

The Third Asia-Pacific Conference on FRP in Structures

APFIS 2 12

Final Program



Hokkaido University, Sapporo, Japan
2-4 February 2012



The Official Regional Conference of the International Institute for FRP in
Construction (IIFC) for the Asia-Pacific Region

Organized by



Japan Concrete Institute

In collaboration of



Hokkaido University



Japan Society of Civil
Engineers



Japan Society for
Composite Materials

Welcome to APFIS2012 in Sapporo

APFIS2012 is the third IIFC Asia-Pacific regional conference on the research and application of fiber reinforced polymers (FRP) in civil and architectural engineering structures to be held in Sapporo, Japan from 2 to 4 February 2012. APFIS2012 aims to continue the success of the preceding conferences held in Hong Kong, China in 2007, and Seoul, Korea in 2009 with expecting participation from the Asia-Pacific region and various parts of the world.

APFIS2012 includes 6 keynote and 66 general papers as well as 11 posters. The first authors of 42 papers are from Asia, while 12 papers each are from Oceania and North America and 6 papers from Europe with the biggest contribution, 22 papers from the host country, Japan. Presentations are made either in the technical session or in the poster session. Some of the poster presentations do not have full papers in the proceedings. Topics of the papers cover issues covering strengths (material, anchorage and member), bond, confinement and durability. Structural types dealt with in the papers are not only concrete but also steel and FRP. Hybrid structures and materials using FRP are also the major interests in the papers.

APFIS2012 will be held at Conference Hall, Hokkaido University. Hokkaido University started out in 1876 as Sapporo Agricultural College, the first modern academic institute in Japan. Since the Japanese government's purpose of setting up SAC was to develop Hokkaido, an untamed land, using the advanced knowledge of foreign faculty and subsequently SAC graduates, civil engineering education in Japan started in earnest at SAC.

Sapporo is the fifth largest city of Japan with a population of more than 1.8 million. It developed as the main urban center of Hokkaido, the northern island of Japan and became well known internationally when in 1972 it became the first Asian city to host the Winter Olympics. Sapporo is also famous for its annual Snow Festival, in which massive ice sculptures adorn Odori Park in the city center. We scheduled this conference to coincide with this event so that participants can experience spectacular snow structures.

Looking forward to seeing you at Sapporo!

APFIS2012, Organizing Committee,
Chairman



Tamon Ueda
Professor, Hokkaido University

DETAIL OF DAILY SESSIONS

Wednesday 1st February, 2012

Registration (15:00-18:00)

Aspen Hotel

Venue : Aspen Hotel

Thursday 2nd February, 2012

Registration (9:00-10:00)

Hall

Room : Hall

Opening Ceremony (9:30-10:15)

Room A

Room : Room A (Large Lecture Room)

Keynote Lectures (10:15-12:50)

Room A

Chair : **Prof. N Grace (Lawrence Technological University, USA)**

Room : Room A (Large Lecture Room)

KEY01 Performance Evaluation of Precast Concrete Block Reinforced with GFRP Rebars for Erosion Control

Prof. Jongsung Sim

KEY02 Debonding Failures in CFRP-Strengthened Steel Structures

Prof. Jin-Guang Teng

KEY03 Damage of Bridges by the Tsunami and Current Activity of JSCE Committee on Bridge Design against Tsunami

Prof. Kyuichi Maruyama

Lunch (12:50-14:00)

Poster Session (14:00-15:40)

Room S

Chair : **Dr. S. Smith (University of Hong Kong, China) and Dr. K. Yamaguchi (Kyushu University, Japan)**

Room : Room S (First Conference Room)

P01 Geometrically Nonlinear Stress Analysis for Imperfect CFRP Reinforced Steel Cylinders under Compression

Krishna Kumar Bhetwal, Seishi Yamada, Yukihiro Matsumoto, Sreing Sonit

P02 Static and Fatigue Experimental Study on Flexural Behavior of Hybrid GFRP-Concrete Bridge Decks

Yuqing Liu, Haifeng Fan, Jun He, Dingjun Wu

P03 Flexural Strength Analysis of CFRP Box Beams with Different Laminate Structures

