

PRELIMINARY PROGRAM

**Advances in Cement and Concrete IX:
*Volume Changes, Cracking, and Durability***

August 10-14, 2003

Copper Mountain, Colorado

Conference Chair

David A. Lange

University of Illinois at Urbana-Champaign

Conference Co-Chairs

Karen Scrivener

Ecole Polytechnique Federale de Lausanne

Jacques Marchand

Laval University

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Program Overview

The program consists of nine technical sessions and a poster session. Each technical session will be led by an invited speaker (45 min), three additional speakers (30 min each), followed by open discussion (30 min).

Technical sessions will be held in the morning and the late afternoon, allowing for free time in early afternoon.

The poster session will be held Tuesday afternoon.

Dinner will be served daily at 7:15, and a banquet will be held on Wednesday evening.

Sunday, August 10

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| 2:30 pm – 4:30 pm | Registration |
| 4:15 pm | Conference Welcome and Overview |
| 4:30 pm – 5:15 pm | Keynote Speaker: Francis Young, Professor Emeritus, University of Illinois, Urbana, IL USA BRINGING CONCRETE INTO THE 21ST CENTURY |
| 5:15 pm – 7:15 pm | Session 1: Hydration mechanisms and microstructure Session Leader: Karen Scrivener, Swiss Federal Institute of Technology at Lausanne, Switzerland |
| 05:15 pm – 05:45 pm | Karen Scrivener, Swiss Federal Institute of Technology at Lausanne, Switzerland ETTRINGITE MYTHS, REALITIES AND CHALLENGES |
| 05:45 pm – 06:15 pm | Maria Garci Juenger, University of Texas-Austin, USA EXAMINING CEMENT HYDRATION IN SITU USING SOFT-XRAY TRANSMISSION MICROSCOPY |
| 06:15 pm – 06:45 pm | Anton K. Schindler, Auburn University, USA INFLUENCE OF MINERAL ADMIXTURES ON THE HEAT OF HYDRATION OF CONCRETE |
| 06:45 pm – 07:15 pm | Open Discussion |
| 7:15 pm – 09:00 pm | Dinner |
| 9:00 pm – 10:00 pm | Opening Reception |

Monday, August 11

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| 7:00 am – 8:30 am | Breakfast |
| 8:45 am | Session 2: Thermal volume change, chemical shrinkage, self-dessication Session Leader: Erik Sellevold, Norwegian University of Science and Technology, Norway |
| 8:45 am – 9:30 am | Erik Sellevold, Norwegian University of Science and Technology, Norway THERMAL EXPANSION COEFFICIENT (CTE) OF CEMENT PASTE: EFFECT OF MOISTURE CONTENT |
| 9:30 am – 10:00 am | Jan-Erik Jonasson, Lulea University of Technology, Sweden SPLITTING OF THERMAL DILATATION AND SHRINKAGE IN EARLY AGE CONCRETE |
| 10:00 am – 10:30 am | Coffee Break |
| 10:30 am – 11:00 am | Thomas A. Bier, Technische Universitat Bergakademie Freiberg, Germany EARLY SHRINKAGE AND MICROSTRUCTURE IN RAPID SETTING MORTARS |
| 11:00 am – 11:30 am | Tor Arne Hammer, SINTEF, Norway FUNDAMENTAL ASPECTS REGARDING THE PORE WATER PRESSURE AND VOLUME CHANGE OF CONCRETE BEFORE AND DURING SETTING |
| 11:30 am – 12:00 noon | Open Discussion |
| 12:15 pm – 01:30 pm | Lunch |
| 01:30 pm – 04:00 pm | <i>ad hoc</i> discussion/free time for recreation |
| 04:00 pm – 04:30 pm | Afternoon Coffee |
| 04:30 pm | Session 3: Autogenous shrinkage and self-curing strategies Session Leader: Ole Jensen, Technical University of Denmark |
| 04:30 pm - 5:15 pm | Ole Jensen, Technical University of Denmark TECHNIQUES FOR INTERNAL WATER CURING OF CONCRETE |

05:15 pm – 05:45 pm E.A.B. Koenders, Delft University of Technology, The Netherlands
MOISTURE FLOW BY MICRO-STRUCTURAL CONTRACTION

Monday, August 11 - continued

05:45 pm – 06:15 pm Pietro Lura, Technical University of Denmark
MEASUREMENT OF WATER TRANSPORT FROM SATURATED
PUMICE AGGREGATES TO HARDENING CEMENT PASTE

