2019 10th International Conference on Environmental Engineering and Applications (ICEEA 2019)

Czech Technical University in Prague, Czech Republic

June 26-28, 2019

Co-organized by **Held in**

Published and Indexed by

www.iceea.org
www.cbees.org

Conference Venue

Faculty of Civil Engineering, Czech Technical University in Prague

http://www.fsv.cvut.cz/index.php

Address: Faculty of Civil Engineering, Czech Technical University in Prague, Thakurova 7/2077, 166 29 Prague 6 Dejvice

You enter the main gate of **building C** (the medium of building).
Registration will be arranged in atrium after you enter the main gate of building C
You come in atrium. On the left and right sight there are stairs to the second floor and rooms C217 is exactly above the atrium.

Registration
June 26. 2019
10:00-17:00

Reports
June 27. 2019
9:00-18:00

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Prague Conference Introductions

Welcome to HKCBEES 2019 conference in Faculty of Civil Engineering, Czech Technical University in Prague, Czech Republic. The objective of the Prague conference is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Environmental Engineering and Applications.

2019 9th International Conference on Environmental Engineering and Applications (ICEEA 2019)

Papers will be published in the following journal:

Journal of Environmental Science and Development (IJESD, ISSN:2010-0264) which will be indexed by Chemical Abstracts Services (CAS), CABI, Ulrich Periodicals Directory, Electronic Journals Library, Crossref, ProQuest..

Conference website and email: http://www.iceea.org/; iceea@cbees.org.

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about **12** Minutes of Presentation and **3** Minutes of Question and Answer
Keynote Speech: about **35** Minutes of Presentation and **5** Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on June 27, 2019.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Prof. Roberto San Jose
Technical University of Madrid (UPM), Madrid, Spain

Prof. Roberto San Jose is a Professor of the Technical University of Madrid (UPM). He studied Physics in the University of Valladolid (Spain) and made the Ph. D. in 1983 on relation to Atmospheric Boundary Layer. He became associated professor in University of Valladolid in 1986. He was on leave in the Max-Planck Institute of Meteorology in Hamburg (Germany) in 1989-1990 and He was a guest senior scientist in the IBM-Bergen Environmental Sciences and Solutions Center in Bergen (Norway) in 1990-1992. In 1992 he moved to the Computer Science School of the Technical University of Madrid (UPM) in Madrid (Spain). In 2001 he became head professor of the UPM. In 1992 He started a laboratory in UPM called Environmental Software and Modelling Group. Up to now, Prof. San Jose has been principal investigator in more than 200 projects related with Air Quality and Climate issues. The projects were down with private and public companies and also with European Union. More than 20 EU projects on the environmental area and Information Technology have been carried out.

Topic: “Modelling air quality impacts of industrial sources: Madrid waste treatment case study”

Abstract—.A computational modelling tool has been developed to assess the impact of the industrial emissions on air quality. It is a tool for mapping with high spatial resolution the expected exceedances of the EU Air Quality Directive over a large area and the contribution of different emission point sources. The system allows identifying in time and space the percentage of inmission concentrations due to industrial plants. The system uses the state-of-the-art of Eulerian models. The air quality system is based on WRF/Chem and the emission model EMIMO (UPM). WRF-Chem is a version of WRF coupled on-line with a chemistry model where meteorological and chemical components of the model are predicted simultaneously. The impacts are calculated using the zero-out emission methodology (ON/OFF), running different emission scenarios on a high demand computing platform (cluster). In the case study, we analyze the contribution of two elevated point sources (plants for waste or residual treatment) to the Madrid air quality. The simulations showed that point source emissions were contributors to NO2 exceedances in the nonattainment area of Madrid city. Also the sources reduced the number of O3 exceedances. The differences (OFF-ON) distributions show heterogeneity patterns in spatial and temporal scales due to significant topographic diversity and meteorological variations over short distances.The magnitude of these changes in concentration is potentially significant and illustrates the accuracy of the modelling tool and how it can be used in forecasting mode to provide meaningful and relevant information to stakeholders.

Keynote Speaker II

Prof. Ing. Milan Holický
Czech Technical University in Prague, Czech Republic

Prof. Dr. Milan Holický got his civil engineering degree at the Czech Technical University in Prague, and doctor degree at the University of Waterloo, Canada. He is involved in the research of structural reliability and risk assessment. Since 1965 he is employed at the Klokner Institute of CTU in Prague and lecturing at the Faculty of Civil Engineering and Faculty of Architecture of CTU in Prague.

He is an author or co-author of more than 300 scientific and technical publications including textbooks and five monographs (three in English, published by Elsevier and Thomas Telford Publications). He is actively participating in international research within CIB (Conseil International du Batiment), JCSS (Joint Committee for Structural Safety, particularly in WP 2 Risk Assessment) and in international standardisation within ISO (International Organisation for Standardisation). Since 1991 he has represented the Czech Republic in the European Committee for Standardisation CEN (Comité Européen de Normalisation) in the Technical committee TC 250 "Structural Eurocodes”.

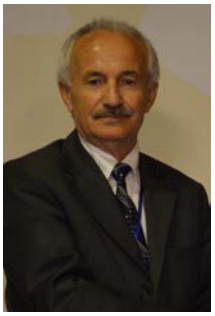
Since 1990 Prof. Holicky closely cooperates with BRE Watford, UK, since 1997 he is BRE Associate. In 2010 he became Extraordinary Professor at the University of Stellenbosch, South Africa, in 2011 he was awarded degree Honorary Doctor of Science and Engineering of Moscow State University of Civil Engineering. Recently Prof. M. Holický was a coordinator of several research and educational European projects concerning Eurocodes. Presently he is a leader of the project team CEN/TC/250 SC2.PT1 developing Technical specification Assessment of existing structures.

Topic: “Target Reliability for New and Existing Structure”

Abstract—The basic principles accepted in upcoming European document on existing structures are illustrated by operational applications. Particular attention is paid to specification of the target reliability levels and application of the appropriate values in engineering practice when adjusting the partial factors, specifying the assessment values and using probabilistic approach. It is shown that the reliability approach to assessment of existing structures provides prediction of the remaining working life of a structure. The target reliability level is commonly related to a convenient reference period (1 or 50 years) taking into account durability aspects and mutual dependence of the failures in subsequent basic time periods (usually one year). General principles are illustrated by assessment of a reinforced concrete structure.

Coffee Break & Group Photo Taking	**10:25~10:45**

Invited Speech



Prof. Dr. Osman ADIGUZEL
Firat University in Elazig, Turkey

Dr Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post doctoral research scientist in 1986-1987, and studied on shape memory alloys. He worked as research assistant, 1975-80, at Dicle University and shifted to Firat University, Elazig, Turkey in 1980. He became professor in 1996, and he has already been working as professor. He published over 60 papers in international and national journals; He joined over 100 conferences and symposia in international and national level as participant, invited speaker or keynote speaker with contributions of oral or poster. He served the program chair or conference chair/co-chair in some of these activities. In particular, he joined in last five years (2014 - 2018) over 50 conferences as Keynote Speaker and Conference Co-Chair organized by different companies. He supervised 5 PhD- theses and 3 M.Sc- theses.

