



VILNIUS GEDIMINAS  
TECHNICAL UNIVERSITY  
FACULTY OF CIVIL ENGINEERING



INTERNATIONAL ASSOCIATION FOR  
BRIDGE AND STRUCTURAL ENGINEERING  
(LITHUANIAN GROUP)



EUROPEAN COUNCIL OF CIVIL  
ENGINEERS



LITHUANIAN ASSOCIATION OF  
CIVIL ENGINEERS



THE LITHUANIAN ACADEMY OF SCIENCES



THE ASSOCIATION OF EUROPEAN CIVIL  
ENGINEERING FACULTIES



EUROPEAN CIVIL ENGINEERING  
EDUCATION AND TRAINING ASSOCIATION

The 13<sup>th</sup> International Conference

# Modern Building Materials, Structures and Techniques

Conference Programme

May 16–17, 2019, Lithuania



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## The Conference is organized by



Faculty of Civil Engineering, Vilnius Gediminas technical university,  
International Association for Bridge and Structural Engineering (Lithuanian group),  
European Council of Civil Engineers,  
Lithuanian Association of Civil Engineers,  
The Lithuanian Academy of Sciences,  
The Association of European Civil Engineering Faculties,  
European Civil Engineering Education and Training Association.

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## Overview

The 13th international conference “Modern Building Materials, Structures and Techniques” will be held in Vilnius, Lithuania, on 16–17 of May, 2019. The conference provides an opportunity for scientists, engineers, managers and professionals from around the world to share the latest achievements and to highlight the problems. Such a conference is an excellent opportunity to meet colleagues, to exchange knowledge and experience, and to extend your list of contacts. Starting from year 1991, faculty of Civil Engineering at Vilnius Gediminas Technical University (VGTU) together with national and international partners already has organized twelve highly successful international scientific conferences to discuss up-to-date problems in civil engineering. This conference is aimed at discussing of both industrial and academic research which has been recently carried out on analysis and design of modern structures, development of innovative building materials, maintenance of structures, building technology and management, etc.

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## Conference topics

- **MATERIALS**

- Modern building and structural materials**

- High-performance materials
  - Non-metallic reinforcement
  - Concrete technologies
  - Cementitious composites
  - Ceramics
  - Thermal insulation materials
  - Fire-resistant materials
  - Nanomaterials
  - Acoustic evaluation of materials and structures
  - Sustainable materials and their production

- **STRUCTURES**

- Advanced structures, analysis and design**

- Composite and layered structures
  - Steel and aluminum structures
  - Glass, plastic and timber structures
  - Reinforced concrete and masonry structures
  - Prestressed structures
  - Stability of structures
  - Structural mechanics and optimization
  - Smart structures
  - Structural health monitoring and risk analysis
  - Repair, strengthening and rehabilitation of structures
  - Geotechnics
  - Footings, foundations and tunnels
  - Innovative bridge structures
  - Masts, towers and tall buildings
  - Thin-walled structures
  - Cable supported structures
  - Spatial structures and large-span roofs
  - Structural fire resistance design

- **TECHNIQUES**

- Smart construction technologies**

- Building information modeling
  - Decision support systems in construction
  - Operational research
  - Facility management
  - Real estate management
  - Maintenance and renovation of buildings
  - Fire safety
  - Human safety
  - Ergonomics

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## Honorary committee:

A. Daniūnas (Lithuania)

H. A. Mang (Austria)

E. K. Zavadskas (Lithuania)

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## Organizing committee:

### Chairman:

L. Juknevičius (Lithuania)

### Members:

R. Zavalis

L. Kanapeckienė

R. Valaitienė

L. Bakšienė

# Scientific committee:

## Chairman:

A. Juozapaitis (Lithuania)

## Members:

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 P. Alawdin (Poland)  
 J. Atkočiūnas (Lithuania)  
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 G. L. Balazs (Hungary)  
 R. C. Barros (Portugal)  
 R. Belevičius (Lithuania)  
 A. R. M. Bernat (Spain)  
 H. Brandl (Austria)  
 D. Camotim (Portugal)  
 A. P. Caldentey (Spain)  
 V. Cervenka (Czech Republic)  
 D. Dubina (Romania)  
 J. Eberhardsteiner (Austria)  
 M. Eisenberger (Israel)  
 A. C. Escamilla (Spain)  
 J. Galaj (Poland)  
 T. V. Galambos (USA)  
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 L. G. Hagsten (Denmark)  
 H. Herrmann (Estonia)

K. Holshemacher (Germany)  
 D. Hui (USA)  
 G. I. Jakovlev (Russia)  
 L. Mica (Czech Republic)  
 A. Norkus (Lithuania)  
 B. Pacewska (Poland)  
 A. Paeglitis (Latvia)  
 J. P. Jaspert (Belgium)  
 R. Kačianauskas (Lithuania)  
 G. Kaklauskas (Lithuania)  
 A. Kaklauskas (Lithuania)  
 Z. Kala (Czech Republic)  
 O. Kaplinski (Poland)  
 R. Katzenbach (Germany)  
 R. Kliukas (Lithuania)  
 H. Krugel-Emden (Germany)  
 A. Korjakins (Latvia)  
 U. Kuhlmann (Germany)  
 A. K. H. Kwan (Hong Kong, China)  
 P. L. NG Lamas (China)  
 R. Liias (Estonia)  
 S. Luding (Netherlands)  
 T. Lodygowski (Poland)  
 J. Machaček (Czech Republic)  
 F. M. Mazzolani (Italy)

A. Mandolini (Italy)  
 G. Marčiukaitis (Lithuania)  
 V. C. Pandolfelli (Brazil)  
 H. Pasternak (Germany)  
 K. Pilakoutas (UK)  
 K. Rasmussen (Australia)  
 T. Rousakis (Greece)  
 T. F. Ronning (Norway)  
 M. J. Skibniewski (USA)  
 M. Schlaich (Germany)  
 L.S. da Silva (Portugal)  
 H.H. Snijder (Nederland)  
 G. Skripkiūnas (Lithuania)  
 R. Stonys (Lithuania)  
 A. Šapalas (Lithuania)  
 R. Šukys (Lithuania)  
 I. Talvik (Estonia)  
 L. Torres (Spain)  
 V. M. Ulitsky (Russia)  
 L. Ustinovičius (Lithuania)  
 J. Valivonis (Lithuania)  
 F. Wald (Czech Republic)  
 J. Wallaschek (Germany)  
 R. Ziemian (USA)  
 M. Ziegler (Germany)

