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22 Faddis Concrete Products has evolved into a powerhouse in the precast industry with a dedication to tailor-made products and a knack for diversification.

On the Cover:

Faddis Concrete Products built a wall for a substation in Greenwich, Conn., that featured custom lengths and pilasters of various angles.

Photo courtesy of Faddis Concrete Products

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CORRECTION: In the July/August issue of *Precast Inc.*, the article titled *Closer Look: Accelerators and Retarders* stated, "Unlike retarders, hydration stabilizers are more apt to result in lower long-term strengths." This statement should have said, "Depending on how the hydration stabilizer is used, its impact on long-term strength would range from no impact to an increase similar to that obtained by using a conventional retarder."

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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 posted on precast.org.

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

Mo writes:

Our 28-day compressive strength test result was lower than our 7-day compressive strength test result. What happened? Is the concrete acceptable?

NPCA Technical Services engineers answered:

If your 28-day compressive strength test results are lower than your 7-day test results, it is likely that the test procedures for the 7-day cylinders and/or the 28-day cylinders were not conducted in accordance with the test method.

A lot of factors could be the cause: the rate at which the load was applied to the cylinder was incorrect; the neoprene pads placed on either end of the cylinder may be worn out and need to be replaced; the cylinder may not be placed in the middle of the machine/may be off-center; the load may have been applied at a very slight angle instead of perpendicular to the top of the cylinder; the cylinder may not have been fabricated in accordance with the standard (could have an uneven surface, may not have been consolidated properly, etc.)

Check to make sure each cylinder is manufactured exactly in accordance with the applicable standard, and ensure each compressive strength test is done exactly in accordance with the proper test method. Also be sure the compressive strength testing machine has been calibrated at least within the last year. Also check to make sure the cylinders did in fact come from the exact same batch of concrete, they were cured in the same manner, and the dates at which they were tested are accurate.

If you have spare cylinders from this batch of concrete, conduct a compressive strength test now to see what the results are. It is a best practice to test at least two cylinders from the same batch, cured in the same manner, and tested at the same age, and calculate the average of those two results and report that average as the test result.

Check the project specifications and requirements for information on what is acceptable in this case. **PI**





Controlling dosage rates is important to ensure consistency batch to batch.

NPCA file photo

A Closer Look:

WATER-REDUCING ADMIXTURES

By Alex Morales, M. Ed.

Editor's Note:

This is the fifth article in a year-long series explaining common raw materials used in precast.

In the 1930s, Roy J. Plunkett was researching chlorofluorocarbon refrigerants when he produced a white powder as a byproduct of his work. He studied the powder for properties other than refrigeration and found the substance to be heat-resistant, chemically inert and low in surface friction. Plunkett had accidentally invented what we know today as Teflon.¹

Water-reducing admixtures have a similar backstory –

researchers stumbled upon an admixture's impact on water demand while trying to evenly disperse pigment in concrete. In 1930, Cabot Corporation had promised to create a black concrete for a local state road, but trial batches yielded a blotchy result. At the same time, Dewey and Almy Chemical Company was experimenting with naphthalene sulfonate formaldehyde condensate (NSFC) as an emulsifier for artificial rubber in sealing compounds. Together, they found

that NSFC evenly dispersed the black color throughout the concrete mix.²

They also noticed that the black concrete was considerably stronger than the same mix without NSFC. Further studies revealed that NSFC, while evenly distributing the black color, was also dispersing the cement in the mix. Dispersing the cement particles and preventing cement particle flocculation enables the mix water to more readily access the cement grains, thereby lowering the amount of water required to hydrate the cement. This discovery would spur years of research on how to design admixtures that properly distribute cement throughout a concrete mix, acting as what we now know as water-reducing admixtures.

WATER REDUCERS AND WATER DEMAND

Water demand of a concrete mix refers to the amount of water required to create a specified slump. It is a measure of water as it relates to the workability of a concrete mix. Water-reducing admixtures do not magically find water in a concrete mix and eliminate it – no such additive exists. Instead, a water reducer is an admixture that, when added to a fresh concrete mix, will increase its workability without the use of additional water. In the presence of a water reducer, a concrete mix will need less water to achieve the same slump.

Water demand of a concrete mix refers to the amount of water required to create a specified slump.

WATER-CEMENT RATIO

A good predictor of hardened concrete quality is the concrete mix's ratio of water to cementitious materials, or w/c. Lower w/c values – within reason – have long been associated with increased compressive strength, watertightness, durability and more, so less water in a mix is a common goal of designers. In the plastic state, however, conventional concrete made with more water tends to be more workable and easily placed, which is ideal from a production standpoint. Water reducers balance these competing needs, resulting in concrete that is easily placed, consolidated and finished without increasing the mix design's w/c.

WATER REDUCERS TODAY

Today's water reducers are advanced additives that have evolved from the artificial rubber emulsifier that helped disperse the black concrete coloring agent in the 1930s. Water reducers developed over the years can be categorized as lignosulfonates, hydroxycarboxylic acids, hydroxylated polymers, salts of melamine formaldehyde sulfonates or naphthalene formaldehyde sulfonic acids. The most recent technology, using polycarboxylates, was introduced in the 1990s. The exact formulation of a water reducer is largely proprietary, and suppliers in the industry work with precast producers to optimize the dosing



19 HAMILTON FORM CREATES FUNCTION
CASE STUDY
MANOR EXPRESSWAY SOUND WALLS
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A large, blue, modular precast concrete formwork panel standing upright. It has a complex shape with multiple vertical sections and a hanging mechanism at the top. The panel is set against a dark background.

A photograph showing a precast concrete coping being lifted by a crane. The coping is a long, narrow, rectangular piece with a decorative, textured surface. It is suspended by cables and is being moved over a construction site.

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The Project: MSE retaining walls with a decorative precast concrete coping play a major role in bringing the "Central Texas Heritage" design theme to life on the Manor Expressway near Austin, Texas.

The Challenge: The coping has an intricate series of cut outs, recesses and textures. The product is 15 feet long, 5 feet tall and has variable depths, making handling complex.

The Solution: The formwork was designed to simplify production, stripping and handling. Sidelforms were slightly offset to eliminate a visible seam at the center. Chamfer is used to locate block outs, and a hanging back pan with integral top ties creates the ledge.

What seemed like a complex product is simple to set-up and cast.

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of their particular brand. But how a modern water-reducing admixture works relates to what was discovered when NSFC had its unintended water-reducing effect in the 1930s.

EFFECT ON CEMENT

When cement contacts water, opposite electrical charges at the surface of the cement particles attract one another. This causes a flocculation, or grouping, of cement particles which can increase water demand. Water-reducing admixtures neutralize surface charges on cement particles and cause all particles to carry like charges. Because like charges repel each other, flocculation is reduced and cement particles are better dispersed throughout the mix. Better dispersion of cement particles economizes water during the cement hydration process. Water that would otherwise be trapped within flocculated particles is freed, decreasing the viscosity of the paste and increasing slump. As a result, the amount of batch water required to create a desired slump is reduced.

The effect of a water reducer is dependent on source material, dosage, position in the batching sequence and the water reducer's molecular weight. For example, if you use a water reducer categorized as a hydroxycarboxylic acid, expect different dosing rates and batching sequence recommendations than for a water reducer that is a hydroxylated polymer. Because the chemistry of each water reducer varies, even when used at the same dosage rate, they will not behave exactly alike.

RANGES OF WATER CONTENT

Typically, water reducers are categorized by their impact on water content rather than on the materials used to create them.

► Low-range water reducers

Conventional water-reducing admixtures (WRA) are low-range water reducers. Low-range WRAs can reduce water content by approximately 5 to 10% and must comply with ASTM C494 Type A (water-reducing admixtures). They are intended for concretes with 3-to-6-inch slumps. Water reducers in this range are usually made of lignosulfonates, hydroxycarboxylic acids or carbohydrates. When used at high dosages, low-range water reducers can prolong concrete's set time.

► Mid-range water reducers

Mid-range water reducers typically reduce water content by 10 to 15% for concrete with a slump range from 5-to-8 inches. They must usually comply with the requirements of ASTM C494 Type F (water reducing, high range) and Type G (water reducing, high-range and retarding) admixtures. Mid-range water reducers can help reduce stickiness associated with lower water content and improve the finishability of the concrete. This range of water reducers was developed in the 1980s specifically to address the retarding effect seen with higher doses of low-range water reducers. Water reducers in this range are usually made of lignosulfonates and/or polycarboxylates.

► High-range water reducers

High-range water reducers (HRWR), or superplasticizers, complying with ASTM C494 Types F and G are capable of reducing water content from 12 to more than 30%. Because they are so efficient at reducing water demand and reducing a mix's w/c, HRWRs often yield denser hardened concrete with improved watertightness and

reduced chloride ion permeability. In addition, HRWRs can produce high-performance concretes with strengths in excess of 16,000 psi. HRWRs are usually made of sulfonated melamine formaldehyde condensates, sulfonated naphthalene formaldehyde condensates, lignosulfonates and/or polycarboxylates. These admixtures can be used at higher dosage rates than low-to-mid-range water reducers without the retardation effect associated with high dosages of those admixtures.

Table 1. Water-Reducing Admixture Uses, % Reduction and Slump Range

Types	Uses	% Water Reduction	Slump Range
Low-range	Reduce w/c ratio, increase slump	5-10%	3-6 inches
Mid-range	Reduce stickiness, improve finishability, pumpability, placement and use with SCMs	10-15%	5-8 inches
High-range	Product high-strength and/or high-performance concrete for heavily reinforced members or where consolidation is difficult	12-30+%	8 inches or greater, SCC

Table 2. Water-Reducing Admixture Chemistries

Types	Uses
Low-range	Lignosulfates, Hydroxycarboxylic acids, Carbohydrates
Mid-range	Lignosulfates, Polycarboxylates
High-range	Sulfonated melamine formaldehyde condensates, Sulfonated naphthalene formaldehyde condensates, Lignosulfates, Polycarboxylates

A closer look at the materials used to make these admixtures can help you understand how they are sourced, what makes them effective at reducing water demand and, ultimately, why dosing rates can differ for the same WRA used to achieve the same slump or water-reducing effect.³

Carbohydrates

Sugars make up most of this classification of admixtures. The primary source of these sugars is agricultural. As a result, the base ingredients in these admixtures vary from region to region. Carbohydrate-based admixtures create a film around cement particles and make the particles slick, causing them to slide past each other to prevent flocculation. This creates a water-reducing effect and prevents water from becoming trapped within cement particles that have flocculated. Carbohydrate-based admixtures are primarily hydration stabilizers and in high doses can create a very sticky concrete mix that can be difficult to place and finish.

