



17th CONGRESS OF IABSE
CHICAGO 2008

*Creating and Renewing Urban Structures
Tall Buildings, Bridges and Infrastructure*

REPORT

RAPPORT

BERICHT

International Association for Bridge and Structural Engineering
Association Internationale des Ponts et Charpentes
Internationale Vereinigung für Brückenbau und Hochbau

IABSE
AIPC
IVBH



Table of Contents

Keynotes

<i>The Structural Design of the World's Tallest Structure: The Burj Dubai Tower</i> William BAKER—D. Stanton KORISTA, Lawrence NOVAK, James PAWLIKOWSKI, Bradley YOUNG	2
<i>Engineering for Climate Change—The Adaptation Challenge and the Role of the Engineers</i> Peter HEAD	10
<i>Personal Involvement in Early US Cable-Stayed Bridges</i> Holger SVENSSON	27
<i>New Trends and New Models for Analyzing Dynamic Interactions</i> Christian CREMONA	35
<i>Appropriate Seismic Regulations for Urban Structures</i> Loring A. WYLLIE	112
<i>Past—Present and Future: Trends, Drivers and Challenges in Tall Buildings and Urban Habitat</i> Antony WOOD	126
<i>Sutong Bridge—A Cable-Stayed Bridge with Main Span of 1088 Meters</i> Qingzhong YOU—Ping HE, Xuewu DONG, Xigang ZHANG, Shouchang WU	142

1A Wind Dynamics and Damping of Structures

<i>Probabilistic Criteria for Assessment of Aerodynamic Instability of Long-Span Bridges</i> Yao Jun GE—Hai-Fan XIANG	64
<i>Damping in Tall Buildings—Uncertainties and Solutions</i> Rob SMITH—Michael WILLFORD	66
<i>Increase of a High Rise Buildings Damping Behaviour by Applying Large Scale Tuned Mass Dampers</i> Christian MEINHARDT	68
<i>Multiple Controllers of Wind-induced Oscillations of a Long Span Bridge</i> Ronaldo BATTISTA—Michèle PFEIL, Nilton VELIHOVETCHI, Ariel MACIEL	70
<i>An Optimal Design of TMD for the Improvement of Fatigue Reliability of Steel- Composite High-Speed Railway Bridges Using Target Performance Approach</i> Sung-Jae KIM—Soo-Chang KANG, Wonsuk PARK, Hyun-Moo KOH, Ho-Kyung KIM	72
<i>Aerodynamic Investigation on a Long-Span Suspension Bridge with Central-Slotted Box Girder</i> YongXin YANG—Yao Jun GE	74



<i>A Damper System for Mitigation of Suspension Bridge Flutter</i> Inho HWANG—Yunki SON, Hu Seok LEE, Sang Hyun HONG, Dongho YOO, Jong Seh LEE	76
--	----

1B Strengthening and Upgrading of Buildings

<i>Modern Solutions for Strengthening of Structural Elements</i> Sorin DAN—Corneliu BOB, Cosmin ENUICA, Liana BOB, Catalin BADEA, Aurelian GRUIN	80
<i>A Seismic Retrofit for Masonry Infill Walls Using Ductile Concrete</i> Marios A. KYRIAKIDES—Sarah L. BILLINGTON	82
<i>Repair and Strengthening of Reinforced Concrete Slab-Column Connections</i> WIDIANTO—Oguzhan BAYRAK, James O. JIRSA	84
<i>RC Beams Strengthened with FRP Systems—Results in Dapped-Ends and Increase of Flexural Capacity</i> Tamás NAGY-GYÖRGY—Valeriu STOIAN, Daniel DAN, Cosmin DĂESCU, Dan DIACONU, István DEMETER	86
<i>Use of CFRP to Strengthen Lap Splices of Reinforced Concrete Columns</i> InSung KIM—James O. JIRSA, Oguzhan BAYRAK	88
<i>Flexural Strengthening of Beams Using Externally Bonded Plates: Advanced Optical Measurements at the Beam-to-Plate Interface</i> Ann SCHUMACHER—Christoph CZADERSKI, Erwin HACK, Masoud MOTAVALLI	90
<i>Upgrading of a 70 year Old Grandstand</i> István BODI—Kálmán KORIS, József ALMÁSI	92

1C Techniques for Evaluating Bridges

<i>Slip in Hanger Cable Anchorages of Dintelhaven Railway Bridge Rotterdam</i> H.H. (Bert) SNIJDER—B.H. (Bert) HESSELINK, K. (Kors) NOORLANDER, J. (Jacques) BERENBAK, J.S. (Jaap) SPOELSTRA	96
<i>Collapse of the Koror Babeldaob Bridge</i> Gary KLEIN	98
<i>Structural Assessment Using Identified Bending Stiffness</i> Roman WENDNER—Alfred STRAUSS, Simon HOFFMANN, Konrad BERGMEISTER	100
<i>Evaluation of a Excessive Deflection Long-Span Concrete Beam Bridge</i> Yanwei NIU—Xuefei SHI, Xin RUAN	102
<i>I-205 Glenn Jackson Bridge-Bike Path Deck Panel Investigation, Portland, Oregon, USA</i> Burak KORU—D. E. WAGNER, John HINMAN, P. TOPARK-NGARM	104



- Large-Bar Connection for Precast Bridge Bents in Seismic Regions*
Jason B. K. PANG—John F. STANTON, Marc O. EBERHARD 106
- Numerical and Experimental Investigation on Real Temporary Structures Useful
for Incremental Launching Bridge Construction*
Laura ANANIA—A. BADALA', Giuseppe D'AGATA 108

