THE MANY FACES OF PRECAST

OUTSTANDING PRECAST DESIGNS FOUND AROUND THE WORLD

Also in this issue:

- Compress for Success – Concrete Testing, A Necessary Task
- Fall Protection in Precast Concrete Plants
- Damp Proofing vs. Waterproofing – Part 3
- Creating a Strong Corporate Culture
Complete Plant Construction

From start to finish, large or small, full plants or retrofits.

Whatever your needs, Haarup North America has the mixers, batching equipment and technical expertise to design and build exactly the plant you need.

Just another reason to trust Haarup.

12695 NE Marx St. / Building #12 / Portland, OR 97230
Ph: 503.954.1718 / Fax: 503.206.8892
www.haarup.com
haarupna@haarup.com
A SIMPLE SHIFT IN THINKING ON THE ROAD TO SUCCESS

IN AN INSTANT,
EARL NICHOLS LEARNS THE VALUE
OF INDUSTRY-LEADING RISK
CONTROL

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

When it comes to risk control solutions that help NPCA members remain productive and profitable … we can show you more.®

To learn more about our broad portfolio of insurance products and services for precasters, visit www.cna.com/manufacturing.
While renewed housing demand has pushed the construction industry on an upward trend and some precasters are doing quite well, the big picture is that the big housing recovery is not as robust as expected.

If you think back to the beginning of this century - just 14 years ago - you may remember being amazed at how much our world was changing as we crossed into the new millennium. We were in the middle of the dot.com bubble, and out here in Central California we were close to the epicenter of it all. The Y2K computer systems crash that was supposed to vanquish the world didn’t happen on Jan. 1, 2000. And while we all breathed a sigh of relief that our businesses didn’t come to a halt, it did throw a spotlight on how interconnected we were and how dependent we had become on technology.

But that seems like the stone ages compared to our world today. In 2000, Facebook wasn’t even an idea. Google was a 15-month old fledgling that had just barely outgrown the garage in which it was founded. YouTube didn’t come around until 2005. And in 2000, the idea of getting emails on your phone was just a novelty for most precasters. Why would anybody want a phone that gets emails?

Even if you don’t use Facebook or Google or YouTube in your business or personal life, you can see how they have continued to alter our world. But we’re not just connected through technology. Seismic shifts happen that impact our precast concrete businesses, and if we’re not constantly scanning the environment and peering over the horizon, we could disappear faster than Netscape (anybody remember Netscape?).

Here’s an example of how something seemingly far removed from the precast concrete industry can actually impact your bottom line. Exploding college tuition and student loan debt are topics that have been in the news for the last several months. If you have children in college, you know all about it. But what’s that got to do with precast?

Think back about 18 months. Some economists were forecasting a strong rebound for the construction industry after the Great Recession. After four years of stagnation it looked like 2013 was the year when the housing recovery would lift the construction economy to growth of 6% or more. There was pent up demand in the housing market. People who stayed on the sidelines during the Great Recession were going to start buying houses. New developments would spring up, and there would be demand for septic tanks, pipe, curbs, paving stones and all sorts of other precast materials. Commercial developments would follow closely behind, and other infrastructure to service those new developments would keep our plants humming - just like recoveries in years past.

But while renewed housing demand has pushed the construction industry on an upward trend and some precasters are doing quite well, the big picture is that the big housing recovery is not as robust as expected, so the pace of the recovery is slower than expected. Why? Because many of those 30-year-olds who are in their prime first-time home buying years are still on the sidelines. They’re delaying marriage or living with mom and dad until they can pay down their student debt. And the job market they’re looking at does not have near the promise of the job market when many of us entered the workforce a generation ago.

Of course there are many other contributing factors, but more and more economists are pinning at least part of the blame for a slow recovery on the collective $1 trillion in student debt that young people are struggling to pay down.

So even if student debt is not a problem in your family, it could still be impacting your business. It’s just one of the many examples of how we’re more connected than ever and how, as business owners and managers, we need to constantly be aware of what is happening in the world outside our plants.
What’s inside

July/August 2014

FEATURES

6 Compress for Success
Expert explains why making, curing and testing concrete cylinders is necessary in the field.
By Eric Carleton, P.E.

10 Fall Protection in Precast Concrete Plants
Don’t let the No. 1 OSHA violation run loose in your plant.
By Evan Gurley

14 Welder’s Update
Technology is transforming the welding trade, but the welder’s environment and tools still demand a high level of safety awareness.
By Sue McCraven

16 Creating a Strong Corporate Culture
Precasters are seeking new ways to keep workers on task, engaged and involved.
By Bridget McCrea

PROFILE

The Many Faces of Precast
Outstanding precast designs found around the world.
Story by Sue McCraven

DEPARTMENTS

4 Insights Our connected world
30 Technically Speaking Damp proofing vs. waterproofing Part 3
34 Green Piece Awarding excellence in sustainability
38 Association News New faces at NPCA, webinars, a NPCA founder remembered and more
40 Foundation News Meet Irene Kurtz
42 Product Profile Oldcastle manufactures record-length concrete girders
44 People & Products Recent promotions and the latest products
46 NPCA Calendar
46 Advertisers Index

precast inc.

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

Material in this publication may not be reproduced without written permission from NPCA. Requests for permission should be directed to the editor.

Copyright 2014 by NPCA.

Address your letters and comments to the editor:
Precast Inc./Editor
1320 City Center Drive Suite 200
Carmel, IN 46032
(317) 571-0041

E-mail: npca@precast.org

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

Connect with us on social media at precast.org
Compress for Success

Expert explains why making, curing and testing concrete cylinders is necessary in the field.

BY ERIC CARLETON, P.E.

The cylinder compression test. It’s a regular occurrence in nearly every precast concrete plant. Why do we spend all this time making and breaking concrete cylinders and painstakingly recording the results? Some precasters look at concrete cylinder testing as little more than a make-it-and-break-it chore to maintain certification or appease the purchasers’ specifications. There are, however, many reasons why a precaster should want to cast and test concrete cylinders, regardless of the project or certification requirements.

Although ASTM C31 published its original Standard Practice for Making and Curing Concrete Test Specimens in the Field in 1920, confusion still exists among some precasters about the proper procedures for casting, curing and testing concrete cylinders for concrete mixes and products. Below is a comprehensive list describing reasons why it is important to conduct concrete cylinder compression tests.¹

Testing:
1. Ensures the concrete was batched properly: that is, the proper ingredients, in the proper proportions, were used and the laboratory mix design was adequate.
2. Indicates the statistical variability on the properties of the concrete being produced. High variability is an indication of poor practice.
3. Reveals problems arising due to inadvertent changes in the materials or environmental conditions.
4. Ensures that the people involved in the production, delivery and placement of the concrete do not become lax or careless in their operations.
5. Helps pinpoint the problem even if structural problems arise. Properly carried out and documented tests will be key.
6. Sets timelines for further construction operations to be carried out. For instance, strength tests may be used as a guide for form removal.
The data available to precast concrete manufacturers through testing leads to quick and economical choices to correct problems should they arise. You may never need concrete cylinder testing information until you really need it; and then you may wish you had lots of it. And, of course, by then it is too late. Additionally, it is an easy method for tracking hardened concrete trends for long-term efficiency adjustments, leading your company to the first steps of continuous improvement.

**Standard testing made easy**

Within the past decade, major changes to standard testing have made it easier to cast and test concrete cylinders. The first is testing and specifying agencies acceptance of the use of unbounded caps in accordance to ASTM C1231 *Standard Practice in Determination of Compressive Strength of Hardened Concrete Cylinders*. Though this practice was first published in 1993, many agencies hung on to the established methods of capping by high strength mortar or the cumbersome, and somewhat dangerous, capping method of molten sulfur. When proper testing procedures are met, such as using correctly sized retaining rings and not exceeding the maximum of 100 tests per pad (50 per side), unbounded caps will provide consistent results.

Another change that has eased the burden of cylinder testing is the widespread acceptance of the 4 in. by 8 in. high cylinder shape in lieu of the long-standing 6 in. by 12 in. specimen. Besides the handling weight advantage of the smaller samples, the greatest gain is the ability to take the test to an ultimate failure result. Modern precast concrete mixes produce hardened concrete with compressive strengths that routinely exceed 7,000 psi in a week to 14 days. This requires high ultimate loads to break the 6 in. by 12 in. cylinders. This load can exceed the gauge limit on the testing machine. Constant loading to the maximum loads has proven detrimental to the cylinder break testing frames. Consequently, many testing technicians stop the test to save the equipment. This still verifies the mix far exceeds the original specified requirements, typically 4,000 psi, but denies the ultimate strength data that could be used for consistent observations or mix optimization. The smaller specimen size provides the best compressive strength results.

Some of the critical criteria for the allowance of the smaller diameter is similar to the larger 6 in. by 12 in. specimen, including the maximum size of the course aggregate used in the concrete mix not exceeding a 1/3 of the cylinder diameter. The 4 in. diameter cylinder means 1.33 in. However, some specifying agencies have limited the maximum aggregate size to 1.25 in. or

<table>
<thead>
<tr>
<th>ASTM</th>
<th>Subject</th>
<th>Sample Size</th>
<th>Lifts</th>
<th>External Vibration vib/min.</th>
<th>Surcharge (lbs.)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C31</td>
<td>Practice for Making and Curing Concrete Test Specimens in the Field</td>
<td>6x12</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>Internal vibration only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4x8</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>Internal vibration only</td>
</tr>
<tr>
<td>C192</td>
<td>Practice for Making and Curing Concrete Test Specimens in the Laboratory</td>
<td>6x12</td>
<td>4</td>
<td>≤3600</td>
<td>10</td>
<td>If low W/C ratio prohibits internal vibration, manufacture and externally vibrate-Note 16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3x6</td>
<td>3</td>
<td>≤3600</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>C497</td>
<td>Test Methods for Concrete Pipe, Manhole Sections, or Tile</td>
<td>6x12</td>
<td>3</td>
<td>≤800</td>
<td>9.2</td>
<td>Reference to C31 or by methods comparable to concrete of manufactured product. Surcharge weight based on 0.353 psi and diameter less .25 in. of cylinder mold. Sizes other than 6 in. by 12 in. are not prohibited.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*4x8</td>
<td>3</td>
<td>≤800</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>C1176</td>
<td>Practice for Making Roller-Compacted Concrete in Cylinder Molds using a Vibrating Table</td>
<td>6x12</td>
<td>3</td>
<td>≤3600</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
The concrete industry and academia agree that smaller cylinders will produce slightly higher compressive strength results. Additionally, original testing results indicate the 4 in. by 8 in. cylinders had greater variability of testing results as compared to the 6 in. by 12 in. cylinders. This has led regulatory agencies to require the breaking of three 4 in. by 8 in. cylinders as a companion set for a result in place of the standard two commonly required for the 6 in. by 12 in. cylinder. This protocol requirement is not universally accepted, however, and there is compelling research showing the variability may not be as great as originally anticipated.

