2019 9th International Conference on Environment Science and Engineering (ICESE 2019)

March 20-22, 2019

Leuven, Belgium

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Conference Venue

Park Inn

Address：Martelarenlaan 36 - BE-3010 Leuven - Belgium

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Tel:+32 16 61 66 00/Fax:+32 16 61 67 00

This contemporary hotel is located within walking distance of Leuven city center and is just steps away from Central Station, from which it's only a 15-minute commute to Brussels International Airport. The Great Market, Stella Artois Brewery and University Library are all just a short distance from the hotel. Our 133 stylish guest rooms feature free high-speed Wi-Fi, individual climate control and flat-screen LCD televisions.

Enjoy flavorful meals from the grill, including juicy burgers and steaks and tasty pastas, at the on-site RBG Bar & Grill. Take advantage of complimentary access to the fitness center and indoor public parking near the hotel. Travelling to Leuven on business? We have a well-equipped business center and flexible meeting spaces that feature natural daylight and individual climate control, as well as modern audiovisual technology and free high-speed Wi-Fi. You can also park your car in the public parking lot under the hotel.

Hotel features

The Great Market is located within a 10-minute walk of our Leuven hotel.
Use the pedestrian bridge next to the hotel to reach Central Station, which offers a 15-minute commute to Brussels International Airport.
All 133 of our vibrant rooms include coffee and tea supplies, free high-speed Wi-Fi and a work desk.
RBG Bar & Grill serves international favorites in a cozy, contemporary environment.
Complimentary access to the on-site fitness center.
Indoor public parking facilities are available near the hotel.
Our large conference room spans 200 square meters and can be divided into 3 rooms, with 2 additional meeting rooms suitable for smaller gatherings.
“Happiness Guarantee” is our promise to you. If you’re not 100% happy with something, please let one of our staff know during your stay and we’ll make it right or you won’t pay.

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Leuven Conference Introductions

Welcome to 2019 HKCBEES Leuven conference. This conference is organized by HKCBEES. The objective of the Leuven conference is to bring together innovative academics and industrial experts in the field of Environment Science and Engineering to a common forum.

2019 9th International Conference on Environment Science and Engineering (ICESE 2019)

Accepted papers will be published in the following Conference Proceeding:

IOP Conference Series: Earth and Environmental Science (EES) (ISSN: 1755-1315), and all papers will be indexed by EI Compendex, Scopus, Thomson Reuters (WoS), Inspec,et al.

Conference website and email: http://www.icese.org/; icese@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 **40** 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 March 20 and March 21, 2019.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Prof. Raf Dewil
Head Cluster Sustainable Chemical Process Technology KU Leuven - Department of Chemical Engineering, Belgium

Prof. Raf Dewil holds a Master of Science in Chemical Engineering (KU Leuven, 2003) and a PhD in Bioscience Engineering (University of Antwerp, 2006). Currently, he is a professor with the Chemical Engineering Department of the KU Leuven, where he heads the Laboratory for Process and Environmental Technology. Within the Faculty of Engineering Technology of the same university, he chairs the Sustainable Chemical Process Technology Cluster. His main research domains include (i) (bio)chemical conversion methods for the valorization of biomass and organic wastes (currently main focus on anaerobic digestion), and (ii) the integration of physicochemical treatment methods in wastewater treatment (e.g., advanced oxidation processes, ultrasound, microwave). He has (co-)authored over 80 publications in peer-reviewed international journals and about 90 presentations at international conferences. His papers received over 2800 citations and his h-index is 23. He is Editor-in-Chief of the Journal of Environmental Management (Elsevier, IF 4.01) and in the editorial board of several renowned journals such as Chemical Engineering Journal and Renewable Energy.

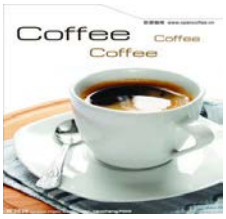
Topic: ‘Sulphate radical induced advanced oxidation of pharmaceuticals in water: state-of-the art and prospects’

Abstract—There is a growing concern on the ecological impact of pharmaceutically active components in natural waters. Globally, about 4000 active pharmaceutical ingredients are being distributed in prescription medicines, over-the-counter therapeutic drugs, and veterinary drugs. For the production of the active ingredients of these pharmaceuticals, various synthetic chemical compounds are produced at a rate of 100000 tons per year. Pharmaceutical micro-pollutants are regarded as a special threat to the ecosystem due to their specific biological effect and the potential of inducing drug-resistant bacteria. Drug residues are only partially removed in a classical wastewater treatment plant and traces are still detected in effluents, surface waters and ground waters. Although present in small concentrations, (metabolites of) pharmaceutical residues were shown to have an adverse effect on fish populations and other aquatic organisms.

