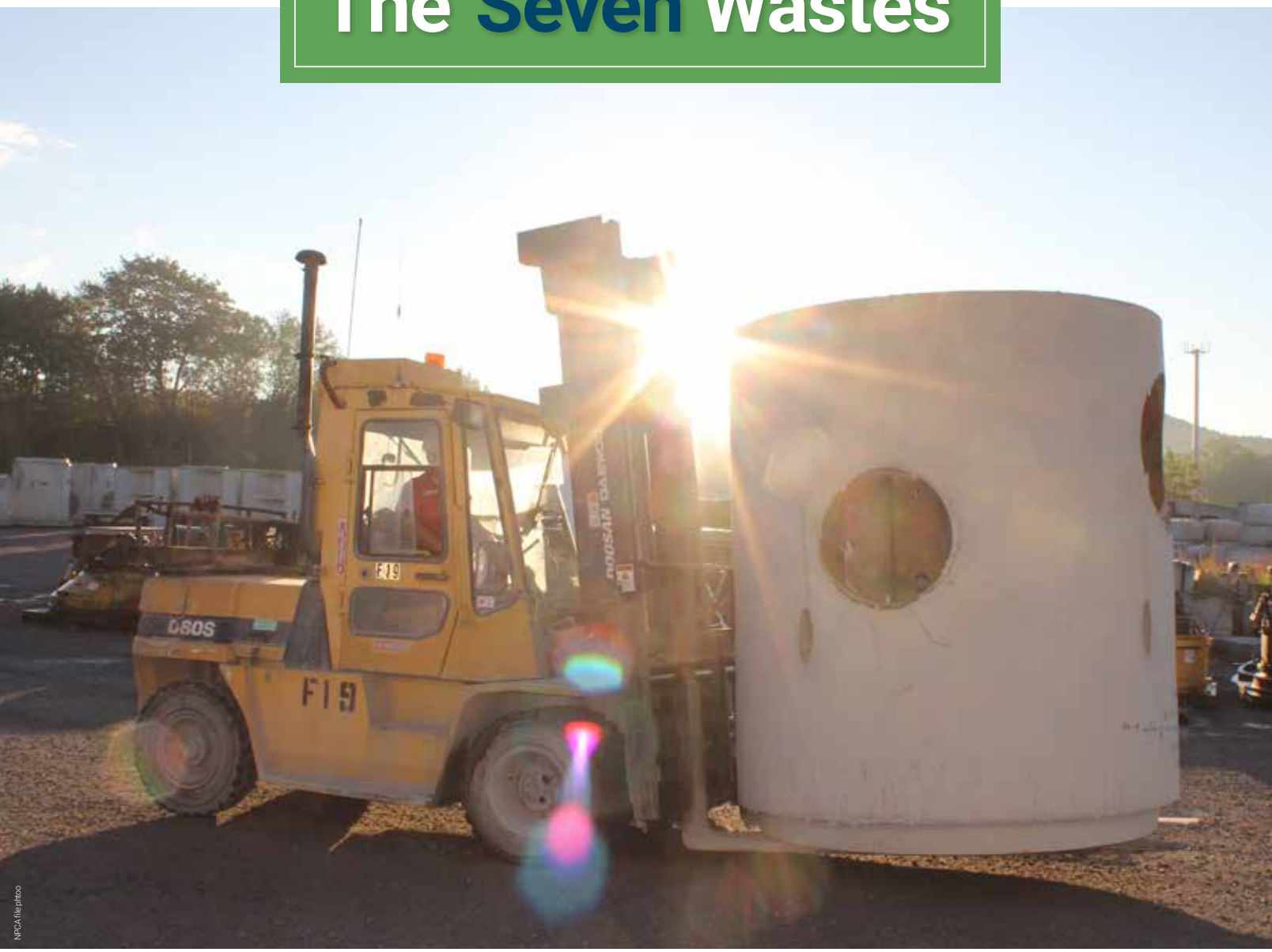
The Seven Wastes



NPCA file photo

Waste #1:

TRANSPORTATION

Reducing **transport waste** can increase productivity and profit.

