

# **51st International Scientific Conference on Experimental Stress Analysis**

**(EAN 2013)**

**Litomerice, Czech Republic  
11-13 June 2013**

**Editors:**

**Blanka Skocilasova**

**Alena Petrenko**

**ISBN: 978-1-63266-821-9**

**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© (2013) by the Czech Society for Mechanics  
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Czech Society for Mechanics  
at the address below.

Czech Society for Mechanics  
Dolejskova 5  
Praha 8  
182 00  
Czech Republic

Phone: +420 266 053 045

Fax: +420 286 587 784

[csm@csm.cz](mailto:csm@csm.cz)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2634  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>Method Of Investigation Of The Stress-Strain State Of Surface Layer Of Machine Elements From A Sintered Nonuniform Material</b> .....	1
<i>V. Kuzin, S. Grigoriev</i>	
<b>Behaviour of Different Types of Concrete under Impact and Quasi-static Loading</b> .....	5
<i>Petr Maca, Petr Konvalinka, Manfred Curbach</i>	
<b>Experimental Identification of Material Properties of Piezoelectric Patch Transducer</b> .....	11
<i>Zuzana Lasova, Robert Zemic</i>	
<b>The Changes of the Gypsum Mechanical Properties in Dependence on the Number of the Freeze-Thaw Cycles</b> .....	17
<i>Tomas Plachy, Pavel Tesarek, Richard Toupek, Vaclav Nezerka, Michal Polak</i>	
<b>Deformation Properties of Laminated Glass Subjected to Increased Temperature</b> .....	21
<i>Bittner Tomas, Tej Petr, Bouska Petr, Spacek Miroslav, Vokac Miroslav</i>	
<b>Mechanical Resistance of Triple Glass Facade Panels</b> .....	27
<i>Bouska Petr, Pukl Radomir, Spacek Miroslav, Vokac Miroslav, Bittner Tomas</i>	
<b>Temperature And Stress Field Measurement At Friction-Stir Welding Of An Aluminum Alloy Probe</b> .....	33
<i>Pavel Elesztos, Roland Janco, Ladislav Ecsi, Gregor Izrael</i>	
<b>Implementation Of Correction Coefficients Relevant For Photoelastic Coatings Into The Photostress Software</b> .....	39
<i>Peter Frankovsky, Frantisek Trebuna, Jan Jadlovisky, Miroslav Pastor, Maria Kenderova</i>	
<b>Determination Of The Necessary Geometric Parameters Of The Specimen In Ring-Core Method</b> .....	45
<i>Frantisek Menda, Frantisek Trebuna, Patrik Sarga</i>	
<b>The Use Of Modan 3D In Experimental Modal Analysis</b> .....	51
<i>Robert Hunady, Frantisek Trebuna, Martin Hagara, Martin Schrotter</i>	
<b>Portable Device for Indirect Assessment of Strength in Tension of Building Materials and Problem of Boundary Condition</b> .....	57
<i>Stepan Major, Ivan Jandajsek, Jaroslav Valach, Daniel Vavrik</i>	
<b>Influence Of Imperfections On The Stress State Identification Accuracy Assessment Using The "Hole-Drilling Strain-Gauge Method"</b> .....	64
<i>Karel Vitek</i>	
<b>The Knowledge Acquired By Using Of Optical Methods By Strain Fields Investigation</b> .....	68
<i>Martin Hagara, Frantisek Simcak, Matus Kalina</i>	
<b>QUALISYS System Applied to Industrial Testing</b> .....	74
<i>Pavel Maly, Frantisek Lopot</i>	
<b>Impact Performance Of Sandwich Structures Produced By Crush-Core Technology</b> .....	80
<i>Ladislav Fojtl, Sona Rusnakova, Milan Zaludek</i>	
<b>Investigation Of Long-Term Mechanical Response Of Rubber</b> .....	84
<i>Jan Heczko, Radek Kottner, Lesek Fukala</i>	
<b>Time Progress of Compressive Strength of High Performance Concrete</b> .....	90
<i>Ondrej Holcapek, Filip Vogel, Tomas Vavrinik, Martin Keppert</i>	
<b>The Evolution of the Cement Paste Creep with Addition of Fly Ash in Time and Ratio of Parts 60/40</b> .....	96
<i>Pavel Padevet, Petr Bittnar</i>	
<b>Comparison of the Humidity Influence on the Material Properties of Cement Paste with Fly Ash</b> .....	102
<i>Pavel Padevet, Ondrej Zobal</i>	
<b>Correlation of Material and Mechanical Properties of the Cement Paste with Fly Ash, depending on the Water Content</b> .....	108
<i>Ondrej Zobal, Pavel Padevet</i>	
<b>Residual Stress Surface Distribution in the Vicinity of Welds in Laser Welded Steel Sheets</b> .....	112
<i>Zdenek Pala, Kamil Kolarik, Nikolaj Ganev, Jiri Capek</i>	
<b>Tensile Strength and Stiffness of PVA-based Nanofiber Textiles with Incorporated Copper Ions</b> .....	118
<i>Zuzana Racova, Pavla Ryparova, Richard Hlavac, Pavel Tesarek, Vaclav Nezerka</i>	
<b>Experimental Investigation Of Projectile Impact Local Damage On Cementitious Composite Slabs</b> .....	122
<i>Tomas Vavrinik, Jan Zatloukal</i>	
<b>Bending Strength of Mortars Containing Crushed Brick Particles</b> .....	128
<i>Pavel Tesarek, Vaclav Nezerka, Tomas Plachy, Pavel Padevet</i>	
<b>Experimental Verification of Test Blade Loading</b> .....	132
<i>Karel Doubrava, Jiri Kuzelka</i>	

