IABSE Conference 2018

Engineering the Developing World

IABSE Symposium Report Volume 110

Kuala Lumpur, Malaysia
25 - 27 April 2018

Volume 1 of 2

ISBN: 978-1-5108-6425-2

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571

Some format issues inherent in the e-media version may also appear in this print version.

Printed by Curran Associates, Inc. (2018)

International Association for Bridge and Structural Engineering (IABSE)
c/o ETH Zurich
Honggerberg HIL E 21.3
Stefano-Franscini-Platz 5
8093 Zurich
Switzerland

Phone: +41-44-633 2647
Fax: +41-44-633 1241

secretariat@iabse.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Malaysian Highways Infrasructure – Vision 2050 & Challenges Ahead in Coming Decades
ISMAIL MD SALLEH 1

Do Structural Codes Stifle Creativity?
NETHERCOT, David A 9

The Second Penang Bridge Project: Planning, Design, Construction and Maintenance
ISMAIL, Mohamed Taib 19

Case Study on Comparison between Chinese and American Design ofHigh-Rise RC Frame-Core-Tube Structure
XIAO, Congzhen 29

Bridge Design for India - from Kolkata to New Delhi
SCHLAICH, Mike; BURKHARDT, Uwe 39

Brunei Temburong Link
HUSSAIN, Naeem; YIP, Sammy; TO, Murphy; CHIN, Kok Kong; DING, Lee Sing; YAT, Kheong Cheng 47

Technical Risks to Major Infrastructure Development
ANCICH, Eric; CHIRGWIN, Gordon 54

Mega Challenge for Mega Project: Stakeholder's Perspective
ALSANAD, Shaikha 68

System of Combined Foundation as Base For Mega-Structures
REBIELAK, Janusz 75

Structure and Performance Characteristics of Curved Box Girders with Corrugated Steel Webs
WANG, Kangjian; ZHANG, Peiwei; CHEN, Jinxiang; ZHOU, Man 81

Experimental Study on Shear Behavior of Curved Box Girders with Corrugated Steel Webs
LIU, Sumei 88

The All-Composite Road Bridge – A Proposal for Rapid Urbanisation
SIWOWSKI, Tomasz; KOZŁOWSKI, Aleksander ; ZIEMIAŃSKI, Leonard; RAJCHEL, Mateusz; KALETA, Damian 95

Study on Steel-Concrete Composite Beams under Pure NegativeBending and Combined Negative Bending and Torsion
LIN, Weiwei 103

Behaviour of Metallic Anchorage Plates for Prestressing CFRP Laminates Under Room and Elevated Temperatures
SENA-CRUZ, José; CORREIA, Luís; BARRIS, Cristina 111

Seismic Behavior of Skew RC Bridges with CFRP piers
SHIRAVAND, Mahmoud Reza; MAHBOUBI, Shima 119

Fully Stress Laminated Timber Bridge
FELICIANGELI, Dario; MIERZWA, Krzysztof; ANTUNES, Mariana 127

Experimental Study on Hybrid Masonry Structure with RC Frame under Lateral Reversed Cyclic Loading
ZHANG, Fei; MA, Jianxun 135

Research on The Automatic Tension Control and Management Integrated System of Railway Prestressed Concrete Beam
ZHUO, Yi 143

Economy and Elegance in Bridge Design: The Beauty of Practical Objects that do their Job Well
GAUVREAU, Paul 151

Architecture of Roman Catholic Cathedrals and Basilicas in the Developing Countries
VERTATOVA, Eva 159

Structural, Technological and Aesthetical Considerations for the Detailing of Steel Tubular Joints
GEORGIEV, Vasil Georgiev; DAKOV, Dimitar; MIHOV, Yavor 167

Beauty Create the World
HUI, luo 175

Pro Value of State of the Art Bridge Bearings and Expansion Joint Solutions
GUENTHER, Peter; ROOS, Rainer 183

