acipgh.org
American Concrete Institute
Pittsburgh Area Chapter
P.O. Box 86
Zelienople, PA 16063

February 2025

CHAPTER NEWS

Progress through Knowledge

Concrete In the Steel City

2025 Pittsburgh Area Chapter Upcoming Meetings & Events

MEMBER MEETING
Wednesday - February 19th
DOMENICO'S RESTAURANT
Piazza Plaza, 20550 Route 19
Cranberry Twp., PA 16066

Present Strategies and Future Outlook of Sustainability in the Cement and Concrete Industries
Presented by: Ben Lentine with Heidelberg Materials

MEMBER DINNER MEETING
Wednesday - March 19th or 26th
DOMENICO'S RESTAURANT
Piazza Plaza, 20550 Route 19
Cranberry Twp., PA 16066

AWARDS BANQUET
Saturday - 26, April 2025
SOUTHPOINTE GOLF CLUB
Canonsburg, PA

GOLF OUTING
Monday - July 28, 2025
QUICKSILVER GOLF CLUB
Midway, PA 15060

For more upcoming events visit acipgh.org/calendar-of-events

PITTSBURGH AREA CHAPTER
acipgh.org
February 2025
CHAPTER NEWS

What Exactly is Lightweight Concrete?

Courtesy of Specify Concrete Posted on April 25, 2019

The first modern use of lightweight concrete (LWC) was recorded in 1917, when the American Emergency Fleet Corporation started building ships with this mixture due to its high strength and performance. Since then, LWC has become a common building material for constructing sturdy load-bearing walls, bridges, and sewer systems.

WHAT IS LIGHTWEIGHT CONCRETE?

Lightweight concrete is a mixture made with lightweight coarse aggregates such as shale, clay, or slate, which give it its characteristic low density. Structural lightweight concrete has an in-place density of 90 to 115 lb/ft^3, whereas the density of regular weight concrete ranges from 140 to 150 lb/ft^3. This makes lightweight concrete ideal for building modern structures that require minimal cross sections in the foundation. It is being increasingly used to build sleek foundations, and has emerged as a viable alternative to regular concrete.

Nevertheless, a higher compressive strength of 7000 to 10,000 psi can be attained with lightweight concrete. However, this may compromise the density of the mixture as it requires the addition of more pozzolans and water-reducing admixtures to the concrete.

DIFFERENCES BETWEEN NORMAL AND LIGHTWEIGHT CONCRETE

In contrast to traditional concrete, lightweight concrete has higher water content. The use of porous aggregates increases the time it takes to dry; hence, to offset this problem, aggregates are pre-soaked in water before being added into the cement.

As mentioned earlier, normal concrete can weigh between 140 to 150 Lbs/ft^3 due to the presence of denser aggregates in their natural state. As a result, many believe normal concrete to be cheaper compared to LWC. However, projects made with normal concrete require additional material for framing, cladding, and steel reinforcements – ultimately increasing the overall cost. Hence, LWC remains a cost effective construction material, especially for larger projects.

PRACTICAL APPLICATIONS OF LIGHTWEIGHT CONCRETE

One of the most popular structures built with lightweight concrete is the Bank of America Building in Charlotte, N.C. This shows how LWC can be used to build formidable structures, especially since the possibility of dead load being transferred from one floor to the next is greatly reduced.

LWC is thus ideal for constructing additional flooring on top of older or even newer structures, as it reduces the risk of collapse. As such, it can be used to successfully build bridges, decks, girders, piers, precast constructions, and high rise buildings with reduced density. For example, utilizing LWC in the Wabash River Bridge allowed builders to reduce project density by 17%, and save 18% in terms of cost – amounting to a whopping $1.7 million.

...Continued on page 2 ►

► Continued from page 1...

What Exactly is Lightweight Concrete?

Due to LWC's low thermal conductivity and higher heat resistance, it is now commonly used to insulate water pipes, walls, rooftops, etc. It guards against steel corrosion by forming a protective layer, which also works to insulate steel structures against rot. LWC is also commonly used to construct interstate and traffic lanes, without adding dead load to existing structures.

TYPES OF LIGHTWEIGHT CONCRETE

LIGHTWEIGHT AGGREGATE CONCRETE

This form of lightweight concrete is produced using porous and lightweight aggregates including Clay, Shale, Slate, Volcanic Pumice, Ash, or Perlite. Weaker aggregates may also be added to the mixture, which has an impact on its thermal conductivity; however, doing so may reduce its strength.

Lightweight aggregate is perfect for pre-cast concrete blocks or steel reinforcements. However, denser varieties show better bonding results between steel and concrete, along with enhanced protection from steel corrosion.