**Concrete cylinder specimen curing**

Within the precast industry, there has been some misunderstanding about curing concrete test cylinders by precast concrete plants. ASTM C31 describes two methods of curing concrete cylinders.

The first is described in **section 10.1.3.1 Final Curing Cylinders**, and is described by ASTM C39 to be used when acceptance testing for specified strength, checking adequacy of mixture proportions for strength and quality control. These types of specimens are often described as the “mix potential” of the concrete and are cured in a temperature-controlled water bath for a specified period of time prior to testing. The intent is to eliminate all the variables except the mix properties and batching. Many precasters are not aware this provision permits the use of a moist curing room in place of the water bath. The standard suggests the testing times for these type of cylinders also be uniform and consistent to eliminate another variable. Though this curing method is not required by many specifying agencies for precast concrete products, a precast manufacturer can obtain the concrete mix data that is useful in troubleshooting or process optimization to maintain a uniform frequency of cylinder testing specimens.

The other curing method is the field curing procedure described by ASTM C39. When determining whether a structure is capable of being put into service, this method compares test results of standard cured specimens or with various in-place test methods, adequacy of curing and protection of concrete in structure, and form or shoring removal time requirements. This curing method is often used by specifying agencies and requires cylinders to be cured similarly to the product they represent. After initial curing, if the product is taken out of the plant to the yard, the concrete cylinders go with it. The expectation is the test cylinders will be broken to verify compliance or design minimums prior to installation.

### TABLE 2. Frequency Minimums for Concrete Cylinder Strength Testing

<table>
<thead>
<tr>
<th>Code, certification or standard</th>
<th>Product Description</th>
<th>Concrete Cylinder Standard</th>
<th>Minimum Cylinder Testing Frequency</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI 318</td>
<td>section 5.6.2</td>
<td>ASTM C31; 4x8 or 6x12</td>
<td>One sample per day but not less than 150 cu. yds. Not less than 5,000 sq. ft. of surface area for slabs or walls</td>
<td>Section 5.6.2.4 states a cylinder sample consists of not less than two 6 in. by 12 in. cylinders or three 8 in. by 4 in. cylinders</td>
</tr>
<tr>
<td>NPCA Plant Certification</td>
<td>section 5.3.5.4</td>
<td>ASTM C31 for wet cast, ASTM C497 for dry cast; 4x8 or 6x12</td>
<td>4 cylinders for each 150 cu. yds. or 1 week whichever is first</td>
<td>Section 4.8.1 states a manufacturer is required to develop a product specific stripping strength based on compressive testing that is verified quarterly</td>
</tr>
<tr>
<td>ASTM C76</td>
<td>Reinforced Concrete Pipe</td>
<td>ASTM C497</td>
<td>5 per day</td>
<td>If acceptance is based on material tests, not 3-edge testing</td>
</tr>
<tr>
<td>C476</td>
<td>Precast Concrete Manholes</td>
<td>ASTM C497</td>
<td>5% of total order of product, not greater than 2 per day</td>
<td>If required by owner</td>
</tr>
<tr>
<td>C658</td>
<td>Precast Concrete Utility Structures</td>
<td>ASTM C31</td>
<td>None Specified</td>
<td></td>
</tr>
<tr>
<td>C913</td>
<td>Precast Water &amp; Wastewater Structures</td>
<td>ACI 318</td>
<td>To be specified by purchaser</td>
<td></td>
</tr>
<tr>
<td>C915</td>
<td>Precast Concrete Crib Wall</td>
<td>ASTM C31</td>
<td>2 per 10 cu yds., 2 per day min.</td>
<td></td>
</tr>
<tr>
<td>C1227</td>
<td>Precast Concrete Septic Tanks</td>
<td>ACI 318</td>
<td>None Specified</td>
<td>Manufacturer shall certify product meets 4,000 psi minimum design strength</td>
</tr>
<tr>
<td>C1417</td>
<td>Precast Concrete Pipe-Direct Design</td>
<td>ASTM C497</td>
<td>5 per day</td>
<td></td>
</tr>
<tr>
<td>C1433</td>
<td>Precast Concrete Box Culvert</td>
<td>ASTM C497</td>
<td>3 per day</td>
<td></td>
</tr>
<tr>
<td>C1504</td>
<td>Precast 3-Sided Structures</td>
<td>ASTM C497</td>
<td>3 per day</td>
<td></td>
</tr>
<tr>
<td>C1577</td>
<td>LRFD Precast Concrete Box Culvert</td>
<td>ASTM C497</td>
<td>3 per day</td>
<td></td>
</tr>
<tr>
<td>C1613</td>
<td>Precast Concrete Grease Interceptors</td>
<td>ACI 318</td>
<td>None Specified</td>
<td>Manufacturer shall certify product meets 4,000 psi minimum design strength</td>
</tr>
<tr>
<td>C789/C850</td>
<td>Precast Box Culvert</td>
<td>ASTM C497</td>
<td>5 per day</td>
<td>Original box culvert standards replaced by C1433</td>
</tr>
</tbody>
</table>
Dry mix concrete cylinder molding

The proper way to cast a cylinder for “zero-slump” concrete or mixes has never been clearly defined by the concrete industry and specifying agencies. The traditional consolidation methods of rodding or internal vibration were deemed inappropriate for these stiff concrete mixes; however, at the time, the use of these dry mix processes was employed by a small segment of the concrete industry. Consequently, the issue was not addressed by the same ASTM C9 Concrete and Concrete Aggregates Committee that developed the C31 standard. It was left to the individual product specifications committees that produced the precast products, which led to a lack of correlation between different product committees on the procedures of dry mix concrete cylinder molding.

For precast concrete products, ASTM Committee C13 Concrete Pipe took it upon itself to clear up the confusion by including a provision within ASTM C497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile. Section 11, Cylinder Strength Test Methods, removed the wide variety of dry mix mold making from each of the individual material standards. The provision in C497 now describes the specific procedure to make testing cylinders for precast concrete products other than those specified in ASTM C31 when, “the concrete consistency is too stiff for compaction by rodding or internal vibrations.” See Table 1 for compressive strength testing guidelines.

ACI Level I Testing Technician Certification programs do not cover the method to consolidate dry mix concrete cylinders. It is the manufacturer’s job to properly train their concrete QC personnel on the methods described within ASTM C497 to provide consistent and reliable test results.

Frequency of testing

The final item that has confused the industry is the frequency of making and breaking concrete cylinders. The answer lies with many variables including:

• Variable mixes produced per day and cubic yard output
• The minimum requirements within their own unique quality control manual
• Minimums required under any nationally recognized certification program, such as the NPCA Certified Plant Program
• Unique testing requirements of specifying agencies
• Compliance to the requirements stated within a specific material standard seen in Table 2

One or all of these will determine what minimum testing obligation is required of the precast manufacturer.

Concrete cylinder testing is one of the primary methods of specifying agencies and precast product purchasers to verify compliance with specifications and standards. It can also be a valuable tool employed by the precaster to provide a more efficient and economical manufacturing process. The routine task of making and breaking concrete cylinders, and keeping track of endless testing reports and data should be considered a valuable duty rather than a mundane chore.

Eric Carleton, P.E., is NPCA’s vice president of Technical Services.

References:

1 Concrete, Second Edition by Mindess, Young, and Darwin (section 14.2 Significance of Test, page 365)
2 Concrete and Concrete-Making Materials ASTM STP169C (Chapter 10 Making and Curing of Concrete Specimens), Klieger and Lamond.
3 MDOT Research Report 04-005 Comparison of Compressive Strenths Using 4x8 vs. 6x12 Cylinders for Prestress Concrete.
Every year, the U.S. Occupational Safety and Health Administration (OSHA) releases its top 10 most frequently cited violations from the previous fiscal year as compiled by OSHA inspections. OSHA publishes this list to alert employers and employees about commonly cited standards so they can use the information to take preventive measures. Many, if not all, of these frequently cited standards are preventable injuries or illnesses that occur in the workplace.

Year after year, this top 10 list remains basically the same. There may be a reshuffling of violations from year to year, but essentially the layout remains unchanged.

Patrick Kapust, OSHA’s deputy director of the Directorate of Enforcement Programs, best described the reason for creating a top 10 list in an interview with the Safety and Health Council.

“The data found in the top 10 list is not meant to gauge how well OSHA is performing or how safe businesses in the country are,” Kapust said. “The list is at its best when used by employers as a tool to improve safety at their work sites. Employers who may be interested in what are the possible hazards in their workplaces could look at the top 10 list and see if they’re covering all hazards and assessing the kinds of changes they may have to make to their safety and health programs.”

OSHA’s report for fiscal year 2013 once again cites fall protection as the No. 1 offender. The top 10 most frequently cited OSHA standards and the number of violations are:

1. Fall Protection (1926.501) – 8,241 violations
2. Hazard Communication (1910.1200) – 6,156
3. Scaffolding (1926.451) – 5,423
5. Electrical, Wiring Methods (1910.305) – 3,452
7. Ladders (1926.1053) – 3,311
8. Lockout/Tagout (1910.147) – 3,254
9. Electrical, General Requirements (1910.303) – 2,745

The top 10 most frequently cited OSHA standards for fiscal year 2012 were:

1. Fall Protection (1926.501) – 7,250 violations
3. Scaffolding (1926.451) – 3,814
5. Ladders (1926.1053) – 2,310
7. Powered Industrial Trucks (1910.178) – 1,993

Don’t let the No. 1 OSHA violation run loose in your plant.

BY EVAN GURLEY

Fall Protection in Precast Concrete Plants
8. Electrical, Wiring Methods  
(1910.305) – 1,744  
9. Lockout/Tagout  
(1910.147) – 1,572  
10. Electrical, General Requirements  
(1910.303) – 1,332  

OSHA citations from 2012 to 2013 increased by a staggering 45%. While there are no surprises to which violations they are, the top 10 violations for 2013 totaled 42,502 which is 13,323 more than the 2012’s tally of 29,179.

Overview of the OSHA Fall Protection Standard

In the U.S. construction industry, falls are the leading cause of worker fatalities. Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls during construction-related activities.

OSHA recognizes that accidents involving falls are generally complex events involving a variety of factors. Consequently, the standard for fall protection deals with both the human and equipment-related issues protecting workers from fall hazards.

OSHA has revised its construction industry safety standards' and developed procedures designed to prevent employees from falling off, onto or through working levels, and to protect employees from being struck by falling objects.

The OSHA fall protection standard outlines when fall protection is required, which systems are appropriate for given situations, the proper construction and installation of safety systems, proper supervision of employees to prevent falls, safe work procedures for workers who use fall protection systems, and training requirements for workers who use fall protection systems.