Performance of Modular Expansion Joints under Strong Ground Motions
SAVIOZ, Pascal; IMAM, Moustafa 191

Advanced Bridge Pot Bearing Technologies with a Special Focus on Railway Applications
SAVIOZ, Pascal; BRUENINGHOLD, Max 199

Replacement of Bridge Expansion Joints: Challenges and Solutions
SAVIOZ, Pascal; MENG, Niculin 201

Construction of 90m multi-span Viaducts with Span by Span Construction Method - A New Possibility in Bridge Engineering
PACHECO, Pedro; COELHO, Hugo; BORGES, Pedro; CARVALHO, Diogo 203

Hybrid Launching Gantry for the Construction of Span by Span Precast Segmental Bridge
OOI, Shu Tat 211

Challenges in Design & Construction of Elevated Grade Separators with Wide Deck & Single Central Pier, in Urban Areas
BHOWMICK, Alok; JAIN, Sanjay 219

Efficient and Economical Structural System in the form of Inverted-T Pier Crosshead and Deck Slab Continuity for Beam and Slab Bridges As Adopted in DUKE 2 Project in Malaysia
ANBARASAN, G. Irusan 227

Helping Gasiza have a Bridge for Generations to Come
DEAN, Sean 232

Appropriate Approaches to Health, Safety And Welfare during Footbridge Construction in Developing Countries
WHITTAM, Johannes; LUDIN, Matthias 234

B2P Rutaka Footbridge – Improving Safety Using Innovative Deck Pull Method
TOWLER, Ian; MILLS, Ben; LOFTS, Matthew; MILLS, Brandon; BENSON, William 242

Integrated Engagement for Considered Infrastructure: Harmonising New with Old
STROYMAN, Molly 250

Bridges to Prosperity Llapallapani Suspension Pedestrian Bridge, Llapallapani, Bolivia
COOPER, Thomas; MONTENEGRO, Juan Diego; TILLEMAN, Kirsten 252

Planning, Design and Construction of Elevated Guideway of Kelana Jaya (KLJ LRT) Extension Project and Challenges & Lessons Learnt
BISWAS, Pradip Kumar; GANENDRA, Dennis; EMBI, Azmar Bin 259

Design of Segmental Precast Portal Frame for Red Line Mass Transit System in Bangkok, Thailand
WIROJJANAPIROM, Puvanai; RITDUMRONGKUL, Sopon; IMSOMBAT, Sittisak; NIELSEN, Knut H. 267

The Kenyan Dream : Developing Concept of Nairobi MRTS
ROY, BC; WANJAU, George P G; BHATTACHARJEE, Satyaki 275

Precast Segmental Aerial Guideway for Honolulu Rail Transit Corridor Project
LEE, Hohsing 283

Design of the Viaducts for the Line 3 of the Riyadh Metro LRT in Saudi Arabia
DURAND, Paul-Emile; WISE, Lucas; JOY, Emmanuel; ROSSETTO, Alain 291

Mumbai Metro Line 2A – Challenges in Design and Construction
SHAIKH, Mohammed Adil; SAWANT, Mangesh; TANK, Ajay; MODY, Nirav; PANDEY, Amit 299

Digitally Enabling Design for Manufacture, Assembly and Maintenance of Bridges
FARMER, Neil Stephen; BRILAKIS, Ioannis; MCGOVERN, Scott 307

A Rational Approach to Life Cycle Design of Infrastructure Developments in Malaysia
GURUSAMY NAIDU, Kribanandan 315

Human Errors and Corresponding Risks in Reinforced Concrete Bridges
PEREIRA, Neryvaldo Galvão; MATOS, José; OLIVEIRA , Daniel; FERNANDES, João 323

Towards Nonlinear Reliability Assessment of Concrete Transport Structures
PUKL, Radomír; LEHKÝ, David; NOVÁK, Drahomír 330