Dr. Adiguzel served his directorate of Graduate School of Natural and Applied Sciences, Firat University, in 1999-2004. He received a certificate awarded to him and his experimental group in recognition of significant contribution of 2 patterns to the Powder Diffraction File – Release 2000. The ICDD (International Centre for Diffraction Data) also appreciates cooperation of his group and interest in Powder Diffraction File. He is also member of some International Scientific Societies.

Topic：The Role of Thermal and Mechanical Processes in Memory Behavior of Shape Memory Alloys

Abstract-Shape memory effect is a peculiar property exhibited by a certain alloy systems in the β-phase fields, and result of thermal and mechanical treatments. These alloys have dual characteristics called thermoelasticity and superelasticity, governed by thermal and stress induced martensitic transformations. Thermal induced transformation occurs thermally along with twinning reactions on cooling, with which ordered parent phase structures turn into twinned martensite structures. Twinned martensite structures turn into detwinned martensite structures by means of stress induced transformation by mechanically deformation after cooling. This is plastic deformation; strain energy is stored in the materials keeping the deformed shape of material, and released on heating by covering original shape. This behavior is called thermoelasticity. The material cycles between original and deformed shapes on heating and cooling, respectively. Superelasticity is also a result of stress induced martensitic transformation and performed in only mechanical manner by stressing and releasing in the parent austenite phase region. The materials are deformed just over Austenite finish temperature, and shape recovery is performed simultaneously upon releasing the applied stress; complete shape recovery is observed upon unloading. Superelasticity is performed in non-linear way, unlike normal elastic material behavior; loading and unloading paths in stress-strain diagram are different, and hysteresis loop reveals energy dissipation. Deformation at different temperatures in intermediate region between Martensite start and Austenite finish temperatures exhibits different behavior beyond shape memory effect and superelasticity, and the materials partially recover original shape. Thermal induced martensitic transformation occurs with the cooperative movement of atoms on {110}-type planes of austenite matrix, by means of shear-like mechanism.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based structures. Lattice invariant shears are not uniform in copper based shape memory alloys, and the ordered parent phase structures martensitically undergo the non-conventional complex layered structures on cooling. The long-period layered structures can be described by different unit cells as 3R, 9R or 18R depending on the stacking sequences on the close-packed planes of the ordered lattice.

In the present contribution, x-ray diffraction and transmission electron microscopy studies were carried out on two copper based CuZnAl and CuAlMn alloys. X-ray diffraction profiles and electron diffraction patterns of these alloys exhibit super lattice reflections inherited from parent phase due to the displacive character of transformation. X-ray diffractograms taken in a long time interval show that diffraction angles and intensities of diffraction peaks change with the aging time at room temperature. This result reveals a new transformation in diffusive manner.

Brief Schedule for Conference

Day 1	**June 26, 2019 (Wednesday) 10:00~17:00** **Venue: Atrium of building C.** Faculty of Civil Engineering, Czech Technical University in Prague, Thakurova 7, 166 29 Prague 6, Participants Onsite Registration & Conference Materials Collection
Day 2	June 27, 2019 (Thursday) 9:00~17:00 Venue: Lecture Hall C217 Arrival Registration, Keynote Speeches, Invited Speech and Conference Presentations
	Morning Conference **Venue: Lecture Hall C217**
	Opening Speech 9:00~9:05 Prof. Ing. Milan Holicky from Czech Technical University in Prague, Czech Republic **Keynote Speech I 9:05~9:45** Prof. Roberto San Jose from Technical University of Madrid (UPM), Madrid, Spain) **Topic:** "Modelling air quality impacts of industrial sources: Madrid waste treatment case study" **Keynote Speech II 9:45~10:25** Prof. Ing. Milan Holicky from Czech Technical University in Prague, Czech Republic **Topic:** "Target Reliability for New and Existing Structure"
	Coffee Break & Group Photo Taking 10:25~10:45
	Invited Speech I 10:45~11:10 Prof. Dr. Osman ADIGUZEL from Firat University, Department of Physics, Turkey **Topic:** "The Role of Thermal and Mechanical Processes in Memory Behavior of Shape Memory Alloys"
	Session 1: 11:10-12:25 5 presentations **Topic: Disaster Science and Management** **Session Chair: Prof. Roberto San Jose** **Venue: Lecture Hall C217**
	Lunch 12:25~14:00
	Afternoon Conference **Venue: Lecture Hall C217**
	Session 2: 14:00~16:15 9 presentations **Topic:** Building Materials and Civil Engineering **Session Chair:** Prof. Ing. Milan Holický
	Coffee Break 16:15~16:30

	Session 3: 16:30~18:30 7 presentations **Topic:** Environmental Engineering and Renewable Energy **Session Chair:** Prof. Dr. Osman ADIGUZEL
	Dinner 18:30 **Venue:** The organizing committee will take attendees to dinner hall together
	Poster Session: 9:00~18:30 **Venue: C217**
Day 3	**June 28, 2019 (Friday) 10:00~17:00** **One Day Visit**

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

Note: (1) The registration can also be done at any time during the conference.

(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(3) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session.

Session 1

Morning, June 27, 2019 (Thursday)

Time: 11:10-12:25

Venue: C217

5 presentations-Topics: “Disaster Science and Management”

Session Chair: Prof. Roberto San Jose

I4006-A Presentation 1 (11:10~11:25)
Analysis of Time Intervals of Acoustic Emission Under Influences Variation
Ekaterine Mepharidze, Aleksandre Sborshchikovi, Teimuraz Matcharashvili, Tamaz Chelidze,Natalia Zhukova
Ivane Javakhishvili Tbilisi State University, M. Nodia Institute of Geophysics

Abstract—In this research the results of analysis of time interval (interevents sequences) between bursts of Acoustic Emission (AE) data sets were investigated. Spring-slider laboratory experimental model of stick-slip process represents a system of energy transfer two horizontally basalt plates with macroscopic contacts and applied mechanical periodic forcing. Stick-slip laboratory experiments have been carried out for three types of stiffness of driving springs (78.4 N/m, 235.2 N/m and 1705.2 N/m). The records have been investigated under different conditions: frequency in range 5-120 Hz and voltage in range 0-3V applied on the 20Hz vibrator attached on upper (sliding) plate. From the results of laboratory experiments the stick-slip process was observed at relatively low velocities of movement and at low stiffness. External influences on laboratory stick-slip processes induce changes in dynamical features. For the analysis of interevents sequences of Acoustic Emission (AE) we have carried out different statistical and dynamical, linear and nonlinear methods: DFA (Detrend Fluctuation Analysis) - self-similarity analysis method, Kullback–Leibler Divergence (KLD)-method to calculate the non-symmetric measure of the difference between two probability distributions, Hilbert-Huang Transform (HHT) - method of EMD empirical mode decomposition with added noise on IMF (intrinsic mode function), Recurrence Quantification Analysis (RQA) - the method of the determination system. Those investigations were observed in different natural and technical systems and represent interdisciplinary research subject

