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Mission:
To support research
and educational pro-
grams that will in-
crease professionalism
and quality in the
concrete industry



Riding the Wave of Sustainable Development

The following is an excerpt from the article "Sustainable Development: The Wave of the Future - And the Future is Now" that will appear in the Spring 2008 edition of *Concrete inFocus*.

"Sustainable development." "Green building." "Environmentally friendly materials." These terms are no longer part of the vernacular previously reserved only for those who thought it chic to construct buildings with an environmental conscience. Today, individuals, companies, and governments world-wide are demanding that energy and environmental impacts of construction projects be considered long before ground is broken. This dramatic change in thinking has given rise to "green" building rating systems such as the popular U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program and others. Efforts to thwart global warming and decrease the overall carbon footprint are discussed daily in popular media and the issue will likely be a main topic of discussion as part of the year's presidential elections. Everyone now claims to want to be part of the solution. Concrete, however, has always been an environmentally friendly building material and part of the solution, even before the problem was widely recognized.

One area of pavement construction that has seen a particularly high explosion of interest on the part of builders, architects, designers, government officials and others is pervious concrete. With its stellar storm-water management qualities, its positive environmental impact, and potential safety benefits, it's not surprising that its popularity has soared in recent years. This surge in interest in pervious concrete has also likely been fueled by several research projects funded and released by the RMC Research & Education Foundation over the last year and a half. In early 2007, the Foundation released two projects developed by the Stormwater Management Academy at the University of Central Florida: "Construction and Maintenance Assessment of Pervious Concrete Pavements" and "Hydraulic Performance Assessment of Pervious Concrete Pavements for Stormwater Management Credit". Both studies also underscore the

importance of proper placement and mix design.

The United States Senate's Environment and Public Works Committee and the Environmental Protection Agency (EPA) have expressed deep concern over the environmental impacts of various pavements. In an effort to address some of these concerns, the Villanova Urban Stormwater Partnership at Villanova University is undertaking a side-by-side comparison of pervious concrete and porous asphalt. Funded by the RMC Research & Education Foundation, Villanova University, EPA and Prince George's County, MD, the study will examine the differences between pervious concrete and porous asphalt with regard to durability, maintenance requirements, the ability to transmit or filter key contaminants such as hydrocarbons and the ability to mitigate heat island effects.

It is not surprising, given the success of pervious concrete pavement's use in parking areas and sidewalks, that the construction and design communities would be interested in expanding its use – along with its environmental benefits – to streets and local roads, and even highways in the future. The RMC Research & Education Foundation is working with The CP Tech Center at Iowa State University to study just such a possibility. This pervious concrete mix design for wearing course applications study will examine the development of concrete mix designs that have adequate strength and durability for wearing course pavements. Additionally, the pavement would have surface characteristics which reduce noise and enhance skid resistance while also providing adequate removal of water from the pavement surface and structure. The development of pervious concrete mixes for use in highways, street and local road applications will examine their suitability for this use as well as their long-term behavior.

A hallmark of the green building tide is the increased number of building projects seeking certification in the USGBC's Leadership in Energy and Environmental Design (LEED) program and the growing number of governments, agencies and companies requiring that new

construction be LEED certified. Given the many ways in which the use of concrete contributes to the qualification process for LEED points, the RMC Research & Education Foundation chose to fund the development of the *Ready Mixed Concrete Industry LEED Reference Guide* in cooperation with the Portland Cement Association. The Guide provides a dual educational purpose: First, it educates designers, architects and others involved in building projects about how concrete can contribute in the LEED certification process; and second, it educates those in the concrete industry about the LEED program. The Foundation's Board of Trustees recognized the growing popularity of sustainable development rating systems and seized upon the opportunity to showcase how well concrete's energy and environmental benefits fit with the LEED program.

Concerning the recycling aspect of the sustainable development movement, the Foundation's study "Crushed Returned Concrete as Aggregates for New Concrete – Final Report" is extremely popular. The intense interest surrounding the report stems not only from the findings' potential to save the concrete industry up to \$300 million annually in materials and disposal costs, but also how the use of crushed concrete aggregate supports sustainable construction initiatives. The study demonstrated that crushed concrete aggregate (CCA) can be properly reused in fresh concrete, with concrete still meeting performance requirements. The data from this study will be used by the National Ready Mixed Concrete and other partnering organizations to support changes in specifications to allow increased use of CCA for a variety of concrete applications.