Viaduct in the Highway Siervo de la Nación
SANTOS, Carlos; MATOS, José; BARBOSA, José Luís; LEITE, Ricardo 338

Effects of Structural Deterioration and Infrastructure Upgrading on the Life-cycle Seismic Resilience of Bridge Networks
CAPACCI, Luca; BIONDINI, Fabio 340

Carbon Reinforced Concrete in Construction Practice
SCHLADITZ, Frank; TIETZE, Matthias; LIEBOLDT, Matthias; SCHUMANN, Alexander; GARIBALDI, Maria Patricia; CURBACH, Manfred 348

Future Applications in Carbon Reinforced Concrete
TIETZE, Matthias Rolf; SCHLADITZ, Frank; CURBACH, Manfred; KAHNT, Alexander; ZOBEL, Robert ... 356

Crack Width Calculation Methods for Large-Scale Concrete Structures for the Ferry-Free E39
TAN, Reignard; KANSTAD, Terje; GEIKER, Mette R; HENDRIKS, Max A N 358

Strength Properties and Microscopic Observations of Concrete with Plastic Wastes as Partial Aggregate Substitute
ORETA, Andres Winston C; CUARTERO, Maejann E; VILLANUEVA, Nikko Paolo P 360

Behavior of Reinforced Concrete Beams with 700 MPa High-Strength Reinforcement - Flexure and Serviceability
LEE, Joo-Hyung; CHO, Jae-Yeol 368

Review of the Most Common Repair Techniques for Reinforced Concrete Structures in Coastal Areas
ANCICH, Eric; RASHIDI, Maria; BUCKLEY, Peter; GHODRAT, Maryam 370

Challenges and Innovation in Large-Scale Infrastructure Projects – the WHSD Project
PEDERSEN, Nikolaj Rask; JACOBSEN, Jonas Sejersbøl; LAUSTEN, Søren 378

The Harbor Passage Bridge in Hamburg
REINTJES, Karl-Heinz 386

Configuration Design of Viaduct Pier in Urban Highway
JIN, Yanjun; XIAO, Keli; LI, Lin; ZOU, Aijia; DUAN, Xinglong; HE, Wei; YUAN, Chongwei 393

Standardized Manufacturable Steel Orthotropic Decks for Urban Bridges
SOUGATA, Roy 401

Experimental Investigation of the Punching Shear Behaviour of RC Slab-Column Connections Under Seismic Loading
ABDELKHALIK, Amr; ELAFANDY, Tamer; ABDELRAHMAN, Amr; SHERIF, Alaa 403

Seismic Behaviour of Six-Storied RC Residential Structure with Existing LLRS
PURUSHOTHAMA, Chaithra; BAI, H Sharada; G, Ambrish 411

Transitioning to Seismic Design
TIONG, Timothy 419

The Seismic Performance Evaluation of RC High-Rise Buildings Designed to Various Building Codes
HASSAN, Waqar ; ANWAR, Naveed; NORACHAN, Pramin; NAJAM, Fawad A 427

Innovative Upgrading of Heritage Buildings: Structural Case Studies
GURUSAMY NAIDU, Kribanandan 435

Rebuilding of Tokyo's SUITENGU Shrine
IIDA, Tomohiro; NAKANE, Kazutomi; ASO, Naoki 443

Reinforcement of Old Masonry by New Structure
YAMAZAKI, Ryohei 451

Structural Feasibility of ISO Shipping Containers for Core-dwelling Housing
TAN, Cher Siang; NUSSBAUMER, Alain 459

Shear Resistance Mechanisms on High-Panelized Steel Sheet Walls with Burring Holes
KAWAI, Yoshimichi; FUJIHASHI, Kazunori; TOHNAI, Shigeaki; SATO, Atsushi; ONO, Tetsuro 466

Deformation Capacity of Web Perforated H-shaped beams
INABA, Toru; USAMI, Tetsu; YAMAZAKI, Kenji; USHIWATA, Fumi; ODAJIMA, Nobuyuki; JUN, Okamoto 474