<b>Memorization and Other Transient Effects of ST52 Steel and Its FE Description</b> .....	136
<i>Radim Halama, Frantisek Fojtik, Alexandros Markopoulos</i>	
<b>Experimental Testing of a Bridge</b> .....	142
<i>Jozef Melcer</i>	
<b>Interpretation of Results of Penetration Tests Performed on Timber Structures</b> .....	148
<i>Lenka Melzerova, Michal Sejnoha</i>	
<b>High-Pressure Pipelines Repaired by Steel Sleeve and Epoxy Composition</b> .....	154
<i>Pavol Novak, Milan Zmindak, Zoran Pelagic</i>	
<b>Numerical And Experimental Research Of Design Optimization Of Baths For The Production Of Nanofibers By The Electrospinning</b> .....	162
<i>Michal Petru, Ondrej Novak, Ladislav Sevcik, Petr Lepsik</i>	
<b>Analysis And Measurement Of The Charge Intensity Of The Selected Electrospinning Electrodes</b> .....	169
<i>Michal Petru, Ondrej Novak, Petr Lepsik</i>	
<b>Analysis of a Dynamic Response of a Car Door Impact into the Lock</b> .....	176
<i>Antonin Potesil, Petr Hornik, Martin Husek</i>	
<b>Experimental Verification Of The Properties Of Fibres For The Mechanisms Based On Parallel Kinematic Structures</b> .....	180
<i>Jaroslav Vaclavik, Pavel Polach</i>	
<b>Mechanical Response Of The Crosslinked Pericardial Tissue</b> .....	186
<i>Eva Gultova, Lukas Horny, Hynek Chlup, Elena Filova, Lubica Stankova, Jan Pirk, Lucie Bacakova, Rudolf Zitny</i>	
<b>Inflation Test and Histology of Vena Saphena Magna</b> .....	190
<i>Jan Vesely, Daniel Hadraba, Hynek Chlup, Lukas Horny, Tomas Adamek, Rudolf Zitny</i>	
<b>Using Spectral Measurements And FRF In Understanding The Dynamic Properties Of Machines</b> .....	196
<i>Vladimir Dekys, Alzbeta Sapietova, O. Stevka</i>	
<b>The Long-term Monitoring of the Stress in the Structural Components of a Tension Fabric Roof</b> .....	203
<i>Petr Fajman, Michal Polak, Jiri Maca, Tomas Plachy</i>	
<b>The Numerical Analysis of Influence of the Shape of the Anchor Head on the Headed Stud's Tensile Capacity</b> .....	209
<i>Jindrich Fornusek, Petr Konvalinka</i>	
<b>Moment Capacity Of FRP Reinforced Concrete Beam Assessment Based On Centerline Geometry</b> .....	215
<i>Zatloukal Jan, Konvalinka Petr</i>	
<b>Acoustic Emission Method Application at Three-Point Bending to Determine Parameters for Double-K Model</b> .....	221
<i>Lubos Pazdera, Libor Topolar, Hana Simonova, Pavel Fojtu, Jaroslav Smutny, Ivana Havlikova, Zbynek Kersner, Veronika Rodriguezova</i>	
<b>Acoustic Emission Monitoring during Static Modulus Elasticity Test of Concrete Specimen</b> .....	227
<i>Libor Topolar, Lubos Pazdera, Petr Cikrle</i>	
<b>Non-Destructive Inspection of Surface Integrity in Milled Turbine Blades of Inconel 738LC</b> .....	233
<i>Kamil Kolarik, Zdenek Pala, Jiri Capek, Libor Beranek, Zdenek Vyskocil, Nikolaj Ganev</i>	
<b>Residual Stress Investigations of Electron Beam Welds on Samples Prepared by Reconstitution Method</b> .....	239
<i>Pavol Mikula, Miroslav Vrana</i>	
<b>An Effect of Surface Laser Hardening on Deformations and Fatigue Properties of 42CrMo4 Steel Specimens</b> .....	243
<i>Ivo Cerny, Jiri Sis</i>	
<b>Monitoring of Internal Damage of Glass Fibre Reinforced Composite Components Using Strain Measurements with Strain Gauges and Fibre Optic Sensors</b> .....	247
<i>Ivo Cerny</i>	
<b>Measurement of Torque Moment of Aircraft Electric Drive Unit</b> .....	251
<i>Jindrich Rosa, Jan Cagan</i>	
<b>The Use of Fiber Bragg Grating Sensors During the Static Load Test of a Composite Wing Structure</b> .....	259
<i>Milan Dvorak, Miroslav Kabrt, Milan Ruzicka</i>	
<b>Strain Gage Measurements For Accurate Yield Point Determination</b> .....	263
<i>Jaromir Janousek, Miroslav Balda</i>	
<b>Verification Of Deformation And Loading Of A Mould During Manipulation</b> .....	269
<i>Ales Lufinka, Antonin Potesil</i>	
<b>Experimental Tests Of The HPC In Triaxial Compression</b> .....	273
<i>Filip Vogel, Radoslav Sovjak, Marcel Jogl</i>	
<b>Wear Behavior Of Hard Dental Tissues And Restorative Materials</b> .....	279
<i>Radim Ctvrtlik, Jan Tomastik</i>	

