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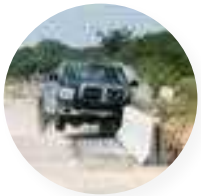
NPCA is a trade association representing the manufacturers of plant-produced concrete products and the suppliers to the industry around the world.

32 Chairman's Choice

Ashley Smith, newly elected NPCA Chairman of the Board and president of **Smith-Midland Corp.**, selects three projects that highlight his company's work.



MASH 2016 has had a major impact on precast concrete producers who manufacture **traffic barriers**

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On the Cover:
Smith-Midland Corp. in Midland, Va., has become known for its innovative precast panels, such as its work on VITA in Tysons, Va.

Photo © Alan Karchmer/ OTTO

CORRECTION: In the article, "Practice What You Preach: Tips for Welding Rebar," in the September-October issue, the equations for calculating the carbon equivalency for ASTM A615 and A706 rebar are incorrect. The portion relating to carbon and manganese for both should be represented as C.E. = %C+%Mn/6.

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Questions from the **Field**

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

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

Scott writes:

The state of West Virginia's Material Control, Soils and Testing Division is now requiring us to cure our cylinders in the exact environment as our products. We have used the lime bath method for many years without any issues, so the change came as a surprise. My question is, can we eliminate the lime bath and cure cylinders using the ambient weather and if we do so, will we still remain in compliance with the National Precast Concrete Association?

NPCA Technical Services engineers answered:
Yes, you can still remain in compliance with the National Precast Concrete Association Plant Certification Program requirements if you stop using the lime bath to cure your compressive strength cylinders. Section 5.3.5.1 of the NPCA Quality Control Manual for Precast Concrete Plants states, "Compressive strength cylinders shall be made in accordance with ASTM C31, 'Standard Practice for Making and Curing Concrete Test Specimens in the Field.' Specimens shall be cured in a manner similar to the curing of the concrete products represented by the specimens, unless otherwise required by the project."

Therefore, curing your compressive strength cylinders in a manner similar to the products represented by those cylinders should not pose an issue regarding NPCA Plant Certification compliance.

However, curing your cylinders in an ambient environment without a lime bath or without added moisture could produce lower compressive strength values when you break your cylinders. The cylinders cured without the lime bath will represent your products and their curing environment more accurately, but you'll have to monitor your quality control data carefully to ensure you're still meeting stripping and shipping strengths. Also, if you stop using the bath altogether, you will lose all correlation to previous 28-day breaks.

Even though the state of West Virginia will require these field-cured cylinders for approval, you may consider maintaining some level of testing frequency of the lime-bath cured cylinders. The field-cured cylinders introduce many additional variables that can affect cylinder strengths. Consequently, this can increase the complexity of trying to troubleshoot a concrete mix issue or track concrete mix- and/or batching-process trends. Therefore, you may need to add another set of cylinders for 28-day breaks that you'll store with the products to comply with state requirements.

Cylinders for 1-day, overnight and stripping-strength breaks are cured with the precast products. Shipping-strength cylinders are also cured with the products. Typically, the cylinders used for 28-day breaks are cured in the bath; however, some owners require cylinders be kept with the product as well.

Jon writes:

Can you explain the difference between the 6-foot and 4-foot heights for walking/working surfaces and why both pertain to the precast industry? And what is considered the plant area? Is this plan approved by the Occupational Safety and Health Administration and applicable to the septic tank precast industry?

NPCA Technical Services engineers answered:
OSHA has different fall protection requirements for different industries. Manufacturing precast concrete products in a plant environment falls under the general industry standards (29 CFR 1910) and the 4-foot rule applies here. Construction or performing construction-related activities is governed under the construction standards (29 CFR 1926) and the 6-foot rule applies in those instances. The best way to look at it is, anything that occurs at your plant, including your production area, storage yard or office, would fall under the 4-foot rule. If you go out and install precast products on-site or place in an excavation/final destination at a construction site, then the 6-foot rule governs.

Phillip writes:

What is the purpose for a gravel layer under a manhole? We have a project where the contractor is excavating down to hard sandstone and placing a manhole structure. The municipal standard called for 9 inches of gravel/stone to be placed under manhole structures. He was wondering about the intent of this stone layer.

NPCA Technical Services engineers answered:
Its intent is to be a leveling layer to provide uniform bearing across the precast base section and also to provide more precise elevation control when placing precast sections. ASTM C1821, "Standard Practice for Installation of Underground Circular Precast Concrete Manholes Structures," states this layer is only 3 inches minimum and is not intended to be a structural-soil-support component in the presence of a soft subbase. In that case, additional soil testing would be

necessary to design an appropriate aggregate base to be placed to support the manhole load.

If the municipal standard is 9 inches minimum, it would appear they included some additional thickness to stiffen the base layer and resist settlement.

For this application with the structure resting on excavated rock/sandstone, the aggregate leveling course is very important to reduce the possibility of point loads on the bottom of the precast base section by either high spots on the rock or an imperfect casting surface.

Jim writes:

We have a client who requires the precast product to be within 10 degrees Fahrenheit of the ambient temperature before the form can be stripped. Is that typical?

NPCA Technical Services engineers answered:

The short answer is we have never heard of this temperature requirement until now. For some prestressed bridge components or other critical sections we know of a requirement to include thermocouples within the mix to verify the product's temperature is similar to the concrete cylinders' temperature. This is used to verify field strength. Also, thermocouples are used to verify strength through a process called the maturity method.

It certainly would be beneficial to see if there is a reason this requirement was developed. The specifying agency may have had some type of concern where accelerated curing was taking place and the ramp up and/or down phases of the concrete temperature were not followed.

Unfortunately, sometimes the "problem" is more perceived than real. It is possible that a staff member read about the importance of the curing cycle and misinterpreted it. The only other reason would be if the agency experienced some type of thermal shock of the concrete due to a large temperature range during casting, stripping and stocking. Within ACI 306R, "Cold Weather Concreting," Figure 7.1 shows a permissible temperature difference between the concrete and air temperature to avoid cracking. The temperatures are in the 20-to-35 degree range. **PI**

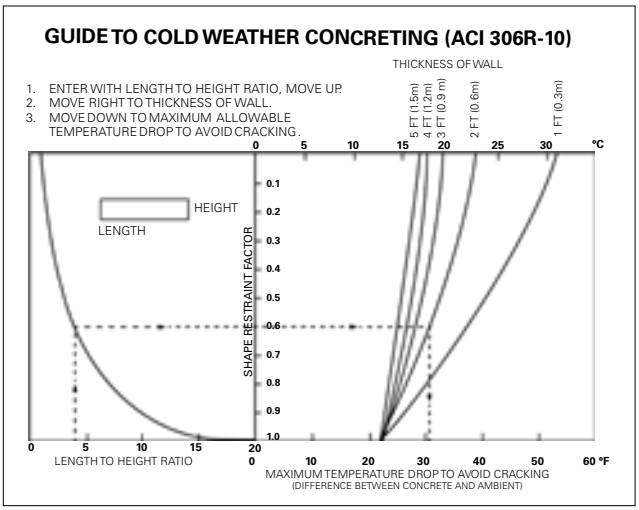

Figure 7.1 – Graphical determination of safe differential temperature for walls (Mustard and Ghosh, 1979).

Testing Conventional FRESH CONCRETE PART 1

Following **ASTM standards** for testing conventional wet-cast fresh concrete is **critical** for manufacturing a **high-quality precast** concrete product.

By Mitch Rector

Editor's Note: *This article is intended to serve as a reference guide for entry-level production workers. This first part of a two-part series explains the basics of sampling mixed concrete and performing a temperature test, slump test and density test.*

Why do we test fresh concrete? One important reason is to gain an awareness of performance indicators while casting a precast concrete product. But we are also looking for trends or variations in test results that may indicate an issue.

Section 1.1.3 of the National Precast Concrete Association Quality Control Manual for Precast Concrete Plants requires that both the plant quality control manager and the assigned backup personnel hold American Concrete Institute Concrete Field Testing Technician – Grade 1 certification. This requires understanding the following four ASTM standards related to concrete sampling and testing. Additional testing standards will be reviewed in the January/February

Measuring the concrete's temperature is a vital step in order to ensure a high-quality precast concrete product.

issue of Precast Inc. These standards are critical in ensuring every manufactured precast concrete product is of the highest quality.

SAMPLING FRESHLY MIXED CONCRETE

It is every technician's duty to ensure all concrete test samples represent the whole mix, not simply the first concrete to come down the chute or out of the bucket. If a technician only collects a sample from one part of a mix, it can easily lead to test results that do not represent the properties of the rest of the mix. Therefore, following ASTM C172, "Standard Practice for Sampling Freshly Mixed Concrete," is key to obtaining a representative sample of a mix.

There are four ways to obtain a sample of fresh concrete, depending on the type of mixer used. Sampling from stationary mixers – not paving mixers – involves passing a receptacle such as a wheelbarrow completely through the discharge stream of the mixer. Be careful not to use portions from the very beginning or very end of the discharge.

Samples from a revolving drum truck mixer are collected by taking two or more portions at regular intervals from the middle of the concrete discharge. Like with stationary mixers, portions from revolving drum truck mixers should not be taken from the beginning or end of the discharge and should be collected by passing a receptacle through the entire discharge stream. If the rate of discharge needs to be adjusted to more easily collect the sample, adjust the rate of revolution and do not change the size of the gate opening. Samples taken from continuous mixers should be collected after a discharge of at least 5 cubic feet and at least two portions from the discharge need to be collected at regular intervals.

No matter the type of mixer, there are some common steps to follow:

- No more than 15 minutes may pass between taking the first and final portions of a sample.
- Tests for slump, temperature and air content must begin within 5 minutes of obtaining the final portion of the sample.
- Strength test specimens must be molded within 15 minutes of completing the composite sample.

TEMPERATURE TESTING

The reaction between cement and water can generate a large amount of heat. Monitoring this heat is an important way to predict the properties of hardened concrete. Concrete that has a higher initial temperature will likely develop early strengths more quickly, but at the cost of a suboptimal later strength. Alternatively, concrete that has a low starting temperature will likely develop a lower early strength, but will usually end up with a higher ultimate strength. Temperature can affect more than just strength, though. It can change the properties of admixtures in the concrete. Measuring the concrete's temperature accurately is one of the first things to do to ensure a consistent high-quality product..

When done correctly, temperature testing is one of the easiest tests to perform. The equipment required for performing proper temperature testing listed in ASTM C1064, "Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete," includes:

- A container large enough to provide at least 3 inches of concrete clearance around the measuring device in all directions.
- A temperature-measuring device that is capable of being inserted into the concrete at least 3 inches and able to measure temperature to an accuracy of 1 degree Fahrenheit. Lasers or temperature guns may not be used for ASTM C1064.

Ensuring the accuracy of the temperature-measuring device is important for performing the test correctly. This can be done by suspending the measuring device, along with a reference temperature-measuring device, in oil or bath liquid that is kept at a constant temperature within 0.5 degrees Fahrenheit throughout the verification process. The measuring devices cannot touch the sides or bottom of the fluid's container and must be left in the fluid for at least 5 minutes. The measuring device should be rejected if there is a difference of more than 1 degree between the two devices.

According to ASTM C1064, it's important to confirm the accuracy of the temperature-measuring device prior to taking the temperature of the freshly mixed concrete sample by following these steps:

- Begin the temperature testing within 5 minutes of collecting the sample.
- Press the temperature-sensing portion of the measuring device at least 3 inches into the freshly mixed concrete, ensuring 3 inches of cover in all directions.
- Close the void caused by placement by lightly pressing the concrete around the surface of the device. This keeps ambient air from affecting the measurement.
- Leave the device in the freshly mixed concrete for 2-to-5 minutes and record the temperature to the nearest whole degree Fahrenheit. The most common mistake is removing the device to take the temperature. This is a problem because once is it taken out of the concrete, it will no longer be measuring the concrete's temperature. Keep the probe in the concrete while reading the measurement to guarantee a proper reading.