2A Codes and Standards

- Appropriate Seismic Regulations for Urban Structures*
Loring A. WYLLIE 112
- Design and Evaluation of Facade Access Equipment for Tall Buildings*
Jonathan LEWIS—Mark SCHMIDT 118
- SEI Pre-Standard and Commentary on Progressive Collapse: Part I—Risk
and Action Determination for Progressive Collapse Events*
Kirk MARCHAND—Eric WILLIAMSON, David STEVENS 120
- European Guideline for Assessment of Existing Railway Bridges*
Jens S. JENSEN—Joan R. CASAS, Dawid F. WISNIEWSKI 122

2B Tall Buildings

- Past—Present and Future: Trends, Drivers and Challenges in Tall Buildings and
Urban Habitat*
Antony WOOD 126
- Design Challenges for the Tallest Tower in Madrid*
Arantzazu ALARCON—Gregory LAKOTA 134
- Dubai Tower Doha*
John MERRICK—Mike HAYSLER, Andrew DAVIDS, Darko POPOVIC 136
- Structural Engineering of the 600m Chicago Spire*
Richard TOMASETTI—Joseph BURNS, Thomas SCARANGELLO, Dave McLEAN,
Garret BROWNE, Nicholas STEELE 138

2C Long Span Bridges

- Sutong Bridge—A Cable-Stayed Bridge with Main Span of 1088 Meters*
Qingzhong YOU—Ping HE, Xuewu DONG, Xigang ZHANG, Shouchang WU 142
- Construction of the Bai Chay Bridge*
Kazuteru TSUCHIDA—Hiroshi OHNO, Tomoki NAKAMURA, Toshihiro
WAKAHARA, Naoki NAGAMOTO, Masahisa KOMIYA 150
- Design & Construction of Ada Bridge Across Tissa River in Serbia*
Bratislav STIPANIC—Zoran FLORIC, Rene MILOSEVIC, Dragomir LUKIC,
Sasa MICIC 152



Curved Cable-Stayed Bridges

Jan BILISZCZUK—Wojciech BARCIK, Jerzy ONYSYK, Krzysztof SADOWSKI, Janusz TADLA	154
---	-----

2D Building Information Modeling

A Dynamic Framework for Construction Scheduling Based on BIM Using IFC

Jan TULKE—Mohamed NOUR, Karl BEUCKE	158
---	-----

BIM and Advanced Post-Tensioning Design Methods

Jyrki JAUHAINEN	160
-----------------------	-----

Optimizing the Design Process of Complex Structures

Jörg KOBARG	162
-------------------	-----

3A Adaptive Reuse and Sustainability of Structures

Building Facility Development—The Renewal of a Car Plant Without Interfering the Production

Robert HERTLE	166
---------------------	-----

Structural Investigation of Hong Kong's Aging Public Rental Buildings

Hon Wah PANG—Chi On CHAN	168
--------------------------------	-----

Controlled Rocking of Steel Frames as a Sustainable New Technology for Seismic Resistance in Buildings

Jerome HAJJAR—Matthew EATHERTON, Gregory DEIERLEIN, Xiang MA, Alejandro PEÑA, Helmut KRAWINKLER, Sarah BILLINGTON	170
--	-----

R1664 Suspension Trail Bridge Using Sustainable Materials

Bradley MILLER	172
----------------------	-----

Mechanical Properties of Biocomposites for Sustainable Construction Practices

Sarah SCHRASS-CHRISTIAN—Sarah BILLINGTON	174
--	-----

Increasing Loads on Existing Foundations

Bernard H. HERTLEIN—Clyde N. BAKER, Fernando SARABIA	176
--	-----

3B Design of Challenging Buildings

The Tianjin Jinta Tower: 74-Story Steel Plate Shear Wall Tower

Neville MATHIAS—Mark SARKISIAN, Eric LONG, Zhihui HUANG	180
---	-----

Trump International Hotel and Tower, Chicago

William BAKER—Stan KORISTA, Dane RANKIN	182
---	-----

Comparison of the Structures for Two High-Rise Buildings in Madrid

Miguel GÓMEZ NAVARRO—Julio MARTÍNEZ CALZÓN	184
--	-----

Brief on the Construction Planning of the Burj Dubai Project, Dubai, UAE

Ahmad ABDELRAZAQ—Kyung Jun KIM, Jae Ho KIM	186
--	-----



<i>Structural Design for Beijing Grand MOMA</i> Congzhen XIAO	188
--	-----

<i>Seismic Design of Traditional Wooden Five-Storeyed Pagoda</i> Kimihiro MORITA—Norikazu IKEMA, Masayasu MATSUBARA	190
--	-----

3C Strengthening and Upgrading of Bridges

<i>Upgrading Existing Railway Bridges in Europe for Higher Speeds and Loads. Assessment Procedures and Requirements</i> Joan R. CASAS—Dawid F. WISNIEWSKI, Mette SLOTH	194
---	-----

<i>Upgrading Mainland Europe's Oldest Suspension Bridge</i> Sigrid ADRIAENSSENS—Ine WOUTERS, Michael De BOUW	196
---	-----

<i>Strengthening Existing Steel Bridge Girders by the Use of Post-Installed Shear Connectors</i> Gunup KWON—Michael D. ENGELHARDT, Richard KLINGNER	198
--	-----

<i>Remarkable Strengthening of an Old Steel Highway Bridge</i> Harald UNTERWEGER	200
---	-----

<i>Strengthening of the I-39 Bridges Over the Kishwaukee River</i> Martin FURRER—Mahmoud ETEMADI	202
---	-----