<b>System Inaccuracy Bolometric Components To Determine Elimination Procedures In The Process Of Thermal Translocation Liver Living Biological Material .....</b>	<b>285</b>
<i>Lucia Duricova</i>	
<b>Plane Stress – Finite Element Analysis and Experimental Measurement .....</b>	<b>289</b>
<i>Vladimir Goga</i>	
<b>Liver Material Pathological Sample Identification for Timeline Establishment in the Algor Mortis Process .....</b>	<b>297</b>
<i>Jan Ivanka</i>	
<b>Modal Parameter Estimation For Underdamped Linear Dynamic Systems .....</b>	<b>301</b>
<i>Fillemon Nduvu Nangolo, Josef Soukup</i>	
<b>Recursive Identification Algorithms Library in SIMULINK .....</b>	<b>307</b>
<i>Navratil Petr</i>	
<b>Methods of Testing Gearboxes of Rail Vehicles .....</b>	<b>313</b>
<i>Karel Petr, Vojtech Dinybyl</i>	
<b>Permeability Properties Of Concrete With Metakaolin Addition .....</b>	<b>319</b>
<i>Pavel Reiterman, Martin Keppert, Monika Cachova, Ondrej Holcapek, Filip Vogel, Karel Kolar, Petr Konvalinka</i>	
<b>Wrapping Machine with Integrated Manipulator .....</b>	<b>326</b>
<i>Frantisek Stary, Vojtech Dinybyl, Jiri Mrazek</i>	
<b>Numerical Verification Of Model Multibody Systems .....</b>	<b>330</b>
<i>Martin Svoboda, Josef Soukup</i>	
<b>Evaluation of Operational Testing of Agricultural Trailer .....</b>	<b>336</b>
<i>Roman Uhlir, Pavel Mossoczy, Pavel Maly</i>	
<b>Author Index</b>	