## Overview of Conference schedule

| Date                       | Time \ Location | Hall Stiklo                                  | Hall Granito               | Hall Gintaro               | Hall Marmuro                |
|----------------------------|-----------------|----------------------------------------------|----------------------------|----------------------------|-----------------------------|
| Thursday, 16th of May 2019 | 7:30–9:00       | Registration in lobby                        |                            |                            |                             |
|                            | 9:00–10:30      | <b>PLENARY session I</b>                     | –                          | –                          | –                           |
|                            | 10:30–11:00     | Coffee break                                 |                            |                            |                             |
|                            | 11:00–12:30     | <b>PLENARY session II</b>                    | –                          | –                          | –                           |
|                            | 12:30–13:30     | Lunch                                        |                            |                            |                             |
|                            | 13:30–15:00     | <b>STRUCTURES session 1</b>                  | <b>MATERIALS session 1</b> | <b>MECHANICS session 1</b> | <b>TECHNIQUES session 1</b> |
|                            | 15:00–15:30     | <b>POSTER session</b> / Coffee break         |                            |                            |                             |
|                            | 15:30–17:00     | <b>STRUCTURES session 2</b>                  | –                          | <b>MECHANICS session 2</b> | <b>TECHNIQUES session 2</b> |
|                            | 17:00–19:00     | Free time                                    |                            |                            |                             |
|                            | 19:00–22:00     | Gala dinner                                  |                            |                            |                             |
| Friday, 17th of May 2019   | 8:30–9:00       | Registration in lobby                        |                            |                            |                             |
|                            | 9:00–10:30      | <b>PLENARY session III</b>                   | –                          | –                          | –                           |
|                            | 10:30–11:00     | <b>POSTER session</b> / Coffee break         |                            |                            |                             |
|                            | 11:00–12:30     | <b>STRUCTURES session 3</b>                  | <b>MATERIALS session 2</b> | <b>MECHANICS session 3</b> | –                           |
|                            | 12:30–13:30     | Lunch                                        |                            |                            |                             |
|                            | 13:30–14:00     | <b>POSTER session</b> / Free time            |                            |                            |                             |
|                            | 14:00–17:00     | Technical visit/ Guided excursion in Vilnius |                            |                            |                             |

# Keynote speakers



**David Hui**, University of New Orleans, USA

## KEYNOTE LECTURE

Composites under Harsh Environments: Civil Engineering and Aerospace Engineering perspectives

## ABSTRACT

The work presents an overview of the current state of the art in low temperature effects on materials in terms of durability and safety of vehicles. Susceptibility of composites to failure at low temperature is a critical issue for the aerospace industry. Spacecrafts operate at temperatures well below -200 degC. High altitudes aircrafts routinely fly at -70 deg C to -100degC. These low temperatures result in two competing effects on composite stiffness. One beneficial effect involves increased stiffness because the polymer matrix would harden at low temperature. The other detrimental effect involves increased thermally-induced stress, which produces microcracks in matrix, which in turn, reduces the overall stiffness of the composites. These two competing beneficial-detrimental phenomena at the microstructure level have been studied for decades, but a quantitative understanding of the interplay of these two effects has continued to elude the researchers. Additional complexities arise when the stiffness increase effect is considered because of high strain rate loading. Long term exposure to cyclic or vibration can again reduce the stiffness. The competing effects for fatigue of fiber-reinforced polymer composites at low temperatures will be presented. Emphasis will be on civil engineering structural and other involving earthquake applications, orthogrids, FRP rebars, sandwich structures, guardrails, piers and structural members. In order to study the effects of high temperatures, the whole range of temperatures from low temperatures -250 deg C to high temperatures up to Glass Transition Temperatures will be examined. This paper will address these issues using phenomenological models and experimental observations. The low temperature effects is the cause of Space Shuttle disaster, and Titanic Ship, and helicopter crashes, and numerous traffic hazards and accidents, thus, all design of vehicles, or systems must be designed for low temperatures. As a complete analysis, this work also deals with high temperature failures, which is the reason for one other Space Shuttle accidents in reentry to atmosphere.

## BIO

Dr. David Hui is Professor of Mechanical Engineering and director of Composites Materials Research Laboratory at University of New Orleans. He received his Ph.D. from University of Toronto in Aerospace Engineering, and Master of

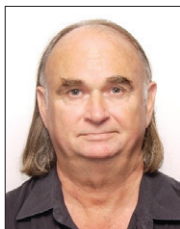
Science from Massachusetts Institute of Technology. Dr. Hui has edited over 40 widely cited books, as evidence in the Google Search showing on these books. Other books includes, editor of Army Research Office workshop "Dynamics of Structures" proceedings, ICCE/1-24, SES, ASME books and numerous special issues of journals, and served as numerous keynote lecturers. He has served as founder and *editor-in-chief* of Composites part B journal. Currently, he serves on the editorial board of 11 SCI journals, seven of them are nano journals, and the rest are mostly composite materials journals. Dr. Hui is ASME Fellow, ICCE Life Member, AIAA Associate Fellow and CASI Associate Fellow. Dr. Hui is currently Doctor Honoris Causa of five universities in Italy, Ukraine, Georgia, Vietnam and Bosnia and Herzegovina. He is academician of Engineering of three countries, Armenia, Georgia and Serbia. Dr. Hui is the chairman of ICCE, which has grown to be one of the world's pre-eminent annual composite materials or nano-materials conferences.

Dr. Hui has conducted over 3 million US dollars funded research on composites materials and nano-materials, mostly for mechanical/aerospace engineering and ship structures applications. He is widely known for his research on (i) nano materials mechanical properties modeling and prototyping (ii) mechanical behavior of materials under high or low temperatures, flammability and creep of composite materials, including smart material and structures, (iii) impact of blast dynamics, micro-crack initiation and growth under thermal and mechanical loadings and (iv) infrastructure composites under harsh environments. Dr. Hui has co-authored over 396 SCI journal publications, and these papers have been cited over 9800 times from Scopus. Currently, Dr. Hui serves on over 40 technical committees or editorial boards, consisting of over 2000 respected scientists on specific diverse fields of materials or nano science.

