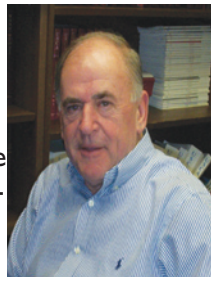
Winter 2010

THE CONNCRETE TIMES

The Connecticut Concrete Promotion Council (CCPC) of the Connecticut Ready Mixed Concrete Association
912 Silas Deane Hwy., Wethersfield, CT 06109 | http://ctconstruction.org | 860. 529. 6855 | fax: 860. 563. 0616

DIRECTOR'S MESSAGE



This winter edition marks CONNCRETE TIME's first year of publication. The construction marketplace has been very receptive to our newsletter and we look forward to a continued expansion of our mailing list. The CCPC workshops featuring pervious concrete and concrete fundamentals has generated increased market awareness and a desire to learn more about our incredible construction material.

The Metropolitan District Commission (MDC) has signed on to the National Ready-Mixed Concrete Association webinars outlined by Mr. Doug O'Neill's articles in the newsletter. A webinar featuring pervious concrete will lead to educational workshops in the spring for the MDC.

The CCPC has been anxious to provide assistance to the construction marketplace and the newsletter has been focusing on the unique qualities of a CCPC membership. This edition is no exception with the front page article featuring volumetric concrete mixers. The CCPC is fortunate to have many of the Connecticut "square truck" producers as members. Their membership is welcomed by the ready-mixed concrete producers as an integral part of the concrete marketplace.

All the best,

Jim Langlois

ON THE CONCRETE SCENE

VOLUMETRIC CONCRETE TRUCKS: IT'S HIP TO BE SQUARE!

From Donald Mullin
Concrete Express, Inc., Salem, CT

The Mobile Mix Concrete method, technically called Volumetrically Mixed Concrete, was invented in the 1960s by Irl Daffin. Performing as a batch plant on wheels, these machines produce high-quality, volumetrically proportioned concrete via a chain or belt driven system with adjustable gates set for the required design mix. Admix chemicals and fiber reinforcement can be added before it is mixed in a screw auger and discharged as fresh concrete. Multiple mix designs and slumps can be accomplished at the same jobsite with a few calibrated adjustments. Volumetric trucks operate under the ASTM C-685 standard for volumetric mixers as well as ACI's 304.6R-91 specifications. Each mobile is also certified and plated by the Volumetric Mixer Manufacturer's Bureau.

Volumetric concrete trucks primarily focus on two specific markets; small yardage concrete and specialty concrete pours. In Connecticut, these trucks serve the needs of the homeowner or contractor that requires a "small pour," three yards or less of concrete. With ten such companies in business in the state today, mobile mix trucks can fill the need for these jobs quickly, efficiently, and with no waste. Customers enjoy the concept of paying only for what they use and not having to deal with any wasted product. Typical jobs would be things like deck footings, sidewalks, oil tank slabs, and pool repairs. Unique jobs have ranged from providing ballast for the Amistad and other sailing vessels, to traveling out by barge and performing repairs on a lighthouse in the middle of the ocean. Since all materials are loaded on the trucks "dry", we are capable of delivering to emergency jobs or

Continued on inside back cover

CCPC PROFESSIONAL MEMBERS

A. Aiudi & Sons
American Concrete Pumping
Barker Steel Co. Inc.
Barnes Concrete
BASF
The Beard Concrete Co.
Castle Concrete
CECO Concrete Construction
Concrete Anytime
Concrete Connections
Concrete Crafters of CT. Inc.
Concrete Express Inc.
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Corsetti Construction, Inc.
Devine Brothers Inc.
Doka, USA, Ltd.
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F&F Concrete
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A. H. Harris & Sons Inc.
Headwaters Resources
Holcim USA
IMTL, Inc.
Jolley Concrete & Block
Kobyluck Ready-Mix Inc.
LaFarge North America
Lehigh Cement Company
Martin Laviero Contractor Inc.
Manafort Brothers
Materials Testing Inc.
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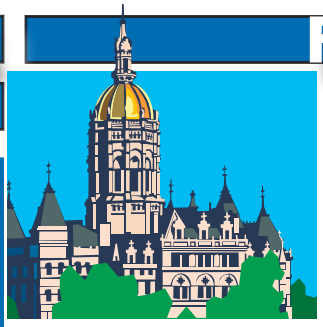
Modern Concrete Pumping
Mongillo Foundation Co. Inc.
JJ Mottes Co. Inc.
Myers Associates
Norlite Corp.
Northeast Solite Corp.
O'Dea Concrete Products Inc.
O&G Industries Inc.
H. O. Penn Machinery Co. Inc.
Propex Concrete Systems
Purinton Builders Inc.
RJB Contracting, Inc.
Short Load Concrete LLC
Sika Corporation
Spiegel, Zamecnik & Shah
L. Suzio Concrete Co. Inc.
Terracon
Tilcon Connecticut
Wheaton Mobile

FOR THE RECORD



AT THE CAPITOL: Despite Winter Storms, Legislation Moves Ahead

from Matthew Hallisey
CCIA Director of Government Relations & Legislative Council

A major Nor'easter may have shut federal government offices for several days in early February, but the snowstorm did not stop regulators in the nation's Capital from developing new rules affecting concrete production and the construction industry.