Duty to have fall protection

When addressing fall protection during construction-related activities, employers are required to:

• Determine if walking/working surfaces have the strength and structural integrity to support employees safely  
• Provide working conditions that are free of known dangers  
• Keep floors in work areas in clean and, so far as possible, dry conditions  
• Select and provide required personal protective equipment at no cost to workers  
• Train workers about job hazards in a language they can understand  

When fall protection is needed

The use of 100% fall protection at the point of work, as well as going to and from the work area, is mandatory for all employees and all contractor personnel on projects when employees are at risk of falling or working a minimum of 6 ft or more off the floor or ground, except in plant areas covered by OSHA standard 1910.23. Where the minimum distance off the floor or ground is 4 ft. In addition to the 6-ft rule in construction-related activities, other areas or activities where fall protection may be required include, but are not limited to, formwork and reinforcing steel, leading edge work, unprotected sides and edges, precast concrete erection, ramps, walkways, hoist areas and holes in walking surfaces.

Types of fall protection used

All fall protection components and/or systems must conform to the osha standards prescribed in 1926.502. Under the current standards, employers have the choice of selecting fall protection that aligns with the work being performed. Methods to address fall protection include:

• Elimination or substitution. For example, eliminate a hazard by lowering the work surface to ground level, or substitute a process, sequence or procedure so that workers no longer approach a fall hazard.

• Passive fall protection. Isolate or separate the hazard or work practice from workers through the use of guardrails or by covering exposed floor openings.

• Fall restraint. Secure the worker to an anchor using a lanyard short enough to prevent the worker’s center of mass from reaching the fall hazard.

• Fall arrest. This includes systems designed to stop a worker’s fall after a fall has begun.

• Administrative controls. These work practices or procedures warn a worker to avoid approaching a fall hazard.

Passive systems are those that do not involve the actions of employees. Examples of passive systems include:

• Guardrails
• Safety nets
• Covers
• Fences
• Barricades

Active systems are systems and components that require manipulation by employees to make them effective in providing protection. Examples of active systems include:

• Anchorage points
• Lanyards
• Snap hooks
• Life lines
• Body harnesses
• Installation of toe boards (at least 3.5 in. wide)
• Building a barricade and restricting entrance
• Installation of screens

Training
Employers must provide training programs that teach employees who might be exposed to fall hazards how to recognize such hazards and how to minimize them.

Employers must prepare a written certification that identifies the employee trained and the date of the training. The employer or trainer must sign the certification record, and retraining must be provided when necessary.

Planning
Careful planning and preparation lay the groundwork for an accident-free workplace. If you are an employer, you are responsible for anticipating fall hazards at your plant and for including fall protection measures in your day-to-day activities. If you are an employee, you are responsible for following the policies, procedures and training requirements established by your employer.

If falling hazards are present at your plant, plan ahead to eliminate the possibility of a falling accident. Consider these important steps:
• Identify all fall hazards that workers are likely to encounter
• Describe how workers will gain access
• Describe how workers will prevent tools and materials from dropping to lower levels
• Establish procedures for inspecting, maintaining, and storing fall protection equipment
• Identify the tasks that expose workers to fall hazards
• Make sure workers use fall protection systems appropriate for their tasks
• Identify areas in which workers may be exposed to falling objects and determine how to control the hazards

It’s not complicated
Fall protection is a broad concept that includes training, procedures, rules, systems and methods intended to protect workers from fall hazards. Fall protection doesn’t mean bulky or cumbersome equipment. It doesn’t interfere with work tasks, and it doesn’t get in the way of coworkers – if you understand the concept and apply it appropriately.

Evan Gurley is a technical engineer with NPCA

References:
1 29 Code of Federal Regulations, Subpart M, Fall Protection, 1926.500, 1926.501, 1926.502 and 1926.503
Somewhere between winning the bid...

...and delivering a perfect precast product lies a precision CLECO system.

“A craftsman’s only as good as his tools”. How many times have you heard that? Competition is tough in the precast concrete industry and if you’re not building your precast products with rugged, long-lasting, precision forming systems, you’re risking breakdowns, product rejection and damage to your reputation. All of which can lead to slow company growth, no company growth or even worse. For 40 years, we’ve helped hundreds of precasters just like you become serious industry leaders with forming systems that deliver rugged dependability and provide precast products that mirror-image any plan. Call us now... we can help.

CLECO MANUFACTURING

14 Park Avenue, Hudson, New Hampshire 03051
(603) 886-5472  FAX (603) 880-3095
www.clecoforms.com
When acetylene and oxygen from pressurized cylinders meet a spark, a 6,000 F welding torch is created with a flame hot enough to melt through steel. Known as “hot work,” welders and pipefitters use regulated torches to cut or fuse pieces of metal. And as high temperatures, an ignition source, potential fumes and job site conditions are linked with the trade, a welding professional requires constant training, skill and safety awareness.

Technology is transforming the welding industry from an art to a technical and scientific trade with improved work conditions, thanks to health and safety regulations. This article is a refresher on safety and welding terms, but cannot cover all OSHA and American Welding Society (AWS) regulations and guidelines. According to AWS, the next edition of the Structural Welding Code – Reinforcing Steel D1.4, will be issued in late 2016 or early 2017, so specific code changes won’t be known for the next year while the draft is developed.

Precast welding requires constant awareness

With more than 40 AWS Safety & Health Fact Sheets for welders, including everything from burn protection, combustible dust, glove selection, confined spaces, and electrical hazards, plant welders need to regularly review the trade safety rules and regulations.

Welding performed at precast concrete plants includes fabricating metal forms or positioning reinforcement bars and welded wire assemblies. Tack welding of reinforcing bars is not recommended, because it can create “notches” in the bar that decrease the steel’s yield strength and compromises the concrete durability. All welded splices for reinforced concrete...

Yet more often, a precast plant welder may be called to fabricate, modify or repair a variety of equipment – forklifts, trucks, hitches, pipes, mixers and, most critically, lifting device welding – a skill requiring certification. Workplace risks grow as welders employ different methods as materials and site conditions vary. For this reason, a welder must be well trained and qualified to work on many materials with a range of tools.

To see a more comprehensive list of all AWS Safety & Health Fact Sheets, visit aws.org/technical/facts.

Welding safety: new OSHA standard

OSHA is preparing to release a new set of HazCom requirements, warnings and safety data sheets for workplaces as part of its new GHS Hazard Communication Standard. The AWS committee advised the new rule would affect precast concrete plants specifically by proposing to reduce the permissible exposure limit (PEL) to crystalline silica. Crystalline silica dust is a basic component in soil, sand, granite or other minerals. When breathed in, it can cause severe health problems. “This should be the most significant single regulatory-change impact to hit this industry in some time,” said AWS committee members. For more details and deadlines, visitosha.gov/dsg/hazcom/HCSFactsheet.html

Unlocking the jargon

In addition to a myriad of potential hazards and their corresponding safety rules, the welding profession uses numerous acronyms, some of which can cause confusion. AWS members say the biggest acronym confusion is MIG and TIG as opposed to GMAW and GTAW. Here are the five most common acronyms used:

- **SMAW** – Shielded Metal Arc Welding is also known as MMW, Manual Metal Arc Welding, and is one of the most prevalent and versatile types of welding. SMAW is commonly known as “stick welding” and requires more time to accomplish, because the consumable electrode rod (usually steel filler material) requires frequent replacement. The welding rod is coated with flux, and after completing the weld, the slag (residue from the flux) must be removed.

- **MIG** – Metal Inert Gas welding combines two pieces of metal using a consumable wire connected to an electrode current. MIG’s faster welding speed is due to a continuous wire feed passing through the welding gun at the same time as the inert gas. The inert gas protects the electrode from contaminants. MIG is also known as GMAW, and its electric arc can generate very high temperatures – from 6,000 F to 43,000 F.

- **TIG** – Tungsten Inert Gas welding uses nonconsumable tungsten along with an inert gas and is typically used to weld thinner pieces of material together. While TIG welding requires more skill and time to set up, it produces a precise, high-quality weld and generates fewer fumes and sparks. The tungsten electrode provides the electricity, creating a weld where one part melts into the other. TIG can also use a separate filler material. TIG is also known as GTAW, a process most often used on stainless steel and light metals, and can produce temperatures of up to 35,000 F.

- **FCAW** – Flux Cored Arc Welding uses the flux of the welding wire in the center of the electrode instead of on the outside. This more rapid, expensive welding process uses feed spools and cable rather than stick-welding’s solid rods.

- **SAW** – Submerged Arc Welding uses a continuous wire feed and covers the arc beneath a layer of flux so that no fumes or airborne contaminants are produced. SAW is known for its high productivity – rapid wire deposit rate – and improved working conditions. Because SAW uses a high-quality arc and rapid welding, it is commonly used on large industrial products, such as pressure vessels.

Spot vs. tack welds

As with numerous acronyms, there is also confusion about the difference between “tack” and “spot” welding.

Tack welding is an important first step where the welder deposits separate short beads to properly position, align and secure pieces together using filler material prior to final welding. Tack welds save time and effort in assembly, because if a misalignment or defect is noted, tack welds are easily removed to correct the problem.

Spot welding is the final step, using both pressure and heat – with no filler material – to permanently fuse two pieces together. Spot welding is used mainly on foils or thin materials that have a thickness of a ¼ in. or less. The simplest way to remember the difference between tack and spot welds is that welds are a preliminary step for positioning and securing pieces for welding, whereas spot welding is the final and permanent join.

Welders earn respect

Skilled welders are responsible for properly assembling, repairing and modifying our industrial equipment and the infrastructure and buildings where we work and live. The welder’s dedication to precision and safety merits the respect of those who work under less arduous conditions.

For this reason, proper ventilation and protective gear – helmets, gloves, cotton clothing and quality eye protection – are critically important. It is exposure to potential toxic, carcinogenic fumes and chemicals, from either the welding gases themselves or from cleaners, paints and sealants used on welding surfaces that pose the greatest threat to welders.

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

References:

1. The American Welding Society develops and publishes standards that apply to welding and related disciplines.


3. Globally Harmonized System of Classification and Labeling of Chemicals (GHS)
Creating a STRONG Corporate Culture

Company loyalty is a two-way street. Here’s how to create a corporate culture that keeps your workers on task, engaged and involved for the long term.

BRIDGET McCREA

The numbers are in and the results are both staggering and sobering. According to a recent Gallup survey of 5.4 million working adults, more than half of employees say they are not engaged in their work. An additional 18% of workers describe themselves as “actively disengaged” — a state of mind that can quickly create bad apples that spread their bitterness to co-workers.