SLUMP TESTING CONVENTIONAL WET-CAST CONCRETE

Slump is a measure of concrete's fluidity and consistency. Even though changes in water content do affect slump, it is vital to understand that slump is not a measure of the water content. Factors like air content, temperature or the presence of admixtures impact slump. ASTM C143, "Standard Test Method for Slump of Hydraulic-Cement Concrete," is the method specified in NPCA's QC Manual. With only 2 1/2 minutes from the start of the test to removal of the slump cone, it is important to understand all the concepts and steps beforehand. There is no time to pause and double-check.

An orderly workspace is the first step in completing a successful slump test. The following items are needed:

- A 12-inch-tall device in the shape of the frustum of a cone with a top diameter of 4 inches and a base diameter of 8 inches. The cone must be free of any dents, damage or debris. Cones that can clamp on to a nonabsorbent base plate are commonly used, as long as the clamps do not deform or move the cone and the base contains the slumped concrete.
- A tamping rod with a 5/8-inch diameter and a length of at least 4 inches greater than the depth of the cone, but less than 24 inches. The rod must have a hemispherical tip that is used to tamp the concrete in the cone.
- A rigid or semi-rigid measuring device such as a ruler or metal measuring tape. This instrument must be at least 12 inches and marked in 1/4-inch increments.
- A scoop for filling the cone.

Once all the instruments have been gathered, it is time to begin the test.

- Dampen the interior face of the cone and place it on a nonabsorbent surface large enough to hold the slumped concrete.
- Hold the cone firmly in place by standing on the foot plates or clamp it to a base plate.


NPCA file photo


NPCA file photo

A slump test must be completed from start to finish in 2 1/2 minutes, so the quality control technician must know the concepts and steps beforehand.

- Fill the cone in three layers, each equal to 1/3 the volume of the cone. A good practice is to mark lines on the cone that correspond to these levels to ensure consistency.
- After placing each layer of concrete in the slump cone, rod the concrete with the tamping rod exactly 25 times. For the second and third layers, the tamping rod should penetrate the layer below by 1 inch.
- Place the final layer of concrete, ensuring it exceeds the top of the cone before rodding. If concrete drops below the top of the cone during tamping, more can be added.
- Strike off excess concrete protruding above the slump cone opening by rolling and screeding the tamping rod once rodding of the final layer is complete.
- Remove any excess concrete from the base of the cone, then raise the slump cone vertically 12 inches in 5 seconds.
- Place the slump cone next to the slumped concrete, then measure the slump of the displaced center of the top surface of the sample relative to the top of the cone. If any shearing or falling away happened during the test, it should be disregarded and restarted with another portion of the sample.

DENSITY AND YIELD TESTING

Concrete made using normal-weight aggregate commonly has a density of approximately 150 pounds per cubic foot. This can vary depending on the mix design, air content and admixtures. High-density concrete will often exhibit high strength, abrasion resistance and cracking resistance. Conversely, lower-density concrete featuring high air content can exhibit higher resistance to freeze and thaw cycles by allowing water to navigate to the voids during freezing. Whether high, low or normal density, the proper way to test density is one of the key tasks a technician will need to perform. NPCA's QC Manual states that density tests must be performed at least once per week or for every 150 cubic yards of fresh concrete, whichever occurs first. If lightweight concrete is used, density tests must be performed at least once every month or for every 100 cubic yards of lightweight concrete. Density tests must comply with ASTM C138, "Standard Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete."

The equipment required to test density is:

- A balance or scale accurate to 0.1 pounds or within .3% of the test load, whichever is greater. The scale should be zeroed before the test.
- A tamping rod with a diameter of 5/8 inch and a length of at least 4 inches greater than the depth of the cone, but less than 24 inches. The rod must have a hemispherical tip that is used to tamp the concrete in the cone.
- A cylindrical container that conforms to ASTM C29 and C231.
- A flat plate that is at least 1/4-inch-thick metal or 1/3-inch-thick glass or acrylic. The plate must be more than 2 inches wider than the inner diameter of the cylindrical container.
- A rubber or rawhide mallet with a 1 1/4-pound head if the cylindrical container's volume is 1/2 cubic foot or smaller, or a 2 1/4-pound head if the container is larger than 1/2 cubic foot.
- A scoop for filling the cone.

Unlike the slump test, a density test is not timed. However, the following procedures should still be completed in one act:

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- The interior of the cylindrical container should be dampened but clear of any standing water. Record the weight of the empty container.
- Fill the cylinder to 1/3 of its volume before rodding 25 times. Tap the sides of the cylinder 10-to-15 times with the mallet to close any voids. Repeat the process two more times, rodding 1 inch into the previous layer each time.
- There should then be roughly 1/8 inch of excess concrete, which is then struck off in accordance with ASTM C138 using the strike-off plate.
- Weigh the filled container to find the mass of the concrete.
- Calculate the density and yield.

While the steps here provide an overview of each test, it is important to consult the proper ASTM standard for each test. The standards contain more detailed information regarding what tolerances are allowed.

QC technicians are responsible for maintaining the reputation of their company's products. They not only need to know the proper equipment to use and steps to follow for fresh concrete testing, but also must perform these tests consistently to minimize variation. It is easy to become distracted in a plant environment and lose count of how many times a sample has been rodded, forget to calibrate a scale or let a slump test run too long. Therefore, it's important to carefully follow each test as it helps maintain consistency and results in high-quality precast products. **PI**

Mitch Rector is a technical services engineer with NPCA.

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Taking SEPTIC TANKS *to the* Next Level

By Claude Goguen, P.E., LEED AP

Nick Rye photo

Editor's Note: *This is the first article in a three-part series on septic tanks.*

Being a producer of precast concrete septic tanks can be tough. Depending on where you are located, competition from alternative products or other precast producers can be fierce. How do you set yourself apart? You know your plant makes a great tank and focuses on quality control. You've got a wonderful new website and can't lower your price much more. Where do you go from here?

One option is to expand your expertise and services to offer more than just a tank. You can go from asking, "What size do you need?" to asking, "What are you treating?" Some customers look for producers who can help with treating high-strength wastewater, some want guidance treating a sensitive area that requires nitrogen reduction strategies and others may be concerned about pathogens. Evolving from a product supplier to a solution provider can help you rise above your competition. Here's some information on what's ahead should you choose to venture down this path.

IT STARTS WITH KNOWLEDGE ABOUT THE SYSTEM

In the scheme of wastewater treatment, the septic tank sometimes gets shortchanged. It's viewed as simply a buried box that holds sewage, but it's much more than that. It's the first stop in a wastewater treatment plan. This tank houses a complex system of microorganisms and bacteria to create a mini ecological system that lowers the wastewater strength prior to proceeding to the system's next phase. Learning about these processes goes a long way in making you a resource for homeowners, business owners, contractors and regulators.

WHAT IS IN WASTEWATER?

When you consider that approximately 99% of residential wastewater by weight is water, the task doesn't seem so daunting. However, that 1% poses a threat to the environment and public health. In addition, we may equate wastewater with sewage, but it's more than that. Water from showers, sinks, disposals and washers also needs to be treated, and can carry specific challenges. The components of wastewater can be characterized as organic and inorganic matter, oils and grease, nutrients, pathogens and solids.

Organic matter

Organic substances are carbon-based compounds – the building blocks of most living things. Organic materials in wastewater come from human waste, but also from paper products, foods, cosmetics and detergents. Most organic compounds are made of biodegradable proteins, carbohydrates or fats, which are easily broken down by microorganisms in the tank. The more organic material present in the wastewater, the more oxygen will be depleted to break these compounds down. This is reflected in the biochemical oxygen demand, which is a measurement of wastewater strength. BOD represents the amount of dissolved oxygen needed by aerobic biological organisms for breaking down organic material present in a water sample at a certain temperature over a specific period of time. When the time period is five days, the notation used will be BOD5. BOD is usually measured in milligrams per liter.

Inorganic matter

Inorganic minerals, metals and compounds, such as sodium, potassium and calcium, are common in wastewater from residential sources. Most inorganic substances are relatively stable and cannot be broken down easily by organisms in wastewater.

Oils and grease

Fatty organic materials from animals, vegetables and petroleum are also not quickly broken down by bacteria. On-site systems can be harmed by too much oil and grease, which can clog drain field pipes and soils, adding to the risk of system failure. Excessive grease also adds to the septic tank scum layer, which results in more frequent tank pumping.

Nutrients

Wastewater often contains large amounts of nutrients such as nitrogen and phosphorus. If the soil treatment area contains too much nitrogen, it may pass through to the groundwater and then surface water, which can lead to issues with algae blooms and loss of aquatic life. Denitrification systems may be integrated within the on-site system to manage nitrogen loading. Phosphorus originates from human waste, food residue and some cleaning agents, and can also cause issues with groundwater and surface water if loading is excessive.

Pathogens

Many disease-causing viruses, parasites and bacteria are also present in wastewater and can enter from almost anywhere in the community. Wastewater from typical homes contains enough pathogens to pose a risk to public health if not handled and treated properly.

Solids

Solid materials in wastewater include organic and/or inorganic materials and organisms. Solids will either settle, float or dissolve in the tank. Suspended solids that resist settling may pass through a tank and cause issues with clogging downstream. The measure of suspended solids is known as Total Suspended Solids and is usually measured in milligrams per liter.

TYPICAL RESIDENTIAL WASTEWATER

The U.S. Environmental Protection Agency reports that the average daily wastewater flow from a typical residential dwelling is approximately 45 gallons per day. However, the American Water Works Association conducted a similar study on 1,100 households and found a median rate closer to 60 gallons per day.

The following table represents typical residential wastewater indicators in milligrams per liter.

RESIDENTIAL WASTEWATER INDICATORS

(all units milligrams per liter)

	Weak	Medium	Strong	Minimum treatment requirements
BOD	110	220	400	30
TSS	100	220	350	30
Nitrogen (N)	20	4	85	variable
Phosphorus (P)	4	8	15	variable

Source: U.S. Environmental Protection Agency

According to a recent Water Environment Research Foundation study, the median TSS concentration in raw residential wastewater was 232 milligrams per liter. The median TSS concentration coming out of the septic tank was closer to 61 milligrams per liter.

Total nitrogen typically ranges between 20-to-85 milligrams per liter in untreated wastewater, and 50-to-90 milligrams per liter in septic tank discharge, so it can increase in the tank.[1]

TREATMENT

A septic tank is designed to recycle wastewater by gathering it from the source, treating it and dispersing it back into the natural environment. The final treatment stage usually involves soil in the dispersion area used in a mound or trench system, depending on the soil condition.

In the tank, several processes take place to provide partial treatment. These processes can be separated into three types: physical, biological and chemical.

Physical process in a septic tank

The tank operates as a flow attenuator because it serves to equalize the wastewater flow through the system. Large surges of flow from a residence – like when a toilet flushes or a washing machine drains – are dampened by a septic tank. This ensures the flow leaves the tank and enters the drain field at a lower rate and is extended over a long period of time. The tank will also help equalize the temperature of the wastewater when high-temperature flows enter the tank from household appliances.

Separation

The physical process that has the most impact on treatment within the tank is separation. Depending on a particle's density and size as it enters the tank, it will either float, settle to the bottom or remain suspended in place. Most solids and oils will float or sink and create a top and bottom layer inside the tank, while a clearer middle layer of water will form, allowing the flow to move through to the next compartment or into the effluent filter. ASTM C1227, "Standard Specification for Precast Concrete Septic Tanks," requires the transfer port on compartment walls be situated in the middle 25% of the water depth. As effluent moves to the second compartment, assuming the tank is designed this way, more settling and floating will occur while the clearer middle layer forms, allowing the flow to move into the outlet baffle through a filter and to the next treatment component. The key to the efficiency of this physical process is time, or more precisely, retention time. Substances in wastewater need time to float or sink. If a particle rushes through a tank in a series of velocity spikes, it won't experience the effects of gravity. The tank must be designed to provide enough retention time for separation to occur.