<i>Strength of Corroded Bridge Wires and Repair Methods</i> Shun-ichi NAKAMURA—Keita SUZUMURA	204
--	-----

4A New Techniques for Analysis

<i>The Design of Steel Sections for Combined Axial Load and Bending</i> Angus LOW	208
--	-----

<i>Evaluation of Direct and Indirect Approaches For Progressive Collapse</i> David STEVENS—Kirk MARCHAND, Brian CROWDER, Ed CONRATH, Tim CAMPBELL	210
---	-----

<i>The Crack Sliding Model—Unified Approach to Shear and Punching Shear</i> Linh C. HOANG	212
--	-----

<i>Punching Behavior of Compact Slabs</i> Josef HEGGER—Marcus RICKER	214
---	-----

<i>Analysis of Steel Frames with Precast Concrete Infill Panels</i> P.A. (Paul) TEEUWEN—C.S. (Ceas) KLEINMAN, H.H. (Bert) SNIJDER, H. (Herm) HOFMEYER	216
---	-----

<i>Structural Optimization of a Non-Conventional Composite Steel and Concrete Connection Through FE Analysis</i> Tobia ZORDAN—Bruno BRISEGHELLA, Airon Chen, Enzo SIVIERO, Ruan XIN	218
---	-----

<i>Probabilistic Modelling of HSC Slender Columns in High-Rise Buildings</i> Holger SCHMIDT—Michael SIX	220
--	-----



4B Materials Behavior

<i>Load Capacity and Deformation Behaviour of Headed Studs Used in Trapezoidal Steel Sheetings</i>	
Ulrike KUHLMANN—Matthias KONRAD	224
<i>Experimental Investigation on Mechanical Behavior of Y-shaped Steel and Concrete Composite Joints</i>	
Jie ZHANG—Xilin LU	226
<i>Shear Capacity of Hollow Core Slabs in Slim-Floor-Constructions</i>	
Josef HEGGER—Thomas ROGGENDORF	228
<i>Slab with Integrated Installations</i>	
Andreas E. KAINZ—Stefan L. BURTSCHER, Johann KOLLEGGER	230
<i>Large X-Lam Floor and Roof Plates for Composite Construction</i>	
Ian SMITH—Andi ASIZ	232
<i>Hybrid RC Building Structures with Corrugated Steel Shear Panels</i>	
Susumu KONO—Yukako ICHIOKA, Yoshihiro OHTA, Fumio WATANABE	234
<i>Size Effect: What is Its Rationale and Penalty for Neglect?</i>	
Zdeněk P. BAŽANT—Qiang YU	236

4C Techniques for Evaluating Bridges

<i>Changes in Traffic Demand and Influence on the Lifetime of a 45 Year Old Bridge</i>	
Helmut WENZEL	240
<i>Design—Implementation and Measurement of Cable Dampers for Large Cable-Stayed Bridges</i>	
Limin SUN—Hongwei HUANG	242
<i>Recent Austrian Activities in Bridge Monitoring</i>	
Roman GEIER—Hubert REITER	244
<i>The Importance of Dense Monitoring of Long-span Bridges for its Performance Re-evaluation</i>	
Tomonori NAGAYAMA—Dionysium M. SIRINGORINGO, Yozo FUJINO	246
<i>An ANN-Based Backward Prediction Model for Reliable Bridge Management System Implementations Using Limited Inspection Records—Case Studies</i>	
Jaeho LEE—Hong GUAN, Michael BLUMENSTEIN, Yew-Chaye LOO	248
<i>Importance and Organization of Bridge Inspections in Germany</i>	
Joachim NAUMANN	250
<i>Severe Cracking of Viaduct Piers and Pilecaps Due to Delayed Ettringite Formation</i>	
Paul WHITE—Roger BUCKBY, Craig MILLS, Don WIMPENNY	252



4D Creative Design of Urban Bridges

Footbridges—Enriching Urban Structures

Mike SCHLAICH 256

Structural Engineering for Gehry's Curves at Millennium Park, Chicago, USA

Ahmad ABDELRAZAQ—Hal IYENGAR, Robert SINN, John ZILS 258

Piston Stayed Bascule Bridge: a Novel Mobile Bridge Typology at Temse, Belgium

Sigrid ADRIAENSSENS—Laurent NEY, Matthieu MALLIE 260

Design and Construction of William R. Bennett Bridge

Darryl MATSON—Svein-Erik JAKOBSEN, Per Norum LARSEN,
Karsten VENG, Eduardo PRADILLA 262

New Conceptual Design for Two Signature Footbridges Recently Built in Spain.

Juan José ARENAS—Guillermo CAPELLÁN, Emilio MERINO 264

Wichita Riverfront Pedestrian Bridges

Frank BLAKEMORE 266

Design of the North Arm Extradosed Bridge

Don BERGMAN—Andrew GRIEZIC, Chris SCOLLARD 268

5A Urban Infrastructures

Transport Infrastructure in Indian Urban Environment

B.C. ROY 272

Covering Paris' Ring Road: To Reduce Pollution and Restore Urban Continuity

Michel MOUSSARD—Dimitri FRANK 274

The MRO-Tunnel in Munich, Germany

Otto WURZER—Ulrich SCHOLZ, Ralf WULF 276

Gautrain—A modern transit project in a progressing country, South Africa

Olivier MARTIN—Alain CHAULIAC, Philippe FUNCK 278

New Railway Connection Below Brussels Airport

Philippe VAN BOGAERT—Bart DE PAUW 280

The "TISB" and "TMG" Concepts: Application on a Proposal for the Railway Tunnel Through the Strait of Gibraltar

