

Editors:

Bijan Samali, Mario M. Attard & Chongmin Song

From Materials to Structures: Advancement through Innovation



[help](#) [open](#)

Table of contents

Preface

Scientific committee

Keynote papers

Composite structures & materials

Computational mechanics

Concrete structures

Dynamic analysis of structures

Earthquake & wind engineering

Fibre composites

Fire engineering

Foundation and pavement engineering

Geomechanics

Mechanics of materials

New design and construction technologies

Shock and impact loading

Steel and aluminium structures

Structural health monitoring

Structural optimisation and reliability

Sustainability of structures and materials

Timber engineering

Concrete/material technology

Author index

[help](#)

[exit](#)

[main menu](#)

[search](#)

[<](#) [>](#)

Keynote papers

Analysis of dynamic penetration of soils
J.P. Carter & M. Nazem

Strategies for structural health monitoring of bridges: Japan's experience and practice
Y. Fujino & D. Siringoringo

Recycled and renewable materials as resources for electric arc furnace steelmaking
M. Zaharia, N.F. Yunus & V. Sahajwalla

Terror, security, and money: The risks, benefits, and costs of critical infrastructure protection
M.G. Stewart & J. Mueller

[help](#)

[exit](#)

[main menu](#)

[search](#)

[<](#) [>](#)

Concrete filled fabricated VHS tube to mild steel plate triangular stub columns under axial compression load
F. Alatshan, F.R. Mashiri & B. Uy

Multi-objective design optimisation of GFRP sandwich beams

Z.K. Awad, T. Aravinthan, Y. Zhuge & F. Gonzalez

Effect of construction sequence in the axial shortening behaviour of composite columns
N. Baidya, L. Zhang, P. Mendis & S. Fragomeni

Structural evaluation of concrete expanded polystyrene sandwich panels for slab applications

R.M. Bajracharya, W.P. Lokuge, W. Karunasena, K.T. Lau & A.S. Mosallam

Long-term deformation of composite concrete slabs under sustained loading
A. Gholamhoseini, R.I. Gilbert, M.A. Bradford & Z.T. Chang

Residual strength of timber-concrete composite beams after long-term test
M. Hailu, C. Gerber, R. Shrestha & K. Crews

Effect of boundary conditions on the creep response of sandwich beams with a viscoelastic soft core
E. Hamed & M. Ramezani

A review of FRP composite truss systems and its connections

R.M. Hizam, A.C. Manalo & W. Karunasena

Post-critical behaviour of sandwich cylindrical shells with variable thickness
P. Jasion & K. Magnucki

Analytical solution of multi-layer composite beam including interlayer slip and uplift
A. Kroflič, M. Saje & I. Planinc

Time dependent behaviour of two-layer composite beams
A. Kroflič, M. Saje & I. Planinc

Effect of ply configuration on hollow square reinforced concrete columns confined with Carbon fibre-reinforced polymer (CFRP)
T.D. Le, M.T. Lester & M.N.S. Hadi

Electroelastic analysis of interface cracks and corners in piezoelectric composites using scaled boundary finite element method
C. Li, H. Man, C. Song & W. Gao

Long-term in-plane analysis of concrete-filled steel tubular arches under a central concentrated load
K. Luo, Y.L. Pi, M.A. Bradford & W. Gao

A comparison of various plate theories for functionally graded material sandwich plates
S. Natarajan & M. Ganapathi

continued on next page

Composite structures & materials (continued)

Crack propagation modeling in functionally graded materials using polygon elements modeled by the scaled boundary finite element method

E.T. Ooi, S. Guo & C. Song

Effect of eccentric load on retrofitted reinforced concrete columns confined with FRP

T.M. Pham, X. Lei & M.N.S. Hadi

Application of externally post-tensioned FRP bars for strengthening reinforced concrete members

A. Rajabi, H.R. Valipour, B. Samali & S. Foster

Evaluation of effective width of GFRP-steel composite beams for structural construction