Venturi effect

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A precaster that evolves from a product supplier to a solution provider can rise above the competition.

fluid increases in velocity when passing through a constriction – for example, as the wastewater in a tank is sucked through at a higher speed around a transfer port. ASTM C1227 states, "The transfer port between compartments shall be sized to maintain a low velocity as liquid moves between compartments. A minimum of 50 in.^{2} shall be used where local codes do not specify otherwise." Using a larger hole or slot will slow down the velocity and increase the retention time and separation.

Let's assume we have a two-compartment tank that is 4 feet wide inside and the water line is 4 feet from the bottom of the tank. The inlet and outlet pipe are 4 inches in diameter. Wastewater arrives through a .087 ft.^{2} pipe into a large, 16 ft.^{2} flow area, which leads to a .347 ft.^{2} pipe (if the tank is ASTM C1227 compliant) into another 16 ft.^{2} area and out through a .087 ft.^{2} pipe.

Keep in mind that the most retention time you'll ever receive is when the tank is first used or after cleanings. As the bottom and top layers inside the tank get thicker, the middle layer gets thinner, resulting in increased velocities and less retention time. This supports the need for maintenance and cleaning on a regular basis.

Biological process in a septic tank

Let's first define the term dissolved oxygen. This is the measurement of the amount of gaseous oxygen dissolved in the water. Oxygen enters the water through two natural processes:

1. Diffusion from the atmosphere
2. Photosynthesis by aquatic plants

Mixing surface water by wind and waves increases the rate at which oxygen can be dissolved or absorbed into the water. Adequate dissolved oxygen is important for water quality and necessary to all forms of life. Dissolved oxygen levels that drop below 5 milligrams per liter cause stress to aquatic life. This is why most fish tanks have an air pump. The bubbles increase the dissolved oxygen level, which ensures the survival of the fish.

Wastewater entering the septic tank contains measurable levels of dissolved oxygen. The microbial population in the tank rapidly depletes the dissolved oxygen as the flow disperses and moves toward the outlet. Previously, we discussed the three layers in septic tank wastewater. The middle zone is typically anoxic, which means there is little to no oxygen. In this region, microbes break down the biodegradable material. This process is called anaerobic digestion because it occurs without the need for oxygen. This anaerobic bacterial environment is the reason for the term septic.

This incomplete digestion produces methane, hydrogen sulfide and sulfur dioxide gases, and sludge. These microbes perform a very important function, and their growth and effectiveness depend on wastewater characteristics such as flow temperature; organic load; inorganic trash; toxic chemicals; cleaners and detergents; excessive fats, oils and greases; and pharmaceuticals and personal care products. This is why homeowner education on what not to put in septic systems is critical to system performance.

Chemical process in a septic tank

Chemical processes that occur in a septic tank include precipitation, adsorption and ion exchange. When a solution becomes a solid, it's the result of a chemical reaction called precipitation. An example is when cations – positively charged calcium and magnesium – interact with anions such as negatively charged phosphate or ammonium to form crystals. Adsorption occurs when polar molecules react with organic molecules, binding compounds together.

WHAT DOES THIS ALL MEAN?

We want to design our systems to provide enough retention time for proper initial treatment. The biggest impact a septic tank has on initial wastewater treatment is the level/concentration of TSS. It will also reduce BOD slightly. If there are circumstances that require additional treatment for lowering BOD, nutrients or pathogens, some options you can recommend or offer include advanced treatment, aerobic treatment, nitrogen removal and pathogen reduction. We will cover these extensively in the January-February issue of Precast Inc.

DO YOUR RESEARCH

There's always room to enhance your ability to serve your customers. It takes research and time. A good way to conduct research is to attend wastewater conferences. From large national events to regional conferences, networking with suppliers and regulators will go a long way to help you understand the needs within your market and how to position yourself to supply those needs. This focus on enhancing your ability to provide solutions for a wide array of issues will benefits your company and clients for many years to come. **PI**

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

RESOURCES:

1 Small & Decentralized Wastewater Management Systems, Crites and Tchobanoglous

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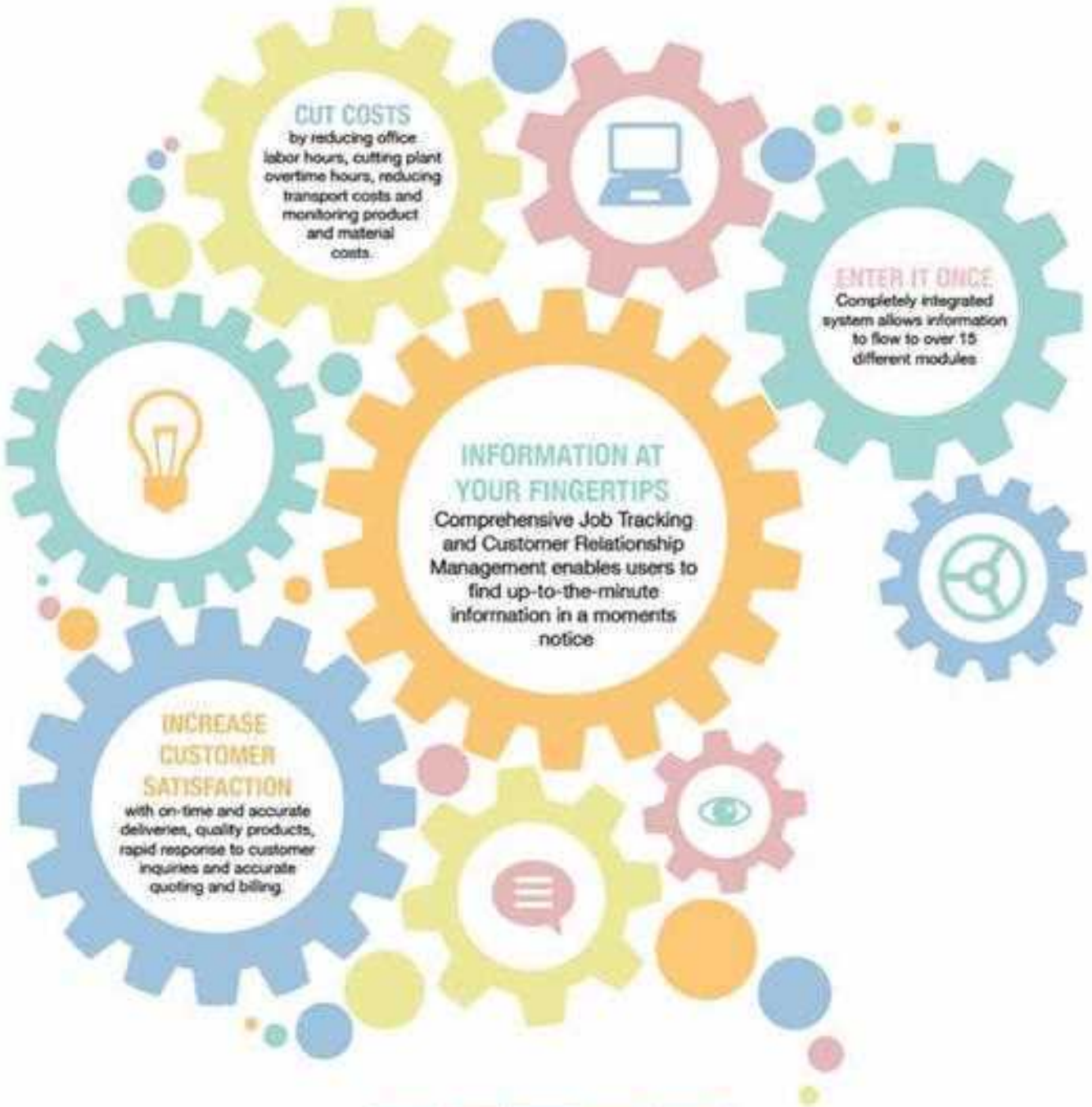

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MASH provides guidelines for crash-testing roadside barriers, including precast concrete barriers. It also recommends evaluation criteria to assess these test results.

Photo courtesy of EasiSet Worldwide

MASH Regulation

By Eric Carleton, P.E.

When most people hear "MASH," they think of the popular television show based on the antics of a Mobile Army Surgical Hospital unit in the Korean War. However, for those involved with transportation projects and construction, the acronym refers to the Manual for Assessing Safety Hardware, which presents guidelines for permanent and temporary roadside barriers including precast concrete barriers. Recent developments and the implementation of MASH 2016 have had a major impact on precast concrete producers who manufacture traffic barriers.

RECENT HISTORY OF BARRIER TESTING

MASH was first published by the American Association of State Highway and Transportation Officials (AASHTO) in 2009. At that time, the MASH 2009 manual replaced an existing 1993 roadside safety device report developed by the Transportation Research Board (TRB) through the National Cooperative Highway Research Project (NCHRP) report NCHRP 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features."[1]

NCHRP 350 was important because it brought uniformity to the traffic barrier and device testing methods and protocol, which up to that time varied widely. On July 27, 1997, the Federal Highway Administration (FHWA) Office of Engineering and Technology issued a guidance memo mandating that all work

zone devices used on the National Highway System (NHS) be crash-tested to meet NCHRP 350 requirements. In 2002, the Transportation Safety Board initiated project 22-14(02), "Improvement Procedures for Safety-Performance Evaluation of Roadside Features," which was designed to address the changes in vehicle geometry, road speeds and other technical considerations since the original NCHRP 350 report. The result was MASH 2009, which was completed in 2008. The report included many revisions that affected testing procedures described in NCHRP 350.

This information was then published by AASHTO as a guidance document rather than a TRB technical report. Some of the larger modifications in MASH 2009 that relate to concrete barriers include:

Changes in test matrices

- The small car impact angle is increased from 20 to 25 degrees to match the impact angle used with light-truck testing.
- The impact speed for the single-unit truck test is increased from 80 to 90 kilometers per hour to better distinguish the TL-4 test from TL-3.

Changes in test installations

- More detailed documentation of components used in the test installation is required.
- Minimum installation length requirements are specified more clearly.

Changes in test vehicles

- The size and weight of test vehicles are increased to reflect the increase in vehicle fleet size:
  - The small-car 820C test vehicle is replaced by the 1,100C.
  - The light-truck 2,000P test vehicle is replaced by the 2,270P.
  - The single-unit truck mass is increased from 8,000 to 10,000 kilograms.
  - The light-truck test vehicle must have a minimum center of gravity height of 28 inches.

Changes in evaluation criteria

- The option for using passenger car test vehicles older than six years is removed.
- All evaluation criteria will be pass/fail, eliminating the marginal pass.
- All longitudinal barrier tests are required to meet flail-space criteria.
- Maximum roll and pitch angles are set at 75 degrees.
- Post-impact vehicular trajectory criteria was added, which is a measure of the potential of a vehicle to result in a secondary collision with other vehicles or fixed objects.

Changes in test documentation

- Computer-aided drafting drawings of the test device and test installation are required.
- Additional documentation of the test and evaluation results is required.

Changes in performance evaluation

- Language emphasizing the importance of in-service evaluation is added.

MASH 2009 IMPLEMENTATION AGREEMENT

With this new AASHTO guidance document, the FHWA and AASHTO entered into a joint implementation plan agreement to develop a process of roadside barrier device acceptance and eligibility for federal highway funding.

Key components of this agreement are:[3]

- AASHTO's Technical Committee on Roadside Safety is responsible for developing and maintaining the evaluation criteria as adopted by AASHTO. FHWA shall continue to review and accept highway safety hardware.
- Highway safety hardware accepted using NCHRP 350 criteria is not required to be retested using MASH criteria.
- Any new or revised highway safety hardware under development at the time MASH is adopted may continue to be tested using NCHRP 350 criteria. However, FHWA will not issue acceptance letters for new or revised highway safety hardware testing using NCHRP 350 criteria after Jan. 1, 2011.
- Highway safety hardware installed on new construction and reconstruction projects shall be those accepted under NCHRP Report 350 or MASH.

