

Speakers for Doha 2011 International Concrete Sustainability Conference

Per Fidjestol

Elkem Silicon Materials; Technical Manager concrete at Elkem, Norway

Biography: ACI Fellow Per Fidjestol has more than 30 years experience in high performance concrete and durability. He is recipient of ACI's Arthur Andersen Award and ACI's Henry C Turner Medal for work in HPC and silica fume. He has published more than 80 papers on the subjects. He is member of several ACI committees, ASTM C9, CEN-committee on silica fume, Norwegian Standards Concrete Reference Board. He is technical Manager for concrete application (Global) with Elkem Silicon Materials.

Title: Improving sustainability of concrete construction – the role of high strength concrete

Abstract: An initial study has been performed on the ways in which the use of high strength concrete and special construction features will improve sustainability related aspects of general concrete construction. Compared to current practice resource consumption is reduced by about 40 %, CO₂ by 55 % and cost by 15% - all designed within current codes and essentially within code requirements to material composition. The approach is based on the combination of four main steps:

- Using high strength concrete to minimize the consumption of materials
- Use advanced materials design methods (particle packing) to minimize the consumption of binder materials.
- Optimize the binder by using the maximum possible of SCM's, thus minimizing the clinker
- Use available technology to reduce concrete volume in floor slabs

The paper will discuss the limitations and bottlenecks facing this approach, along with a look at the future in terms of opportunities to further optimize material composition when other factors influence the availability of present day volume SCM's, such as fly ash and slag, and the impact of sub-micron silica fume on strength development and other properties of the resulting ternary binders.

Emily Lorenz

Structural and Architectural Evaluation; CTL Group; USA

Biography: Ms. Lorenz serves as an engineer in the areas of green structures and practices, energy efficiency, heat transfer and thermal properties. Since joining CTLGroup in 2010, Ms. Lorenz has performed analyses to predict thermal resistance for building components and conducted solar reflectance testing. In the area of sustainability, Ms. Lorenz has assisted on LEED™ and other green building projects to provide expertise on environmental impact, solar reflectance, integrated design and other areas. Prior to joining CTLGroup, Ms. Lorenz served as Director of Sustainability and Editor-in-chief of the PCI Journal for the Precast/Prestressed Concrete Institute (PCI). A licensed engineer in Michigan, Lorenz previously worked as the engineering editor of the American Concrete Institute's (ACI's) Concrete International magazine, and as a structural engineer for Albert Kahn Associates in Detroit, MI, and Ericksen Roed Associates in St. Paul, MN. She received her bachelor's and master's degrees in structural engineering from MTU in Houghton, MI.

Title: Estidama and Concrete

Abstract: Life cycle assessment tools and green building rating systems are practical methods of translating sustainability into practice. Estidama is a point-based system for certifying the level of a building's sustainability. This presentation will

focus on concrete's contribution to the Estidama rating system. Using cement and concrete in building construction contributes to sustainable buildings by reducing environmental impacts in many ways. These include:

- Reduced site disturbance
- Improved outdoor thermal comfort
- Minimizing energy use
- Building reuse
- Material emissions
- Regional materials
- Durable materials
- Resistance to fire and wind
- Safe and secure environment

Green buildings project a positive environmental image to the community. Additionally, meeting many green building practices can result in significant energy and cost savings over the life of the structure. Other advantages include better indoor air quality and plenty of daylight. Studies have shown that workers in these environments are more productive, miss fewer days, and stay with an employer longer. These benefits contribute directly to a company's profits because salaries—which are about ten times higher than rent, utilities, and maintenance combined—are the largest expense for most companies occupying office space.

Lionel Lemay

Senior Vice President, Sustainable Development; National Ready Mixed Concrete Association; USA

Biography: Lionel Lemay is Sr. Vice President, Sustainable Development for the National Ready Mixed Concrete Association (NRMCA). He manages programs to assist producers, contractors, and designers transform concrete manufacturing and construction to improve overall sustainability of the concrete industry. He manages a program to educate concrete industry professionals, engineers and architects on the proper use and design of concrete for buildings, parking areas, roadways, and other applications. He works on developing standards and specifications with a focus on performance-based specifications for concrete. He has written numerous articles on concrete construction and is co-author of the McGraw-Hill book *Insulating Concrete Forms for Residential Design and Construction*. Mr. Lemay is LEED AP and a registered as Professional Engineer and Structural Engineer in the state of Illinois, USA. He holds a bachelors and masters degree in civil engineering and applied mechanics from McGill University in Montreal, Canada.

Title: Environmental Product Declarations for Concrete

Abstract: This presentation provides a methodology for tracking environmental impacts of concrete and how concrete producers can use that information for an Environmental Product Declaration (EPD). Corporations in every industry are shaped by their customers' desire to be more environmentally responsible. Companies that adopt sustainable practices will become preferred suppliers. Environmental performance, including greenhouse gas emissions, will be increasingly monitored and regulated. This presentation will discuss initiatives such as LEED, Architecture 2030 Challenge for Products, and other standards that challenge product manufacturers to measure and track carbon footprint and other impacts.

