

**FIRST ASIA-PACIFIC CONFERENCE ON FRP
IN STRUCTURES**

APFIS 2007

**12-14 DECEMBER 2007
HONG KONG, CHINA**

PROGRAM

GENERAL INFORMATION

CONFERENCE VENUE

The conference will consist of a three-day technical program and will be held at:

Intercontinental Grand Stanford
70 Mody Road, Tsim Sha Tsui East, Hong Kong
T: (852) 2721 5161
F: (852) 2732 2233
W: www.hongkong.intercontinental.com

All conference technical sessions will be held in the Forum rooms which are located on the level below the hotel lobby and can be accessed via stairs or guest elevators. Morning and afternoon tea will be served in the Exhibition area located adjacent to the Forum rooms. A detailed map of the Forum rooms and Exhibition is given on page 4. Lunch on all three days will be held in the Academy rooms which are located on the first floor of the hotel.



Map of Tsim Sha Tsui, Kowloon, Hong Kong

Hotels located in the Tsim Sha Tsui area are all within an easy walking distance to the conference venue.

CONFERENCE SECRETARIAT AND HELPERS

All questions should be directed to the conference staff at the Registration Desk. The registration desk is located at the entrance to the Forum Rooms (see map on page 4) and will be open during the following times:

Tuesday, 11 December	17:00-19:00 (1 hour prior to and the first hour of the Welcome Reception)
Wednesday, 12 December	08:00-16:00 (Day 1 of the conference)
Thursday, 13 December	08:00-16:00 (Day 2 of the conference)
Friday, 14 December	08:00-16:00 (Day 3 of the conference)

Questions can also be directed to any one of the conference support staff who will all be wearing blue coloured name badges.

REGISTRATION

Delegates are requested to register at the Registration Desk upon arrival to the conference venue and entitled to:

1. Participation in the conference,
2. Access to exhibits,
3. Conference bag and conference gift,
4. Name badge and registration payment receipt,
5. One copy of the two volume proceedings + conference program and other conference bag inserts,
6. Lunch as well as tea/coffee breaks in the mornings and afternoons on day/s of registration,
7. One Welcome Reception ticket (only for full three-day registration),
8. One Conference Banquet ticket (only for full three-day registration), and
9. 2008 IIFC membership (if an existing member or eligible for new membership).

A certificate of attendance can be provided upon request.

SUBMISSION OF PRESENTATION/S

The following visual aids will be supported:

- Powerpoint (in Microsoft PowerPoint format), and
- Overhead transparency.

Delegates are requested to submit their PowerPoint presentations by one of the following means:

- Submit presentation on a CD upon registration with speaker name, session ID and presentation time clearly indicated on the CD, or
- Download presentation directly onto the laptop in the appropriate Session Room at least one session before the required presentation time. The presentation must be downloaded with the assistance of the technical support staff assigned to the Session Room in question.

PRESENTATION OF PAPERS

All papers are to be presented and discussed in English which is the official language of the conference. The time allocation per presenter is:

- 30 minutes for Keynote speakers (25 min. presentation + 5 min. discussion)
- 20 minutes for a speaker in one of the 3 parallel sessions (15 min. presentation + 5 min. discussion)

Speaker biographical forms will be available at the conference Registration Desk to complete and submit to the Registration desk or the appropriate session chair prior to the session commencement.

SPEAKER'S READY ROOM

Speakers may use Picasso Room A of the Forum Rooms (see plan on page 4) as a preparation room. The room will be open from 08:00 to 17:00 for the whole three days of the conference.

INTERNET

Wireless internet coverage is available throughout the conference venue. Please note the speed of the connection is dependent on the number of users logged onto the system.

WELCOME COCKTAIL PARTY

A welcome cocktail party will be held on the evening of Tuesday 11 December in Monet Room B of the Forum Rooms (see floor plan on the following page) from 18:00 to 21:00. It is free for registered delegates with a full three-day registration package. Additional tickets can be purchased for HK\$300 (US\$40) each.

CONFERENCE BANQUET

The conference banquet will be held on the evening of Thursday 13 December at the Jumbo Floating Restaurant (Tai Wo Din Room), Shum Wan Pier Drive, Wong Chuk Hang, Aberdeen, Hong Kong. Coaches will be provided to take conference delegates and guests to and from the conference venue and Jumbo Floating Restaurant. The coaches will leave the conference venue at 17:45 and return to the conference venue by 23:30. The banquet is free for registered delegates with a full three-day registration package. Additional tickets can be purchased for HK\$800 (US\$100) each.

TECHNICAL TOUR

A complimentary half-day technical tour has been organised on Saturday 15 December which is the day following the conclusion of the conference. The tour will consist of a visit to Stonecutters Bridge construction site (<http://www.stonecuttersbridge.net/en/main.htm>) (Stonecutters Bridge is a 1,596 metre long dual 3-lane high level cable stayed bridge, with a clear span of 1,018 metres, which is currently under construction) followed by a tour of the Civil Engineering Department and Laboratories of The University of Hong Kong. All tour participants will then enjoy a lunch at The University of Hong Kong's Senior Common Room.

A coach will pick up members of the tour from the conference venue at 09:00 and then return by 14:30. Registration for the technical tour can be made at the conference Registration desk during the conference however places are limited to 30 and on a first come first served basis.