Development of Retrofitting Method against Fatigue Cracks in Orthotropic Steel Deck Stiffened by Trough Ribs
SHINNO, Takahiro; MIZOKAMI, Yoshiaki ; MORIYAMA, Akir; KISHI, Yuki ; SAKANO, Masahiro 482

Proposal for New Beam-End Connection with Rib Plates inside Steel Panel zone of Beam-to-Column Joints
YAMAZAKI, Kenji; INABA, Toru; USAMI, Tetsu; TAKUMA, Kawakami; SABURI, Kazuhiro 489

Design and Development of the Msikaba and Mtentu River Gorge Bridges
ANDERSON, John Robert Beveridge 497

Design and Construction of Beipanjiang Bridge
LIU, Bo; PENG, Yundong; HOUMAN, ; ZHOU, Daqing 505

Partial cable-stayed bridge in the application of heavy haul railway
LI, Guilin; SHI, Di; ZHANG, Xiaojiang 513

Design of Sea-Crossing High-Speed Railway Steel-Concrete CompositeBox Girder Cable-Stayed Bridge
ZENG, Jiahua; WEN, Wangqing; YAN, Aiguo 521

Effects of High Speed Trains on Bridges
CALATOZZO, Erica; LEMAIRE, Arnaud; MONTENS, Serge 526

Innovation Design of a Ballastless Cable-Stayed Bridge with Main Span of 300m in High-Speed Railway
DIPING, Li 534

Key Techniques Introduction to Maputo Bridge Steel Box Girders Construction
QIANG, Yaofeng; GUO, Changrui; ZHAO, Congming 542

Study on Correction of Linear and Internal Force of Steel Box Girder Bridge Based on Zero Moment Method
TIAN, Wei; WENG, Fangwen; HUANG, Can 550

Thermal Simulation on the Flat Steel Box Girder of the Maputo Bridge under Solar Radiation
LIU, Cheng; FAN, JianSheng; ZHUANG, LiangDong; GAO, JinYang 555

Construction and Engineering Challenges of the Entrance Building Roof for the Hong Kong West Kowloon Terminus Station
CHONG, Alecs K. T.; TAPLEY, Mike; BESSODES, Mathieu; HAU, C C 563

5 Martin Place Sydney
WEBB, John; LAVORATO, Tony 571

The New Large Space Frame - Tama-Sudare
YAMADA, Tatsuya 579

Double Layer Space Frame for Setia SPICE Convention Centre
CHOONG, Kok Keong; SAW, Hin Cheong; WONG, Sik Kwang; CHEW, Khai Seng; TANG, Song Teik 587

Structural Robustness of Long-Span Cable-Supported Bridges Segmented by Zipper-Stoppers to Prevent Progressive Collapse
SHOGHIJAVAN, Mohammad; STAROSSEK, Uwe 593

Fast Tracking the Pulau Poh Cable-stayed Bridge
VOON, Chet Chie; GOH, Hiang Miang; KOO, Chuan Seng 601

Brunei Temburong Link – Design of Cable Stayed Bridges Against Extreme Loading Conditions
YIP, Sammy; KITE, Steve; LEUNG, William; CARLUCCI, Alberto; GAINEY, Catherine; HOOTON, Martin 609

Seismic Pounding Mitigation of an Existing Cable Stayed Bridge using Metallic Dampers
JAVANMARDI, Ahad; GHAEDI, Khaled; IBRAHIM, Zainah; MUTHU, Karuppiah Udayar 617

Loading Steps in Analyzing the Interaction Between the Tied Arch Continuous Bridge and Multiple Tracks
YAN, Bin; HAN, zhongshu; ZHOU, Min 624

Application Status and Developing Foreground of CRTS Ⅲ Ballastless Track
JING-YUAN, Bai; YAN, Bin 632