One of Dr. Hui's outstanding contributions in research lies in the modeling of impact of composite materials using the energy partition model and functional graded approach to enhance the durability and safety of engineering structures under harsh environments. His pioneered research on the mechanisms of degradation of materials under low temperatures on composites has resulted in enormous improvement in the safety of engineering structures. Dr. Hui was the first to validate the dramatic effects of small curvature on vibration of flat plates, leading to the re-design and re-analysis of many structures critical for engineering safety.

Dr. Hui was the recipient of research grants from NASA, ARO, ONR, AFOSR, NSF, LEQSF, US Army CRREL, GCRMTC, NOAA, Wright Patterson AFB, Universal Energy, Avondale Shipbuilding Inc., Northrup Grumman Ship Systems, among others. In recent years, Dr. Hui presented numerous keynote lectures: He was successful in promoting federally funded multi-universities partnerships on nano-materials or composite or nano materials.

# Keynote speakers



**Harald Justnes**, SINTEF Building and Infrastructure, Department of Concrete, Norway.

## KEYNOTE LECTURE

Influence of SCMs on hydration and durability of blended cements – Chemical and physical principles

## ABSTRACT

The influence of supplementary cementing materials (SCMs) on the hydration and durability of blended cement has been evaluated using chemical and

physical principles. Similarities and differences between various SCMs has been considered while they have been grouped into categories as latent hydraulic or pozzolanic and sub-divided into siliceous, aluminous, carbonaceous etc. For instance, the important synergy between SCMs producing calcium aluminate hydrate and calcium carbonate has been elucidated showing how maximizing water binding leads to reduced porosity and thereby increased strength by forming calcium monocarboaluminate hydrate. Similarly, any magnesium content in the carbonate would lead to hydrotalcite formation in the presence of aluminates. The interaction of admixtures with SCMs, like plasticizers, and the use of accelerators to speed up hydration are also treated. The influence of SCMs on durability issues like chloride ingress, carbonation, alkali aggregate reactions, sulphate resistance and freeze-thaw resistance are discussed as well. For instance, the self-accelerating carbonation of cement blended with alumina containing SCMs is explained by the carbonation of the high content of Aft and Afm phases releasing their crystal water back to liquid form. The importance of not accelerating the durability exposure too much is stressed in order avoid creation of products from the SCMs that will not occur in practice. In general, SCMs improve the resistance of blended cements to most degradation mechanisms at equal w/c, with the exception of carbonation that can be improved by reducing w/c.

## BIO

Prof., Dr. Harald Justnes is Chief Scientist at SINTEF Building and Infrastructure, Department of Concrete. He has been with the Foundation for Scientific and Industrial Research (SINTEF) since 1985. His field of interest covers the chemistry of cement, concrete, admixtures and additives (including polymers) from production, through reactivity, to durability. He was educated at the Institute of Inorganic Chemistry, Norwegian University of Science and Technology (NTNU), and is now Adjunct Professor in "Cement and Concrete Chemistry" at Institute of Materials Technology, Section for Inorganic Chemistry, NTNU.

He was appointed visiting Professor at China Building Materials Academy (CBMA), Beijing, China, in 2008 and Honorary Professor at Xian University of Architecture and Technology, Xian, China, in 2007.

He received an award for Outstanding Contributions in the Development of Chemical Admixtures for Use in Concrete presented at the Sixth CANMET/ACI International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, Nice, France, 2000, and an award for "outstanding and sustained contribution to the success of CANMET/ACI conferences by presenting original papers, chairing technical sessions and participating in technical paper review panels" presented at the 11<sup>th</sup> International Conference on Superplasticizers and Other Chemical Admixtures in Concrete, Ottawa, Canada, July 14, 2015.

Justnes has more than 330 papers in journals and conference proceedings.

## Keynote speakers



**Ayman S. Mosallam**, Department of Civil & Environmental Engineering, University of California, Irvine, USA

### KEYNOTE LECTURE

Advances in the use of composites and hybrid systems in construction

### ABSTRACT

This paper provides an overview on some of the latest advances in structural rehabilitation and safety. In the rehabilitation side, innovative polymer compos-

ite systems were developed, evaluated and applied on a portion of the Sauvie Island highway steel bridge in Portland, Oregon. A description of the field application of the composite systems is presented. The use of hybrid composite decks for providing an efficient solution for the chronic fatigue problem of the lift span of the Schuyler Heim highway bridge in Long Beach, California is also presented. In addition to weight saving, the composite deck has a superior fatigue properties and high strength-to-weight and stiffness-to-weight ratios as compared to the existing welded steel gratings. In this program, a pilot project in developing field emergency repair procedure was conducted and the repaired deck exceeded the strength of the undamaged deck by over 25%. Rapid and emergency repair of reinforced concrete bridge columns is another successful application of FRP composites. The results and details of a pilot project was conducted at the University of California of Irvine aiming at evaluating repaired shear-deficient columns damaged by a simulated gravity and cyclic forces is reported. The results of the large-scale testing indicated that the use of polymeric composites as external jackets can be performed rapidly in the field with minimum workmanship requirements in addition of being a cost-effective solution capable of not only restoring the original capacity of the damaged column, but also increases its shear strength and ductility. In addition, details of an innovative functionally-degraded sandwich system for enhancing the high-energy impact resistance of reinforced concrete highway bridge girders are discussed. This innovative system will increase the safety of both the over-height trucks as well as the impacted girder. The efficiency of this innovative system was validated via large-scale horizontal impact tests as well as numerical simulation using Dyna-LS software.