Hydroxycarboxylic acids

Hydroxycarboxylic acids are in the carbohydrate family of admixtures, having primarily a set-retarding effect on concrete and, secondarily, a water-reducing effect.⁴ The most commonly used WRAs are α -hydroxycarboxylic acids like gluconic acids. Gluconic acids are mild organic acids derived from glucose and, like carbohydrates, are an agricultural byproduct primarily derived from plants.

Lignosulfonates

Lignosulfonates are complex polymers that are a byproduct of the wood pulping process.⁵ During wood pulping, lignin is sulfonated to



make it water-soluble and to separate it from the insoluble cellulose. The resulting solution is called lignosulfonate.

Lignosulfonates are water-soluble polyelectrolyte polymers, meaning they are made of a single type of charged monomers. The overall polymer is either negatively or positively charged.⁶ This property makes their use in water reducers meaningful in relation to dispersing cement particles throughout a concrete mix. Lignosulfonates typically reduce water content by about 10% and have a secondary set-retarding effect on concrete. They can be used with carbohydrate or hydroxycarboxylic admixtures to reduce water demand while balancing retarding effects.

Melamine formaldehyde sulfonates

Melamine formaldehyde is a resin created by condensation polymerization. The melamine monomer and formaldehyde monomer react during this process to create a polymer. Both are chemicals sourced from a variety of industries, including coal tar and petroleum. For use in a water-reducing admixture, the melamine is sulfonated prior to polymerization to create a charge on the melamine particle, which aids in cement dispersion.

Naphthalene formaldehyde sulfonic acids

Naphthalene is a solid hydrocarbon obtained from the distillation of coal tar or petroleum. Like melamine formaldehyde, naphthalene formaldehyde is created by condensation polymerization, and the naphthalene is sulfonated before the polymer is made. Both materials have a high water-reduction ability, capable of reducing water content by 20 to 30%.

Polycarboxylates

Polycarboxylates are the newest type of water-reducing admixture. They consist of specialized polymers created by addition polymerization, opening the door to the advent of self-consolidating concrete. The polymer is called a comb polymer because its backbone – when viewed at a molecular level – includes teeth. The backbone is an acrylic or methacrylic acid while the teeth contain polyethylene oxide or polypropylene oxide. Originally, petroleum feedstock was the primary source of the ethylene oxides and acrylic acids. Today, there are various sources, including the coal industry.

The shape of the polymer contributes to a high flowability while preventing segregation. The backbone is usually already charged when sourced. It sticks to the cement while the teeth help move the rest of the

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mix along. The backbone-and-teeth comb structure of the polymer can be used to improve workability and other concrete characteristics, but it is the charged backbone of the comb polymer that contributes to the improved dispersion of cement in a mix, reducing water demand.

IN PRACTICE

Raw material sources for each type of WRA – some of which are naturally occurring organics – can vary, and each type of WRA affects water demand in different ways. As a result, a specific type of admixture can affect a concrete mix in different ways depending on the brand's formula. Moreover, the chemical makeup of cement and batch water (especially if using well water), aggregate composition and even other admixtures will affect the performance of the mix in the presence of a WRA. It is important to run test batches when beginning to use a WRA or change the dose of an existing WRA to understand how the chemicals in the admixture affect the mix design. Rely on admixture suppliers throughout this process to optimize the performance of the WRA for each application. **PI**

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

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Using Formliners to Add a Creative Touch

Adopting the use of formliners has the potential to transform your business.

By Claude Goguen, P.E., LEED AP

Precast manufacturers often seek methods to diversify their product lines as a means to fuel future growth or to buffer against downturns in specific sectors. Sometimes, a company may choose a new product due to a customer request. In other cases, it can come from identifying a market opportunity.

But diversifying doesn't always entail manufacturing completely new products. New opportunities might also arise from making your existing products in a different way. One example is adding custom patterns and finishes to your precast concrete structures. This ability could expose your business to a whole new market. There are times precast concrete structures will be out of sight to the public, such as underground utility products, and standard finishes are appropriate. For above-ground applications, however, there are many options to explore.

Concrete can be made into amazing pieces of art. For example, sound walls and retaining walls bordering our highways are now highly visible surfaces that are sometimes used to display community symbols and works of art. Nowadays, manufacturing such structures is increasingly simple through the use of formliner technology. In the past, creating patterned or textured concrete required laborious handcrafting. Materials like wood, stone and steel were used to place a pattern into a concrete surface, but this process offered limited options.

Elastomeric urethane formliners were introduced in Europe in the 1960's, and soon afterwards, designers began using them to bring their artistic visions to life. The polyurethane formliner came along next, expanding finish options substantially and giving way to more natural and ornate designs. Today, precasters can achieve just about any pattern or texture.

A wide variety of formliners are available to manufacturers. Choosing which you'd like to take advantage of typically comes down

to the formliner's service life or expected number of uses, desired texture and type of finish.

FORMLINER TYPES

There are two types of formliners: single-use and multi-use. Single-use formliners are often made of styrene plastic and are lightweight and less expensive. However, they may not offer the same degree of relief and texture depth as multi-use formliners. Precasters typically use these liners as gaskets or holders for thin bricks that are embedded into precast wall panels. Liners hold the brick in place, providing consistency in the simulated brick mortar joints.

Plastic foam, which precasters often use for blockouts in structures, can also be used to make single-use formliners. Polystyrene and acrylonitrile butadiene styrene (ABS) formliners provide moderate relief and texture. These liners are typically limited to 10-to-15 uses. Precasters use elastomeric urethane (rubber) formliners to achieve





Courtesy of Smith Midland Corporation



NPCA file photo

Polyurethane formliners give precasters endless design options.

more detailed relief and texture and can be used more than 100 times, depending on the supplier and production practices. They are usually more expensive but can result in the best value when manufacturing products for larger projects that require more pattern and texture definition.

HOW FORMLINERS ARE MADE

Transforming concrete into a work of art involves many steps. It all starts with an idea. If a building designer wants the lower portion of the wall panel to boast a pattern that resembles tall grass, conceptual drawings must be created and approved. Sometimes, the formliner manufacturer may also generate a 3D mockup for approval. Once the pattern is confirmed, it is often converted by computer numerical control (CNC) software onto a master mold surface. The master mold surface is carefully checked for accuracy and quality, then sealed if necessary. Liquid resin or rubber is then poured onto the master mold. Once the material has cured, it is removed from the master mold and carefully inspected again before it's sent to the precast concrete manufacturer.

FORMLINER USE

The key for any project requiring new formliners is to involve the formliner supplier in the process as early as possible. Discussions should take place at the design phase to facilitate collaboration. When the precaster is bidding the job, it's important to consult with the



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formliner supplier to ensure every detail and production consideration is discussed.

The supplier will submit a shop drawing for approval after the client chooses the design. The precaster will also need to obtain adhesive material to secure the formliner to the production surface. They will also need to determine the proper form release agent recommended by the formliner supplier. Generally, petroleum-based products are not advisable.

The precaster must also prepare an area to store the formliner. It may be necessary to lay out the formliner to let it "relax" prior to use so it lays appropriately within the form. Depending on the product, this could require considerable space. The precaster must also allot for storage space after use. Most formliners need to be kept out of direct sunlight and away from the elements. Loose formliners can be rolled up and stored; however, stacking formliners for a lengthy period can damage the texture or pattern.

When using formliners, the precaster must follow the recommended form release agent application instructions from the supplier. These instructions should be carefully reviewed with the production crew, especially if using formliners is a new experience to any team members. Use not only the recommended form release, but rebar chairs (if allowed), spacers and anything else that may contact the formliner. After stripping the product from the formliner, check for any defects in the formliner prior to reuse or storage. If there is damage, some formliner types, such as polyurethane, can be repaired. Some of these repairs can be made at the precast plant, but others may require shipping the product back to the manufacturer.

The 7 Deadly Sins of Formliner Use

Ray Clark, president of US Formliner, developed this list of what to avoid when working with formliners:

1. Using an improper release agent, not enough release agent or too much release agent.
2. Leaving small debris on the production table or formliners, causing a dimple in the concrete.
3. Improper formliner storage.
4. Cutting formliners.
5. Improper layout or mating of formliners.
6. Aggressive stripping of the concrete from the formliners.
7. Incorrectly adhering formliners to the production table.

NEW TECHNOLOGIES

The attainable finish options using formliners is endless and includes everything from intricate textures to deep reliefs. Imagine taking a photo and being able to transfer that image onto concrete using a formliner. Architects in Montreal, Canada, were able to accomplish this feat when they designed the Edison Residence. An image captured by Thomas Edison of Montreal firefighters in 1901 was scanned into a computer, which separated the color tones of the image. Designers created a machining file that was then fed to a CNC machine, which engraved the different grooves and textures on a master model. Finally, workers poured fresh concrete onto the master mold to make the panels. When you stand back and look at the panels, Edison's image comes alive.¹ A similar process was used in Toulouse, France, for the Université de Toulouse Paul Sabatier. The concept of using a precast concrete facade to tell a story through images has spurred further innovations in formliner technology.

There are also products that come in plastic foil printed with an image or graphics that use a concrete activator. This activator

causes the concrete to set at different rates, similar to using a surface-applied retarder. This process allows for a thin layer of paste to be partially removed as per the pattern of the activator. The contrast between the removed thin layers and smooth surfaces creates the image or graphic.

