FRPRCS-9

9th International Symposium on Fiber Reinforced Polymer Reinforcement for Concrete Structures

Current Challenges and Future Trends

Monday 13 - Wednesday 15 July 2009

Four Points Darling Harbour Sydney

Professor Sami Rizkalla

Professor Rizkalla is currently a Distinguished Professor of Civil Engineering and Construction and the Director of the Constructed Facilities Laboratory at North Carolina State University. He is also the Director of the National Science Foundation Industry/University Collaborative Research Center on Repair of Buildings and Bridges with Composites at North Carolina State University.

Professor Chris Burgoyne

Chris Burgoyne is Reader in Concrete Structures at the University of Cambridge, where he has been working since 1989. He has been involved with the use of high strength fibres for applications in Structural Engineering since 1982, when he was working at Imperial College in London. His initial studies concentrated on the use of aramid ropes as prestressing tendons for concrete structures, and stay cables for bridges. Later work has studied the use of aramid fibre spirals for containment of compression zones, and the application of fracture mechanics to the breakdown of bond with CFRP plates. He has presented keynote and invited lectures at many international conferences.

Professor Jin-Guang Teng

Dr. Jin-Guang Teng is Chair Professor of Structural Engineering, Dean of the Faculty of Construction and Land Use, and Associate Vice President of The Hong Kong Polytechnic University. His research interests include the application of fibre-reinforced polymer (FRP) composites in construction, steel structures, shell structures, and structural mechanics. He is the author/co-author of over 320 papers and book chapters, including some 120 SCI journal papers and over 30 other refereed journal papers . In addition, he is the lead author of the book "*FRP-Strengthened RC Structures*" published by John Wiley and Sons in 2002 . From 2003 to 2006, Professor Teng served as the founding President of the *International Institute for FRP in Construction* (IIFC) , the leading international organisation dedicated to the advancement of the understanding and the application of FRP composites in the civil infrastructure. He is also the Editor-in-Chief of the international journal *Advances in Structural Engineering* and a member of the editorial boards of 5 other international journals.

Dr. Jian-Fei Chen

Dr. Jian-Fei Chen is a Reader at Edinburgh University, U.K. He has research experience in many areas of structural engineering including the behaviour and modeling of FRP-strengthened concrete structures, solids flow & wall pressures in silos, and shell structures. He has authored or co-authored over 120 refereed publications, including the book "FRP-Strengthened RC Structures" published by Wiley in 2002. Dr. Chen is a Vice President of the International Institute for FRP in Construction (IIFC) and co-chairs the IIFC Working Group on Bond Behaviour of FRP in Structures. He is the recipient of several awards including the Howard Medal 2004 awarded by the Institution of Civil Engineers.

FRPRCS-9 Full Paper Submission Guidelines

General Instructions

Authors of accepted abstracts should submit **online** to the Symposium Secretariat a **full paper of 4 pages** (in case of shorter papers the number of pages should be **even**, e.g 2) on or before Friday 12 December 2008.

Previously submitted abstracts of accepted authors will be included in the printed volume of the Symposium Proceedings with full papers being included in the CD-ROM of the Proceedings.

Papers that do not conform will be returned to the authors to be revised. Failure to comply with these rules will result in rejection of the paper. Acknowledgement of sponsorship at the end of a paper is both appropriate and acceptable.

4. *Clearances:*
The authors are responsible for obtaining written permission to profile the project or subject matter in their paper(s) from any and all clients, owners or others who contracted for the work. Symposium organisers assume that authors have obtained the proper permission. Symposium organisers assume no liability for the authors' failure to gain proper permission.

5. *Copyright material:*
It is the authors' responsibility to obtain copyright permissions for reproducing any materials, such as figures, tables or photographs, published in any other source. The source of the reproduced material should be referenced in an appropriate way in the paper as well, for example in the caption of tables, figures or photographs. Reference of the source does not waive the authors' responsibility to obtain reproduction permission. Symposium organisers assume the authors have obtained the proper permission. Symposium organisers assume no liability for the authors' failure to gain proper permission.

6. *Assignment of Copyright:*
All authors (or one of the authors as authorised agent) will be requested to sign a Copyright Transfer Form and send it by Email (scanned original) or Fax to the Symposium Secretariat to allow including their paper(s) in the Symposium Proceedings once their paper has been accepted.