Another survey from Careerbuilder.com also paints a dim picture of today’s workplace, where 76% of full-time workers, while not actively looking for a new job, would leave their current workplace if the right opportunity came along. Combined, this pool of negative sentiments results in a talent loss of 20 to 50% annually for the average company.

But what if you’re not running an average company? What if your manufacturing firm went the extra mile to establish a corporate culture that oozed employee appreciation and was designed to not only recruit the best of the best, but also keep those workers happily employed for the long term? And as an added benefit, that strong corporate culture would spawn stronger customer and business partner relationships — both of which are vital to precasters operating in today’s increasingly competitive market.

TREATING everyone like family members

Michael Achenbach understands the value of a strong corporate culture. Since inception, he says the ownership team at Leesport, Pennsylvania-based Reading Precast Inc. has gone out of its way to create a workplace where people actually want to come to work every day. The company started by Achenbach’s family 41 years ago boasts an average employee tenure of 15 years, with some exceeding 20 years. He says the 20-employee firm’s culture is rooted in a very simple philosophy: “To treat everyone who works here as if he or she were a member of the family.”
As part of that mission, Reading Precast uses a triple-interview process when hiring new employees. “Obviously experience is key, but we also like to look at the individual and at how well he or she will fit in with our corporate culture,” says Achenbach. “We operate in a pretty laid back atmosphere around here and that’s different for a lot of employees. Not everyone fits into this atmosphere.”

Achenbach says the company’s culture began to take shape in the late 1980s when his father, who headed up the company at the time, became frustrated with high employee turnover. “At one point, he realized that maybe it wasn’t the employees who were the problem; it was something that he was doing,” recalls Achenbach. “That’s when things started to turn around and when we really began focusing on honing our corporate culture.”

Fast-forward to 2014 and Achenbach says former employees are now calling him to get back on the employee roster at Reading Precast. Maybe it’s the personalized birthday cakes and associated celebrations managed by Karen Achenbach, Michael’s wife and company controller, or perhaps it’s the fact that the company’s president takes the time to speak one-on-one with every employee as frequently as possible. “Little things like that really add up,” said Achenbach, “and it’s something that a lot of our workers have never experienced at their previous jobs.”

To further cement its corporate culture, Reading Precast also holds monthly meetings with all employees. At those pow-wows – which have been taking place for the last 25 years – the meeting leader reads the firm’s mission statement and customer compliments and complaints received during the prior month. The firm’s sales manager goes over company sales numbers, profits, order backlogs and “anything else that might be going on at the company (like the purchase of a new truck or office equipment),” Achenbach said. Employees are also given the floor and asked to voice their opinions, criticisms and compliments. “It really makes our employees feel like they’re part of something bigger,” he notes, “and that their opinions and voices matter.”

Achenbach says his ultimate goal is to get all employees thinking like small business owners who have a stake in the company’s overall well-being and success. “All

5 STEPS TO SUCCESS

In “5 Steps to Creating Good Company Culture,” Samar Birwadker, CEO at HR consultancy Good.Co, says creating a positive company culture takes more than just writing a nice-sounding mission statement. Here are five steps Birwadker says all organizations can take toward creating a more positive company culture:

1. Embed values in everything. Your company’s core values should be clear and communicated in every aspect of the business. When a staff member makes a decision, he or she should know what’s ultimately important to the company.

2. Recruit and hire to fit. When your company’s culture is clear, it becomes easier to find new staff that will fit in and become productive members of the team.

3. Be clear about expectations. New hires should be able to quickly and easily understand what is expected within the company culture – from why you do what you do, to how they should present themselves to clients, and how they should interact with colleagues.

4. Follow through. Paying attention to both the visible and invisible aspects of your company’s culture is important. If something is heading off course, quickly redirect it.

5. Start from the top. The best way to establish and maintain a strong culture is for leadership to live it. If your company’s leaders are doing the exact opposite of what’s expected, it will become difficult to convince employees to follow a different set of guidelines.
employees owe it to themselves to get out there and sell their services for a company that will appreciate them and take care of them,” Achenbach said. “Our 15-year average tenure proves that things must be pretty good here, and I feel great about that.”

Reaping the rewards

According to Daniel Paulson, CEO at InVision Business Development in Madison, Wisconsin, the most effective corporate culture initiatives start at the top of the corporation and move down through the entire organization – right to the frontline staff. Paulson, who recently helped a second-generation, family-run cast stone manufacturer strengthen its leadership teams and build on an already effective business culture, said frontline staff is often the most important component of an effective corporate culture.

“In a precast plant, those frontline workers are most worried about building the next widget, and even their managers don’t always understand concepts like business direction and culture,” Paulson points out. The cast stone manufacturer, for example, was dealing with a number of redundant systems and processes that had been instituted over time but never actually assessed in their entirety. With an eye on improving efficiencies, the company broke down its bid process to ferret out points of delay – and wound up reducing its bidding system to two days from one week – and worked with teams in the plant to lower error rates and manufacture better products.

“A lot of the improvements were a result of working with management teams to communicate to the frontline workers on what they were doing, how they were doing it and looking...
for better solutions,” said Paulson, who sees continuous improvement as a necessary component for a strong corporate culture and for ongoing profitability and success. “A lot of companies assume that they’re at the top of their games and/or the best in their industries, when in fact that’s not always the case.”

Precasters who take the time to develop and hone their corporate cultures can expect numerous benefits in return. Paulson cites lower employee turnover, increased sales and higher profitability as just three of the key rewards that most companies achieve over time. And while those benefits may not appear overnight, Paulson assures precasters that the rewards will become evident as time passes. “Usually there is a slight lag time before companies begin seeing the advantages of a strong corporate culture,” he notes, “but as you start to improve your culture and as employees and managers buy into those improvements, the positive results will show up.”

Don’t fight a losing battle

At Western Precast in El Paso, Texas, all employees are treated equally – whether they’ve worked for the company for 10 years or one day. And even though the company has staff members who have been on board for two or three decades, Leo Feuerstein, operations manager, says the company’s owners work hard to create an atmosphere of equality as part of their core corporate culture. “No one is more important than the next person,” said Feuerstein, whose management team applies that philosophy when recruiting and selecting new hires. “We know that they won’t always last,” he admits, “but we try to make every newcomer feel as though they play an important role from day one.”

Feuerstein says Western Precast’s corporate culture has been in place for more than 30 years and that the company is continually honing that culture to make sure it remains relevant and useful. “We’re always trying to improve upon it,” he said. As part of that culture, the company distributes cards containing personalized notes from the firm’s owners and $25 checks on employee birthdays; gym memberships for staff members and their immediate family; life insurance policies; and a health maintenance program. Western Precast also offers a week of vacation and five personal days annually for workers who have been on the payroll for over a year, and free psychological counseling for stress-related job or family situations.

Having grown from just six employees to 50-plus over the last three decades, Western Precast operates on the core value that if you want to achieve profits and build quality products, you have to treat all individuals equally and with respect. “Ignore that human element and the odds that you’ll have a profitable firm and/or quality products will be pretty slim,” said Feuerstein. “You’ll basically be fighting a losing battle.”

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.
THE MANY FACES OF PRECAST

BY SUE McCRAVEN

EXCEPTIONAL ARCHITECTURAL PRECAST CONCRETE DESIGNS REFLECT INNOVATION, HISTORY AND CULTURE FOUND AROUND THE WORLD.
DREAMSCAPE: LOUISIANA STATE MUSEUM & HALL OF FAME, NATCHITOCHES

Architect: Trahan
Precaster: Advanced Architectural Stone
Engineer: LBYD
Completed: 2013

The fluid, soothing design found at Louisiana’s State Museum and Sports Hall of Fame may place a visitor into a dreamlike state as they walk the winding halls and corridors. The museum overlooking historic Cane River Lake captures shapes and textures that emulate Natchitoches’ local terrain and winding rivers, fusing two seemingly incompatible venues — sports and history — with exceptional design. According to Trahan Architects, the site greatly influenced the interior design. The “fluid shapes” of the corridors, or “river channels,” are separated by structures, or “masses of land.”

Advanced Architectural Stone created more than 1,150 precast concrete panels that are supported by a custom structural steel frame beneath.
TILTING 65 FT MORE AT THE TOP THAN AT THE BOTTOM, THE TOWERS ARE THE FIRST TILTED PRECAST CONCRETE CONSTRUCTION IN THE WORLD.

Scandinavia’s largest hotel, Bella Sky, adds modern elegance to Copenhagen, Denmark’s capital city, and was designed as the perfect world-class structure for the trending neighborhood of Ørestad. “We have knowingly worked towards designing a building unlike anything else in Copenhagen — and we did that because Ørestad, which is a new city neighborhood, is also unlike any other place in Copenhagen,” said Kim Herforth Nielson, principal and founder of 3XN, project architects. “Bella Sky is designed specifically to reflect the identity of Ørestad.”

3XN designed Bella Sky’s two towers to twist apart (the south tower twists at the top, while the north tower twists at the bottom), a daring architectural approach. “The effect of the leaning towers has also resulted in corner rooms where the building angles create a view which is actually underneath the room!” said Nielsen. “It gives the illusion of floating above the view itself.”

In addition, one tower twists outward by 19.2 degrees, making the 250-ft structure appear to contort in the wind. Located near the Copenhagen Airport, the hotel could not be designed as one tall tower due to flight safety regulations. Aluminum and glass façade panels cover the precast concrete building, which includes hollow-core slabs, beams and internal columns.1

“Abroad, a building such as Bella Hotel would normally be built using in-situ concrete or steel,” said Kaare K.B. Dahl, project engineer at Rambøll. “But in Denmark we have a tradition of using precast concrete units. It is cost-effective, results in fewer flaws in the individual units and is far more comfortable to work with.”

The Danish Precast Concrete Association (DPCA) is proud of the Bella Sky Hotel. “Bella Sky is not only an icon for precast,” said Poul Erik Hjorth, director of DPCA. “It also has moved the limits for precast. When you can design and construct such a building with concrete elements — you can use precast solutions everywhere.”

Bella Sky Hotel recently received the 2014 fib award for Outstanding Concrete Structure from the International Federation for Structural Concrete.
The City of Grapevine, Texas, a community just northwest of Dallas, grew in prosperity when the railroad linked the city with Dallas. To maintain the rich and deep history of the town as a transportation hub, the convention and visitor’s bureau has preserved the old railroad hotel façade architecture in its new building.

According to Advanced Architectural Stone (AAS), the specs for the center called for a series of storefronts that would mimic the rustic style of the Old West found in the 1800s. Cast stone copings, pier caps and water tables all were formed using a grapevine motif that is similar to the original wooden façades.