Hiroki Sakuraba, Takashi Matsumoto, Toshiro Hayashikawa

P04 A New Analytical Model for Concrete Cover Separation of R/C Beams Strengthened with FRP Laminates

Dawei Zhang, Tamon Ueda, Hitoshi Furuuchi

P05 Fatigue Test on Out-of-Plane Gusset Welded Joints Strengthened with Carbon Fiber Reinforced Polymer Materials

Tao Chen, Qian-Qian Yu, Xiang-Lin Gu, Xiao-Ling Zhao

P06 Design Equations for Shear Capacity of Concrete Girders Strengthened in Shear with Externally Bonded FRP Sheets

Abdeljelil Belarbi, Daniel Kuchma, Ayman Okeil, Sang-Wook Bae

P07 Performance Evaluation of Different Anchorage Systems for Externally Bonded FRP Sheets for Shear Strengthening of Concrete Structures

Abdeljelil Belarbi, Carlos Ortega, Sang-Wook Bae

P08 Analysis of The Shear Strength of RC Beams Fully Wrapped with Large Rupture Strain FRP Composites

Jun-Jian Xu, Jian-Guo Dai, Tamon Ueda

P09 Bond Strength between CFRP Plate and Concrete under Fatigue Load

- Wei Zhang, Toshiyuki Kanakubo
- P10 Finite Element Analysis of Adhesively Lap Joints in FRP/Steel Hybrid Structures
Yukihiro Matsumoto, Seishi Yamada, Tatsuya Shibata, Yusuke Mitoma, Yukihiro Hanada
- P11 Confinement Effectiveness of CFRP Grids on Concrete Columns
Lining Ding, Sami Rizkalla, Gang Wu, Zhishen Wu
- P12 Degradation of Tensile Properties of Basalt FRP and Hybrid FRP Tendons under Salt Environment
Xin Wang, Zhishen Wu, Gang Wu, Xie Qiong
- P13 FRP Stay-in-Place Structural Forms for Bridge Decks
Amir Fam, Mark Nelson
- P14 Experimental Study on Shearing Reinforcement Properties of RC Beam with Multi-axial Fiber Sheets
Wataru Horimoto

Coffee Break (15:40-16:00)

Session T1A (16:00-18:00)

Room A

- Title : Strengthening of concrete, metallic, timber and masonry structures
Chair : **Prof. J. Sim (Hanyang University, Korea) and
Dr. Y. Kurihashi (Muroran Institute of Technology, Japan)**
Room : Room A (Large Lecture Room)

- T1A01 Comparison of Different Configurations for FRP Strengthening of Masonry Walls
A. Sayari, T. Donchev
- T1A02 Experimental Study on Strengthening Effect of CFRP Strand Sheet on RC Beams Applied with Several Kinds of Adhesives
Atsuya. Komori, Kenshi Taniguchi, Satoru. Nakamura, Kouhei Yamaguchi, Sinichi Hino
- T1A03 Efficiency and Critical Points of Strengthening Masonry Structures with FRP
Jiri Witzany, Tomas Cejka, Radek Zigler
- T1A04 Shear Strengthening of RC Beams using FRP Mesh and PVA Short Fiber Mixed Shotcrete
Takuro Nakamura, Fumio Taguchi, Yusuke Kurihashi, Norimitsu Kishi, Hiroshi Mikami
- T1A05 Fibre Composites for High Pressure Pipeline Repairs, in-air and subsea – An Overview
Md Shamsuddoha, Md Mainul Islam, Thiru Aravinthan, Allan Manalo, Kin-tak Lau, David Elder
- T1A06 Shear Deformation of RC Beams Jacketed with Large Fracture Strain FRP in the Post-Yielding Region
Tidarut Jirawattanasomkul, Naruse Ryota, Dawei Zhang, Tamon Ueda

Session T1B (16:00-18:00)

Room B

- Title : Bond behavior and debonding failures
Chair : **Prof. X.L. Zhao (Monash University, Australia) and
Prof. S. Yamada (Toyohashi University of Technology, Japan)**
Room : Room B (Small Lecture Room)