FRPRCS-9 Symposium Program

Sunday 12 July 2009

1800 - 1900	**REGISTRATION**
1800 - 1900	**Welcome Reception**

Monday 13 July 2009

0800	**REGISTRATION**			
0900 - 1045	**SYMPOSIUM OPENING & KEYNOTE PRESENTATIONS** Room: Ballroom *Chairs: Deric Oehlers, Michael Griffith and Rudolf Seracino*			
0900 - 0915	**Symposium Welcome** Deric Oehlers			
0915 - 1000	**Advances on the use of FRP for the Precast Concrete Industry** Sami Rizkalla *Chair: Kenneth Neale*			
1000 - 1045	**Slender FRP-Confined Circular RC Columns** Jin-Guang Teng *Chair: Charles Bakis*			
1045 - 1115	**MORNING TEA**			
1115 - 1245	**Concurrent Sessions 1**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: C. Bakis*	**18. Behaviour and design of members internally reinforced with FRP** Room: Kent Room *Chair: R. Seracino*	**3. Accelerated and real time performance of FRP such as bond and strength** Room: Bridge Room II *Chair: C. Burgoyne*	**14. Bond of FRP systems to concrete or masonry** Room: Wharf Room *Chair: J.F. Chen*
1115 - 1130	**Shear Strengthening of Prestressed Concrete Girders with Externally Bonded CFrp Sheets** Michael Murphy	**Thermal effects on the Bond Properties of GFRP Rebars embedded in concrete: Experimental study and Analytical Interpretation** Radhouane Masmoudi	**Experimental Study on the Performance of FRP-to-Concrete Interfaces Subjected to Cyclic Dry/Wet Actions** Jian-Guo Dai	**Prediction of Axial Behavior of Reinforced Concrete Circular Columns with Short Term Preloading** Zheng He
1130 - 1145	**Experimental Study on FRP Shear Strengthened Full-Scale Concrete Beams** Angel Arteaga	**Thermal Cracking of Concrete Slabs Reinforced with Fibre Reinforced Polymer Bars** Mamdouh El-Badry	**Low Strength Concrete Columns Confined with CFRP: Behaviour under Temperature Changes and Loads** Ugurhan Akyuz	**Bond Behavior of Carbon Fiber Sheets to Cracked Concrete** Amr El-Dieb
1145 - 1200	**Behavior of RC t-Beams Strengthened in Shear with Externally Bonded FRP Sheets** Abdeldjelil Belarbi	**Application to PC Beam with CFRP and Material Properties of CFRP Manufactured Automatically** Kohei Yamaguchi	**Effects of Elevated Temperatures And Freeze-Thaw Cycling on FRP Laminates Behavior** Marco Di Ludovico	**Guideline for the Performance and Interpretation of Bond Tests on Concrete Specimens with Externally Bonded CFRP Strips** Wolfgang Finckh
1200 - 1215	**Analytical Evaluation of Punching Strength of Two-Way Slabs Strengthened Externally with FRP Sheets** Ahmed Farghaly	**Sectional and Arch Models for Shear Strength of FRP Reinforced Beams Without Stirrups** Matthias Andermatt	**Investigation of the Parameters Influencing FRP Shear-Strengthened Beams** Ahmed Godat	**Alternative Methods to Surface Preparation to Postpone Debonding of FRP Laminates** Ehsan Mahmoudabadi
1215 - 1230	**Flexural and Shear Strengthening of RC Columns and Beams with CFRP Sheets: A Practical Case, Compostilla Thermal Plant Power, León - Spain** Stefano Primi	**Shear Strength of Concrete Beams Reinforced with Glass Fibre Reinforced Polymer (GFRP) Bars** Md. Shah Alam	**Structural Behavior and Analysis of RC Deep Beams with Openings Strengthened in Shear Using Near Surface Mounted Technique** Khaled Heiza	**A Proposed Constitutive Law for FRP/Concrete Interfaces Based on Nonlinear Micromechanics Finite Element Analyses** Hussien Abd El Baky