### BIO

Professor Ayman S. Mosallam is a Professor of Structural and Earthquake Engineering, a Professor, Materials & Manufacturing Engineering Technology and served as the Director of the UCI Structural Engineering Testing Hall at the Civil & Environmental Engineering Department at University of California, Irvine. He is a Fellow Member of the American Society of Civil Engineers. He is a registered Structural Professional Engineer. Professor Mosallam is an international leading authority in the area of non-conventional sustainable building systems. He is the developer of the first US Army smart assault bridge that is made of sandwich carbon/epoxy sandwich composites with an integrated optical fibers remote sensing nerve system. He has several patents on innovative building system and smart composite repair and joining systems. He is a member of ASCE Construction Institute Materials Directorate (Executive Committee) and a Control Member on the ASCE Structural Composites and Plastics Committee (SCAP). Professor Mosallam serves on the Technical Advisory Board of the International Accreditation Service (IAS). He has published over 500 technical papers, chapters, and reports on structural performance of structural systems and authored, edited and co-edited seven books in this area. He is the author of the ASCE Design Manual for FRP Composites Connections (ASCE MOP 102) and the co-developer of the ASCE/PIC Prestandard Document on Structural Design of Pultruded FRP Composite Structures. He is serving on the editorial board of Composites: Part B Journal, and as an Editor in Advances in Civil Engineering, and serves a Guest Editor for special issues on Infrastructure Applications for Composites: Part B, Reinforced Plastics and Composites, and Advances in Civil Engineering Journal. He is the Founder of the Egyptian Green Building Council and the principal author of the Green Pyramid Rating System (GPRS). Professor Mosallam is the recipient of numerous prestigious awards including Best Design Paper Award from Composite Institute, President's Award from Orange County Engineering Council, Industry Impact Award from McGraw Hill, Best Paper Award from SPI, and the Outstanding Engineering Educator of Year Award from American Society of Civil Engineers, among other numerous national and international awards.

# Keynote speakers



**Hartmut Pasternak**, Brandenburg University of Technology at Cottbus, Germany

## KEYNOTE LECTURE

Some remarks about the new generation of EN1993

## ABSTRACT

Since 2015, the "Eurocodes" standards of the series EN 1990 to EN 1999 have been revised. The aim is to incorporate the experience of practice from the first decade of application and the latest scientific findings.

In the first phase, the general rules for the design of components and connections in steel construction were first revised – therefore EN 1993-1-1 and EN 1993-1-8.

Some of the most important innovations for the dimensioning of cross sections and components will be pointed out, e.g. applicable safety factors  $\gamma_{M0}$  and  $\gamma_{M1}$ , cross-sectional proofs for elastic-plastic cross sections of class 3, new European lateral-torsional buckling curves for double symmetric cross sections. Moreover there will be given some information about the new EN1993-1-13 "Steel beams with large web opening" and EN1993-1-14 "Design assisted by finite element analysis".

## BIO

Prof. Dr.-Ing. habil. Hartmut Pasternak from the Brandenburg University of Technology at Cottbus, Germany, is involved in teaching, research and design of steel structures for more than 30 years. He is member of several National and International Committees (e.g. full member of the ECCS Technical Committee 8 "Structural Stability"). He has participated in numerous research projects (e.g. on thin-walled members, welding stresses and adhesive bonded joints). Under his supervision 16 PhD's were completed. Prof. Pasternak has more than 170 publications in Journals and at Conferences and is co-author of five books in German and English on steel structures. Moreover he is the editor of the journal "Bauingenieur" for steel structures.

# Keynote speakers



**Albert T. Yeung**, Department of Civil Engineering, University of Hong Kong, Pokfulam, Hong Kong

## KEYNOTE LECTURE

Environmental Installation of Piles in Hong Kong and Macau

## ABSTRACT

Most infrastructures and high-rise buildings are supported by deep foundations founded in competent geologic strata. Piles are the most common type of

deep foundations in practice in Hong Kong and Macau. Piles can be cast in-situ, such as large-diameter bored piles, or pre-fabricated, such as steel H-piles or precast prestressed concrete piles. Pre-fabricated piles are usually installed by percussion. Due to the growing environmental awareness of the public, problems of air pollution, noise and vibration induced by the percussion piling process are becoming unacceptable to the public. The problem is further aggravated by the extremely populous and congested living environments of Hong Kong and Macau. The banning of the use of diesel hammers in Hong Kong has eased the air pollution problem. However, problems of noise and vibration remain. The techniques of jacking pile and preboring precast prestressed piles will be presented in this seminar. These techniques of pile installation are more environmentally friendly in many aspects.

For pile jacking, piles are jacked into the ground hydraulically to eliminate any air pollution, noise and vibration problems. The pile can be steel H-pile or precast prestressed concrete pile. Every pile is load-tested during the installation process and the reliability of the piles installed is thus greatly improved. Installation of precast prestressed concrete piles by preboring was initially developed in Japan. The soil in the vicinity of the pile is liquefied and improved by the introduction of cement-bentonite slurry through augering by specially designed equipment prior to installation of the precast prestressed concrete pile. The method of installation does not only eliminate the problems of air pollution, noise and vibration. It also eliminates the uncertainty of pile damage by percussion which is a common problem of driving of concrete piles. The method of pile installation was introduced to Macau recently and the first trial pile program was successfully performed in March 2012.

These environmentally friendly pile installation techniques will be presented in the keynote lecture. Moreover, the construction problems and solutions associated with the installation techniques will be discussed.

## BIO

Ir Dr. Albert T. YEUNG is on the civil engineering faculty of The University of Hong Kong (HKU), and an Adjunct Professor of Taiyuan University of Technology under the International 100 Talents Scheme of Shanxi Province, China. He is a Fellow of the ASCE, the ICE of U.K., and the Hong Kong Institution of Engineers (HKIE). He is also a member of the Chinese Institute of Civil and Hydraulic Engineering. He received his BSc(Eng)(Hon) in civil engineering from HKU with first class honors, MS and PhD from the University of California, Berkeley. He is a Registered Professional Engineer of Hong Kong, a Chartered Engineer of U.K., and a Registered Professional Engineer of Texas.

Before his return to Hong Kong in 1998, he taught at Northeastern University in Boston and Texas A&M University in College Station of the U.S. for a total of more than 7 years. After his return to Hong Kong, he served as Chief Engineer of Binnie Black & Veatch Hong Kong Limited (a subsidiary of Black & Veatch of Overland Park, Kansas, U.S.A.), and Assistant Secretary for Financial Services and the Treasury of the Hong Kong HKSAR Government before his return to academia in 2003.