PROGRAM AT A GLANCE

11 December 2007 (Tuesday)

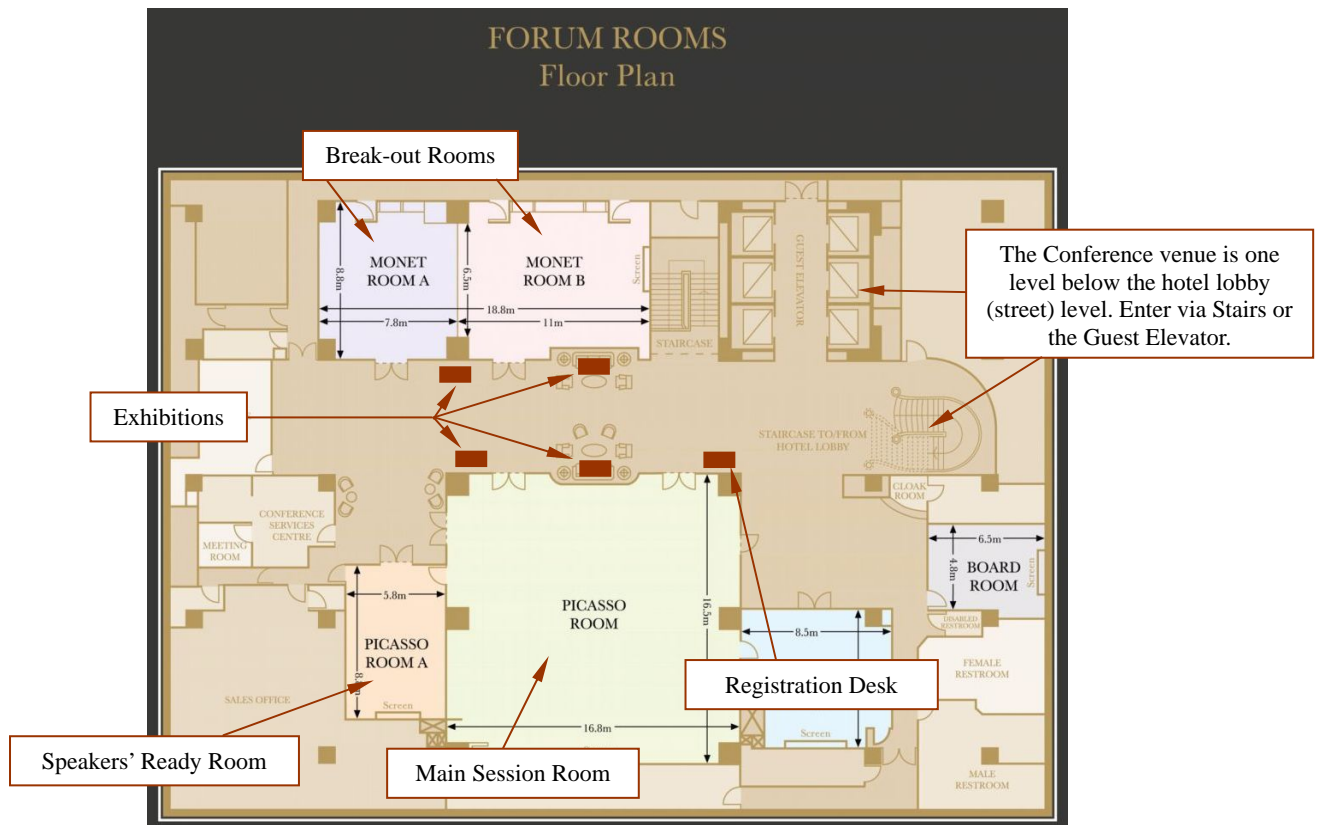
Registration: 17:00-19:00

Welcome Reception: 18:00-21:00 (**Monet Room B**)

12 December 2007 (Wednesday, Day 1)

08:00-16:00	Registration Desk Opening Hours		
08:30-09:10	Opening Ceremony (Picasso Room)		
09:10-10:10	Keynote Lectures 1 and 2 (Picasso Room): <i>Chair: S. Rizkalla</i>		
10:10-10:30	Morning Tea		
	Picasso Room	Monet Room A	Monet Room B
10:30-12:30	Session Picasso-1 Concrete and Masonry Members Reinforced with Internal FRP <i>Chairs: J.S. Sim & J. Deng</i>	Session Monet A-1 Metal WG [#] -1: Strengthening of Metal Flexural Members <i>Chairs: X.L. Zhao and B. Täljsten</i>	Session Monet B-1 Hybrid + All FRP Members <i>Chairs: K. Harries & S. Yamada</i>
12:30-13:40	Lunch (Academy Rooms I-III)		
13:40-15:20	Session Picasso-2 Concrete Members Prestressed with Internal or External FRP <i>Chairs: Z.S. Wu & S. Denton</i>	Session Monet A-2 Metal WG-2: Strengthening of Metal Compression Members and Shells <i>Chairs: S.S.J. Moy & B. Young</i>	Session Monet B-2 All FRP Members <i>Chairs: T. Aravinthan & J.J. Melcher</i>
15:20-15:40	Afternoon Tea		
15:40-17:00	Session Picasso-3 Confinement of Concrete-1 <i>Chairs: G. Monti & L. Bisby</i>	Session Monet A-3 Metal WG-3: Cyclic Loading and Fatigue <i>Chairs: A. Fam & K. Maeda</i>	Session Monet B-3 Ductility <i>Chairs: D.J. Oehlers & S.J. Foster</i>
17:20-18:20	IIFC Executive Committee Meeting: (Tiffany's New York Bar)		