06:15 pm – 06:45 pm Neal S. Berke, W. R. Grace and Co, USA
EFFECTIVENESS OF SHRINKAGE REDUCING ADMIXTURES IN
REDUCING TOTAL SHRINKAGE

06:45 pm – 07:15 pm Open Discussion

07:15 pm – 09:00 pm Dinner

09:00 pm – 10:00 pm Social Hour

Tuesday, August 12

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| 7:00 am – 8:30 am | Breakfast |
| 8:45 am | Session 4 (concurrent with 5): New microstructure characterization techniques Session Leader: Kim Kurtis, USA |
| 08:45 am – 09:30 am | Kim Kurtis, Georgia Institute of Technology, USA MICROSCOPY OF CEMENT-BASED MATERIALS: SHOULD WE CONSIDER A BIOLOGICAL APPROACH? |
| 09:30 am – 10:00 am | Thomas Van Dam, Michigan Technological University, USA APPLICATIONS OF THE X-RAY MICROSCOPE TO THE CHARACTERIZATION OF CONCRETE MICROSTRUCTURE |
| 10:00 am – 10:30 am | Coffee Break |
| 10:30 am – 11:00 am | Paul Stutzman, NIST, USA IMAGING CEMENT MICROSTRUCTURE BY SCANNING ELECTRON MICROSCOPY |
| 11:00 am – 11:30 am | P.A.M. Basheer, Queen's University Belfast INTERFACIAL POROSITY OF CONCRETE USING GAUSSIAN SEGMENTATION AND MANUAL THRESHOLDING OF BSE IMAGES |
| 11:30 am – 12:00 noon | Open Discussion |
| 08:45 am | Session 5 (concurrent with 4): Transport and Rate-Controlled Processes Session Leader: Doug Hooton, Canada |
| 08:45 am – 09:30 am | Doug Hooton, University of Toronto, Canada STUDIES ON DEVELOPMENT OF NEAR-SURFACE, FLUID PENETRATION RESISTANCE OF CONCRETE FOR USE IN SELECTING APPROPRIATE CURING REGIMES |
| 09:30 am – 10:00 am | Yunping Xi, University of Colorado, USA A NEW TESTING METHOD FOR DETERMINING THE COUPLING EFFECT OF CHLORIDE DIFFUSION ON MOISTURE TRANSFER IN CONCRETE |
| 10:00 am – 10:30 am | Coffee |

Tuesday, August 12 - continued

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| 10:30 am – 11:00 am | Susanne Kasperek, Institute of Building Physics and Material Science, University of Essen, Germany TEMPERATURE AND MOISTURE DISTRIBUTION IN CONCRETE CAUSED BY TRANSPORT UNDER FREEZE-THAW ATTACK - CONSEQUENCES FOR TESTING |
| 11:00 am – 11:30 am | Kenneth A. Snyder, NIST, USA PHYSICO-CHEMICAL TRANSPORT-REACTION SERVICE LIFE COMPUTER MODELS: A THERMODYNAMIC APPROACH TO PERFORMANCE PREDICTION OVER VARYING TIME SCALES |
| 11:30 am – 12:00 noon | Open Discussion |
| 12:15 pm – 01:30 pm | Lunch |
| 01:30 pm – 04:00 pm | Poster Session |
| 04:00 pm – 04:30 pm | Afternoon Coffee |
| 04:30 pm | Session 6: Drying shrinkage and creep & elastic properties Session Leader: Kosta Kovler, Technion, Israel |
| 04:30 pm – 05:15 pm | Kosta Kovler, Technion, Israel HISTORICAL REVIEW AND FUTURE TRENDS OF SHRINKAGE AND CREEP RESEARCH |
| 05:15 pm – 05:45 pm | Shingo ASAMOTO, The University of Tokyo, Japan INFLUENCE OF LIQUID CHARACTERISTIC AND ITS DISTRIBUTION IN MICRO-PORE ON TIME-DEPENDENT MECHANICAL BEHAVIOR OF CONCRETE |
| 05:45 pm – 06:15 pm | Emmanuel K. Attiogbe, Master Builders, Inc., USA CRACKING POTENTIAL OF CONCRETE UNDER RESTRAINED SHRINKAGE |
| 06:15 pm – 06:45 pm | J. J. Beaudoin, National Research Council, Canada DIMENSIONAL CHANGE AND ELASTIC BEHAVIOR OF HARDENED PORTLAND CEMENT PASTE, MONTMORILLONITE AND 1.4 NM TOBERMORITE: A COMPARATIVE STUDY |
| 06:45 pm – 07:15 pm | Open Discussion |
| 07:15 pm | Dinner |