He is a Past Chair of the Executive Committee of the Asian Civil Engineering Coordinating Council which is composed of 13 civil engineering member societies worldwide. He is also the Immediate Past Chair of the ASCE Region 10 (International Region) Assembly. He is serving on the Editorial Board of *Geomechanics and Geoengineering: An International Journal* and *The Open Waste Management Journal*. He is serving on the Board of Directors of the International Press-in Association and the Centre for Pavement Excellence Asia Pacific Limited.

He has been serving as a consultant to many government departments, consultants, contractors and lawyers in Hong Kong and Macau. Moreover, he has been serving as an Expert Witness in the High Court, District Courts, and Magistrates of Hong Kong and arbitration tribunals.

He has more than 200 publications to his credit. His notable awards include the IPA Research Grant Awards of the International Press-in Association 2008, 2012 and 2014; the 1st Prize of Civil Engineering Papers of the Year Award 2008 of HKIE; the Peter H.K. Chan Award 2001 for the Best Environmental Paper of HKIE; the Samuel Arnold Greeley Award 1999 of ASCE; the Arthur Casagrande Professional Development Award 1996 of ASCE; the Dow Outstanding New Faculty Award 1994 of the American Society for Engineering Education; the Texas Engineering Experiment Station Select Young Faculty Award 1993; the Kumagai Prize 1994 of HKIE; among many others.

## Keynote speakers



**Ronald D. Ziemian**, Bucknell University, USA

### KEYNOTE LECTURE

Structural Stability – Letting the Fundamentals Guide Your Judgement

### ABSTRACT

One of the great things about working with structural steel is that most design provisions are based on first principles and fairly predictable experimental test results. This is especially true when assessing structural stability. The primary objective of this lecture is

to show how most stability problems can be understood by focusing on the big picture rather than on the details of the seemingly complex mathematics. The presentation will begin by identifying those factors that primarily impact the buckling strength of a system, member, or cross section. Drawing on several example applications, the proper use of today's computational analysis tools will be demonstrated as a means for enhancing engineering judgement. A case will be made for how a fundamental understanding of structural stability is often sufficient for today's steel designers, whether applying the direct analysis method to assess system strength or a column curve to evaluate the strength of a compression member. The lecture will also include an overview of the author's paper "Formulation and Validation of Minimum Brace Stiffness for Systems of Compression Members."

### BIO

Ronald D. Ziemian is a professor at Bucknell University. He received his BSCE, MENG, and PhD degrees from Cornell University. In addition to authoring papers on the design and analysis of steel and aluminum structures, Ron is co-author of the textbook *Matrix Structural Analysis* (Wiley, 2000), the developer of the educational analysis software MASTAN2, and the editor for the 6th edition of the *Guide to Stability Design Criteria for Metal Structures* (Wiley, 2010). He is the Co-Editor in Chief of Elsevier's *Journal of Constructional Steel Research*. Ron is a member of AISC's Committee on Specifications, chairs AISC's TC3 – Loads, Analysis and Stability, and previously chaired AISC's TG on Inelastic Analysis and Design. He also serves on the AISI and Aluminum Association Specification Committees, is active with the Steel Joist Institute, and the former chair of the Structural Stability Research Council. Ron was awarded the ASCE Norman Medal (1994), the AISC Special Achievement Award (2006), and the ASCE Shortridge Hardesty Award (2013) for his contributions to the profession related to the stability analysis and design of metal structures.

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# Plenary Session I

**9:00–10:30**

**Thursday, May 16, 2019**

Chairman: **A. Šapalas**

**A. Daniūnas**

Welcome address by the Rector of Vilnius Gediminas technical university

**H. Endriksone**

Welcome address by the Executive Board Member of European Council of Civil Engineers

**D. Gedvilas**

Welcome address by the President of Lithuanian Builders Association

**A. T. Yeung**

*Keynote presentation:* Environmental installation of piles in Hong Kong and Macau

# Plenary Session II

**11:00–12:30**

**Thursday, May 16, 2019**

Chairman: **G. Kaklauskas**

**H. Justnes**

*Keynote presentation:* Influence of SCMs on hydration and durability of blended cements – chemical and physical principles

**R. D. Ziemian**

*Keynote presentation:* Structural stability – letting the fundamentals guide your judgement

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# Plenary Session III

**9:00–10:30**

**Friday, May 17, 2019**

Chairman: **V. Gribniak**

**H. Pasternak**

*Keynote presentation:* Some remarks about the new generation of EN1993

**A. S. Mosallam**

*Keynote presentation:* Advances in the use of composites and hybrid systems in construction

**D. Hui**

*Keynote presentation:* Composites under harsh environments: civil engineering and aerospace engineering perspectives

# Materials – Session I

13:30-15:00

Thursday, May 16, 2019

Chairmen: **G. Skripkiūnas, G. Yakovlev**

**I. Polyanskikh, G. Yakovlev, A. Gumeniuk, A. Gordina, A. Ignateva**

Structure formation of construction materials modified with natural and man-made nanoadditives

**A. Kudžma, R. Stonys, V. Antonovič**

Effect of graphene oxide on the properties of the hydraulic binders

**G. Skripkiūnas, E. Karpova, J. Bendoraitienė, I. Barauskas, R. Drochytka**

Degree of MWCNT suspension dispersity and its influence on rheology of cement pastes

**S. Moukannaa, A. Nazari, A. Bagheri, M. Loutou, R. Hakkou**

Thermal resistance of alkaline fused phosphate sludge – based geopolymer mortar

**G. Yakovlev, A. Gordina, V. Khritankov, V. Khozin, A. Shaybadullina, D. Khazeev, I. Bazhenova, A. Ivakina, Z. Saidova, A. Repin**

Gypsum composition with siltstone-based mineral modifier

**R. Moceikis, A. Kičaitė, G. Skripkiūnas**

Effect of aggregate particle shape and granulometry on the workability and mechanical properties of glass reinforced concrete

**A. Dalzhonak, A. Bakatovich**

Wall blocks based on the aggregates from plant wastes

## Materials – Session II

11:00–12:30

Friday, May 17, 2019

Chairmen: **V. Antonovič, A. Korjamins**

**R. Kusiorowski, J. Witek, I. Majchrowicz, A. Kleta, A. Jirsa-Ociepa**

Fire barrier based on expanded perlite composites

**S. K. Adhikary, Ž. Rudžionis**

Investigations on lightweight concrete prepared by combinations of rubber particles and expanded glass aggregate