[#] Metal WG = IIFC Working Group on FRP-Strengthened Metallic Structures



13 December 2007 (Thursday, Day 2)

08:00-16:00	Registration Desk Opening Hours		
	Picasso Room	Monet Room A	Monet Room B
08:30-10:30	Session Picasso-4 Bond WG [^] -1: Basic Bond Mechanisms: Externally Bonded Sheets/Plates <i>Chairs: J.G. Teng & J.F. Chen</i>	Session Monet A-4 Strengthening of Concrete Beams and Connections <i>Chairs: C. Mazzotti & C. Chalioris</i>	Session Monet B-4 Bridge WG ^{^^} -1: Superstructure Behaviour and Development <i>Chairs: B.S. Kim & T. Yu</i>
10:30-10:50	Morning Tea		
10:50-11:50	Keynote Lectures 3 and 4 (Picasso Room): <i>Chair: V. Karbhari</i>		
11:50-12:10	Group Photograph (Picasso Room)		
12:10-13:20	Lunch (Academy Rooms I-II)		
13:20-15:00	Session Picasso-5 Bond WG-2: Basic Bond Mechanisms: Internally Embedded Bars, Tendons and Anchors <i>Chairs: M.M.S. Cheung & Y.F. Wu</i>	Session Monet A-5 Strengthening of Concrete and Masonry Members <i>Chairs: R. Seracino & E. Ferrier</i>	Session Monet B-5 Bridge WG-2: Superstructure Behaviour and Development + Field Applications <i>Chairs: S.Y. Park & S.W. Lee</i>
15:00-15:20	Afternoon Tea		
15:20-17:00	Session Picasso-6 Bond WG-3: Flexurally-strengthened Concrete Beams <i>Chairs: L.P. Ye & E. Martinelli</i>	Session Monet A-6 Strengthening of Timber and Glass Members <i>Chairs: R. Kliger & G. Pistone</i>	Session Monet B-6 Confinement of Concrete-2 <i>Chairs: A. Ilki & G.P. Lignola</i>
17:45-23.30	Banquet: Jumbo Floating Restaurant, Aberdeen (Coach pick-up from conference venue at 17:45 and return to conference venue by 23.30)		

[^] Bond WG = IIFC Working Group on the Bond Behaviour of FRP in Structures

^{^^} Bridge WG = IIFC Working Group on FRP Bridge Decks

14 December 2007 (Friday, Day 3)

08:30-16:00	Registration Desk Opening Hours		
	Picasso Room	Monet Room A	Monet Room B
09:00-10:40	Session Picasso-7 Field Applications and Case Studies-1 <i>Chairs: E.T. Smith & D.L. Beneke</i>	Session Monet A-7 Bond WG-5: Interfacial Stresses <i>Chairs: K.W. Neale & M. Savoia</i>	Session Monet B-7 Confinement of Concrete-3 + Seismic Retrofit <i>Chairs: T. Ozbakkaloglu & Z.G. Guan</i>
10:40-11:00	Morning Tea		
11:00-13:00	Session Picasso-8 Fibre Optic Sensors, Measurement and Nondestructive Evaluation <i>Chairs: K.T. Lau & B. Bakht</i>	Session Monet A-8 Bond WG-4: Intermediate Crack Induced Debonding <i>Chairs: J.D. Dai & E. Martinelli</i>	Session Monet B-8 Durability, Fire and Impact + Product Testing and Development <i>Chairs: B. Wan & T. Stratford</i>
13:00-14:10	Lunch (Academy Rooms I-III)		
14:10-15:10	Keynote Lectures 5 and 6 (Picasso Room): <i>Chair: J.F. Chen</i>		
15:10-15:30	Afternoon Tea		
15:30-16:30	Session Picasso-9 Field Applications and Case Studies-2 <i>Chairs: P. Labossière & S.S. Mahini</i>	Session Monet A-9 Bond WG-6: Durability, Fatigue and Cyclic Loading <i>Chairs: B. Täljsten & J.L. Wang</i>	Session Monet B-9 Metal WG-4: Analytical and Numerical Modelling <i>Chairs: M.R.. Bambach & R. Landolfo</i>
16:30-16:50	Closing Ceremony (Picasso Room)		
17:20-18:20	IIFC Education Working Group Meeting: (Tiffany's New York Bar)		

15 December 2007 (Saturday)

Technical Tour: Stonecutter's Bridge + Department of Civil Engineering and Laboratories, University of Hong Kong.

DETAILED PROGRAM

OPENING CEREMONY, KEYNOTE LECTURES AND CLOSING CEREMONY

OPENING CEREMONY (PICASSO ROOM)

WEDNESDAY, 12 DECEMBER 2007: 08:30 to 09:10 (Day 1)

Chair: S.T Smith

- 8:30 Welcome by APFIS 2007 Organising Committee Chair
S.T. Smith
- 8:40 Welcome by IIFC President
K.W. Neale
- 8:50 Welcome Address by Dean of the Faculty of Engineering, The University of Hong Kong
W.C. Chew
- 9:00 Welcome Address by Council and Executive Member of The Hong Kong Institution of Engineers
K.K. Choy

KEYNOTE LECTURES 1 AND 2 (PICASSO ROOM)

WEDNESDAY, 12 DECEMBER 2007: 09:10 to 10:10 (Day 1)