By Shari Held

Editor's Note: *This is the first article in a year-long series about how seven common types of waste in manufacturing can create unprofitable activity and how to address them in your plant.*

In an ideal world, all businesses would operate at top efficiency all the time. However, that's tough to accomplish in reality. In the precast concrete industry, there are seven types of unproductive manufacturing practices that add to labor and production costs and chip away at profits.

The first of these is transport waste – moving products and materials that aren't actually required by typical production practices. Much of this type of waste can be attributed to poor plant layouts or times when plants are running full throttle to fill orders.

Here are the transport issues three precasters are grappling with and their solutions for eliminating them.

CAMP PRECAST

Milton, Vt.

Precast concrete product must be moved multiple times during the day to make room for more product, to place it in the stockyard or to position it for loading on a delivery truck. These movements take labor and time and increases the risk of product damage and worker safety issues.

"You try your best to plan for when production will begin or a delivery is going to be made, but this is just the reality of what happens," said Travis Brousseau, general manager at Camp Precast.

One improvement Camp Precast plans to make in order to eliminate unnecessary product transport is moving its reinforcing cage manufacturing area/equipment closer to the production area. The process will only take one month while allowing the plant to remain in production.

"In the long run, it will save us money," Brousseau said.

OLYMPIAN PRECAST

Redmond, Wash.

Like Camp Precast, Olympian Precast's rebar cage manufacturing area is not located near its production area.

"We've considered moving it closer, but the solution doesn't outweigh the problem currently," said Clarke Jewell, president of Olympian Precast.

The company's made several improvements over the years, though. For example, its forklifts and cranes have built-in, custom roller systems, allowing a worker to pick up product and rotate it all in one step.

To save time and steps, total daily production is loaded on trailers placed 50 feet or less from the production area. Small pieces such as stair treads are finished on the trailer and then palletized.

Olympian Precast plans to begin process mapping to increase efficiencies next year.

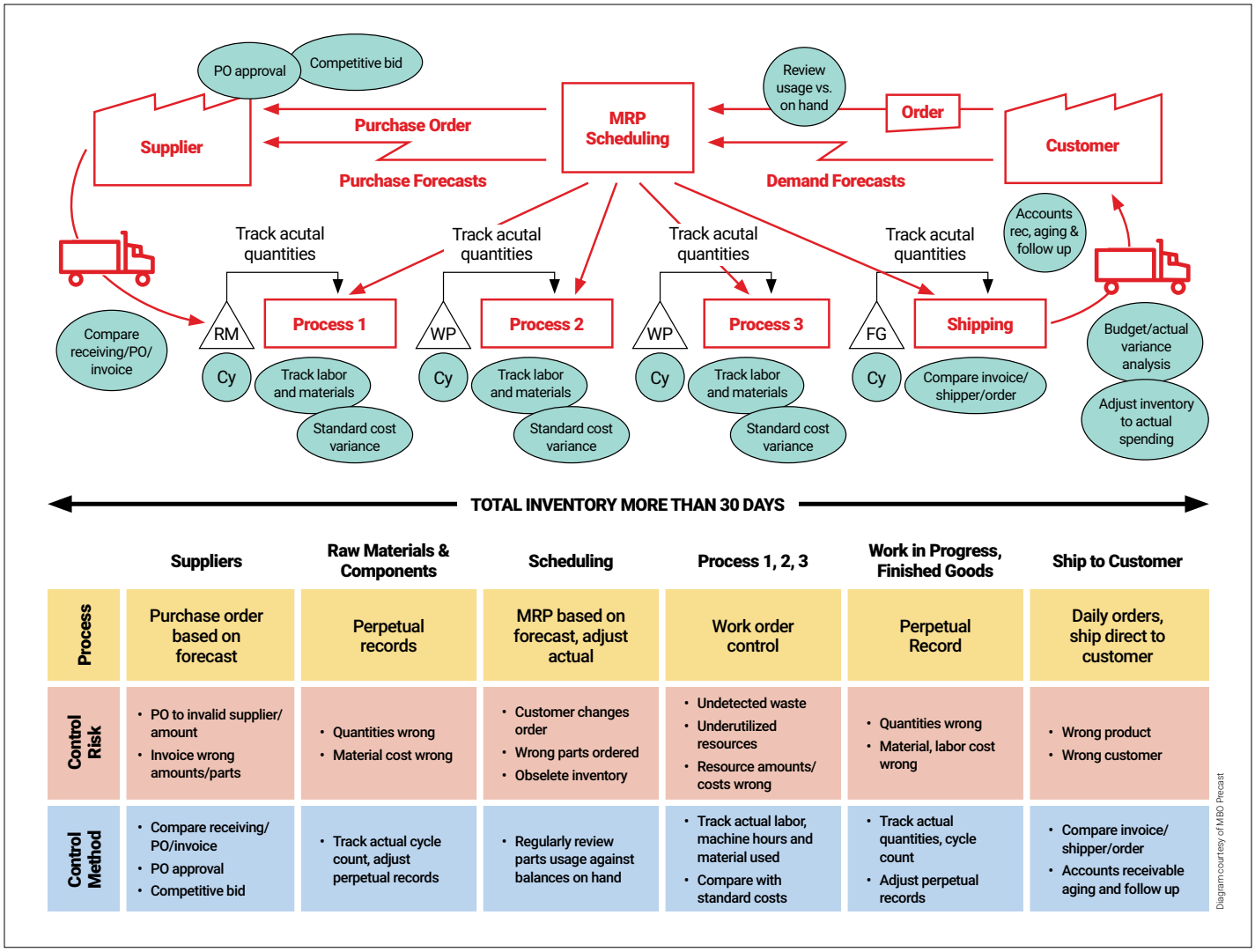
"I'd say we're on the right path," Jewell said. "But there's still room for improvement. In the long term, reducing waste from a cost standpoint helps from a sustainability standpoint as well."