- T1B01 Mechanical Behavior of Plate Bonded FRP Sheets under Uniaxial Compression Load
Yusuke Okuyama, Takeshi Miyashita, Tatsuo Ogata, Kazuo Fujino, Kazuo Ohgaki,
Yuya Hidekuma, Wataru Horimoto, Masatsugu Nagai
- T1B02 Stress Analysis for Steel Plate Multilayered CFRP under Uniaxial Loading
Takeshi Miyashita, Masatsugu Nagai
- T1B03 Experimental Study of The Bond Strength between Steel Substrate and CFRP under Impact Tensile Loads
H. Al-Zubaidy, X.L. Zhao, R. Al-Mahaidi
- T1B04 Experimental Study on Debonding Behavior of CFRP for Axial Tensile Reinforced Steel Plate by CFRP Strand Sheets
Yuya Hidekuma, Akira Kobayashi, Yusuke Okuyama, Takeshi Miyashita, Masatsugu Nagai
- T1B05 FRP-to-Metal Bonds: Effect of Test Specimen Configuration on Interfacial Stresses
J.Q. Yang, Scott T. Smith, Peng Feng
- T1B06 Tensile and Compressive Test on Thickness-Reduced Steel Plate Repaired by CFRP Strand Sheet and Underwater Epoxy with Bond Defects
Yasuo Kitane, Xiao Chen, Yoshito Itoh, Toshiyuki Ishikawa

Welcome Reception (19:00-)

Room S

Room : Room S (First Conference Room)

Friday 3rd February, 2012

Registration (8:30-9:30)

Hall

Room : Hall

Session F1A (9:00-10:40)

Room A

Title : Strengthening of concrete, metallic, timber and masonry structures

Chair : **Prof. R. Al-Mahaidi (Swinburne University of Technology, Australia) and Dr. F. Taguchi (Civil Engineering Research Institute for Cold Region, Japan)**

Room : Room A (Large Lecture Room)

- F1A01 Capacity Development of Externally Bonded CFRP Subject to Oscillating Loads During Resin Cure
Kent A. Harries, Wen-wei Wang, Jian-Guo Dai
- F1A02 FRP Anchorage Systems for Infill Masonry Structures
Dillon S. Lunn, Sami H. Rizkalla, Shohei Maeda, Tamon Ueda
- F1A03 Partially Cured Epoxy Adhesive for Anchoring Prestressed CFRP Strips on Concrete
Julien Michels, Christoph Czaderski, Raafat El-Hacha, Masoud Motavalli
- F1A04 The Study of FRP Sheet Effectiveness on Structural Behavioral of AAC Blocks
Asghar V. Oskouei, Shahed Rasouli
- F1A05 Feasibility Study on Increasing Bending Stiffness of FRP Girders by Bonding CFRP Strips and Bonding Girder Sections
Onek Denis Obedi, Shuhei Sugai, Hitoshi Nakamura, Ken-ichi Maedaz, Ken-ichi Yaginuma

Session F1B (9:00-10:40)

Room B

Title : Confinement and seismic retrofit / Concrete structures reinforced or prestressed with FRP / Fire, impact and blast loading

Chair : **Prof. H. Mutsuyoshi (Saitama University, Japan) and Prof. W.C. Xue (Tongji University, China)**

Room : Room B (Small Lecture Room)

- F1B01 Seismic Performance of Beam-Column Joints Reinforced with GFRP Headed Bars
Mohamed H. Hasaballa, Ehab F. EL-Salakawy
- F1B02 Investigation on GFRP Bar Performance in High Strength Concrete Footing
Mohammad Pirgholi Kivi, Hassan Araghi, Asghar Vatani Oskouei
- F1B03 Use of CFCC Tendons and Reinforcements in Concrete Structures for Durability
Tsuyoshi Enomoto, Ken'ichi Ushijima
- F1B04 Evaluation of A Shear Wall Reinforced with Glass FRP Bars Subjected to Lateral Cyclic Loading
Nayera Mohamed, Ahmed Sabry Farghaly, Brahim Benmokrane, Kenneth W. Neale
- F1B05 Stiffness of FRP Pultruded Tubes under Repeated Axial Impacts
Ernesto J. Guades, Thiru Aravinthan, Md. Mainul Islam, Allan C. Manalo