1230 - 1245	**Shear Design of RC Beams Strengthened with FRP Using Genetic Algorithms** Ricardo Perera	**Stress and Strain Distribution in Concrete Beams Reinforced with FRP Bars** Tomislav Kisicek	**Rehabilitation of Precracked RC Push-off Specimens with Bi-Directional CFRP Fabrics** J. Jayaprakash	**A New Method for Interfacial Stress Analysis of Beams Bonded with a Thin Soffit Plate** Vijayabaskar Narayananamurthy
1245 - 1415	**LUNCH**			
1415 - 1545	**Concurrent Sessions 2**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: R. Kotynia*	**5. Innovations and developments in fibre composite materials and systems** Room: Kent Room *Chair: S. Rizkalla*	**3. Accelerated and real time performance of FRP such as bond and strength** Room: Bridge Room II *Chair: R. Al-Mahaidi*	**14. Bond of FRP systems to concrete or masonry** Room: Wharf Room *Chair: Z.S. Wu*
1415 - 1430	**Strength, Stiffness and Ductility of RC Beams Strengthened with FRP Sheets** Maurizio Taliano	**Maximum Shear Stress Control in Potted Anchors for Composite Rods** Charles Bakis	**An Improved Higher Order Zig-Zag Plate Model for Bending and Buckling Response of Soft Core Sandwich Plates** A.H. Sheikh	**Effective Rib Height of Deformed GFRP Rebar** DoYoung Moon
1430 - 1445	**Repair of Pre-cracked RC beams using CFRP laminates** Adel Elsafty	**Tailor-Made 3D-Reinforcements for TRC Structures** Christian Kulas	**Durability Predictions of GFRP Bars in Concrete** Julio F. Davalos	**Experimental Study of the Behavior of Various Non-Bolted Anchorages for CFRP Laminates** Ted Donchev
1445 - 1500	**External Prestressing of RC T-Beams with CFRP** Anders Bennitz	**Novel Peel-and-Stick FRP System for Confinement of Concrete** Rossella Ferraro	**Efficiency of Using Externally Bonded CFRP Laminates Under Shear-Moment Interaction Conditions** Nasir Shafiq	**Shear Strength and Behaviour of FRP Spike Anchors in Cracked Concrete** Scott Smith
1500 - 1515	**Anchorage Devices for FRP Strengthening of Concrete Structures Close to Beam-Column Joints** Valentino Paolo Berardi	**New Prestressing System for FRP Reinforcement in Concrete Structures** David Horak	**Seismic Evaluation And FRP Strengthening of Existing RC Columns Under Near Field Ground Motion** Alireza Mortezaei	**Behaviour of Externally Bonded Reinforcement Under Low Cycle Fatigue Loading** Angela Nizic
1515 - 1530	**Nonlinear Dynamic Response of Reinforced Concrete Coupling Beams Externally Bonded with FRP Sheets** Hosein Naderpour	**Possibilities of Application of Glass-fibre-concrete in Composite Steel-concrete Beams** Marcela Karmazínová	**Stepped Isostress Method for Aramid Fibres** Chris Burgoyne	**Intermediate Debonding in RC Beams Externally Strengthened By FRP: Mechanical Remarks and Simplified Formulations** Enzo Martinelli
1530 - 1545	**Flexural Strengthening of 48-Year Old Pedestrain Reinforced Concrete Bridge Girders Using Various Near-Surface Mounted FRP Systems** Raafat El-Hacha	**Evaluation of Shrinkage Cracking Properties of Fiber Reinforced Concrete with Using Plat-Ring Type Restrained Test Method** Jeong-Soo Nam	**Stress-Strain Behaviour of Concrete Cylinders Confined with CFRP Composite Fabrics** Sun Punurai	**Modeling of Bond Behavior of GFRP Bars** Jung-Yoon Lee