The Environmental Protection Agency proposed tightening National Ambient Air Quality Standards for Ozone, which could jeopardize highway funds. The current standard, from 2008, is .075 parts per million (ppm). EPA is proposing a level between .70 and .60 ppm. EPA's own data show the transportation sector has significantly reduced ozone emissions over the past several decades - without tighter federal standards, which ignore the public safety and health consequences that would result from the accompanying denial of highway improvement in areas that fail to meet the new standard.

Some state environmental regulators have urged EPA to proceed slowly with the rollout of proposed federal rules curbing industrial greenhouse-gas emissions, arguing that they lack funding to regulate the emissions and that the administration's approach could delay construction projects, overwhelm them with paperwork and undercut their own efforts to fight climate change. The California Energy Commission, in a letter to EPA, said the proposed rule would cause "gridlock" on the construction of new power plants. One EPA proposal scheduled to take effect in the spring would require facilities emitting at least 25,000 tons of greenhouse gases a year to obtain construction and operating permits. EPA is reviewing the comments and no decision has been made about the final rule.

Proposed EPA rules that would treat coal ash and other coal by-products as hazardous waste are being reviewed by the Office of Information and Regulatory Affairs within the White House Office of Management and Budget, upsetting some environmental groups, according to *The Wall Street Journal*. The office has conducted meetings with industry groups since October to discuss the potential impact of the proposed rule. EPA has yet to publish the regulation, which would trigger public comment and hearings. EPA Administrator Lisa Jackson submitted the proposed rule to OMB for review in September, promising to issue her decision on the matter by the end of 2009. But last month, in the wake of the meetings with the regulatory affairs office, EPA said it was delaying its decision "due to the complexity of the analysis" required. Industry groups believe an adverse EPA ruling could jeopardize the use of coal ash in construction materials such as concrete.

Meanwhile, at the state Capitol in Hartford, a $600 million budget deficit for the current fiscal year and declining revenues confronted lawmakers who began a three-month legislative session in what is expected to be an unusual election year.

SUSTAINABLE CONCRETE THROUGH INTERNAL CURING

From
Bill Wolfe, Norlite Lightweight Aggregate
Ralph Acampora, Northeast Solite Corp.
and Joe Kowalewski, Norlite Lightweight Aggregate

WHAT IS INTERNAL CURING (IC)?

Internal Curing refers to the process by which the hydration of cement occurs because of the availability of additional internal water that is not part of the mixing water. (ACI-308)

For many years we have cured concrete from the outside in; internal curing cures concrete from the inside out. Internal curing is supplied via internal reservoirs, such as absorbent lightweight aggregate, which has been pre-saturated.

WHY DO WE NEED INTERNAL CURING?

As concrete evolves from conventional design to high performance design the concrete utilizes lower water/cement ratios. Particularly in high performance concrete (HPC) it becomes increasingly difficult to provide curing water from the top surface that is adequate to satisfy the ongoing chemical shrinkage. At this time the cement paste is searching for water. Without adequate water, stresses develop that can lead to chemical shrinking, autogenous shrinkage, early age cracking and micro-cracking. Internal curing can eliminate or largely reduce these detrimental conditions improving the quality, life expectancy, and sustainability of the concrete.

HOW DOES INTERNAL CURING WORK?

Research and development has shown that presaturated lightweight aggregate sand (LWAS) distributes the additional curing water uniformly throughout the entire concrete microstructure. It is now possible to maintain adequate saturation of the cement paste during hydration. This prevents self-desiccation, micro cracking and autogenous shrinkage. It also improves the later age characteristics of the concrete by keeping the internal relative humidity high. This increases later age strength and improves dimensional stability through reduced shrinkage and warping.