Coffee Break (10:40-11:00)

Session F2A (11:00-12:40)

Room A

Title : Hybrid structures and all FRP structures / Strengthening of concrete, metallic, timber and masonry structures

Chair : **Prof. J.G. Teng (Hong Kong Polytechnic University, China) and Prof. T. Shimomura (Nagaoka University of Technology, Japan)**

Room : Room A (Large Lecture Room)

- F2A01 Seismic Control of Plastic Mechanism of Steel Reinforced Concrete Columns by the Use of GFRP Bars

Riyad S. Aboutaha, Rafic G. El-Helou, Manar S. Shraideh

F2A02 Investigation of Flexural Performance of RC Beams Strengthened with CFRP Textiles and Cement Based Adhesives

Siavash Hashemi Riadh Al-Mahaidi

F2A03 Strengthening of Flat Plates with An Opening Using FRP Systems
Kiang Hwee Tan

F2A04 Effectiveness of A New CFRP Anchor in Preventing Delamination
Ahmed A.B. Mostafa, A. Ghani Razaqpur

F2A05 Behavior of Laterally Restrained GFRP Reinforced Concrete Slab
Yu Zheng, Chunhong Li, Guoyou Yu

Session F2B (11:00-12:40)

Room B

Title : Durability and long-term performance / Strengthening of concrete, metallic, timber and masonry structures

Chair : **Prof. R. El-Hacha (University of Calgary, Canada) and Dr. J.G. Dai (Hong Kong Polytechnic University, China)**

Room : Room B (Small Lecture Room)

F2B01 Fatigue of Center Cracked Steel Plates with UHM CFRP Plate Strengthening
Chao Wu, Xiaoling Zhao, Wenhui Duan, Mohammad R. Emdad, Riadh Al-Mahaidi

F2B02 Enhancement of Mechanical Performance of Steel/CFRP Adhesively-Bonded Joints at Elevated Temperatures through Carbon Nanotube Modification and Curing
Yu Bai, Tien C. Nguyen, Chao Ding, Xiao-Ling Zhao

F2B03 Improving Fatigue Performance of CFRP Strengthened Steel Beams by Applying Vacuum Pressure in the Wet Layup of CFRP Woven Sheets
Hui Jiao, Xiao-Ling Zhao, Fidelis Mashiri

F2B04 Development of Reduction Technique of Thermal Stress Induced in CFRP Bonded Steel Plates
Toshiyuki Ishikawa, Atsushi Hattori, Hirotaka Kawano, Takashi Nagao, Akira Kobayashi

F2B05 Mechanical Characteristics of CFRP Reinforcement for Corroded Steel under Axial Tension
Yukihiro Matsumoto, Nguyen Duc Long, Seishi Yamada, Takahiro Matsui

Lunch (12:40-14:00)

Session F3A (14:00-15:40)

Room A

Title : Hybrid structures and all FRP structures

Chair : **Prof. K.H. Tan (National University of Singapore, Singapore) and Dr. P. Feng (Tsinghua University, China)**

Room : Room A (Large Lecture Room)

F3A01 Prediction of The Flexural Behavior of Fibre Composite Sandwich Beams
Allan C. Manalo, Thiru Aravinthan, Karu Karunasena

F3A02 Performance of Newly Developed CFRP Precast Prestressed Decked Bulb T Beams
Nabil Grace, Tsuyoshi Enomoto, Prince Baah, Mena Bebawy

F3A03 Effects of the Material Constants of Bond on Stress Distributions for FRP/ALC Sandwich Slabs
Seishi Yamada, Takeshi Seino, Yukihiro Matsumoto, Hideo Oka

F3A04 The Use of FRCC and FRP for the Joining Method of Permanent Formwork
Qingxu Jin, Christopher K. Y. Leung