Please note: Committee reserves the right to alter program

FRPRCS-9 Symposium Program

1545 - 1615	**AFTERNOON TEA**			
1615 - 1745	**Concurrent Sessions 3**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: S.T. Smith*	**18. Behaviour and design of members internally reinforced with FRP** Room: Kent Room *Chair: S. Foster*	**17. Hybrid FRP-concrete structures** Room: Bridge Room II *Chair: J.G. Teng*	**2. Durability of FRP systems such as in exposure to heat, light and chemicals** Room: Wharf Room *Chair:J. Myers*
1615 - 1630	**Finite Element Modelling of FRP Strips Near-Surface Mounted to Concrete** Shishun Zhang	**Design Procedures and Detailing Guidelines for FRP Pultruded Grid Reinforced Bridge Decks** Lawrence Bank	**Investigation of a Concrete Bridge Deck Using Structural Stay-In-Place GFRP Formwork** Amir Fam	**The Role of Chemical Bonding on Durability of FRP-Reinforced Concrete** Elliot Douglas
1630 - 1645	**Plane Section Assumption for FRP Strengthened Beams** Antony Darby	**Durability and Long-Term Performance of GFRP RC Bridge Deck Slabs Subjected to Freeze-Thaw Cycles and Fatigue Loading** Ehab El-Salakawy	**Hybrid Glulam Composite Beams Reinforced with FRP and Ultra High Performance Concrete** Emmanuel Ferrier	**Performance of FRP Strengthening Systems for Concrete During Exposure to Elevated Temperatures** Luke Bisby
1645 - 1700	**Structural Performance Evaluation of Strengthening With Sprayed FRP** Chunho Chang	**Design of Concrete Bridge Deck Slabs Using Different Types of GFRP Bars** Tarik Youssef	**Development of FRP-Concrete Composite Deck with Long Span** Keunhee Cho	**Durability of RC Beams Reinforced with CFRP Sheet under Wet-Dry Environmental and Loading Conditions** Ren Huitao
1700 - 1715	**Long-Term Performance of FRP Wrapped Columns and Beams in Highly Corrosive Environment** Harshda Prasad	**Carbon Fiber Grid Reinforcement for Cast-In-Place Concrete Toppings** Rudi Seracino	**Development of a Robust Mechanical Shear Connector Between FRP and Concrete for FRP Stay-In-Place Participating Formwork** Xian Gai	**Moisture Degradation in Concrete/Epoxy Systems** Denvid Lau
1715 - 1730	**The Flexural Performance of Strengthened R.C Beams with CFRP-NSMR Method** Sung Moo Park	**Cracking Behaviour of Concrete Beams Reinforced with GFRP/Steel Wire Composite Rebars** Qingduo Hao	**Fabric Formwork for Innovative Concrete Structures** Tim Ibell	**Chemical Durability of Silicon Dioxide Coatings for FRP Tendons** Janet Lees
1730 - 1745	**Study of the Fire Behaviour of Structures Strengthened with NSM** Stijn Matthys	**Indirect Deflection Control of Concrete Slabs Reinforced With Fiber-Reinforced Polymers (FRP) Based on Calculated Deflections** Martin Kurth	**Behavior of Hybrid FRP Composite I-Girder with Concrete Deck** Allan Manalo	**Stress Transfer and Pull-Off Strength of Externally Bonded CFRP Following Sustained Loading at Elevated Temperature** Maria Lopez De Murphy
1800 - 1930	**Fun Night**			