S. POMPEU SANTOS 282

5B Design for Fire and Serviceability

Vulnerability of Fire Protection and Structural Safety of Tall Buildings

Markus KNOBLOCH—Mario FONTANA, Elio RAVEGLIA, Andrea FRANGI 286

Behavior of Prestressing Steels After Fire

José Miguel ATIENZA —Manuel ELICES 288



<i>Performance Based Design for the Fire Situation, Leading to Economic and Safe Fire Resistance</i> Jean-Baptiste SCHLEICH	290
<i>Fire Safety Concept for Tall Timber Buildings</i> Andrea FRANGI—Mario FONTANA, Markus KNOBLOCH	292
<i>Prediction Methods for Concrete Diagnosis with Electrochemical Test and Probability</i> Katsuya TODA—Takayuki NISHIDO	294
<i>Practical Experience with Wind-Tunnel Predicted Tall Building Motions</i> Peter IRWIN—Bujar MYSLIMAJ	296

5C Analysis and Design of Bridges

<i>Assessment of the Suspension Cables of the Severn Bridge, UK</i> Jeff YOUNG—Martin LYNCH, Paul LAMBERT, Jeff FISHER	300
<i>Experimental Validation of a Numerical Model for the Dynamic Analysis of a Bowstring Arch Railway Bridge</i> Diogo RIBEIRO—Rui CALCADA, Raimundo DELGADO	302
<i>Probabilistic Shear and Bending Resistance Models for Assessment of Reinforced and Prestressed Concrete Bridges</i> Dawid F. WISNIEWSKI—A. Abel HENRIQUES, Paulo J.S. CRUZ	304
<i>Dynamic Amplification Factors of an Urban Maglev Guideway</i> Wonseok CHUNG—Inho YEO	306
<i>Wind and Extremely Long Bridges—A Challenge for Computer Aided Design</i> Dorian JANJIC—Johann STAMPLER, Andreas DOMAINGO	308
<i>A New Energy-Efficient Device for Active Control of Bridge Vibrations</i> Joern SCHELLER—Uwe STAROSSEK	310

5D Materials Technology for Bridges

<i>A Unique Transparent Structure for the New Footbridge Across a Moat in Darmstadt, Germany</i> Jochen STAHL—Christian ECKHARDT	314
<i>The New Pinel Bridge in Rouen, the Fifth French Road Bridge Using Ultra High Performance Fibre-Reinforced Concrete Components</i> Daniel de MATTEIS—Pierre MARCHAND, Aude PETEL, Thierry THIBAUUX, Nicolas FABRY, Sandrine CHANUT	316
<i>Active Vibration Control with Artificial Pneumatic Muscles for Carbon Fibre Stress-Ribbon Bridge</i> Achim BLEICHER—Mike SCHLAICH	318



<i>Experiencing More GFRP Composite Bridge Decks for Vehicular and Pedestrian Bridges</i> Sung Woo LEE—Kee Jeung HONG	320
<i>Design and Development of Fiber Reinforced Elastomeric Bearings</i> Ulrich GERHAHER—Alfred STRAUSS, Konrad BERGMEISTER	322
<i>Study on Application of Steel Fiber Reinforced Self-Stressing Concrete in Transforming Old Simply Supported Bridges into Continuous System</i> Boxin WANG—Chengkui HUANG, Huanan HE	324

6A Educational Approaches

<i>Conceptual Design in the Education of Civil Engineers</i> Thomas VOGEL—Heinrich FIGI	328
<i>Creative Designing—Teaching the Impossible?!</i> Annette BOEGLE	330
<i>Experiences from Engineering Education in Conceptual Design of Structures</i> Philippe VAN BOGAERT—Hans DE BACKER, Bart DE PAUW, Amelie OUTTIER, Corneel DELESIE, Lien VERBERCKMOES	332
<i>Developing Teamwork and Other Professional Skills While Teaching Reinforced Concrete Design.</i> Anne GARDNER—Keith WILLEY	334
<i>Young Structural Engineers Building Structures for the Poor</i> Fernando MOREU	336
<i>Evaluation of the Program for the Reconstruction of Houses in India</i> Ignacio PAYÁ-ZAFORTEZA—Pedro A. CALDERÓN-GARCÍA	338

6B Glass and Fiber Applications

<i>Modern Facades Made of Glass</i> Barbara SIEBERT	342
<i>Point-fixed Glazing—Materials and Processing</i> Andreas HAESE—Geralt SIEBERT	344
<i>Glass Meets New High-strength Materials</i> Kirsten PIEPLOW	346
<i>Glass Plus X—Development of Innovative Hybrid Structures</i> Bernhard WELLER—Thorsten WEIMAR	348
<i>Design of Blast Resistant Long-Carbon Fiber Concrete Walls</i> Andrew COUGHLIN—Andrea SCHOKKER, Eric MUSSELMAN	350
<i>Reinforced UHPFRC Tension Chords</i> Marion RAUCH—Viktor SIGRIST	352



6C Rehabilitation and Replacement of Bridges

<i>Replacement of the US 90 Bridge Across St. Louis Bay</i> Frank BLAKEMORE—Travis KONDA	356
<i>US 90 Bridge Over Biloxi Bay—A Design-Build Solution to Katrina Recovery</i> Patrick CASSITY	358
<i>Post Tsunami Reconstruction in Indonesia</i> Robert MAGLIOLA	360
<i>Rehabilitation of a Viaduct Subjected to a Landslide Thrust</i> Luis B. FARGIER G.—Rosendo CAMARGO M.	362
<i>Seismic Retrofit of an Aged, Historic Signature Concrete Bridge</i> Daniel J FITZWILLIAM—Matthew TOBOLSKI	364
<i>Rehabilitation Design of the Alexander Hamilton Bridge Complex</i> Martin KENDALL	366