MBO PRECAST

Carver, Mass.

Four years ago, when Clark Simmons, technical services manager, came to MBO Precast, he and his team members instituted value stream mapping for the entire plant and looked at where different processes were located. Rebar was cut, reinforcing cages manufactured and then moved by a forklift 2,000 feet to the production area. In addition, different types of finished material were randomly stored in multiple locations 600 to 700 yards from production, taking additional time for forklift drivers to locate and load it. Bucketloads of concrete had to be

Value Stream Mapping Example



	Suppliers	Raw Materials & Components	Scheduling	Process 1, 2, 3	Work in Progress, Finished Goods	Ship to Customer
Process	Purchase order based on forecast	Perpetual records	MRP based on forecast, adjust actual	Work order control	Perpetual Record	Daily orders, ship direct to customer
Control Risk	• PO to invalid supplier/ amount • Invoice wrong amounts/parts	• Quantities wrong • Material cost wrong	• Customer changes order • Wrong parts ordered • Obselete inventory	• Undetected waste • Underutilized resources • Resource amounts/ costs wrong	• Quantities wrong • Material, labor cost wrong	• Wrong product • Wrong customer
Control Method	• Compare receiving/ PO/invoice • PO approval • Competitive bid	• Track actual cycle count, adjust perpetual records	• Regularly review parts usage against balances on hand	• Track actual labor, machine hours and material used • Compare with standard costs	• Track actual quantities, cycle count • Adjust perpetual records	• Compare invoice/ shipper/order • Accounts receivable aging and follow up

Diagram courtesy of MBO Precast

Value stream mapping (VSM) is a flowchart method that helps to identify and eliminate wasteful manufacturing practices. VSM is used to illustrate, analyze and improve the steps required to deliver a product or service to the customer.

transported 600 yards to where it would be used in the production area.

MBO Precast's solution was to completely reorganize the plant, bringing production closer to the main batch plant and reorganizing other areas to eliminate transport waste wherever possible.

The manhole line was moved from 200 yards to less than 50 yards from production. The rebar cutter and cage manufacturing were relocated right next to production. And each finished product now has a specific loading zone, reducing retrieval time for shipment.

Making adjustments based on value stream mapping results made a huge difference for MBO Precast, and they have the stats to prove it. The company's production day – once 10 to 11 hours – is now 8 or 8-1/2 hours.

"Depending on workflow, in labor hours we've been able to save $3,000 to $6,000 per week," Simmons said.

As productivity increased, MBO was able to award workers with raises and provide cross-training opportunities. Increased plant productivity has also enabled MBO's sales staff to bring in jobs the plant couldn't previously handle. In addition, product damage was reduced from 6%-to-8% to only 2%. And Simmons said safety improved tenfold.