Please note: Committee reserves the right to alter program

FRPRCS-9 Symposium Program

Tuesday 14 July 2009

0800	**REGISTRATION**			
0900 - 1030	**Concurrent Sessions 4**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: M. Green*	**10. Behaviour of FRP confined concrete** Room: Kent Room *Chair: J. Jirsa*	**18. Behaviour and design of members internally reinforced with FRP** Room: Bridge Room II *Chair: M. Guadagnini*	**14. Bond of FRP systems to concrete or masonry** Room: Wharf Room *Chair: K. Neale*
0900 - 0915	**Flexural Strengthening of Reinforced Concrete Bridge Slab Overhangs Using Near Surface Mounted Reinforcement** Lijuan Cheng	**Behaviour of FRP Wrapped Circular Concrete Columns** Muhammad Hadi	**Failure Modes in Reinforced Concrete Beams Strengthened With PBO Fiber Reinforced Cementitious Mortars (FRCM)** Luciano Ombres	**Effect of Bar Sizes on De-Bonding Load of RC Beams Strengthened with FRP Laminates** Mohammad Reza Eftekhar
0915 - 0930	**Flexural Performance of RC Beams Retrofitted Using Different FRP Systems Through Experimental Investigation** Shahab Mehdizad Taleie	**Confinement of RC Non-Circular Columns Repaired with Glass Fibre Reinforced Polymer Discrete Strips** Abdul Aziz Abdul Samad	**Concrete Shear Strength of Beams Reinforced with FRP Bars According to Flexural Reinforcement Ratio and Shear Span to Depth Ratio** Hee Jang	**Analytical Modeling of FRP-to-Concrete Bond Subjected to Combined Push-Off and Pull-Out Actions** Baolin Wan
0930 - 0945	**Study on Basic Characteristics of FRP Strand Sheets and its Flexural Strengthening Effect For RC Beams** Akira Kobayashi	**A Unified Strength Model for FRP-Confined Concrete Columns with Existing Damage** Yufei Wu	**Structural Response of Full-Scale Reinforced Concrete Columns with Internal FRP Reinforcement Under Compressive Load** Antonio De Luca	**Tests on FRP Reinforced Concrete Beams Submited to Vibrations While are Bonded** Angel Arteaga
0945 - 1000	**CFRP Application for Strengthening of Concrete Bridge Beams and Piers** Kianoush Siamardi	**External Confinement of Concrete with Post-Tensioned GFRP Sheets: A Pilot Study** Alper Ilki	**Design of FRP Reinforced Concrete Beams Against Shear Failure** Wade Lucas	**Tension of Reinforcement Bars Embedded in Concrete Prisms Strengthened with CFRP Plates** Piotr Rusinowski
1000 - 1015	**CRFP Repair of Concrete Beams Aged by Accelerated Corrosion** Julio F. Davalas	**Mohr Coulomb Model for Concrete Sections of Various Shapes Confined by FRP Jackets** Chris Pantelides	**Experimental and Numerical Evaluation of Shear Beam Behaviour Reinforced with External Cement Matrix Composites. Comparison with Beams Externally Reinforced with FRP** Amir Si Larbi	**Bond Behaviour of Different FRP Sheets** Mohamed Fahmy
1015 - 1030	**Repair of Concrete Structures Reinforced with FRP Bars** Ehab El-Salakawy	**FRP Strengthening of Full Scale PC Girders** Marco Di Ludovico	**Nonlinear Numerical Modelling of FRP-Reinforced Concrete Slabs** Y.X. (Sarah) Zhang	**The Adhesion Between FRP Reinforcement and Masonry Support** Luisa Rovero
1030 - 1100	**MORNING TEA**			
1100 - 1145	**KEYNOTE SESSION** Room: Ballroom *Chair: T. Ueda*			
1100 - 1145	**Role of Bond Modelling in Predicting the Behaviour of RC Beams Shear-Strengthened with FRP U-Jackets** Jian-Fei Chen			
1150 - 1250	**Concurrent Sessions 4**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: J. Barros*	**11. FRP retrofitting or FRP systems for blast loads** Room: Kent Room *Chair: K. Soudki*	**18. Behaviour and design of members internally reinforced with FRP** Room: Bridge Room II *Chair: E. El-Salakwy*	**9. Ductility of FRP retrofitted members** Room: Wharf Room *Chair: TBA*
1150 - 1205	**Shear Behaviour of Unreinforced Masonry Panels Retrofitted with Fibre Reinforced Polymer Strips** Robert Petersen	**Tensile Dynamic Behavior of GFRP Subjected to Controlled Strain Rates and Aging Conditions** Domenico Asprone	**Estimation of Shear Crack Induced Deformation of FRP RC Beams** Maurizio Guadagnini	**Further Investigations into the Ductility and Deformability of FRP Strengthened RC Elements** David Tann
1205 - 1220	**Rehabilitation of Existing Un-Reinforced Masonary (URM) Structures Using CFRP Fabrics** Mohammad Taghi Mansouri Kia	**Near Field Blast Resistance of Hybrid Panels Retrofited with a Polyurea System** John J. Myers	**Basalt Fibres for Reinforcing and Strengthening of Concrete** Aniello Palmeri	**Ductility Design of FRP Reinforced Concrete Beams** Matthew Haskett
1220 - 1235	**Numerical Investigation on Strengthening Performance of Shear Deficient RC Beams Bonded with CFRP Laminates** Haeng-Ki Lee	**Performance of Retrofitted Masonry Walls Under Blast Loads** Chengqing Wu	**Compressive Membrane Action in FRP Reinforced Slabs** Gobithas Tharmarajah	**Effects of CFRP Strengthening on the Moment Redistribution of Reinforced Concrete Continuous Beams** Francesco Micelli
1235 - 1250	**Modeling Issues in the Dynamic Finite Element Analysis of Masonry Walls Strengthened with Composite Materials** Ehab Hamed	**Numerical Modelling of Blast Loaded FRP Strengthened Reinforced Concrete Columns** Pat Heffernan	**Shear Analysis of Concrete Members with Fiber-Reinforced Polymers (FRP) as Internal Reinforcement** Martin Kurth	**New Design and Construction of Road Bridge in Composites Materials in Spain: Sustainability Applied to Civil Works** Stefano Primi
1250 - 1415	**LUNCH**			

