

Table of Contents

<i>Preface</i>	xii
<i>International Scientific Committee</i>	xiii
Keynote Papers	
Edge Stiffening for Cold Formed Members <i>David A Nethercot and Mohammad Reza Haidarali</i>	3
Evolution of Composite Construction Design Provisions in the USA: 1999–2009 <i>Roberto T. Leon</i>	14
Applications, Behaviour and Design of Composite Steel-Concrete Beams Subjected to Combined Actions <i>Brian Uy</i>	34
Analysis of Indirect Strains in Composite Slabs <i>M. A. Bradford</i>	50
Advanced and Second-Order Analysis of Composite Columns <i>S. L. Chan, M. Fong and Y. P. Liu</i>	66
Scaled Analysis of Steel-Concrete Composite Beam-Column Connections <i>Uwe E. Dorka</i>	74
A Numerical Investigation into Continuous Composite Beams with Deformable and Non-ductile Shear Connectors <i>K. F. Chung and C. K. Chan</i>	83
The Robustness of Steel Connections in Fire <i>Ian Burgess</i>	103
Composite Beams	
Plastic Collapse Mechanism for Moment-Rotation Curves of Steel and Composite Steel Beams <i>Ronny Budi Dharma and Tan Kang Hai</i>	115

Time-Dependent Effects in Curved Composite Beams <i>Rolf Kindmann and Alexandra Wehnert-Brigdar</i>	122
Elasto-Plastic Material Model for the Realistic Calculation of the Deflections of Pre-Deformed Composite Girders <i>Frank Böhme, Harald Nelke and Jörg Lange</i>	128
Finite Element Modelling of Simply Supported Composite Beams with Deformable and Non-ductile Shear Connectors <i>K. F. Chung and C. K. Chan</i>	135
Numerical Investigation of Distortional Lateral Buckling of Composite Beams with Transverse Web Stiffeners <i>Shiming Chen, Xindi Wang and Yuan Lin</i>	143
Composite Steel-Concrete Beams Subjected to Hogging Bending and Axial Tension <i>B. Kirkland and B. Uy</i>	151
Study on the Behavior of Embedded Steel-Concrete Composite Beams with Notched Web during Construction Stage <i>Li Xianhui, Li Guoqiang and Zhangzhe</i>	157
The Behaviour and Design of the Webs of Economic-Fabrication Steel Girders Used in Composite Construction <i>Miroslav Škaloud and Marie Zörnerová</i>	166
Composite Bridges	
Design Rules for Distortional Lateral Buckling in Continuous Composite Beams <i>R. P. Johnson</i>	175
Modeling of Steel — Concrete Composite Bridges Spatial Systems vs. Grillages <i>Ioannis Vayas, Theodoros Adamakos and Aristidis Iliopoulos</i>	183
Design of Transverse Looped Bar Joints in Pre-cast Concrete Decks for Composite Bridges <i>Stuart R. Gordon and Ian M. May</i>	189
Ultimate Flexure and Shear Strength of I-girder Under Hogging Bending Moment in Double-Composite Girder Bridges <i>Masatsugu Nagai, Naofumi Inaba and Yoshiaki Okui</i>	195
IDA-Based Seismic Analysis of Concrete-Filled Steel Tube Arch Bridges <i>Sumei Zhang, Changyong Liu and Yuyin Wang</i>	201

Stability Research on Papilionaceous Partial Tied Arch Footbridge <i>Wu Jie and Shu Ganping</i>	210
Creep Analysis of Concrete Filled Steel Tube Arch Bridge Based on Model B3 <i>Han Bing, Mao Zhong-Kun and Wang Yuan-Feng</i>	217
Structural Analysis of Corrugated Steel Plate Bridges Based on Soil-Steel Interaction <i>Liu Baodong, Feng Zhimao and Han Bing</i>	224
Composite Columns	
Performance of Concrete Filled Steel Tube Reinforced Concrete (CFSTRC) Columns Subjected to Cyclic Bending <i>Lin-Hai Han, Fei-Yu Liao, Zhong Tao and Zhe Hong</i>	233
Load-Carrying Capacity of Steel-Concrete Compression Members Composed of High-Strength Materials <i>Marcela Karmazínová, Jindrich J. Melcher and Václav Röder</i>	239
Experimental Investigation of Concrete-filled Aluminum Stub Columns <i>Feng Zhou and Ben Young</i>	245
Compressive Behaviour of Concrete-filled Elliptical Hollow Sections <i>H. Yang, D. Lam and L. Gardner</i>	253
Experimental Study on High-strength Concrete Filled Square Steel Tubular Beam with Inner CFRP Circular Tube <i>Guochang Li and Ye Yang</i>	259
Finite Element Analysis of Elliptical Stub CFT Columns <i>N. Jamaluddin, D. Lam and J. Ye</i>	265
Effect of Concrete Confinement on Axial Strength of Circular Concrete-filled Steel Tubes <i>N. Umamaheswari, S. Arul Jayachandran and M. Lakshmi pathy</i>	271
Experimental Investigations of Eccentrically Hollow Concrete-Filled Circular Stainless Steel Tubular Members under Compression <i>Artiomias Kuranovas, Kestutis Gurksnys, Gintas Sauciūvenas, Antanas Sapalas and Audronis Kazimieras Kvedaras</i>	279
Brief Introduction to Technical Specification of Hollow Concrete-Filled Steel Tubular Structures (CECS 254: 2009) <i>Zhong Shan-Tong and Zha Xiao Xiong</i>	285