S. Satasivam, Y. Bai & X.L. Zhao

Behaviour of composite steel-concrete beams under elevated temperatures

K. Wilkins, O. Mirza & B. Uy

Experimental trends of FRP-to-concrete joints anchored with FRP anchors

H.W. Zhang & S.T. Smith

Multi-scale nonlinear elastic analysis of thin-walled members including local effects
R.E. Erkmén

Thin plate bending analysis using the generalized RKP-FSM
M. Khezri, Z. Vrceelj & M.A. Bradford

On volume change dependency of the soil water characteristic curve in numerical modeling of unsaturated soils
A. Khoshghalb & N. Khalili

Improved nonlinear analysis methods for determining the initial shape of cable-supported bridges
M.Y. Kim, D.J. Min & M.M. Attard

Efficient bending analysis for piezoelectric plates using scaled boundary finite-element method
H. Man, C. Song, W. Gao & F. Tin-Loi

Evaluation of stress intensity factors on cracked functionally graded materials using polygons modelled by the scaled boundary finite element method
E.T. Ooi, I. Chiong & C. Song

In-plane stability of variable cross-section columns with shear deformations
L. Su & M.M. Attard

Limit analysis in the presence of plasticity and contact
S. Tangaramvong, F. Tin-Loi & C.M. Song

Application of explicit finite element analysis in solving practical structural engineering problems
T. Watts, K. Kayvani & A. Kucyber

Fluid flow through single fracture using Lattice Boltzmann Method
P. Yin & G. Zhao

The behaviour of fibre reinforced continuous concrete slabs under load – an experimental study
F.M. Abas, R.I. Gilbert, S.J. Foster & M.A. Bradford

Application of flexible façade systems in reducing the lateral displacement of concrete frames subjected to seismic loads
P. Abtahi, B. Samali, M. Zobec & T. Ngo

Investigation of ground flint glass as a supplementary cementitious material in autoclaved lime-silica binders
K. Angus, P.S. Thomas, K. Vessalas & A.S. Ray

Finite element model calibration of an instrumented RC building based on seismic excitation including non-structural components and soil-structure-interaction
F. Butt & P. Omenzetter

Modelling of reinforced concrete beam response to repeated loading including steel-concrete interface damage
A. Castel, R.I. Gilbert, S.J. Foster & G. Ranzi

Shear strengthening of RC beam with external FRP bonding: A state-of-the-art review
R. Choudhury, T.G. Suntharavadivel, P. Keleher & A. Patil

Evaluation of longitudinal bond shear stress and bond-slip relationship in composite concrete slabs using partial shear connection method
A. Gholamhoseini, R.I. Gilbert, M.A. Bradford & Z.T. Chang

Evaluation of mechanical properties of carpet fibre reinforced concrete
N. Ghosni, B. Samali & K. Vessalas

Bond failure in grouted post-tensioned slab tendons with little or no initial prestress
R.I. Gilbert

Effect of supporting conditions on the long-term load capacity of high strength concrete panels
Y. Huang & E. Hamed

A mathematical model for complete stress-strain curve prediction of permeable concrete
M.K. Hussin, Y. Zhuge, F. Bullen & W.P. Lokuge

Effects of temperature, relative humidity and outdoor environment on FRP-concrete bond
M.I. Kabir, R. Shrestha & B. Samali

A preliminary investigation of the strength and ductility of lapped splices of reinforcing bars in tension
A.E. Kilpatrick & R.I. Gilbert

Feasibility study of autonomous deformation control of PC viaducts
M. Kunieda, N. Chijiwa, K. Ohara & K. Maekawa

continued on next page

Concrete structures (continued)

Anchorage of deformed reinforcing bars in tension: An outlook for advanced formulation of a bond-slip constitutive law
M.H. Mazumder, R.I. Gilbert & Z.T. Chang

Structural performance of 45 year old corroded prestressed concrete beams
T.M. Pape & R.E. Melchers

Fatigue behaviour of reinforced concrete beams with addition of steel fibres
A. Parvez & S.J. Foster

An experimental study on the shrinkage and ultimate behaviour of post-tensioned composite slabs
G. Ranzi, A. Ostinelli & B. Uy