DIVERSIFY THE LOOK OF YOUR PRODUCT

As a precast concrete manufacturer, you already provide a material that is strong, durable, low-maintenance, sustainable and resilient. Adding the ability to incorporate your customer's creative designs and ideas into your product has the potential to add value to your company and to your clients. Formliner technology has evolved rapidly in recent years, enabling producers to adopt a whole new level of versatility. **PI**

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

REFERENCE:

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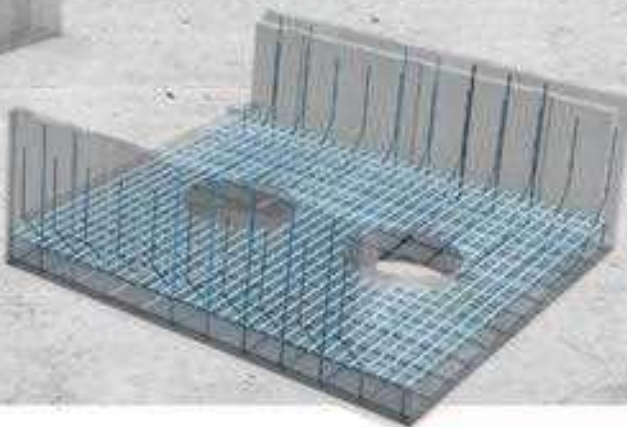
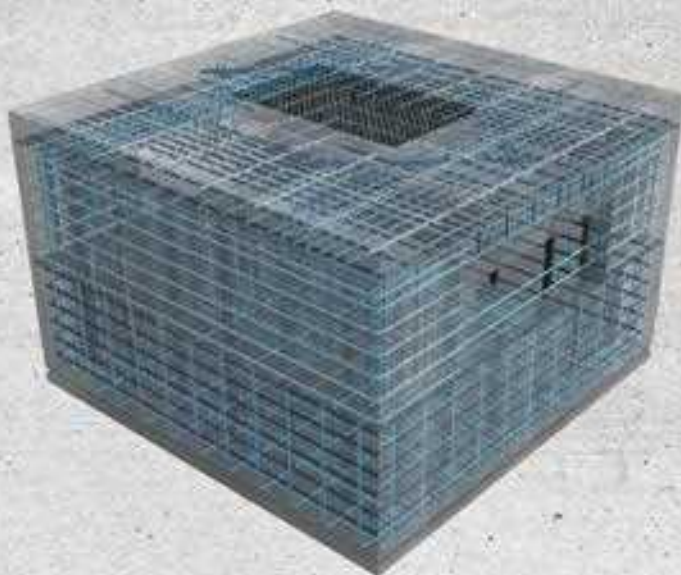
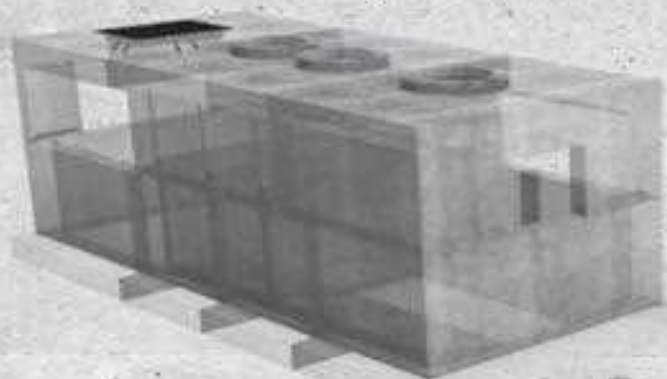
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Building New or Expanding?

HERE'S HOW TO DO IT RIGHT

Ensure the **highest level of success** for your new plant or facility expansion.

By Bridget McCrea

Building a new precast concrete plant or expanding an existing facility is a significant undertaking. Finding the right location, obtaining building permits, lining up financing, purchasing equipment and actually constructing the building all require a strategic approach that takes time to plan.

Already operating on the “inside track” in the construction field, precast concrete manufacturers have an edge when it comes to

building or expanding. You can maximize that position by applying your knowledge of permitting, zoning and construction methods, and even doing some of the work yourself.

While these advantages can create time and cost savings along the way, there are still many technical details to work out to get a new or expanding location up and running and doing so efficiently.

PLAN, PREPARE AND BE PATIENT

Andy Wieser, president of Wieser Concrete Products, noted every situation is different. He knows firsthand, having been through multiple plant expansions and new construction projects over the last decade. Since 2014 alone, the company has added onto its Maiden Rock, Wis., plant three times, and in 2019 it added onto its plant in Portage, Wis.

Wieser starts by assessing the company's needs and the impetus behind the expansion for each project. In most cases, the move was being made due to a lack of space, the need for better operational efficiencies or because a specific product line demanded it. Sometimes it was because of all three factors.

Next, Wieser examines the staffing needs for the new or expanded location. This is particularly important during tight labor markets, when adding new positions can be extremely challenging. Financing is another key consideration the company considers early in the process. This triad (needs assessment, staffing, and financing), serves as the cornerstone for any expansion project.

However, Wieser has learned that even having all your ducks in a row doesn't necessarily guarantee an easy expansion. For example, permitting, zoning and regulatory issues can delay a precaster's dream of opening a new plant or adding more space to an existing facility. He explained the company began planning and obtaining pricing on a new facility at its Maiden Rock location in 2012, two years before development began. Early steps included answering key questions like:

- What need(s) do we need to address?
- What do we want to build?
- Where do we want to build?
- How big should it be to meet our immediate needs and should we consider planning ahead for more growth in the future?
- How far into the future do we anticipate the new build will meet our needs?
- How will we organize processes through the new facility?

With these details sketched out, Wieser Concrete staff began investigating the permitting requirements for the new facility – but that's where things started to get complicated.

"We learned that, according to FEMA maps, the area where we wanted to build was located on a flood plain," Wieser said. "But we knew we weren't in a flood plain."

The plant was indeed labeled as being in a flood plain based on original maps, but Wieser said this was done in error, noting the original FEMA maps were outdated and inaccurate.

Still, the precaster would need a FEMA map amendment showing the location wasn't in the flood plain. Eighteen months and \$35,000 in engineering fees later, Wieser Concrete had what it needed to proceed with the expansion.

Wieser suggests precasters connect early with any city or county departments that will be involved. Determine exactly what needs to be done from a regulatory standpoint (e.g., including accessible restrooms in new buildings) and factor in the additional costs and time associated with these requirements.

"Think the whole process through before you get started," Wieser advised. "Consider location, material flow, staffing and everything else that goes into running a successful company. Then, take out your



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Photo courtesy of Tindall Corporation

division will be moving into a new facility nearby. The company was in the middle of grading the site and preparing to pour the foundation at the time of the interview for this story.

“Both divisions are growing, so it was time for one to leave the original Spartanburg location,” said Joel Sheets, vice president and general manager of Tindall’s utility division. “We decided that we wanted the two production facilities to be in close proximity, but with one focused on utility-type products and the other on prestressed products.”

crystal ball and consider your future needs and how they’ll impact what you’re doing now.”

COMING OUT OF THE GROUND

After 50 years of sharing a location with one of the company’s prestressed divisions in Spartanburg, S.C., Tindall Corporation’s utility

Being near one another will allow the divisions to share resources while also giving each more room to move and grow. Careful consideration went into selecting the new location, deciding on a plant layout and determining the flow of work. As the company added new products, product lines and capabilities in the past, production flow wasn’t always optimal, resulting in production inefficiencies.



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“We wound up putting new equipment where we had the space, versus having a blank slate to work from and the ability to organize things in a more linear fashion,” Sheets said.

Leadership also got its personnel involved in the process.

“We talk to them in small groups about what we can do to help them work smarter, not harder, and about where they see opportunities for the company to improve and grow,” Sheets said.

Wieser said his company also involves its staff and management teams in the plant expansion process, starting with a meeting to determine if the overall effort is warranted. During the early stages, he cautions other precasters not to get employees too excited over a project that may not get off the ground.

“You have to strike a balance between creating some excitement and keeping expectations in check,” he said. “Early on, we keep the participating groups small – and sometimes confidential – to avoid getting everyone in an uproar.”

Once the decision to move forward is set in stone, Wieser and his team use the announcement as a morale booster.

“We tell them what we’re doing and why, and show how it’s going to make things easier for them,” said Wieser, who during the last plant expansion focused on how the company was moving one particularly noisy piece of equipment to a new area where it wouldn’t bother as many people. “By doing that, we both created space and lowered the noise levels in our existing building. It was definitely a win-win.”

TIPS FOR SUCCESS

To create more win-win situations when expanding plants or building new ones, Sheets tells precasters to hire a qualified engineering design team.

“There are too many rules and regulations to keep track of for new construction, so we engage engineers, designers and architects and integrate them into our design team to avoid designing something that really can’t be built,” he said.

“Think the whole process through before you get started. Consider location, material flow, staffing and everything else that goes into running a successful company.”

– Andy Wieser, *Wieser Concrete Products*



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You should next look at which aspects of the project you can handle yourself. For example, Sheets explained that Tindall’s Prestressed Division will be manufacturing all the new facility’s wall panels. The Utility Division had already produced all of the utility structures for the site.

Wieser Concrete Products also manufactures its own walls and supplies the concrete for the floors in its new buildings.

“Any way we can see to save some costs that make sense financially, we do it,” Wieser said. “For one floor that we did last year, we just poured it in the middle of the night so that it didn’t interfere with our production for the day.”

You should also factor in the energy usage at the new plant. Often put on the backburner until opening day for the new facility, conducting a quick comparison of industrial energy rates and potential usage can translate into major cost savings and fewer headaches down the road.

Regardless of how much or little you will be doing yourself, what local or state laws dictate, or any other special consideration, it is essential to start planning as early as possible. Engage with your internal team and raise questions about the project from all angles. That way any concerns that do arise are manageable and everyone is on board to tackle them and reach the end goal together. **PI**

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



ALL IN:

Training New Hires on the Importance of Safety

Developing a **solid safety foundation** for new hires through onboarding and ongoing training pays massive dividends.

By Mason Nichols

Strategy, planning and forethought goes into the design, construction and operation of a precast concrete plant. Many factors must be considered, including the layout of the production floor, access to tools and forms, the equipment that will support the manufacturing process and more. But for James Crockett, plant manager at Trenwa Inc. in Florence, Ind., which received an NPCA Safety Hall of Fame Award for operating five consecutive years without a recordable incident, one factor stands out above the rest.

“The greatest resource that we have is our human resource,” he said. “And their well-being is our personal responsibility.”

Without workers to use the tools and operate the equipment, precast operations would cease to exist. That’s exactly why providing employees with the resources they need to remain safe in the plant – from day one – plays a critical role.

ON BOARD WITH SAFETY

Most precast manufacturers would likely point to their onboarding

program as the first step in training new workers regarding the importance of safety. According to Crockett, precasters should seek new team members who either have experience in a similar industry or have demonstrated a commitment to safety in their previous job.

“I look for people who wouldn’t consider my shop environment as foreign or alien,” Crockett said. “If it were someone that had only worked an office job in the past, they’d have to start off with sweeping the floor and getting used to the plant and the potential hazards around them.”

The intent is to limit distractions for inexperienced new hires as they adapt to a new workplace and responsibilities. As Crockett explained, distractions can lead to stress, which can lead to accidents.

Still, onboarding remains crucial, and there are steps you can take to support new workers from the beginning, regardless of their previous experience. Joel Sheets, vice president and general manager for Tindall Corporation’s Utility Division in Spartanburg, S.C., explained new employees across all the company’s locations participate in a safety orientation program during their first day of work. This program, led by a supervisor or the site safety manager, takes most of a new team member’s first day.

“Day one safety orientation kicks them off in the right direction,” he said. “Each new hire watches videos and learns the rules of how we expect them to operate as an employee at Tindall.”

Crockett employs a similar approach at Trenwa. During orientation, the Indiana location shows new hires both internally and externally produced videos on a wide variety of topics. Each video must not only be informational, but also entertaining, as Crockett has found that resonates best with newcomers.

For both Trenwa and Tindall, covering safety right from the get-go begins the process of instilling a culture of safety. In addition, the existing employees handling the training are reminded of safety basics they don’t think about on a day-to-day basis, which renews their training and awareness and helps them lead the safety culture.