With its detailing work, AAS’s achievement of exceptional architectural intricacy for the building won many industry accolades and more including the 2012 Architectural Precast Association Award of Excellence – Design & Manufacturing & Craftsmanship, and the Construction Specifications Institute Award for Manufacturing & Design Excellence.
HITTING HOME: GARNER VETERANS MEMORIAL, NORTH CAROLINA
Architecture: Clearscapes
Artist: Thomas Sayre
Precaster: Lucas Concrete Products Inc.
Completed: 2013

More boys and young men from North Carolina fought and died in the American Civil War than from any other state in the Confederacy. The local veterans association in Garner, North Carolina, wanted to honor the ultimate sacrifice of all local soldiers lost in conflicts in a memorial that would give visitors an emotional connection with the fallen warriors. Garner Veterans Memorial’s architecture design achieves the shared objective.

The Architectural Precast Association awarded the memorial the APA Design & Manufacturing Excellence Award in 2013. “This really wowed us,” jury members said.

The following is Clearscapes artist Thomas Sayre’s detailed explanation of the design process.

The Garner Veterans Memorial is the result of a competition to create a place of both education and remembrance to honor the veterans of Garner, North Carolina. Individual bands of precast concrete and stone establish walls representing conflict, while benches offer peace marking 24 decades of our nation’s past and the series of conflicts that have brought us to today.

Each of the 37 precast concrete wall panels was individually molded and poured utilizing an “earthcasting” technique. Clay is broken into clods and the soil is packed into molds to create the texture of broken ground, the soil of the plowed field — or the exploded surface of warfare. The concrete was then pigmented with iron oxide to match the red clay soil. The surface of the earthcast panels protects the memorial’s smooth inner granite panels, where each conflict is described with the names of the fallen from Garner.
CARIBBEAN FLAVOR: PORT FERDINAND LUXURY RESORT, BARBADOS, WEST INDIES

Precaster: Preconco LTD
General Contractor: Jada Builders
Current Architect: Michael Gomes Architects

Completed: Phase I completed in 2013, Phase II currently under construction, 2014

Port Ferdinand Marina and Luxury Condominium Resort is an exclusive residential resort set on 16 acres of land just north of historic Speightstown, Barbados. The resort marina features 120 yacht berths and 83 luxury homes, each with captivating views of the breathtaking Caribbean Sea and a horseshoe-shaped marina.

Preconco Limited, an NPCA member located in Lears Quarry, Lears, St. Michael, manufactured and installed all the precast and prestressed concrete components for the resort’s all-precast concrete superstructure core and shell. The “Cross Wall” construction method uses precision-engineered and factory precast concrete custom components for a more modern and effective building approach.

“After first getting our feet wet with the Port St. Charles Marina in Barbados (over 10 years ago) and again in St. Lucia with The Landings Resort & Residences, we were thrilled with the opportunity to be involved with the development of the Port Ferdinand Luxury Resort & Marina,” Mark Maloney, Preconco Limited CEO, said.

“Given the design and architectural flair of this luxury property, precast was the obvious choice for this project. Precast concrete is an efficient, cost-effective product, which allows for flexibility in design, speedy installations and high quality structures. We are proud to have had the opportunity to highlight precast concrete through the construction of this world-class project.”
CELLULAR ARCHITECTURE: LA TROBE INSTITUTE FOR MOLECULAR SCIENCE, AUSTRALIA

Architect: Lyons  
Builder: Watpak Construction  
Engineer: Meinhardt  
Precaster: Advanced Precast  
Size: 118,000 sq ft  
Completed: 2013

The design by Lyons, an architecture firm in Melbourne, Australia, for the new La Trobe Institute of Molecular Science in Victoria, Australia, is bursting the bonds of typical campus structure geometry.

According to architect Carey Lyon, “The campus master plan dates back to 1968 and the objective was clear – the design of this new building is to break the mold belonging to the decades of the 60s and 70s. Obviously, we gave the façade a visual metaphor for cell research.”

From the 200-mm thick precast external wall, hexagonal precast concrete cells blast out of the structure’s façade to starkly symbolize cell research. And the façade is made all the more dramatic and daring with the use of vibrant colors and wood finishes. Notice that the hexagons are positioned randomly and even offer spaces for students and classes to meet.
When It Has To Be Watertight, Don’t Just Seal It... ConSeal It!

- Stormwater Detention
- Burial Vaults
- Septic Tanks
- Manholes
- Lift Stations
- Tunnels

Technology for Today and Tomorrow for Virtually Any Precast Application

ConSeal
Concrete Sealants Inc.

800.332.7325 www.ConSeal.com
41X: AUSTRALIAN INSTITUTE OF ARCHITECTURE VICTORIA CHAPTER

Architect: Lyons
Contractor: Hickory Group
Precaster: Euro Cast
Engineer: Winward Structures
Size: 307,000 sq ft, 22 floors
Completed: 2014

Developed by the Australian Institute of Architects, Institute 41X is a 22-level, Five Star Green Star strata-titled tower that sits on a small footprint of about 300 sq ft. 41X targets carbon neutrality over its 30-year lifespan — accounting for embodied energy, base building operational energy, transport and waste.

Besides the Institute, 41X offers a rooftop terrace and is home to retail operations, including a café and bookstore. A striking sculptural precast concrete exterior forms a stairway design that, according to Adrian Stanic, director of Lyons Architects, “explores the idea of joining together a public and commercial building by connecting the city street space with the Institute’s occupied levels.”
Sue McCraven, freelance writer and NPCA technical consultant, is a construction engineer and environmental scientist.

THE INTERIOR DESIGN IN PARTICULAR IS WELL SUITED FOR ARCHITECTURAL PRECAST CONCRETE – A STRUCTURAL MEDIUM THAT POSSESSES THE FLUIDITY REQUIRED FOR SEAMLESS CONTOURED DESIGNS.

INTERGALACTIC DESIGN: PROPOSED GUGGENHEIM HERMITAGE MUSEUM, VILNIUS, LITHUANIA
Architect: Zaha Hadid
Project Architects: Thomas Vietzke and Jens Borstelmann
Engineer: AKT
Size: 140,000 sq ft

Zaha Hadid Architects used the latest digital and fabrication technology in its proposed design of the Guggenheim Hermitage Museum in Vilnius, Lithuania. According to the architect, the structure “appears like a mystical floating object that seemingly defies gravity. Curvilinear lines echo the elongated contours of the building, offering an enigmatic presence that contrasts with the vertical skyline of Vilnius’ business district.”

The interior design in particular is well suited for architectural precast concrete – a structural medium that possesses the fluidity required for seamless contoured designs. This futuristic architecture was chosen as the winner in a 2008 international design competition as judged by a panel that included the Guggenheim Hermitage director, Mikhail Piotrovsky and Guggenheim Foundation director, Thomas Krens. If built, the estimated cost of the structure is approximately $80 million.

Sue McCraven, freelance writer and NPCA technical consultant, is a construction engineer and environmental scientist.

References:
More than 7,000 precast elements were used in the main structural system. See the precast structural model for Bella Sky on the NPCA website at precast.org.

1 In masonry architecture, a water table deflects water from running down the building’s face or to the foundation.
Concrete is an incredibly strong and durable building material, and the quality control measures involved with precast concrete only accentuate those characteristics. But, like every other building material, concrete is not invincible. A high quality precast product – with low permeability and a dense matrix – paired with a protective coating, however, will remain protected from detrimental elements and provide the long service life owners have come to love. Before applying a protective coating, though, it’s important to understand the significant areas where concrete degradation can be expected and how to best protect your product.

Reviewed here are four common mechanisms of degradation.

**Acidic reactions**
When concrete is first hydrated, its pH is 12.5 or higher. Exposed to an acid source, with a pH below 7.0, the cement components dissolve and form chloride, sulfate and/or nitrate salts. As the cement paste continues to dissolve, coarse aggregate is exposed which leads to reduced strength and greater porosity. This process continues as fresh concrete surfaces are exposed to more acid – leading to more concrete degradation. Acid resistant types of cement help, but no concrete can resist sustained exposure to flowing acidic conditions indefinitely. It should be noted that pH values do not always correlate to the aggressiveness of an acidic solution in regard to its ability to dissolve cement paste. The aggressiveness of the acid depends on the solubility of the calcium salts formed when the acid reacts with calcium hydroxide. The higher the solubility of the resulting calcium salt, the greater the acidic attack on cement.

Prolonged exposure to acid manifests itself as rust bleeding from corroding reinforcing steel, cracking, exposed coarse aggregate, spalling and a highly weakened concrete matrix.
Alkaline reactions
   Fresh concrete, with a pH between 12-14, is typically unaffected by alkaline solutions unless the solutions are hot. Under sustained exposure, a hot 25% solution of sodium hydroxide may slowly degrade concrete over time and the same is true for hot potassium hydroxide. Under such conditions, the concrete undergoes destructive alkali-silica reactions (ASR). To enhance resistance, use aggregates low in reactive forms of silica, testing them to ASTM C289.

Chloride induced deterioration
   When concrete is placed around reinforcing steel bars, the steel surface initially corrodes, forming a tightly adherent oxide film over the surface to provide protection from further corrosion. The highly alkaline environment maintains this protective film provided it remains free from exposure to moisture, oxygen and chloride ions. If exposed to those elements, the result is the formation of large amounts of iron oxide (rust) being generated from the steel with concurrent expansion. When these expansive forces exceed the tensile strength of concrete, concrete cracks develop. Cracks further perpetuate the cycle and further degradation occurs. Rust bleeding, cracking and spalling are all signs of chloride-induced corrosion.

Sulfate deterioration
   Both naturally occurring and manufactured sulfate products can attack concrete. Such an attack can occur when concrete is in contact with sulfate containing water (seawater, swamp water, groundwater or sewage water). Their exposure to concrete structures causes extremely destructive reactions with hydrated portland cement paste. Over time, if evaporation cycles occur, sulfate concentration increases and cause microcracking, then larger cracking and concrete matrix disintegration. Sulfate attack usually occurs in two stages:
   1. Sulfate ions react with calcium ions in the cement paste forming calcium sulfate (gypsum).
   2. Gypsum and calcium aluminates form calcium sulfoaluminates (ettringite).

<table>
<thead>
<tr>
<th>CHEMICAL AND SECONDARY CONTAINMENT PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial storage holding tanks and wastewater structures associated with chemical and agricultural industries is another area prone to concrete degradation. The following is a list of industries that have concrete degradation exposure:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food and Beverage Industry</th>
<th>Lactic acid exposure from milk products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Citric acid exposure from fruit decomposition</td>
</tr>
<tr>
<td></td>
<td>Acid exposure from wine making operations</td>
</tr>
<tr>
<td>Power Utilities</td>
<td>Sulfuric acid exposure from oxidized sulfur gasses</td>
</tr>
<tr>
<td>Oil and Petrochemical</td>
<td>Hydrogen sulfide, sulfuric acid</td>
</tr>
<tr>
<td>Industrial Wastewater</td>
<td>Sulfuric and hydrochloric acid</td>
</tr>
<tr>
<td>Chemical Manufacturing</td>
<td>Various chemical and acid exposure</td>
</tr>
</tbody>
</table>

In other instances, the chemical may fall into a previous classification and may cause concrete deterioration requiring a protective coating. The chemical may not be detrimental to concrete, but to limit environmental exposure, a coating is applied to contain it. Government regulations, regarding containment of hazardous chemicals, have made it mandatory to coat or line containment systems that have the potential to reach the soil or groundwater.
Both reactions cause cracking and disintegration. When concrete is frequently exposed to sulfates in an environment of cyclic wetting and drying, the concentration of destructive sulfates increases sufficiently to cause rapid concrete deterioration.