Instantaneous and long-term behaviour of cracked reinforced concrete slabs prepared with different curing conditions
M.M. Rahman, A. Ostinelli, G. Ranzi & R.I. Gilbert

Effect of reinforcement confinement on concrete cover cracking in reinforced concrete structures
H.B. Sabtu & M.G. Stewart

Lateral strain of confined concrete incorporating size effect
A.K. Samani & M.M. Attard

Combining high-strength self-compacting and normal-strength concretes in reinforced concrete frame structures
M. Soleymani Ashtiani, R.P. Dhakal & A.N. Scott

Investigating the arching action in reinforced concrete beams
N.F. Vesali, H. Valipour, B. Samali & S.J. Foster

FEM modelling and analysis of reinforced concrete section with lightweight blocks infill
A.S. Wahyuni, V. Vimonsatit & H. Nikraz

Effective stiffness of reinforced concrete section with lightweight blocks infill
A.S. Wahyuni, V. Vimonsatit & H. Nikraz

Dynamic analysis of structures

Assessment of key response quantities for design of a cable-stayed bridge subjected to sudden loss of cable(s)
Y. Aoki, B. Samali, A. Saleh & H. Valipour

Ambient vibration tests and analysis of a multiple-span elevated bridge
X. Chen, P. Omenzetter & S. Beskhyroun

A novel piezoelectric wafer-stack vibration energy harvester
X.Z. Jiang, Y.C. Li & J.C. Li

Optimization-based interval dynamic response analysis of a bridge under a moving vehicle with uncertain properties
N. Liu, W. Gao, C.M. Song & N. Zhang

Automatic dynamic crack propagation modeling using polygon scaled boundary finite elements
E.T. Ooi, M. Shi, C. Song, F. Tin-Loi & Z.J. Yang

Dynamic analysis for plate structures by the scaled boundary finite-element method
T. Xiang, H. Man, C. Song & W. Gao

Earthquake & wind engineering

A newly developed analytical model of transient downburst wind loads

E. Abdelaal, X. Ma & J.E. Mills

Dynamic behaviour of flexible facade systems in tall buildings subjected to wind loads

A. Azad, B. Samali, T. Ngo & C. Nguyen

Seismic risk analysis based on historical events reported in Sri Lanka

P. Gamage & S. Venkatesan

Influence of infilled masonry wall on vibration properties and dynamic responses of building structures to earthquake ground excitations

H. Hao

Behavior of reinforced concrete rectangular aboveground tanks subjected to near-source seismic excitations

M. Hosseini & Sh. Abizadeh

A comparative study on the seismic performance of moment resisting frame steel buildings, designed by IBC and Eurocode, based on nonlinear time history analyses

M. Hosseini & F. Sheikhlou

Optimal story-wise distribution of viscous dampers in a five-story building

B. Kashani Madani & M. Hosseini

Effects of vertical seismic loadings on safety evaluation for earth dams

H.J. Li & Z.W. Yan

Smart structures embedded with MR dampers using non-affine Fuzzy Control

Z. Movassaghi, B. Samali & Q.P. Ha

Seismic performance improvement of stone masonry buildings in mud mortar

R. Pun, B. Samali & H. Valipour

Quasi-static testing protocol for simulating earthquake conditions in regions of low-moderate seismicity

R. Shahi, N. Lam, E. Gad & J. Wilson

Dynamic analysis of structures with interval parameters under random process earthquake excitations

C.W. Yang, C. Wang, W. Gao & C.M. Song

Fibre composites

Assessment of wollastonite microfibre on drying shrinkage behaviour of cement-based composites
N.L. Galea, P. Hamedanimojarrad, K. Vessalas & P.S. Thomas

Experimental study on the bondline behavior between concrete and FRP materials
S.A. Hadigheh, R.J. Gravina, S. Setunge & S.J. Kim

An experimental investigation of a thermal break composite façade mullion section
S. Huang, J. Li, B. Samali & M. Zobec

Mechanical properties of bamboo fiber-polyester composites
A.C. Manalo, W. Karunasena & K.T. Lau

Influence of hooked-end steel fibers on absorbed energy of slurry-infiltrated fiber concrete in flexural test
Y. Shafaei & O. Eren