Experimental Study on the Dynamic Deformation of Simply Supported Beam in Chinese High-speed Railway
WANG, Meng 637

Design & Construction of Setiawangsa – Pantai Expressway (SPE-DUKE Phase 3) – Section 3 from Pandan to Setiawangsa in Kuala Lumpur
PUVVADA, Srinivas Rama Krishna Satya; BENG CHOY, Tham 644

The Realisation of the 6.2km Long Padma Multipurpose Road and Rail Bridge in Bangladesh
JONES, V; HALLIDAY, R; KING, M; ISLAM, Shafiqul 652

Opportunities and Challenges of Traffic Dispersal Structures in KL and the Periphery
BASKARAN, S; ONN, ChanSooi 661

Doha New Orbital Highway Project, Junction 7 Existing Bridge Widening
BANCE, Andrew; CLUETT, Joseph; SAITO, Daisuke; DAOUTIS, George 669

Design & Construction of Duta – Ulu Kelang Expressway (Phase 2) – Tun Razak Link (TRL) in Kuala Lumpur
PUVVADA, Srinivas Rama Krishna Satya; BENG CHOY, Tham 677

Large Scale Infrastructure Project Implementation in Malaysia. A Case Study - Metropolitan Highways in Klang Valley: Damansara-Shah Alam Elevated Highway (DASH)(DASH)
EUSOFE, Zarulazam; HARUN, Sazali 685

Next Generation Flexible Plug Joint Material
SAVIOZ, Pascal; GALLAI, Gustav; METTNER, Knut 693

Integration of SHM at an Early Stage in the Design and Construction of Long-Span Bridges
ISLAMI, Kleidi; SAVIOZ, Pascal; MALEKZADEH, Masoud 701

Design Guidelines for Bolted Single Support Bar Modular Bridge Joint Systems
ROY, Sougata; ARTMONT, Frank A. 709

Bridge Deck Waterproofing on Concrete
STOLL, Philippe 717

The durability of Finger Type Expansion Joints for Penang Second Bridge with Comparison Studies based on Expansion Joints for Bridges in Malaysia & Around the World
CHONG, Seng Shia 720

Retrofitting and Strengthening Interventions of RC Members Using Ultra High Performance Concrete (UHPC)
TEO, Wee; SHIRAI, Kazutaka; HOR, Yin 726

Lateral Behaviour of PT Segmental Bridge Columns with Ultra High Strength Concrete (UHSC)
NIKBAKHT, Ehsan; AL-NINI, Ahmed; DAHI, Saleh Mohammed; MAHZABIN, Mst Sadia 732

Cyclic Behavior of Precast Segmental UHPFRC Bridge Columns with Replaceable Damage-Concentrated Elements
WANG, Zhen; WANG, Jingquan; ZHU, Junzheng 736

Prefabricated Box Girder with Ultra High Performance Concrete
XIAO, Keli; JIN, Yanjun; LI, Lin; HE, Wei; XINLONG, Duan 744

Sustainable Ultra High Performance Cementitious For Rapid Urbanization and Carbon Neutral Mega Construction Projects
LAI, Fook Chuan 746

Method of Designing a Plate-like Ultra High-rise Building
OKAMURA, Shoko; MUTO, Kei 757

Mega High Rise Buildings – Strength and E-modulus Limits for High Performance Concrete in Malaysia
GURUSAMY NAIDU, Kribanandan 765

Descending Order Reversely Constrained Optimal Design Method for Tall Building Structures under Wind Loading and Earthquake action
ZHAO, Xin; ZHAO, Jianzhe; ZHUANG, Ma 773

High-rise PPVC Building for Rapid Urbanisation
CHUA, Yie Sue; LIEW, Jat Yuen, Richard 780

Intermediate Seismic Isolation Ultra High-rise Office Building Integrated with Historical Building
HAMADA, Yuki 783