Please note: Committee reserves the right to alter program

FRPRCS-9 Symposium Program

1415-1545	**Concurrent Sessions 5**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: A. H. Sheikh*	**5. Innovations and developments in fibre composite materials and systems** Room: Kent Room *Chair: I. Harik*	**17. Hybrid FRP-concrete structures** Room: Bridge Room II *Chair: A. Fam*	**12. Seismic retrofitting or seismic-resistant design with FRP systems** Room: Wharf Room *Chair: C. Pantelides*
1415 - 1430	**Stress Concentration in Cut-Off Zones of RC Beams Retrofitted with Near Surface Mounted Reinforcement: An Analytical Approach** Van Hien Nguyen	**Strengthening of Old Reinforced Concrete Structures Using Fiber Reinforced Cementitious Mortars (FRCM): A Case Study** Luciano Ombres	**Strength and Ductility of CFFT Beams Reinforced with Steel / GFRP Rebars** Radhouane Masmoudi	**Behavior of Shear Deficient RC Beam-Column Joint Strengthened with CFRP Composites Compared to Ideally Designed Joint** Yousef Al-Salloum
1430 - 1445	**Non-Linear Finite Element Analysis of RC and PC Bridge Girders Strengthened In Shear With FRP Composites** Abdeldjelil Belarbi	**Strengthening of Reinforced Concrete One-Way Slabs with Mechanically Fastened FRP Laminates** Annalisa Napoli	**Structural Behavior of FRP-Concrete Composite Deck With Concrete Wedge** Sung Yong Park	**Seismic Retrofit of Precast RC Wall Panels with Cut-Out Openings Using FRP Composites** István Demeter
1445 - 1500	**How Shear Resistance of RC Beams is Affected by Cutting Steel Stirrups for Installing NSM Laminates for the Flexural Strengthening** Joaquim Barros	**Evaluation of Strand Sheet as a new CFRP for Flexural and Shear Strengthening of RC Beams Using Polymer-Cement Pastes** Sanjay Pareek	**Composite Assembly Systems of GFRP and Polymer Based Concrete Materials** Maria Cristina Ribeiro	**Seismic Performance of FRP Retrofitted RC Bridge Piers with Explicit Consideraion of Residual Deformations** Mohamed Fahmy
1500 - 1515	**Use of ANN to Estimate Shear Capacity of FRP-RC Beams** Aly Said	**Pseudo-Static Experimental Study on the Performance of Concrete Columns Reinforced by Steel-Fiber Composite Bar (SFCB)** Zeyang Sun	**Structural Behaviour of a SFGP-RC Prototype Panel's** Salvatore Russo	**Flexural Behaviour of NSM CFRP Retrofitted Masonry Wallettes Under Static and Cyclic Loading** Michael Griffith
1515 - 1530	**An Experimental Study on Shear Resisting Effect of Reinforced Concrete Beams Filling-Up Carbon Fiber Rod Plastic** Gi-Su Ju	**Flexural Behaviour of Composite Sandwiches for Structural Applications** Allan Manalo	**Experimental Study on Hybrid FRP-Concrete Beam** Yanlei Wang	**Impact Testing of Polyurea Coated Reinforced Concrete and Hybrid Panels** John J. Myers
1530 - 1545	**Shear Reinforcement Design of Concrete Beams with FRP Using Neural Networks** Ricardo Perera	**A New Reinforcement Materials of Steel Fiber Composite Bar (SFCB) and its Mechanics Properties** Zeyang Sun	**Design of Concrete-Filled FRP Tubes: Provisions in the Chinese Code** Tao Yu	**Use of CFRP Anchors to Strengthen Lap Splices of Rectangular RC Columns** James Jirsa
1545 - 1615	**AFTERNOON TEA**			
1615 - 1745	**Concurrent Sessions 6**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: D.Oehlers*	**13. Fatigue resistance of FRP systems** Room: Kent Room *Chair: P. Hamelin*	**8. Codes and standards for FRP concrete and masonry systems / 16. Strengthening or repair of historic structures using FRP systems** Room: Bridge Room II *Chair: R. Masmoudi*	**12. Seismic retrofitting or seismic-resistant design with FRP systems** Room: Wharf Room *Chair: M. Griffith*
1615 - 1630	**Application of Fiber Reinforced Plastics for Concrete T-Beam Bridge Strengthening** Ali Asghar Moonesan	**Cycling Testing of GFRP Reinforced Concrete Bridge Slabs** Valter Carvelli	**Influence of the Percentage of Steel Stirrups in the Effectiveness of the NSM Laminates Shear Strengthening Technique** Joaquim Barros	**Performance of Exterior RC Beam-Column Joints Upgraded With CFRP Composites Under Seismic Loading** Yousef Al-Salloum
1630 - 1645	**Bond Aspects of NSM FRP Strengthened RC Beams** Renata Kotynia	**Experimental Tests on Concrete Columns. Step By Step Consolidation Procedures** Valeriu Stoian	**Experimental Research on Wood Columns Confined with Carbon Fiber Reinforced Polymers** Qingfeng Xu	**Diagonal Shear Testing of Unreinforced Brick-Masonry Wallettes Retrofitted with Carbon FRP Plates** Hamid Mahmood
1645 - 1700	**Analytical Procedure for Flexural Strengthening of Reinforced Concrete Chimneys Using Carbon Fiber Reinforced Polymer (CFRP)** Mo Ehsani	**Fatigue Performance and Modelling of Corroded RC Beams Repaired with CFRP** Stephen Foster	**Masonry Arches Reinforced with CFRP Strips** Ugo Tonietti	**Seismic Strengthening of Rectangular RC Columns With CFRPS** Günay Özcebe
1700 - 1715	**Localized NSM GFRP Rods for Strengthening RC Beams** Khaled Soudki	**Fatigue Resistance of Reinforced Concrete Beams Strengthened with CFRP Sheets** Mohsen Issa	**A Case Study on the Preservation of a Timber Structure Using GFRP Composite Systems** Woo Weng Seng	**Seismic Retrofit of Shear-Critical R.C. Beams Using CFRP** Shamim Sheikh
1715 - 1730	**Study on Flexural Capacity of RC Beams Reinforced with CFRP Sheet, CFRP Plate And CFRP Strand Sheet** Yoshihiro Takahashi	**Bond Capacitiy of Externally Bonded CFRP-Plates on RC-Structures Under Fatigue Load** Thorsten Leusmann	**The FIB Perspective on FRP Reinforcement in RC** Kyriacos Neocleous	**CFRP Seismic Collectors for Concrete Diaphragms** Owen Arthur Rosenboom
1730 - 1745	**Finite Element Modelling of FRP- and Steel- Strengthened Two-Way Slabs** Usama Ebead	**Fatigue Performance of CFRP Prestressed Concrete Lighting Poles** Janet Lees	**In-Plane Response of an Alternative URM Infill Wall System with and without a Polyurea Retrofit** John J. Myers	**Effectiveness of Seismic Retrofit of RC Beam-Column Joints with FRP Composites and Strut-and-Tie Model** Chris Pantelides
1900 - 2330	**Symposium Dinner**			