Properties and behaviour of gomuti fibre composites under tensile and compressive load
A. Ticoalu, T. Aravinthan & F. Cardona

Formula for SIF of cracked steel plates strengthened with CFRP plate
Q.Q. Yu, X.L. Zhao, T. Chen, Z.G. Xiao & X.L. Gu

Influence of in-situ pore pressures and temperatures on spalling of reinforced concrete walls subjected to hydrocarbon fire
M. Guerrieri & S. Fragomeni

Thermal performance of non-load bearing LSF walls using numerical studies
P. Keerthan & M. Mahendran

Prediction of shear failure of hollowcore slabs exposed to fire
J.K. Min, R.P. Dhakal, A.K. Abu, P.J. Moss & A.H. Buchanan

A review on fire protection for phase change materials in building applications
Q. Nguyen, T. Ngo & P. Mendis

Self-strengthening of structural steel members using shape memory alloys in fire
H. Sadiq, M.B. Wong, X.L. Zhao & R. Al-Mahaidi

Foundation and pavement engineering

Review of residential footing design on expansive soil in Australia

A.M.A.N. Karunaratne, E.F. Gad, S. Sivanerupan & J.L. Wilson

Analysis of pile group behaviour due to excavation induced ground movements

R. Nishanthan, D.S. Liyanapathirana & C.J. Leo

Inelastic lateral seismic response of building frames under influence of bedrock depth variations incorporating soil-structure interaction

H.R. Tabatabaiefar, B. Fatahi & B. Samali

Numerical and experimental investigations of stress wave propagation in utility poles under soil influence

N. Yan, J. Li, U. Dackermann & B. Samali

**Comparison of existing design methods for geosynthetic reinforced pile-supported embankments:
Three-dimensional numerical modelling**

P. Ariyaratne, D.S. Liyanapathirana & C.J. Leo

Efficient modeling of wave propagation in unbounded domains using the scaled boundary finite element method

X. Chen, C. Birk & C. Song

Experimental investigation of desiccation of clayey soils

Y. Gui, G. Zhao & N. Khalili

A geotechnical site investigation by surface waves

P. Harutoonian, C.J. Leo, D.S. Liyanapathirana & K. Tokeshi

A constitutive permeability evolution model for fractured porous media

J. Ma, N. Khalili & G. Zhao

Comparisons of seismic rock slope stability assessments between the Hoek-Brown and Mohr-Coulomb failure criteria

Z.G. Qian, A.J. Li, V. Kong & A.V. Lyamin

Permeability of the fractured rockmass – A review

K.K. Singh, D.N. Singh & P.G. Ranjith

Horizontal-to-vertical spectral ratio inversion using Monte Carlo approach and enhanced by Rayleigh wave dispersion curve

K. Tokeshi, P. Harutoonian, C.J. Leo, D.S. Liyanapathirana & R. Golaszewski

An investigation of arching mechanism of geosynthetic reinforced column supported embankments

N.N.S. Yapage, D.S. Liyanapathirana, C.J. Leo, H.G. Poulos & R.B. Kelly

Synergistic energy absorption in the in-plane static compression response of filled honeycombs
R.J. D'Mello & A.M. Waas

Stress analysis of cemented wellbores in geosequestration of carbon dioxide
M.G. Haider, J. Sanjayan & P.G. Ranjith

Metal surface profile and residual stress: Persuasion of adhesion
M.S. Islam, L. Tong & P.J. Falzon

Strength of glass under concentrated force
H. Jiang, N.T.K. Lam, L. Zhang & E.F. Gad

Orthotropic Simo and Pister hyperelasticity
D.C. Kellermann & M.M. Attard

Pressure correction in water-bag testings to investigate post cracked behaviour of laminated glass
R. Lumantarna, C. Nguyen, M. Zobec & T. Ngo

Biomechanical environment of early stage of bone healing under biological internal fixation
S. Miramini, L. Zhang, P. Mendis & M. Richardson

Material structural design with isotropy constraint
A. Radman, X. Huang & Y.M. Xie