Title: Life Cycle Assessment of Concrete Structures

Abstract: Building owners, contractors, architects, engineers, specifiers and consumers are demanding more efficient and environmentally friendly projects and products. Life Cycle Assessment (LCA) is increasingly being used to evaluate structures and building product for environmental performance. This presentation provides an introduction to how LCA

can be used to assess the environmental performance of concrete structures, including buildings and pavements. A review of new and existing research comparing the environmental life cycle performance of concrete and competing building materials will be presented including Year 2 results from *The Edge of Concrete: A Life-Cycle Investigation of Concrete and Concrete Structures* from the Concrete Sustainability Hub (CSH) at the Massachusetts Institute of Technology.

Colin Lobo

Senior Vice President of Engineering; National Ready Mixed Concrete Association; USA

Biography: Colin Lobo is Senior Vice President of Engineering for the National Ready Mixed Concrete Association. He is a registered professional engineer in the state of Maryland. He has a doctorate in concrete materials from Purdue University. He is a member of the ACI Committees 318 and 301, building code and specifications for structural concrete. He is also active on several ASTM Committees that develop standards for concrete and concrete making materials. He has developed and coordinated several courses and seminars on concrete technology and applications and has authored books, journal and magazine articles. Mr. Lobo is responsible for the research, education and certification activities at the National Ready Mixed Concrete Association.

Title: Role of Performance Based Specifications in Sustainable Development

Abstract: Performance based specifications can substantially help in sustainable development. Minimal cement content requirements is one well known popular prescription that increases the environmental footprint of concrete. Like wise there are at least 20 other requirements that are not so well known. This presentation will outline all of those and clarify how concrete performance can be maintained while removing those requirements. The resulting specification can help attain concrete with the desired performance and a lower environmental footprint.

Doug Ruhlin

Principal Environmental Consultant; Resource Management Associates; USA

Biography: Douglas Ruhlin is President and Owner of Resource Management Associates, Inc., an environmental and operational consulting firm specializing in the concrete industry. Mr. Ruhlin is a Registered Environmental Manager (REM), Certified Environmental Auditor (CEA), and holds the following certifications from the National Ready Mixed Concrete Association: Green-Star EMS Auditor, Sustainability Certification Auditor, Certified Concrete Industry Environmental Professional, and Certified Ready Mixed Concrete Plant Manager. Mr. Ruhlin has over 20 years experience in the consulting industry for the concrete and construction materials industries, and specializes in water quality management, environmental management systems, sustainability, solid waste and recycling, acquisition services and environmental due diligence, with a significant emphasis on training and industry outreach in these areas. He holds a BS in Geology from Rider University, and an MS in Atmospheric and Oceanic Science with a specialization in Geochemistry from The University of Michigan.

Title: What Do Sustainable Concrete Plant Operations Mean?

Abstract: We hear a lot about sustainability today, but what does it really mean to a concrete producer? This session will cover the main concepts of sustainability as it applies to concrete plants (as well as other types of plants). Topics to be covered will be:

- What does sustainability mean, and how does this apply to the concrete industry?
- What sustainable practices can, and should, a concrete implement right now, and what outcomes can be expected.
- How does continuous improvement fit into a program of sustainability, and what is an EMS.

- How to benchmark great performance, using the NRMCA Green-Star and Sustainable Plant certification programs.
- What can be done with sustainability, including marketing benefits and green building participation.

This seminar will provide a complete understanding of sustainability, how to implement a program, and to benchmark results and capitalize from your success!

Christopher Stanley

Technical Director of Unibeton Readymix, UAE

Biography: He is Consulting Engineer for over 50 years including an Advisory Engineer for the British Cement & Concrete Association. Published two books and over 265 technical papers on a wide variety of concrete subjects. Awarded the International Environment Medal of the Society of Chemical Industry for his work on Concrete and the Environment.

Title: The Green Concrete Revolution.

Abstract: A review of the latest technological advances to produce environmentally friendly concrete with a low carbon footprint and its application in modern buildings and structures.

Wassim Mansour

Assistant Technical Manager of Readymix Abu Dhabi: UAE

Biography: Wassim holds a Bachelor degree of Science in civil Engineering. He is in progress with a Master degree program on Concrete Rheology at Reykjavik University. Wassim was speaker at many international conferences. He is currently the Assistant Technical Manager of Readymix Abu Dhabi which also manages ALDAR Readymix in the UAE and Redland Readymix in Lebanon. Wassim has more than 10 years experience in the concrete industry, assessment of existing structures and soil mechanics. He was involved in various prestigious projects in Lebanon, Syria, Qatar and the UAE.

