Program

SHOTCRETE FOR UNDERGROUND SUPPORT X

September 12 – 16, 2006

Hilton Whistler Resort & Spa
4050 Whistler Way - Whistler, BC, Canada  V0N 1B4
Tel: 1-604-966-5013  --  Fax: 1-604-966-5092

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American Shotcrete Association
University of British Columbia
International Tunnelling Association

Conference Chair

Dr. D. R. (Rusty) Morgan
AMEC Earth & Environmental, Canada

Conference Co-Chair

Dr. Harvey Parker
Harvey Parker & Associates Inc., USA
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Gold Level:
- BASF
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- Propex Concrete Systems
- AMBEX Concrete Technologies
- Johnson Western Gunite
Tuesday, September 12, 2006

4:30 pm – 6:30 pm  Registration
            Sign-up for Optional Tours

6:00 pm – 6:45 pm  Welcome Reception

6:45 pm – 8:30 pm  Welcome Dinner

8:30 pm – 9:15 pm  Social Hour

**Important Notes**

Breakfasts are in the hotel restaurant “CBG” (via voucher)

Lunches and dinners – Mt. Currie South

Technical sessions – Mt. Currie North

Please wear your name badge at all conference functions – it admits you to meals and identifies you as a conference participant.

Audio taping, videotaping and photography of presentations are prohibited.

Please do not smoke at any conference functions.

Turn your cell phones to *vibrate or off* during technical sessions.

Optional Recreational Activities are available for Thursday afternoon:
  Nairn Falls Nature Walk/Hike
  Green Lake Guided Canoeing or Kayaking Tour
Please sign up with ECI prior to Monday, September 11\textsuperscript{th} at 12 noon.
Wednesday September 13, 2006

7:30 am – 9:00 am  Breakfast (in Hotel Restaurant “CBG” via voucher)

9:00 am – 9:15 am  Opening Comments: ECI – Herbert Klapperich, Technical Liaison

9:15 am – 9:30 am  Conference Chair opening address, D. R. Morgan, AMEC Americas Ltd., Vancouver, BC, Canada

9:30 am – 12:00 pm  Session I: Standards and Specifications
                     Session Chair: Harvey Parker, Seattle, Washington, USA

9:30 am – 10:00 am  Keynote Paper: Activities of the ITA Working Group on Shotcrete Use
                     Tarcisio Celestino, University of Sao Paulo, Brazil and
                     Atsumu Ishida, Denki Kagaku Kogyo Co. Ltd., Niigata, Japan

10:00 am – 10:30 am  Standards, Test Methods and Guides for Shotcrete Ground Support
                      Peter Tatnall, Performance Concrete Technology, Marietta, Georgia, USA

10:30 am – 11:00 am  Coffee Break

11:00 am – 11:30 am  ACI Guide for Underground Shotcrete Specification
                      Harvey Parker, Harvey Parker and Associates, Seattle, Washington and
                      Chris Breeds, Sub-Terra Inc., Seattle, Washington, USA

11:30 am – 12:00 pm  Recommendations for Shotcreting (draft) Part Tunnels by NATM by The
                      Japan Society of Civil Engineers
                      Taketo Uomoto, The University of Tokyo, Tokyo, Japan and
                      Chikanori Hashimoto, The University of Tokashima, Tokashima, Japan.

12:00 pm – 1:00 pm  Lunch

1:00 pm – 5:30 pm  Session II: Shotcrete Research and Testing
                    Session Chair: Stefan Bernard, TSE Pty, Ltd., Sydney, NSW, Australia

1:00 pm – 1:30 pm  Keynote Paper: Bringing Science to an Art: A Decade of Shotcrete Research at the University of British Columbia
                    Nemkumar Banthia and Sidney Mindess
                    University of British Columbia, Vancouver, BC, Canada

1:30 pm – 2:00 pm  A Decade of Shotcrete Research at Laval University
                    Marc Jolin and Benoit Bissonnette, Laval University, Quebec City,
                    Quebec, Canada
Wednesday September 13, 2006 (continued)

1:30 pm - Abstract only  
*An Application for Bayesian Statistics for Monitoring the Thickness of Shotcrete Linings*  
Haken Stille, Royal Institute of Technology Stockholm,  
Mats Holmberg, Tunnel Engineering AB, Nykoping and  
Tomas Franzen, Swedish Rock Engineering Research, Stockholm, Sweden

2:00 pm – 2:30 pm  
*Design of Bolt-Anchored Reinforced Shotcrete Linings Subjected to Impact Loadings*  
Jonas Holmgren and A. Ansell, Royal Institute of Technology, Stockholm, Sweden

2:30 pm – 3:00 pm  
*Applicability of Shotcrete for NATM Using Blast Furnace Slag Cement*  
Satsumo Yoshida and F. Taguchi, Civil Engineering Research Institute of Hokkaido, Hiragishi and S. Yamanaka and H. Sato, Hokkaido Development Bureau, Ministry of Land Infrastructure and Transport, Hokkaido, Japan