Chair: S Rizkalla

- 9:10 Fundamental Issues that Govern the Rotation of FRP Retrofitted Columns and Beams: The Intractable Plastic Hinge Ductility Problem
D.J. Oehlers, M.S. Mohamed Ali, M.C. Griffith and T. Ozbakkaloglu
- 9:40 Integrated Strengthening of Structures with Bonded Prestressed FRP Reinforcements
Z.S. Wu

KEYNOTE LECTURES 3 AND 4 (PICASSO ROOM)

THURSDAY, 13 DECEMBER 2007: 10:50 to 11:50 (Day 2)

Chair: V. Karbhari

- 10:50 Debonding Failures of RC Beams Strengthened with Externally Bonded FRP Reinforcement: Behaviour and Modelling
J.G. Teng and J.F. Chen
- 11:20 Assessment of Numerical Models for FRP-strengthened Concrete Structures
K.W. Neale

KEYNOTE LECTURES 5 AND 6 (PICASSO ROOM)

FRIDAY, 14 DECEMBER 2007: 14:10 to 15:10 (Day 3)

Chair: J.F. Chen

- 14:10 Building Confidence in the use of Fibre Reinforced Polymers in Construction
S. Denton
- 14:40 Unified Definition of Safety Factors for Traditional RC Members and Members Incorporating FRP
L.P. Ye and P. Feng

CLOSING CEREMONY (PICASSO ROOM)

FRIDAY, 14 DECEMBER 2007: 16:30 to 17:00 (Day 3)

Chair: S.T Smith

- 16:30 Closing Remarks
- 16:40 Announcement of APFIS 2009

SESSION PICASSO-1

CONCRETE AND MASONRY MEMBERS REINFORCED WITH INTERNAL FRP

Chairs: *J.S. Sim and J. Deng*

- 10:30 Flexural Bonding Characteristics of Newly-developed GFRP Rebar
H.S. Oh, J.S. Sim, M.K. Ju and T.S. Kang
- 10:50 Reliability Assessment on the Serviceability of Concrete Beams Reinforced with Glass Fiber Reinforced Polymer Rods
Z. He and F. Qiu
- 11:10 Mechanical Performance of Curved FRP Rebars: Part I - Experimental Study
T. Imjai, M. Guadagnini and K. Pilakoutas
- 11:30 Mechanical Performance of Curved FRP Rebars: Part II - Analytical Study
T. Imjai, G. Maurizio and K. Pilakoutas
- 11:50 Experimental Research of Concrete Beams and Masonry Walls Reinforced with GFRP Reinforcement
Z. Soric, T. Kisicek and J. Galic
- 12:10 Concrete and Masonry Elements Reinforced with Newly Developed FRP Reinforcement
D. Horak, M. Zlamal and P. Stepanek

SESSION MONET A-1

METAL WG-1: STRENGTHENING OF METAL FLEXURAL MEMBERS

Chairs: *X.L. Zhao and B. Täljsten*

- 10:30 Performance of CFRP Strengthened Lightsteel Beams Subjected to End Bearing Forces
X.L. Zhao and R. Al-Mahaidi
- 10:50 Bond Behavior of a CFRP Strengthening System for Steel Structures
M. Dawood, M. Guddati and S. Rizkalla
- 11:10 Effect of CFRP Reinforcement on CHS Beams in Pure Bending
J. Haedir, M.R. Bambach, X.L. Zhao and R.H. Grzebieta
- 11:30 Upgrading of Steel Beams using Composite Materials
D. Linghoff and M. Al-Emrani
- 11:50 An Assessment of the Suitability of Wrought Iron for Strengthening using FRP Composites
S.S.J. Moy and H.W.J. Clarke

SESSION MONET B-1

HYBRID + ALL FRP MEMBERS

Chairs: *K. Harries and S. Yamada*

- 10:30 The Effect of Core Architecture on the Behaviour of Sandwich Columns under Edgewise Compression Loading
T. Omar, T. Aravinthan and G. Van Erp
- 10:50 Applications of FRP in Cladding Panels of Buildings
T. Sharaf, A. Fam, W. Shawkat and B. Taylor
- 11:10 On Design and Experimental Verification of Actual Behaviour of Selected All-FRP Structural Components for Civil Engineering
J.J. Melcher, M. Karmazinova and M. Filip
- 11:30 Shear Deformation Characteristics and Web Crippling of New Hybrid Composite Girders
H. Nakamura, K. Maeda, H. Mutsuyoshi and K. Suzukawa
- 11:50 Buckling and Reduced Stiffness Criteria for FRP Cylindrical Shells under Compression
K. Matsumoto, S. Yamada, H.T. Wang and J.G.A. Croll
- 12:10 Radio Frequency Transparent Barriers for Airport Structures: The SAS Project
D. Asprone, A. Prota, R. Parretti and A. Nanni

SESSION PICASSO-2

CONCRETE MEMBERS PRESTRESSED WITH INTERNAL OR EXTERNAL FRP

Chairs: *Z.S. Wu and S. Denton*

- 13:40 Elastic Moment Capacity and Prestress Loss of Steel-concrete Composite Beams Strengthened with a Prestressed CFRP Plate
J. Deng, M.M.K. Lee and P.Y. Huang
- 14:00 Study on Effective Prestress of RC Beam Strengthening with Prestressed FRP
X.Y. Guo, P.Y. Huang and G.M. Pan
- 14:20 Strengthening of Structures with the CarboStress® System
F. Fischli, R. Clénin, A. De Silva and P. Chaemmangkang
- 14:40 Pretension of Externally Bonded FRP Sheets for Flexural Reinforcement of RC Beams: Methods and Design Equations
G. Monti and M.A. Liotta
- 15:00 A New Method for Evaluation Systems for Prestressing of CFRP Plates
M. Cerny