The 2009 implementation plan did not sunset the use of NCHRP 350 hardware. The FHWA anticipated highway safety device manufacturers would actively develop new MASH-compliant devices, but it did not occur. During this time, the FHWA was taking an active role in evaluating manufacturer or department of transportation (DOT)-submitted NCHRP 350 and MASH test results of various highway safety devices, including precast concrete barrier. Those devices that successfully passed the criteria were issued an eligibility letter by FHWA stating their use on DOT projects was acceptable and qualified for federal aid reimbursement.

MASH 2016 IMPLEMENTATION AGREEMENT

More recently, the AASHTO Technical Committee on Roadside Safety updated the MASH 2009 document. The revisions in MASH 2016 include a large focus on cable barrier systems and had minimal impact regarding any revised testing protocol of precast concrete barrier. However, MASH 2016[2] presented major changes regarding specific dates sunsetting NCHRP 350 criteria. This was outlined within a new AASHTO/FHWA Joint Implementation Agreement at the end of 2015.[4]

Specific provisions of the new agreement are:

- The AASHTO Technical Committee on Roadside Safety will continue to develop and maintain the evaluation criteria as adopted by AASHTO.
- FHWA will continue to issue letters of eligibility of roadside safety hardware for federal-aid reimbursement.
- Agencies are urged to establish a process to replace existing highway safety hardware that has not been successfully tested to NCHRP 350 or later criteria.
- Agencies are encouraged to upgrade existing highway safety hardware to comply with MASH 2016 either when it becomes damaged beyond repair or when an individual agency's policies require an upgrade to the safety hardware.
- For contracts on the NHS with a date after the dates listed below, only safety hardware evaluated using MASH 2016 criteria will be allowed for new permanent installations and full replacements:
  - Dec. 31, 2017 – w-beam barriers and cast-in-place concrete barriers
  - June 30, 2018 – w-beam terminals
  - Dec. 31, 2018 – cable barriers, cable barrier terminals and crash cushions
  - Dec. 31, 2019 – bridge rails, transitions, all other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports and all other breakaway hardware

- Temporary work zone devices, including portable barriers manufactured after Dec. 31, 2019, must have been successfully MASH 2016 tested. Such devices manufactured on or before this date and successfully tested to NCHRP 350 or MASH 2009 may continue to be used throughout their normal service lives.
- Regarding the federal aid eligibility of highway safety hardware, after Dec. 31, 2016:
  - FHWA will no longer issue eligibility letters for highway safety hardware that has not been successfully MASH 2016 crash-tested.
  - Modifications of eligible highway safety hardware must use criteria in MASH 2016 for re-evaluation and/or retesting.
  - "Non-significant modifications"[4] of eligible hardware that have a positive or inconsequential effect on safety performance may continue to be evaluated using (engineering or) finite element analysis.

This new policy has important ramifications for precast barrier manufacturers. Any precast barrier or bridge rails used for a permanent application must be MASH TL-3 crash tested on or after Dec. 31, 2019. In addition, precast barriers manufactured on or after Dec. 31, 2019, for use as temporary work zone devices must be MASH TL-3 tested. Importantly, a concession was made that precast concrete barriers used as temporary work zone applications and successfully tested to meet NCHRP 350 may still be used "throughout their normal service lives," as defined by each state DOT. To assist the industry and DOT to better understand the new AASHTO/FHWA agreement, the FHWA provided a resource titled, "Questions and Answers Regarding MASH Implementation Agreement."[5,6]

A STORM BREWING AND SUDDEN CHANGE

In addition to MASH documents, testing protocols and accepted practices, and FHWA review and eligibility designations, a large legal issue had developed regarding a non-precast roadside safety device. Certain accepted approval protocols were questioned by hired legal professionals and others on behalf of injured parties involved with highway accidents with this product. Additionally, on June 16, 2016, the U.S. Government Accounting Office (GAO) issued a report to Congress titled, "More Robust DOT Oversight of Guardrails and Other Roadside Hardware Could Further Enhance Safety."[7]

This report reviewed the current practices involved with roadside safety device crash testing, approval, installation and subsequent installed performance. It stated there was much confusion and misinformation among state DOTs and FHWA regarding what is required by law or regulation for roadside hardware approval and use, including crash-testing and eligibility letters.

In response to the GAO report and the legal issues surrounding the specific safety device lawsuit, on May 26, 2017, FHWA issued an open letter to "all highway safety hardware and roadside design community."[8]

This important policy letter stated, "Effective immediately, FHWA is implementing the following changes on how requests for Federal-aid


NPCA file photo

Precast concrete barrier manufacturers must verify whether the barrier geometry and corresponding connecting hardware has been crash-tested and passes MASH criteria.

eligibility letters for roadside safety hardware systems are accepted:

1. In order for manufacturers and States to qualify for a FHWA Federal-aid eligibility letter, all roadside hardware devices must complete the full suite of recommended tests as described in AASHTO MASH. This applies to:
   - **a.** all devices currently in the FHWA queue that have not received an eligibility letter by the effective date of this letter.
   - **b.** retroactively to requests received after Jan. 1, 2016.

Manufacturers and States that received an eligibility letter under AASHTO's MASH standards and did not run the full suite of tests will be required to run the remaining tests in order to retain the Federal-aid eligibility letter. The FHWA has contacted the affected manufacturers. These affected parties have up to one year, from the date of this letter, to run the balance of crash tests and resubmit their request for an eligibility letter. A written request, including crash test results from an accredited laboratory, must be submitted to FHWA within one year."

This FHWA memo provides an opportunity for state DOTs to proactively take control of review and approval processes of barrier systems used on their roadways. However,

many states see this as an unexpected policy shift that replaces a process they believed was working appropriately. Additionally, there is a concern the mandates for new and full-suite crash testing of barrier systems will exceed the testing facility's capacity.

Contact your local DOT to discuss what **appropriate policy** regarding precast concrete barriers will be **implemented** in light of the latest FHWA directives.

WHAT THIS ALL MAY MEAN TO THE PRECAST CONCRETE BARRIER MANUFACTURER

For precast concrete barrier manufacturers, these changes may not affect current production. However, it is important to verify whether the barrier geometry and corresponding connecting hardware has been crash-tested and passes MASH criteria.

- If your state barrier geometry is consistent with generic styles such as f-shape, jersey shape or constant slope, it is likely the barrier has been tested either by your state or by a coalition of states working together.
- If your precast barrier will be used on a project on or after Dec. 31, 2019, it must have passed a MASH crash test.
- If your precast barrier will be used on a construction project as a temporary safety device and was manufactured prior to Dec. 31, 2019, it may still be employed on that and other construction projects, but shall at least meet NCHRP 350 criteria and be used throughout its normal service life.
- Precast concrete barriers used as temporary safety devices on construction projects manufactured after Dec. 31, 2019, shall have passed MASH crash testing.
- The final decisions on selection and modifications to devices will be at the state and local level.

Regardless of where you believe your barrier status is at this point, it is important to contact your local DOT to discuss what appropriate policy regarding precast concrete barriers will be implemented in light of the latest FHWA directives. **PI**

Eric Carleton, P.E., is NPCA's director of codes and standards.

RESOURCES:

1 NCHRP 350, trb.org/Main/Blurbs/160283.aspx
2 MASH 2016 2nd Edition, bookstore.transportation.org/Item_details.aspx?id=2707
3 roadsystems.com/pdf/nchrp-mash/MASH-Update-Sept2009.pdf
4 Jan. 7, 2016, FHWA Memo safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/docs/memo_joint_implementation_agmt.pdf
5 Jan. 7, 2016, FHWA Memo FAQ, safety.fhwa.dot.gov/roadway_dept/countermeasures/faqs/docs/aqs_mash_implementation_agrmt.pdf
6 FHWA FAQ website, safety.fhwa.dot.gov/roadway_dept/countermeasures/faqs/
7 GAO Report, gao.gov/products/GAO-16-575
8 May 26, 2017, FHWA Memo, safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/openletter052617.cfm
9 FHWA website, safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/

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LEAN manufacturing for Precasters

By Bridget McCrea

Precast manufacturers are using **lean principles** to run tighter ships, eliminate waste and improve output.

In the English language, the word lean has many meanings. Someone can lean a piece of plywood against a wall, lean a chair back from a desk or lean toward a career in engineering. Lean can also refer to an individual who is particularly fit or in good shape.

In the business world, lean incorporates all these definitions, but ultimately translates into maximizing customer value while minimizing waste. Put simply, lean focuses on creating more value for customers and doing it with fewer resources, according to the Lean Enterprise Institute (LEI).

"The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste."

To accomplish this, LEI said lean thinking changes the focus of management from optimizing separate technologies, assets and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets and departments to customers.

LEAN 2.0

Originally developed to describe Toyota's business during the late '80s, lean is all about simplifying complicated processes and removing waste, such as excessive clutter around a workstation, unnecessary steps in the manufacturing process, etc.

Paul Akers, president at FastCap in Ferndale, Wash., said he's inundated by associations and individual organizations that want to know more about lean.

"It's insane," Akers said. "I get a speaking request per day from somewhere in the world. I can't even keep up with it."

Driving this demand, said Akers, is lean's transition from being an extremely analytical and technical concept to one which primarily involves people. Companies used to hire outside consultants to come in and "lean out" their facilities – a strategy Akers said often failed – but now they're focusing on building out corporate cultures and creating lean-centric training programs.

"Companies are training their people to think differently, as opposed to hiring consultants to tell them how to think," Akers said. The good news, he adds, is that this 2.0 version of lean manufacturing is not only working, but it's also attracting more followers to the fold. As a result, he said lean is gaining momentum across all sectors, including precast manufacturing.

Akers, who recently took a trip to Japan with a group of precast manufacturers from the U.S. who wanted to see lean concepts up close and in action, said those participants got totally engaged in the experience and are now figuring out how to apply lean in their own plants. Akers said one of the key frustrations among precasters and others is engaging their employees in lean.

"The manufacturers themselves are frustrated with a general sense of their businesses being clunky," Akers said. "As a result, they're seeking out ways to work more effectively and efficiently."

TOURING THE FACILITY, PICKING UP SLACK

As a designer, engineer, and manufacturer of steel and aluminum access hatches, doors, covers and grates for utility applications, Jensen MetalTech in Sparks, Nev., was the first Jensen Precast venture to travel down the lean path. According to Steven Jensen, agricultural products manager and continuous improvement manager for Jensen Precast in Reno, the company began identifying areas of waste and setting up key performance indicators meant to create process efficiencies several years ago.

When Jensen came on board in 2014, he began spearheading lean strategies for other areas of the company. Armed with previous lean experience, he became the first employee to initiate and support the cause, focusing on lean principles and Kaizen, a Japanese business philosophy of continuous improvement of working practices and personal efficiency.

"Since then, we've used consultants who have come into our plants and held Kaizen and continuous improvement events," Jensen said. "We analyzed some 5S opportunities and the seven sources of waste, and then really started driving lean on an internal basis."

Over the last year, Jensen said the company's Sparks, Fontana and Las Vegas plants have all been integrating lean into their processes. He said the initiative is going well and that it's largely rooted in culture changes the average precaster might not necessarily embrace or be comfortable with.

"In general, in the precast industry, we're just coming to the party in terms of lean," Jensen said. "I think our industry understands the value of lean, but we haven't been doing it for 20 or 30 years like the automotive industry has, so there's still some work to do."

When tasked with introducing lean strategies to frontline production workers who have been on the job for 20-plus years, questions like, "How can we improve your job?" are often met with resistance. That's where the corporate culture shifts come into play, said Jensen, who notes that every textbook and manual related to lean addresses the challenges that companies will face on this front.