KVMRT Challenges - Elevated Viaducts and Station Structures
WONG, ChongLing 791

Utilization of Existing Metro Rail Viaduct for Emergency and Personal Rapid Transit
RAJA, Prabu; KUMAR, Naresh 799

Klang Valley MRT Viaduct Structural Design Development
HEWSON, Nigel; TEH, Tzyy Wooi 806

Optimizing and Mitigating Risks for Lead Rubber Bearing Application on Jakarta Light Rail Transit (LRT)
MAURIS, Georges; WOUTS, Ivan; NISCHIGUTI, Eduardo; TOUAT, Arezki 814

Statistical Investigation of Design Live Load by Applying WIM Data with Different Degree of Compliance with Truck Weight Limit
PAIK, Inyeol; JEONG, Kilhwan 820

Challenge in Tunnelling for Kolkata East West Metro – Passage of Underground Twin Tunnels in the vicinity of Brabourne Road Flyover
DEWANJEE, Biswanath 822

Making the World's Longest Subsea Tunnel Sustainable
SØYLAND, Ketil; WOLDEN, Christer; GARMANN, Christopher; HARRISON, Debbie 830

The Vertical and Horizontal Displacements of Cross-River Twin-Tunnels Surroundings Induced by Tunneling
WU, Lin; ZHANG, Zhihua; ZHANG, Xiedong; LIN, FaJin 838

The Application of Steel-Concrete-Steel Composite Structures in Immersed Tunnels
GUO, Yutao; FAN, JianSheng; NIE, Jian-guo; XU, Guo-ping; TANG, Liang; SONG, Shen-you 845

Hong Kong Underground Space Development and its Enlightenment for the Mainland
ZHANG, Dexiang 853

Precast Industry Contributed toward Green Construction
LIMSUWAN, Ekasit; JONGVIVATSAKUL, Pticha 861

Bridging the Gap: Enabling Lower Carbon Footprint and Creating Economic Value from Application of Modern High Strength Niobium Steels
PATEL, Jitendra 867

Photobioreactor Façade Elements - From Concept to Prototype
AßMUS, Elisabeth; WELLER, Bernhard; WALTER, Frank 875

Way Forward for Construction Industry with active participation in Carbon Footprint Reduction for Sustainable Development using Geosynthetics.
MARIAPPAN, Saravanan; HOOD, Fauziah Hanis 882

Large Bridges Recently Built in Poland
TOCZKIEWICZ, Robert; BILISZCZUK, Jan; TEICHGRAEBER, Marco 889

Kampala Flyovers - Structural Technical Review
WOJNARSKI, Lukasz; RAYAT, Kulvinder 897

A Case Study of Failure of Pile Bore at Bridge Construction Project, Agra-Lucknow Expressway, India
KADBHANE, Digambar J; MAHENDRKAR, Avinash Y 899

Design & Construction of Prai Swing Bridge
KUMAR, Sashi 905

Evaluation of the Innovative Bridge Concepts for the Extreme Norwegian Fjord Crossings
JENA, Parthasarathi; EIDEM, Mathias Egeland; VILLORIA, Bruno 907

The Scheme Design of 'Bi-Speed Bicycle Viaduct' Demonstration Line
XIAO, Keli; JIN, Yanjun; ZOU, Aijia; LI, Lin; HE, Wei 909

Smart Structures and Materials
MYSORE SRIRAMA PRASAD, Rakesh 917

Design and Construction of Triple-Span Precast Concrete Open Spandrel Arch Bridge
ONG, Chong Yong; CHOONG, Kok Keong; ONG, Tai Boon; CHIA, Kenny; KAN, Wong Fook 925

Full Scale Load Test of a 20m Span Precast Concrete Closed Spandrel Arch Bridge System with Corrugated Section
ONG, Chong Yong; CHOONG, Kok Keong; MA, Wee Lee; TAN, Geem Eng; ONG, Tai Boon 933