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Morning, June 27, 2019 (Thursday)

Time: 11:10-12:25

Venue: C217

5 presentations-Topics: "Disaster Science and Management"

Session Chair: Prof. Roberto San Jose

I1004-A presentation 2 (11:25~11:40)
The Spatial Correlation Analysis between Natural Disasters and Social Vulnerability for Environmental Justice: Jeju, South Korea
JungSeok Seo and WooSuk Han
Korea Research Institute for Human Settlements, Sejong-si, South Korea

Abstract—Climate change and rapid urbanization make our society more vulnerable to natural disasters. In particular, socially vulnerable groups, such as low-income people or elderly people living alone, are known to be more vulnerable to natural disasters. So, in terms of Environmental Justice, it is important to make urban planning for disaster prevention for socially vulnerable groups. However, there are a few empirical studies about relationship between the socially vulnerable groups and natural disaster vulnerability, and they have explored the relationship only at macro-level. In other words, it was limited to identify where the socially vulnerable groups live at micro-level, and to reduce the social vulnerability through the site-specific urban planning. Hence, this study examines the spatial relationship between socially vulnerable groups and areas which are vulnerable or have been damaged from natural disasters. The study area is Jeju where natural disasters occur frequently due to climate and geographical characteristics and the data is selected based on the index used in the Disaster Vulnerability Assessment of South Korea and collected from 2006 to 2017 at spatial unit of census output area. In the method, the study conducts hot spot analysis to identify where high or low values are statistically significant clustered. Then, we performs correlation analysis to explore the relationships between social vulnerability and natural disaster. We find that socially vulnerable groups have lived in the past damaged areas from flood and heavy snow. Especially, elderly people living alone are highly correlated to the heavy snow damaged areas. In addition, there are (+) correlation between socially vulnerable groups and vulnerable areas, such as steeply sloping areas or poor residential areas. It is meaningful that this study conducts empirical analysis which proves the high probability of lack of environment justice in terms of natural disaster. Furthermore, this study is expected to be used not only to improve the Disaster Vulnerability Assessment by more understanding the relationship between natural disaster vulnerable areas and socially vulnerable groups, but also to contribute to make vulnerability-specific planning.

Session 1

Morning, June 27, 2019 (Thursday)

Time: 11:10-12:25

Venue: C217

5 presentations-Topics: “Disaster Science and Management”

Session Chair: Prof. Roberto San Jose

I1006-A Presentation 3 (11:40~11:55)

A Retrospective Philosophical Discussion on the Consequences of the Littleton 2011 New Zealand Earthquake

Patricio Quintana Gallo

School of Civil Engineering, University of Valparaíso, Valparaíso, Chile

Abstract—At 12:51 of 22 February 2011, an Mw 6.1 intraplate earthquake stroke the Canterbury region of New Zealand (Littleton earthquake). The seismic event was reported as the product of the rupture of a previously unknown geological fault, at a depth of only 5.9 km, and with epicentre located 6 km SSE of the Central Business District (CBD) of Christchurch, New Zealand’s largest city in the South Island. This earthquake followed a previous Mw 7.0 intraplate event that affected the same city on 4 September 2010 (Darfield earthquake), but did not cause extreme damage, and ‘satisfied’ the expectations of the engineering community, creating a feeling of ‘conformity’. Nevertheless, the consequences of the 2011 earthquake were much more severe in terms of destruction compared to the 2010 event. A large number of unreinforced masonry buildings and houses were severely damaged and there was a great amount of soil liquefaction, consequence of the well-recognized poor response of such buildings against seismic actions, and the very poor conditions of the soil. However, what was worrisome, was the intense damage suffered by engineered reinforced concrete (RC) buildings designed as per modern (after 1995) and the latest codes provisions of New Zealand, including the collapse of the CTV building. In addition, other RC buildings designed prior to the formal inclusion of capacity-based design and ductile detailing in New Zealand, which were already identified as seismically prone, were not retrofitted on time, partially due to a potential overconfidence of engineers and stakeholders following the 2010 Darfield earthquake. Many of these structures suffered irreparable damage or collapse in 2011. There are several points from the sentences above that deserve attention from a philosophical perspective. These are related to the inevitable fallibility of code provisions, which are continuously modified based on new experiences which uncover their downsides; and the somewhat dogmatic belief that more severe seismic demands cannot occur at a given place in the future, based on prior seismological evidence. After reporting the characteristics of the damage experienced by selected buildings, alongside examination of their structural drawings, this paper discusses such philosophical aspects, following the Critical Rationalism approach proposed by Karl Popper during the second half of the 20th century. It addresses, amongst other things, the philosophical problems that present the modification of recorded earthquake ground motions to fit preconceived spectra, and the amplification of the amplitude of a record to simulate larger seismic intensities.

Session 1

Morning, June 27, 2019 (Thursday)

Time: 11:10-12:25

Venue: C217

5 presentations-Topics: “Disaster Science and Management”

Session Chair: Prof. Roberto San Jose

I4005-A Presentation 4 (11:55~12:10)
The Analysis of Temporal Distribution of Earthquakes Events
Aleksandre Sborshchikovi, Ekaterine Mepharidze, Teimuraz Matcharashvili, Tamaz Chelidze,Natalia Zhukova
Ivane Javakhishvili Tbilisi State University, M. Nodia Institute of Geophysics, Georgia

Abstract—In this work we have done the investigation of statistical characteristics of the earthquakes temporal distribution for several earthquake catalogues. We could not forecast earthquakes without understanding of how earthquakes are distributed in time. This question is one of the most important questions in geophysics and nowadays many researchers are studying them. In our analysis we have used simple statistical approach based on the calculation of time intervals between earthquakes, named waiting times (WT). This method helps us to answer the question at what period and how the process of time distribution of earthquake becomes randomness. Here we have used different dynamical and statistical, nonlinear and linear analysis methods. WT analysis method is useful because the data tool is short and not perfect. We have analyzed the earthquake temporal distribution for several earthquake catalogues .and for different sub-periods and at various magnitude thresholds. From the results of our analysis we can see that the earthquakes’ temporal distribution becomes most random-like in periods of decreased local seismic activity. Also we should notice that the randomness never reaches its maximum in periods before the strongest earthquakes. However, many scientists still think that seismic process is completely random, and are sure that changes in dynamic structure cannot be quantified. But using the findings we have made in variability of degree of an order in the temporal distribution of earthquakes will have immense importance. Also in this research was carried out a new method of estimation of quantile density function using WT. The comparing this method with the well-known methods was done as well.