Never before have the concepts of sustainable development and green building been more important than they are today. In looking toward the future, the concrete industry will play an extremely important role as energy and environmental considerations become a priority in the design, building and construction communities. The Foundation will continue in its commitment to seek and support projects that promote sustainable development.



Did you know:

- The Foundation will have many of its deliverables available at its booth at NRMCA's Convention and will also have materials available at NRMCA's Booth at CONEXPO-CON/AGG?

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The Newsletter of the RMC Research & Education Foundation

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From the Chairman

As I take on the chairmanship of the Foundation for 2008, the concrete industry, and others throughout the country, faces uncertain times. However, despite some concern with market downturns, there remains a constant industry resource to bolster us - the RMC Research & Education Foundation. The projects and programs supported by the Foundation help to improve both our product and our workforce, advancements that will strengthen our industry, in good times and during challenging times.

In the short time since the releases of the crushed concrete aggregate study and the new Plant Inspector's Guide last fall, there has been very high interest in both items, as noted below. The same is true for our new long-term field performance report on pervious concrete, highlighted on page two. Although just released in December, this new pervious report is already extremely popular, particularly with those in northern climates.

Construction projects are rarely considered these days if they do not incorporate the concepts of sustainable development. For this reason, pervious concrete remains a very hot topic for research which is why the Foundation's Board of Trustees commissioned a pervious concrete research compilation so that we could fully understand the breadth of existing knowledge on pervious concrete without duplicating efforts. The revised edition is now available, as reported on page three. The Foundation also supports efforts with regard to sustainable development in several other ways, the details of which are outlined in an article that will appear in the Spring edition of NRMCA's *Concrete inFocus*. An excerpt from this article appears on page four. Similarly, the widespread concern over the high cost of fuel and poor air quality from emissions also permeates the minds of citizens. However, there is evidence to suggest that the use of concrete may be able to increase fuel efficiency in urban areas on streets and local roads while also decreasing emissions. To further examine this notion, the Trustees approved funding for a new project that you may read about on page two.

Trade shows such as the upcoming CONEXPO-CON/AGG show in March and World of Concrete allow us the opportunity to spread the word about the Foundation and we report on those plans on page two. We also look forward to the release of two important P2P reports and the second offering of the new front-line supervisors course "The Effective RMC Supervisor" which will be offered again in April following a very strong first offering in January. You may read about it and the P2P releases on page three.

I am proud of all that the Foundation has accomplished and hope that, as a donor, you are also proud of our work. With your continued support, we can weather these trying times together.

Regards,
George Gregory
Chairman



Foundation Projects Drawing Attention, Making a Difference

Several of the Foundation's projects released since last fall have garnered a great deal of media attention and are making a significant impact in the industry. The crushed concrete aggregate (CCA) study on using returned concrete as aggregate in new concrete, released in September, received tremendous media attention, including a link on www.cnn.com. The potential for the use of CCA to save the industry as much as \$300 million annually is only one reason the report is so popular. The green aspects of the report,

including the recycling of concrete and the reduction in materials that would normally be disposed in landfills, are very positive benefits for the public.

The Plant Inspector's Guide and the new engineer qualification program for NRMCA's plant certification has also received very positive attention. In fact, the new Guide has raised additional interest on the part of some state DOTs. The Departments of Transportation for North Dakota, Ohio and Pennsylvania have all expressed interest in the certification and

learning more about the Guide. The fact that the Plant Inspector's Guide ensures that the plant certification program is uniform across the country has been noted as one of its appeals.

Qualifications for inspecting engineers and more information about the certification process may be obtained by contacting NRMCA's Nina Stedman at 240-485-1162 or at nstedman@nrmca.org.

Copies of the CCA study may be downloaded from the Foundation's website or obtained by contacting Jennifer LeFevre.

Foundation Outreach at CONEXPO-CON/AGG, NRMCA Convention and WOC

Trade shows and NRMCA meetings provide the Foundation with excellent opportunities to showcase its work. And with sustainable development being a particularly hot topic among all in the construction community, there is a very large audience for the Foundation's deliverables that support green building efforts. The Foundation will make these materials available at the upcoming CONEXPO-CON/AGG show taking place in Las Vegas in March, both through NRMCA's booth and at booths of exhibitors who are donors to the Foundation.