Experimental study on mixed-mode fracture between concrete and rock
H. Zhong, T. Ding & G. Lin

In-plane buckling analysis of funicular arches with pinned supports
J. Zhu & M.M. Attard

New design and construction technologies

Structural performance under lateral loads of innovative prefabricated modular structures

T. Gunawardena, T. Ngo, P. Mendis, L. Aye & J. Alfano

Displacement based design method for outrigger braced tall buildings

N. Herath, P. Mendis, T. Ngo & N. Haritos

Innovative materials for next generation façade systems

Q. Nguyen, P. Mendis, T. Ngo, P. Tran & C. Nguyen

Review of diaphragm actions in domestic structures

I. Saifullah, E.F. Gad, J.L.Wilson, N.T.K. Lam & K.Watson

Study of blockage effect on scouring pattern downstream of a box culvert

S. Sorourian, A. Keshavarzi, B. Samali & J. Ball

Shock and impact loading

Fundamentals of impact actions demonstrated by miniature experimentations

M. Ali, J. Sun, N. Lam, L. Zhang & E. Gad

Numerical simulation of impact pile driving and its effect on far field

S.D. Ekanayake, D.S. Liyanapathirana & C.J. Leo

Effects of energy level and impact repetitions on the impact fatigue behaviour and post-impact flexural properties of square FRP pultruded tubes

E.J. Guades, T. Aravinthan, A.C. Manalo & M.M. Islam

A novel adaptive base isolator utilising magnetorheological elastomer

Y.C. Li, J.C. Li & B. Samali

Numerical modelling of composite textile subjected to impact loading

P. Tran, T. Ngo, E.C. Yang, P. Mendis & W. Humphries

Bio-inspired composite structure subjected to underwater impulsive loading

P. Tran, T. Ngo & P. Mendis

Numerical simulation of concrete spalling under impact

C.Wu & L. Shen

Simulation of pressure impulse diagrams for foam protected RC members

C.Wu & H. Sheikh

Impact analyses simplified by the two-degrees-of-freedom models

Y. Yang, N. Lam, L. Zhang & E. Gad

Steel and aluminium structures

Testing of steel-CFRP adhesive joints under freeze-thaw cycling
A. Agarwal, S. Foster, E. Hamed & Z. Vrcelj

A new kinetic model for steel specific heat during phase transformation
H. Fang, M.B. Wong & Y. Bai

Finite element modeling of a beam-column connection in industrial storage racking structures
A. Firouzianhaji, A. Saleh & B. Samali

Shear tests of lipped channel beams with stiffened web openings
P. Keerthan & M. Mahendran

The use of neural networks for identification of parameters of semi-rigid connections
A. Kozłowski & L. Ziemiański

Finite element modeling of existing cable net structures
G.J. Lume

Theoretical research on cold-formed channel sections under bending
S. Maduliat, P. Mendis, T.D. Ngo & M.R. Bambach

Analysis of a railway turnout system with a spot replacement sleeper
A.C. Manalo, T. Aravinthan & W. Karunasena

Stability reinforcement of steel plates by heat-induced stress deformation fields
N. Schillo, D. Schaefer & M. Feldmann

Numerical study of block shear strength of coped beams bolted with angles/tee-section
K.S. Seak, A.C.C. Lam & M.C.H. Yam

Re-evaluation of shear strength of high strength bolts in AS 4100
R.H.R. Tide

Structural health monitoring

A comparative study on the performance of the damage detection methods in the frequency domain

M.M. Alamdari, J. Li & B. Samali

A FRF-based damage detection method utilising wavelet decomposition

M.M. Alamdari, J. Li & B. Samali

Adaptive multiple forgetting factor recursive least square (AMFF-RLS) for real-time structural identification

M. Askari, J. Li & B. Samali

Integrated bridge deterioration modeling for concrete elements incorporating Elman Neural Network

G.P. Bu, J.H. Lee, H. Guan & Y.C. Loo

Transmissibility function analysis for boundary damage identification of a two-storey framed structure using artificial neural networks