SESSION MONET A-2

METAL WG-2: STRENGTHENING OF METAL COMPRESSION MEMBERS AND SHELLS

Chairs: *S.S.J. Moy and B Young*

- 13:40 FRP-stabilised Steel Compression Members
K.A. Harries, E. Abraham and A. Peck
- 14:00 Control of Overall Buckling of HSS Slender Columns using CFRP Plates
A. Shaat and A. Fam
- 14:20 Steel Square Hollow Section Short Columns Strengthened with CFRP
M.R. Bambach and M. Elchalakani
- 14:40 On the use of the EC3 and AISI Specifications to Estimate the Ultimate Load of CFRP-strengthened Cold-formed Steel Lipped Channel Columns
N. Silvestre, D. Camotim and B. Young
- 15:00 Elastic Buckling of FRP-strengthened Cylinders with Axisymmetric Imperfections
M. Batikha, J.F. Chen and J.M. Rotter

SESSION MONET B-2

ALL FRP MEMBERS

Chairs: *T. Aravinthan and J.J. Melcher*

- 13:40 Innovative all Composite Multi-Pultrusion Truss Systems – FE Modelling & Behavioural Issues
T. Omar, G. Van Erp, T Aravinthan and P. Key
- 14:00 Design and Experimental Investigation of Energy Dissipating FRP Box Infill System
W.Y. Jung and A.J. Aref
- 14:20 Limit Analysis for Orthotropic Composite Laminates
A.A. Pisano and P. Fuschi
- 14:40 Geometrically Nonlinear Theory of Thin-walled Composite Box Beams
T.P. Vo and J. Lee
- 15:00 A Study on the Application of Advanced Thermoplastic Composites for use in Building Construction Industry
H.K.K. Yeung and R.P Kamineni

WEDNESDAY, 12 DECEMBER 2007: 15:40 to 17:00 (Day 1)

SESSION PICASSO-3

CONFINEMENT OF CONCRETE-1

Chairs: *G. Monti and L. Bisby*

- 15:40 Concrete-Filled Square FRP Tubes under Axial Compression
T. Ozbakkaloglu, J.C. Lim and D.J. Oehlers
- 16:00 Analytical Study on Efficiency Evaluation of FRP Confinement on Square RC Columns
A. Zarafshan and S. Zarafshan
- 16:20 Square Concrete Section Confined by FRP: Ultimate Strength Prediction
G. Monti and N. Nisticò
- 16:40 FRP Strengthening of RC Columns - Parametric Finite Element Analyses of Bar Quality Effect
T.C. Rousakis, G.E. Manolitsi and A.I. Karabinis

SESSION MONET A-3

METAL WG-3: CYCLIC LOADING AND FATIGUE

Chairs: *A. Fam and K. Maeda*

- 15:40 CFRP Reinforcement of Steel Beams Adhesive Cure under Cyclic Load
S.S.J. Moy
- 16:00 Environmental Fatigue Test of Bonded Composite Patch Repaired Metallic Structure
Y. Okamoto, T. Kamizono, H. Namiki and H. Cai
- 16:20 Strengthening of Old Metallic Structures in Fatigue with CFRP Materials
C.S. Hansen, J.W. Schmidt and B. Täljsten
- 16:40 Repair of Fatigue Cracks at Welded Web Gusset Joint using CFRP Strips
W. Jiang, H. Nakamura, H. Suzuki, K. Maeda and T. Irube

SESSION MONET B-3

DUCTILITY

Chairs: *D.J. Oehlers and S.J. Foster*

- 15:40 Ductility Behavior of Compression-yielding Reinforced Concrete Beams
Y.W. Zhou, Y.F. Wu and J.G. Teng
- 16:00 A New Ductility Model for RC/PC Sections Strengthened with or without Bonded FRP
Z.G. Guan and J.Z. Li
- 16:20 Compression Yielding by SIFCON Block for FRP-reinforced Concrete Beams
K. Liu and Y.F. Wu
- 16:40 Mechanical Behavior of Mild Steel Compressive Yielding Blocks
X.C. Liu, Y.F. Wu, A.Y.T. Leung and J.G. Hou

SESSION PICASSO-4

BOND WG-1: BASIC BOND MECHANISMS: EXTERNALLY BONDED SHEETS/PLATES

Chairs: *J.G. Teng and J.F. Chen*

- 08:30 Behaviour of FRP-to-concrete Interfaces between Two Adjacent Cracks in FRP-Plated Concrete Members: A Numerical Investigation
G.M. Chen, J.F. Chen and J.G. Teng
- 08:50 Bonding CFRP and SRP to Ultra-High Performance Concrete
A. Elmahdy, R. El-Hacha and N.G. Shrive
- 09:10 Direct versus Indirect Identification of FRP-to-concrete Interface Relationships
C. Faella, E. Martinelli and E. Nigro
- 09:30 New Three-parameter Bond Strength Model for Externally Bonded FRP-concrete Interface
S.M. Shahidul Islam and Z.S. Wu
- 09:50 Bond Stress versus Slip Model for CFRP Plates Bonded to Concrete
M.K.Y. Loo, S.J. Foster and S.T. Smith
- 10:10 Behaviour of CFRP Sheets Bonded to Historical Masonry
R. Capozucca