F3A05 Structural Behavior of Composite Girders Consisting of Hybrid FRP I-Beam and Precast Ultra High Performance Fiber Reinforced Concrete Slab
Hiroshi Mutsuyoshi, Nguyen Duc Hai, Zhishen Wu

Session F3B (14:00-15:40)

Room B

Title : Durability and long-term performance / Hybrid structures and all FRP structures

Chair : **Prof. C.K.Y. Leung (HKUST, China) and Dr. I. Nishizaki (Public Works Research Institute, Japan)**

Room : Room B (Small Lecture Room)

F3B01 Influence of Environmental Temperature for Bond Strength between CFRP Sheet and Concrete

Yasuhiro Koda, Akihisa Kamiharako, Ichiro Iwaki

F3B02 Effect of Adhesive Viscoelasticity on the Creep Behaviour of FRP Strengthened Concrete Beams

Ehab Hamed

F3B03 Durability of Aramid and Carbon FRP PC Beams under Tidal and Thermal Accelerated Exposure

Hiroshi Nakai, Hirofumi Watanabe, Tsuyoshi Enomoto, Taketo Uomoto

F3B04 Imperfection Influence on FRP-Plated RC Beams

Y.C. Guo, G.M. Chen, L.J. Li, F. Liu, B. Yuan, F.M. Ren, P.Y. Huang

F3B05 Fatigue Performance of Hybrid CFRP-GFRP-UHPC Beams

Donna S.M. Chen, Raafat El-Hacha

Coffee Break (15:40-16:00)

Keynote Lectures (16:00-18:15)

Room A

Chair : **Prof. Z.S. Wu (Ibaraki University, Japan)**

Room : Room A (Large Lecture Room)

Key04 Proposals of CF, GF and NF Composites to Civil and Architectural Structures

Prof. Goichi Ben

Key05 All FRP and FRP-Concrete Hybrid Components for Bridges: Experiments, Theories and Case Study

Dr. Peng Feng

Key06 Research and Development of Fibre Composites in Civil Infrastructure – The Australian Experience

Dr. Thiru Aravinthan

Banquet (19:00-)

The Sapporo Beer Garden

Venue : The Sapporo Beer Garden

Saturday 4th February, 2012

Registration (8:30-9:30)

Hall

Room : Hall

Session S1A (9:00-10:40)

Room A

Title : Confinement and seismic retrofit

Chair : **Dr. Y.F. Wu (City University of Hong Kong, China) and Dr. K. Yonemaru (Shimizu Corporation, Japan)**

Room : Room A (Large Lecture Room)

S1A01 Size Effect of Square Concrete Columns Confined with CFRP Wraps

Zhenyu Wang, Daiyu Wang, Scott Thomas Smith

S1A02 Shear Strengthening of Full-Scale RC T-Beams with CFRP Sheets

Abdeldjelil Belarbi, Michael Murphy, Sang-Wook Bae

S1A03 Shear Strengthening of RC Beams Using Hybridized FRP Composite

Sang-Su Ha, Dong-Uk Choi, Thomas H.-K. Kang, Chin Yong Lee

S1A04 Short Term Creep Tests of Low Strength Rectangular Concrete Members Jacketed with Carbon FRP Sheets

Cem Demir, Aygul Aydogmus, Alper Ilki

Session S1B (9:00-10:40)

Room B

Title : Bond behavior and debonding failures

Chair : **Prof. S.H. Rizkalla (North Carolina State University, USA) and Dr. T. Kanakubo (University of Tsukuba, Japan)**

Room : Room B (Small Lecture Room)

- S1B01 Bond and Force Transfer of FRP Materials Bonded to Concrete Using Sitecure System
Rebecca J. Gravina, S. Ali Hadigheh, Sujeeva Setunge
- S1B02 Bonding of Varying-Thickness FRP Laminates to RC Beams
P. Fakhrimoghadam, A. Vafai
- S1B03 Bond Properties between Continuous Fiber Rope and Concrete
Kenzo Sekijima, Kyouhei Kawakami, Junichi Izumo
- S1B04 Bond Strength of Carbon and Aramid Fiber Reinforced Polymer Rebars in Normal Strength Concrete
So Jeong Han, Dae-Jin Kim, Young Hak Lee, Heecheul Kim
- S1B05 Investigation of the Bond Behavior for the Embedded Through-Section FRP Rod Shear-Strengthening Method
Ahmed Godat, Amar L'hady, Omar Chaallal, Kenneth W. Neale