"There are going to be culture changes, but people will eventually embrace it," said Jensen, who focuses on good and open communication throughout the process.

He advises other precasters to be patient, knowing that the process can be new, frustrating and even a bit scary for everyone who is being impacted by the transition.

"Take baby steps and understand that sometimes you may take a few forward and then a couple back; it's just part of the process," said Jensen, who encourages precasters to assemble a lean team to champion the effort, communicate with employees and keep the initiative's momentum moving in the right direction.

He sees plant cleaning and decluttering as a good first step in the right direction, and said it's the easiest and quickest win when addressing the 5S principles.

"You can always do a better job of organizing and cleaning, so use that as a starting point down the lean path," Jensen said. "Then, once people start embracing those minor wins because now they can find their tools and equipment faster, you can expand the strategy out from there. The key is to get that initial buy-in."

MORE OUTPUT WITH THE SAME INPUT

At Concrete Sealants, Engineering Manager Sam Lines said the company uses lean across its manufacturing processes, and that the firm is continually adapting and changing its lean approach. One example is Concrete

> "I think our **industry** understands the **value of lean**, but we haven't been doing it for 20 or 30 years like the automotive industry has, so there's **still some work** to do."
>
> – Steven Jensen, *Jensen Precast*

Sealants' color-coding technique, through which important processes in the plant are standardized by color.

"We have 1,500 different process cards in our shop that indicate, for instance, how to run a particular item or set up a machine," said Lines, who explained that each of those cards falls under one of eight different major setup umbrellas, each with a high number of variations. "The rest of the cards address minor tweaks and adjustments to the setup."

Using a color-coding scheme, each process sheet is printed on paper with a color that matches one of the plant's eight major processes. That way, when a process change is pending, the operator can quickly grab the right instructions without having to spend extra time reworking or retooling to run the next job.

Color coding also eliminates the chance that someone will read the card incorrectly and then realize that the setup is incorrect, Lines added.

"At one point, we were going back once a week to tear things down and set them up again the right way," Lines said. "It was a major time waster that we solved through color coding."

Lines said this is just one example of Concrete Sealants' lean processes, and he advises precasters to embark on their own lean journeys by examining their biggest problem areas. Ask questions like:

- **What are we having problems with?**
- **What's taking a long time to complete?**
- **Where are we continually wasting man hours?**

The answers will help pinpoint the areas most in need of a lean tuneup.

"If you only have X number of hours in an operation, you can only do so much in that amount of time," said Lines, who adds that Concrete Sealants' lean commitment has resulted in 10% additional manufacturing output with zero additional input. "What you can do is create more efficiency and, in turn, produce more output in the same amount of time." **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.

"What you can do is **create more efficiency** and, in turn, **produce more output** in the same amount of time."

– Sam Lines,
Concrete Sealants

LEAN on Others to Achieve Success

By Ashley Smith, President, *Smith-Midland Corp.*

I found out about lean manufacturing about 15 years ago and began to study it and tour facilities employing it. If you're interested in lean, let me start by saying you don't master it overnight. If you're looking for a quick fix or an easy win for the team, lean is not the route. However, if you're interested in meaningful change and improvement and are in it for the long haul, I encourage you to look into it.

When we brought lean to Smith-Midland, it didn't go too well at first because I still didn't know enough about it or how to implement it. Eventually, we realized we needed someone experienced in lean to help us out. After that, we began to make real progress. So my first piece of advice is to get assistance from someone with practical experience and a history of success. They need to be on the shop floor to immerse themselves in your work and to truly understand what you're doing.

Lean, like most things in business, is all about *PEOPLE* and everyone needs to be invested.

We are currently doing a deep dive in one area of production, working with the people and, most importantly, learning. We now have people on the floor who take ownership of our processes and results, and who are empowered to make adjustments. That's huge because it frees managers up to work on other things. By doing this, we learned my second piece of advice, which is that everyone in the plant needs to understand what you're doing and why you're doing it and you need to thank them.

My third and final piece of advice is management needs to be involved throughout. Lean, like most things in business, is all about people and everyone needs to be invested. As we roll this out to other departments, these lessons will guide us and I hope they help you on your journey as well.

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CHAIRMAN'S CHOICE

Smith-Midland is on the (High)rise

By Kirk Stelsel, CAE

Editor's Note: *The "Chairman's Choice" feature story features projects selected by Ashley Smith, president of Smith-Midland Corp. and newly elected NPCA Chairman of the Board.*

In 1960, a dairy farmer in Virginia named David Smith developed a way to keep his cattle from straying off by using concrete. In 2017, his grandson, Ashley Smith, now heads Smith-Midland Corp., a successful precast concrete company with three locations, a wide range of products and a subsidiary company with six proprietary product lines licensed by precasters around the world.

What transpired in the decades between is a story of perseverance, innovation and collaboration. David's son Rodney Smith, and Rodney's sons Ashley, Jeremy, Matthew and Roderick, have not just grown, but advanced the company. The Smith-Midland team constantly seeks ways to push the boundaries of how it manufactures precast concrete, what it looks like and how it functions both during and after installation.

The three projects detailed here were hand-picked by Ashley, NPCA Chairman of the Board, as examples of projects and products that exemplify Smith-Midland.

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Cliffside Heights, N.J.

CLASSICALLY MODERN LUXURY

When the owner of Cliffside Park Towne Centre in Cliffside Heights, N.J., first saw the renderings of his building, a $140 million, 13-story luxury apartment tower, he knew he wanted a more classical, turn-of-the-century limestone look. With that in mind, the Smith-Midland team worked with the client and the architect to evolve the design.

CHAIRMAN'S CHOICE

Photos courtesy of Smith-Midland Corp.

The goal for the Cliffside Park Towne Center project was to create the feel of a classic limestone building with a modern twist.

"The **experience** with Ashley and Smith-Midland was **wonderful**. They were involved from the **planning** and **design** stage to the **construction** phase."

– James Virgona,
Virgona & Virgona Architects

"He actually asked us what we thought and we said, 'Well, you're the client, so whatever you want we'll work with you to get your vision out there,'" Ashley said. "We were able to help the owner and architect come up with a design that moved it towards his vision, and we helped them to standardize some of the patterns and the master molds."

The design was finalized by Virgona & Virgona Architects and brought to life by Smith-Midland. Due to the versatility of the precast panels, the architects were able to customize the pattern to create a theme and give visual interest to the project while also maintaining consistency and cohesion.

"The experience with Ashley and Smith-Midland was wonderful," said James Virgona of Virgona & Virgona Architects. "They were involved from the planning and design stage to the construction phase. The amount of documentation they provided, their management during construction, the field visits, and tours of the factory and finish selections were essential.

"That really made us comfortable with the material, and the color and finish consistency were outstanding."

The majority of the panels for the project are SlenderWall panels, a licensed product of Smith-Midland's subsidiary, Easi-Set Worldwide. SlenderWall panels are thermal- and fire-code compliant and their lighter weight and attached steel studs can help the owner reduce costs. The panels also come to the job site pre-insulated with a closed-cell foam.

The M-shaped panels used on the project permit larger windows and more natural light than usual. Smith-Midland had already used this design successfully on another building in New Jersey and plans to employ it on future projects as well. As Ashley saw the panels leaving the plant, he could tell the intricate design looked nice, but he had no idea what they would look like assembled on-site.

"I hadn't been to the job site for about a month or so after the installation started, and by the time I got there a lot of panels had been put up and I was just impressed," he said. "It's our work, but to see it go from an architectural drawing to shop tickets to seeing it out on the building was really impressive. The first thing I did was I went and told the owner, 'Hey, you've done a great job; it's just an awesome building.'"

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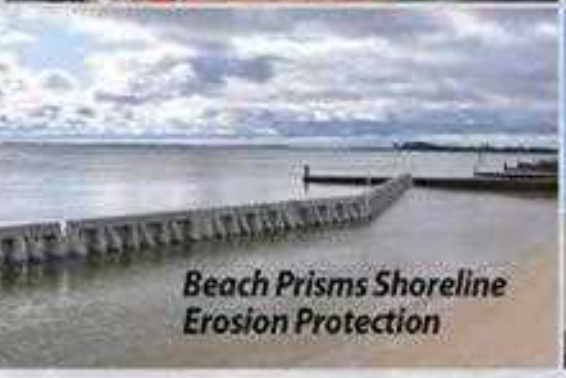

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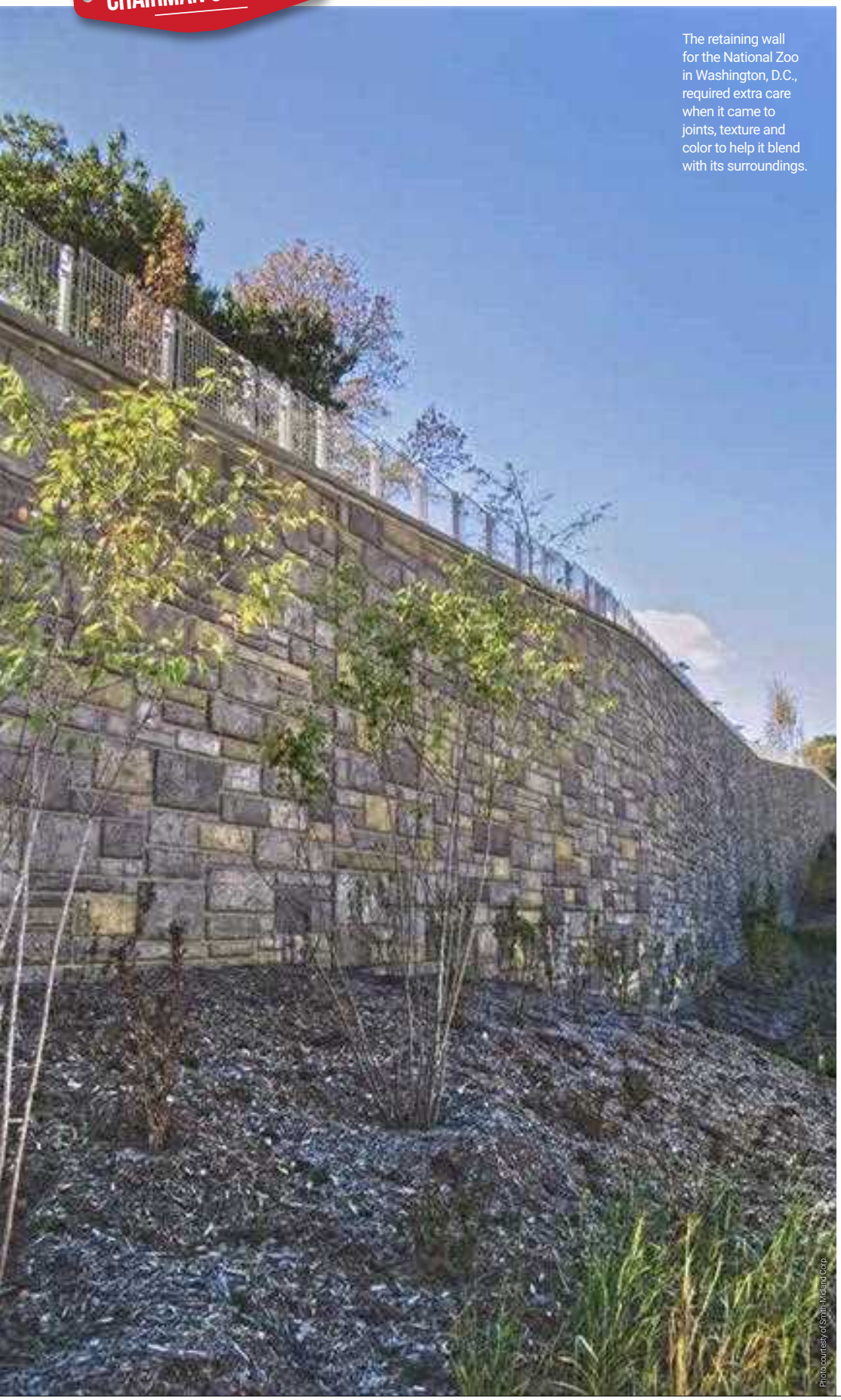

The retaining wall for the National Zoo in Washington, D.C., required extra care when it came to joints, texture and color to help it blend with its surroundings.