AERATED OR FOAMED CONCRETE

This type of lightweight concrete is also known as gas concrete or foamed concrete, since it is developed by introducing large voids into the mortar mass or concrete. Voids are typically injected through a chemical reaction, or with the use of an air entraining agent.

Aerated or foamed concrete does not require flattening, exhibits appropriate thermal insulation, and is self-compacting. This makes it ideal for use in hard to reach spaces and sewer systems.

...Continued on page 3 ►

A Warm Welcome & Thank You to Our Newest Chapter Members!

INDIVIDUAL MEMBERSHIPS

Intertek PSI - Zachary Elsesser

Wine Concrete Products - Michelle Johnston

Xypex - Lucas McCann

Wiss, Janney, Elstner Associates, Inc.
Jessica Viehman

The Pittsburgh Area Chapter continues to grow because of support from all of our members!

Chapter News is published by the American Concrete Institute, Pittsburgh Area Chapter for the purpose of informing members and others about issues of concern to the concrete industry. If you have information to include in this publication or any comments, contact ACI Pittsburgh Chapter at 724-452-1468

10th Annual Excellence in Concrete Project Award

If you wish to submit an entry to be considered for this award, please visit our website acipgh.org to download the application form.

Reminder:
The deadline for project entries is February 28, 2025.

► Continued from page 2...

What Exactly is Lightweight Concrete?

NO-FINES CONCRETE

This form of concrete is developed by eliminating fine aggregates from the mixture; resulting in concrete which comprises of only large voids and coarse aggregates. This is why No-Fines concrete has better insulation and relatively reduced drying shrinkage.

No-Fines concrete is best-suited for load bearing walls and can be used for both indoor and outdoor constructions. However, this type of lightweight concrete should not be used with reinforced concrete, especially due to its lower density and cement content.

PROS & CONS OF LIGHTWEIGHT CONCRETE

Lightweight concrete is a flexible and easily transportable building material, and requires little support from materials such as steel or additional concrete. This makes it cost effective, especially for larger building projects.

Additionally, due to its low thermal conductivity and fire resistance, LWC is an ideal material for insulating against heat damage.

Despite its reduced density, structures built with LWC are unlikely to collapse. In fact, LWC is less likely to shrink compared to normal concrete and also shows increased resistance to rot and termite infestations.

However, LWC also has a few limitations. Since it has higher water content, it takes longer to dry out. Moreover, adding too much water can result in the formation of laitance layers, while compromising on water to offset this limitation may result in a weaker mixture.

Since LWC is also highly porous, it is difficult to place the mixture correctly. Another issue with LWC is that the cement tends to separate from aggregates if mixed incorrectly.

IN A NUTSHELL

Lightweight concrete is a cost effective alternative to normal concrete, especially since it does not compromise on the structure's strength. The higher porosity of LWC also influences its thermal conductivity, making it suitable for projects that require insulation from heat damage.

ACI Pittsburgh Area Chapter Mission Statement

The mission of this chapter is to **teach, train, gather, and share information to guide and support** the concrete construction industry in the Greater Pittsburgh Region.

LIFETIME ACHIEVEMENT AWARD - TRIBUTE TO: THOMAS "TINK" BRYAN

The Lifetime Achievement Award (formerly known as the Tink Bryan Award) was created in honor of an outstanding individual who had dedicated himself to his family, business, and the concrete industry. For several years now, the Chapter has honored various individuals with this award. The Pittsburgh Chapter Board of Directors is requesting nominations for this year's recipient. If a candidate is selected, they will be announced at the Awards Banquet in April. The candidate should demonstrate exceptional commitment and achievement of outstanding service to the concrete industry, and, throughout their professional career, has persistently made significant contributions in areas such as leadership, quality, or education in support of concrete promotion and industry advancement.

Please forward a letter with your candidate(s) name and reasons for nomination to:
ACI, Pittsburgh Area Chapter | PO Box 86, Zelienople, PA 16063 | or email to: bethaci@zoominternet.net

To be accepted for board review, nominations should be received by March 15, 2025.

Past Award Recipients:

2024 – Brian Montarti
2022 – David Thomas
2016 – Chuck Niederriter
2014 – Mark Patton
2012 – Robert Lawrence
2008 – Russell Smith, Sr.
2007 – John Thrower, Sr.
2006 – Robert A. Prisby
2005 – David Chilcote, Sr.
2004 – Bernard Erlin
2003 – Joe Homitsky, Sr.
2002 – Paul Rader
2001 – Andy Fertal
2000 – George Wargo
1999 – Wayne Miller