Please note: Committee reserves the right to alter program

FRPRCS-9 Symposium Program

Wednesday 15 July 2009				
0845	**REGISTRATION**			
0915 - 1045	**Concurrent Sessions 7**			
	15. Strengthening or repair of concrete or masonry structures using FRP systems Room: Ballroom *Chair: C. Wu*	**2. Durability of FRP systems such as in exposure to heat, light and chemicals** Room: Kent Room *Chair: M. Lopez de Murphy*	**19. Behaviour and design of members prestressed with FRP** Room: Bridge Room II *Chair: E. El-Salakawy*	**14. Bond of FRP systems to concrete or masonry** Room: Wharf Room *Chair: T. Ueda*
0915 - 0930	**Dynamic Properties Deterioration in FRP Strengthened Masonry Walls** Ehab Hamed	**Durability of Aramid and Carbon FRP PC Beams Under Tidal and Thermal Accelerated Exposure** Hiroshi Nakai	**Flexural Behaviour of Self-Consolidating Concrete Slabs Reinforced with GFRP Bars** Khaled Soudki	**Bond Behaviour of Various Shapes of NSM CFRP Bars and Concrete** Kalpana Perera
0930 - 0945	**FRP-Confined Masonry Columns** Francesco Micelli	**Early Life Freeze/Thaw Tests on Concrete with Varying Types of Fibre Content** Alan Richardson	**Behaviour of Concrete Column-Slab Connections Strengthened with Pre-Stressed Carbon Fibre Plates** Ahmad Abdullah	**Basic Research on the Anchorage of Textile Reinforcement in Cementitious Matrix** Enrico Lorenz
0945 - 1000	**An Experimental Investigation Into the Behaviour of a Two-Span Masonry Arch Bridge Repaired with FRP** Jian-Fei Chen	**Tensile Capacity of Stressed CFRP Strand Exposed to Extreme Aggressive Groundwater Environments** Matthew Sentry	**Prestressed Concrete Bridge Girders Strengthened with CFRP Systems** Guilherme S Melo	**Cement Based Bonding Material for FRP Strengthening of Concrete Structures** Siavash Hashemi
1000 - 1015	**Iterative Loading Test with Constant Amplitude for Flexural Reinforced RC Beams with FRP Sheet** Yusuke Kurihashi	**Investigation of CFRP-Concrete Bond Under Long-Term Exposure to Cyclic Temperature** Kumari Gamage	**Load Carrying Behavior of Flexural Reinforced RC Beams with Pre-Tensioned AFRP Sheet** Norimitsu Kishi	**The Effect of Cyclic Loading on Performance of Surface Bonded FRP Sheets on Concrete** Behnam Shadravan
1015 - 1030	**Finite Element Simulation of IC Debonding in FRP-Plated RC Beams: A Dynamic Approach** Jin-Guang Teng	**Deflection and Strain Variation of GFRP-Reinforced Concrete Beams After One Year of Continuous Loading** Tarik Youssef	**Prestressed High Strength Concrete Prisms as Reinforcement in Structural Applications** Hugues Vogel	**Increase of the Bond Capacitiy of Externally Bonded CFRP-Plates on RC-Structures Due to Self-Induced Contact Pressure** Thorsten Leusman
1030 - 1045	**Application of Carbon Fiber Reinforced Polymer in Strengthening to Shear R/C TBeams** Túlio Bittencourt	**Effect of Aggressive Environment on FRP-Concrete Bonding** Marco Savoia	**Experimental and Analytical Study on Pretensioned Inverted T-Beam with Circular Web Openings Strengthened with GFRP** Bashar Mohammed	**End Anchorage of Externally Bonded FRP Sheets for the Case of Shear Strenghtening of Concrete Girders** Michael Murphy
1045 - 1115	**MORNING TEA**			
1115 - 1245	**Concurrent Sessions 8**			
	10. Behaviour of FRP confined concrete Room: Ballroom *Chair: M. Issa*	**6. Field applications, case studies or costs of structures with FRP reinforcement** Room: Kent Room *Chair: L. Bank*	**15. Strengthening or repair of concrete or masonry structures using FRP systems / 19. Behaviour and design of members prestressed with FRP** Room: Bridge Room II *Chair: R. El-Hacha*	**4. Fire resistance of FRP systems / 7. Standardisation of FRP materials, bonding agents, and test methods** Room: Wharf Room *Chair: L. Bisby*
1115 - 1130	**FRP Strengthening of Columns Against Bars Buckling-Parametric Finite Element Analyses** Theodoros Rousakis	**Self-Supporting TRC sandwich façade** Christian Kulas	**An Experimental Study on Application of New Prestressing System for NSM Strengthening Technique** Woo-Tai Jung	**Modelling the Heat Transfer and Structural Behaviour of Plain and FRP Confined RC Rectangular Columns in Fire** Mark Green
1130 - 1145	**Effect of FRP on Behavior of Confined Lightweight Concrete Square Specimens** Asghar Vatani Oskouei	**Strengthening and Retrofit of Industrial Infrastructure with Carbon Fiber Reinforced Polymer (CFRP)** Mo Ehsani	**FRP-Prestressed Timber: Losses in Prestressing Force Due to Elastic, Creep and Shrinkage Deformations of the Timber** Maurice Brunner	**Development of Methods for Quality Control of CFRP Anchors** James Jirsa
1145 - 1200	**Influence of Concrete Strength and Fibre Type on the Compressive Behaviour of FRP-Confined High-Strength Concrete** Thomas Vincent	**Twelve Years of Field Applications of FRP Materials in Kentucky** Issam Harik	**Flexural Strengthening of a Steel Beam with Prestressed CFRP Strips - Preliminary Investigation** Khaled Soudki	**Fire Resistance of Concrete Slabs Reinforced with FRP Bars: Experimental Investigations** Emidio Nigro
1200 - 1215	**Behaviour of Concrete Filled FRP Tubes Under Eccentric Loading** Shady Hammouda	**Field Application of Seismic Retrofit System Using Carbon Fiber Sheet** Katsumi Kobayashi	**Pre-Stress Technique for the Flexural Strengthening with NSM-CFRP Strips** Joaquim Barros	**Experimental Round Robin Test on FRP-Concrete Bonding** Marco Savoia
1215 - 1230	**Evaluation of Effective Ultimate Strain of FRP Confinement Jackets Applied on Circular RC Columns** Gian Piero Lignola	**A Case Study on Structural Strengthening of Twin 50-Storey Office Towers with CFRP Composite Systems** Ong Wee Keong	**Use of Fiber Reinforced Polymers in Shear Strengthening of Reinforced Concrete Deep Beams with Openings** Tamer El Maaddawy	**Detection of Bond Defects in CFRP Sheets Bonded to Concrete Using Infrared Thermography** Jawdat Tashan
1230 - 1245	**RC Slender Columns Strengthened by CFRP Composite Fabrics Subjected to Biaxial Bending and Axial Compression** Wonsiri Punurai	**Case Studies on the Maintenance of Infrastructures Using CFRP Composite Systems** Woo Weng Seng	**Basalt Fiber Reinforced Cementitious Matrix Composites for Infrastructure Rehabilitation** Francisco J De Caso y Basalo	**Fire Resistance of Concrete Slabs Reinforced with FRP Bars: Theoretical Models** Emidio Nigro
1245 - 1415	**LUNCH**			