**R. Gailitis, A. Sprince, L. Pakrastins, G. Shakhmenko, T. Kozlovskis, L. Radina**

Long-term properties of foamed concrete

**Ł. Majewski, R. Jaskulski, W. Kubissa**

Influence of partial replacement of sand with copper slag on the thermal properties of hardened concrete

**M. Achik, H. Benmoussa, A. Oulmekki, M. Ijjaali, N. EL Moudden, O. Kizinievič, V. Kizinievič**

Evaluation of physical and mechanical properties of fired-clay bricks incorporating both mineral and organic wastes

**W. Godlewska, W. Kubissa, K. Prałat, P. Tomczak**

Influence of activation of microsphere and latex base addition on mechanical properties of concrete

## Materials – Poster Session

### **R. Jaskulski, W. Kubissa**

Mechanical properties of copper slag waste based CLSM mixtures

### **G. Yakovlev, J. Kerienė, V. Grakhov, R. Drochytka, A. Gordina, A. Pichugin, K. Bazhenov, V. Troshkova**

High-strength fluoroanhydrite composition

### **V. Turchin, S. Sychugov, L. Yudina, A. Gumeniuk, T. Zhilkina, Y. Gmizov, R. Mackevičius, T. Ivanova**

Corrosion resistance dry mix mortars base on alkaline slag binder for using in aggressive sulfate medium

### **I. Wilińska, B. Pacewska, W. Kubissa**

Investigation of cement materials containing high amounts of different kinds of fly ashes

### **S. Ravaszová, K. Dvořák**

The influence of milling technology on the crystallite size and granulometry of tricalcium aluminate

### **P. Šebestová, V. Černý, R. Drochytka**

The influence of the fireclay waste on the microstructure and the physico-mechanical properties of autoclaved aerated concrete

### **J. Húšťavová, V. Černý, R. Drochytka**

Study of the influence of the secondary raw materials on microstructure and properties of calcium silicate composite

### **K. Barkauskas, D. Nagrockienė, I. Girnienė**

The effect of glass powder on physical and mechanical properties of hardened cement paste

**V. Voišnienė, O. Kizinievič, V. Kizinievič, J. Malaiškienė**

Production of fired clay brick from municipal solid waste incinerator (MSWI) fly ash

**E. Namsone, G. Sahmenko, E. Namsone, E. Namsone, A. Korjamins and D. Bajare**

Experimental investigation on foamed concrete produced using planetary ball mill

**M. Vyšvařil, P. Bayer**

Cellulose ethers as water-retaining agents in natural hydraulic lime mortars

**P. Rovnaník, I. Kusák, L. Topolář, P. Schmid**

Sensing properties of slag-based geopolymer composite with carbon fibers under compressive loading

**J. Fíla, M. Eliášová, Z. Sokol**

Material properties of solid glass bricks

**R. Šukys, J. Pranckevičienė, G. Girskas, I. Pundienė, D. Leonavičius, M. Kligys**

Experimental study of the behaviour of cement pastes in the presence of carbon nanotubes

**G. Bumanis, Jelizaveta Zorica, I. Pundiene, D. Bajare**

The workability kinetics of phosphogypsum binder

**J. Wawrzeńczyk, A. Molendowska, A. Kłak**

Quantitative assessment of aggregate segregation of hardened self compacted concrete based on 2D image analysis

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**J. Setina, I. Juhnevica, J. Baronins**

The effect of ashes on the properties of cement mortar and typical concrete fillers

**I. Kirilovica, M. Karpe**

Chemical and physical investigations of historic mortars in St. John's Church

**P. Reiterman, M. Keppert**

Application of concrete slurry waste in cement screeds

**A. Kremensas, A. Kairytė, S. Vaitkus, S. Vėjelis, G. Balčiūnas, A. Strąkowska, S. Członka**

Mechanical performance of biodegradable hemp shivs and corn starch based biocomposite boards

# Structures – Session I

13:30–15:00

Thursday, May 16, 2019

Chairmen: **H. Pasternak, A. Šapalas**

**J. Koťátková, J. Patera, Z. Hlaváč**

Non-linear ultrasonic defectoscopy of concrete structures for nuclear industry

**M. Kropacek, R. Cajka**

Volume changes of concrete in interaction with sliding joint

**G. Kaklauskas, A. Sokolov**

A new approach in crack analysis of RC bending members

**A. Vidaković, J. Halvonik**

Shear resistance of clamped deck slabs assessed using design equations and FEM analysis

**R. Balevičius**

The effect of concrete creep on the long-term tension-stiffening law and prediction of a time-dependent inertia moment of the cracked RC flexural cross-sections

**A. Shoushtarian Mofrad, D. Shlychkova, Y. Ciupack, H. Pasternak**

Evaluating bending stiffness and resistance of sandwich panels at elevated temperatures

**J. Šlaitas, J. Valivonis**

Crack parameters in normal section of FRP strengthened RC elements

# Structures – Session II

15:30–17:00

Thursday, May 16, 2019

Chairmen: **Z. Kala, G. Kaklauskas**

**S. Leppla, R. Katzenbach**

Safety and quality assurance for geotechnical constructions in urban areas

**Y. Ciupack, L. Ledecy, Y. Kasper, A. Geßler, M. Albiez, H. Pasternak, T. Ummenhofer, M. Feldmann**

Strengthening of steel structures with fatigue cracks using adhesively bonded non-prestressed and prestressed CFRP lamellas

**A. Ghosh, M. R. Hosseini, R.A. Ameri, G. Kaklauskas, B. Nikmehr**

Internet of Things (IoT for digital concrete quality control (DCQC): A conceptual framework

**K. Holschemacher, P. Löber**

Experimental investigation on friction between foundation slabs and substructure

**Z. Kala**

Global sensitivity analysis of failure probability subordinated to contrasts

**T. Hána, M. Vokáč, M. Eliášová, K. V. Machalická**

Advanced computational methods of perpendicularly loaded laminated glass panes

**V. Gribniak, A. K. Arnautov, A. Rimkus**

Development of an anchorage prototype for CFRP stress-ribbon systems using 3D printing technique

**M. N. González García, F. I. Olmedo Zazo, M. I. Prieto Barrio, M. P. de la Rosa García**

Study of the repassivation of previously corroded frames embedded in mortars containing varying amounts of chloride