Coating considerations and types

Protective barrier coatings are primarily used to protect concrete surfaces from chemical attack, and the entrance of liquids and gases. The coating must be alkaline compatible, and must resist the chemical it will be exposed to. Alkali resistance in coatings has become increasingly important because fast track construction often will not permit a 28-day cure prior to coating.

Understanding and defining actual exposure conditions – chemical type and concentration, duration and type of exposure, wet/dry cycling, and temperature – is critical in selecting the proper coating system. Chemical resistance is a function of molecular weight or crosslink density. Chemical resistance is typically greater with increasing crosslink density. However, flexibility can be lost in the gain for increased chemical resistance.

The three most often used generic coating types include:

- **Epoxies** – Epoxies are two-component systems consisting of an epoxy resin and a curing agent and are known to have good resistance to alkalis and organic acid. The cure rate of epoxies is affected by temperature and should not be applied below 40 F. Many cured epoxies soften above 150 F and are not resistant to ultraviolet light (UV). Epoxy novolacs have a greater crosslink density and an excellent all around resistance to alkalis, acids and solvents. The downside to having a higher crosslink density is they are more viscous, making application more difficult.
Urethanes – There are two general types of urethane coatings: two-component and moisture cure. Mixing a polyisocyanate and a polyol creates a two-component urethane. Moisture-cure polyurethanes are one-component systems that cure by reacting with moisture in the environment. Two-component systems have a greater crosslink density and barrier properties; however, moisture-cure polyurethanes are still widely used since they perform well and offer the convenience of a one-component system. Urethanes perform best when applied on dry concrete as water can interfere with cure and film formation.

Acrylics – Acrylic coatings will not attain the crosslink density of epoxies or urethanes but do offer chemical resistance in many situations. They are UV resistant and are available in lower volatile organic compound content (VOC) than alternative systems. In recent years, self-crosslinking acrylic coatings have emerged within the acrylic family, which provide a higher degree of crosslinking and improved resistance properties.

Other protective coating options include:
- Polyureas
- Polyaspartics
- Polymer fortified concrete overlays
- Polyesters and vinyl esters

Coatings are not a guarantee of 100% success in protecting from detrimental elements. However, coatings significantly reduce the contact between the concrete and potentially damaging substances. Coatings used to protect concrete against water and aqueous chemical solutions should have a very low water transmission rate (MVT). This is particularly true for immersion grade coatings or secondary containment coatings. ASTM E96, Test methods for Water-Vapor Transmission of Materials, gives one such way of evaluating coating permeability.

Tim Frazier is technical director of Concrete Sealants Inc. He has been involved with coating-related products for 27 years and with concrete coatings for the past 20 years. Frazier holds a bachelor’s degree in chemistry from Wilmington College, and a master’s degree in chemistry from Wright State University.

Resources:
ICRI Guideline No. 03732. Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays; ICRI, Sterling, VA.
Randy Nixon, The Fundamentals of Cleaning and Coating Concrete, SSPC: The Society for Protective Coatings, Pittsburgh, PA.
On a warm spring day in 2008, the NPCA Board of Directors joined to discuss the growth of the association and precast concrete industry. One topic all members present touched on was sustainability, so a task force was assigned the job of leading the association through uncharted waters.

Much has happened since that spring day. The task force is now known as the Sustainability Committee, a Life Cycle Analysis (LCA) of precast concrete was commissioned and completed, NPCA members use a LEED calculator and other documentation to help designers obtain LEED points and educational courses are taught at NPCA events. And to spotlight companies who adopted sustainable practices and recognize the associated benefits, the NPCA Sustainability Awards were formed in 2012.

Here is the list of The 2013 Sustainability Award winners. The awards are divided into four categories: producer plant, producer project, associate plant, and associate product.

To see complete descriptions of the winning projects and honorable mentions, visit precast.org/awards.

**PRODUCER DIVISION**

**FIRST PLACE PROJECT**

**Company:** Smith Midland Corporation – Midland, Virginia  
**Project:** Nelson Harvey Facility, Johns Hopkins Medicine Campus  
**Location:** Baltimore, Maryland

After decades of wear, the hand-laid brick envelope of the nine-story Nelson Harvey facility on the Johns Hopkins Medicine Campus in Baltimore began failing. Architects needed a solution that met two criteria: a system lightweight enough to prevent any need for additional superstructure or foundation costs, and the facility needed to stay operational during the exterior renovation.

The Smith-Midland SLENDERWALL system met both requirements by allowing for the recladding to take place without removing the old fascia. The project included 158 SLENDERWALL panels with an Endicott brick facing, maintaining continuity with the original exterior. Smith-Midland also applied its closed-cell “H20ut” foam insulation sealant to the panels. These options will provide savings in time and on-site trades, and insurance against air and water infiltrations. The project is to be certified under Baltimore City’s Green Stars Program, which is an equivalent to LEED silver.

**FIRST PLACE PLANT**

**Company:** Shea Concrete Products – Amesbury, Massachusetts  
**Project:** Solar Power Panels on Precast Plant  
**Location:** Amesbury, Massachusetts

Shea Concrete went solar in the summer of 2013. The Shea facility in Amesbury powered up on Aug. 30 with a new, American-made, $1.4 million solar panel system installed on the roof of the plant. The 1,184 SunPower solar panels will produce an estimated 421,000 kw-hours per year. This makes Shea Concrete a Net-Zero electrical energy consumer, meaning that the solar panel system generates enough electricity to fully power the Amesbury location without the need for additional energy from the grid.
Partnerships to Build a Sustainable Tomorrow

Meeting the construction needs of today and tomorrow requires a connected approach. By creating one global brand for the construction chemicals industry, we are combining the leading expertise and innovative strength of BASF brands with more than a century of experience under one roof. Master Builders Solutions. We are dedicated to partnering with our customers to help them succeed in solving the most challenging construction applications, all while minimizing environmental impact and saving resources.

www.master-builders-solutions.basf.us
For careers at BASF please visit http://jobs.basf.us/
requiring any additional sources of electricity. The panels, which are American Recovery and Reinvestment Act (ARRA)-compliant, harvest an output that is on average 7% better than other panels annually and 20% more productive over the 25-year life of the system.

HONORABLE MENTION – PRODUCER PROJECT
Company: Northeast Precast LLC – Millville, New Jersey
Project: Bimbo Bakeries – Thin Wall Panels
Location: New York, New York
The project saw integration of architectural and structural design into a lightweight sustainable panel system made up of sandwich and solid panels. The owners saw the advantages of this system with the elimination of the outermost steel columns, insulation value, additional square footage and the enhanced life cycle of the building.

HONORABLE MENTION – PRODUCER PROJECT
Company: Northeast Precast LLC – Millville, New Jersey
Project: Boardwalk Casino and Townhouses
Location: Sea Isle City, New Jersey
This was a total precast sustainable solution for post-Sandy construction on the Jersey shore. This project was made up of sandwich panels, solid panels, NEP floor plank, columns, precast elevator shafts, inverted tee beams, double tees and other custom precast shapes and sizes. This building will not only be energy efficient and durable, but also resilient in the face of storms in the future.

HONORABLE MENTION – PRODUCER PLANT
Company: Reading Rock Inc. – Cincinnati, Ohio
Project: Concrete Recycling Process
Location: Cincinnati, Ohio
Today, recycling concrete by “crushing” the material is part of Reading Rock, Inc.’s manufacturing process. However, nearly five years ago, trucks would haul the waste to a local dump site, which was costly and not environmentally responsible. In 2009, Reading Rock purchased a crusher to allow concrete materials to be ground down for reuse. In just over 36 months, Reading Rock saw a return on investment and has continued to see positive results over the past several years.

ASSOCIATE CATEGORY
FIRST PLACE PRODUCT
Company: The Euclid Chemical Company – Cleveland, Ohio
Product: Tuf-Strand SF Macro-Synthetic Fibers
Location: Cleveland, Ohio
The building sector is a major contributor to the carbon dioxide footprint in any developed community. One way scientists refer to this footprint is by describing carbon dioxide equivalents or CO2eq.
An important way to decrease the CO2eq associated with building practices is to use materials that have a smaller carbon footprint. Polypropylene fiber reinforced concrete (PFRC) is a versatile and high-performance material suited for concrete construction. The Euclid Chemical Co. recently partnered with the University of Akron in a research study to establish the benefits and potential reduction of CO2eq when using TUF-STRAND SF macro-synthetic fibers in concrete. The results of the study indicated that the use of polypropylene fibers reduced the CO2eq emissions by 56% compared with steel reinforcement. This analysis can be carried over to applications within the precast concrete industry to help reduce CO2eq.

FIRST PLACE PLANT
Company: The Euclid Chemical Company – Cleveland, Ohio
Product: Tuf-Strand SF Macro-Synthetic Fibers
Location: Cleveland, Ohio
The Euclid Chemical Co. continues to recognize that sustainability drives company success and employee satisfaction. Over the past several years, multiple projects have been deployed at Euclid’s manufacturing facilities throughout North America to improve metrics on waste management, energy consumption, water use and safety. These initiatives are communicated to the company’s employees and customers to demonstrate its commitment to being a good neighbor and a
respected business partner. Recognizing that sustainability is a process, Euclid promotes the foundational values of “people, plant and prosperity,” where the social, environmental and economic factors of day-to-day business are blended into the global and political arena. The company has instituted a variety of programs to trim waste and curb energy use and established a Sustainability Leadership Team to track energy consumption and improve efficiency at its plants.

**HONORABLE MENTION – ASSOCIATE PRODUCT**
**Company:** W.R.. Grace – Cambridge, Massachusetts  
**Product:** Airtrac Air Management Technology

Sustainable structures must be durable, and it is well established that freeze-thaw durable concrete requires proper levels of entrained air, but high variability of air content batch is a vexing quality control problem. AIRtrac, a breakthrough technology, allows a step change in the ability to keep air levels within specified limits while saving time vs current practice.