SESSION MONET A-4

STRENGTHENING OF CONCRETE BEAMS AND CONNECTIONS

Chairs: *C. Mazzotti and C. Chalioris*

- 08:30 Ultimate Load Modeling of RC Flats Elements Strengthened by CFRP
L. Michel, E. Ferrier and P. Hamelin
- 08:50 Experimental Study on the Effects of Cyclic Loading during Repairing Period on the Effectiveness of Bonded CFRP
M. Quiertant, L. Siegert, C. Boulay, P. Fakhri, C. Tourneur and J.-L. Clément
- 09:10 An Experimental Investigation on the Strengthening of RC Beam-column Connections with FRP Composites
R. Shrestha and S.T. Smith
- 09:30 Seismic Upgrading of Existing RC Ordinary Moment Resisting Frames using FRPs
S.S. Mahini and H.R. Ronagh
- 09:50 A New CFRP Strengthening Technique to Enhance Punching Shear Strength of RC Slab-Column Connections
H. Erdogan, G. Özcebe and B. Binici
- 10:10 Effect of Loading Configurations on the Structural Behavior of FRP Strengthened Concrete Beams
J.L. Pan, T. Chung and C.K.Y. Leung

SESSION MONET B-4

BRIDGE WG-1: SUPERSTRUCTURE BEHAVIOUR AND DEVELOPMENT

Chairs: *B.S. Kim and T. Yu*

- 08:30 Dynamic Behavior of an All-FRP Pedestrian Bridge
Y. Bai, T. Keller, T. Vallée
- 08:50 Replacing a Composite RC Bridge Deck with an FRP Deck – The Effect on Superstructure Stresses
K.A. Harries and J. Moses
- 09:10 Static Behavior of Hybrid FRP-concrete Bridge Superstructure
Y.L. Wang, Q.D. Hao and J.P. Ou
- 09:30 Development of a Pedestrian Slab Bridge using GFRP Pultrusion Profiles
K. Maeda, H. Nakamura, X. Cui, N. Kitayama and T. Watanabe
- 09:50 A Foam-filled GFRP Bridge Deck
G. Zi, J. Jung, B.M. Kim, Y.K. Hwang and Y.H. Lee
- 10:10 Flexural Behavior of Hybrid FRP Girder with Concrete Deck
H. Mutsuyoshi, T. Aranvithan, S. Asamoto, A.C. Manalo and K. Suzukawa

SESSION PICASSO-5

BOND WG-2: BASIC BOND MECHANISMS: INTERNALLY EMBEDDED BARS, TENDONS AND ANCHORS

Chairs: *M.M.S. Cheung & Y. Wu*

- 13:20 Comparison of the Interfacial Bond and Slip Behaviour of Steel and FRP Reinforcement
M. Hasket, D. Oehlers and C. Wu
- 13:40 Pullout and Bond of Glass Fibre Reinforced Polymer/Steel Wire Composite Rebars in Concrete
Q.D. Hao, Y.L. Wang and J.P. Ou
- 14:00 Mechanical and Bonding Performances of Steel Cable-GFRP Composite Rebar
Z.C. Zhang and J.P. Ou
- 14:20 Pull-out Tests on FRP Anchors
S.J. Kim and S.T. Smith

SESSION MONET A-5

STRENGTHENING OF CONCRETE AND MASONRY MEMBERS

Chairs: *R. Seracino and E. Ferrier*

- 13:20 Numerical Simulations of In-plane Behavior of Tuff Masonry Strengthened with Cementitious Matrix-Grid Composites
G.P. Lignola, A. Prota and G. Manfredi
- 13:40 Strengthening and Retrofitting Unreinforced Masonry Walls with Various FRPs Systems
G.A. Parsekian, R. El-Hacha and N.G. Shrive
- 14:00 Finite Element and Limit Analysis of the Large Scale Model of Mustafa Pasha Mosque in Skopje Strengthened with FRP
R. Landolfo, F. Portioli, O. Mammana and F.M. Mazzolani
- 14:20 Influence of the Concrete Mechanical Properties on the Efficacy of the Shear Strengthening Intervention on RC Beams by NSM Technique
V. Bianco, J.A.O. Barros and G. Monti
- 14:40 Behavioural Model of FRP Strengthened Reinforced Concrete Beams under Torsion
C.E. Chalioris

SESSION MONET B-5

BRIDGE WG-2: SUPERSTRUCTURE BEHAVIOUR AND DEVELOPMENT + FIELD APPLICATIONS

Chairs: *S.Y. Park and S.W. Lee*

- 13:20 Behavioral Characteristics of FRP-Concrete Composite Deck in Negative Moment Zones According to Connection Details
S.Y. Park, K. Cho, S.T. Kim, J.R. Cho and B.S. Kim
- 13:40 Flexural Response of Fiber Reinforced Plastic Decks using Higher-order Shear Deformable Plate Theory
Y. Kim and J. Lee
- 14:00 Construction of the Asset Polymer Composite Bridge
B. Täljsten
- 14:20 Applying of Composite Materials in Bridge Construction in Moscow Magapolis
A. Ushakov, A. Pankov, V. Ekimov and A. Kuvshinov
- 14:40 Opening the Gate: Construction of 300 m Composite-deck Bridge in Korea
S.W. Lee and K.J. Hong