Session 1

Morning, June 27, 2019 (Thursday)

Time: 11:10-12:25

Venue: C217

5 presentations-Topics: “Disaster Science and Management”

Session Chair: Prof. Roberto San Jose

I1005-A Presentation 5 (12:10~12:25)
The Direction to Improve of the Disaster Vulnerability Assessment Method coped with Flooding Disaster in JeJu, South Korea
JungSeok Seo and **WooSuk Han**
Urban Disaster Prevention & Water Resource Research Center, Korea Research Institute for Human Settlements, Sejong-si, South Korea

Abstract—Recently, natural disasters such as flooding disaster are becoming larger and change of the disaster characteristics due to climate change and urbanization effect. In order to cope with those natural disasters, the urban planning for disaster prevention such as to find the disaster vulnerable area and make urban planning measures to reduce vulnerability has become important in urban disaster prevention field. In similar vein, the “Land Use Regulations at the National Territory Plan and Use Act” was revised at 2015 for including the Disaster Vulnerability Assessment and the Urban Planning for Disaster Prevention in Korea. The Disaster Vulnerability Assessment analyzes six different natural disaster types(Heavy rainfall, heat-wave, heavy snowfall, strong winds and sea level rising) that can be amplified by climate change effect. In the Disaster Vulnerability Assessment, the present/future exposure and urban sensitivity indices are used to find vulnerable area. For assessing the vulnerable condition in present, the long-term observed climate data and urban GIS data are used. The climatic scenario data and the future urban information such as development plan and the trend of population increase etc. are used to predict the vulnerable condition in the future. The spatial unit of the assessment is the spatial unit of census output area and the expression of the result is four different level by the vulnerable degree. In this research, Jeju, South Korea which is vulnerable to flooding disaster by climatic and geographic characteristics is selected by study area. As the analysis of the result of Disaster Vulnerability Assessment, it was found that the insufficient reliability of assessment result by the poor reflection of rainfall-runoff processing characteristics, and the limitation of efficient application of the urban disaster prevention measures by the spatial unit of the assessment(the range of the spatial unit of census output area are less than 0.01 km2 to larger than 10 km2). In order to reflect the characteristics of rainfall-runoff processing, new urban sensitivity index which is accumulated CN value using NRCS CN method by small watershed is created

and comparison analysis between accumulated CN value and flooding mark map are conducted. For solving the spatial unit problem, it is proposed to perform the Disaster Vulnerability Assessment by grid format which have same size(100m and 250m) and re-classify by a lot unit, instead of the spatial unit of census output area. The result of this study can contribute to the improvement of the Disaster Vulnerability Assessment and Urban Planning for Disaster Prevention which are the representative urban disaster prevention policy in Korea.


Lunch	**12:25~14:00**

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: "Building Materials and Civil Engineering"

Session Chair: Prof. Ing. Milan Holický

I1021 Presentation 1 (14:00~14:15)
Experimental investigation and Gaussian process emulation of steel skeleton reinforced concrete behaviors in split Hopkinson pressure bar tests
Qiong-Li Wang, F.A. DiazDelaO
Institute for Risk and Uncertainty, University of Liverpool, Liverpool L69 7ZF, UK

Abstract—This paper conducts split Hopkinson pressure bar (SHPB) experiments to investigate the dynamic compressive properties of steel skeleton reinforced concrete (SSRC) materials. The SSRC specimens with the different volume fraction of steel range from 0 to 2.94% are investigated by conducting quasi-static and SHPB compression tests, respectively. In SHPB tests, the strain rate achieves from 30 s-1 to 100 s-1. The concrete matrix for all SSRC specimens is mixed to obtain a compressive strength of 45 MPa. The influences of different steel skeleton arrangements on the compressive strength, energy absorption, dynamic strain-stress relations, and failure modes are discussed and compared. The most important indicator, dynamic increase factor (DIF) relations of SSRC for compressive strength and Young's modulus are modelled probabilistically using Gaussian process (GP) emulation under the Bayesian framework. The corresponding performances are validated by individual prediction errors (IPE) diagnostics. The experimental results demonstrate that by adding certain types of steel skeleton into plain concrete, which gives a general better bonding property to concrete materials and increases the capacities of dynamic compressive strength, dynamic resistance and energy absorption.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I2009-A Presentation 2 (14:15~14:30)
Application of TiO2 Penetration into Concrete Surface to remove NOx
Young Kyu Kim, **Chhay Lyhour**, Hei Rak Ahn, Seung Woo Lee
Civil Engineering Department, Gangneung-Wonju National University, Gangneung, 24527, South Korea.

Abstract—In zones of high-volume traffic, such as the vicinity of interstates in expansive urban areas, the amounts of nitrogen oxides (NOx) transmitted into the atmosphere significantly contribute to air pollution. As NOx gas is a major cause of smog and acid rain, it is particularly harmful. Numerous researchers around the world have been focused on the way to disposal the NOx from the air. Titanium dioxide (TiO2) is one of photocatalytic reaction material which is particularly effective in the removal of NOx. The solar photocatalytic reaction of TiO2 is the mechanism that eliminates NOx, so the ultraviolet rays (UV) of sunlight is the importance composition for the reaction of TiO2 in concrete road structures. Surface spray method (penetration method) and mixing TiO2 with concrete binder method are alternative methods which use in TiO2 application to remove NOx. But, a mixing method with TiO2 is not efficient as a penetration method since a portion of TiO2 inside concrete cannot contact the UV of sunlight and can apply only in the fresh concrete. Therefore, this study aimed to evaluate the NOx removal efficiency of photocatalytic concrete due to TiO2 penetration method in the laboratory and field test. Evaluation of NOx removal efficiency of TiO2 concrete was followed by NOx Analyzing System based on the specification of ISO 22197-1. The result shows the average NOx concentration was reduced by 0.07 ppm and 13% of NOx removal efficiency rating. The result also indicated that the quantity of sunlight influenced the NOx removal efficiency rate. The TiO2 penetration method can be an alternative to existing TiO2 concrete produced by replacing a portion of the concrete binder with TiO2 to remove NOx gas from the air. □

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I1007 Presentation 3 (14:30~14:45)
Stress Analysis of Rigid Hanger of Railway Arch Bridge Based on Vehicle-Bridge Coupling Vibration
Xu Xin-yu, Zheng Xiao-long, Zhou Chuan-jiang and Chen Xing-yu
China Railway Eryuan Engineering Group Co., Ltd., Chengdu, Sichuan 610031 China.