09:00 pm – 10:00 pm

Poster Session continued with Social Hour

Wednesday, August 13

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| 07:00 am – 08:30 am | Breakfast |
| 08:45 am | Session 7 Volume change from deleterious chemical reactions Session Leader: Paulo Monteiro, USA |
| 08:45 am – 09:30 am | Paulo Monteiro, University of California - Berkeley, USA VOLUME CHANGES DUE TO DELETERIOUS REACTIONS |
| 09:30 am – 10:00 am | Carolyn Hanson, University of Waterloo, Canada CORROSION OF REINFORCING STEEL IN CRACKED HIGH PERFORMANCE CONCRETE |
| 10:00 am – 10:30 am | Coffee Break |
| 10:30 am – 11:00 am | Sidney Diamond, Purdue University, USA DRY DENSIFIED SILICA FUME - IS IT WHAT THEY SAY IT IS? |
| 11:00 am – 11:30 am | C.P. Ostertag, University of California - Berkeley, USA EFFECT OF STEEL MICROFIBERS ON EXPANSION, REACTION PRODUCTS AND MECHANICAL PROPERTIES DUE TO ALKALI SILICA REACTION |
| 11:30 am – 12:00 noon | Open Discussion |
| 12:15 pm – 01:30 pm | Lunch |
| 01:30 pm – 04:00 pm | <i>ad hoc</i> discussion/free time for recreation |
| 04:00 pm – 04:30 pm | Afternoon Coffee |
| 04:30 pm - | Session 8 Cracking and Fracture Session Leader: Henrik Stang, Denmark |
| 04:30 pm – 05:15 pm | Henrik Stang, Technical University of Denmark CRACKING AND FRACTURE IN EARLY AGE CONCRETE |
| 05:15 pm – 05:45 pm | Jason Weiss, Purdue University, USA TIME-DEPENDENT FRACTURE PROCESSES IN VOLUMETRICALLY RESTRAINED FIBER REINFORCED CONCRETE |
| 05:45 pm – 06:15 pm | Nick Buenfeld, Imperial College, London HEALING OF CRACKS IN CONCRETE |

Wednesday, August 13 - continued

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| 06:15 pm – 06:45 pm | E. Schlangen, Delft University of Technology, The Netherlands MULTI-SCALE MODELING OF CRACK FORMATION IN THE CONCRETE COVER ZONE |
| 06:45 pm – 07:15 pm | Open Discussion |
| 07:15 pm | Dinner |
| 09:00 pm – 10:00 pm | Social Hour |

Thursday, August 14

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| 07:00 am – 08:30 am | Breakfast |
| 08:45 am | Session 9 Service Life -- modeling, transport, and forensic issues Session Leader: Mike Thomas, University of New Brunswick, Canada |
| 08:45 am – 09:30 am | Mike Thomas, University of New Brunswick, Canada ISSUES RELATED TO SERVICE LIFE MODELS FOR REINFORCED CONCRETE STRUCTURES |
| 09:30 am – 10:00 am | Vellore Gopalaratnam, University of Missouri-Columbia, USA HIGH PERFORMANCE CONCRETE FOR BRIDGE APPLICATIONS – ISSUES RELATED TO DURABILITY AND TIME-DEPENDENT RESPONSE |
| 10:00 am – 10:30 am | Coffee Break |
| 10:30 am – 11:00 am | Daniel P. Johnston, South Dakota Department of Transportation, USA IMPLICATIONS OF EXISTING ALKALI-SILICA REACTION FOR REPAIR AND REHABILITATION OF PCC PAVEMENTS AND STRUCTURES |
| 11:00 am – 11:30 am | Doug Burke, NFESC (U.S. Navy) PREDICTION OF THE LONG-TERM DURABILITY OF LIGHTWEIGHT AGGREGATE CONCRETE MIXTURES UNDER SEVERE MARINE ENVIRONMENT |
| 11:30 am – 12:00 noon | Open Discussion |
| 12:15 pm | Boxed lunch and Departure |