Prior to the CONEXPO-CON/AGG Show, the Foundation will have a booth display at NRMCA's Convention, also taking place in March in Las Vegas at The Venetian. There the Foundation will also unveil its new project funding brochure that summarizes all of its funded projects to-date.

At the recent World of Concrete Show, also in Las Vegas, Foundation staff received very positive feedback on the pervious concrete resources made available there including interest on the part of exhibitors to offer the materials from their booths. In light of this interest, the Foundation would like to offer to donor companies who are exhibiting at CONEXPO-CON/AGG the opportunity to make any of the Foundation's deliverables available on CD at their booth. If you are interested, please contact Julie Garbini or Jennifer LeFevre by February 18th. There will be a limit to how many copies we will be able to provide each exhibitor. This will be an excellent opportunity for vendors to provide additional resources to their customers.

Long-Term Field Performance Study of Pervious Concrete Offers Confidence for Its Use in Cold Climates

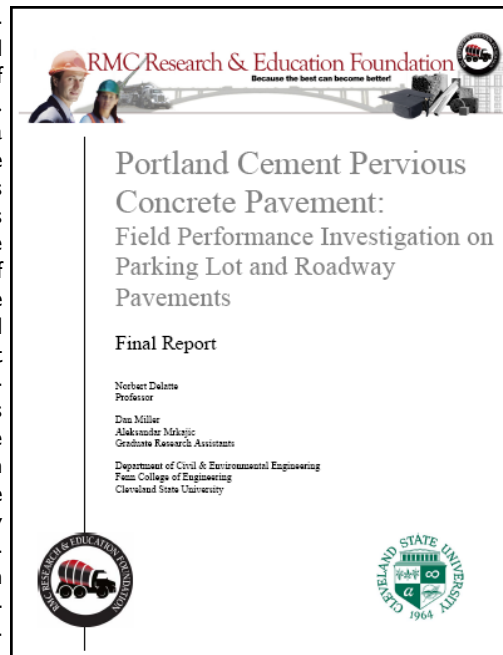
One explanation given for the hesitation to embrace the use of pervious concrete in northern climates was the uncertainty of its performance in freeze-thaw conditions. In order to assuage those concerns, the RMC Research & Education Foundation funded a long-term field performance study of pervious concrete's performance in harsh weather conditions. The study, "Portland Cement Pervious Pavement: Field Performance Investigation on Parking Lot and Roadway Pavements" validated the belief that pervious concrete could perform well in freeze-thaw environments, with little maintenance required. The findings of the study will allow northern states to now use pervious concrete with confidence. Builders in cold climates are particularly excited about the prospect of being able to use pervious concrete not only because of all of its environmental benefits, but also because of the safety benefits it offers. On impervious services, when snow would melt and re-freeze, the resulting ice could pose a danger to pedestrians. Pervious concrete allows melting snow to

run through it so there is no ice when temperatures again fall below freezing.

The interest in this study has been intense and feedback has been very positive. Said Bill Childs, President and CEO of Chaney Enterprises and Foundation Trustee "I do not believe I have ever read a more well researched and presented document prepared in any arena of our industry. [The report] is a real confidence builder and adds tremendous veracity to the worthiness of this innovative product." And Mr. Childs is not alone in his enthusiasm for this report. The media attention for this release has been very strong and several northern region associations and companies have

requested copies of the report or have downloaded it from the Foundation's website.

The full final report is available from the Foundation's website at www.rmc-foundation.org. Or, to receive multiple copies of the report as a hardcopy or on CD, please contact Jennifer LeFevre.



Foundation Approves Funding to Study the Effect of Pavement Type on Fuel Efficiency and Emissions

The Foundation's Board of Trustees recently approved funding for a new study that will evaluate the effect of pavement type on fuel consumption and emissions. This study will focus on urban driving conditions on streets and local roads and will build upon previous research that examined these issues on highways.

The Foundation is working with the University of Texas at Arlington on this study. The project will include a correlation to government data so that the model may be used to calculate

fuel consumption savings and the environmental benefits of a variety of pavement types. Municipalities and state departments of transportation may then use this model to assist with their deci-



sion-making with respect to pavement selection. As governments become more interested in utilizing green building materials, this project becomes even more relevant since the work can be used to help understand

the overall carbon footprint of concrete vs. asphalt pavements over the design life of a project.