Photo courtesy of Smith-Midland Corp.

Smithsonian's National Zoo

Washington, D.C.

THE DISAPPEARING ACT

Sometimes the general public is never meant to notice precast products, and sometimes extraordinary emphasis is placed on colors and architectural details to make them stand out. For a project at the Smithsonian's National Zoo in Washington, D.C., Smith-Midland found themselves doing a little bit of both.

The retaining wall panels supplied required precise coloring and texture in order to blend into the surrounding area. The job came to Smith-Midland from general contractor Hensel Phelps, a client the company has worked with many times before on large-scale, complex projects.

"Hensel Phelps continues to come to us because they're always looking to do something creative," Ashley said. "They win their projects when there's a multi-step process and you get evaluated on the package and the design. We've teamed up with them because we've come up with a lot of creative projects with them."

The project's original cast-in-place design would have required Hensel Phelps to tear out a road and divert traffic for the whole project. Instead, it decided on a soil-nail tieback wall where the client could continue using the road. The process started by spraying shotcrete and drilling back horizontally to cast steel connection plates into the shotcrete wall.

"You have a better looking wall this way," said Kim Slusher, site manager for Hensel Phelps. "The joints all lined up well and the shoulder joints are set consistently. Speed of construction was good and the owner is pretty happy."

Smith-Midland completed

CHAIRMAN'S CHOICE

Photo courtesy of Smith-Midland Corp.

"We are **proud** of this project that exemplifies Smith-Midland's ability to **innovate, improve,** and **initiate** products that are current and pleasing to the eye."

– Ashley Smith, *Smith-Midland Corp.*

installation of the precast panels at night because that's the only time the road could be closed. The installers positioned a crane truck above and a crew down below on a man lift. They would drop the panel from above and the crew would attach it to the wall.

The most complex part of the project was meeting the aesthetic requirements of the Smithsonian Institution, owner of the zoo. The wall needed to blend in and not show joints.

"We put little steps in the horizontal joints," Ashley said. "When you go out today and look, if you didn't know, you really wouldn't be able to see them. They also didn't want a pattern repeating so we had to come up with three patterns and mix them up horizontally and vertically along the face of the wall."

In order to create the natural pattern, Architectural Polymers came to the site to find existing stone walls for castings. Following installation, a permanent, penetrating stain from Europe was hand applied by EverGreene Architectural Arts to mimic the look and color variations of a natural stone wall.

"We are proud of this project that exemplifies Smith-Midland's ability to innovate, improve, and initiate products that are current and pleasing to the eye," Ashley said. "The contractor and the project won a Craftsmanship Award from the Washington Building Congress, so our guys went up on stage and got an award for it. It was like the Academy Awards of construction.

"There were about 1,000 people at the Washington Hilton, lights, big screens, video – it was a pretty big deal. They all got dressed up and brought their wives."

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Vita in Tysons. Photo Smith-Midland

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"The panels are **two stories tall** and they're all in the **shape of a seven**. You can see that when you look at the building."

– Ashley Smith, *Smith-Midland Corp.*

Photo © Alan Karchmer/OTTO

CHAIRMAN'S CHOICE

VITA

Tysons, Va.


Photo courtesy of Smith-Midland Corp.

LEADING THE WAY

Tysons, Va., formerly known as Tysons Corner, is on the rise. In fact, a sign on Route 7 reads, "Welcome to Tysons, America's Next Great City," and the city's redevelopment has been well chronicled in The Washington Post.

The newest addition to the District of Columbia's Metro, the Silver Line, was the catalyst. It connects Tysons to D.C., creating an easy way for commerce to move between the two areas without encountering gridlock traffic.

Luckily for Smith-Midland, the company's headquarters is nearby, and it found its way in early. In addition to supplying products for the Silver Line, it worked on VITA, a luxury rental building and the first major residential tower for the redevelopment. The contractor, Donohoe Construction Co., chose Smith-Midland to manufacture the architectural panels. The project architect, Shalom Baranes Associates, placed a heavy emphasis on the shape and feel of the building, as well as the distinct gray color for the precast panels.

"We worked with Dynamic Color Solutions to achieve the color," Ashley said. "We made 1-foot-by-1-foot-by-2-inch thick samples and sent those back and forth with the owner. You have to discern and listen and then make another sample until you winnow it down to what they're looking for."

The building's shape is a folded, pleated floor plan and the architect wanted a skin that would form around that shape. As a result, the precast panels are offset every other floor and the resulting shape implies a weave, like a fabric, to make the skin fluent and appealing.

"For me, architecturally, precast concrete had all the flexibility we needed," said Robert Sponseller, AIA, design principal, Shalom Baranes Associates. "Personally, this material is highly underutilized. A lot of architects use it too modestly in beige or white and I think the material has much more potential.

"I like to exploit its potential as a material so we used a zinc-gray color and did an unusual shape for the panel."

As the concrete structure reached about a third of the way, Smith-Midland was able to start panel installation. Its crew would come in at night and use the tower crane that was used during the day to set panels on the lower floors, connecting them with thousands of inserts from fellow NPCA member JVI. Following them were the window installers. This method of trades following each other up the building enclosed it faster and saved the owner time and money.

"The panels are two stories tall and they're all in the shape of a seven," Ashley said. "You can see that when you look at the building. At grade, there are retail, high-end, white tablecloth restaurants and other high-end retail, so we have white precast panels with a horizontal thin rib pattern. So, that's another texture and another color we did." **PI**

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


Photo courtesy of Smith-Midland Corp.

The VITA building in Tysons employs precast concrete panels with a unique shape and color to create a shape that implies a weave, like fabric.

To learn more about Smith-Midland, visit **smithmidland.com**

Rendering and exterior shot of finished Niche One apartment condos in Calgary, Alberta.

Rendering courtesy of Niche Development


Photo courtesy of Niche Development

Sustainable Building:

A Win for Everyone

By Shari Held

Precast and structural steel prove to be a **winning combination** for a sustainable building in Canada.

Niche Development Corp. is breaking new ground in its quest to provide affordable, energy-efficient and low-maintenance multi-family housing. The results of the company's first venture, Niche One apartment condos in its headquarters city of Calgary, Alberta, are impressive. But the real news is how the real estate developer/builder is making it possible.

Wood-frame construction is a popular choice for Canadian multi-home residences. However, when Peter Purewal, CEO, and John Clarke, president, founded Niche Development in 2015, they bucked tradition and turned to precast and structural steel as their materials of choice.

"I've personally made precast and steel my only method of construction," Clarke said. "Using precast in harmony with structural steel makes us more energy-efficient and construction-efficient."

THE MANY MERITS OF PRECAST

A precast structure has many benefits for builders, real estate operators and homeowners. First, concrete is a non-combustible material that doesn't support mold growth.

Recently, the Canadian Precast/Prestressed Concrete Institute commissioned a study to determine insurance companies' biggest concern during the construction process.

"We thought it would be fire," said CPCI Board Member Jason Rabasse, C.E.T, business development manager at Lafarge Precast in Edmonton, Alberta. "We were completely surprised to find out it was mold."

Fire came in second. Both issues increase insurance rates for wood-frame construction.

Cast-in-place concrete requires on-site curing, testing and cleanup, which negatively impact the construction schedule. Clarke also finds precast to be less expensive and faster to install than cast-in-place. This is critical because the Alberta climate limits building to only eight months. The precast concrete elements are manufactured off-site in an environmentally controlled facility, resulting in Lafarge Precast taking advantage of the winter months as part of the construction season.

"Time is everything," Clarke said. "The moment the product's installed, we can move on to the next portion of construction. That's where we gain speed.

"Our methodology reduces construction time by 33% or more."

Work on Niche One began mid-March 2016 with the demolition of two asbestos-filled multi-family residences dating back to 1952. The three-story, 18-unit apartment condos were finished in mid-November – in about half the time it takes to erect a comparable wood-frame structure, according to Clarke.

"The combination of **hollowcore** and **structural steel** used in a truly **integrated design** is what made this project unique and successful."

– Jason Rabasse, *Lafarge Precast Edmonton*

Second, Niche Development feels building with precast is better for the environment, an important issue for the company.

"A design based on precast and structural steel promotes sustainability by reducing the duration of on-site construction and energy consumption of heating equipment, which is particularly important for workers," said MoDA Architect Nicholas Tam, AAA, NCARB, MRAIC, B.Arch. MoDA Architecture is currently working with Niche Development on its latest project, Belgravia Square, a 70-unit apartment condo in Edmonton.

Additionally, precast and structural steel offer far more design opportunities compared to wood-frame construction. Tam noted precast allows designers more freedom with the layout of interior walls.

"The combination of steel and precast is able to provide larger structural spans with fewer requirements for columns or structural walls," Tam said.

Niche Development achieved a free-falling effect with the balconies at Niche One by cantilevering them 8 feet off the structure – without using columns.

"Working with precast is like having an art canvas that no one's ever painted on before," Clarke said. "You can do almost anything with it."

A DIFFERENT MINDSET

One thing Niche Development found it couldn't do was simply swap out wood and replace it with precast and structural steel in the design.

"We had to design a totally different building," Clarke said.

The biggest challenge was the significant pre-planning required. The design had to be completed down to the last detail prior to ordering the precast and steel. Most builders aren't used to operating like that. Fortunately, new design tools like 3-D Building Information Modeling software make the predesign process easier.

"The nice part is that once you've preordered your material, you know exactly what's going to show up and you know exactly how to put it together," Clarke said.

The big question is: Can this methodology compete with wood-frame construction? Clarke thinks so – especially if you look at long-term savings.

THINNER IS BETTER

Lafarge Precast Edmonton provided the precast hollowcore slabs for Niche One's flooring system. Niche Development worked closely with Rabasse and Lafarge's team during the design phase to maximize efficiencies. As a result, every floor in Niche One is constructed of full, 4-foot-wide hollowcore slabs, eliminating waste and cutting charges.

"It's always nice when you have an owner that wants to listen to a supplier and understands what the product can do so he can design efficiently," Rabasse said. "The combination of hollowcore and structural steel used in a truly integrated design is what made this project unique and successful."

It took 320 pieces (approximately 30,000 square feet) of 8-inch-thick hollowcore for the flooring system. The weight of the largest piece was about 7,000 pounds.

Niche One
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Photo courtesy Niche Development

"I've personally made **precast and steel** my only method of construction. Using precast **in harmony** with structural steel makes us **more energy-efficient** and construction-efficient."

– John Clarke, *Niche Development*

The resulting finished floor system is only 10 inches thick, which allowed for spacious 9-foot ceilings.

"With wood framing or conventional steel framing we'd be dealing with a 2-foot floor system," Clarke said. "On six-story buildings that adds about 6 feet, so it becomes substantial."

Another big advantage is that hollowcore dissipates sound, making it a very quiet building. That's a big plus for condo residents.

FINISHED AND FUNCTIONAL FOUNDATION WALLS

Alberta holds the Canadian record for the most extreme temperature change – in one hour, the temperature rose from -2 F to 72 F. Winter lows can reach -22 F. Keeping heating and cooling costs under control was imperative for the Niche One project.

Niche Development used closed-loop geothermal heating and cooling in combination with insulated precast walls to maximize energy efficiency. As a result, Niche One exceeds the current energy code by 30%.

The major structural walls – foundation walls, elevator shafts and stairwells – are constructed from approximately 5,000 square feet of insulated precast sandwich panels. Lafarge Precast Calgary fabricated a total of 36 panels, each approximately 10 feet high. The weight of the largest insulated wall panel was more than 25,000 pounds.