Composite Columns of the new Hangar at Düsseldorf Airport <i>Rolf Kindmann, Matthias Kraus and Hans Joachim Niebuhr</i>	293
Non-Linear FE Analysis of Eccentrically Loaded Slender CHS Columns in-Filled with Fibre Reinforced Concrete <i>S. Ramana Gopal</i>	299
Sensitivity Analysis of Steel-concrete Structural Members <i>Zdeněk Kala, Marcela Karmazínová, Jindřich Melcher, Libor Puklický and Abayomi Omishore</i>	305
 Composite Coupled Wall	
Performance-Based Design of Composite Core Wall Systems <i>John W. Wallace, Brian L. Sayre and Leonardo M. Massone</i>	313
Design of Innovative Coupling Beams for Use in Hybrid Coupled Core Wall Systems <i>Gian A. Rassati, Patrick J. Fortney and Bahram M. Shahrooz</i>	319
Seismic Design of Hybrid Coupled Wall Structures <i>Kent A. Harries, Sherif El-Tawil, Bahram M. Shahrooz and Patrick J. Fortney</i>	325
 Composite Slabs	
Ultimate Strength Behavior of Lightweight Steel-Concrete-Steel Sandwich Panels <i>KMA Sohel and JYR Liew</i>	333
Experimental and Numerical Research on Multi-span Composite Slab <i>Shixiong Guo and Colin Bailey</i>	339
Experimental Investigation of Lightweight Composite Deck Slabs <i>T. Luu, E. Bortolotti, B. Parmentier, X. Kestemont, M. Briot and J.-C. Grass</i>	345
Composite Slabs with Self-Compacting Lightweight Concrete <i>Wolfgang Kurz, Falk Jurisch, Viktor Mechtcherine and Arnd-Eike Bruedern</i>	351
Experimental Investigation of Individual Embossed Mechanical Bond in Composite Floor <i>Noémi Seres and László Dunai</i>	357
140 m ² Column Free Space due to Innovative Composite Slim Floor Design <i>Matthias Braun, Oliver Hechler and Vincent Birarda</i>	363

CFRP Composite Structures

- Proposed Experimental Method for Assessing Performance of Bonded FRP-to-Steel Interfaces 371
Kent A. Harries and Parker Webb
- Study on Compressive Instability of Concrete Filled CFRP-Steel Tubes 377
Yinghua Zhao and Haozhao Wang
- Comparison between 2D and 3D Computer Modeling for Strengthening Composite Steel-Concrete Bridges with HM-CFRP and Steel Sheets 384
Mohd Zamin Jumaat and Kambiz Narmashiri
- Experimental Verification of Behaviour of Composite Steel and Glass-Fibre-Concrete Beams 390
Jindřich J. Melcher, Marcela Karmazínová and Jan Pozdíšek

Dynamics, Earthquake and Impact

- Ballistic Performance of Portable Deployable Shelter 399
Vu Khac Kien, Ma Chenyin, Phyo Khant and J. Y. Richard Liew
- Remote Collaborative Pseudo-dynamic Tests of a Ten-story Concrete Filled Steel Tubular Composite Frame 405
Fan Yun-lei, Xiao Yan, Guo Yu-rong, He Wen-hui and Li Feng-wu
- Capacity and Demand Prediction Methods for Steel-Concrete Composite Columns under Severe Earthquakes 411
Tsutomu Usami, Hanbin Ge and K. A. S. Susantha
- Experimental Investigation of the Seismic Behavior of Reinforced Concrete Beam to Concrete-Filled Steel Tube Column Connections 417
Yu Hang and Zha Xiao Xiong
- Stiffness and Strength Requirements for Buckling Restrained Brace Cover 425
Yoshida Keito and Kuriyama Yoshio
- Hysteretic Analysis of Strip Model of Thin Steel Plate Shear Wall 431
Lanhui Guo, Ran Li, Sumei Zhang and Xinbo Ma
- Demand of Shear Panel Dampers in Multiple Earthquakes 437
Xi Chen, Hanbin Ge and Yoshito Itoh