MBO's entire production process runs much smoother and steadier now, allowing the company to manage inventory and labor force more effectively.

"The biggest bang for the buck in the precast lean process is value stream mapping, in my opinion," Simmons said. "It allows the other areas of waste to become more visible to your team."

While these precast manufacturers understand transporting product and material is a necessary function, they have also noticed obvious expenses associated with transporting items unnecessarily. And, transportation waste often creates a hidden cost – waiting, which will be the fourth type of waste covered in this series. Staff have to wait for reinforcement or product to be delivered which results in extended lead times. It also exposes the operation to greater opportunities for damage and loss of items during transport. Plus, the cost of equipment to move items, staff training to operate the equipment and more all add up. Consider reorganizing the plant layout, the fabrication area or the storage yard to reduce transport waste, and ultimately, increase your company's profit. **PI**

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

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Helping Next Generation Precasters

Gainey's Concrete Products tradition of hosting summer interns came with a unique twist in 2019.

By Sara Geer

Gainey's Concrete Products typically will have 4-5 interns working for the company during the summer, but this past summer was different. Owners Lisa and Greg Roache said not only did the company host eight interns, but one intern was their daughter, Lanie Chandler, and another intern was Adam Wieser, son of Mark Wieser, P.E., vice president of Wieser Concrete Products, who runs the company's plant in Portage, Wis. Both are NPCA Foundation scholarship recipients. It was the first time Gainey's hosted an out-of-state intern, Lisa explained, but more importantly, they invited Adam to live with them during the summer. The full immersive internship experience was fruitful for all involved and benefitted Gainey's beyond what was expected.

LANIE CHANDLER: Following in the family footsteps

Growing up, Lanie Chandler's earliest memories involved walking around Gainey's office and plant and picking up loose rebar. She never had an inclination to work in the precast concrete industry until attending high school. There, she started seriously thinking about where she wanted to go in life.

"I've always admired the work that my parents do and always admired the industry and NPCA because of the family-like atmosphere it has always had," she said. "I knew there was nothing else I would want to do for the rest of my life."

She said she would like to run the business one day, but in order to do so correctly, she needed to attain the technical knowledge first. This led her to pursue a civil engineering degree at the University of Louisiana at Lafayette and a minor in business. And, what drew her to apply for an NPCA Foundation scholarship was the internship requirement. She made the decision to complete her first internship at Gainey's in conjunction with completing some summer school courses.

"I was really nervous at the beginning working for my parent's plant, but it ended working really well in the end," she said. "I got to see my first taste of what all goes into what we do and since I already knew the people that were in the company, it really gave them an opportunity to show me something new that I didn't know about, like the different skills that they have and what exactly goes into their job. It also gave me an opportunity to gain some respect within the company at the same time.

"I was showing them that this is what I'm passionate about and this is where I want to come back to. I am putting in the time and effort to prove to you that I'm worthy and dedicated."

She said her internship followed the NPCA Foundation template structure which included spending one week in each department – from estimating to post-production – to gain an overview of the entire company. The most challenging department for her was working in production due to the physical aspects of the job. The department she liked best was post-production. Other plant workers found it funny that she enjoyed post-production because the department is in the constant sun, but she felt a sense of pride helping the crew finish the products in preparation for their delivery to the client.

"I had the most fun in post-production

> "I've always admired the work that my parents do and always **admired the industry and NPCA** because of the family-like atmosphere it has always had. I knew there was **nothing else I would want to do** for the rest of my life."
>
> – Lanie Chandler

because the people I worked with are so passionate about what they do and care about the product so much," she said. "Their end goal is to please the customer and they made sure everything sent out for delivery was as perfect as they could get it."

After completing her time at Gainey's, she said the internship helped give her a better appreciation of the work her parents do to ensure the lights stay on every day. The experience also helped her to better tailor her coursework to her field of study and has given her the momentum to continue pursuing her goal to one day run the company. Next summer she plans to complete her second internship at C.R. Barger & Sons in Kingston, Tenn.

"If I had anything else to say about the entire experience, it would be to say thank you to everyone who supports the NPCA Foundation and what they do," she said. "I could not get through college in an engineering degree without it."

