9th International Symposium on Steel Bridges 2018

IOP Conference Series: Materials Science and Engineering Volume 419

Prague, Czech Republic 10 – 11 September 2018

ISBN: 978-1-5108-7198-4 ISSN: 1757-8981 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.

Copyright© (2018) by the Institute of Physics All rights reserved. The material featured in this book is subject to IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics Dirac House, Temple Back Bristol BS1 6BE UK

Phone: 44 1 17 929 7481 Fax: 44 1 17 920 0979

techtracking@iop.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

Volume 419

9th International Symposium on Steel Bridges 10–11 September 2018, Prague, Czech Republic

Accepted papers received: 20 August 2018 Published online: 20 September 2018

Preface

9th International Symposium on Steel Bridges

Peer review statement

Papers

Bridge maintanance

Problems and innovative solutions considering "open type" bridge deck structures in old steel riveted railway bridges

Martina Nikolova and Lazar Georgiev 1

<u>Reinforced structures type "Filler Beam" – advantages in reconstruction of bridge</u> <u>superstructures.</u>

Alexander Jiponov and Lazar Georgiev.....7

Failure analysis and repair assessment of a steel box girder bridge

Maciej Kulpa and Tomasz Siwowski.....16

Lifetime extension of existing steel bridges

Alessio Pipinato and Roberto Pavan.....24

Lightweight solution for existing steel movable bridge retrofit and repair

Antonella Ruzzante and Roberto Pavan.....30

Assessment of existing steel bridges: codes and standard

Erica Siviero and Roberto Pavan.....38

"FEVE based coating systems: Protecting Steel Bridges for over 30 years"

Floris B. Kooistra, Ben Runhaar, Charlène Danoux, Kiyoshi Kasahara and Takasi Takayanagi.....46

Retrofit against fatigue cracking at web penetration details with a slot in steel girder

Chihiro Sakamoto, Masahiro Sakano, Hideyuki Konishi and Takashi Fujii.....54

Bridge monitoring

Effectiveness of GPS technology in monitoring of traffic-induced response of highway steel bridge

Piotr Górski, Peter Breuer, Eduard Konopka and Monika Napieraj.....62

Estimate of the steel bridges fatigue life by application of the fracture mechanics

J M Djoković, R R Nikolić, J Bujnák and B Hadzima.....70

Potential modelling and verification of bridge superstructures behaviour

J Bujnák, J. Gocál and J Odrobiňák.....77

Numerical simulation of rib distortion in orthotropic steel decks

Heng Fang, Evy Van Puymbroeck, Nouman Iqbal, Zain Ui-Abdin and Hans De Backer.....84

Hybrid measurement techniques used to a study of historic cast iron suspension bridge

Wojciech Anigacz, Damian Beben and Jacek Kwiatkowski.....91

Structural health monitoring for combined damage states

Martin A Butler, James A Swanson and Gian A Rassati.....99

Fatigue performance evaluation of steel arch bridge based on experimental tests in the light of increased operating loads

M Kużawa.....107

Case studies

Advanced solutions with hot-rolled sections for more economical bridges

Wojciech Lorenc, Maciej Kożuch, Dennis Rademacher and Wojciech Ochojski.....116

The particular challenges of expansion joint installation in steel bridges – Case studies

David Jelínek, Niculin Meng and Colm O'Suilleabhain.....124

Experience of duplex stainless steels as structural materials for bridges

Sukanya Hägg Mameng, Andrew Backhouse, Jonathan McCray and Graham Gedge.....132

Fabrication and construction

Qualification of the welding technology of the structural steel S355J2G3

V Lazić, D Arsić, I Ilić, S Aleksandrović, R Nikolić, M Djordjević and B Hadzima.....140

Influence of High Frequency Impact Treatment (HiFIT) on fatigue strength of welded joints of high-strength steel S700MC for bridges applications

Krzysztof Krasnowski.....152

New Modular Bridges Solutions

A André, J Fernandes, I Ferraz and P Pacheco.....158

Highway bridges

Barkarby Bridge

Manuel Biedma García, Mayra Toledo Serrano, F. Javier Martínez López and José Manuel González Parejo.....167

Long-Span Orthotropic Steel Deck Bridges of Turkey

Nurdan M. Apaydin and Selcuk Bas....175

Historical bridges

Damage or change detection in a small scale model of steel bridge deck under static loading by extensionetery

S Iglouli, N Boumechra and K Hamdaoui.....183

Comparison of FEM Analysis And Experimental Investigation for A 168m Long Steel Double Twin Truss Launching Gantry Subjected To Different Load And Support Conditions

Doncho Partov and Lazar Georgiev.....192

The residual lifetime of steel bridges under the action of fatigue and corrosion effects.

Martin Macho, Pavel Ryjáček and José António Campos e Matos.....200

Factors Influencing the Design Life of Old Steel Bridges

Nor Ashikin Muhamad Khairussaleh, Gerald A.R. Parke and Boulent Imam.....208

Pedestrian bridges

Dynamic behaviour of the steel footbridges with spatial pipe truss girders

Marek Pańtak, Bogusław Jarek and Kinga Marecik.....215

Vibration damping in steel footbridges

Marek Pańtak, Bogusław Jarek and Kinga Marecik.....223

Comparative analysis of dynamic behaviour of two cablestayed footbridges made entirely of steel and GFRP composite

Piotr Górski, Beata Stankiewicz and Marcin Tatara.....230

Advanced layout of a steel bridge - Ullevaalskrysset footbridge

Andri Gunnarsson and Magnús Arason.....238

Railway bridges

Railway Road Bridge in Novi Sad - Steel tied network arches across the Danube

A Bojović, A Mora, Z Marković, M Pavlović, N Novaković and M Spremić.....246

<u>Comparison of acoustic phenomena in the vicinity of two types of steel plate girder</u> <u>bridges</u>

Lucjan Janas.....256

Refurbishment

Experimental results of steel truss nodes strengthen by high strength concrete encasement Stoyan Ivanov, Roman Geier, Carlos Rebelo and Bruno Pedrosa.....262

Application of Research into Deck Bridges with Encased Filler-Beams in Design Practice

Viktória Kožlejová, Ľubomír Kožlej and Vincent Kvočák.....270

Using fracture mechanics principles in steel bridge renovation projects

Maarten Rikken, Daan Tjepkema and David Gration.....277

The strengthening of a steel bridge with prestressed CFRP strips

Tomasz W Siwowski, Paulina Siwowska and Agnieszka Wiater.....285

Research and inovations

Investigation on stiffened panels subjected to biaxial compression

Martin Mensinger, Ulrike Kuhlmann, Joseph Ndogmo, Vahid Pourostad and Nadine Maier.....293

Automation of evaluation of data measured on steel bridges, category detail of welded lamellas

Stanislav Vejvoda.....301

The impact of backfill quality on soil-steel composite bridge response under seismic excitation

Tomasz Maleska and Damian Beben.....308

Models of thermal actions for steel and composite bridges based on monitoring

J Markova.....316

Research and materials

Experimental investigation on the bridge segments with transversally curved bottom flange

Filip Ljubinković, João Pedro S C Martins, Helena M S Gervásio and Luís A P Simões da Silva.....322

Experimental evaluation of stiffened curved plates subjected to pure compression

Sara Piculin, Franc Sinur and Primož Može.....330

Structural connections

Advanced procedures for design of bolted connections

František Wald, Jaromír Kabeláč, Marta Kuříková, Ondřej Perháč, Pavel Ryjáček, Oscar Minor, Marcos Bryan Flores Pazmiño, Lubomír Šabatka and Drahoslav Kolaja.....338