Research on Restoring Force Characteristics of Honey Combed Steel Beam and Welded Compound-ring-hoop Column Composite Joints <i>S.C. Li and M.J. Song</i>	443
 Fire Behaviour	
Structural Behaviour of Unprotected Long Span Steel Trusses at Elevated Temperatures <i>H. C. Ho, K. F. Chung and Young Wong</i>	453
Three-Dimensional Model of Axially Loaded Slender Concrete Filled Steel Tubular Columns Under Fire <i>Ana Espinós, Antonio Hospitaler, Carmen Ibáñez and Manuel L. Romero</i>	462
Fire Performance of 2D Framed Steel-Concrete Structures <i>Alexandre Landesmann, Juan Manuel Fratti and Eduardo de Miranda Batista</i>	468
Integration of Structural Engineering into Fire Engineering Design <i>S. M. Leung, N. K. Fong, W. K. Chow, S.L. Chan, S. W. Yuen and Andrew K. W. So</i>	474
Residual Strength of Concrete-Filled Double-Skin Steel Tubular Stub Columns after Exposure to Fire <i>Xin Yu, Zhong Tao, Lin-Hai Han and Brian Uy</i>	483
Inconsistencies in the Fire Design Rules of Composite Columns to EN 1994-1-2 <i>Matti V. Leskela</i>	489
Effects of Preload and Cooling Phase on Post-Fire Behaviour of Concrete-Filled Steel Tubular Stub Columns <i>Jing-Si Huo, Guo-Wang Huang and Yan Xiao</i>	495
A Study on Fire Resistance of Reinforced Concrete-Filled Square Steel Columns Exposed to Fire <i>Park Su Hee, Song Kyung Chul, Choi Sung Mo, Won Yong Ahn and Bang Joong Seck</i>	501
Failure Modes and Ultimate Strength of Tubular Joints Under Elevated Temperatures <i>Minh-Phuong Nguyen, Kang Hai Tan and Tat Ching Fung</i>	509
Behaviour of High Strength Grade 10.9 Bolts under Fire Conditions <i>Fernando González and Jörg Lange</i>	517

Discussion on Elastic Buckling of Compression Steel Members Under Uniform Temperature <i>Yuan Weifeng and Tan Kang Hai</i>	523
---	-----

Hybrid Structures

Experimental Investigations of Seismic Retrofit Technique for Bare Frame and Framed RC/CB wall Utilizing Thick-Hybrid-Walls <i>Koji Yamashiro, Tetsuo Yamakawa, Yoichi Morishita and Shinya Takara</i>	531
Experimental Study on Steel Plate Shear Walls with CFT Columns <i>Fan Jiansheng and Nie Jianguo</i>	537
A New Retrofit Technique for Existing RC Frame by Installing Steel Braced Frame <i>Tetsuo Yamakawa, Pasha Javadi and Makoto Kobayashi</i>	543
Fastening of Steel Structural Members to Concrete Using Post-Installed Mechanical Fasteners <i>Marcela Karmazínová, Jindrich J. Melcher and Michal Štrba</i>	549
Prediction of the Bending Behaviour of Profiled Steel Sheeting Dry Board Roof Panel Through the Finite Element Method <i>W. H. Wan Badaruzzaman, N. Nordin, M. F. Hamid and H. Awang</i>	555

Progressive Collapse

Progressive Collapse Resistance of Composite Floors <i>Yasser Alashker and Sherif El-Tawil</i>	563
Development of a Simplified Method to Calculate Tying Resistance of Fin Plate Connection to Concrete Filled Square Tubular Columns <i>M. H. Jones, Y. C. Wang</i>	569
Connection Modelling for Progressive Collapse Analysis <i>Panagiotis Stylianidis and David A. Nethercot</i>	575
Mitigation of Progressive Collapse of Composite Tall Building and Long Span Bridge Structures <i>Fouad Kasti</i>	581

Steel and Composite Connections

A Simplified Analytical Method of Natural Periods and Damping Ratio for Steel Frames with Semi-rigid Composite Connections <i>Hu Da-zhu, Li Guo-qiang and Huang Ben-cai</i>	591
--	-----