John Coniglio is the co-owner and managing director at Occupational Safety and Environmental Associates, a safety consulting firm headquartered in Buffalo, N.Y. His clients experience the most success training new hires when they employ a multi-pronged approach, which can begin with a series of PowerPoint presentations or videos but should eventually include something more human-centered and interactive. He advised incorporating personal contact from the onset. Connect the new employee with a go-to person who can answer questions and demonstrate proper procedures in case the plant safety manager is unavailable. New employees will develop additional questions as they become acclimated to their role and responsibilities, and they must feel confident and empowered to stop what they’re doing and ask for help or guidance when needed.

BEYOND DAY ONE

During the first day or even first few weeks on the job, a new hire will become hyperaware of all things safety due to the topic being an area of focus during onboarding and training. As the worker becomes more accustomed to the plant environment, several factors can detract

from this focus, including an increasing workload, more responsibilities and even complacency.¹ As Coniglio suggested, one of the best ways to combat this is through human connection.

According to Sheets, Tindall also takes this approach with its new team members.

“For us, onboarding actually takes place over the course of an entire year,” he said. “There may be a lot more touchpoints in the first week than there are in the first month and beyond, so to help keep safety top of mind after that, we have our buddy program.”

Each new team member at Tindall is assigned a buddy who has considerable experience in the plant. New hires are instructed to

follow their buddy around to learn their work habits and ask questions, especially those related to safety. The relationship is a two-way street, as experienced workers are expected to continuously relay information to their assigned new hires. This approach ensures new hires will learn over an extended period, retain more information and continue to build on their experiences.

To further position new hires for success, Tindall assigns each new employee to a routine production area, which typically consists of 4-foot manholes and knockout boxes.

“It’s doing the same thing over and over,” Sheets said. “That way, each new worker is worried less about their next action and more about getting acclimated to the work. They’re with someone who is their buddy and can nudge them along, and they’re also in the area of production that’s not constantly changing.”

Trenwa employs a similar method for supporting the safety – and safety training – of their new employees.

“Our established guys who have been working with us for a while keep an eye out on all the new personnel,” Crockett said. “Our philosophy is to have an entire shop full of people making sure that no one does anything that can be avoided.”

During this process, it is critical that new employees understand they can ask a question at any time. In addition, they must understand that the expectation to question what they perceive to be an unsafe practice does not end when the initial training is over. A good safety culture encourages questions at any time from any employee. Questions must be taken seriously and addressed by management, otherwise those asking the questions will simply stop asking. When employees feel empowered to ask questions or to stop what they are doing or ask another employee to stop an unsafe practice, accountability is established at every level of the company and safety ensues.

ONGOING EFFORTS

While operations vary considerably from plant to plant, every precaster benefits from having a safety plan in place. It can be especially helpful for new hires, who must clearly understand the baseline expectation for their work from day one.

The management team at Trenwa developed a standard operating procedure manual based on Occupational Safety and Health Association standards the company must adhere to in day-to-day production. The entire team meets at least once per month to discuss safety, referring to

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this document to communicate to workers what must be accomplished to maintain compliance.

“We like to remind our team that what’s listed in the manual is not negotiable,” Crockett said. “We tell them, ‘We have to do this, and here’s how we’re going to make it happen.’ It’s as simple as that.”

Coniglio said having a basic safety program in place is a necessity for all precast manufacturers but noted the programs must be tailored to each plant’s unique situation, including the number of new employees present each day.

“I always like to tell owners and managers to establish your program around the training you need,” he said. “Compliance is the minimum expectation – you have to look at your operations to determine who is getting hurt and how. Your training initiatives should spring from that.”

Additionally, Coniglio pointed to toolbox sessions and other periodic safety updates as a particularly helpful resource for new employees. Consistent messaging over the course of an extended timeframe helps focus new team members on safety as they continue to grow accustomed to working in the plant. At Tindall, the team holds periodic safety meetings in which multiple divisions of the company link with safety managers to discuss initiatives. All team members also receive a weekly safety bulletin update that includes a topic for the week, including key metrics for the plant.

Tindall uses two different safety cards for focusing on day-to-day safety. One card is a report for any time there is a near miss, which also necessitates a creating a report of the incident. The other serves as a small reminder to practice safe behavior and functions as a daily sign-in/sign-out system at the start and end of each shift. If an employee is injured during the day, he or she must refrain from signing the card and report the injury to a supervisor.

Regardless of the approach you take with your new employees, it’s



Photo courtesy of Tindall Corporation

imperative each hire understands the importance of being cognizant of their surroundings.

“Awareness is critical,” Sheets said. “You’re in a moving environment with a lot of heavy items, and the plant floor can change daily. Having that awareness of what’s going on around them and where they’re placing all the parts of their body at any given time is paramount.”

Coniglio agreed.

“These workers must be situationally aware,” he said. “Remind them every day to look around their workplace. There’s always something new – don’t assume it’s the same today as it was yesterday.”

PRIORITY ONE

From the production floor to management and ownership, safety is the responsibility of every team member at a precast plant. A culture of safety and accountability must be instilled early and continually supported. Building a safe, successful business starts with properly training new hires on appropriate practices and systems. It continues with ongoing training and empowerment of employees to not only implement safe practices themselves but ensure those around them are doing the same. For Crockett, it all comes down to one very important obligation.

“It is your responsibility to see that all employees leave each day unharmed,” he said. “That responsibility should be taken very seriously.”

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/2020/01/combating-safety-complacency/>

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Two tower cranes help build Minneapolis' soon-to-be highest residential structure

Construction of a plush new precast high-rise condominium building is underway in downtown Minneapolis. When completed, it will be the tallest residential building in the city, standing at 41 stories, or 550 feet. The project is getting a welcome assist from two tower cranes, a Potain MDT 368 and a Potain MDT 485B-GH, from Dawes Rigging and Crane Rental and ALL Tower Crane, both members of the ALL Family of Companies.

The building, known simply as Eleven and located along the Mississippi River in the Minneapolis' tony Mill District, is being constructed using a unique combination of cast-in-place concrete columns, post-tensioned floors, and precast facade panels.

Typically, when high-rise construction employs two tower cranes, each takes a turn being the high crane, leapfrogging to allow for alternating tie-ins. However, with this project, the MD 485B-GH will always have to be the high crane. This is because precast installation can only be performed after stretches of the core have been completed, and also because of some air restrictions with a property line below.

"Think of the high-rise as a pencil," said Ryan Harrison, branch

manager of Dawes' Madison location. "The core is the pencil lead and the precast forms the pencil around it. The shorter of the two towers, the MDT 368, is a topless tower crane. This allows it to get closer to the building so there is less hook distance between the cranes, and it's easier to coordinate tie-ins."



The MD 485B-GH went up last November and is expected to be onsite until the fall of 2021. It has 148 feet of jib, began with a 230-foot hook height, and will finish at 624 feet of hook height. The MDT 368 followed in December and will be on the job through next June. It's configured with 131 feet of jib, started with a hook height of 197 feet, and will climb to 590 feet. Each tower will tie in a total of four times so panel installation can be maintained as core work continues. Both towers also allow for

fast, in-cab switching between two- and four-fall reeving.

"Depending on what each shift is working on, they may need speed or capacity from the cranes," said Sam Moyer, general manager of ALL Tower Crane. "This switching ability makes it easy to go back and forth as needed. Both cranes were also ordered with the largest available hoist, which serves well on this kind of a project."

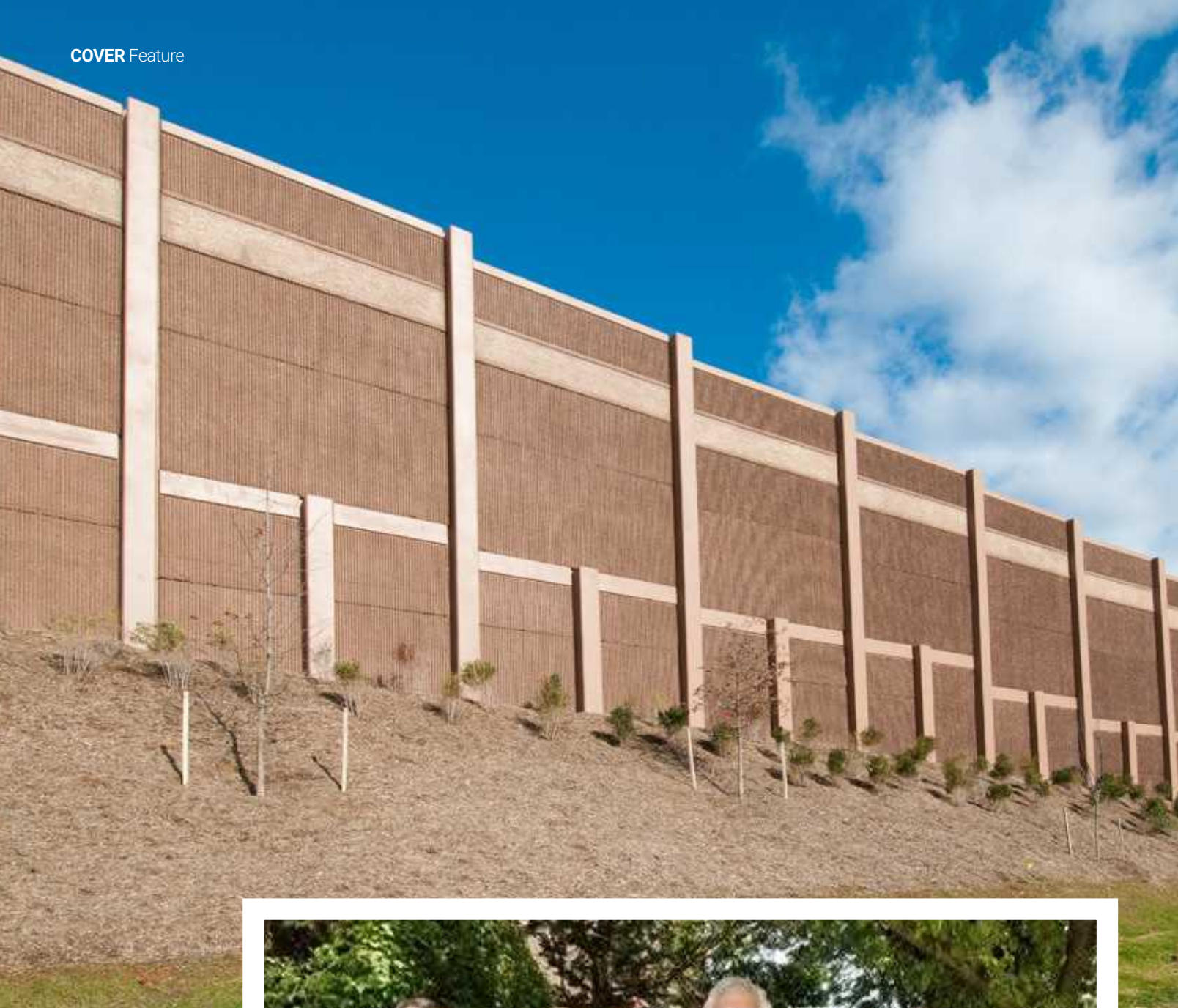
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Faddis Concrete Products prides itself on taking on challenging projects like the substation wall pictured far right, which features thin brick multi-level surfaces and a cast stone water table, as well as the sound-absorptive wall pictured above.