U. Dackermann, J. Li & B. Samali

Numerical computation of dispersion relations in three-dimensional waveguides

H. Gravenkamp, J. Prager, H. Man, C. Birk & C. Song

Long-term monitoring of vibration properties of structures with different materials and boundary conditions

H. Hao

Deterioration prediction of concrete bridges with artificial neural network (ANN) derived from discrete condition data

M.S. Hasan, S. Setunge & D.W. Law

Structural damage detection using the Wiener filter

M. Jayawardhana, X. Zhu & R. Liyanapathirana

Evaluation of thermal gradients and their effects in a bridge box girder using monitoring data

P. Omenzetter, P. Chua, A. Issa & B. Sanders

Numerical modelling of Lamb waves in cracked plates using the scaled boundary finite element method

A.A. Saputra, C. Birk, C. Song & H. Gravenkamp

Mechanical properties of epoxy grouts for structural repair

M. Shamsuddoha, M.M. Islam, T. Aravinthan, A.C. Manalo & K.T. Lau

Damage detection in a timber bridge model

D. Tran, S. Venkatesan & S. Fragomeni

Structural optimisation and reliability

Reliability analysis of steel pipeline welds subjected to long-term seawater exposure
I.A. Chaves & R.E. Melchers

Statistical safety factor calibration of short concrete-filled steel tubular columns
W.H. Kang, B. Uy, Z. Tao & S. Hicks

Model updating of a full-scale bridge structure using particle swarm optimization
F. Shabbir & P. Omenzetter

Spatial reliability analysis of reinforced concrete columns subject to explosive blast loads
Y. Shi & M.G. Stewart

Uncertainty in long-term analysis of concrete-filled steel tubular columns under sustained loading
X. Shi, W. Gao, Y.L. Pi & M.A. Bradford

Topology optimization under displacement and softening constraints
S. Tangaramvong, F. Tin-Loi & Y.M. Xie

Damage severity estimation using Parallel Genetic Algorithm and power spectral density
M. Varmazyar, N. Haritos & M. Kirley

Modal analysis of structures with mixed random and fuzzy parameters
C. Wang, J.W. Feng, W. Gao & C.M. Song

Uncertain limit analysis of structures with interval parameters
D. Wu, W. Gao, F. Tin-Loi & S. Tangaramvong

Sustainability of structures and materials

A novel acid resistant green mortar for high corrosive environments

G. Adam, S. Salek, B. Samali, P. Battista & M. McKinnon

Environmental impact assessment of post tensioned and reinforced concrete slab construction

D. Miller, J.H. Doh, H. Guan, M. Mulvey, S. Fragomeni, T. McCarthy & T. Peters

Deterioration of concrete structures in Australia under a changing climate

L. Peng & M.G. Stewart

High-strength self-compacting concrete for sustainable construction

R. Sri Ravindrarajah

Advancement in construction: Application of “Rapid Quality Identification Technique” in stone for risk mitigation and sustainability

D. Sarma & M.D. Sarma

Damage potential to residential structures due to ground movement

D. Wagle, E.F. Gad, S. Sivanerupan & J.L.Wilson

An overview of sustainable concrete made with scrap rubber

O. Youssf & M.A. ElGawady

Steel-timber hybrid structures – Design performance and dynamic behaviour
C. Dickof, S.F. Stiemer & S. Tesfamariam

Review on long-term behaviour of timber-concrete composite floors
N. Khorsandnia, H.R. Valipour, R. Shrestha, C. Gerber & K. Crews

The predictive model for strength of inclined screws as shear connection in timber-concrete composite floor
F. Moshiri, C. Gerber, H.R. Valipour, R. Shrestha & K.I. Crews

Dynamic performance of timber flooring systems
R. Rijal, B. Samali, R. Shrestha, G. Gerber & K. Crews

Stressed cross-laminated-timber for bridge applications
L. Shearman, C. Gerber & K. Crews

Behaviour of stress wave propagation in utility timber pole
M. Subhani, J. Li & B. Samali

Ultimate performance of timber connection with normal screws
Z. Zabihi, R. Shrestha, B. Samali & K. Crews

Characterisation of cement mortar containing oil-contaminated aggregates
M.H. Almabrok, R.G. McLaughlan & K. Vessalas