SESSION PICASSO-6

BOND WG-3: FLEXURALLY-STRENGTHENED CONCRETE BEAMS

Chairs: *L.P. Ye and E. Martinelli*

- 15:20 Hybrid Bonding System for Optimizing Structural Performance of FRP Flexurally Strengthened Concrete Beams
J.G. Dai, H. Yokota and T. Ueda
- 15:40 Numerical Simulation of Debonding Failure of Reinforced Concrete Beams Strengthened with Externally Bonded FRP
K. Farah and Y. Sato
- 16:00 Investigation of Stress Concentration in Cut-off Zones of Beam Strengthened by Near Surface Mounted FRPs
V.H. Nguyen, M. Guadagnini, K. Pilakoutas and V.N. Le
- 16:20 Interlaminar Peeling in Concrete Beams Strengthened with CFRP Plates - Experimental Study
P. Rusinowski and B. Täljsten
- 16:40 Retrofitting Reinforced Concrete Bridge Frames using Externally Bonded FRP Sheets
G.R. Pandey, H. Mutsuyoshi and T. Aravinthan

SESSION MONET A-6

STRENGTHENING OF TIMBER AND GLASS MEMBERS

Chairs: *R. Kliger and G. Pistone*

- 15:20 Strengthening Glulam Beams with Steel or Composite Plates
R. Kliger, M. Al-Emrani, M. Johansson and R. Crocetti
- 15:40 Strengthening of Wooden Beams with FRP Materials
C. Bernardini, L. Credali and G. Pistone
- 16:00 Evaluation of Timber Beams Reinforced with FRP Fabrics
J. Vanerek and P. Hradil
- 16:20 On the Bending of GFRP Reinforced Glass Element
E. Speranzini and P. Neri

SESSION MONET B-6

CONFINEMENT OF CONCRETE-2

Chairs: *A. Ilki and G.P. Lignola*

- 15:20 Principles of a Design Method for RC Columns Reinforced by CFRP under Eccentric Compression Loading
K. Veròk, M. Quiertant and J.-L. Clément
- 15:40 Stress-Strain Model for FRP-confined Rectangular RC Sections via an Incremental Procedure
K. Megalooikonomou, K.D. Kim and G. Monti
- 16:00 Assessment of Drucker-Prager Type Plasticity Models for Predicting the Behaviour of FRP-Confined Concrete
T. Yu, J.G. Teng, Y.L. Wong and S.L. Dong
- 16:20 Compressive Strength Models of FRP-Confined Concrete
Y.A. Al-Salloum

FRIDAY 14, DECEMBER 2007: 09:00 to 10:40 (Day 3)

SESSION PICASSO-7**FIELD APPLICATIONS AND CASE STUDIES-1**

Chairs: *E.T. Smith and D.L. Beneke*

- 09:00 Long-term Behaviour of a FRP-strengthened Structure: The Case of the Sainte-Émélie-de-l'Énergie Bridge
P. Labossière, K.W. Neale, P. Rochette, M. Demers, M. Savard and G. Desgagné
- 09:20 Strengthening an Early 20th Century RC Bridge with FRP (Unidirectional Carbon Fibres)
G. Pistone
- 09:40 Reinstatement of the Flexural Fatigue Strength of Precast Concrete Link Slabs using CFRP
D.L. Beneke and R.J. Feller
- 10:00 TFC - FRP Strengthening Solution from FREYSSINET
D. Deschamps and T. Wong
- 10:20 Structural Strengthening and Extending Concrete Structure Service Life using FRP and Corrosion Inhibiting Technologies – A Case Study
K.Y. Lo, T.H. Yeung, G. Lee, J.S. Wang and S.H. Giam

SESSION MONET A-7**BOND WG-5: INTERFACIAL STRESSES**

Chairs: *K.W. Neale and M. Savoia*

- 09:00 Debonding Shear Stress of Steel Plates with a Fiber Sheet Inserted under a CFRP Strip
I. Okura and T. Ishikawa
- 09:20 Influence of End Locations of Inserted Glass Fiber Sheet on Debonding Load of CFRP Bonded to Steel Plates
T. Ishikawa, K. Komura, I. Okura, S. Yokota and M. Saito
- 09:40 Three-Parameter Elastic Foundation Model of FRP Strengthened Concrete Beams
J.L. Wang
- 10:00 Influence of Local Imperfections on Interface Stresses of RC Beams Strengthened with Hybrid Fiber Sheets
L.J. Li, Y.C. Guo, F. Liu, Y. Yang and Z.J. He
- 10:20 Numerical Analysis of Interface Stresses of RC Beams Strengthened with Pre-stressed Hybrid CFS-GFS
Y.C. Guo, P.Y. Huang, L.J. Li and J. Deng

SESSION MONET B-7**CONFINEMENT OF CONCRETE-3 + SEISMIC RETROFIT**

Chairs: *T. Ozbakkaloglu and Z.G. Guan*

- 09:00 A Simplified Model for FRP-confined Hollow Circular Concrete Columns under Axial Compression
G.P. Lignola, A. Prota, G. Manfredi and E. Cosenza
- 09:20 Effects of Pre-damage and Cyclic Compression on Axial Behavior of FRP Jacketed Concrete
A. Ilki, C. Demir and N. Kumbasar
- 09:40 Anchorage System for External Bonded CFRP Seismic Reinforcement
E. Ferrier and P. Hamelin
- 10:00 Seismic Retrofitting of Reinforced Concrete Columns using Carbon Fiber Reinforced Polymer (CFRP)
O. Ozcan, B. Binici and G. Özcebe
- 10:20 FRP Tubular Poles with Partial Concrete Filling
J. Mitchell and A. Fam

FRIDAY 14, DECEMBER 2007: 11:00 to 13:00 (Day 3)