Figure 1 shows a lightweight aggregate particle

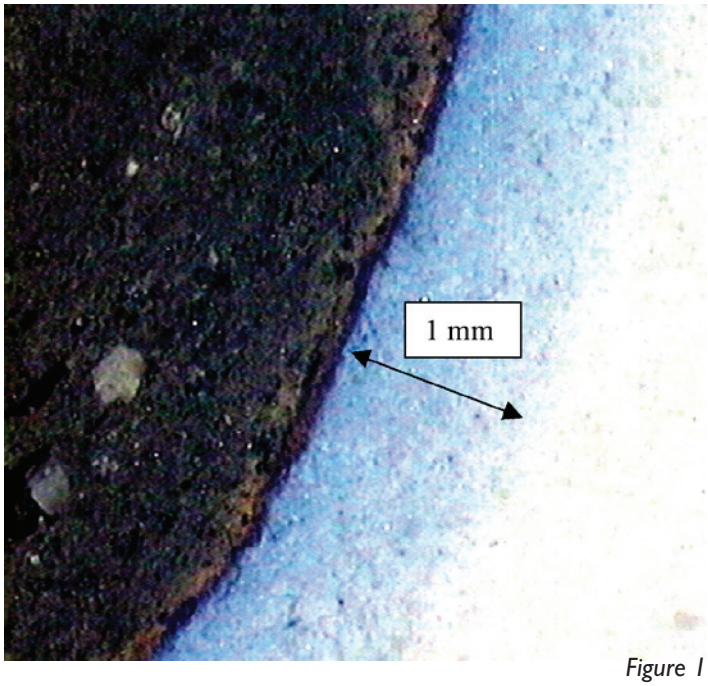


Figure 1

that has been saturated with blue die. The aggregate has been placed in a white cement matrix with a w/c ratio of 0.37. After one week it can be seen that the blue die from the internal pores of the lightweight aggregate particle has migrated 1mm into the surrounding paste to provide the water needed to hydrate the cement.

Internal curing is not a substitute for external curing. Moisture loss (after set) must still be prevented using conventional external measures e.g. (blanketing, misting, fogging and curing compounds).

WHAT ARE SOME OF THE MAIN BENEFITS THAT INTERNAL CURING CAN PROVIDE?

Concrete can be improved by substituting a small amount of natural sand in the concrete mixture with an equal volume of presaturated structural grade lightweight aggregate sand at the rate of 200 lbs/cubic yard.

Benefits of Internal Curing include:

- Increased cement hydration and strength development

- Eliminates or reduces autogenous shrinkage and cracking
- Reduced permeability and increased durability.

HIGH PERFORMANCE CONCRETE (HPC) TOGETHER WITH INTERNAL CURING (IC)

Internal curing is especially helpful when used in conjunction with HPC. Because of low w/c ratios in HPC, there is typically insufficient water to fully hydrate the cement. IC with LWAS provides the additional water needed as well as improving the following properties:

- Reduces autogenous shrinkage
- Reduces cracking
- Hydrates more of the cement
- Increases strength from the first 24 hours and beyond
- Keeps internal relative humidity high
- Reduces self-desiccation
- Reduces chloride permeability
- Improves durability

Increased cement hydration results in higher earlier strengths as soon as 12 hours. This also affords an opportunity for some cement savings. The strength increases experienced in full-scale production runs averaged between 10% and 15%. These increases carried over through 28 days.

High strength concrete alone does not guarantee high performance concrete. Many times high strength concrete experiences early-age cracking. The addition of presaturated LWAS provides for significant reduction in early age cracking. The area where cracking occurs is often referred to as the contact zone (figure 2). This is where the cement mortar and the surface of the aggregate meet. Improvement against tensile failure here results in extending life cycle performance.

CONTACT ZONE IN LIGHTWEIGHT CONCRETE *(Figure 2)*

Reduced permeability is even more significant than strength gain. This feature insures extended life expectancy far beyond prior expected years. IC works well with blends of additional cementious materials in particular Silica Fume because of its high water demand. In order for the pozzolanic reaction to be effective it is absolutely dependent on the availability of moisture. In reality LWAS carries the

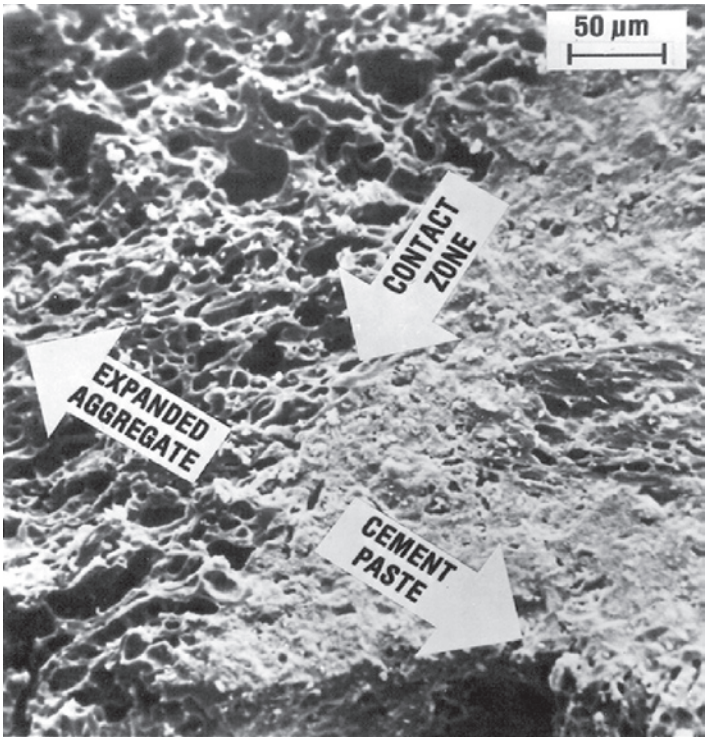


Figure 2

equivalent of approximately five gallons of water evenly dispersed (separate from the mixing water) throughout a yard of concrete. This additional water does not move into the cement matrix until after the concrete has set and has no effect on the water cement ratio.