Abstract—In order to study the stress of circular steel and flat-plate rigid hangers on railway arch bridges, a finite element model of a railway through arch bridge was established. The analysis of dynamic characteristics of bridges was conducted, and the influence of different types and sizes of hangers on the dynamic characteristics of bridges was compared. Based on the established vehicle-bridge coupling vibration model, the influences of circular steel and flat-plate hanger sizes on the stress amplitude of suspender were discussed when the train passes through the bridge. The results show that when the flexible hanger of arch bridge was replaced by the rigid hanger, the symmetrical vertical bending frequency of bridge significantly increased. For change of the size of flat-plate hanger, the torsional mode of the bridge was doped with the local vibration of the flat-plate hanger. With the increase of circular steel hanger diameter, the maximum stress amplitude of the suspender decreases as a whole. For plate hanger, when the long side size b is the same, the maximum stress amplitude of the hanger decreases with the increase of the short side size d. When the short side size d is the same, with the increase of the long side size b, the maximum stress amplitude of the shorter suspender decreases, and the maximum stress amplitude of the longer suspender increases. When the size of the flat-plate hanger is too small or too large, the maximum stress amplitude is large.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I1001-A Presentation 4 (14:45-15:00)
Fuzzy theory- and SVM-based Bayesian network evaluation method for geotechnical engineering
Yang Liu, Jianjing Zhang, Chonghao Zhu, Mengfang Li and Bo Xiang
School of Civil Engineering, Southwest Jiaotong University, Chengdu Sichuan, China

Abstract—For the machine learning method can fully exploit the complex non-linear relationship between the influencing factors and the target factors from the data without knowing the specific mechanical mechanism and mechanical parameters, it has been widely used in various geotechnical engineering evaluation problems in recent years. However, due to the small number of samples obtained in history, over-fitting problems would appear when the traditional machine learning methods are used for geotechnical engineering. Considering that most geotechnical engineering problems are usually accompanied by some prior knowledge, a general evaluation method for geotechnical engineering based on Bayesian network is proposed, which combines prior knowledge with historical samples. The proposed method utilizes the fuzzy theory to obtain prior attribution of Bayesian network parameter. Meanwhile, support vector machine is applied to solve the actual sample potential distribution of the Bayesian network parameter. Then Bayesian estimation method is used to combine the prior distribution with the actual sample potential distribution to obtain the posterior distribution of Bayesian network parameters. The steps of method are stated in detail by taking the scale evaluation of slope damage caused by earthquake as an example. The established method is used to evaluate the seismic damage scale for 32 slopes along roads in Wenchuan earthquake affected area. The evaluation results show that the method can solve the over-fitting problem often occurring when application traditional machine learning method to geotechnical engineering, and the accuracy of the method is much higher than that of traditional machine learning method. Moreover, this method can also effectively evaluate various geotechnical engineering problems in the absence of some influencing factors.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I1033-Presentation 5 (15:00~15:15)
Shear Strength Prediction of Soil-Bentonite Mixture Using Recurrent Neural Network and Artificial Neural Network
Swapneel N. Shah, Milind S. Amin, Shubham A. Padia, and Manas K. Bhoi
Pandit Deendayal Petroleum University, Gandhinagar, India

Abstract—This paper studies the engineering behavior of silty soil mixed with different proportions of bentonite (clay), by conducting unconfined compression tests (UCS) and data analysis of experimental data using Artificial neural network (ANN) as well as in Recurrent neural network (RNN). The index properties like water content of soil were obtained in addition to engineering properties like Cohesion (C) and Angle of friction (ϕ). Neural network methods like ANN and RNN are used to simulate the load deformation behavior of soil in UCS test and unconfined compressive strength. The backpropagation feedforward network, as well as the Layer Recurrent network, was used to train the data set of the modified soil sample and then output for soil with other percentage of bentonite has been predicted. After comparing experimental results and NN predicted results through different no. of hidden layers and for different soil parameters, it has been observed that the Stress-Strain curves for both results are close. Hence the chosen parameters for training the network are quite relevant and the absence of any of these parameters affect the result a lot in predicting. It has been observed that for soil containing 25% bentonite clay, the variation in axial strain was high at shear stress 300 kg/mm2; while it keeps on decreasing with increase in shear stress. After 450 kg/mm2 the results were quite similar.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I2008 Presentation 6 (15:15-15:30)
Assessment on Harmony of Pavement Condition Index using ASTM, IRC and Regression Techniques
Rajesh K Tripathi, Sunny D Guzzarlapudi
National Institute of Technology/ Department of Civil Engineering, Raipur, India

Abstract—Pavement Maintenance and rehabilitation of low volume roads to the designated level of serviceability is a daunting task. Pavement condition index (PCI) is a promising numerical indexing technique for the structural integrity and performance of in-service pavements. Assessment of PCI is depending on theresults obtained from the visual inspection survey from which type, intensity and severity of various distresses are diagnosed. Indexes estimated from various techniques are appearing to be similar and tempting to adopt different indexes for comparing the performance of in-service pavement sections. The basic objective of this study is to carry out a comparative study on PCI values estimated from American Standard for Testing Materials (ASTM) and Indian Road Congress (IRC) techniques. To determine the level of agreement between these estimated indexes, a database composed of PCI values of 20.35 km of in-service distressed low volume PMGSY roads in India was used. The comparison of rating scales depicts that only 32% of pavement sections were representing similar rating whereas, for the other sections shown significant differences among seemingly similar pavement condition indexes. In addition, Index values estimated from the developed linear regression model for low volume roads shows good agreement with in-situ measured data. The developed model index values were also compared with ASTM and IRC techniques which show substantial increase in the similarity of ratings varying from 50% to 69% of pavement sections. Thus the developed model is simpler and robust in indicating the realistic performance of the pavement condition for defining optimum maintenance strategy.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I1011-A Presentation 7 (15:30~15:45)
Study on Eco Recycling of Construction Sludge for Production of Improved Soil.
Yasuhide Mochida, **Joshua O. Ogunbiyi**
Department of Architecture and Urban Design, Ritsumeikan University, Japan

Abstract—This study is conceived in a bid to further promote environmental sustainability through reasonable resources consumption pattern in line with The United Nation sustainable development goals. The purpose of the study is to examine the feasibilities and efficiency of developing a ground improvement method using recycled construction sludge. While discussing the technology and processes involve, this paper extensively evaluates the existing practice of reuse of construction sludge in relative civil engineering works in Japan. The use of an ICT device for measuring electrical resistivity for enhanced quality control and assurance through adequate prediction of properties including the degree of mix and strength at curing age of the improved soil was also introduced. The study also recommends the use of the new improved soil for pre-bored embedded pile foundation in residential buildings.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I2013 Presentation 8 (15:45~16:00)
Static and cyclic performance of repaired reinforced concrete beams using a range of underlays
Abid Abu Tair, Mohamed Nabil Omar
British University in Dubai – Faculty of Engineering & IT, Dubai, U.A.E

Abstract—The repair and strengthening of concrete structures has become a significant area of specialization in the construction industry, in many countries the cost of repair and strengthening is accounting for nearly 50% of the overall expenditure within the construction industry. Generally, concrete properly made and compacted has a high resistance against deterioration and possible damage. However, structures may suffer damage or deterioration from a variety of internal and external causes. Repair may carried out to protect the reinforcement, to restore the structure to its original strength, or merely to restore the original appearance. Whatever the reason, an essential requirement is that the repair achieves a satisfactory bond with the substrate concrete and maintains good adhesion and protection over the service life of the structure. A range of repair of repair materials and techniques are available to the maintenance engineer, the selection of the best suitable materials and most effective technique are essential in a durable and effective technique. In this investigation, three types of materials used representing the full range of repair materials available, namely, a basic cementitious, a polymer modified cementious and an epoxy render. Twelve reinforced concrete beams, with preformed faults, were repaired and tested under three loading systems, a static loading, a service level cyclic loading and a near ultimate fatigue loading, the results from these beams were compared to control beams with similar reinforcement and made from similar concrete, but with no faults.