7A Impact Loads on Structures and Performance Based Designs

<i>Design for Extreme Events—Progressive Collapse</i> David A NETHERCOT	370
<i>Analytical Studies on Load Carrying Capacities of Riveted Railway Bridges Subjected to Collision Damages</i> Taishi NAKAYAMA—Motoya KIMURA, Manabu IKEDA, Kenji KITA, Fumio NAGASHIMA, Shigeyuki MATSUI	372
<i>Performance-Based Vessel Collision Modeling</i> Peter MATUSEWITCH	374
<i>Ship Collision Protection Device for Zhanjiang Bay Bridge</i> Yinghong CAO—Linge LUO, Ying ZHOU	376
<i>Damage Caused by Accidental Loads—Assessing of Damaged Reinforced Concrete</i> Maximilian FUCHS—Manfred KEUSER	378
<i>Reinforced Concrete Precast Structures with Rigid Connections</i> Corneliu BOB—Andras LEIDAL, Liana BOB	380
<i>Application of Risk Analysis for performance based Tunnel Design</i> Juergen KRIEGER—Frank HEIMBECHER, Ingo KAUNDINYA	382

7B Forensic Investigation of Structures

<i>Failures Resulting from Inadequate Design-Construction Interface</i> John F. DUNTEMANN	386
<i>Structural Reliability Assessment for Existing Composite Bridges Without Design Documents</i> Thomas BRAML—Manfred KEUSER	388



<i>Solomon R. Guggenheim Museum Restoration: Correlating Projected and Actual Movement of Thin Shell Concrete Walls</i> Nancy R. HUDSON	390
<i>Rehabilitation of Ferry Docks in Southwestern Ontario</i> N. David LEBLANC—Mike SHALLHORN, Dennis W. KERR	392
<i>Casino Parking Garage Collapse Forensic Investigation</i> Matthew SHEEHAN—Eric VANDUYNE, W. Gene CORLEY	394
<i>Structural Evaluation of Four Frank Lloyd Wright Buildings</i> Edmund P. MEADE	396
<i>Evaluating Fatigue Performance of Sign, Signal and Luminaire Structures</i> Sougata ROY—Yeun-Chul PARK, Reilly THOMPSON, Richard SAUSE, John FISHER	398

7C Ways and Means: Bridges and Excavations

<i>Stonecutters Bridge—Main Span Erection</i> Steve KITE—Naeem HUSSAIN, Michael TAPLEY, Brian W WEST, Robin SHAM ..	402
<i>Construction Engineering for Stonecutters Bridge: Concrete Backspans and Steel Deck Heavy Lift</i> Guido MORGENTHAL—Robin SHAM	404
<i>The New Main Street Bridge, Columbus, Ohio, A Signature Single-Rib Tied Arch</i> Steven HAGUE—Hans HUTTON	406
<i>Erection Engineering Considerations for Horizontally Curved Steel I-Girder Bridges</i> Brandon CHAVEL—Shawn TUNSTALL, Jason FULLER, Matt BUNNER	408
<i>East Tsing Yi Viaduct—A Tough Schedule to Erect a Concrete Deck 7 km Long</i> Yves RIALLAND—Fabrice CAYRON, Naeem HUSSAIN	410
<i>Short- and Long-term Effects on Upheaval Buckling of Blinding Struts</i> Jeanette M. ABELA—Robert L. VOLLUM, Bassam A. IZZUDDIN, David M. POTTS	412
<i>Lateral-Torsional Instability of Box Girder Bridges at Erection</i> Per-Olof THOMASSON	414

POSTER SESSION

Session 1

<i>Anchorage to Concrete Design: The Transition from Tabular Load Capacity to Rational Design and Anchor Qualification Procedures to Manage Risk</i> Neal S. ANDERSON—Donald F. MEINHEIT	418
<i>Vehicle-induced Vibration of Half-through and Through CFST Arch Bridges</i> Qing-Xiong WU—Bao-Chun CHEN	422



<i>Development of Earthquake Crisis Management Strategic Plan for Metropolitan Motorway Systems</i>	
I. ANASTASOPOULOS—Rallis KOURKOULIS, George GAZETAS, Bill HALKIAS, F. PAPADIMITRIOU	424
<i>Spot Monitoring and Numerical Analysis of High Rising Building</i>	
Zhang SHENWEI—Zhang QILIN, LOUXIN	426
<i>Knowing the Typical Pathologies of Bridges—the Brazilian Experience</i>	
Julio TIMERMAN	428
<i>Bridge Information Modeling—Approach for Improving Safety and Serviceability from the Design Phase Throughout the Life Cycle</i>	
Dorian JANJIC—Ronald A. LOVE	430
<i>A Review of Code and Performance Based Seismic Design Procedures of Reinforced Concrete High-rise Building Structures</i>	
Atila ZEKIOGLU—Michael WILLFORD, Huseyin DARAMA, Murat MELEK	432
<i>Tests of Grouting Voids in Post-tensioned Bridges by X-ray Penetration</i>	
Lin AN—Yaming ZHENG	434
<i>New York City DOT Bridge Management System</i>	
Kevin MCANULTY—Gilles HOVHANESSIAN, Benoit KROELY	436
<i>Experimental Study on Composite Structural Walls with Hysteretic Dampers</i>	
Kenji SAKINO—Hiroyuki NAKAHARA	438
<i>Multi Mapping in Condition Assessment of Three City Bridges</i>	
Aleksander WAWRUSIEWICZ	440
<i>Numerical Analysis of Progressive Collapse of RC Frame Under Blast Loading</i>	
Zhong-Xian LI—Yanchao SHI, Hong HAO	442
<i>The Supplementary Damping Advantage—Flexibility for a High-Rise Building</i>	
Jamieson ROBINSON—Michael WESOLOWSKY, Graham FITZGERALD	444