EVAPORATION REDUCTION

As water evaporates near the surface of concrete, particles of presaturated LWAS release moisture at an accelerated rate. This additional water supplements water lost through evaporation. Surface cracking due to drying stress is greatly reduced and in most cases eliminated.

Years of research have discovered that in addition to reduction of early age cracking (IC early goal) Internal Curing benefits concrete throughout its lifetime. By virtue of extra water (non-mixing water) IC can improve slump retention, workability, and finish ability of fresh concrete.

This basic concept certainly improves the sustainability of concrete to its fullest potential.

For more information contact:
Bill Wolfe www.norliteagg.com
Ralph Acampora www.nesolite.com
or Joe Kowalewski www.norliteagg.com

SETTING NEW SITES

NRMCA-REGIONAL PROMOTION

from Douglas O'Neill, LEED® AP
National Resource Director
National Ready Mixed Concrete Association

LEED and Concrete– Most Bang for the Buck

Most ready mixed concrete personnel are under the misconception that concrete's main contribution to LEED has to do with the use of Fly Ash in the mix. In reality, the use of Fly Ash, although an important environmental benefit of concrete, doesn't play a significant role towards earning LEED points. How can we expect the design community to understand concrete's contribution to LEED if our own industry isn't clear on it? So, here is a quick summary of where concrete gets the most "bang for the buck" as it relates to meeting LEED requirements.

Both conventional and pervious concrete parking lots offer specific points within LEED.

- A pervious lot can meet the stormwater management requirements AND the light color of a conventional pavement can meet the heat island effect credit.
- Not to mention the fact that each yard of concrete which under normal circumstances is produced and delivered locally, adds to the total for meeting the regional materials credit.
- Using concrete for the structure of the building is another area where concrete can play a significant role within LEED. The thermal mass and high insulating characteristics of ICF's and Tilt-up systems along with the reduction in lighting requirements for a concrete parking lot are all ways to assist the design team in meeting the Optimize Energy Performance credit.

There are SO many more areas where concrete can play a role within LEED, but knowing these key elements can be a great start in better communicating our tremendous advantages.

For more information about LEED and Concrete, contact Doug O'Neill at NRMCA, doneill@nrmca.org.

For more information on NRMCA's webinars or to find out how to customize a program specifically for your company, visit our website at www.nrmca.org or contact Doug O'Neill at doneill@nrmca.org.

ON THE CONCRETE SCENE

Continued from front page

night work at a moments notice. With materials stored on a remote jobsite, concrete can be continuously batched at a rate of 90-120 yards per hour.

Larger trucks are usually utilized in the specialty concrete market. Some applications include rapid setting, latex modified, low density, foamed, and pervious concretes. Remote jobsites and night work are areas where a volumetric truck might be utilized.

In the twenty years that volumetric trucks have existed in Connecticut, they have seemingly filled a niche market that was not being satisfied. Concrete pours that were too big to hand-mix but too small for a ready-mix truck were presenting a problem. Presently, the state is geographically covered with owner/operators ready to serve the needs of the small-end user and the night, weekend, and emergency repair work. Because of the nature of small pours, jobs can be scheduled to meet specific time schedules but also have the capability to stay on time-consuming jobs without worry of the concrete "setting up."

STRATEGIES FOR SUCCESS

Schedule, registration forms, and information available at CCPC office.

Annual Joint Dinner of the Design & Construction Industry
Race Brook Country Club
Orange, CT
Mar. 3, 2010, 5:30 PM

NRMCA Annual Convention
Barton Creek Resort
Austin, Texas
Mar. 14-16, 2010

Design & Trades Conference
Naugatuck Valley Community College
Waterbury, CT
Mar. 18, 2010
7:00 AM - 1:05 PM

ACI Field Tech Certification
CCIA Offices and Tilcon
May 6 & 8, 2010

ACI Field Tech Certification
CCIA Offices and Tilcon
Sept. 9, 11, 16, 18, 2010

Your CONNCRETE TIMES CONNECTION

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Upcoming Strategies for Success

WELCOME NEW MEMBERS

To become a member of a growing professional trade organization, contact Jim Langlois at CCPC 860.529.6855

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