Session 2

Afternoon, June 27, 2019 (Thursday)

Time: 14:00-16:15

Venue: C217

9 presentations-Topics: “Building Materials and Civil Engineering”

Session Chair: Prof. Ing. Milan Holický

I1022-A Presentation 9 (16:00~16:15)
Multi-objective Optimization and Fragility analysis of an Innovative Modularized Suspended Building Structure Based on the Experimentally Verified Numerical models
Zhihang Ye, Abdollah Shafieezadeh, Gang Wu, De-Cheng Feng
School of Civil Engineering, Southeast University, Nanjing, China
Department of Civil, Environmental & Geodetic Engineering, Ohio State University, Columbus, OH, USA

Abstract—Suspended building structures offer appealing architectural forms of high transparency and passive vibration control performance via interactions between the primary and the suspended components. Modularized suspended structures have been proposed to overcome the drift-induced damage of the secondary structures in earlier configurations of suspended buildings and to enhance the overall attenuation of seismic-induced responses. Previously, 1:15-scaled shake table experiments of modularized suspended steel structures were conducted. OpenSees numerical models were developed and subsequently calibrated based on the experimental data. However, the experimental performance was undermined by the high inherent friction in the connections of the small-scale specimen along with the air-spring effect of the Airpot dampers. This highlights the need to comprehensively explore the true potential of the system using the experimentally verified modelling strategy, with lower friction, realistic damper behaviours, and different structural designs. Moreover, uncertainties of structural parameters should be accounted for, in order to assess the fragility of the system and objectively compare with conventional suspended building structures.
In this study, the calibrated model which matched satisfactorily to the experimental data, is adopted and modified into a 10-story and a 16-story group of models, to investigate the impacts of major structural parameters such as the height and stiffness of the primary structure, the inelasticity of the reinforced concrete, and the types of dampers. Dual-objective optimizations in time domain using spectrum-compatible ground motions indicated reductions of about 50% in seismic responses of both the primary and secondary structures. The overall performance is sensitive to the inter-module stiffness which affects the tuning effect. As the reinforced concrete core-tube enters the nonlinear stage, isolating the suspended segment with low-stiffness connections to the core-tube becomes more beneficial than the tuning strategy.

Uncertainties of key structural parameters, for instance, damper and inter-module spring properties, concrete parameters, and module mass, are accounted for in developing fragility curves giving a full account of multiple damage conditions. Especially for suspended buildings whose structural robustness is less satisfactory, a mapping rule from component-level damage states to the system-level damage state is proposed to represent the impact of the spread of vulnerable areas. Comparison of the fragility curves shows the superiority of the modularized-type over the conventional-type suspended building with different patterns of contributing damage sources.

Coffee Break	**16:15~16:30**

Session 3

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: "Environmental Engineering and Renewable Energy"

Session Chair: Prof. Dr. Osman ADIGUZEL

I3015-A Presentation 1 (16:30~16:45)
Monitoring of Radioactive Aerosols of Chernobyl Genesis in Ground-Level Air Near Shelter Object
A.K. KALYNOVSKYI, V. A. Krasnov, V. E. Khan
Institute for Nuclear Safety Problems, Ukraine

Abstract—The results of long-term monitoring of radioactive aerosols (RA) (1998–2018), which are an important component in assessing radiation safety of personnel during work being carried out near the Shelter Object (SO) (its local area) and pollution of environment, are presented in the article.
Sampling of aerosols was made by pumping the air through FPP-15-1.5 filters of about 0.8 m2 square. Average filtration rate was 8 000 - 12 000 m3/day. The composition of long-lived nuclides (LLN) of Chernobyl genesis in surface air layer of local area from beginning of 2000s up to the present time is almost constant and contains: Σα-LLN (238, 239, 240Pu, 241Am) and Σβ-LLN (137Cs, 90Sr+90Y, 241Pu). The determination of radionuclide contained in aerosols was carried out by γ-spectrometry complex consisting of HPGe detector with beryllium window and Genie 2000 (CANBERRA) program.
Main degradation of aerosol situation in the air of SO local area, when RA volumetric activity increased ten-fold as compared to the beginning of 2000s, was due to radioactive dust resuspension. First, from surface of ground during earthwork to build foundation strips of New Safe Confinement's "Arch" (NSC) in 2010. During this period, average annual volumetric activity of ∑LLN was 80 mBq/m3, with weekly maximum activity of Σα-LLN – 6 mBq/m3 and Σβ-LLN – 520 mBq/m3. Second, when dismantling concrete and metal structures of Shelter in 2016, average annual volumetric activity of ∑LLN was 62 mBq/m3, and weekly maximum activity reached Σα-LLN – 18 mBq/m3 and Σβ-LLN – 1400 mBq/m3.
In addition, it was shown that shutdown of Chernobyl NPP power Unit 3 and implementation of

stabilization measures contributed to approximately two-fold decrease in RA volumetric activity in local area, and NSC “Arch” commissioning are resulted in a ten-fold decrease of the LLN volumetric activity in air near the SO (1.8 mBq/m3) in 2018, as compared to 90s end, when average activity was approximately 17 mBq/m3. RA volumetric activity after 2018 will continue to decrease, since local area becomes more streamlined, radioactive particles will be accumulated by environmental objects, radioactive decay of nuclides will continue and, the most important thing, absence of uncontrollable radioactive releases from the SO.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I3034 Presentation 2 (16:45~17:00)
Emerging Concern of Micropollutants: Recommended Inclusion of Antibiotics Monitoring in the Environmental Effects Monitoring Program for Municipal Wastewater Effluents
MD Mofizul Islam, and **Qiuyan Yuan**
University of Manitoba, Manitoba, Canada

Abstract—Currently, the micropllutants such as antibiotics are not included in the environmental effects monitoring program for municipal wastewater effluent. This paper presents the importance of the integration of the antibiotics in EEM program. In addition, various types of the sample collection and analysis method for antibiotics monitoring are discussed. It is concluded that antibiotic monitoring program would give an insight view of the effectiveness of antibiotic removal measure of the environmental management and would be very crucial tool for finding the proper remedial actions for the wastewater treatment authorities.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I3017-A Presentation 3 (17:00~17:15)
Antimicrobial activity of biosynthesized silver nanoparticles against P. aeruginosa
Michailidu Jana, Čejková Alena
UCT Prague