Faddis Concrete's leadership team consists of (L-R): Austin Hess, Don Cooper, Bob Hess, and Al Tribuno.






RIGHT PEOPLE, RIGHT APPROACH

FADDIS CONCRETE PRODUCTS

Faddis Concrete Products has evolved into a powerhouse in the precast industry with a dedication to tailor-made products and a knack for diversification.

By Mason Nichols

Photos courtesy of Faddis Concrete Products



“Do the right thing” is a simple mantra. No matter what the situation, make decisions that are right for you and others without compromising quality or integrity. On paper, this sounds great. In practice, it is anything but simple, especially when faced with the challenges of the business world.

Delivering high-quality products to every client on every job requires a team of special employees who care deeply about their work. These employees must have access to the proper tools and equipment. You must provide a safe plant environment and develop a proven process of manufacturing that is followed on every project, no matter what the circumstances.

Recognizing this, Don Cooper, owner of Faddis Concrete Products, immediately got to work after purchasing the company in 1989. He knew that if he instilled the right culture from the onset, growth and success would follow. More than three decades later, Faddis Concrete is a booming enterprise, with six locations across

Pennsylvania, Virginia and South Carolina. While Cooper’s work has been a critical part of the company’s evolution, the team members at Faddis Concrete also deserve credit for making the business what it is today.

A GROUNDED APPROACH

Cooper had no prior experience in the precast industry prior to purchasing Faddis Concrete. However, he did have nearly 40 years of experience in banking, holding every position from teller to regional vice president. This background kept Cooper grounded. In the early years, he shoveled concrete, swept and painted side-by-side with production floor employees and could often be seen mowing the lawn at the company’s plant in Downingtown, Penn.

The company was successful in the 1990s, including expanding into the sound wall market, but remained small – employing just 25 team members. Cooper knew that the sound wall side of the business could grow much larger, so he sought to bring on new talent to maximize its potential. This led to hiring Bob Hess, president and chief operating officer, and Gary Figallo, new products and special projects manager, in 2000.

“Through different sources, Mr. Cooper



Above: Faddis manufactured a twin leaf, 42-foot-span arch in the new Millenium project section of Arlington National Cemetery.

Left: Faddis is supplying nine arch structures in addition to sound wall panels and retaining wall panels for a design-build project in Maryland.



in a low cost of materials. These two things paired perfectly with a significant uptick in demand for safety barrier due to the FHWA requirement. There were days when the company shipped more than 100 loads of safety barrier in a 24-hour period, once maxing out at 140 loads, according to Clarence Mauser, plant manager of the company's Kutztown, Penn., location.

"Between the sound absorption and the safety barrier, we were able to capitalize on opportunities," Figallo said. "This is one of the reasons that we've had jobs throughout the East and the Midwest."

With an opportunistic mindset, Faddis Concrete expanded into additional markets, eventually beginning operations at additional plants in Virginia and South Carolina.

PEOPLE-CENTERED

Hess and Cooper also attribute the growth of the business over the past two decades to hard-working, dedicated team members at all six of the company's locations, including:

- **Bob Buchanan**, Assistant Plant Manager (*King George, Va.*)
- **Doug Carvell**, Plant Manager (*Downingtown, Penn.*)
- **Brandon Clemmer**, Cast Stone Plant Manager (*Downingtown, Penn.*)
- **Heather Lear**, Project Manager (*King George, Va.*)
- **Clarence Mauser**, Plant Manager (*Kutztown, Penn.*)
- **Jerry McNeal**, Regional Plant Manager (*Richburg, S.C., and King George, Va.*)
- **Jim Turner**, Plant Manager (*Newcastle, Penn.*)

"It's really about the people," Hess said. "When you get people together that synchronize and work well as a team, you can do almost anything."

bumped into the two of us, and we both had a variety of experience in precast concrete and specifically with sound walls," Hess said. "Mr. Cooper is a 'go-for-broke' kind of person. With the size of the company at the time, this was either going to be total overkill or something great was going to happen – and something great happened."

Hess and Figallo joined Faddis Concrete just one week apart. There was little diversification in the company's product line at the time, and sales could sometimes be a challenge. The pair worked closely to develop a methodology of supporting projects that was fast, reliable and comfortable for the team. This methodology, which was created using a system that Hess brought to Faddis Concrete, allowed the company to bid on projects and quote work quickly and competitively with enhanced accuracy. As a result, the company quickly outgrew the capacity of the original plant in Downingtown, and within a few years opened new locations in Newcastle, Penn., and Kutztown, Penn.

Faddis Concrete was in the process of developing a special sound wall product manufactured from wood-fiber concrete. This product was eventually named AcoustaCrete. Jim Turner, who at the time was the plant manager in Downingtown – and was the first person Cooper hired in his venture into the sound wall market – was key in the development of AcoustaCrete. The product allowed Faddis Concrete to compete for a market share in sound absorptive walls.

The company also took advantage of a Federal Highway Administration requirement that all temporary safety barrier installed at the time be replaced with new product through NCHRP 350. The Kutztown plant was positioned adjacent to a stone quarry, resulting

Team members at Faddis Concrete are guided by the company's "R.I.G.H.T." core values system, which was developed by Hess in a nod to Cooper's commitment to doing the right thing. With the company growing larger each year and adding more locations and employees, Hess explained a set of basic principles was necessary to guide operations. He had a few ideas in mind but turned to Figallo to develop an acronym that would solidify the company's culture and stick with employees. As a result, the R.I.G.H.T. system was born:

- **RESPONSIBILITY:** Be accountable for your decisions and actions at all times.
- **INTEGRITY:** Be a person with high values, in speech and in actions.
- **GOOD QUALITY OF LIFE:** Manage your work and leisure to be well-rounded and completely dependable.
- **HONESTY:** Be totally truthful and trustworthy.
- **TEAMWORK:** Do what is necessary to make the team successful even when it is difficult.

The system tells Faddis Concrete team members that working diligently to deliver high-quality products to clients is a top priority, but also that the health and well-being of each team member is crucial. It also reminds workers that being accountable for your actions will set you back on the right path when adversity hits.

"R.I.G.H.T. is such a great set of values to live and work by," Figallo said. "All these values working together free you up to be totally committed and totally honest about what you're doing."

As Hess explained, a significant portion of the work Faddis performs is in the above-ground category, meaning any mistakes made will be visible. But through the R.I.G.H.T. system, team members are encouraged to learn from mistakes and improve their work on future projects.

The company's culture has attracted a slew of young talent to the team, including Bob Hess's son Austin Hess, vice president of sales and engineering.

"One thing that's contributed to the wave of younger people we've hired is that we are really looking for the person, individual and character – not so much the experience," Austin said. "Instead, we're willing to offer on-the-job training to help people develop here and do things the way that fits our culture."

BRINGING IT ALL TO BEAR

Faddis Concrete has worked on a variety of big projects throughout the years, including the Intercounty Connector in Maryland, which consisted of several hundred thousand square feet of sound wall and retaining wall panels. The company also manufactured more than 2 million square feet of sound wall for large-scale design-build projects on the Interstate 495 Capital Beltway and I-95 corridor south toward Fredericksburg, Va.

With projects of this size, one might surmise that Faddis Concrete's products are cookie-cutter, with simplistic or repetitive designs. But Figallo noted that due to the very specific requirements associated with the work the company performs, every project can be considered custom.

"Walls can be sound-absorptive, have finishes on one side or both sides, and have a number of colors involved," Figallo said. "We are

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Connecting Through NPCA

Through the National Precast Concrete Association Plant Certification program, Faddis Concrete Products has secured additional work due to requirements from the departments of transportation in the regions it serves. The company has also taken advantage of the many resources NPCA has to offer, including webinars, white papers and more. Ultimately, though, Bob Hess, president and chief operating officer, sees the most value in the networking opportunities made possible through membership.

"We've made so many good friends in the industry," he said. "You've got the Wiesers in Wisconsin, the Smiths with Smith-Midland in Virginia and the Martins from Terre Hill Concrete Products in Pennsylvania. The friendships that we share with these folks would not have been possible without our membership in NPCA."



Faddis has supplied millions of square feet of sound walls and retaining walls for projects in Virginia and other states.

fully committed to making the product that the owner or customer wants. In effect, every job is custom, requiring plenty of setup, approvals and quality controls to satisfy the parties involved."

Austin agreed, adding that many of the sound wall and safety barrier projects begin with basic requirements, but then evolve based on clients' specific needs.

Faddis Concrete completed a special project for Eversource Power Company earlier this year that required the company's full range of capabilities, from meeting exacting specifications and tight tolerances to a high-end look. The work was completed in Greenwich, Conn., and comprised a substation perimeter wall in a residential and commercial area. The wall was produced with thin, clay-brick multi-level surfaces, a cast stone water table and coping on panels and pilasters. Many of the panel units were custom lengths, and each had to meet a specific aesthetic to match the architecture of an adjacent building. Faddis Concrete also fabricated the intricate formwork needed for the project and installed the brick into formliners provided by Architectural Polymers.

"In my mind, the Eversource project required every bit of talent that Faddis can bring to the table, from shop drawings to the concept, formwork and design," Figallo said. "It came together beautifully. We just nailed it."

STANDING READY

Armed with ample talent, a strong group of employees and a vision that includes additional product diversification, Faddis Concrete is ready to continue advancing. According to Figallo, the team is seeking to add precast concrete pavement to their product line and will also consider adding environmental solutions to address issues such as river flooding and coastal erosion. And with the success of the Eversource project, the team will also seek more architectural precast work moving forward.

Wherever the company heads next, it will find the way there by continuing to heed Cooper's words, extolling the benefits of doing the right thing through the Faddis Concrete core value system and maintaining the highest levels of quality and consistency.

"Our strength is really in our numbers," Austin said. "We have so many people with multiple talent sets and the resources, experience and flexibility to overcome any obstacle."

The senior Hess agreed.