**HONORABLE MENTION – ASSOCIATE PRODUCT**
**Company:** Hamilton Kent, LLC – Toronto, Ontario  
**Product:** Watertight Box Culvert Joints

A total of 256 pieces of box culvert made by American Concrete will eliminate CSO discharges to the Kennebec River and Bond Brook. The watertight box culvert joints were sealed with the Tylox Super Seal rubber gasket manufactured by Hamilton Kent LLC. This will keep wastewater out of environmentally sensitive areas, and significantly reduces the amount of storm water entering the wastewater treatment plants.

**HONORABLE MENTION – ASSOCIATE PLANT**
**Company:** Hamilton Form Company – Forth Worth, Texas  
**Product:** Improving Sustainable Manufacturing Processes

Hamilton Form began developing a more sustainable facility and manufacturing processes in 2009. The efforts include an insulated and coated roof skylight, roof fans and energy efficient lighting. In addition, the company began recycling steel, paper, bottles and cans.

If you are interested in submitting an application for the 2015 Sustainability Awards. Please go contact Claude Goguen, Director of Sustainability and Technical Education, at cgoguen@precast.org.

Claude Goguen, PE., LEED AP, is NPCA’s director of Sustainability and Technical Education.
Meet the NEW Precast Inc. Editor:
Sara Geer

Greetings!
As the new editor of Precast Inc., I feel a little like the captain of a ship—sailing to discover new treasures with a good idea of where we are and a vision of where we can go.

I joined NPCA in May as a journalism and communication professional with a multimedia background and plan to bring those skills to this publication and all member communications. Precast Inc. has highlighted and discussed the latest and most important topics within the precast concrete industry for many years. It’s my mission to maintain that critical content while helping Precast Inc. grow by providing additional:

• ADVICE from leading voices in the precast concrete industry.
• ENHANCEMENTS that will more deeply integrate the magazine and our website, precast.org, with added videos, blogs and interactive resources for NPCA members.
• EXCLUSIVE information and material you can’t get anywhere else.

However, I cannot sail alone! I need your regular feedback, article ideas and suggestions so we can make the magazine even better together. Please do not hesitate to contact me with your thoughts or even to say hello! I can be reached at sgeer@precast.org or (800) 366-7731.

Founder Remembered
Former Chairman, Yoakum Awardee Douglas G. Hoskin, 89, Passes

NPCA is saddened to learn that Douglas G. Hoskin, one of the founding members of the association, passed away on Thursday, June 5, at Parkwood Hospital in London, Ontario. A professional engineer, Hoskin was president of a concrete step manufacturer in Ontario, Unit Step Woodstock, when he was among a group of visionary producers and suppliers who helped establish the National Precast Concrete Association in 1965. Hoskin served in a variety of capacities with the fledgling association and then served as NPCA chairman of the Board in 1973.

Hoskin is one of two NPCA founders who have been honored by NPCA with annual awards in their name. The Douglas G. Hoskin Award is presented during the Chairman’s Banquet at the Annual Convention to the member who has sponsored the most new members in the previous year. NPCA presented Hoskin with the other founder’s award, the Robert E. Yoakum Award, in 1967. He was the first recipient of the Yoakum Award.

Ron Hyink-retires after 13 years

After 13 years as the managing editor of Precast Inc. and Precast Solutions magazines, Ron Hyink retired on May 31. Ron came to NPCA after a career in the U.S. Air Force, and the military’s loss was the precast industry’s gain. Ron provided an expert editing eye for all NPCA publications during his tenure, and he is now settling into his new life of leisure as NPCA’s first retired employee. Congratulations Ron!

Looking for Precast Plants to Test New Sustainability Program

The Sustainability Committee is looking for 10 precast plants across North America to volunteer to test a new Microsoft Excel-based program. This program can calculate three environmental impact factors: global warming potential, primary energy consumption and water use. The software enables plants to benchmark themselves and measure progress.

This pilot project requires no financial commitment. Users will be trained via webinar and provided with continual support during the 12-month test period. Entering data should be simple and the results could be very helpful to any plant operator who wants to increase efficiency, lower operating costs and decrease the plant’s impact on the environment. Plant data will be kept completely confidential.

Interested? Contact Claude Goguen, director of Sustainability and Technical Education at (317) 582-2328 or at cgoguen@precast.org for more information.

NPCA welcomes new staff member Catherine Lewis

Catherine Lewis started at NPCA earlier this year to aid member services. She will now use her communication and organizational skills to manage the membership database, new member processing and all member/non-member inquiries.

Lewis earned her journalism degree from University of Southern Indiana in Evansville, Ind. Before coming to NPCA, she worked for a brokerage firm as a transportation sales representative. She’s excited to be in her new role.

In her spare time, Lewis enjoys spending time with her husband and reading.

She can be reached at clewis@precast.org or (800) 366-7731.
Challenge Question and Answer from the May/June issue:

**Question:** A structure in your yard is scheduled to ship within the next month. You find a crack on the structure. After having determined the extent of the repair, what major factor would influence your choice of repair material?

**Answer:** Below are a few factors that should weigh in your answer.

1. **Is the crack dormant or active?** Will the sealant need to be flexible or rigid? Using a rigid epoxy to fix a crack can sometimes cause a crack to form adjacent to the repair. If stresses in the structure exist that exceed the concrete capacity, it will form its own expansion joint by cracking.

2. **Where is the crack located?** Is it on a vertical or horizontal surface? Is it near an edge?

3. **What does the project specify in terms of repair material?** Many projects contain directions on repair materials. If none is available, consult with the owner for an approved product list. Your plant should also have approved methods and materials in the event the owner defers to you for a decision.

4. **What exposure will the repair material be subject to?** Foot traffic, vehicular traffic, deicing chemicals, and/or cold or wet conditions?

5. **And finally, aesthetics play a role.** Is this an exposed architectural piece that requires a color match? Or, will the structure be buried underground?

Products on the market for crack repair are manufactured to address these factors and are sold in different colors and textures.

**THINK YOU KNOW YOUR STUFF?**

Take the challenge and answer the following question. Send your response to cgoguen@precast.org and if yours is the correct answer chosen, you will get one free admission to one of our 60 minute webinars being presented in 2014. We will accept one answer per person. Good luck!

**CHALLENGE QUESTION:** Calculate the location of the center of gravity of the following structure:

![Diagram of a structure](image)

**CONGRATULATIONS TO JOE ZACHARA FROM CONCRETE IMPRESSIONS OF FLORIDA!**

Joe wins a complimentary webinar registration for any of the remaining five – 60 minute webinars scheduled for 2014.
Imagine entering a busy bakery in New York City on Christmas Eve. The shop is lively with customers clamoring for last-minute holiday cookies, cakes and pastries. Despite all of the shouting and commotion, your mind is targeted on only one thing: the wonderful assortment of smells.

The human sense of smell is amazing. In fact, people can recall scents with 65% accuracy even after a year. It’s no wonder, then, that many of us associate smells with important events or emotions from our past. For Irene Kurtz, an NPCA Foundation (NPCAF) scholarship recipient currently attending the University of Notre Dame, one particular smell stands out from the rest.

“It’s a strange thing, but I love the smell of concrete,” Kurtz said.

Kurtz’s appreciation for concrete and its scent originated with her father, a professor of structural engineering at Lafayette College. As a child, Kurtz recalls spending plenty of time with her dad, zipping and darting through the engineering labs at various state universities. These opportunities allowed Kurtz to quickly develop both her love of the smell of concrete and a tremendous appreciation for the engineering field.

“I grew up at college,” Kurtz said. “I’ve seen the research side and the hands-on side, which is why I’m so interested in engineering and structural engineering.”

Prior to entering college, Bernard Soluta, a project manager at Bethlehem Precast and friend of the Kurtz family, spoke with Kurtz about the opportunities available in the engineering field. During their discussions, Soluta suggested applying for the NPCAF scholarship, something for which Kurtz said she is forever thankful. “I’m so glad Mr. Soluta reached out to me and suggested I apply,” Kurtz said. “It’s been such a huge help and it has been so great. Whenever I receive the scholarship in the mail, I always email him saying ‘thank you’ because I am so grateful.”

Though Kurtz began her academic career at Lafayette College, she recently decided to seek new opportunities by transferring to Notre Dame. This transition was accompanied by a switch in majors, with Kurtz shifting from civil to chemical engineering. Kurtz stressed that the decision was made possible thanks to the support of the scholarship. “Switching majors – even as only a sophomore – is a huge leap,” she said.
“One of the reasons I was so interested in initially applying for the scholarship is because of how green precast concrete is. A lot of people don’t think that concrete and engineering are sustainable, but they really are.” – Irene Kurtz

“It has helped so much with books, and now I’m staying at Notre Dame over the summer for research. That’s only possible because of the funding from the scholarship.”

Kurtz’s research allows her to focus on her interest in green energy. Over the summer, she will continue her work on making industrial practices more sustainable through reducing the amount of heat required for chemical reactions to take place.

Ultimately, Kurtz explained that her goal is to help the environment and the world’s population by adhering to green engineering processes, something which can be accomplished through the use of precast concrete. “One of the reasons I was so interested in initially applying for the scholarship is because of how green precast concrete is,” Kurtz said. “A lot of people don’t think that concrete and engineering are sustainable, but they really are.”

With a strong work ethic and the support of the NPCAF, Kurtz continues to strive toward establishing a more sustainable world. With any luck, that world will be powered by the durability, strength – and, of course, smell – of concrete. ☑

Mason Nichols is NPCA’s external communication and marketing manager

Reference:

1 http://www.mirror.co.uk/lifestyle/health/20-fascinating-facts-sense-smell-1977351
Oldcastle Manufactures Record-Length Precast Concrete Girders

Oldcastle Precast-Perris, California, has manufactured the largest and heaviest precast/prestressed concrete super girders the California Department of Transportation (CALTRANS) has ever set and placed for a bridge undercrossing. General Contractor Security Paving, located in Sylmar, California, contracted Oldcastle to produce 20, 158-ft-long super girders for the Norwalk-San Antonio Bridge undercrossing section of the $1.6 billion Santa Ana Freeway South Corridor Improvement Project.

The super girders contain a wide flange beam design and are 8,500 psi in compressive strength. The bridge is being constructed in three stages and is comprised of prestressed girders supported by cast-in-place abutments. The beams have facilitated decreased construction time, improved structural performance and cost saving advantages.

The entire project extends nearly seven miles from the Los Angeles County/Orange County line to I-605 to widen the freeway, bridges and overcrossings adding one High Occupancy Vehicle (HOV) lane and one general purpose lane. Project completion is scheduled for late 2015.

CALTRANS CONSTRUCTION CREWS WORKED AT NIGHT TO PLACE 20 PRECAST/PRESTRESSED CONCRETE SUPER GIRDERS FOR THE NORWALK-SAN ANTONIO BRIDGE UNDERCROSS.
The Project:
The original Frederick Avenue Bridge in Baltimore was a two-span concrete arch design built in 1930. In keeping with the historical character of the area, the replacement bridge is a two-span prestressed concrete structure designed to imitate the original bridge.