An experimental investigation into the tensile strength of steel fibre reinforced concrete
A. Amin, S.J. Foster, D. Boillet & A. Muttoni

Comparison of the analytical models to determine modulus of rupture of self-compacting concrete and conventional concrete
F. Aslani & S. Nejadi

Effects of fly ash on compressive strength of structural concrete
R.J. Case, K. Duan & T.G. Suntharavadivel

Brown coal fly ash geopolymer mortar
R. Dirgantara, D.W. Law, T.K. Molyneaux & D. Kong

Evaluation of fresh properties effect on the compressive strength of polypropylene fibre reinforced polymer modified concrete
N. Ghosni, K. Vessalas & B. Samali

Engineered cementitious composites incorporating recycled concrete fines
J. Li, P. Surya & E.H. Yang

Effect of different concentrations of lime water on mechanical properties of high volume fly ash concrete
X.H. Ling, S. Setunge & I. Patnaikuni

Recycled aggregate concrete prepared with water-washed aggregates – An investigative study
C.Y. Lo, S.H. Chowdhury & J.H. Doh

Mechanical properties of polymer concrete with different types of resin
W.P. Lokuge & T. Aravinthan

Investigation on the mathematical models of chloride diffusion coefficient in concrete exposed to marine environment
F. Nabavi, S. Nejadi & B. Samali

Investigation of flint glass for partial replacement of fine aggregate in fly ash cement-based mortars
A. Ngadimin, K. Vessalas, P. Thomas & P. Hamedanimojarrad

Effect of polyvinyl alcohol fibre and fly ash on flexural tensile properties of concrete
A. Noushini, K. Vessalas, N. Ghosni & B. Samali

Investigation into cavitation as a cause of rate-dependent fatigue loss in submerged concrete members
M. Sagan, C. Fujiyama & K. Maekawa

Mechanical properties of fibre reinforced reactive powder concrete after exposure to high temperatures
S. Sanchayan, N. Gowripalan & S.J. Foster

Assessment of bottom ash use as fine aggregate replacement in concrete
R. Satsangi, K. Vessalas & S. Russell

continued on next page

Concrete/material technology (continued)

Assessment of compressive strength of elastomeric modified concrete incorporating waste tyre rubber
N. Sharifi, K. Vessalas & B. Samali

Acids attack on silica fume high-strength concrete
R. Sri Ravindrarajah

Drying shrinkage of concrete made from recycled concrete aggregate
B.A. Whiting, T.J. McCarthy & E. Lume

Preface

The organisers of the 22nd Australasian Conference on the Mechanics of Structures and Materials (ACMSM22) extend a warm welcome to all participants whose presence and contributions will no doubt be a key factor for the success of this conference. This conference is hosted jointly by the Centre for Built Infrastructure Research at the University of Technology Sydney (UTS) and the Centre for Infrastructure Engineering & Safety at the University of New South Wales (UNSW). The theme for the 2012 ACMSM conference is *Materials to Structures: Advancement through Innovation*. The first Australasian conference on mechanics of structures and materials began at the University of New South Wales in 1967 as an initiative of the late Prof.F.S. Shaw. Subsequently, these conferences have been held biennially as a forum for exchanging the latest research in the field of mechanics of structures and materials by researchers in the Australasian region and beyond. The last conference, ACMSM21, was held at Victoria University in Melbourne in December 2010.

Over the forty five year span and twenty one conventions of the ACMSM conferences, there has been continuous research growth in the understanding of infrastructure and the emergence of new and green materials has added more impetus and relevance to these conferences. The ACMSM has become a biennial forum for academics, researchers and practising structural and construction engineers, as well as materials scientists in the region, fostering the exchange of ideas and detailing the research challenges in infrastructure development in our region.