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## Structures – Session III

**11:00–12:30**

**Friday, May 17, 2019**

Chairmen: **K. Holschemacher, A. Norkus**

**J. Fisker, Ch. Svarre, L. Hagsten**

Shear failures in cantilevered reinforced concrete slab-strips without transverse reinforcement

**A. Norkus, V. Martinkus**

Bearing capacity and stiffness of pile group foundation

**D. Gribulis, G. Žaržojus, S. Gadeikis, S. Gadeikytė, D. Urbaitis**

Research of undrained shear strength of till fine soils (moraine)

**J. Medzvieckas, Š. Skuodis, D. Sližytė**

Numerical analysis of vertical stress distribution in the direct shear devices

**Š. Skuodis, N. Dirgėlienė, I. Lekstutytė**

Change of soil mechanical properties due to triaxial sample size

**J. Fisker, Ch. Svarre, M. Langberg**

Stress distribution in curved reinforcement bars

**J. Gražulytė, A. Vaitkus, A. Laurinavičius, D. Čygas**

Concrete modular pavement type selection based on application area

## Structures – Poster Session

### **T. Falborski, N. Lasowicz**

Numerical investigation on dynamic response of a steel transmission tower under various seismic events

### **M. Stulpinas, T. Gečys**

Experimental investigation of secondary use of punched metal plate fasteners in timber structures

### **A. Mudrov, A. Šapalas, G. Šaučiuvėnas**

Experimental investigation of CFST column to steel beam bolted connection

### **M. Zikmundová, K. V. Machalická, M. Eliášová, M. Vokáč**

Artificial ageing of Silane Terminated Polymer adhesive for façade application

### **Sh. Adib, I. Misiūnaitė**

High strength steel cold – formed hollow sections: implication of cross – section aspect ratio and slenderness characteristics on flexural behavior

### **A. Omishore**

Stochastic modelling of fatigue crack growth

### **E. Šuhajdová, M. Novotný, J. Pěňčík, K. Šuhajda**

Experimental research on load bearing capacity of adhesively jointed beech timber lamellas

### **I. Virbule, D. Serdjuks, K. Buka-Vaivade**

Simplified approach for analyse of shear walls for multistorey timber buildings

**R. Venslavavičiūtė, K. Urbonas**

Analysis of second-order effects of constructions behaviour

**M. Daugevičius, J. Valivonis, T. Skuturna**

Numerical analysis of the long-term behaviour of RC beams strengthened with CFRP: deflection

**M. Daugevičius, J. Valivonis, T. Skuturna**

Numerical analysis of the long-term behaviour of RC beams strengthened with CFRP: cracking

**A. Jokūbaitis, G. Marčiukaitis, J. Valivonis**

Damage of prestressed concrete railway sleepers and its impact on durability

**S. Sarvaicova, V. Borzovic, T. Augustin**

The influence of a column shape cross-section on the punching capacity

**L. Kormosova, T. Augustin, J. Halvonik**

Non-linear analysis of slab-column connections with openings

**R. Zavalis, B. Jonaitis**

Experimental investigation of pull out strength of flexible ties in thin brick veneer layer

**O. Goidyk, H. Herrmann**

Initial results of local strength analysis of a fiber concrete plate by 4-point bending tests

**L. Kruska, R. Chmielewski**

Design analysis of strengthening a damaged supporting structure in a swimming pool building

**R. Chmielewski, L. Kruska**

Design errors and performance defects as causes of the risk for a collapse of the ceiling of the concert hall

**T. Grabiec-Mizera, M. Kaczmarczyk**

The global analysis of a structure on the basis of precast building

**S. Gadeikis, D. Urbaitis, D. Gribulis, S. Gadeikytė, G. Žaržojus**

Deformations of foundations of windplant installation crane sites and their reasons

**K. Faktorová, J. Chalmovský, P. Koudela, L. Míča**

Initial investigation of the intrinsic geomechanical properties of soils in area of landslide Černá Pole

**P. Koudela, J. Chalmovský**

Automation of calibration process adopting metaheuristic optimization method

**R. Mackevičius, D. Sližytė, T. Zhilkina, V. Turchin**

Investigation of influence of additives on properties of multi-molecular organic solutions used for permeation grouting

**M. Stragys**

Non-linear Behavior of innovative steel Cable-Stayed Bridge Stiffening Girder

**R. Šalna, B. Levon, L. Juknevičius**

Analysis of the different techniques for calculation of bearing capacity of flexural reinforced concrete deep beams

**V. Karieta**

Analysis of the innovative two span stress ribbon steel footbridge

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**B. Sędkak, P. Sulik**

Impact of reinforcing profiles on the fire resistance of aluminium glazed partitions

**T. Lissauskas, M. Augonis**

The strength and stiffness analysis of carbon fiber reinforced concrete elements evaluating the influence of the precracks

**S. Žilėnaitė, R. Belevičius, A. Juozapaitis, D. Rusakevičius**

Parametric study of network arch steel pedestrian bridges using genetic algorithms

# Techniques – Session I

13:30–15:00

Thursday, May 16, 2019

Chairmen: **J. Zvirgzdins, L. Tupénaitė**

**A. Fathalizadeh, P. Ghoddousi, A. A. Shirzadi Javid, M. Reza Hosseini, A. Ghosh**

Transition to sustainable construction project management: Barriers in developing countries

**J. Zvirgzdins, K. Plotka, S. Geipele**

Circular economy in built environment and real estate industry

**D. Dawiec, G. Ginda**

Low emission hell in Polish cities – how to get rid of it through technical solutions applied in single family houses?

**G. Ginda**

How to help the choice of hydraulic insulation to be sustainable?