SESSION PICASSO-8**FIBRE OPTIC SENSORS, MEASUREMENT AND NONDESTRUCTIVE EVALUATION**Chairs: *K.T. Lau and B. Bakht*

- 11:00 Smart Composites for Civil Infrastructure Applications
K.T. Lau, S.T. Smith, H.Y. Tam and S.L. Ho
- 11:20 Fibre Optic Sensing for the Delamination Behaviour of FRP Reinforced Steel Girders
S. Yamada, Y. Yoshida, S. Saito, S. Yamada and I. Komiya
- 11:40 Quantifying Strain Variation in FRP Confined Concrete using Digital Image Correlation: Proof-of-concept and Initial Results
L. Bisby, W.A. Take and A. Casparly
- 12:00 Quantifying Defects and Progression of Damage in FRP Rehabilitation of Concrete through IR Thermography
A. Shirazi and V.M. Karbhari
- 12:20 Application Properties of Hybrid FRP Reinforcing Rods for Self Diagnosing of Concrete Fracture
S.K. Park
- 12:40 A Quantitative Study on Bond Behavior between Fiber-Reinforced Polymer (FRP) and Concrete Interface using Infra-red Thermography (IRT)
C.S. Poon, W.L. Lai, S.C. Kou, W.F. Tsang and C.C. Lai

SESSION MONET A-8**BOND WG-4: INTERMEDIATE CRACK INDUCED DEBONDING**Chairs: *J.G. Dai and E. Martinelli*

- 11:00 Displacement Induced and Intermediate Crack Debonding in FRP Strengthened One-way Masonry Beams
C.R. Willis, C. Wu, R. Seracino and M.C. Griffith
- 11:20 Improved IC Debonding Resistance of Embedded NSM FRP Plates
M. Haskett, D. Oehlers and C. Wu
- 11:40 Nonlinear Fracture Mechanics of Flexural-shear Crack Induced Debonding of FRP Strengthened Concrete Beams
J.L. Wang and C. Zhang
- 12:00 Intermediate Debonding of FRP Strengthened Beams
C. Mazzotti and M. Savoia
- 12:20 Prediction of Load Carrying Capacity due to Intermediate Crack-induced Debonding in FRP-strengthened Flexural Members
H. Said and Z.S. Wu
- 12:40 Debonding Failure in FRP-strengthened RC Beams: A Model-based Approach
C. Faella, E. Martinelli and E. Nigro

SESSION MONET B-8**DURABILITY, FIRE AND IMPACT + PRODUCT DEVELOPMENT AND TESTING**Chairs: *B. Wan and T. Stratford*

- 11:00 Durability of FRP Strengthening Systems
P. Wilcox, Q. Yang and V.M. Karbhari
- 11:20 Bonded Fibre Reinforced Polymer Strengthening in a Real Fire
T.J. Stratford, M. Gillie and J.F. Chen
- 11:40 Flame Retardant Fibre Reinforced Polyester Formulation for Roofing Application
R. Vasanthakumari
- 12:00 Modeling of Thermo-physical Properties and Thermal Responses for FRP Composites in Fire
Y. Bai, T. Keller and T. Vallée
- 12:20 Study on the Fabricating and Reshaping Process of a New Kind of FRTP Bar
C. Wang and J.P. Ou
- 12:40 Crack Development in CFRP Reinforced Mortar – An Experimental Study
B. Täljsten, K. Orosz and G. Fischer

FRIDAY 14, DECEMBER 2007: 15:30 to 16:30 (Day 3)

SESSION PICASSO-9

FIELD APPLICATIONS AND CASE STUDIES-2

Chairs: *P. Labossière and S.S. Mahini*

- 15:30 Application and Practice of GFRP Bars in the TBM Launching Shaft of Metro in China
M. Li, Y. Cao and H.G. Tang
- 15:50 Seismic Rehabilitation of Historical Masonry Vaults using FRPs – A Case Study
S.S. Mahini, H.R. Ronagh and A. Eslami
- 16:10 Function-integrated GFRP Sandwich Roof Structure
T. Keller, Ch. Haas and T. Vallée

SESSION MONET A-9

BOND WG-3: DURABILITY, FATIGUE AND CYCLIC LOADING

Chairs: *B. Täljsten and J.L. Wang*

- 15:30 Analytical Solution of Bond Behavior in Moist Environments for FRP-concrete Joints under Peel Load
Z. Ouyang and B. Wan
- 15:50 Theoretical Solution for Fatigue Debonding Growth and Fatigue Life Prediction of FRP-concrete Interface
H.M. Diab, Z.S. Wu and K. Iwashita
- 16:10 FRP-Concrete Bond Behaviour under Cyclic Delamination Force
C. Mazzotti and M. Savoia

SESSION MONET B-9

METAL WG-4: ANALYTICAL AND NUMERICAL MODELLING

Chairs: *M.R. Bambach and R. Landolfo*

- 15:30 Fracture Mechanics Analysis of Cracked Steel Plates Repaired with Composite Sheets
H.B. Liu, Z.G. Xiao, X.L. Zhao and R. Al-Mahaidi
- 15:50 Control of Interfacial Stresses in Beams Strengthened with Prestressed CFRP Laminates
R. Haghani, M. Al-Emrani and R. Kliger
- 16:10 Finite Element Modelling of CFRP-Strengthened Rectangular Steel Tubes Subjected to End Bearing Loads
N.D. Fernando, J.G. Teng, T. Yu and X.L. Zhao