Connection to Concrete Filled Hollow Section using Extended Hollobolt (Moment Connection Tests) <i>Ali Al-Mughairi, Walid Tizani and John S. Owen</i>	599
Tests of Concrete-Filled Stainless Steel Tubular X-Joints <i>Ran Feng and Ben Young</i>	605
Experimental Research and Finite Element Modeling of 3-D Semi-Rigid Composite Joints under Proportional Loads <i>B. Gil, R. Goñi and E. Bayo</i>	613
A Numerical Study of the Behaviour of Steel Beam to Tubular Column Joints Using Reverse Channel <i>H. Liu and Y. C. Wang</i>	619
Numerical Study of Bolted Connections in Stainless Steel <i>E. L. Salih, L. Gardner and D. A. Nethercot</i>	625
Structural Behavior of Column-to-Beam Connections for End-plate Yielding Using SN Steel <i>Kim Sun Hee, Jung Hun Mo, Choi Sung Mo, Chae Heong Seok and Lee Seong Hui</i>	633
Probabilistic Sensitivity Analysis of Extended End Plate Connections <i>Zhan Wang and Jianrong Pan</i>	641
Structural Analysis	
Prediction of Lateral Deflection and Moment of Partially-Encased Composite Beam-Columns <i>Jasim Ali Abdullah and Zhang Sumei</i>	649
Steel-Concrete Composite Beam Analysis Using Generalised Beam Theory <i>Rodrigo Gonçalves and Dinar Camotim</i>	657
Closed Form Solutions for the Long-term Behaviour of Prestressed Composite Steel-Concrete Beams <i>Charles Moy, Peter Ansourian and Gianluca Ranzi</i>	663
Analysis of Elastic-Perfectly Plastic Composite Beams Using Equilibrium Elements <i>Quang-Huy Nguyen, Mohammed Hjiatj and Brian Uy</i>	669
Nonlinear Analysis and Design of Wall-framed Structures <i>Y. P. Liu and S. L. Chan</i>	675

Inelastic Buckling of Steel-Concrete Composite Beams Prestressed with External Tendons <i>Shiming Chen and Xindi Wang</i>	682
Interactive Buckling in Prestressed Steel Stayed Columns <i>M. Ahmer Wadee and Daisuke Saito</i>	690
Effect of Equivalent Geometric Imperfections on the Collapse Load of Stiffened Plates Under Uniform Compression Using Nonlinear Finite Element Analysis <i>Pedro Salvado Ferreira and Francisco Virtuoso</i>	697
Design Equation for Load-Carrying Capacity of Compressed Flange in I-Section Beam Under Bending <i>Eiki Yamaguchi, Sachio Sadamune, Hideki Shimizu, Jun Murakoshi, Naoki Yanadori and Kiyoshi Ono</i>	703
Second-order Analysis and Experimental Tests on Shallow Dome <i>M. Fong and S. L. Chan</i>	709
A Super Element Method for Large-scale Structural Analysis <i>Yuan Weifeng and Tan Kang Hai</i>	715
Numerical Validation of the General Method in EC3-1-1: Lateral Buckling, Lateral-torsional Buckling and Bending and Axial Force Interaction <i>Liliana Marques, Luís Simões da Silva and Carlos Rebelo</i>	721
Shear Connections	
Performance of Headed Stud Shear Connectors in Profiled Steel Sheeting <i>W. Ian Simms and Andrew L. Smith</i>	729
Behaviour of Headed Shear Stud in a Push Test using Profiled Steel Sheeting <i>J. Qureshi, D. Lam and J. Ye</i>	737
Effects of Combination of Axial and Shear Loading on the Shear Connection of Composite Steel-Concrete Beams <i>O. Mirza and B. Uy</i>	745
FEM Modelling of Composite Slabs' Shear Connection and New Friction System Based on Steel Sheet Punching <i>Miquel Ferrer and Frederic Marimon</i>	751
Thin-walled Structures	
Structural Behaviour of Lean Duplex Stainless Steel <i>M. Theofanous and L. Gardner</i>	759

Improvements to the Design of Limestone Beams Undergoing Lateral Distortional Buckling <i>Tharmarajah Anapayan and Mahen Mahendran</i>	767
Experimental Studies of the Shear Behavior of Limestone Beams <i>Poologanathan Keerthan and Mahen Mahendran</i>	775
Experiment and Design of Shear for Low-Rise Steel Framed House <i>Toyohiko Higashida and Shiro Kato</i>	783
Advanced Numerical Modelling of Cold-formed Steel Lapped Z-Sections with Bolted Connections <i>H. C. Ho and K. F. Chung</i>	789
Advanced Numerical Modelling of Cold-Formed Steel Z-Sections <i>H. C. Ho and K. F. Chung</i>	795
<i>Author Index</i>	801