3:00 pm – 3:30 pm  
Coffee Break

3:30 pm – 4:00 pm  
*Behaviour of Concrete Panels Reinforced with Welded Wire Fabric and Fibres Under Impact Loading*  
Hanfeng Xu and Sidney Mindess, University of British Columbia, Vancouver, BC, Canada

4:00 pm – 4:30 pm  
*Shotcrete with High Strength at Early Age*  
A. Ishida, Denki, Kaguku Kogyo Co. Ltd., Niigata, Japan

4:30 pm - 5:00 pm  
Open Discussion on Shotcrete Research and Testing

6:30 pm – 7:00 pm  
Social Hour

7:00 pm – 9:00 pm  
Dinner/Informal Discussions
Thursday September 14, 2006

7:30 am – 9:00 am  Breakfast (in Hotel Restaurant “CBG” via voucher)

9:00 am – 12:00 pm  **Session III: Fibre Reinforced Shotcrete**  
                        Session Chair: Pete Tatnall, Marietta, Georgia, USA

9:00 am – 9:30 am  **Keynote paper: High Dosages of Set Accelerators in Fibre Reinforced Shotcrete**  
                        Stefan Bernard, TSE Pty. Ltd., Sydney, NSW, Australia, O. Jerlin and K. Lennesjo, Royal Institute of Technology, Stockholm, Sweden

9:30 am – 10:00 am  **Deformation of Round Determinate Panels Containing Fibres**  
                        Hanfeng Xu, Quian Gu and Sidney Mindess, University of British Columbia, Vancouver, BC, Canada

10:00 am – 10:30 am  **Strength and Deformability Anisotropy of Fibre Reinforced Shotcrete**  
                        Tarcisio Celestino, G.R. de Castro, P. Vessaro, A.A. Borto Lucci and O.J. Santos, University of Sao Paulo, Sao Paulo, Brazil

10:30 am – 11:00 am  Coffee Break

11:00 am – 11:30 am  **Fibre Reinforced Shotcrete: The Effect of Spraying Process**  
                        Vivek Bindiganavile, University of Alberta, Edmonton and Nemkumar Banthia, University of British Columbia, Vancouver, BC, Canada

11:30 am – 12:00 pm  **The Influence of Curing on the Mechanical Performance of Fibre Reinforced Shotcrete**  
                        Stefan Bernard, TSE Pty. Ltd., Sydney, NSW, Australia

12:00 pm – 1:00 pm  Lunch

1:00 pm – 6:00 pm  Free Time (Recreational Activities and/or ad hoc discussions)

6:00 pm – 7:30 pm  Dinner/Informal Discussion

7:30 pm – 9:30 pm  **Session III (continued) Fibre Reinforced Shotcrete**  
                        Session Chair: David Wood, Sudbury, Ontario, Canada

7:30 pm - 8:00 pm  **Behaviour and Performance of Macro-Synthetic Fibres in Dry-Mix Shotcrete**  
                        Jean-Francois Dufour, KPM Industries Montreal, Quebec, Jean-Francois Trottier and Dean Forgeron, Dalhousie University, Halifax, Nova Scotia, Canada,
Thursday September 14, 2006 (continued)

8:00 pm – Abstract only  
**Application of High Performance Fibre Reinforced Shotcrete for Tunnel Primary Support**  
Marijan Skazlic and Z. Skazlic, University of Zagreb, and Kaciceva, Zagreb and J. Majer Transportation Department, Institute of Civil Engineering, Zagreb, Croatia

8:00 pm – 8:30 pm  
**Steel Versus Synthetic Fibre Reinforcement in Shotcrete**  
Royce Ratcliffe, Bekaert Onesteel Fibres Australasia, Perth, Western Australia

8:30 pm – 9:00 pm  
Open Discussion Session on Fibre Reinforced Shotcrete

9:00 pm – 10:00 pm  
Social Hour
Friday September 15, 2006

7:30 am – 9:00 am  Breakfast (in Hotel Restaurant “CBG” via voucher)

9:00 am – 12:00 pm  Session IV: Shotcrete in Tunnels
Session Chair: George Yoggy, GCS, LLC, Allentown, Pennsylvania, USA

9:00 am – Abstract only  Shotcrete Under Squeezing Rock Conditions During the Construction of the Multifunctional Station Faido
Daniel Sporri, Consorto TAT Faido, and Gustav Bracher, Sika Schweiz AG, Widen, Gotthard Base Tunnel, Switzerland

9:00 am – 9:30 am  Keynote paper: Beacon Hill Station Shotcrete Application
J. Laubbichler, Design Engineer, Dr. G. Sauer Corp., Stephen Redmond, Obayashi Corp., and Zephaniah Varley, Parsons Brinkerhoff, Seattle, Washington, USA