A class of treatment technologies that are overall termed Advanced Oxidation Processes (AOP) are receiving high attention for the degradation of these hazardous pollutants from different types of wastewater. Whereas typical AOPs are all based on the oxidation of organics by OH-radicals (*OH), more recently, the use of sulphate radical (SO4*-) based oxidation processes (SR-AOPs) has gained attention as an innovative alternative to typical AOPs. Since the pioneering paper in this field by Anipsitakis and Dionysiou, a renewed scientific interest in these technologies resulted in several papers describing the use of various sulphate radical generation methods and the effectiveness of the treatment for the degradation of a myriad of different organic pollutants.

Some distinct advantages of SR-AOPs are supporting their application.

In this keynote lecture, an overview will be provided of the current state-of-the-art of SR-AOP. The influence of different precursor molecules, process conditions and activation methods on the degradation will be discussed. The contribution of SO4*- and other radicals is of prime importance, and an overview will be provided. The lecture will further discuss the current knowledge gaps and future research opportunities in this domain.



Coffee Break & Group Photo Taking(March 20)	**14:50~15:05**

Keynote Speaker II

Prof. Zhijun Peng
University of Bedfordshire, UK

Professor Peng started his professorship in the University of Bedfordshire, UK in June 2017. Prior to his new role, he has been a Reader in Sustainable Energy Technology in the School of Engineering and Technology, University of Hertfordshire since 2013. As the leader of the Sustainable Energy Technology Research Group in University of Hertfordshire, his is responsible for research activities on sustainable energy technology development and application vehicle powertrains and vehicle energy efficiency technology with an emphasis on experimental investigation, though he also conducts some numerical simulations including CFD modelling. Prof Peng was a lecturer since 2004 and then as a senior lecturer since 2007 in the School of Engineering and Design, University of Sussex. He acquired his industry experience as a senior powertrain development engineer at the Dunton Technical Centre of Ford Motor Company between May 2003 and September 2004.

Topic: ‘Current development and application of fuel cell on ground transport and a life cycle analysis of CO2 emissions from FCV (Fuel Cell Vehicle)’

Abstract—As Toyota, Hyundai, etc. car manufacturers have made their FCVs (Fuel Cell Vehicles) on markets, further technology developments for enhancing fuel cell system reliabilities, total energy efficiencies, system power density and driving range are urgently required. By reviewing current progress on fuel cell development and application on ground vehicles, this talk will present existing challenges of fuel cell and relevant systems, and will explain various efforts and possible solutions for improving fuel cell performances and for extending fuel cell’s application on various vehicles. Finally a life cycle assessment to FCV’s CO2 emissions is demonstrated and compared with conventional ICEV (Internal Combustion Engine Vehicle).

Keynote Speaker III

Prof. Jan Baeyens
Beijing University of Chemical Technology, China

Jan Baeyens studied Nuclear Engineering (Brussels) and Chemical Engineering (Leuven). He obtained his Ph.D. at the University of Bradford-U.K. After 13 years of employment in engineering divisions of various Belgian companies, he became a part-time professor at the University of Leuven (B) and worked as a process and project consultant in Europe and overseas. In 2003. He started the Faculty of Bio-engineering at the University of Antwerp. In 2005, he moved to the University of Birmingham (U.K.) and the University of Warwick (U.K.), where he lectured on process design, sustainable development, renewable energy and powder technology, while also co-ordinating research in these fields. He has contributed to over 200 publications in international journals, is author/editor of 12 books, and is a regular speaker at international congresses. His h-factor is 55, and citations exceed 15000. Since 2010, he is Visiting Professor at the Beijing University of Chemical Technology, where he is actively involved in Life Science and Technology research. Since 1989, he is managing director of European Powder and Process Technology (EPPT). Within EPPT, he continues to co-ordinate design and consultancies for Belgian and overseas companies, mostly in the field of powder technology and renewable energy. EPPT is a partner in European research projects (FP7, and H2020).

Topic: ‘Pathways and Challenges for CO2 capture by single or hybrid processes’

Abstract—The problem of climate change caused by greenhouse gas emissions and the traditional CO2 capture processes were recently reviewed by Song et al1. Combustion of fossil fuel is the dominant contributor for anthropogenic CO2 emission2. In China, about 70% of the energy is provided by coal and petroleum. It is urgent to develop effective CO2 mitigation technologies. Using clean and / or renewable energy instead of fossil fuels is the most effective strategy to mitigate CO2 emission, although it is difficult to optimize the supply of the alternative energy sources in a short term. The presentation will assess the different technologies in both currently used, or researched and under development methods.

The **current CO2 capture technologies** mostly include absorption, adsorption, membrane separation and cryogenics, possibly used in hybrid configurations1. The retrofit of CCS units into a power plant would however cause a significant decrease in electric output3 and a high operating cost of 40–100$ per ton CO2 when using MEA absorption, while its regeneration contributes to ~80% of the total energy consumption. The current cost of implementing such a CCS is between 5 and 10 times higher than both the common carbon tax and the EU carbon credit price. Their use moreover suffers from the degradation of solvent, secondary pollution, equipment corrosion, high material cost, or unstable selectivity.