ADAM WIESER: Like father, like son

Like his grandfather, father, uncles and brothers before him, it was only a natural progression for Adam Wieser to follow the same path and enter the precast concrete industry. Working alongside his father, Mark Wieser, P.E., since he was 14 years old inspired him to become an engineer. He currently is pursuing this passion by completing a dual academic degree – spending three years at University of Wisconsin-Lacrosse focused on applied math and continuing his education at another school for civil engineering. At press time, he said he was applying to civil engineering programs with the hope to attend UW-Milwaukee.

After completing his first internship at Lindsay Precast's plant in North Carolina, he searched for a company that could build on that experience, but also tailor the work to his field of study. Gainey's was able to provide that need.

"My biggest focuses during the summer was on capital improvement and quality control," he said. "I had fun learning about mix designs, which I worked with Greg Roache on. I had no experience with it before."

According to Lisa Roache, Adam worked on several special projects for the company as well. He created new production procedures and put together a new plant layout to increase efficiency. He also wrote up an equipment inventory report listing molds that needed to be removed from the production floor or could be fixed. At the end of each week during his internship, he gave an update detailing each project's progress.

"At one time he was juggling four projects at different stages while moving them forward," Lisa said. "So, it was critical that he turned in a weekly report, which we've now carried on with each intern. They need to understand the importance that it's not for a grade, but there is a real tangible benefit we need to get from their time with us."

Adam said one thing though that made this experience far different than past internships was how he was not the only NPCA Foundation scholarship recipient present at the company and had direct access to the top management after business hours. While he stayed with the Roaches during the summer, he enjoyed chatting and sharing ideas with Lanie about future plans and what the Foundation has done for them both.

"I really want to encourage people to actually open up your home to an intern to enrich the experience because it was a much better experience as a result of having both Adam and Lanie with us," Lisa said.


Adam Wieser

Photo courtesy of Gainey's Concrete Products

"My biggest focuses during the summer was on **capital improvement and quality control**. I had fun learning about mix designs, which I worked with Greg Roache on. I had no experience with it before."

– Adam Wieser


Photo courtesy of Gainey's Concrete Products

And like Lanie, Adam credits the Foundation for it all.

"I'm not entirely sure I would have done this many internships," he said. "Even living in different places, I would not have done that without receiving the scholarship."

A LASTING BENEFIT

Even though summer has passed, Gainey's is still benefitting from the work the eight interns completed. Greg said tying the NPCA Foundation scholarship with completing relevant work was the best decision made by the Board for improving the precast concrete industry.

"It's the old NPCA formula: what you put into an internship program, you get back in dividends," Greg said. "We were enriched as a family for hosting Adam and enriched as a company by sharing his learning experience and having young minds hanging out with us." **PI**

Sara Geer is NPCA's communication manager, and is managing editor of Precast Inc.

Hands-On Precast Curriculum

NPCA's and PCI's Foundations first **jointly funded** precast concrete-specific **design studio** successfully wraps up its first semester.

By Sara Geer

If a civil engineering student's end goal is to shape, build, maintain and expand infrastructure, then receiving a well-rounded education is important. Class prerequisites rooted in mathematics and science will help sharpen design skills, yet a civil engineer must also be knowledgeable about the building materials that will be used to construct the structures.

According to Mustafa Mashal, Ph.D., P.E., Idaho State University's assistant professor of civil and environmental engineering, most civil engineering graduates know about concrete, but never get to learn enough about precast concrete. It is normally the last lecture in a reinforced concrete course. He plans to change that with ISU's new precast-specific engineering studio.

"We would like to educate students so by the time they start their career and a project comes through, they'll know if precast concrete could be a potential opportunity for that project," Mashal said. "We don't want students to be lost and dictated only by conventional ways of construction. We believe precast concrete has many advantages and think it could be the future of construction, especially when it comes to modular construction."

FROM PROPOSAL TO FRUITION

Mashal first learned about the design studio after attending a Precast/Prestressed Concrete Institute faculty seminar in 2017. At the time, there were other studios around the country, but he observed

Courtesy of Idaho State University's Department of Civil and Environmental Engineering

none centered on teaching students about precast concrete in bridges. With help from John Dobbs, P.E., S.E., former PCI Mountain States executive director, he put together and presented a proposal to the PCI Foundation in Spring 2018 to build a precast engineering studio at ISU.