The opportunity to save on fuel consumption is particularly attractive as oil commodities remain volatile and the call for decreased fuel consumption is loud. The first phase of the study will take place in 2008 with a second phase planned for 2009.

For more information on how to submit a proposal for consideration, please visit www.rmc-foundation.org to download our grant guidelines or contact Julie Garbini or Jennifer LeFevre.

First Frontline Supervisor Course Draws Great Reviews

The first frontline supervisor course, now known as "The Effective RMC Supervisor", took place in January in Phoenix and was met with rousing reviews. Noted one participant "This has been a very insightful class. I believe I will take many things home with me that will be good tools and knowledge to move forward."

The course was developed through the Concrete Industry Management (CIM) program at

California State University-Chico with additional development prepared by John Richardson and Joan Dandurand. A second course is scheduled for April 8-10 in Seattle.

NRMCA's Educational Activities Committee recommended the development of this course to assist first-time supervisors with their transition to a new role. Since many middle managers rise up from

the ranks, they often struggle with their new supervisory role. This course assists them in learning how to be a bridge between management and workers and is a vital role in helping to keep costly turnover to a minimum.

For more information on the next class in April 8-10, please contact NRMCA's Susan Bachenheimer at susan@nrmca.org or at 240-482-1166.

Foundation Begins Planning for 2008 Fundraising Golf Tournament

Building upon its success from the 2007 RMC Research & Education Foundation Fundraising Golf Tournament, the Foundation has now begun planning for the 2008 tournament taking place at the General's Retreat Course at the Hermitage Golf Course in Nashville, TN. The tournament will again take place in conjunction with NRMCA's Concrete Works (formerly known as the Fall Conference). If you are interested in participating on the Golf Tournament Planning Committee, please contact Jennifer LeFevre at 240-485-1151 or at jlefevre@rmc-foundation.org. Look for sponsorship and registration forms at NRMCA's Convention in Las Vegas in March.



Updated Pervious Concrete Research Compilation Now Available

Pervious concrete is one of the most popular research topics of all time. The potential this application has for advancing sustainable development is unlike any other pavement available so it's no wonder why researchers would want to be involved in efforts to improve it and expand its applications. However, in order to support the most promising research projects, it is wise to first understand the full breadth of existing knowledge on the subject. That is why the RMC Research & Education Foundation funded the original Pervious Concrete Research Compilation published in June 2006.

The original compilation

became extremely popular and remains in demand today. It is also a valuable resource to producers and specifiers seeking information and guidance on the application. An updated version of the compilation is now available and includes abstracts of study findings as



well as links to study information on the Internet where applicable.

It is important to the Foundation's Board of Trustees that they not fund duplicative research, which is another reason they chose to support the assembly of this compilation. Both the original and revised versions were authored by Dr. Heather J. Brown of the Concrete Industry Management Program at Middle Tennessee State University.

The compilation may be downloaded from the Foundation's website at www.rmc-foundation.org, or to receive a hard copy, please contact Jennifer LeFevre.

Important P2P Projects to be Released this Spring

After extensive vetting and discussion by the Prescription-to-Performance (P2P) Steering Committee, the Foundation will release two important projects in support of the P2P Initiative this Spring. The first is Phase II of the preparation of a model performance-based specification. This second phase details the model specification and is a follow up to phase one, a comprehensive literature review titled "Preparation of a Performance-Based Specification for Cast-in-Place Concrete." The new report will provide specifiers with information they need to specify a project for performance vs. using a prescriptive specification, allowing for increased innovation and quality.

The other project is the long-awaited Guideline Manual for a Quality Management System (QMS). The guideline document will assist ready mixed concrete producers in developing an internal QMS. By establishing a quality management standard, the producer will thereby establish their credentials to bid on and furnish concrete on performance-based criteria. The manual will allow purchasers to feel confident that concrete being provided with performance-based specifications will be a uniform and consistent product. The QMS will also include an example Quality Manual for a fictitious company that documents the procedures that support quality.

These projects are only two of several P2P projects supported by the Foundation. Additional P2P projects include an experimental case study documenting advantages of performance specifications, an evaluation of performance-based alternatives to the durability provisions of ACI 318—building codes and pavements and the creation of an ACI report addressing the development and proper use of performance-based criteria for concrete. More information about these studies may be found at www.rmc-foundation.org.