POSTER SESSION, Tuesday, August 12

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| David A. Lange, University of Illinois, USA | MEASUREMENT AND INTERPRETATION OF INTERNAL RELATIVE HUMIDITY IN CONCRETE |
| A. Palomo, 'Eduardo Torroja' Institute, Spain | ALKALI-ACTIVATED FLY ASH CONCRETE: SOME IMPORTANT DIFFERENCES WITH THE OPC CONCRETE |
| A. Shvarzman, Negev Academic College of Engineering, Israel | MECHANISMS OF HYDRATION, PROPERTIES AND MICROSTRUCTURE OF CEMENTITIOUS SYSTEMS MADE WITH METAKAOLIN |
| A.J. Breunese, TNO Building and Construction Research, The Netherlands | TENSILE PROPERTIES OF CONCRETE DURING FIRE |
| Agnes Nagy, Jönköping University, Sweden | EFFICIENCY ASSESMENT OF CRACK CONTROL MEASURES IN EARLY AGE CONCRETE STRUCTURES |
| Alice Pop, National Institute for Cement CEPROCIM, Romania | EFFECT OF ACID CORROSION AT CURING CEMENT TYPE I |
| Anton K. Schindler, Auburn University | PREDICTION OF CONCRETE SETTING |
| Chunxiang Qian, Southeast University, China | EARLY CRACK RESISTANCE AND FIRE SPALLING ALLEVIATION OF CONCRETE BY ADDITION OF POLYPROPYLENE FIBERS |
| David Trejo, Texas A&M University, USA | IDENTIFICATION AND CHARACTERIZATION OF CONCRETE MATERIAL PARAMETERS INFLUENCING CORROSION-INDUCED CRACKING |
| Edward C. Vincent, Virginia Tech, USA | COMPRESSIVE CREEP OF A LIGHTWEIGHT, HIGH STRENGTH CONCRETE MIXTURE |
| Fumiaki Matsushita, Sumitomo Metal Mining Siporex Co., Ltd, Japan | CALCIUM SILICATE STRUCTURE AND CARBONATION SHRINKAGE OF A TOBERMORITE-BASED MATERIAL |
| Gary S. Wojcik, National Institute of Standards and Technology, USA | THE INFLUENCE OF THE ATMOSPHERE ON CURING CONCRETE TEMPERATURES AND MATURITY |
| Guang Ye, Delft University of Technology, The Netherlands | A MODEL FOR PERMEABILITY OF POROUS CEMENTITIOUS MATERIAL VALIDATED WITH EXPERIMENTS |
| Ha-Won Song, Yonsei | MICROSTRUCTURE-BASED |

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| University, Japan | ESTIMATION OF DIFFUSIVITY AND PERMEABILITY OF SILICA FUME CONCRETE |
| J. Mauricio Ruiz, The Transtec Group, Inc., USA | PREDICTION OF HEAT TRANSPORT IN CONCRETE MADE WITH BLAST FURNACE SLAG AGGREGATE USING THE HIPERPAV MODEL |
| Jan-Erik Jonasson, Luleå University of Technology, Department of Civil and Mining Engineering | FULL SCALE LABORATORY TESTS OF RESTRAINT SITUATION IN WALL ON SLAB |
| Jan-Erik Jonasson, Lulea University of Technology, Sweden | MODELLING OF CREEP AND SHRINKAGE IN HIGH PERFORMANCE CONCRETE |
| Jan-Erik Jonasson, Lulea University of Technology, Sweden | LINEAR LOGARITHMIC MODEL FOR CONCRETE CREEP - FORMULATION, EVALUATION AND PREDICTION FORMULAS |
| Jason H. Ideker, The University of Texas at Austin, USA | DO SILICA FUME AGGLOMERATES CAUSE ASR RELATED EXPANSION? |
| Kamran M. Nemati, University of Washington, USA | PREDICTING ELASTIC MODULI OF CONCRETE USING MOLTEN METAL INJECTION METHOD |
| Kazuo Yamada, Taiheiyo Cement Corp., Japan | WORKING MECHANISM OF A SHRINKAGE-REDUCING SUPERPLASTICIZER OF NEW GENERATION |
| Kevin L.Rens, University of Colorado at Denver, USA | THE MATURITY METHOD USING VARIABLE TEMPERATURE |
| Long-yuan Li, Aston University, UK | MODELLING OF CRACK CLOSURE OF REINFORCED CONCRETE BY ELECTRODEPOSITION TECHNIQUE |
| M. Boulfiza, University of Saskatchewan, Canada | EFFECTS OF EVOLVING CRACKS ON CHLORIDES PENETRATION IN CONCRETE UNDER EXTERNAL LOADING |
| M. Naderi, Imam Khomeini International University, Iran | ASSESSING THE EFFECTS OF DIFFERENT CURING SYSTEMS ON CONCRETE COVER USING FRICTION-TRANSFER METHOD |
| M. Toader, CEPROCIM S.A., Romania | PROPERTIES OF LOCAL BLAST FURNACE SLAG AND THEIR USE IN III/A CEMENT TYPE |
| M. Toader, CEPROCIM S.A., Romania | PROPERTIES OF LOCAL BLAST FURNACE SLAG AND THEIR USE IN III/A CEMENT TYPE |