Fifteen industry professionals visited and shared with ISU students about real-life precast concrete projects.

"I submitted a proposal for a design studio focused on precast bridges and at the time, the proposal only included the PCI Foundation," Mashal said. "The board suggested I reach out to the NPCA Foundation as well since they wanted the studio to also cover precast culverts. From there, I was assigned a liaison to help talk to potential donors or funding companies and communicate the idea to the NPCA Foundation."

The liaisons were Marianne Methven, director of sales and marketing at Hamilton Form Co., and Ray Clark, general manager at US Formliner, who were both active at the time in the NPCA and PCI Foundations. They presented the proposal to the NPCA Foundation and believed Mashal's enthusiasm for teaching precast and the concept of the engineering studio fit well with the Foundation's mission. After hearing about the concept, the NPCA Foundation Board of Directors agreed to partner with the PCI Foundation and fund half the studio for four years, making it the first jointly sponsored engineering studio focused on precast concrete transportation products such as bridges and culverts in the nation. The class will be offered once a year during the Fall semester.

"I applaud the NPCA Foundation for having the vision and the trust to fund this program," Methven said. "My hope is that it serves as a model for similar programs at universities across the country."

"We would like to **educate students** so by the time they start their career and a project comes through, they'll know if **precast concrete** could be a potential opportunity for that project."

– Mustafa Mashal, Ph.D., P.E., *Idaho State University*

Courtesy of Idaho State University's Department of Civil and Environmental Engineering

ISU's precast engineering studio consists of four semester-long programs focusing on precast bridges and culverts.

PRECAST-FOCUSED CURRICULUM

What truly makes ISU's design studio unique and successful, Mashal explained, is the support it has received from PCI, NPCA, and the bridge industry. Support has come from as far as Washington, Montana, Nevada, Utah, Colorado, New York, Georgia and Texas. For the first semester, 15 industry professionals, including the Idaho Transportation Department (ITD) and Ray Clark, visited and shared with the class real-life projects, bringing with them new opportunities for students to consider. In addition, ISU students and faculty toured several precast yards.

"With this particular studio, I think it's important that all precast members within a reasonable geographic distance, as well as associate members, support this to ensure students are getting out of the class what they want them to get out – which is the benefits offered by using and designing with precast concrete," Clark said.

Students also learned about structural and hydraulic design considerations and construction, and participated

"Anytime **precast is taught** at a university or college, it enhances the **awareness** of precast."

– Kirby O'Malley, *NPCA Foundation Chairman*

in several planned lab activities where they created precast concrete specimens and tested them using the ISU's testing facilities. They also became student members of PCI and NPCA. In addition, two student teams have signed up for the PCI Big Beam and NPCA Student Design Competitions.

Mashal also wants the precast studio to be used not just for teaching, but by students participating in research projects. He said currently several projects are in process with ITD, Idaho National Laboratory, and other potential ideas for the industry as they collaborate to push the use of precast concrete for civil and critical infrastructure. Along with educating current students, a shorter version of the studio will also be used to teach ITD District 5 engineers who are not familiar with precast concrete.

Bruce Savage, Ph.D., P.E., associate professor and chair of ISU's civil and environmental engineering department, said the course is a refreshing addition to the civil engineering curriculum because it brings more hands-on instruction into the classroom and better prepares students as they graduate and help build the infrastructure in the next generation.

"The parts are coming together, but it's all a learning process for us too," Savage said. "We're hoping the studio will continue to grow each year and that we'll get better at finding new ways to keep the students excited about this opportunity."

FUTURE INVOLVEMENT

Kirby O'Malley, NPCA Foundation chairman, said he thanks the PCI Foundation for inviting the NPCA Foundation to partner with them to support the studio and for helping the board understand what it can do for the precast industry. He said one way ISU students will be directly involved with the NPCA Foundation is by competing against other schools in its annual student competition. The qualifying teams chosen by the board will be judged at The Precast Show 2020 in Fort Worth, Texas.

"Anytime precast is taught at a university or college, it enhances the awareness of precast," O'Malley said. "The more we go to specifiers and students, the better they'll understand the significance of using precast and how it helps a job and is a better product than cast-in-place. We're excited they are finally starting to do that." **PI**

Sara Geer is NPCA's communication manager, and is managing editor of Precast Inc.