Lancang River Arch Bridge with Stiffened Skeleton of Concrete-filled Steel Tubes
JIN, Fei 940

Corrosion-Resistant Reinforced Concrete Columns
SHEIKH, Shamim Ahmed; KHARAL, Zahra 946

Study on the Corrosion Experiment of Concrete Under Different Stress Conditions
SHEN, Gang; LI, Hui; WU, Xun 954

Fatigue Performance of Pre-Corroded Bridge Wires
JIANG, Chao; WU, Chong; JIANG, Xu 962

Bach Dang River Stay Cable Bridge – Underslung Form Traveller Construction
DUPLEIX, Joakim 969

Structural Topology Optimization of Bridge Girders in Cable Supported Bridges
BAANDRUP, Mads; SIGMUND, Ole; AAGE, Niels 975

Study on A New Type of Deck Applied to Four-lines Railway Cable-stayed Bridge with Wide Truss Stiffening Girder
WEN, Wangqing; XIA, Zheng-chun; QU, Guo-zhao; SHI, Zhou 983

Behavior of Reinforced Concrete Panels by Impact of Hard Projectile
KIM, Chunghyeon; CHO, Jae-Yeol 990

Air-Coupled Nonlinear Ultrasonic Test for Reinforced Concrete Beams
ONGPENG, Jason Maximino C; GUEVARRA, Kenneth; HIROSE, Sohichi 992

Design & Post Tensioning Application of Cement Silos
RAPTOPOULOS, Sotos 998

Structural Planning for Tall Damped Building with Irregularly-Shaped Plan and Elevation
KUSHIMA, Soichiro; MORISHITA, Taisei; YAMASHITA, Yasuhiko; OKUNO, Yuuichirou; NAKAHIRA, Kazuto 1005

3D Non-Linear Model Describing the Behaviour of Peripheral High Capacity Saw-Tooth Connectors Subjected to Compressive Load
AL-KROOM, Hussein Faisal; SCHMID, Volker; REIMER, Andreas 1013

Structural Response of Skew-Curved Concrete Box Girder Bridges under Eccentric Vehicular Loading
GUPTA, TANMAY; KUMAR, Manoj 1021

A Semi-Analytical Method For Dynamic Responses of Cantilever Plates Under Moving Loads
WU, Qi; LI, Qi 1029

A Review on Prestressed Transfer Plate Analysis and Design
LOW, Hin Foo; KONG, Sih Ying; KONG, Daniel 1037

The Appraisal of Wind-Driven Rain within Open-Air Sport Venues
STANFIELD, Robin Alan; CAMMELLI, Stefano; HASHIM, Hayati 1045

Application of Aerogel in Building Energy-saving
HAO, Shuo; YAN, Bin; ZHOU, Min 1052

Managing Wind-driven Rain to Improve the Performance of Outdoor Spaces
LIM, Yi Shan; KALA, Sudeesh; CHATTEN, Mark 1056

Innovative Ballast-less Track System for Urban Areas
ACHS, Günther 1062

Application of Synthetic Wood Sleepers on Double Deck Steel Truss Bridge
ZOBEL, Henryk Ludwik; AL-KHAFAJI, Thakaa; WRÓBEL, Marcin; ŻÓŁTOWSKI, Piotr; PAPIS, Bartłomiej; SULIK, Paweł 1070

Mechanical Behavior of Steel-Concrete Twin I-Girder Bridges
LIN, Weiwei; LAM, Heang; YODA, Teruhiko 1077

Massive Wood Elements and Modular Housing Technology as Innovative Building Concept of Sustainable Urban Planning
AVELLAN, Kari Christer; BELOPOTOCANOVA, Erika; GHOBAKHLOU, Mojtaba 1085

Structural Lightweight Aggregate Concrete and Its Applications
PAYAM, Shafigh 1091

Keynotes (pg 1 - 46), Workshop (pg 1091)