"With the insulation embedded in the concrete, it creates a kind of thermal mass effect and you don't lose heat like you'd normally do," Clarke said.

The insulated panels were cast on a steel bed to ensure the best possible finish. First, a layer of concrete was poured over the entire bed. Next, rigid foam insulation was laid on top to meet the R-15 value required for the project. Then, the final layer of concrete was poured, creating the insulated sandwich panel with insulation extending to all edges of the panel. Several of these panels were load-bearing.

"This wall system gives you a finished building envelope," Rabasse said. "There's no need to stud it, drywall it or insulate it. It's already a finished wall."

Installation was a breeze. Cranes placed the foundation wall panels horizontally around the perimeter of the building to minimize the number of joints. The panels, which carry the weight of the entire structure, were braced in position until enough of the structural steel framing was erected to tie everything together.

This style of building creates a resilient, low maintenance structure in comparison to the

"Working with **precast** is like having an **art canvas** that no one's ever painted on before. You can do almost **anything** with it."

– John Clarke, *Niche Development*

lighter wood-frame construction. However, wood-frame elevator shafts require continual repair and adjustments as the building shifts or settles. Precast elevator shafts are maintenance free, and that means substantial operational savings.

LESSONS LEARNED

What's the biggest lesson Niche Development took away from its Niche One project? They now take advantage of the strength and versatility of precast and will use it more on future projects.

Already on the drawing board are plans to use precast to replace some of the steel cross bracing in its Belgravia Square project.

"So far it looks like it's going to give us a quicker and better project," Clarke said. "And it really saves money."

SUSTAINABILITY MAKES SENSE FOR EVERYONE

Sustainable building – selecting resources that don't harm the environment and using them efficiently – is an essential component of doing business for Niche Development.

According to engineers on the Niche One project, Niche Development saved 30 metric tons of greenhouse gases per year compared to the traditional way of building.

"Minimizing the labor and throwaway waste from your job site helps to reduce the overall costs," Clarke said. "If general contractors and everyone else in the business crunch their numbers, they'll find it saves a lot of money compared to the way we build today."

Condo owners also reap big benefits from investing in energy-efficient buildings that are constructed to last a lifetime and beyond.

"We build a high-quality product that requires very little maintenance and doesn't cost anywhere near the operating costs of a comparable building," Clarke said. "That gives people long-term cost certainty."

In addition to energy and maintenance savings, condo owners receive other benefits. Niche One precast and structural steel apartment condos cost 25% to 30% less to insure than wood-frame buildings. And condo fees at Niche One are less than comparable developments.

Finally, there's the intangible value of knowing you're doing the right thing.

"Long-term, we have to stop polluting," Clarke said. "We have to clean up the old sites. We have to leave our planet a better place." **PI**

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

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NPCA Quality Control Manual: What's New?

The NPCA Quality Control Manual for Precast Concrete Plants serves as the guidance document for the association's plant certification program. As a management tool and a technical resource for quality production practices, the manual is under continuous scrutiny to ensure that it remains current with advances in technology.

Each year, the NPCA Quality Assurance Committee reviews the content of the NPCA QC Manual with a goal of increasing clarity and making improvements. For the 13th Edition of the manual, the QA Committee made several minor changes that NPCA members and specifiers are asked to review during a 60-day open comment period. All comments will be considered by the QA Committee before the manual is updated. The 60-day comment period for the 13th Edition of the NPCA QC Manual opens Nov. 1, 2017, and ends Dec. 31, 2017. Here is a summary of changes and clarifications:

The following sections of the manual have changed:

- **2.1.2 Aggregates** – This section has been rewritten.
- **3.1.1.3 Dry-Cast / Zero Slump Concrete** – This is a new section of the manual.
- **5.3 Concrete Testing** – Language has been added in each subsection.
- **6.2 Concrete Pipe** – This entire section has been rewritten and divided into categories for stormwater concrete pipe and sanitary concrete pipe.
- **6.4.1 Box Culvert Absorption Testing** – This section is no longer a critical section.
- **Appendix A** – The ASTM section has been updated.

These changes ensure the highest quality manufacturing processes from NPCA certified plants and provide assurance to customers regarding quality. NPCA certified plants should review their plant-specific manuals and processes annually and conduct a complete review of all of the critical sections that apply to the products manufactured.

For a complete copy of the addendum that includes the sections mentioned above, visit precast.org/qcmanual.

If you have any questions, contact Phil Cutler, P.E., NPCA's director of quality assurance programs, at pcutler@precast.org or (317) 571-9500. **PI**

The 60-day **comment period** for the 13th Edition of the NPCA QC Manual opens Nov. 1, 2017, and ends Dec. 31, 2017.

Working For You

The NPCA professional staff works to expand the use of quality precast concrete products in many ways. To keep you informed of these ongoing efforts, we created the Working For You page at **precast.org/working-for-you**. This recap provides a high-level overview of staff activities throughout the past two months.

Visit the **Working For You** page to read the full stories or learn more.

Certification and Specifications

Rich Krolewski, director of certification and regulatory services, continues to promote precast and NPCA Plant Certification at the federal, state and local levels. In September, NPCA Plant Certification was added to requirements in Delaware for jointed precast concrete pavement. The state now accepts NPCA certification as an alternative to PCI certification (post-tensioned systems).

Specifier and Student Outreach

NPCA professional staff members have made in-person presentations to **626 specifiers** this year, with several additional presentations planned through the remainder of 2017. Our specifier webinar series kicked off Aug. 31 and has drawn **244 attendees** via two webinars. Two additional specifier-specific webinars, one covering wastewater and one covering MSE walls, will be conducted before the end of the year.

Professional staff also conducted several presentations at universities throughout the U.S. in September and October, including Purdue University, the University of Nebraska and more. More presentations around the country are planned for the final months of the year.


NPCA file photo

Codes and Standards

As of Sept. 30, NPCA professional staff members have attended or been on conference calls for **19 meetings** as they actively participate on **37 groups, committees**, etc.

In early September, Eric Carleton, P.E, director of codes and standards, and Claude Goguen, P.E., LEED AP, director of sustainability and technical education, traveled to Estes Park, Colo., to attend meetings for ASTM Committee C13 on Concrete Pipe. Carleton, who serves as Committee C13's Vice-Chairman, and Goguen provided representation for NPCA members as pipe, box culvert and manhole standards were examined. Information gathered from the meeting will be presented to appropriate NPCA committees for further discussion. A video summarizing details from the meeting can be viewed at precast.org/c13video.

Marketing

As of Sept. 30, targeted advertisements have resulted in more than **100,000 visits** to precast.org. The Fall issue of Precast Solutions was mailed in late September, bringing the total number of 2017 issues sent via the outreach program to specifiers to **40,000**. NPCA's efforts on Facebook and Twitter have netted more than **1 million impressions** this year to go along with **10,149 new followers**.

Other Activity

NPCA professional staff represent precast industry at NOWRA Mega-Conference

National Precast Concrete Association professional staff members Claude Goguen, P.E., LEED AP, director of sustainability and technical education, and Kayla Hanson, director of technical services, exhibited at the National Onsite Wastewater Recycling Association's Mega-Conference in Dover, Del., Oct. 22-25. The event was held in conjunction with three state on-site associations (Delaware, Pennsylvania and Maryland), the State Onsite Regulators Alliance and the National Association of Wastewater Technicians. In addition to speaking with a variety of engineers, environmental professionals and educators at the event, Goguen conducted two presentations, one on septic tank venting and the other on the role of wastewater systems in the restoration of Chesapeake Bay.

Photo provided by Woodard's Concrete Products

The Inquisitive Mind: JODI ZWART

Jodi Zwart's love of learning offers **unlimited potential** to Woodard's Concrete Products.

By Mason Nichols

For more than half a century, Woodard's Concrete Products of Bullville, N.Y., has manufactured quality precast concrete for customers throughout the Northeast. The Zwart family has worked hard to improve their business by expanding the company's product line from concrete well tiles in 1965 to catch basins, manholes, custom products and more today.

The business holds incredible importance for the Zwarts, but one family member was initially convinced her future did not include working in the precast concrete industry.

"I really had no interest in it when I was younger, other than when I needed a summer job," said Jodi Zwart, daughter of Bobby Zwart, the company's president. "And when I did work at the plant, dad would have me weed whack and do all the dirty work."

As a result, Jodi pursued a different career path, attending the College of Saint Rose in Albany, N.Y., to study speech and hearing sciences. Her goal was to become an audiologist. Motivated by her love of learning, Jodi finished college in three years and secured an internship. Everything was going according to plan, until, suddenly, it wasn't.

Jodi quickly discovered office work wasn't for her.

Luckily, her father had a solution. He reminded Jodi that plenty of work was available at the family business. With bills to pay and a recently purchased house to maintain, Jodi returned to Woodard's, this time with a new appreciation and a new role.

"When I first came back to the plant, I started out doing custom orders – a lot of wall panel work," Jodi said. "I ended up liking it more than anything."

As Jodi continued to pick up more responsibilities at the plant and eventually moved into her role as production manager, her appetite for learning remained insatiable. While attending The Precast Show 2012 in Orlando, she learned about Precast University and the Master Precaster program from Ethan Camp of Camp Precast. Jodi was intrigued by the coursework, which includes everything from basic production practices to advanced leadership skills. Something else also motivated her to sign up.

"I asked my dad if he had the Master Precaster certification, and he didn't," she said. "I thought it would be cool for me to get it."

Enrolling in the program made perfect sense for Jodi. During her time in college, she had considered continuing her education and working toward earning a master's degree or Ph.D. Now, through Precast University, she could fulfill her desire to learn while simultaneously enhancing her understanding of all aspects of the precast concrete industry.

Though Jodi enjoyed all the classes in the program, she was particularly fond of the technical course, which allowed her to obtain a better understanding of everyday tasks at the plant.

"Before taking that class, I didn't consider the reasoning behind what I was doing at work each day," she said. "Afterwards, I realized there was a reason why you lift a piece in a specific way."

In addition to gaining a newfound appreciation for her work, Jodi said she also benefitted tremendously from the networking opportunities afforded by the Master Precaster program.

"You get a chance to meet other people in the industry that you become friends with and who will support you for the rest of your career," she said. "I don't think I would know as many people as I do in the industry if I hadn't enrolled in the program."

"You get a chance to meet other **people in the industry** that you become friends with and who will **support you** for the rest of your career."

– Jodi Zwart

Jodi earned her Master Precaster designation at The Precast Show 2017 in Cleveland. Next, she hopes to join the 2018 Leadership NPCA cohort and continue refining her skills as a precast professional.

By earning her gold hardhat, Jodi hasn't only made her family proud – she's also ensured that she will be able to keep Woodard's Concrete Products on the path to success as the company continues to evolve along with the ever-changing precast concrete industry.

"I think where I'm going in this field – especially with the position I'm in with taking over the family business one day – the Master Precaster program has helped fill in the gaps," she said. "It's really helped tie everything together." **PI**

Jodi Zwart with her father, Bobby Zwart.

Mason Nichols is the managing editor of Precast Solutions magazine and is NPCA's director of strategic outreach.

NPCA 52nd Annual Convention Wrapup

SMITH-MIDLAND PRESIDENT ELECTED TO LEAD NPCA

Ashley Smith, a lifelong precaster and president of Smith-Midland Corp. in Midland, Va., will take the helm of the National Precast Concrete Association for the next 12 months after the passing of the gavel at the NPCA 52nd Annual Convention in Atlanta, Ga. This year's meeting was the third-largest in NPCA's history, topped only by the 2007 meeting on Maui, Hawaii, and the 50th Annual Convention in Minneapolis.

Smith succeeds Greg Stratis, president of Shea Concrete Products, headquartered in Amesbury, Mass. Smith started officially working at the family-owned company in 1978 and worked in every area of the plant. He attended his first NPCA Convention in 1980 and has been involved in leadership roles since 1987.