The peer reviewed papers contained in these proceedings were accepted for presentation at ACMSM22, held at the Aerial Function Centre, University of Technology, Sydney, Australia from 11–14 December 2012. The almost 200 papers were authored by academics, researchers and practising engineers from many countries around the world and cover a broad range of structural engineering and materials research under the following topics:

- Biomechanics
- Composite structures and materials
- Computational mechanics
- Concrete, masonry, steel and timber structures
- Earthquake engineering and structural dynamics
- Fire engineering
- Foundation engineering
- Geomechanics
- Innovative and smart structures
- Pavement engineering
- Rehabilitation of structures
- Rock engineering
- Site investigation
- Soil improvement and reinforcement
- Structural health monitoring
- Structural optimisation
- Sustainable materials

The abstracts submitted were initially reviewed by the organising committee and authors of those abstracts that fell within the scope of the conference were asked to submit full papers for peer review. All the papers included in these proceedings were subjected to rigorous review by the experts in relevant fields. This peer review process resulted in many papers being improved and some papers being rejected. The editors would like to acknowledge the contributions made to the conference by the Scientific Committee who undertook the task of reviewing all the submitted papers.

The editors would also like to thank all the keynote speakers, authors, participants and members of the local organising committee especially Dr. David Kellermann, Dr. Michael Man and Dr. Ean Tat Ooi, for their effort and support for this conference.

On behalf of the ACMSM22 Organising Committee, we welcome you to exciting Sydney and hope that you find the conference inspiring and enjoyable.

Bijan Samali
Mario Attard
Chongmin Song
September 2012

Preface

The organisers of the 22nd Australasian Conference on the Mechanics of Structures and Materials (ACMSM22) extend a warm welcome to all participants whose presence and contributions will no doubt be a key factor for the success of this conference. This conference is hosted jointly by the Centre for Built Infrastructure Research at the University of Technology Sydney (UTS) and the Centre for Infrastructure Engineering & Safety at the University of New South Wales (UNSW). The theme for the 2012 ACMSM conference is *Materials to Structures: Advancement through Innovation*. The first Australasian conference on mechanics of structures and materials began at the University of New South Wales in 1967 as an initiative of the late Prof.F.S. Shaw. Subsequently, these conferences have been held biennially as a forum for exchanging the latest research in the field of mechanics of structures and materials by researchers in the Australasian region and beyond. The last conference, ACMSM21, was held at Victoria University in Melbourne in December 2010.

Over the forty five year span and twenty one conventions of the ACMSM conferences, there has been continuous research growth in the understanding of infrastructure and the emergence of new and green materials has added more impetus and relevance to these conferences. The ACMSM has become a biennial forum for academics, researchers and practising structural and construction engineers, as well as materials scientists in the region, fostering the exchange of ideas and detailing the research challenges in infrastructure development in our region.

The peer reviewed papers contained in these proceedings were accepted for presentation at ACMSM22, held at the Aerial Function Centre, University of Technology, Sydney, Australia from 11–14 December 2012. The almost 200 papers were authored by academics, researchers and practising engineers from many countries around the world and cover a broad range of structural engineering and materials research under the following topics:

- Biomechanics
- Composite structures and materials
- Computational mechanics
- Concrete, masonry, steel and timber structures
- Earthquake engineering and structural dynamics
- Fire engineering
- Foundation engineering
- Geomechanics
- Innovative and smart structures
- Pavement engineering
- Rehabilitation of structures
- Rock engineering
- Site investigation
- Soil improvement and reinforcement
- Structural health monitoring
- Structural optimisation
- Sustainable materials

The abstracts submitted were initially reviewed by the organising committee and authors of those abstracts that fell within the scope of the conference were asked to submit full papers for peer review. All the papers included in these proceedings were subjected to rigorous review by the experts in relevant fields. This peer review process resulted in many papers being improved and some papers being rejected. The editors would like to acknowledge the contributions made to the conference by the Scientific Committee who undertook the task of reviewing all the submitted papers.

The editors would also like to thank all the keynote speakers, authors, participants and members of the local organising committee especially Dr. David Kellermann, Dr. Michael Man and Dr. Ean Tat Ooi, for their effort and support for this conference.

On behalf of the ACMSM22 Organising Committee, we welcome you to exciting Sydney and hope that you find the conference inspiring and enjoyable.

Bijan Samali
Mario Attard
Chongmin Song
September 2012