Session 2

<i>North Avenue Bridge Reconstruction Over Chicago River</i>	
Murat AYDEMIR—Craig J. HETUE, Kenneth D. PRICE, Daniel BURKE	446
<i>Abu Dhabi Central Market Redevelopment</i>	
Robert HALVORSON—John VIISE, Eric FENSKE	448
<i>‘Top to Bottom’ Construction—Arcapita Headquarters at Bahrain Bay</i>	
Wilfried LAUFS	450
<i>Textile Reinforced Concrete (TRC) as Torsion Strengthening</i>	
Frank SCHLADITZ—Manfred CURBACH	452
<i>Reconstruction and Revitalization of Peter Behrens’ “Berolinahaus” (at Alexanderplatz 1 in the center of Berlin—Germany)</i>	
Oskar-Henri PEKOLL—Ralf GLASENAPP	454



<i>Inspection and Retrofitting of Fatigue Damaged Orthotropic Steel Deck</i> Takeshi KINOMOTO—Masashi KAJIHARA, Yasuaki HIRABAYASHI, Takuyo KONISHI, Masumi MURANO, Gou SAITO	456
<i>Reduction of the Life Expectancy of Bridges and Viaducts as a Result of Increased Truck Traffic in the Netherlands</i> Boyke M.H. DJORAI—Ane de BOER	458
<i>Structural Design of High-Rise Buildings for Windloads</i> William FRITZ—René GABBAI, Emil SIMIU	460
<i>Reliability Analysis of Concrete Structures Considering Different Hazard Curves for Western and Eastern United States</i> Sergio H. C. SANTOS	462
<i>Sustainability of Timber Bridges—The Magic Triangle: Standard construction drawings- Maintenance Costs—Lifetime</i> Matthias GEROLD	464
<i>Strengthening and Rehabilitation of Quesnell Bridge, Edmonton, Canada</i> Azita AZARNEJAD—Gamil TADROS, Ken REBEL	466
<i>Tests and Inspection for German Bridges with Stay Cables Using Prestressing Strands According to Fib-recommendation</i> Christian GLAESER—Konrad ZILCH	468
<i>New Technology for Cable-stayed Bridge Design of Zhanjiang Bay Crossing</i> Qiang ZHANG—Baofeng GAO, Chengyu LIU, Mujie LIAO	470
<i>555m Tall Lotte Super Tower, Seoul, Korea</i> William BAKER—Charles BESJAK, James PAWLIKOWSKI, Brian McELHATTEN, Preetam BISWAS	472
<i>Cyclic Behavior of Unstiffened Double Split-Tee Beam-to-Column Connection</i> Yukihiro HARADA—Kazumasa EBATO, Junpei YAGI	474
<i>Some Aspects of the Life-Cycle Reliability of the Twin Cable-Stayed Bridges at Malpensa Airport in Italy</i> Fabio BIONDINI—Dan M. FRANGOPOL, Pier Giorgio MALERBA	476
<i>Wind Engineering of the 600m Chicago Spire</i> Peter IRWIN—Dan BACON, Mike CICCI, Richard TOMASETTI, Joseph BURNS, Nicholas STEELE	478
<i>The 2007 Ravenel River Bridge Inspection</i> John STIEB—Gilles HOVHANESSIAN, Benoitu KROELY	480
<i>Sculpted High-Rise: The Al Hamra Tower</i> Mark SARKISIAN—Neville MATHIAS, Aaron MAZEIKA	482
<i>Target Proof Load Determination for Bridge Capacity Assessment</i> Juan D. GÓMEZ—Joan R. CASAS	484
<i>Anti-Slip Test of Main Cable Against Saddle of Three Pylon Suspension Bridge</i> Lin JI—Ce CHEN, Zhaoxiang FENG	486



<i>Engineers and Contractors Advanced Tall Building</i>	
Hanns U. BAUMANN	488
<i>Long Term On-line Health Monitoring of the Poyan Lake Bridge</i>	
Hai-bo XIE—Zhong-chu TIAN, Fa-gen PENG, Wang-gang ZHENG, Zhao-hua TAO, Yu-xiang ZHOU	490
<i>Load Tests of Dongping Bridge in Foshan, China</i>	
Zhongchu TIAN—Lianying ZHANG, Tao PENG, Fengjie MA	492
<i>Impacting Factor Caused by Highway Bridge Deck Roughness</i>	
Yifan SONG—Rongfeng CHEN, Shuanhai HE	494
<i>Steel Structure with Textile Membranes for Renovation of an Existing Built-up Area</i>	
Dimitar DAKOV—Vaty TANEV	496
<i>Computational Modelling of ASR/DEF Affected Concrete Bridge Columns</i>	
Kimberly TALLEY—José ARRELLAGA	498
<i>Third Millennium Bridge over the Ebro River. Zaragoza. Spain</i>	
Juan José ARENAS—Guillermo CAPELLAN, Héctor BEADE, Javier MARTÍNEZ ..	500
<i>Load Carrying Capacity Assessment of Prestressed Concrete Beam Bridge from Structural Forced Vibration Response</i>	
Zhi SUN—Zhen LI	502
<i>Strengthening Concrete Columns in Concrete Condominium Building</i>	
Tracy ZHANG	504
<i>Design Challenges for Hålogalands Bridge</i>	
Allan LARSEN—Lars JENSEN, Bernt JAKOBSEN	506
<i>Study on Application of Viscous Damper in Hybrid Structure</i>	
Weng DAGEN—Zuo SHAOBING, Lu XILIN	508
<i>Ductility Increasing for Concrete Columns. Experimental Results.</i>	
Cosmin Al. DĂESCU—Valeriu STOIAN, Tamás NAGY GYÖRGY, Daniel DAN, Demeter ISTVÁN	510
<i>The Internet as the Perfect Tool to Document Construction Projects</i>	
Nicolas JANBERG	512
<i>Technical Code for Building Monolithic Moving Engineering of China</i>	
Erjun WU—Aiqun LI	514
<i>A Large Span Roof made of Cable Stayed Arches</i>	
Pier Giorgio MALERBA—Paolo GALLI, Marco DI DOMIZIO, Giacomo COMAITA	516