To learn more about the NPCA Foundation and how it directly benefits the precast industry, visit **precast.org/foundation**

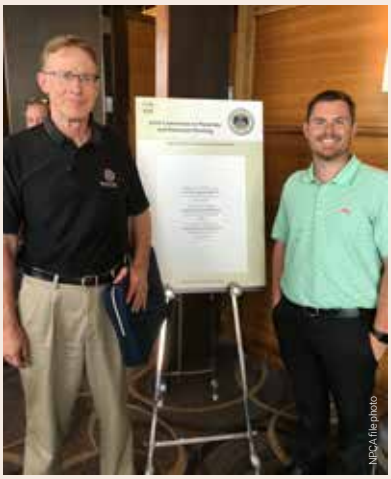
Working For You
IN REVIEW

The NPCA professional staff works to expand the use of quality precast concrete products in many ways. To keep you informed of these ongoing efforts, we created the **Working For You** page at **precast.org/working-for-you.**

This recap provides a high-level overview of staff activities throughout 2019. Visit the **Working For You** page to read the full stories or learn more.

Certification and Specifications

Chris Frederick, director of certification and regulatory services, continues to promote precast and NPCA Plant Certification to federal agencies, state departments of transportation, cities and counties. Plant certification was added to requirements in Arkansas. These efforts to promote precast specifications and NPCA Plant Certification result in more jobs and project bids for NPCA members.



Eric Carleton, P.E. and Chris Frederick

Specifier and Student Outreach

NPCA professional staff members have made in-person presentations to **3,264 specifiers** this year, with several presentations lined up for the first quarter of 2020. Our 2019 specifier webinar series brought in nearly **800 attendees** and included topics on accelerated bridge construction, precast concrete pavement, resiliency and grease interceptors.

Professional staff also conducted presentations to more than **650 students** at universities across the U.S., including Oregon State University, University of North Carolina at Charlotte, Texas State University, Purdue University, Clarkson University and more.

Codes and Standards

NPCA professional staff members have attended or participated in conference calls for more than **80 meetings** as they actively represent the precast concrete industry in **40 groups**, committees and task forces.

Marketing

Targeted advertisements have resulted in nearly **300,000 visits** to precast.org in 2019, a nearly **50% increase** from 2018. NPCA's efforts on Facebook and Twitter have netted more than **1,700,000 impressions** this year to go along with **4,400 new followers**.

Other Activity

Increased Involvement in ASC

NPCA became increasingly involved in the Associated Schools of Construction throughout 2019. Most recently, NPCA sponsored a problem statement at the 2019 Region 3 Annual Conference and Student Competition in Downers Grove, Ill. NPCA partnered with Procore to develop the Project Solutions problem statement, which called for students to submit and present their proposal in accordance with specific criteria distributed to them on the first day of the conference. The association is investigating further participation in other regional ASC chapters throughout 2020.

PEOPLE & PRODUCTS

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

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

Tom Howell, Longtime Besser Staff Member, Passes


Tom Howell

Tom Howell, longtime member of Besser's pipe and precast sales team, passed away unexpectedly in October while on a business trip, visiting customers in California. Tom's kind nature, warm smile and friendship will be missed by all who were fortunate to know him. His usual, "well, hello sunshine," morning greeting will remain a small legacy among his fellow team members in Boone, Iowa.

Tom began his career at Besser in 1998. His depth of knowledge was well-known throughout the industry. He enjoyed working closely with producers whether over the phone, during visits to their facilities or at industry events. Precasters attending The Precast Show will fondly recall Tom's welcoming smile and firm handshake when they visited the Besser booth. He always listened intently to their needs before sharing the information they were seeking.

Afinitas Promotes Matt Childs to Sales Vice President of Americas

Afinitas announced the promotion of **Matt Childs** to vice president of sales for the Americas for its HawkeyePedershaab-BFS equipment and automation sales organization.

Childs joined HawkeyePedershaab in 2017 as vice president of sales for North America. In his new role, in addition to North America, his management responsibilities will also include equipment and automation sales in South America. He has a bachelor's degree in business from Baylor University and both bachelor's and master's degrees in civil engineering from the University of Texas, Arlington. Childs is a licensed professional engineer in the state of Texas and is based in Dallas.