"We're flexible, but we're also resilient," he said. "You don't see the type of growth we've had without a lot of tremendous people working hard and committing to do the right thing each and every day." **PI**

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



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The Seven Wastes

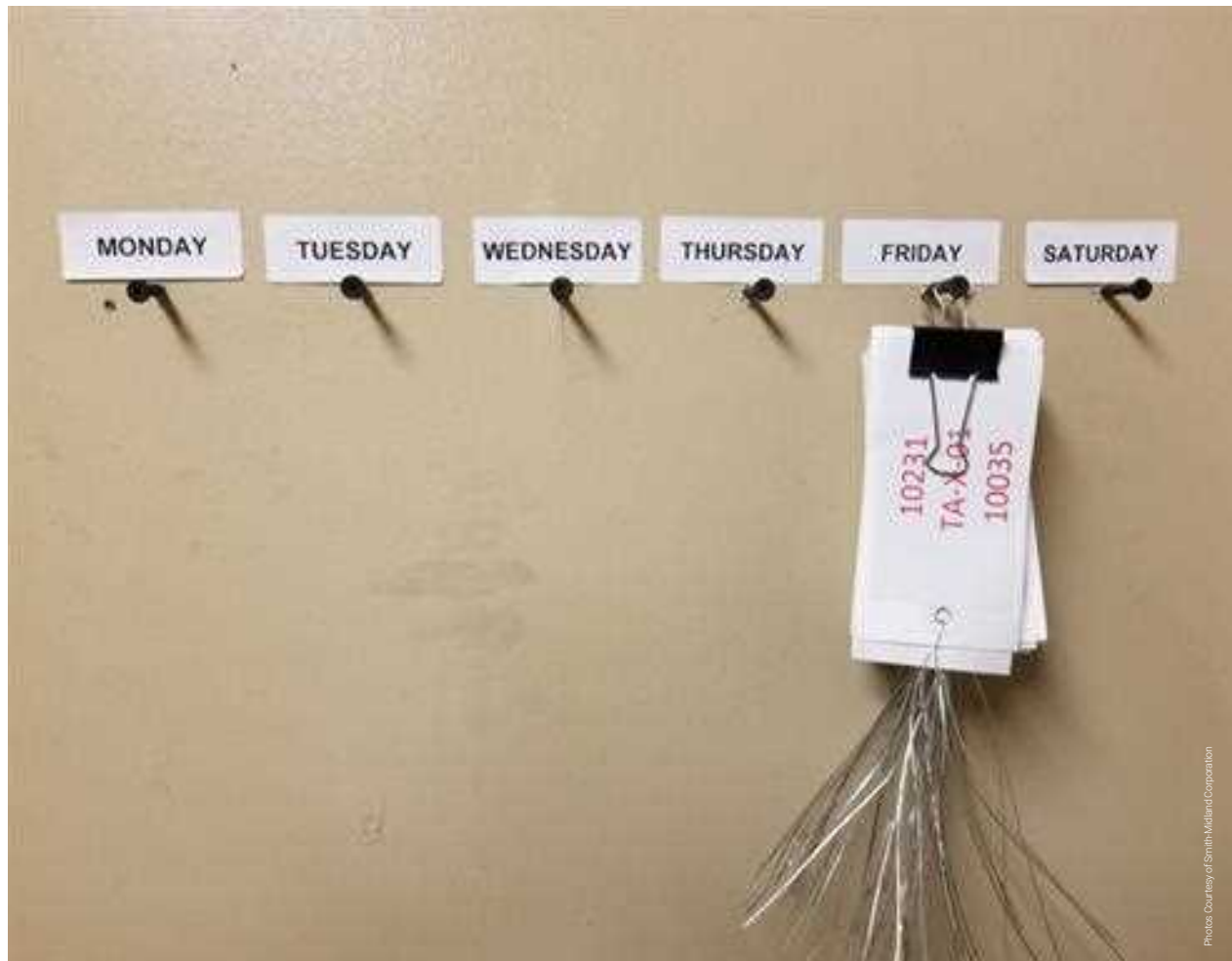
Waste #5:

Overproduction and Overprocessing

Minimizing wastes associated with overproduction and overprocessing at your precast plant can lead to leaner, more efficient operations.

By Claude Goguen, P.E., LEED AP

Editor's Note: This is the fifth 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.



Photos: Courtesy of Smith Midland Corporation

Henry Ford once said, “If it doesn’t add value, it’s waste.” In order to assess waste, it is useful to examine the process from the perspective of the customer. Within the production process, does each action constitute a value for the customer? If not, this action holds no value and could be considered a waste. With this in mind, manufacturers can identify wastes in their operations given the time to observe the process from customer order to delivery. These wastes generally fall into seven categories that are explored in this series, and the two profiled in this article are overproduction and overprocessing.

Let’s say you order a load of Portland cement. As a precaster, your primary focus is that you receive the shipment quickly and that the cement meets or exceeds your quality expectations. If the supplier addresses these concerns, you’re a happy customer.

The cement supplier has many tons of cement in their inventory, and they’ve been adding a material to the clinker that lightens the color of the finished product. As the customer, suppliers’ large stock of diverse types of cement you do not require doesn’t matter to you. Also, since you manufacture underground products, the lighter concrete color doesn’t add value to your particular application for the cement you order. Your main focus is getting an on-time load that meets your applicable specifications – everything else can be considered wastes. In this example, and as their customer, their having an abundance of

cement in stock is overproduction, while their adding a process and material to lighten the concrete color (an attribute you don’t need) is overprocessing. Overproduction and overprocessing are two of the seven wastes of lean manufacturing.

Precast concrete manufacturers also run the risk of overproducing and overprocessing, which can lead to excessive waste. Learning how to diminish or even avoid these wastes can result in a leaner process and a variety of associated benefits.

OVERPRODUCTION

Because overproduction can impact most of the other wastes (transportation, inventory, motion, waiting, overprocessing and defects), many say it is the most impactful waste of all. An increasing amount of product manufactured in excess of what the company needs produces more product the company must inventory and periodically handle. Additional handling increases the chance of damage that may require repair or replacement, as well as the potential for quality issues.

Overproduction can manifest in multiple ways, including manufacturing more final products than current demand (septic tanks,

Each Kanban tag contains unique product identification information. In this instance, the form setup team gives one to steel reinforcing and the other tells the form setup team what they are setting up. When the form is ready, the cage arrives “just in time.”

manholes in the yard) or overstocking more components than needed during manufacturing (cages, blockouts).

In the 1950s, Eiji Toyoda, president of Toyota Motor Manufacturing, was invited to tour the Ford assembly plants in Michigan to study their processes. Toyoda had been invited a few times to learn from this revolutionary method of manufacturing.

When Toyoda toured Ford plants, he noticed excessive levels of product in inventory. He found that Ford rewarded managers who produced lots of parts, keeping machines and workers busy despite this resulting overproduction and disruptions in flow. He also observed that Ford held many finished model T's in inventory.

When he returned to Japan, he tasked an industrial engineer named Taiichi Ohno with improving Toyota's manufacturing process so they could compete with Ford. Toyota did not have Ford's vast manufacturing and inventory space or access to the same amount of materials. Instead, it developed a process to create a one-piece material flow that could be efficient and flexible based on customer demand known as the Toyota Production System (TPS). TPS incorporated the concept of the "pull" system. This means a product or component is made based on demand or "made-to-order." Making products or components in anticipation of a speculated future need or "made-to-stock" is a "push" system and leads to many types of waste.

For example, a precaster may manufacture welded wire cages of varying diameters in anticipation of them being needed for manhole pours. The steel assembly workers may be proud of their output, but

the increased number of cages exceeds demand and ends up occupying space in the plant or yard. If steel is stored outside for too long, it can lead to quality issues, such as the steel becoming dirty or damaged. The precaster can also run into transport wastes as it moves cages around until they are needed.

This is an example of a "push" system of manufacturing, where the manufacturer makes-to-stock in anticipation of a future need. Ideally, manufacturers should operate in a "pull" system. Here, the cage would only be made after a customer request. The goal is not to necessarily operate in a pull-only system, but to find the optimum balance of push-pull that will enable a good production flow without overproducing components.

What precasters need to do is identify a stock level that triggers when more cages need to be produced. Think of it like the low fuel light in your car. When the light comes on, you're low on fuel but have enough to get to the gas station. Continuously filling up your car while the needle hovers near full would be wasteful.

Preventing pileups of inventory along the production process is the goal of Kanban, a scheduling system developed by Taiichi Ohno for lean manufacturing and just-in-time manufacturing. The Kanban system limits the buildup of excess inventory at any point in production. The manufacturer establishes limits on the number of items waiting at supply points and reduces inefficiencies as they are identified and removed. Whenever limits are exceeded, inefficiency should be addressed.

"We have begun using a Kanban method to place the order for the

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“We have begun using a **Kanban method** to place the order for the reinforcing shop to produce reinforcing cages for the form setup group.”

– Alan Pritchard, *Smith-Midland Corporation*

reinforcing shop to produce reinforcing cages for the form setup group,” said Alan Pritchard, plant manager at Smith-Midland Corporation.

“This made a difference when we had instability within the shops related to COVID-19 concerns and to prepare for possible unpredictable attendance related to health concerns.”

The pull system also applies to final products. Many precasters manufacture a high number of stock products during slower winter months. The goal is to keep machines busy and employees working, so managers speculate what customers will need when the construction season ramps up. The potential downside is that there is money tied up in that stocked product, along with storage costs.¹

Precasters may perceive making products to order as a delayed method of delivering them, as opposed to pulling something from stock; however, that delay is exactly what should be examined to streamline the production process. How can the company make products faster without sacrificing quality and safety? Once that’s figured out, the need to stock so much product becomes less important.

OVERPROCESSING

Overprocessing occurs when additional work does not add value for your customer. It includes taking unnecessary steps in the process due to factors such as poor design, poor quality manufacturing or faulty tools and machinery. Overprocessing also includes adding attributes to a product that are not necessary. All of this can incur costs that add up over time.

For example, if a precaster produces an underground structure that requires a coating under the waterline, but applies this coating throughout the inside of the structure, this is overprocessing. The coating above the waterline does not add any value for the customer. Another example is filling in minor bug holes after the product is stripped. This process requires time and money, again adding no value

to the customer as they already have an expectation of the final product. The company is incurring waste by adding a step to meet an expectation that may not exist. In this case, the first thing should be to evaluate whether the bug holes are excessive. Many concrete products contain bug holes, which are not detrimental to the function and durability of that product. If they are deemed excessive, performing a root-cause analysis to determine the cause and addressing it could eliminate that added step, thus cutting down on waste.

Overprocessing can also be attributed to internal processes of manufacturing. For example, if storing and moving stock cages results in having to clean the reinforcing and readjust the ties, an additional step is created. This step adds no value to the internal customer waiting for the cage in the next step of manufacturing.

