PITTSBURGH AREA CHAPTER

September 2009

Chapter News

Evaluation of Fiber Reinforced Concretes

By Michael Mahoney, P.Eng.
Director of Fiber Technology - The Euclid Chemical Company

While the growth of the construction industry and use of fiber reinforced concrete continues to struggle nationwide, many companies and suppliers of fibers for reinforced concrete applications are turning up the heat and offering new marketing ideas to spur growth and generate sales. However, it is sometimes important to get back to basics in understanding what can and can't be done when it comes to the using fibers.

In general, ACI and other national concrete organizations recognize two distinct classes of fiber materials:

MICRO AND MACRO FIBERS.

Micro fibers, mostly synthetic, are usually used to help mitigate and control the formation of plastic shrinkage cracks in concrete. These fibers are generally found in the form of monofilament and fibrillated polypropylene, along with other types, used at dosages ranging from 0.5 to 1.5 pounds per cubic yard (pcy). Traditionally, the use of wire mesh has been used for these applications but it has been shown that synthetic micro-fibers will provide superior resistance to the formation of plastic shrinkage cracks versus welded wire fabric. However, these fibers are unable to provide any resistance to further crack width openings caused by drying shrinkage, structural loads or other forms of stress. In other words, these fibers do nothing for improving the structural capacity of concrete.

Macro-synthetic and steel fibers have emerged over the past decade as truly viable options for the replacement of temperature and shrinkage steel and some limited structural applications although the purchaser should be careful to select the appropriate fiber type and dosage as to meet the requirements of the application. These fiber types can vary in dosage from 3 to 20 pcy for macro-synthetics and 20 to 100 pcy for steel. Macro-fibers should be specified by the required performance and not by a prescribed dosage rate. As the expression goes - *"not all fibers are created equal"*. ACI 544.3R-08 has very useful information into the proper specification and production of quality FRC.

Test methods, such as ASTM C1399 and C1609 measure the post-crack performance of fiber reinforced concrete and should not be used as evaluation tools when micro fibers are being considered for plastic shrinkage protection. These tests can be used for steel and synthetic macro-fibers, however, if a comparative evaluation between fibers is requested or if an engineering stress has been calculated whereby the fibers are needed to resist this stress in a similar manner

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to the capacity of light gage rebar and welded wire mesh. ACI 360, Design of Slabs on Ground, has performance information related to designing with macro-fibers where testing of fibers is needed to verify design work. These types of fibers can actually contribute to the structural capacity of concrete but only at much higher volumes.

Above all, fiber suppliers should always have documentation, testing reports and certifications showing that their fibers comply with **ASTM C1116 - Standard Specification for Fiber Reinforced Concrete and Shotcrete.** Marketing and pricing should always yield to performance and engineering so that all persons involved; the owner, engineer, contractor, concrete supplier and fiber manufacturer are all protected and that a quality fiber reinforced concrete project can be constructed successfully.

An Unnecessary Problem,
Concrete Products, February 1994

President's Message

By Bruce Cody

We are reminded on a daily basis of the state of our economy. Businesses closing, friends and colleagues loosing their jobs, just a simple stop at the grocery store walking out with one bag, can cost fifty dollars. These are the hardest times for many of us in our professional career.

One point I try to drive home to design professionals when I do presentations regarding defects in concrete, "Defects in concrete workmanship can be directly related to the economy". I always get looks when I say that. My explanation - when the economy is stable and everyone is busy working doing the work they regularly are accustomed to, there is a higher quality of work being performed than when work is slow, people loose their jobs, jump from one industry into another. We all need to keep that in mind and work together to keep the quality work that we need in our industry.

The Pittsburgh ACI chapter is one of the top chapters in the country. We have received the outstanding chapter award numerous times. It does take time and hard work from our members to keep up the status that others before us have established. In this economy, that will be difficult. Many of us have additional work load to deal with, and time is a commodity. Our time in the spotlight is one year away, when Pittsburgh will be hosting the 2010 Fall ACI Convention. We need help from our members to make this event a success. Our upcoming October 14th, dinner meeting at Amici's will be dedicated to this event with a presentation on the necessary work for a successful convention. Please try to attend that meeting. Your time and involvement in the Pittsburgh ACI Chapter is greatly appreciated.

Sincerely,

Bruce Cody
President

Art Livingood Scholarship

The ACI Pittsburgh Area Chapter established the Art Livingood Scholarship in 1988 for undergraduate students, including seniors, who have an interest in the areas of cement technology, or concrete technology, design or construction. The student should be studying Civil or Materials Engineering/Technology, or Architecture/Architectural Engineering. The awards are offered in the amount of $2,500, $1,500 and $1,500.

At this time, we are accepting applications for the 2009/2010 academic year. The student is required to submit: an ACI application, a letter of transmittal, an official copy of their transcript of grades; and two letters of recommendation. **Applications must be received by January 31, 2010.**

*If you would like to obtain an application form or have any questions, log onto **www.acipgh.com**, then click on 'Scholarships and Awards'.*

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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

2009 Pittsburgh Area Chapter Upcoming Events

Member Dinner Meeting

October 14, 2009 *at*
Amici's Banquet Center

We will be discussing the Status of the 2010 Fall ACI Convention in Pittsburgh.

ACI ~ PITTSBURGH AREA CHAPTER

Fall 2009 / Spring 2010 Certification Schedule

DATE	CERTIFICATION CLASSES	PLACE
October 12-13, 2009	$375 - Concrete Field Testing Tech-Grade I	Stone & Company – Plum, PA
November 2-3, 2009	$375 - Concrete Field Testing Tech-Grade I	R. W. Sidley – West Middlesex, PA
December 7-8, 2009	$375 - Concrete Field Testing Tech-Grade I	Ligioner Stone & Lime – Latrobe, PA
January 11-12, 2010	$375 - Concrete Field Testing Tech-Grade I	J.J. Kennedy, Inc. – Clarion, PA
January 19, 2010	$175 - Flatwork Finisher/Technician	Four Points Sheraton – Mars, PA
February 8-9, 2010	$375 - Concrete Field Testing Tech-Grade I	New Enterprise Stone & Lime – Altoona, PA
March 8-9, 2010	$175 - Flatwork Finisher/Technician	Stone & Company – Greensburg, PA

IF INTERESTED IN HOSTING ONE OF THE ABOVE CLASSES, PLEASE CALL (724) 452-1468
Registration forms can be obtained at **www.acipgh.com**, click on 'Certification' then 'Course Schedule'.

• A T T E N T I O N •

Volunteers Needed!

If you are currently certified as a **Concrete Field Testing Technician – Grade I,** The Pittsburgh Area Chapter of ACI needs your help. We are hosting certification classes on the following dates:

October 12-13, 2009 *Plum, PA*	**November 2-3, 2009** *West Middlesex, PA*	**December 7-8, 2009** *Latrobe, PA*

January 11-12, 2010 *Clarion, PA*	**February 8-9, 2010** *Altoona, PA*

If you can volunteer your time to help out as a supplemental examiner, we would greatly appreciate it.

Please call ACI at (724) 452-1468 if you can help. Thank you!

PITTSBURGH AREA CHAPTER

"Progress Through Knowledge"

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Pittsburgh Area Chapter
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