NPCA file photo

Greg Stratis, Shea Concrete Products, passes the gavel to newly elected NPCA Chairman of the Board Ashley Smith, Smith-Midland Corp.

As president of Smith-Midland Corp., Smith instituted lean manufacturing principles, which focus on eliminating the seven types of deadly waste: transportation, inventory, motion, waiting, over-production, over-processing and defects. Smith targeted his remarks at the NPCA Convention on what he called the eighth deadly waste: "The waste of the undeveloped potential of employees."

"I heard a story about a guy who's packing up his toolbox on his last day of work after spending 30 years at the plant," Smith said. "He's been a loyal employee for three decades, never complained, always did what was asked of him. And, as he's saying goodbye to his co-workers and pulling out of the parking lot for the last time, he's thinking: 'You know, I gave them my hands for 30 years. If they asked me, I would have given them my head and my heart too.'

"I don't want that to ever happen at our plant."

Smith said he is a student of the Toyota Production System.

"At Toyota, continuous improvement and attention to detail are driven by employees on the plant floor, and it shows in the end product," Smith said. "I want our plant to be like that and I want the precast concrete industry to be like that, because it is vital to our future success."

In other Convention activity, NPCA awarded the association's highest honor, the Robert E. Yoakum Award, to Andy Wieser, president of Wieser Concrete Products, headquartered in Maiden Rock, Wis. Wieser, the 2015-2016 chairman of the board, is a longtime member noted for his support for raising quality standards through the NPCA Plant Certification Program, and for mentoring other NPCA members throughout the country.

Leo Feuerstein, secretary/treasurer of Western Precast Concrete in El Paso, Texas, was presented with the Douglas G. Hoskin Award for membership development. Feuerstein's sponsorship of new members and outreach to those members during their first year earned him a second Hoskin Award in four years.

The NPCA 53rd Annual Convention will convene Oct. 4-6, 2018, at the Omni Providence Hotel in Providence, R.I.

Visit precast.org for more information on NPCA activities. **PI**

2017 OFFICERS

Chairman of the Board
Ashley Smith
Smith-Midland Corp.
Midland, Va.

Chairman-Elect
Mike Hoffman
Lindsay Precast Inc.
Canal Fulton, Ohio

Secretary/Treasurer
Jon Ohmes
Champion Precast Inc.
Troy, Mo.

NEW BOARD MEMBERS

Wes Dees
Seaman Corp.
Wooster, Ohio

Jeff Malcolm
Norwalk Concrete Industries
Norwalk, Ohio

Joel Sheets
Tindall Corp.
Spartanburg, S.C.

Mark Wieser
Wieser Concrete Products Inc.
Portage, Wis.

ROBERT E. YOAKUM AWARD

Andy Wieser
Wieser Concrete Products Inc.
Maiden Rock, Wis.

Mark Thompson (left), the 2016 Robert E. Yoakum Award winner, presented the 2017 award to Andy Wieser, Wieser Concrete Products.

DOUGLAS G. HOSKIN AWARD

Leo Feuerstein
Western Precast Concrete Inc.
El Paso, Texas

Leo Feuerstein (right), Western Precast Concrete, receives the Douglas G. Hoskin Award from Sam Lines, Concrete Sealants.

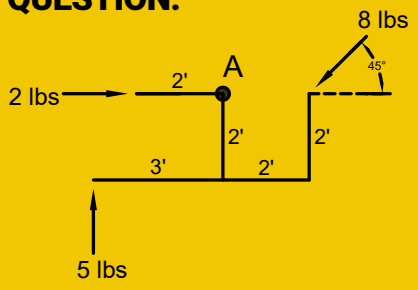
Sept./Oct. Challenge Answer:
7,987.20 pounds

Think you know your stuff?

Prove it by answering the following question. Send your response to Kayla Hanson, director of technical services, at khanson@precast.org, and if yours is the correct answer (chosen randomly from among all correct answers), you will receive one free admission to one of our 60-minute webinars presented in 2018. We will accept one answer per person. **Good luck!**

CHALLENGE QUESTION:

What is the magnitude of the moment (torque) around point A?



2017 NPCA **WEBINAR** Schedule

DATE	TOPIC	INSTRUCTOR	PRICE
Nov. 7, 9, 14, 16*	**PQS II – Technical**	Claude Goguen, P.E., LEED AP	$495 Per Person
Dec. 7	**Sales and Marketing Alignment: A Key to Revenue Growth**	Bryan Gray, Revenue Path Group	$89 Per Location

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

All webinars begin at noon Eastern.

For course descriptions and registration, visit **precast.org/2017webinars**

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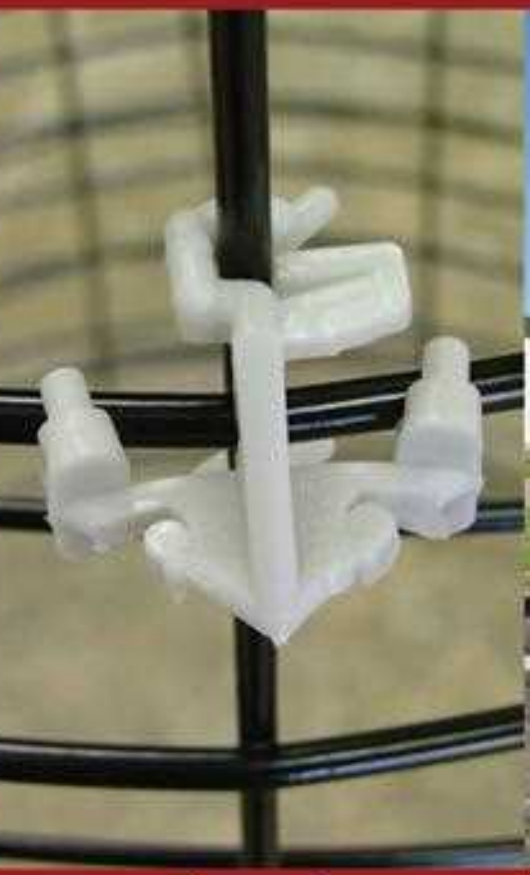

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NPCA Foundation
FALL WRAPUP

NPCA FOUNDATION WELCOMES NEW BOARD MEMBERS AND NPCA BOARD LIAISONS

The NPCA Foundation is pleased to welcome Dan Barbour, Barbour Concrete Co., and Alex Burkhart, Smith-Midland Corp., to its board of directors. In addition, Mark Wieser, Wieser Concrete Products, and Ray Clark, U.S. Formliner Inc., have been appointed NPCA Board Liaisons.

Dan Barbour
Vice President
Barbour Concrete Co.

Alex Burkhart
Projects Manager
Smith-Midland Corp.

Mark Wieser
Executive Vice President
Wieser Concrete Products

Ray Clark
General Manager
US Formliner Inc.

MEMBERS RAISE FUNDS FOR NPCA FOUNDATION AT ANNUAL CONVENTION

The NPCA Foundation thanks everyone who donated items to the silent and live auctions at the NPCA 52nd Annual Convention, as well as those who bid on the items. The Foundation raised $33,259 on the silent auction and another $10,825 at the live auction during the casino night event. In total, 173 people attended the casino night. Thank you to everyone for your unending support of the Foundation and its mission.

NPCA file photos

The money raised at the casino night and live auction will help fund NPCA Foundation scholarships, internship development and outreach programs to students and professors.

SCHOLARSHIP APPLICATION PERIOD NOW OPEN

The NPCA Foundation provides educational scholarships to undergraduate and graduate students enrolled in civil engineering, architectural and construction-related curricula. Applications are now available at precast.org/foundation and are due March 16, 2018. **PI**

A Concrete Partnership

HawkeyePedershaab expands its presence in the precast concrete equipment market with the acquisition of New Hampton Metal Fabrication, market leader in the precast form industry.

The partnership draws on decades of combined experience to push the boundaries of innovation while maintaining our dedication to delivering outstanding customer service to the industries we serve.

The addition of New Hampton Metal Fab broadens HawkeyePedershaab's reach and offerings to customers by combining the technology and service leaders in dry-cast and wet-cast form equipment








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www.nhmfcorp.com

People & Products

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

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

HAWKEYEPEDERSHAAB ACQUIRES NEW HAMPTON METAL FAB

HawkeyePedershaab Concrete Technologies Worldwide has expanded its presence in the precast concrete equipment market by acquiring New Hampton Metal Fab.

BW Forsyth Partners acquired HawkeyePedershaab in September 2016 with the goal of building the market-leading supplier of equipment and solutions in the precast concrete industry through organic growth and acquisitions.

Jamie and Nick Wegner, president and vice president of New Hampton Metal Fab, will both remain with the combined company and lead its wet-cast division that will retain the New Hampton Metal Fab name.

Left to Right: Trish Wegner (NHMF), Jamie Wegner (NHMF), Brad Schmidgall (HP), Aaron Schmidgall (HP), Ryan Gable (HP), Nick Wegner (NHMF).

Steve Kiefer

MANITEX INTERNATIONAL NAMES STEVE KIEFER AS PRESIDENT

Manitex International named Steve Kiefer as president of Manitex International, North America.

Kiefer has held senior roles with Manitex and affiliated companies since 2015. He brings more than 25 years of experience within the industrial equipment sector from new product development, sales and marketing to business development, operations, and profit and loss management.

Andy Winkler

ANDY WINKLER PROMOTED TO GENERAL MANAGER

Wieser Concrete Products announced that Andy Winkler has been promoted to general manager of its headquarters in Maiden Rock, Wis. He will lead the company's safety, marketing, sales, administrative and service groups.

Winkler joined the company 16 years ago and has worked in production, delivery, installation and sales, and has been instrumental in the company's safety program. Winkler will continue to work closely with Maiden Rock's production manager, Tom Gruber, as well as the managers at the other four plant locations.

ALL ADDS NEW CRANES TO FLEET

The ALL Family of Companies added two Manitowoc MLC650 crawler cranes, as well as four new Grove GRT8100 rough terrain cranes, to strengthen its fleet.

The MLC650 has a 717-ton capacity and features variable position counterweight (VPC) technology

that automatically positions the crane's counterweight to match lifting demands. VPC helps reduce the crane's operating footprint, minimizes required job site ground preparation and reduces the matting required to distribute the crane's weight by as much as half.

The Grove GRT8100 was designed with input from crane owners and operators to incorporate features for a rough terrain crane. It features a 100-ton capacity and a 154-foot MEGAFORM main boom.

EMH OFFERS NEW LIGHTWEIGHT AL SYSTEM LAMP POST WORKSTATION CRANE

EMH added AL System Lamp Post Workstation Cranes to its product offerings. AL System Workstation Cranes feature lightweight aluminum track profiles for load capacity up to 2,200 pounds, EMH T-Slot design, anodized enclosed rails and anti-kick-up nylon wheels.

AL System Lamp Post Cranes require only four upright columns per runway cell, with the crane runway clamped onto the top of the frame at the corners using standard AL clamps. The bridge and lifting devices are then hung from the runway, which enable convenient and open access at either end. The maximum overall height is 15 feet.

AL System Lamp Post Workstation Crane

Phil Sprio

TAYLOR LAUNCHES TAYLOR DEFENSE PRODUCTS, PHIL SPRIO APPOINTED AS LEAD

The Taylor Group of Companies recently launched Taylor Defense Products. TDP provides the U.S. Military, its allies and the U.S. government with material handling and logistics products.

Robert Taylor, president of The Taylor Group of Companies, appointed Phil Sprio to lead the company. Prior to joining Taylor, Sprio served as president and CEO of three North Carolina-based companies that all served the government and defense markets. **PI**

CALENDAR OF Events

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

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

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

Oct. 3-5, 2019
NPCA 54TH ANNUAL CONVENTION
Hyatt Regency Seattle
Seattle, Wash.

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

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