FINDING THE OPTIMUM BALANCE

Increasing efficiency in precast operations requires focusing on one aspect at a time. Examining the flow from customer order to delivery can help identify actions that bring value and actions that constitute waste. In terms of limiting overproduction, looking at past sales trends, keeping up with industry outlooks and enhancing communications with customers can help develop a leaner, more accurate inventory. Additionally, developing internal safety stock levels within the manufacturing process can avoid overproduction of product components. Continuous training and standardization can help lower overprocessing while still allowing you to deliver the quality product your customers expect. **PI**

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

REFERENCES:

¹ <https://precast.org/2020/03/the-seven-wastes/>

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Scholarship Recipients at Work

The **internship requirement** for NPCA Foundation scholarship recipients ensures they roll up their sleeves and get hands-on knowledge of the precast industry.

NPCA Staff Report

When it comes to understanding the precast concrete industry, there's no substitute for real-life experience. The NPCA Foundation ensures this takes place by requiring its scholarship recipients to complete internships at NPCA member facilities.

By working at the ground level of the precast industry, these students learn not just what precast concrete is, but also how it's manufactured and everything that goes into ensuring high-quality products.

Lucas Winkler has a last name that is familiar to some NPCA members as his father, Andy Winkler, is a longtime employee of Wieser Concrete Products and has been active with NPCA for many years. At the time of the interview, Lucas was in the middle of his internship at Vaughn Concrete Products. Given his ties to the industry, the experience bolstered his knowledge and exposed him to new ideas and concepts.

Ian Underburger, a civil engineering student at Ohio State University, conversely, had no knowledge of the precast industry prior to earning an NPCA Foundation scholarship. He chose to complete his internship with NPCA Associate member Concrete Sealants. By doing so, he learned not only about concrete and precast applications, but also how important the products that go into finished products truly are.

These two students, along with their supervisors, have mutually benefited from the internship experience and shared their thoughts on it with NPCA.

NPCA members interested in hosting interns can use the tools developed by the NPCA Foundation to create their program, available at precast.org/foundation/internships.



Lucas Winkler

Lucas Winkler

1. What school do you attend and what are you studying?

This fall I'm going to Chippewa Valley Technical College and working toward a two-year business management degree.

2. What did you hope to gain through this internship program?

My No. 1 goal was to get to know a little bit about

everything and be able to do a little bit of everything when asked.

3. What have you done so far in your internship?

I've learned a lot about delivery and the truck driving side. On top of that, I've learned a lot about the job site structure and how it's set up: what goes on, what to watch for, how to deal with the people, that kind of stuff. I've also learned a little bit about the manufacturing side such as the rebar and pouring the concrete, tearing forms down, setting forms up, oiling forms and other basic plant stuff. I've also become familiar with storm shelters. I've set one of those and dealt with quite a few so far. Also, along with the trucking side, load securement is a bigger thing.

4. What have you learned that you didn't expect to learn?

One of the main things that sticks out is just the structures you can make with precast. I've learned you can make just about anything you want using precast.

5. How do you think precast plants can benefit from hosting interns?

We are another helpful hand, but also, employees go over more things with an intern that normally they wouldn't, which refreshes some of the basic things for them.

6. Having worked at Wieser Concrete Products in the past, how has this experience been different and boosted your knowledge of the industry?

One of the biggest things that's different is VCP manufactures more special structures and more custom structures than Wieser Concrete.

7. What has been your favorite part of the internship so far?

My favorite part has been getting to know everybody and seeing how it all works out here, and then going on the job site and seeing the different struggles or tasks you have to face on the job site and what to expect.

8. What are you plans for the future?

I'll keep doing internships for the next few years and probably stay in the precast industry. I want to try a couple different plants. I haven't fully decided where I'm going to go yet, but I want to get to Mark Wieser's facility in Portage, Wis., and I'll spend a summer in Wieser's Maiden Rock plant. I definitely like this internship and want to keep doing them.

Mike Vaughn

President and General Manager, Vaughn Concrete Products

1. What did you learn from hosting an intern previously?

Each kid is different in what they are looking for. I ask them what they are looking for and what they want to learn to do and tell them what we have to offer to make sure that's what they would be happy with.

2. Why did you decide to host an intern this year?

I think it's Lucas himself. He had that sparkle in his eye. I had a conversation with him and told him that if he wanted to come work for us in the summer to let us know. I told him there would be a wide variety of things he would be exposed to, and he got that sparkle and showed interest.

3. How has the experience benefited Vaughn Concrete Products?

Sometimes we can get too complacent about what our people should know how to do, or that you think they know how to do, but when you take time to explain it to someone it makes sure other people have the details as well. It's a good reminder to us to communicate the details to all your people.

4. Would you recommend other precasters host interns? Why?

In addition to helping refresh your own people, we also have to invest in our future, and our future is the next generation to come. There aren't many kids who are getting out of bed saying, "I want to work at a precast concrete plant." Most don't have any idea really what it is and what we do, and there's a lot of work that goes with it but quite a bit of excitement as well. If they don't know it's out there, they're certainly not going to go down that path.

5. Is it important for people like Lucas, who have industry experience, to work at another precast plant?

I think it really is. There are so many different management styles, so many different philosophies. We build specialty structures, whereas a lot of plants are building repetitious product and adapt that product where it fits. I think it's really good for all of us, and that's why I like to tour precast

plants. You can see what other people are doing, and even if you don't use it tomorrow or the next day, you know that option is out there and I think that's really important – that there are other ways of doing things.

6. Is there anything else you'd like to share?

I'm pretty proud of Lucas. It was his decision to come and in his first few days he learned what a 40-hour workweek is – Monday and Tuesday. He's done well and stuck right with it and hopefully when he's my age he'll look back and say, "I did learn a lot."



Ian Underburger

1. What school do you attend and what are you studying?

I'm studying civil engineering at The Ohio State University and going into my sophomore year.

2. How did you hear about the NPCA Foundation scholarship?

I was researching going into college about scholarships. My mom

actually found the scholarship and got me in the right direction. I knew very little about the precast industry going into it. I took the NPCA PQS I class in the spring, and here at Concrete Sealants I've been able to get my brain around the information better and understand it better. As I was researching precasters in the area to continue my scholarship next year, I was looking at precasters and then precast suppliers came up as well. At Concrete Sealants, they made me feel like they had a plan for me, and it was really enticing to hear what I'd have the opportunity to do.

3. What have you done so far in your internship?

So far, I've tested a lot of the products. I've done pressure cell testing, which is putting our butyl rubber sealant in pressure cells and measuring how much they move due to hydrostatic pressure, and also worked to come up with a consistent concrete mix design to create a control to see how well our products perform. Also, I've been getting to know our side of the industry. I'm doing something completely different that I never thought I would be doing.

4. How has this internship benefited you as a student and prepared you for the future?

An obvious benefit for me is learning the science behind concrete mix design. I learned it a little bit in PQS I, but being able to come up with a design on my own here, actually pour concrete, and to get to do the compression tests and see the results has been great. I can modify the mix design with things like the w/c and gradation of the aggregate. In school, in my concrete mix design class, I think I'm going to ace the class now because I have so much experience with it. For the future, I think it's prepared me for an independent engineering field work environment where I take on projects, go work on them and report back.

5. What is the most surprising thing you have learned during the internship so far?

I would say the uses for the products has been surprising – seeing the technology behind them like the hydrophilic water stops and the densifying

agents, seeing the vast amounts and scopes of their products and the different projects they work on all around the globe.

Sam Lines

Engineering Manager, Concrete Sealants

1. Why did you decide to host an intern this year? Have you had interns in the past?

During the summer, we have high school graduates or college students work in our factory. A couple of times, we've had interns with chemical engineering experience. Jesse Wingert had the thought, "Why don't we get an NPCA Foundation intern and see what we can learn from them and they can learn from us?" The opportunity to interview Ian came up and he is now the first engineering intern we've had. As a Foundation Board member, it was important to me as I've been working to promote it to others.

2. How has hosting an intern benefited Concrete Sealants?

Going into this, I wasn't sure what to expect. We have someone who is very intelligent who can take on projects, be independent with those projects, come to me or others with questions and seek our advice but then go apply that information – that's just been amazing to be able to be able to have that happen.

For me, there are projects that I'd like to do but I have a busy schedule. It's allowed me to take a couple of those ideas and say, "Here's something, own it, run with it and figure it out." Ultimately, there will be things he'll finalize with a nice technical report and provide us with data that will be used to his own personal benefit to show that he's participated in work and there was an outcome. For us, it will provide finite data we can use for years to come.

3. Why do you think Associate members should get involved with hosting interns?

I think when we hear of the Foundation and of scholarships, we immediately think it's an intern to go into construction or civil engineering. So, when you're out there making widgets for the industry, you think, "We don't build bridges." But what's interesting is that we may not be out there building the precast products, but we're involved with every kind of company that builds every kind of precast product. We're in that world all the time, so I would say to the associates out there, "Don't knock it until you try it, because once you try it you're going to be hooked."

4. How does interning at an Associate member help round out the knowledge of the precast industry for interns?

You have to think of the entire product realization cycle of getting a box culvert in the ground or putting a building facade up. There's concrete that gets poured into a form to build a product, but before that ever happens, all the raw materials are sourced, supplied and delivered. For a really good intern to have a knowledge of the entire supply chain from the time the rock gets quarried to the time the materials get ordered and supplied, it's an entire system of events to understand. Working at an Associate member allows an intern to see a broader picture of what's happening in that entire cycle of development. ■



NPCA members interested in hosting interns can use the tools developed by the NPCA Foundation to create their program, available at precast.org/foundation/internships.

NPCA FOUNDATION SCHOLARSHIP RECIPIENTS

The NPCA Foundation awarded 11 scholarships to undergraduate and graduate students pursuing studies related to civil engineering, architecture and construction-related curricula. The scholarship provides financial aid and increases the student's awareness of the many benefits precast concrete products can provide the specifying community. The NPCA Foundation thanks NPCA members who sponsored the winning recipients.

Students are required to work a minimum of 320 hours at an NPCA member company each year in order to receive payments for years two, three and four. The NPCA Foundation encourages NPCA members who are interested in volunteering as a potential internship location to contact Marti Harrell, NPCA Foundation executive director.



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Working For You

NPCA Works for You During COVID-19 Shutdowns

The NPCA professional staff has been working hard to expand the use of quality precast concrete products without missing a beat during the COVID-19 pandemic and resulting travel restrictions. In the months prior to countrywide shutdowns, NPCA professional staff members conducted 22 in-person presentations to a combined audience of 1,779 specifiers and students and participated in 18 live codes-and standards-related meetings. These numbers reflect not only the staff's ability to educate the industry via face-to-face interactions, but it also shows that NPCA is committed to providing education and participating in the codes and standards process.