9:30 am – 10:00 am  Shotcrete Support for the Seymour Shaft and Shaftbase TBM Launch Chamber, Seymour Capilano Twin Tunnels Project, Vancouver, BC, Dean Brox, Hatch Mott MacDonald, Christian Genschel, and Josef Messner, Bilfinger Berger Canada, Andy Saltis, Pacific Liaicon and Associates and Tom Morrison, Greater Vancouver Water District, Vancouver, BC, Canada

10:00 am – 10:30 am  Coffee Break

10:30 am – 11:00 am  Seismic Retrofit of Undersea Massey Tunnel with Reinforced Shotcrete, Dudley Morgan, AMEC Americas Limited, Keith Kazakoff, British Columbia Ministry of Transportation and Hisham Ibrahim, Buckland and Taylor, Vancouver, BC, Canada

11:00 am – 11:30 am  Thermal Barriers and Fibre Concrete - Roles in Passive Fire Protection of Tunnels
Thomas Melbye and Ross Dimmock, UGC International, Division of BASF Admixtures Inc./Master Builders, Switzerland

11:30 am – 12:00 pm  Open Discussion Session on Shotcrete in Tunnels

12:00 noon – 1:00 pm  Lunch
**Friday September 15, 2006 (continued)**

1:00 pm – 3:30 pm  **Session V: Shotcrete in Mining**  
Session Chair: Ross Dimmock, UGC, International Division of BASF Admixtures Inc./Master Builders, Switzerland

1:00 pm – 1:30 pm  **Keynote Paper: Wet-Mix Shotcrete as a Material Process and Ground Control Component of a 21st Century Mining Operation**  
Brad Knight, BASF Admixtures Inc., North Bay Ontario, Canada and Mike Rispin, BASF Admixtures Inc. Cleveland, Ohio, USA, and Ian Clegg, Clegg Consulting, Sudbury, Ontario, Canada

1:30 pm – 2:00 pm  **SCC for Underground Sprayed Concrete Application**  
Michel Lessard, Euclid Canada, St-Hubert, Quebec, Dan Millette, Euclid Chemical Company, Cleveland, Ohio, Francois Vezina, Agnico Eagle Mine, Laronde, Caddillac, Quebec, Alain Tremblay, Beton Fournier, Val d’Or, Quebec and Jean-Claude Leduc, St. Lawrence Cement, Longueuil, Quebec, Canada

2:00 pm – 2:30 pm  **Design, Testing and Implementation of In-Cycle Shotcrete in the Northern 3500 Orebody, Mt. Isa, Australia**  
David O’Toole and S. Pope, Xstrata Copper, Mt. Isa, Queensland, Australia

2:30 pm – Abstract only  **In Cycle Shotcrete for Drifting at Doz Mine PT Freeport, Indonesia**  
Glen Rotty and S. M. Parningotan, PT Freeport, Indonesia

2:30 pm – 3:00 pm  Open Discussion on Shotcrete in Mining

3:00 pm – 3:30 pm  Coffee Break

3:30 pm – 6:00 pm  **Session VI: Miscellaneous Shotcrete**  
Session Chair: Tarcisio Celestino, University of Sao Paulo, Brazil

3:30 pm – 4:00 pm  **Keynote Paper: Pumping Concrete: a Fundamental and Practical Approach**  
Marc Jolin and F. Gagnon, Laval University, Quebec, F. Chapdelaine, Direction Generale des Technologies de l’information et des communications, Quebec, and Denis Beaupré, Unibeton Readymix, Abu Dhabi, United Arab Emirates

4:00 pm – 4:30 pm  **Lessons Learned from a Successful Shotcrete Repair**  
Paul D. Carter, CH2M Hill, Edmonton Alberta and Jim Wong, Alberta Transportation, Edmonton, Alberta, Canada

4:30 pm – 5:00 pm  **The Advantages of Using Preblended Dry Materials for Wet-Mix Shotcrete**  
Mike Ballou, Sika USA Tunnelling and Mining, Taylorsville, Utah, USA, and Mark Lukkarila, Spec Mix Inc., Mendota Heights, Minnesota, USA
Friday September 15, 2006 (continued)

5:00 pm – 5:30 pm  
*Computer Controlled Application of Shotcrete; A Status Report*  
Knut Garshol, Degussa UGC Latin America, Miami, Florida and  
C. Ziegler Switzerland AG, Winterthur, Switzerland

5:30 pm – 6:00 pm  
Closing address: Conference Co-chair Harvey Parker, Seattle,  
Washington, USA

7:00 pm – 7:45 pm  
Pre dinner reception

7:45 pm – 10:00 pm  
Conference Banquet and Cultural Event
Saturday, September 16, 2006

9:00 am  Farewell breakfast (in Hotel Restaurant “CBG” via voucher) and departure