Title: Towards Performance-Based Specifications. Case Studies on Construction Projects in Abu Dhabi

Abstract: Prescriptive and performance specifications have been in existence for as long as code requirements and specifications for concrete have existed. Prescriptive specifications have historically had a predominant share in the UAE construction market. Nevertheless, there was always a concern that prescriptive specification hinders the contractors and/or readymix suppliers from using innovative materials and ideas that support the sustainability and performance of the end product. As the interest in achieving sustainable and durable end-products is progressively prevailing nowadays, performance specification has started to gain more acceptance at the clients and specifiers level especially after the recent issuance of some supporting standards and guidelines (i.e., NRMCA P2P reports, ACI ITG-8R-10... etc.). In many cases, prescriptive specifications fail to be up to date with new concrete technologies. They can also be conflicting whenever they call for both specific types of raw material and specific performance of the end product. Since Readymix Abu Dhabi is the frontrunner in bringing new technologies to the UAE concrete market for the last 35 years, promoting for sustainable concrete and performance specifications have been ones of its main objectives. Readymix Abu Dhabi will share its experience learned in two large scale projects in Abu Dhabi where prescriptive specifications have been successfully replaced by performance based ones.

Samir E. Chidiac

Director, Walter G. Booth School of Engineering Practice, Professor, Department of Civil Engineering, Canada

Title: Dry Cast Concrete Blocks Containing SCM Waste Glass Powder or Polyethylene Aggregates

Abstract: Dry-cast concrete blocks are a popular building material because masonry allows for quick, efficient, durable and economic construction. To improve the economic and environmental sustainability of this industry, its dependence on raw materials needs to be reduced. This can be achieved by replacing a portion of the sand with high density polyethylene (HDPE) or low density polyethylene (LDPE) or a portion of the cement with waste glass powder (WGP). In this study, blocks were produced in an industrial plant with up to 15% of the sand replaced with polyethylene pellets and up to 25% of the cement substituted with WGP. The physical, mechanical and durability properties of the individual blocks and the mechanical properties of the block assemblages were tested. Experimental results revealed that blocks with 10% WGP as cement replacement performed similarly to the control blocks and that blocks containing either LDPE or HDPE resulted in a decrease in strength and an increase in water absorption. Acceptable performance was achieved when 3 to 6% of the sand was substituted with polymer pellets.

Olafur H. Wallevik

Head of Innovation Center Iceland (Rheocenter) and a professor at Reykjavik University; Iceland

Biography: He has worked with concrete technology since he finished his master thesis on the rheology of fresh concrete at Norwegian Institute of Technology in 1983. In 1987 he made the first version of the BML Viscometer which now is purchased from throughout the world. His special fields are Rheology of Fresh Concrete, High Performance Concrete, High Strength Concrete, Self-Compacting Concrete and Microstructures. He is manager of ICI Rheocenter. He has hold about 40 rheology / SCC courses in 16 countries.

Title: Carbon footprint of high performance versus conventional vibrated concrete

Abstract: The carbon footprint of concrete is relatively low and significantly less than ten-present of metals by unit weight, but as it is by far the most “man-made material”, it counts so much. The carbon footprint per strength unit is discussed as well as means to reduce it. Ultra high strength concrete is also debated, but as it can be quite costly it not often a feasible alternative. The importance of the aggregates is included, in particular the particle shape and the consequence of making crushed aggregates more rounded/cubic to reduce paste/binder demand. The evaluation of rheology of the fresh concrete can be essential tool to find more sustainable solutions.

John Harrison

TecEco Pty. Ltd.

Biography: John Harrison is a scientist and economist from Australia committed to developing magnesium cement technology. He is known around the world for the development of reactive magnesia hydraulic cement blends including Tec-Cements and Eco-Cements and for his proposition first announced in the New Scientist Magazine in 2002 that the solution to global warming lay in the use of man made carbonate. Since then he has been solving problems like durability and shrinkage for Portland cement concretes as well as developing the technology for a wide range of concretes including slag cements which he has patents for in most countries. More recently John has been working on the design of a kiln for making magnesium oxides with much more consistent properties without releases of CO₂ to the atmosphere.

Title: An overview of Future Concretes with a Description of the Role of Reactive Magnesia

Abstract: This paper investigates the drivers, options needs and barriers to the implementation of new more sustainable concrete technology. It looks at the candidates and establishes that that the business model and training policy of companies in the industry must change before the many small improvements that have already been made can be implemented by incorporated them in cements. It concludes that all the basic technology is available but what is needed is a few formulation tweaks, many process changes and some lateral thinking to make a substantial difference. The paper concludes that innovation must address new markets as well as sustainability issues and it is time to revisit older cements with new chemical tools such as reactive magnesia the ramifications of the use of which is examined in some detail.

Ihab Bassiouni

Grey Matters Consultancy

Biography: Ihab Bassiouni is professional engineer with Grey Matters Consultancy. He provides education programs, certification programs and engineering services related to concrete construction and manufacturing for Grey Matters.

Title: Concrete Plant and Personnel Certification Programs in the Middle East

Abstract: This presentation provides an overview of the NRMCA ready mixed concrete plant and personnel certifications offered by Grey Matters in the Middle East. NRMCA's Quality Plant Certification provides assurances that concrete plants have the capabilities of producing quality concrete and the NRMCA Concrete Technologist Middle East education and certification program offers a comprehensive background for concrete quality control personnel.