Although stay-at-home orders presented several challenges in continuing the in-person momentum from the first quarter of 2020, NPCA used the time to strategize. We implemented flexible, resourceful and innovative solutions to meet outreach goals even when stay-at-home orders were lifted but travel remained restricted.

CERTIFICATION & SPECIFICATION

NPCA kept in contact with federal, state and local government agencies as officials worked to assess and address the impact of COVID-19 on the public infrastructure and construction industries. Working closely with specifiers and regulators during this time of uncertainty was critical in identifying ways in which the association and NPCA members could be part of the solution, both in specifications and with our own plant certification program.

In July, NPCA rolled out a strategy for promoting flexibility in the Plant Certification Program by conducting virtual plant audits where needed and allowed by state agencies. The plan preserves the consistency of annual in-person audits by converting critical sections of the 14th Edition of the NPCA Quality Control Manual for Precast Concrete Plants to virtual audits that resembled in-person audits.

NPCA Director of Certification and Regulatory Services Chris Frederick maintained contact with specifiers and government officials to ensure precast continues to be specified by state and local authorities. In April, Frederick confirmed that Alaska DOT added plant certification requirements within their specifications for drainage structures along with noise, mechanically stabilized earth and retaining wall structures. Montana was another state-level success. In April, the state DOT extended NPCA Plant Certification requirements to all precast products after previously recognizing NPCA certification only for above-ground products and architectural precast.



To view a map of current NPCA Plant Certification requirements across the country, visit precast.org/working-for-you.

CODES & STANDARDS

NPCA technical staff members were slated to attend several live conferences and meetings related to codes and standards development throughout the spring and summer. Fortunately, many of the meetings were converted to a virtual format. Director of Codes and Standards Eric Carleton, P.E., attended 19 virtual sessions between February through August. Major developments during this time included:

- **ACI Committee 319, Precast Structural Concrete Code**, held its inaugural virtual meeting.
- **ASTM Committee C27 on Precast Concrete Products** issued a ballot for review from April to May. The ballot included 4 items affecting ASTM C1227, C1804 and C1814.
- **ACI 301-20, "Specifications for Structural Concrete"** was finalized and prepared for publishing.
- **ASTM Committee C13 on Concrete Pipe** issued a ballot for review from July to August. The ballot included 23 items impacting precast concrete pipe and rubber joint standards, combining imperial and metric standards for manholes and connectors, and three newly proposed standards.
- **AASHTO Committee on Bridges and Structures** held main and subcommittee meetings to evaluate the proposed update to the existing outdated AASHTO box culvert standards in an effort to harmonize them with ASTM C1577.

OUTREACH EDUCATION

NPCA's presentations to specifiers, regulators, contractors and academia was the focus of our virtual strategy, as demand for virtual continuing education options grew in the current environment. Between May and August, NPCA hosted six webinars and reached nearly 1,400 live session attendees. Those six sessions reached nearly the same number of attendees as the 17 in-person presentations in the first quarter, which trained 1,524 attendees.

Specifier Webinars

NPCA's free specifier webinars saw the greatest success in drawing attendees, as regulators, contractors, academics and students joined our typically specifier-heavy audience. The first two offerings, in May and June, had record-breaking attendance and collectively brought in 1,250 live webinar attendees. With these two webinars alone, NPCA nearly surpassed attendance for all eight specifier webinars held during the last two years.

Onsite Wastewater partnerships

In addition, the outreach team leveraged long-standing partnerships with other associations to provide precast-specific education within their virtual education

efforts. NPCA and the Florida Onsite Wastewater Association entered an agreement for NPCA to conduct four 8-hour courses throughout May and July.

Student and Faculty Relationships

The impact of COVID-19 restrictions presented an opportunity for NPCA's outreach team to incorporate remote education throughout all outreach efforts beyond specifier webinars and industry partnerships. Plans are underway to convert our typical college visits into online learning opportunities. As colleges and universities across the nation moved to remote instruction for the fall, so did the outreach program's strategy for reaching this audience. The NPCA professional staff is currently reaching out to established academic contacts to conduct virtual guest speaking opportunities throughout the fall semester.

An update to NPCA's Student Membership benefits was also announced this spring. NPCA will now offer graduating student members a free one-year Professional Membership. This added benefit is aimed at keeping students entering the workforce in tune with NPCA as they begin careers in the construction, manufacturing or specifying industries.

LOOKING AHEAD

NPCA's outreach program has continued the momentum gained in the first quarter and continued to push the needle by building on existing relationships virtually. Despite the COVID-19 pandemic, outreach efforts in 2020 kept up with 2019 benchmarks. Our year-to-date number of people trained with precast-specific curricula (2,904) is on pace with last year's YTD numbers (2,945). Looking ahead, NPCA will work to connect with the industry via more remote education offerings in addition to coordinating remote guest lectures for college, trade and vocational students throughout the fall, ensuring NPCA does not miss out on making these essential connections.

Despite the limitations created by the pandemic, NPCA continues to work for you to ensure specifiers and students are educated on the benefits of precast concrete products, specifications continue to recognize precast concrete products as the building material of choice, and relationships develop across the country with DOTs, counties and municipalities. ■

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 kstelsel@precast.org.

Command Alkon Releases Software Suite

Command Alkon unveiled CONNEX Jobsite to orchestrate heavy material movements, job cost tracking, order and yield management, and provide traceability and quality assurance insights. CONNEX Jobsite includes an electronic material ticket management system that automates

longstanding manual practices across the industry.

Fabcon Names New CEO, Chairman of the Board

Fabcon Precast has named Mike Rafi as chief executive officer and director. Rafi has served in a number of senior leadership

positions over the past 20 years at Contech Engineered Solutions and Oshkosh Corporation. Mike LeJeune was appointed as the chairman of the board after leading the company as CEO for 20 years.

Combilift Wins Design Award

Combilift was among the winners of the



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CONSTRUCTING THE FUTURE



2020 Red Dot Design Award for its recently launched Combi-CBE8 model – the world's first compact counterbalance design electric powered multidirectional forklift with its patented traction on all wheels.

ALL Family of Companies Named Authorized Service Center

The ALL Family of Companies was named an authorized service center for Load King Cranes. ALL will service Load King boom trucks, truck cranes, and Terex legacy products for customers from 16 of their full-service yards.



CMC Acquires GalvaBar

Commercial Metals Company announced it has acquired substantially all of the assets of AZZ's Continuous Galvanized Rebar business, which produces GalvaBar.

ISI Names New General Manager

Industrial Services International has named Andre Ploetner as general manager. Ploetner comes to the company with more than 15 years of experience in the concrete products industry.

In addition, ISI hired additional service personnel and relocated its warehouse to a new, expanded facility in Hagerstown, Md.





Recruiting Exclusively in Precast

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Jensen Launches New Stormwater Treatment System

Jensen Precast announced its new StormVault Biofiltration System with

engineered Sierra Blend bio soil media has been tested and verified by the New Jersey Corporation for Advanced Technology (NJCAT) as

a Stormwater Manufactured Treatment Device for Green Infrastructure. The verification was certified by the New Jersey Department of Environmental Protection (NJDEP).



StormVault Biofiltration System



Taylor Machine XH-650L Truck Lift

any lifting application found at demanding industrial locations.

RimRiser Names New VP of Engineering

RimRiser has added Dwane Paulsen as the Vice President of Engineering. Paulsen brings more than 20 years of experience and achievement in product research, design and manufacturing. **PI**



Dwane Paulsen

Taylor Machine Works Announces New Lift Trucks

Taylor Machine Works, Inc. has introduced the XH-650L and the XH-700L Lift Trucks.

The trucks are powered by a 250 horse power Cummins QSL9 Tier 4 Final turbocharged diesel engine. The models feature an Ultra-View XD Mast to cover

CALENDAR OF EVENTS



Oct. 13-15, 2020
NPCA VIRTUAL
55TH ANNUAL CONVENTION



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.



March 3-5, 2022
THE PRECAST SHOW 2022
Kansas City Convention Center
Kansas City, Mo.



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

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TITAN TALES - The User Experience

One Version of the Truth



With the Titan Precast Management System, Terre Hill's team works from one information source, rather than multiple versions of data.

One of just a handful of precast concrete companies that can trace its roots back 100 years, Terre Hill Concrete Products evolved alongside the industry, adding new products, better technology, more automation and multiple locations through the years. Located in Terre Hill, Pa., about an hour west of Philadelphia, by 2005 the company was running in several directions, and so were the data systems for accounting, sales, production and dispatching.

It was time to get everybody on the same page. That's when Terre Hill Concrete Products made the move to the Titan Precast Management System, according to Joshua Martin. A fourth-generation family member, Martin is the director of business improvement and the company's point person for IT and all things Titan.

"We use it today to manage our entire quoting process, production, order tracking. It handles our customer invoicing, our general ledger, accounts payable," he said. "Prior to Titan, every department and every office had their own filing system, their own paper files. What I would say is that they had their own version of the truth. So, we were not just duplicating work, we were sometimes triplicating work or more, just starting from scratch – taking a quote and starting all over to make it a shop drawing, and then starting all over to make it a delivery ticket. Starting all over to make it an invoice."

The Entire Process in One System

Titan changed all that with its comprehensive data management of every process at the plant. "The biggest advantage to Titan is the consolidated approach to managing orders," Martin said. "The entire process is contained within one system, accessed by any person in the company regardless of their physical location. And everyone is pointing back to that same data source. That same source of truth."

With about 160 full-time employees spread out among four production locations and a corporate office, the conversion to a global information management system made a lot of sense, but it didn't come easy.

"When we first started using it in 2005 there was a learning curve, as there is with anything new," Martin said. "People, of course, are hesitant to change. But the first thing it did right away, it brought a little bit of sanity to our office. Once everyone got comfortable with it and figured out where the information was stored, we saw that people were suddenly able to help themselves to

that information – rather than waiting for someone to get off the phone so that they could ask the question that only he could answer."

On-Demand Information

"Now, people could go in and it's kind of like self-serve, on-demand information. And that's true not only for the office-level employee, but it's also true for the managers and executives. They can actually just go into Titan directly and look up this information and get what they want when they want it."

The capability for everybody to track what's happening no matter their location is a key benefit. "Not only can we see it, but it's getting updated live," Martin said. "So, for the most part, it's live information. Again, when there is one version of the truth and everyone is looking to that, it really helps to break down silos, to encourage communication, to make sure everyone is literally on the same page."

Martin cautions that it takes a commitment to bring Titan online, but it's well worth it in the long run.

"The process of converting is daunting. And certainly, it's a big investment," he said. "But once you get over the hump, once you get through that necessary transition, you will ask, 'how did we live without it?' And your employees will say, 'I don't ever want to go back.'"



Joshua Martin

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