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| M.A.Taher, Al-Azhar Univ., Assiut, Egypt | EFFECT OF HEAT TREATMENT ON THE BRHAVIOR OF MONTMORILLONITE CLAY IN PRESENCE OF LIME |
| M.R. de Rooij, TNO Building and Construction Research | PREDICTIONS OF CHLORIDE PENETRATION BASED ON CHLORIDE PROFILE ANALYSIS |
| Mamadou Fall, University of Quebec in Abitibi- Temiscamingue, Canada+B14 | AN EFFICIENT AND ROBUST STATISTICAL MODELING APPROACH TO EVALUATE THE EFFECT ON INTERNAL SULPHATE ATTACK ON PASTE BACKFILL STRENGTH |
| Marten Larson, Lulea University of Technology, Sweden | ESTIMATION OF CRACK RISK IN EARLY AGE CONCRETE´ - SIMPLIFIED DIRECT METHODS FOR PRACTICAL USE |
| Martin Nilsson, Luleå University of Technology, Sweden | DETERMINATION OF RESTRAINT I EARLY AGE CONCRETE WALLS ON SLABS |
| Mauricio Lopez, Georgia Institute of Technology, USA | STRAIN DISTRIBUTION AND DEFORMATION MECHANISMS IN CREEP OF HIGH PERFORMANCE LIGHTWEIGHT CONCRETE |
| Mickael Theyry, Laboratoire Central des Ponts et Chaussées, France | EFFECT OF CARBONATION ON DENSITY, MICROSTRUCTURE AND LIQUID WATER SATURATION OF CONCRETE |
| Øyvind Bjøntegaard, The Norwegian University of Science and Technology, Norway | CRACKING TENDENCY OF HPC DURING THE FIRST HOURS AFTER SETTING: RELATION BETWEEN FRESH CONCRETE PROPERTIES AND EARLY AUTOGENOUS SHRINKAGE |
| P.A. Muhammed Basheer, Queen's University Belfast | STRENGTH AND DRYING SHRINKAGE PROPERTIES OF CONCRETE CONTAINING FURNACE BOTTOM ASH AS FINE AGGREGATE |
| Peeyush Kumar, Institute of Technology, Banaras Hindu University, India | SELF-COMPACTING CONCRETE METHODS OF TESTING AND DESIGN |
| Stephanie Staquet, University of Brussels, Belgium | EFFECTS OF HEAT TREATMENT ON CREEP FUNCTIONS OF HPC LOADED AT VERY EARLY AGE |
| Tetsuya Ishida, University of Tokyo, Japan | MODELING OF CHLORIDE EQUILIBRIUM AND TRANSPORT IN CEMENTITIOUS MATERIALS |
| V. Baroghel-Bouny, Laboratoire Central des Ponts | AUTOGENOUS DEFORMATIONS OF CEMENT PASTES: MICRO-MACRO |

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| et Chaussées, France | RELATIONSHIPS AND THRESHOLD EFFECTS |
| Will Hansen, University of Michigan, USA | THERMAL COEFFICIENT OF EXPANSION OF WATER-SATURATED COARSE AGGREGATE -AMBIENT AND SUB-AMBIENT TEMPERATURE RANGE |
| Xiaoqiang Hou, University of Illinois at Urbana-Champaign, USA | THE STRUCTURE OF ASR GEL AND ITS RELATIONSHIP TO C-S-H |
| Xiaosheng Wei, Hong Kong University of Science and Technology | INFLUENCE OF THE SUPERPLASTICIZER ON THE EARLY BEHAVIOR OF PORTLAND CEMENT USING ELECTRICAL RESISTIVITY |
| Zhaozhou Zhang, Boral Material Technologies, Inc., USA | DELAYED ETTRINGITE FORMATION: SEQUENCE OF EVENTS |