Please note: Committee reserves the right to alter program

FRPRCS-9 Symposium Program

1415 - 1500	**Concurrent Sessions 9**			
	10. Behaviour of FRP confined concrete Room: Ballroom *Chair: S. Sheikh*	**5. Innovations and developments in fibre composite materials and systems** Room: Kent Room *Chair: T. Ibell*	**15. Strengthening or repair of concrete or masonry structures using FRP systems** Room: Bridge Room II *Chair: Y. Wu*	**11. FRP retrofitting or FRP systems for blast loads / 12. Seismic retrofitting or seismic-resistant design with FRP systems** Room: Wharf Room *Chair: A. Ilki*
1415 - 1430	**Research on Strengthening of Reinforced Concrete Wall-Type Columns with FRP Composite Systems** Ong Wee Keong	**An Experimental Study on the Explosive Spalling Properties of High Strength Concrete with Contents of Fiber and Prestressed** Kim Young-Sun	**Contribution of PVA Short-Fiber-Mixed Shotcrete and AFRPM to Shear Strength Increase of RC Beams** Fumio Taguchi	**An Inovative Method for Strengthening RC Beam-Column Connections with CFRP** Shahab Mehdizad Taleie
1430 - 1445	**Experimental Investigation of FRP Wrapped Hollow RC Columns** Muhammad Hadi	**Shell Elements of Architectural Concrete Using Fabric Formwork – Part 1: Concept** Niki Cauberg	**Analytical Investigation of Reinforced Concrete Members Strengthened With FRP Sheets in Tension** Kalid Farah	**Finite Element Analysis of Slab-Column Connections Strengthened with FRP Sheets Under Impact Loading** Seyed Rohollah Hoseini Vaez
1445 - 1500	**Evaluation of Seismic Retrofit of RC Bridge Piers with Pseudo-Dynamic Tests** Kenneth Neale	**Shell Elements of Architectural Concrete Using Fabric Formwork – Part 2: Case Study** Tine Tysmans	**Shear Strengthening of Reinforced Concrete Beams Using Near-Surface Mounted CFRP Strips** Raafat El-Hacha	**Investigation the Seismic Behavior of FRP-Strengthened RC Frames** Hosein Naderpour
1505 - 1600	**KEYNOTE SESSION & CLOSING** Room: Ballroom *Chair: L Bank*			
1505 -1550	**Fibre Reinforced Polymers - Strengths, Weaknesses, Opportunities and Threats** Chris Burgoyne			
1550 - 1600	**Symposium Closing Remarks** Michael Griffith			
1600	**AFTERNOON TEA**			

Please note: Committee reserves the right to alter program