Coffee Break (10:40-11:00)

Session S2A (11:00-12:20)

Room A

- Title : Hybrid structures and all FRP structures / Strengthening of concrete, metallic, timber and masonry structures / Durability and long-term performance
- Chair : **Dr. T. Matsumoto (Hokkaido University, Japan) and Prof. A. Belarbi (University of Houston, USA)**
- Room : Room A (Large Lecture Room)

- S2A01 Analysis and Design of Perforated SIFCON Blocks for Compression Yielding Structural Systems
Yufei Wu, Jiafei Jiang, Kang Liu
- S2A02 Improvement of Debonding Bending Moment of Pre-Tensioned CFRP Plates Bonded onto Steel Members
Masaru Shimizu, Toshiyuki Ishikawa, Atsushi Hattori, Hirotaka Kawano
- S2A03 Mechanical Behaviour of A New Type of Fibre Composite Railway Sleeper
Allan C. Manalo, Thiru Aravinthan
- S2A04 Gravimetric Experimental Study on Moisture Diffusion Characteristic of Pultruded FRP Composite and Adhesive Materials
Xu Jiang, Henk Kolstein, Frans S.K. Bijlaard

Session S2B (11:00-12:20)

Room B

- Title : Bond behavior and debonding failures
- Chair : **Dr. A. Kamiharako (Hirosaki University, Japan) and Dr. D. Zhang (Hokkaido University, Japan)**
- Room : Room B (Small Lecture Room)

- S2B01 Practical-Orientated Full-Scale Tests in Comparison with Bond Checks of Different Guidelines
Wolfgang Finckh, Konrad Zilch
- S2B02 Double Shear Tests for Characterisation of Bond between FRP EBR and Concrete
Andreea Serbescu, Maurizio Guadagnini, Kypros Pilakoutas
- S2B03 Interface Bond Strength of Helical Wrapped GFRP Ground Anchors
Weichen Xue, Yuan Tan
- S2B04 A Study on Flexural Bonding Strength for Embedded Length of FRP Rods
J. Sim, T. Kang, J. Park, H. Kim, H. Lee

Closing Ceremony (12:20-12:40)

Room A

Lunch (12:40-14:00)

Committee Members

International Scientific Committee

R. Al-Mahaidi, Australia
T. Aravinthan, Australia
M. Griffith, Australia
X.L. Zhao, Australia
L. Taerwe, Belgium
K.W. Neale, Canada
A.A. Mufti, Canada
N. Banthia, Canada
R. El-Hacha, Canada
A. Fam, Canada
P. Labossière, Canada
J.G. Teng, China
P. Feng, China
S.T. Smith, China
Y.F. Wu, China
H.M. Seliem, Egypt
E. Ferrier, France
T.C. Triantafillou, Greece
M. Motavalli, Iran
A. Katz, Israel
G. Monti, Italy
L. De Lorenzis, Italy
A. Machida, Japan
T. Uomoto, Japan
H. Mutsuyoshi, Japan
H. Nakamura, Japan
J. Sim, Korea
R. Kotynia, Poland
J. Barros, Portugal
K.H. Tan, Singapore
M.D.G. Pulido, Spain
T. Keller, Switzerland
A. Ilki, Turkey
L.A. Bisby, UK
J.F. Chen, UK
M. Guadagnini, UK
T.J. Stratford, UK
S.H. Rizkalla, USA
A. Nanni, USA
C.E. Bakis, USA
L.C. Bank, USA
I.E. Harik, USA
K.A. Harries, USA
V.M. Karbhari, USA
F. Matta, USA
R. Seracino, USA

Organizing Committee

Chairman:

T. Ueda, Hokkaido University

Secretaries:

T. Kanakubo, University of Tsukuba

Y. Sato, Hokkaido University

T. Shimomura, Nagaoka University of Technology

Members:

J. Dai, The Hong Kong Polytechnic University

Y. Goto, Hokkaido University

M. Iso, University of Fukui

A. Kamiharako, Hirosaki University

Y. Kurihashi, Muroran Institute of Technology

A. Kobayashi, Nippon Steel Materials Co., Ltd.

T. Matsumoto, Hokkaido University

K. Nakano, Chiba Institute of Technology

H. Nishi, Civil Eng. Research Institute for Cold Region

I. Nishizaki, Public Works Research Institute

Y. Takahashi, Hokkai-Gakuen University

F. Taguchi, Civil Eng. Research Institute for Cold Region

Z. Wu, Ibaraki University

K. Yamaguchi, Kyushu University

S. Yamada, Toyohashi University of Technology

K. Yonemaru, Shimizu Corporation

Sponsorship

APFIS 2012

The Third Asia-Pacific Conference on FRP in Structures (APFIS2012)
is the official regional conference of



the International Institute for FRP in Construction (IIFC)
for the Asia-Pacific region.

APFIS2012 is organized by



Japan Concrete Institute (JCI),
in collaboration of



Hokkaido University



Japan Society of Civil
Engineers (JSCE)



Japan Society for
Composite Materials
(JSCM)

APFIS2012 is supported by



The Japan Reinforced
Plastic Society (JRPS)



Architectural Institute of
Japan (AIJ)



Carbon Fiber Repair &
Reinforcement Research
Association (CFRRA)

APFIS2012 is sponsored by



Association for Advanced Composite Technology in Construction Field (ACC)

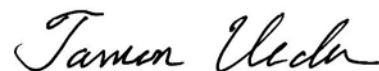
Preface

Asia-Pacific Conference on FRP in Structures (APFIS) is one of the official international conference series of International Institute for FRP in Construction (IIFC). The 1st APFIS was held in December 2007 in Hong Kong and the second one in December 2009 in Seoul. This 3rd APFIS, held in February 2012 at Hokkaido University, Sapporo is organized by the Japan Concrete Institute (JCI). While APFIS conferences are held in winter time, the other IIFC official conference, International Conference on FRP Composites in Civil Engineering (CICE), 5 conferences so far, have been held in summer time of the north hemisphere. We scheduled this conference to coincide with the Sapporo Snow Festival hoping that you will enjoy this magnificent event and your stay in this winter wonderland.

The proceedings of APFIS2012 include 6 keynote and 66 general papers. The first authors of 42 papers are from Asia, while 12 papers each are from Oceania and North America and 6 papers from Europe with the biggest contribution, 22 papers from the host country, Japan. Presentations are made either in the technical session or in the poster session. Some of the poster presentations do not have full papers in the proceedings. Topics of the papers cover issues ranging from strengths (material, anchorage and member), bond, confinement to durability. Structural types dealt with in the papers are not only concrete but also steel and FRP. Hybrid structure and material using FRP are also the major interests in the papers.

As chairman of the Organizing Committee, I would like to express my sincere gratitude to all the authors of papers for sharing the latest achievements on structural FRP in both research and practical fields, especially to the six keynote lecturers, Dr Thiru Aravinthan, Prof Goichi Ben, Dr Peng Feng, Prof Kyuichi Maruyama, Prof Jongsung Sim and Prof Jin-Guang Teng. The paper by Prof Maruyama focuses on the damage in structures by the Great East Japan Earthquake on 11th March 2011, which was not planned originally. I am grateful to the reviewing team which consists of International Scientific Committee and Organizing Committee members for their valuable efforts to guarantee the quality of the papers.

Last but not least it should be mentioned that the proceedings of APFIS2012, which is the primary outcome of the conference, could not have come out without the guidance of IIFC Executive Committee, the professional and financial support of JCI and the team works of JCI Organizing Committee. My special thanks go to Dr Toshiyuki Kanakubo, Dr Takumi Shimomura, Dr Yasuhiko Sato and Ms Naoko Masaki.



Chairman, Organizing Committee of APFIS2012
Tamon Ueda