**R. Laera, I. Martínez Pérez, L. de Pereda Fernández, R. Tendero Caballero, F. Iannone, N. González García**

The role of thermally activated building systems in building energy retrofitting: energy diagnosis and management

**N. Kocanovs, R. Kocanova, I. Geipele**

Qualitative parameters of indoor lighting, issues and impact on quality of life

**M. Tomczak, P. Jaśkowski**

The method of scheduling construction projects increasing the use of resources of the general contractor

# Techniques – Session II

15:30–17:00

Thursday, May 16, 2019

Chairmen: **R. Liias, T. Vilutienė**

**D. Shkundalov, T. Vilutienė**

A new approach for extending the possibilities of collaboration between BIM, GIS and Web environments to increase the efficiency of building space management

**A. Verdenhofs, I. Geipele, T. Tambovceva**

Big data in construction industry: systematic literature overview

**V. Chellappa, U. R. Salve, R. Liias**

Aiming at the improvement of safety at Indian construction workplace

**P. Drukis, L. Gaile, V. Goremikins**

Structural reliability assessment of existing precast concrete building. Case study

**J. Tamošaitienė, M. Lapeikytė**

Model of occupational safety risks assessment at concrete construction works by applying MCDM techniques

**S. A. Erdogan, A. Naumcik**

Evaluation of investing in real estate in EU and non EU countries based on MCDM

**Ž. Morkūnaitė**

Selection criteria for evaluating contractors of sgraffito technique in cultural heritage buildings

**M. Grotowski, J. Mikulik**

The new type of threat needs another approach in planning evacuation

**D. Kavaliauskas, L. Sakalauskas**

Conceptual model of productivity bot for smart construction planning

## Techniques – Poster Session

**A. Kiaulakis, T. Vilutienė, V. Šarka, E. Šarkienė**

Construction project stakeholders' perceptions and expectations of their roles in BIM-based collaboration

**L. Tupėnaitė, T. Gečys, L. Kanapeckienė, S. M. Sajjadian, J. Naimavičienė**

Selection of structural system for mid-rise wooden public building: multiple criteria approach

**J. Tamošaitienė, T. Starta**

A new model for the selection of effective dwelling house walls

**M. Pavlovskis, D. Migilinskas, V. Kutut, J. Antuchevičienė**

Initial data preparation for 3D modelling of heritage building

**R. Kuznecov, J. Šaparauskas**

Multi-criteria assessment of pitched roof reconstruction technologies

**S. M. Sajjadian, L. Tupėnaitė, L. Kanapeckienė, J. Naimavičienė, S. Radif**

High-rise buildings in Europe from energy performance perspective

**B. Ksit, A. Szymczak-Graczyk**

Thermal analysis of structural nodes – as locations of difficult geometry, using computational methods

**R. Szelag**

Initial assessment of the construction status using BIM technology for existing buildings

**J. Gałaj, T. Drzymała, A. Pełech, R. Šukys**

Analysis of the impact of water flow rate of selected Turbo type nozzle on the distribution of sprinkling intensity

**M. Półka, J. Białek**

The smoke emission properties of selected elements of furnishing apartments in the building

**V. Popov, A. Anciūtė, T. Grigorjeva, E. Kriksunov**

Analysis of integration levels of design and analysis systems

**J. Katkus, D. Migilinskas, M. Sadauskas**

An application of BIM technologies in typical dwelling building projects

**A. Kaklauskas, A. Velykorusova, D. Skirmantas**

Development of the video neuroadvertising method and recommended system

**R. Kontrimovičius, L. Ustinovičius, M. Vaišnoras**

Calculating and estimating construction site plan preparation works and temporary objects, using virtual reality technology

# Mechanics – Session I

13:30–15:00

Thursday, May 16, 2019

Chairmen: **J. Rojek, S. Borodinas**

**S. Fialko, V. Karpilowskyi**

Spatial thin-walled reinforced concrete structures taking into account physical nonlinearity in SCAD.  
Rod finite element

**D. Mironovs, A. Mironov, A. Chate**

Harmonic components extraction influence on resulting modal parameters of vibrating structures

**V. Alpatov**

Creation of mathematical model optimization of Freeform Double-Layer Grids for use in the software package

**L. Nazarenko, A. Chirkov, H. Stolarski, H. Altenbach**

Application of equivalent cylindrical inhomogeneity to modeling of CNT and analysis of influence of CNT distributions on response of functionally graded structural elements

**A. Mironov, D. Mironovs**

Modal passport of dynamically loaded structures: application to composite blades

# Mechanics – Session II

15:30–17:00

Thursday, May 16, 2019

Chairmen: **R. Kačianauskas, L. Nazarenko**

**G. Mordas, S. Borodinas, A. Steponavičiūtė, J. Tretjakovas, G. Jočbalis**

Direct laser metal sintering of stainless steel alloy: microstructure and mechanical properties

**J. Rojek, N. Madan, S. Nosewicz**

Enhancement of modelling capabilities of the discrete element method by the use of deformable particles

**J. Lellep, M. Hossain**

Free vibration of rectangular nanoplate strips

**U. Radvilaitė, R. Kačianauskas, D. Rusakevičius, Š. Skuodis**

Modelling soil particles of Lithuanian seashore with semi-analytical method

**D. Lumelsky, J. Rojek, L. Lazarescu, D. Banabic**

Experimental and numerical comparison of Nakajima formability test with limit strain prediction using the time-dependent algorithm

# Mechanics – Session III

11:00–12:30

Friday, May 17, 2019

Chairmen: **J. Rojek, R. Kačianauskas**

**H. Kruggel-Emden**

*Invited lecture:* Application of the discrete element method (DEM) to particle laden multi-phase flows

**R. Navakas, A. Džiugys, R. Kačianauskas**

A community detection method for network structure analysis of force chains in granular medium in a rotating drum

**R. Pacevič, A. Kačeniauskas, R. Kačianauskas, R. Barauskas, G. Kaklauskas**

Reinforced concrete simulations by using large numbers of discrete particles

**S. Nosewicz, J. Rojek, M. Chmielewski, K. Pietrzak**

Discrete element simulations of hot pressing of intermetallic matrix composites

**H. Arif, J. Lellep**

Buckling of nanobeams and nanorods with cracks

**D. Vainorius, A. Maknickas, K. Kilikevičienė, R. Kačianauskas**

Numerical simulation of acoustic agglomeration of aerosol particulate applying the DEM

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## Mechanics – Poster Session

**Z. Sekatte, R. Kačianauskas, A. Aboutajeddine, A. Seddouki**

Micromechanical models analysis of particulate reinforced composite response

**V. Volkova, L. Pakrastinsh, L. Gaile**

Phase trajectories of non-linear oscillations of a tower structure with an attached damper in a uniform wind flow



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