The Challenge:
Northeast Prestressed Products, LLC in Cressona Pennsylvania is supplying the precast elements for the project, including 12 arched sections assembled to create 2 arches on each side of bridge replicating the look of the original double arches.

The Solution:
To cast the beams, Hamilton Form fabricated a soffit that is 44' long and curves to a 52'/6" radius. To form the radius, the understructure material was cut with a high-definition plasma cutter to hold tight dimensional tolerances.

The Results:
Just like the quality of the precast product is dependent on the form it's cast in, the quality of a curved soffit depends on the understructure. The accuracy of the understructure allowed the skin to be easily welded in place. The resulting product is stunning.

When your project calls for innovative, flexible formwork solutions. Call on Hamilton Form. 817 590-2111 or sales@hamiltonform.com

Hamilton Form Company, Ltd.
7008 Midway Road • Fort Worth, Texas 76118
Custom forms. Custom equipment. Practical solutions.
BASF introduces new packaging for MasterFiber MAC Matrix product

BASF’s Construction Chemicals division based out of Cleveland, Ohio, released in May new packaging for its Master Builders Solutions brand MasterFiber MAC Matrix macrosynthetic fiber.

The packaging condenses the fibers in an aligned format, improving their dispersion in the concrete mixture. The enhanced dispersion reduces balling, impacting placement, screeding and finishing operations during concrete production and placement. In addition, the aligned fibers prevent individual fibers from curling or tangling prior to use.

Another benefit of the new packaging size includes the ability to add unopened bags directly into the concrete mixture. The condensed size provides freight and distribution efficiencies and reduces storage requirements for concrete producers.

MasterFiber MAC Matrix is primarily used as a secondary reinforcement in slab-on-ground applications, precast elements and composite metal decks. For more information, visit master-builders-solutions.basf.us.

McNamee rejoins Besser Company sales team

Terry McNamee has rejoined the Besser Co. sales team as a regional sales manager in May.

McNamee brings more than 30 years of sales experience having started his career working with architectural products in 1982. His passion for supporting customers and in-depth knowledge of the concrete products industry is what initially led him to join the Besser sales team in 2006.

He returns to cover the northeast region of the U.S. alongside current employee Randy VanSickle to allow more time to effectively support the company’s existing customers.

McNamee can be reached at (215) 205-5600 or via email at tmcnamee@besser.com.

Besser Company reveals new logo, website

Besser Company has unveiled a new logo and website to recognize several milestones celebrated in 2014, including 110 years of business in the concrete products industry and 60 years of industry education.

The logo incorporates the original 1960s globe design to represent the company’s global presence. The tagline “trusted since 1904” was also added to acknowledge Besser’s longevity in the industry as a leader for quality concrete products, equipment and parts for masonry, hardscape, pipe and precast.

In addition, the website is designed specifically with customers in mind. The site is compatible with all browsers, tablets and mobile devices making content easier to navigate and share. The site features concrete products, equipment, technical support materials and educational opportunities.

For more information, visit www.besser.com.

Cresset develops water-based release agent

Cresset Chemical Co., a manufacturer of release agents based in Weston, Ohio, has advanced its original Crete-Lease 20-VOC-Xtra Release Agent for use on high-profile architectural and decorative concrete applications.

The non-toxic, non-flammable product is water-based and meets EPA’s allowable VOC (volatile organic compounds) amount. The proprietary blend is comprised of a blend of vegetable and mineral oils in water that contains no waxes, silicones or carcinogens.

Crete-Lease 20-VOC-Xtra permits easy, stain-free removal of forms and formliners from hardened concrete while reducing bug holes on the concrete surface.

The product has been used on high-profile projects such as the lion relief at the MGM Grand Hotel in Las Vegas and the decorative floodwalls recently constructed in New Orleans.

For more information, visit cresset.com.

Lafarge North America sponsors National Building Museum exhibition

Lafarge North America announced it is the lead sponsor for Designing for Disaster, a new year-long exhibition held at the National Building Museum in Washington D.C.

The exhibition, open to public viewing now through Aug. 2, 2015, will discuss disaster mitigation and highlight tools and strategies for building safer, stronger and more resilient communities that are both functional and beautiful.

Through the use of graphics, multimedia and video testimonials, the exhibition will explore new solutions for a range of natural hazards including earthquakes, tornados, hurricanes, storm surges, flooding, sea level rises, tsunamis and wildfires.

To compliment the exhibition, the National Building Museum and its partners have planned a full slate of public programming. Topics include the effects of hurricanes in urban areas,
the Rebuild by Design project that hopes to revitalize the region affected by Hurricane Sandy, the rising waters of the Chesapeake Bay and the importance of resilient landscapes.

For more information about the public programming and exhibition, visit www.nbm.org.

**Anchor announces three recent promotions**

John Tait, general manager for the Kingston, Ontario, Anchor Concrete Products Limited and Anchor Rebar Supply Inc., has been named president of both operations, Jeff Bradfield, chief executive officer, announced.

Tait has been with the company since 2002, starting as a controller. His promotion is part of a growth plan that ensures the companies maintain the needs of Anchor’s customer base and varied product lines.

In addition, Roy Baron, who has been controller, was promoted to vice president of finance. And Jude Trembley, who has been sales and marketing manager, was promoted to vice president of customer service.

Trembley will oversee customer service in the engineering and shipping and sales departments.

Visit anchorproducts.com for more information.

**Spillman Company expands magnet product line**

Spillman Company has introduced two new Button Magnet Adapters to be used with the 1 and 2 1/2 ton EZY-STRYP button magnets. The adapters are designed to provide a wide range of magnet applications for when precasters use a variety of forming materials on steel casting tables.

Spillman offers a complete line of EZY-STRYP magnets and magnet products designed specifically for the precast concrete industry.

Spillman, located in Columbus, Ohio, manufactures custom steel forms for the precast concrete industry. In addition, Spillman also sells a wide range of plastic rebar accessories and protective devices, air and electric internal and external vibrators, EZY-STRYP® magnetic clamping devices, and production hardware and accessories.

For more information, contact (614) 444-2184 or visit www.spillmanforms.com.

**Molenaar introduces European product to North America**

Molenaar North America, an American subsidiary of Molenaar Betonindustrie located in the Netherlands, has released a new product to the North American market.

The company’s concrete spacers are made of high performance concrete to maintain the material integrity of the concrete cover. Because they are made out of concrete, the spacers bond with the surrounding concrete and also have the same thermal expansion and do not leave gaps which leads to enhanced durability of the final product.

Molenaar’s concrete spacers are available in various mix designs and in colored concrete. The concrete spacers are engineered to be nearly invisible to fit all types of precast products. The concrete spacers can be fixed to the rebar in various ways including the MoClip, MoStek or steel wire.

For more information, please contact info@molenaar-americas.com or visit www.molenaar-americas.com.

---

**Increasing Profitability is as easy as ...**

Our mixers are the building blocks at the heart of successful concrete producers in North America. Their increased profitability and impressive ROI provides that all-important competitive edge.

Contact us to learn more. It’s as easy as A, C, T.

**Advanced Concrete Technologies**
American division of Wagener Co. and Würschum

Congratulations to Shea Concrete

603.431.5661 · www.concretebiz.com
<table>
<thead>
<tr>
<th>Meeting</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPCA 49th Annual Convention</td>
<td>Le Centre Sheraton Montreal – Montreal, Quebec</td>
<td>Oct. 22-25, 2014</td>
</tr>
<tr>
<td>The Precast Show 2015</td>
<td>Orange County Convention Center – Orlando, Florida</td>
<td>March 5-7, 2015</td>
</tr>
<tr>
<td>The Precast Show 2018</td>
<td>Hyatt Regency Denver – Denver, Colorado</td>
<td>Feb. 22-24, 2018</td>
</tr>
</tbody>
</table>

For the most up-to-date information about NPCA events, visit [precast.org](http://precast.org).

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered; however, National Precast Concrete Association and Precast Inc. magazine act as mediators without approving, disapproving or guaranteeing the validity or accuracy of any data, claim or opinion appearing herein. Information is provided and disseminated with the understanding that the National Precast Concrete Association and Precast Inc. magazine are not engaged in rendering engineering, legal or any other professional services. If engineering, legal or other professional assistance is required, the services of a competent professional should be obtained. National Precast Concrete Association and Precast Inc. magazine do not assume and hereby disclaim liability to any person for any loss or damage caused by errors or omissions in the material contained herein, regardless of whether such errors result from negligence, accident or any other cause whatsoever.

Acceptance of advertising does not imply NPCA’s endorsement of the product. NPCA reserves the right to reject advertising copy and does not accept responsibility for the accuracy of statements by advertisers.

Advanced Concrete Technologies Inc. .................. 45
BASF ............................................ 35
Besser .......................................... 19
Cleco Manufacturing .................................. 13
CNA ............................................. 3
Concrete Sealants Inc. ................................ 27
Euclid Chemical Co. .................................. 37
Formcrete Fiberglass Products Inc. .................... 31
G&K Services ..................................... 33
Gensco .......................................... 41
Haarup North America .................................. IFC
Hamilton Form Co. .................................. 43
M.A. Industries .................................... 12
Meadow Burke ...................................... 32
New Hampton Metal Fab. ................................ 9
Oklahoma Steel and Wire ................................ 41
Pennsylvania Insert Corp. ............................. 46
RoMix Inc. ........................................ 17
Spillman Company ................................... BC
Strike Products ..................................... 42
Tucker’s Machine & Steel Service Inc. ................. IBC

800.220.4857

w w w. p e n n s y l v a n i a i n s e r t . c o m

Inserts, hex nut inserts, pulling irons, pi pockets & lids, sumps, duct terminators, bolt pocket formers, access hatches, ladders, shiplap pallet.
CUSTOM FORMS

and

CUSTOM ENGINEERED PRODUCTS

Design/build services for your unique needs

TUCKER'S
MACHINE & STEEL SERVICE, INC.
TUCKERBILT.COM
352-787-3157
P.O Box 492810 • Leesburg, FL
WE WANT TO FORM A QUALITY PARTNERSHIP WITH YOUR COMPANY

PRODUCT FOCUS

MEDIAN BARRIERS

Spillman has been serving the needs of the concrete products industry since 1948. We offer a complete line of custom steel forms, plastic spacers & slab bolster, and EZY-STRYP® magnetic clamping devices.

1701 Moler Road • P.O. Box 07847 • Columbus, OH 43207-0847
Phone 614.444.2184 Toll-free 800/44-FORMS
Fax: 614.444.1231 • www.spillmanform.com