Abstract—In recent years, silver nanoparticles have been incorporated into some mass-produced products due to their well-documented antimicrobial activity. The physico-chemical production of metallic nanoparticles is, however, not very eco-friendly and cost-effective. Successful biosynthesis of silver nanoparticles appears to be an important step towards their sustainable use in the future. In this study, we assessed the antimicrobial activity of silver nanoparticles produced using Vitis vinifera cane extract against four strains of a gram-negative bacterium Pseudomonas aeruginosa. The antimicrobial properties were explored in different experimental layouts against both planktonic and biofilm-forming cells. The influence of biosynthesized silver nanoparticles was determined using the crystal violet assay designed for total biofilm biomass evaluation, and the MTT assay used to evaluate cell metabolic activity. The influence of biosynthesized silver nanoparticles on communication molecule production was also assessed using a genetically modified biosensor strain. The results show the biosynthesized nanoparticles exhibit measurable antimicrobial activity, whereas they showed the strongest effects when used against the planktonic cells of P. aeruginosa.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I4001 Presentation 4 (17:15~17:30)
Preparation of particle reusable heterogeneous catalyst Fe_3O_4/ATP for methylene blue decolorization
Ting Zhang, Chunyuan Qian, Lingyu Dong
Lanzhou University of Technology

Abstract—New simple wet-ultrasonic method was employed to synthesize akind of particle heterogeneous catalyst Fe3O4/attapulgite (Fe3O4/ATP),which used attapulgite particles as catalyst carrier and Fe3O4 as active component loaded on the carrier. The catalyst is low cost and easy to prepare, and the effects of various preparing factors on its catalytic performance were investigated and discussed. The heterogeneous catalyst was characterized using SEM, FT-IR and XRD for its structure and catalysis properties. Fe3O4/ATP was used as the catalyst to decolorize high concentration (100mg/L) methylene blue (MB) in the heterogeneous Fenton system. Box-Behnken design (BBD) method was used for experimental design, data analysis and optimization. The influences of catalyst dosage, H2O2 initial concentration and pH value on MB decolorization ratios in Fe3O4/ATP/H2O2 heterogeneous Fenton system were studied. The heterogeneous catalyst Fe3O4/ATP has excellent catalytic performance and more than 99%MB decolorization were achieved under the optimum conditions. Higher decolorization ratio was obtained for recycled use of Fe3O4/ATP. Comparison experiments showed MB decolorization in Fe3O4/ATP/H2O2 system is really a catalytic process. Furthermore, Fe3O4/ATP can be easily separated from the solution and reused due to its particle form.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I3031 Presentation 5 (17:30~18:00)
Using Plastic Bags in Roadways
Catarina Figueiredo Mendes, **Gabriela Kuran**, Dr. Gautham Das
Wentworth Institute of Technology

Abstract—Mass production of plastics began just six decades ago and has rapidly accelerated, creating 8.3 billion metric tons of waste, which exists mostly as disposable products that end up as trash. As a means of prevention to this waste production, ideal alternatives would consider the reuse of this waste through inventive applications. Incorporating plastic waste in the design of roads can be one alternative for preventing further pollution and minimizing existing plastic waste. The purpose of this research is to characterize the potential risks associated with the implementation of plastic to asphalt. Samples included the following Low-Density Polyethylene (LDPE) plastics: white plastic bags, black plastic bags, and plastic pellets. These samples were tested for the concentration of the following heavy metals: Lead (Pb), Cadmium (Cd), and Chromium (Cr). All samples were digested and analyzed using various methodologies: Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) testing, Atomic Absorption Spectrometer (AA) testing, X-Ray Fluorescence Spectrometer (XRF) testing, and the Fourier Transform Infrared Spectrophotometer (FTIR). XRF results indicated that black plastic bags had 0.132% of Cr and white plastic bags had 0.01% of Cr. All the other metals in consideration were non-detect or in the parts per trillion range. The extraction results using the ICP-AES indicated Pb concentrations of 12 mg/kg which does not exceed the USEPA permissible standards. Additional testing for Manganese (Mn), Nickel (Ni), and Antimony (Sb) will be conducted in upcoming procedures.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I3021 Presentation 6 (18:00~18:15)
Investigation of agricultural biomass residues in liquefaction process
Leite B.S., Ferreira D.J.O., Leite S.A.F., Bastos F. S., Lins V.F.C., Castro B.T.
Associate Professor - Institute of Science and Technology, Universidade Federal de Viçosa, UFV- Campus Florestal, Florestal, MG, Brazil.

Abstract—The use of agricultural biomass residues as an alternative of fossil derivatives have been extensively investigated in the last years due to environmental concerns. In this context, the liquefaction appears as an alternative to use these renewable sources to produce green materials. The present work aims to synthesize polyols from the cassava peels (CP), lemon bagasse (LB) and rice husk (RH) in order to obtain biopolyols suitable to produce polyurethane foams and add value to these residues. Besides the production of the green foams, this work has also the objective to evaluate how composition of the biomass (e.g.: solid, lignin and holocellulose content) can be related to the process yield and the characteristics of the biopolyol (e.g: hydroxyl number). The polyols were synthesized from the biomass liquefaction, using crude glycerol as solvent (a by-product of biodiesel industry) and sulfuric acid as catalyst. The liquefaction was performed using an autoclave, operated at 125 °C and 1.84 atm. Liquefaction yield varied from 38 to 91 %, according to biomass and process parameters used. It was observed that CP, which has the higher volatile solids content and the lower lignin plus holocellulose content, had the higher liquefaction yield. Polyol’s hydroxyl number from RH had the lowest values and lower variation, according to process parameters. Liquefaction yield and hydroxyl number from LB presented great response to process parameters used.

Session 3

Afternoon, June 27, 2019 (Thursday)

Time: 16:30-18:30

Venue: C217

7 presentations-Topics: “Environmental Engineering and Renewable Energy”

Session Chair: Prof. Dr. Osman ADIGUZEL

I4002-A Presentation 7 (18:15~18:30)
Do Renewable Energy Consumption and Agriculture Reduce CO2 in E-7 Countries
Berna Aydoğan, **Gülin Vardar**
Izmir University of Economics,Head of Department,International Trade&Finance

Abstract—This paper aims to investigate the dynamic causal links between economic growth, per capita CO2 emission, renewable and nonrenewable energy consumption and agricultural value added in a panel of E-7 countries (China, India, Turkey, Russia, Brazil, Indonesia and Mexico) over the period 1990-2014 With a better understanding of the linkage between renewable energy, agriculture and CO2 in these selected emerging countries using panel cointegration and Granger causality techniques, the presence of Environmental Kuznets Curve (EKC) hypothesis is also tested. The OLS and the panel FMOLS and DLOS techniques are employed to estimate the long run parameters of the analysis when per capita CO2 is used as the dependent variable. The findings show that the inverted U-shape hypothetical EKC is not found in the selected E-7 countries. Moreover, the long-run estimates show that increasing renewable energy reduce CO2, whereas nonrenewable energy, GDP and agriculture increase CO2. The empirical results of the study provide fresh insights and policy implications for authorities in these emerging countries to encourage renewable energy consumption as this opens new avenues to the agricultural industry to develop itself and get an advantage from renewable energy technology transfer.