Matt Childs

Also, as part of this organizational change, Darrell Haar, who previously held responsibility for South American sales, has transitioned to the role of executive vice president of sales, retaining oversight of the China and India markets. Haar will focus on key sales opportunities and accounts on a global basis.

Titan II Developers Launch New Contractor's Hub

The developers of the Titan II Precast Management System announce a new collaboration software module that makes it easier for precasters and contractors to share information about their projects. The Titan 3000 Contractor's Hub enables the contractor to view structures and job status, request delivery dates, assign priority numbers and view an invoice history. Through the secure online contractor's hub, precasters and contractors can easily stay up to date on all aspects of the job, resulting in greater efficiency and a reduction in phone calls. Visit titan3000.com for more information. **PI**

Does your company have news to share?

Submit your press releases and photos to Sara Geer at sgeer@precast.org for possible inclusuion.

CALENDAR OF EVENTS

March 5-7, 2020

THE PRECAST SHOW 2020

Fort Worth Convention Center
Fort Worth, Texas

Oct. 15-17, 2020

NPCA 55TH ANNUAL CONVENTION

Omni Amelia Island Resort
Amelia Island, Fla.

Feb. 25-27, 2021

THE PRECAST SHOW 2021

Ernest N. Morial Convention Center
New Orleans, La.

Oct. 28-30, 2021

NPCA 56TH ANNUAL CONVENTION

The Broadmoor Hotel
Colorado Springs, Colo.

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

ADVERTISERS INDEX

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Before and After: A Dramatic Difference

BOOTH 707 THE PRECAST SHOW

The Titan Precast Management System enables Nance Precast to take charge of a growing operation

For Nance Precast Concrete Products, there's the "before" and the "after." Based in Piedmont, Oklahoma, Nance Precast has grown steadily since its founding in 1991. But there comes a point when keeping track of all aspects of the business using manual processes and several software applications gets a little unwieldy. That's the "before."

"We had an independent quoting software and a different accounting program for invoicing and payables," said Chad Nance. "We used Excel for production scheduling, along with a CAD program for drawings."

It took a lot of effort and a lot of staff time to coordinate the wide-ranging pieces of a project from start to finish. So Nance, the third generation precaster who now owns the company with his father Randy and his uncle Stanley, started to look for a solution.

"I started doing some research, thinking that if there was a way to tie it all together, increase efficiency and reduce errors, that would be awesome," he said. "I came across Titan and started talking to them."

That's the "after."

Transforming the Business

Nance learned about the Titan Precast Management System, committed his company to deploying the system, and watched it transform the way Nance Precast manages all aspects of its business.

"What's great about it from our side is that it ties everything together," Nance said. "Other than a few of the smaller packages, we use every module. We use it for quoting, costing, drawing, scheduling, quality control, loading, dispatch, invoicing, payables, et cetera," he added.

"For the most part, we're paperless," Nance continued. "The only paper we use are the production drawings that go to the guys out back. Everything else is tracked and available in Titan.

"So, for example, our sales department quotes the project," Nance said. "Once sold, a project manager converts it to an active order and finalizes the drawings. It is then turned over to production for scheduling. Next, the parts are produced and run through the quality control program. Finally, the job is scheduled to ship, is loaded, and then shipped.

"All of these processes are converted to the different modules easily and handled by the Titan program," Nance said. "From the time the project is quoted to delivery, the information is only entered once at the beginning. There is no risk of errors manually converting from one module to the next. This is significant for us," he said.

Chad Nance

"Accessibility is a great benefit with Titan," Nance added. "With all of the information being available to everyone at any time, it eliminates the need for employees to have to go back and forth looking for answers to questions. More importantly, you know that the answers you seek are in the program and correct. Again, from the time the project is quoted to the time the invoice is paid, everything is correctly tracked."

Managing Growth

As the company has grown, the Titan Precast Management System has enabled it to keep pace without adding additional support staff, which is another key benefit.

Since implementing the Titan system, "it's been record year after record year," Nance said. "We're a growing company, and because of Titan we've been able to keep the same core in the office and still support that growing volume. We probably have fewer people in the office now than we did when we had half the sales 10 years ago."

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