Session 3

<i>General Design of Airport Road Yaojiang Bridge in Ningbo</i>	
Rengui WANG—Weisheng WU, Fanchao MENG, Daojin LIN	518



<i>A Significant Infrastructure Project within the Urban Environment of Athens: The Case of Attica Tollway</i>	
Bill HALKIAS—Helen TIROGIANNI, Dimitris KITSOS	520
<i>150 Km of U Shape Prestressed Concrete Decks for LRT Viaducts</i>	
Daniel DUTOIT—Yves GAUTHIER, Serge MONTENS, Jean-Charles VOLLERY ...	522
<i>The Magic Box. Multifunctional Sports Centre by Manzanares River in Madrid</i>	
Salvador FERNÁNDEZ—Juan FDEZ. ANDRINO, José Luis SÁNCHEZ	524
<i>Stability and Dynamic Analysis of A CFST Arch Bridge With Basket Type</i>	
Guihan PENG—Baochun CHEN, Qingxiong WU	526
<i>Second Order Effects on Building Structures—an Approximate Evaluation</i>	
László P. KOLLÁR	528
<i>Short-span Bridges—Leading Australian Innovations</i>	
Frank RAPATTONI	530
<i>Building on Water: Design Projects Using Aluminium Structural Elements</i>	
Dianne VAN HOVE—Frans SOETENS	532
<i>The Christopher S. Bond Bridge—An Icon for Kansas City, Missouri</i>	
Patrick CASSITY	534
<i>Problems and Opportunities of Nonlinear RC Frame Analysis</i>	
Thomas LÖEHNING—Jochen SCHENK, Uwe STAROSSEK	536
<i>Experiment on Seismic Behaviour of Damaged Cable-stayed Crossing Structure</i>	
Yang DING—Jin-Guo WANG, Lin QI	538
<i>US 20 Arch over the Mississippi River</i>	
Patrick CASSITY	540
<i>Seismic Evaluation of Garcia Cadena Bridge (Colombia)</i>	
Esperanza MALDONADO—Gustavo CHIO, Rodolfo VILLAMIZAR	542
<i>Push-launched Bridges with the Prestressing Cables Deflected after the Launch.</i>	
Angus LOW	544
<i>Curved Precast Concrete Bridge Projects in Colorado</i>	
Gregg A. REESE	546
<i>Finite Element Modelling and Operational Modal Analysis of a Curved Cable Stayed Bridge in Venice</i>	
Bruno BRISEGHIELLA—Fulvio BUSATTA, Carmelo GENTILE, Enzo SIVIERO, Tobia ZORDAN	548
<i>Trial Design on Concrete Arch Bridge with Corrugated Steel Webs</i>	
Bao-chun CHEN	550
<i>Design of the Long-Span Roof of the O2 World in Berlin Germany</i>	
Nils SVENSSON	552
<i>Monitoring System for a Cable-Stayed Bridge in Plock</i>	
Maciej HILDEBRAND—Jan BILISZCZUK, Andrzej BERGER	554



<i>Recent Innovations for Enhancing Durability of Post Tensioning Systems in the USA.</i>	
Erich AIGNER	556
<i>Dynamic analysis and optimisation using morphological indicators</i>	
Thomas VANDENBERGH—Willy Patrick DE WILDE, Pierre LATTEUR	558
<i>Behaviour of Tendons for Cryogenic Applications</i>	
Christian GLAESER—Konrad ZILCH	560
<i>Durability Evaluation of a Carbon Fiber Reinforced Member</i>	
Tetsuo HOJO—Kazutoshi ASAO	562
<i>Stress Limitation of External Prestressing Tendons in Serviceability Limit State</i>	
Chao LIU—Dong XU, Yuan SUN, Zhenrong WU	564
<i>Design of Deep Beams with Openings using Strut-and-Tie Models</i>	
David BIRRCHEr—InSung KIM, John BREEN	566
<i>Composite Behavior of Concrete Filled Tube with Large Width-Thickness Ratio of Steel Plate</i>	
Hisao TSUNOKAKE—Yasunori KOBAYASHI, Yoshihiro YAMADA, Hajime OHUCHI	568
<i>Shrinkage Effect at Concrete Interfaces in Rigid-frame Bridges</i>	
Xuefei SHI—Xiaoxiang LI, Xin RUAN	570
<i>Innovative Foundation Design at Complex Urban Sites</i>	
Clyde N. BAKER—William H. WALTON	572
<i>Effect of Long Carbon Fibers on Deflection of One-way Members</i>	
Je II LEE—Eric MUSSELMAN, Andrew SCANLON, Andrea J. SCHOKKER	574
<i>Research and Practice with Composite Polymer Bridges in Poland</i>	
Henryk ZOBEL—Wojciech KARWOWSKI, Marcin WRÓBEL, Przemysław MOSSAKOWSKI, Krzysztof ŻOLTOWSKI, Andrzej KOZAKIEWICZ, Jerzy PIECHNA, Bartłomiej GROTE, Piotr ŻOLTOWSKI	576
<i>Rigidity Selection for Mid-Tower of Three Tower Suspension Bridge</i>	
Jing RUAN—Zhaoxiang FENG, Jianchi ZHONG	578
<i>Cable stayed bridge with two decks and a single tower</i>	
Catão RIBEIRO—Heitor Afonso NOGUEIRA, Cândido HERNANDO Filho, Fernando R. STUCCHI	580
<i>Influence of Higher Modes on the Response of Irregular Tall Buildings</i>	
Seymour M. J. SPENCE—Massimiliano GIOFFRE, Vittorio GUSELLA	582
<i>Structural Design of Aluminium Bridge Decks for Existing Traffic Bridges</i>	
Johan MALJAARS—Frans SOETENS, Dick DE KLUYVER	584