Poster Session

June 27, 2019 (Thursday)

Time: 9:00-18:30

Venue: C217

I3013 Presentation 1 (9:00-18:30)

Evaluating the Effect of Rumen Microorganisms in the Codigestion Process of Swine Manure and Rice Husk

Leite S.A.F., **Leite B.S.**, Dell´Isola A.T.P., d´Angelo J.V.H.

Institute of Science and Technology, Universidade Federal de Viçosa, UFV- Campus Florestal, Florestal, MG, Brazil.

Abstract—Biomass from agricultural residues consists largely of cellulose, hemicellulose and lignin, which are responsible for forming a rigid structure with difficult biodegradation. A viable alternative to increase the release of these components and improve codigestion process is the fortification of the inoculum adding microorganisms from bovine rumen. The objective of this work was to evaluate the influence of inocula enriched with microorganisms from bovine rumen, either using ruminal content or bovine manure, on the codigestion of swine manure and rice husk. From the results of methane yield, specific methanogenic activity and kinetic analysis it was observed that the enriched inocula, improved the codigestion, especially during process startup. On a pilot scale, the use of bovine manure presented a relevant performance on methane yield. Considering the availability of bovine manure, it can be an interesting option to be used in the startup of codigestion of swine manure and lignocellulosic residues.

Poster Session

June 27, 2019 (Thursday)

Time: 9:00-18:30

Venue: C217

I3016 Presentation 2 (9:00-18:30)
Effects of the Horizontal Elements on Windward Wall of Buildings on Natural Ventilation and Pollutant Dispersion
Yuya XIONG, Hong CHEN
Huazhong University of Science and Technology

Abstract—Natural ventilation is a well-known method to improve indoor air quality. Most studies did not consider the elements on building envelopes. This paper tries to investigate the horizontal elements' effect on one-sided ventilation of the windward rooms along a street canyon and study the dispersion of pollutant by using a computational fluid dynamic (CFD) model. Firstly, a three-dimensional numerical model for simulating flow and pollutant dispersion was developed by using the coded OpenFOAM and then validated against the water channel and the wind tunnel results. After the validation, four different widths of horizontal elements are applied to this present study, as well as a compared case, which is of no element (We=0). Dimensionless pollutant concentration and ventilation rates (ACH) are analyzed. The numerical results reveal that the percentage decrease of average ventilation rate of buildings reaches 94.7% when the width of the horizontal elements (We) is increased from 0.2m to 1.5m. Besides, the pollutant concentration is reduced by adding the horizontal elements, though, the value of We do not influence the air flow. Elements on building envelope provides a possibility to improve the quality of building environment. This study intends to learn more about the effects of the horizontal elements on ventilation and pollutant dispersion and thus may contribute to city and building designs.

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Poster Session

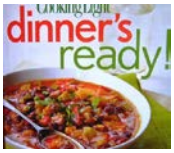
June 27, 2019 (Thursday)

Time: 9:00-18:30

Venue: C217

I3026 Presentation 3 (9:00-18:30)
Risk Assessment and Source Analysis of Heavy Metal in Agricultural Soil of a Township in Wuxi County
Hengchang Zhang, **Chuan Fu***, Tingzhen Li, Bin Yan, Yan Wu
College of Environmental and Chemical Engineering, Chongqing Three Gorges University

Abstract—According to the total amount and morphological results of heavy metals (Cd2+, Cr3+, Cu2+, Pb2+, Zn2+) in cropland in Tianyuan Township, Wuxi County, Nemerow index, potential ecological risk index and geo-accumulation index method were utilized to assess the potential risks of heavy metals in soil. The consequences made clear that the average content of 5 heavy metals in the agricultural topsoil of Tianyuan Township, Wuxi County was: Zn2+ (85.92 mg/kg)>Cr3+ (73.00 mg/kg)>Pb2+ (31.17 mg/kg)>Cu2+ (31.16 mg/kg)>Cd2+ (1.61 mg/kg); Cr3+, Cu2+ and Zn2+ were mainly residuals, the average proportion was 91.61%, 84.48% and 72.30%, respectively. Pb2+ was mainly Fe/Mn oxide bound (38.24%) and residuals (49.22%), and Cd2+ was mainly exchangeable (22.25%) and Fe/Mn oxide bound (47.57%). Nemerow index, potential ecological risk index method and geo-accumulation index method all indicated that Cd2+ pollution was relatively serious, and Cr3+, Cu2+, Pb2+ and Zn2+ were all in a relatively clean state. Correlation analysis and principal component analysis showed that Cr3+ was mainly affected by natural factor soil parent material. Human pollution mainly had an effect upon Cd2+, Pb2+ and Zn2+, including traffic emissions and agricultural activities, and Cu2+ was jointly affected by two factors.

Dinner	**18:30**

One Day Visit

June 28, 2019 (Friday)
10:00--17:00

The following places are for references, and the final schedule should be adjusted to the actual notice.

Prague Castle

Prague Castle (Czech: Pražský h Berna Aydoğan rad; [ˈpraʃskiː ˈɦrat]) is a castle complex in Prague, Czech




Republic dating from the 9th century. It is the official office of the President of the Czech Republic. The castle was a seat of power for kings of Bohemia, Holy Roman emperors, and presidents of Czechoslovakia. The Bohemian Crown Jewels are kept within a hidden room inside it.

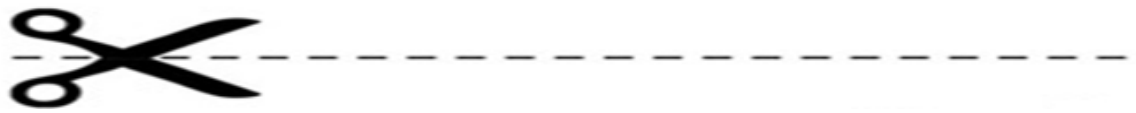
Prague Old Town Square

Old Town Square is a historic square in the Old Town quarter of Prague, the capital of the Czech Republic. It is located between Wenceslas Square and the Charles Bridge.

The square features various architectural styles including the Gothic Church of Our Lady before Týn, which has been the main church of this part of the city since the 14th century; the church's towers are 80 m high. Prague Orloj is a medieval astronomical clocklocated on the Old Town Hall. The clock was first installed in 1410, making it the third-oldest astronomical clock in the world and the oldest one still in operation. The Baroque St. Nicholas Church is another church located in the square, while the tower of the Old Town Hall offers a panoramic view of Old Town. An art museum of the Czech National Gallery is located in KinskýPalace.

Note

Note



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Did the conference fulfill your reason for attending?	Yes– Absolutely □ Yes- But not to my full extent □ No□ (If “No”, please tell us the main reason)
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