Session 4

<i>Exploration of a New Rigid-Frame Arch Bridge Constructed by Vertical Downrotation</i>	
Zhixiang ZHOU—Guowen YAO, Haijun WU, Yong XU	586



<i>SEI Pre-Standard and Commentary on Disproportionate Collapse: Part II—Prescriptive Approaches to Provide Robustness</i> Kirk MARCHAND—David STEVENS, Aldo E. MCKAY	588
<i>Autonomous Systems for Strain and Vibration Measurements</i> Hans DE BACKER—Amelie OUTTIER, Bart DE PAUW, Philippe VAN BOGAERT	590
<i>Application of the Pre-stressed Concrete Box-girder with Corrugated Steel Webs in Bridge Engineering in China</i> Li SHUQIN—Zhu KUNNING, Wan SHUI	592
<i>Design and Erection of Two Recent Urban Cable-stayed Bridges in Spain</i> Juan José ARENAS—Guillermo CAPELLÁN, Miguel SACRISTÁN	594
<i>Analysis for Initial Equilibrium Condition and Erection Stages of Sorok (Self-Anchored Suspension) Bridge</i> Yunki SON—Dongho YOO, Seungwook JEONG, Teaseop YOON	596
<i>Research on Location Control of GPS in Super High-rise Building Construction</i> Yunkai GUO—Dongli PENG, Shengguang DONG, Xuping XIONG, Zhiyong FAN ...	598
<i>Post-Weld Treatments for the Service Life Extension of Existing Steel Bridges</i> Scott WALBRIDGE	600
<i>Appliance of Orthogonal Experiment in Bridges Seismic Engineering</i> Yongjun ZHOU—Shuanhai HE, Gang ZHANG, Wei QUAN, Yu ZHAO	602
<i>Fatigue Behavior of Welded Pipe Intersections in Bridges</i> Ingbert MANGERIG —Norbert ROMEN	604
<i>Design of Heavy Movable Structures using Advanced Modeling and Visualizations</i> Keith R. GRIESING	606
<i>Warta River Crossing 130 m of Ready Construction per Week with a Crowning Achievement—Extradosed Bridge</i> Andrzej BERGER—Marcin LEWANDOWSKI, Adam NADOLNY, Jerzy ONYSYK, Krzysztof SADOWSKI, Pawel HAWRYSZKOW	608
<i>Widening and Rehabilitation of Some Bridges in Indiana Toll Road</i> Santiago PÉREZ-FADÓN—José Emilio HERRERO, Javier LEÓN, Jesús GONZÁLEZ FERNÁNDEZ	610
<i>A Complete Guide to Blast-Resistant Design of Low Rise Reinforced Concrete Buildings</i> Steven SMITH—Dennis MCCANN, Mahmoud KAMARA	612
<i>Geotechnical Engineering of the 600m Chicago Spire</i> William WALTON—Darren DIEHM, Joseph BURNS, Fernando SARABIA, Garret BROWNE, Suzanne PROVANZANA	614
<i>Design & Construction of WanZhou Yangtze River Railway Bridge</i> Xue-wei DUAN—Mujie LIAO	616



<i>Construction Process Simulation Based on Significant Day-to-day Data</i> Karin AILLAND—Hans-Joachim BARGSTÄDT	618
<i>Erection Control Analysis—Meeting the Demands of New Construction Techniques</i> Dorian JANJIC—Johann STAMPLER	620
<i>Two Examples for the Design of Load Bearing Structures with Steel Fibre Reinforced Concrete</i> Thomas KASPER—Carola EDVARDBSEN, Carsten S. SØRENSEN	622
<i>Light Curing Acrylates in Glass Structures</i> Bernhard WELLER—Silke TASCHE	624
<i>Fluoropolymer Coatings for Buildings, Bridges, and Infrastructure</i> Winn DARDEN—Takashi TAKAYANAGI	626
<i>Dynamic Response of Water Networks in Seismic Areas</i> Virginia CORRADO—Berardino D'ACUNTO, Nicola FONTANA, Maurizio GIUGNI	628
<i>Offsite/ Accelerated Construction of a Busy Interchange Bridge</i> Abhay THORAT—Christopher BAILEY	630
<i>Earthquake Tests for Glass Structures</i> Geralt SIEBERT	632
<i>Creative Design of Earthquake Resistant Tall Building Structures and Bridge Structures</i> Peter ROSKO	634