Efforts are hence concentrated on **developing moderate to high temperature CO2 capture technologies** in power generation and calcination of carbonate minerals. The ultimate purpose of these processes is to produce a concentrated CO2 stream suitable for storage and application. Although, in principle, the entire flue gas stream containing low concentrations of CO2 could be transported and injected underground or in oceans, the total costs of the operations make this approach impractical. These CO2 capture technologies are mainly classified into post-combustion capture, pre-combustion capture and oxy-fuel capture. Chemical looping reactions are a separate alternative. These methods are increasingly studied on a mostly laboratory scale. Many CO2 sorbents have been studied, including common alkali/earth alkali oxides, hydroxides and carbonates, or more exotic compound molecules such as Li4SiO4. Li2ZrO3, K2ZrO3 and Na2ZrO3. To assess the priority of these sorbents, an objective selection criterion will be proposed.

Both current and researched methods will be critically assessed, and guidelines for further research, development and application will be presented.

Coffee Break & Group Photo Taking (March 21)	**10:30~10:50**

Brief Schedule for Conference

Day 1	**March 20 (Wednesday)** 10:00~17:10 **Venue: Park Inn（Lobby）** (Add:Martelarenlaan 36 - BE-3010 Leuven – Belgium) Participants Onsite Registration & Conference Materials Collection & Conference Reports
	Opening Remarks 14:00~14:05 Prof. Raf Dewil Head Cluster Sustainable Chemical Process Technology KU Leuven - Department of Chemical Engineering, Belgium **Keynote Speech I** 14:05~14:50 **Topic: 'Sulphate radical induced advanced oxidation of pharmaceuticals in water: state-of-the art and prospects'** (Prof. Raf Dewil, Head Cluster Sustainable Chemical Process Technology KU Leuven - Department of Chemical Engineering, Belgium)
	Coffee Break 14:50~15:05
	Session 1 15:05~17:05 **Venue: Erasmus 2** 8 presentations-Topic: "Water Treatment and Resource Management" Session Chair: Prof. Raf Dewil
Day 2	**March 21 (Thursday)** 08:55~18:00 **Venue: Erasmus 2& Mercator 1** (Add:Martelarenlaan 36 - BE-3010 Leuven – Belgium) Participants Onsite Registration & Conference Materials Collection & Conference Reports
	Opening Remarks 08:55~9:00 Prof. Jan Baeyens Beijing University of Chemical Technology, China **Keynote Speech II** 09:00~09:45 **Topic: 'Current development and application of fuel cell on ground transport and a life cycle analysis of CO2 emissions from FCV (Fuel Cell Vehicle)'** (Prof. Zhijun Peng, University of Bedfordshire, UK)
	Keynote Speech III 09:45~10:30 **Topic: 'Pathways and Challenges for CO2 capture by single or hybrid processes'** (Prof. Jan Baeyens, Beijing University of Chemical Technology, China)

	Coffee Break & Group Photo Taking 10:30~10:50	
	Session 2 10:50~12:05 **Venue: Erasmus 2** 5 presentations-Topic: “Waste Management and Sustainable Development” Session Chair: Prof. Zhijun Peng	
	Lunch 12:05~13:30 **Venue: Restaurant in the Hotel**	
	Session 3 13:30~15:30 **Venue: Erasmus 2** 8 presentations-Topic: “Building Materials and Concrete Technology” Session Chair: Prof. Hasan N. Katkhuda	**Session 4** 13:30~15:15 **Venue: Mercator 1** 7 presentations-Topic: “Environmental and Chemical Engineering” Session Chair: Prof. Raf Dewil
	Coffee Break 15:15~15:45	
	Session 5 15:45~17:45 **Venue: Erasmus 2** 8 presentations-Topic: “Architectural and Civil Engineering” Session Chair: Assoc. Prof. Girum Urgessa	**Session 6** 15:45~18:00 **Venue: Mercator 1** 9 presentations-Topic: “Urban and Transportation Engineering” Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah
	Poster Session: 08:55-18:00 **Venue: Erasmus 2**	
	Dinner 18:00	
Day 3	**March 22, 2019(Friday) 9:00~17:00** **One Day Tour**	

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 on March 20 and March 21.

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.

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: "Water Treatment and Resource Management"

Session Chair: Prof. Raf Dewil

M0009-A Presentation 1 (15:05~15:20)
Assessment of Advanced Photocatalytic Oxidation process for Micropollutant Elimination in Municipal and Industrial Waste Water Treatment Plants
Christelle Vreuls, Stephane Drot, Sophia Dircks, Andrea Börgers, Jochen Türk, Julien Mahy, Cédric Wolfs, S. D. Lambert
CELABOR, Research Centre, Environmental Department, Herve, Belgium

Abstract—Pharmaceuticals, personal care products, pesticides and other chemicals used for domestic purpose or industrial production are continuously discharged into wastewater and lead to global contamination of the aquatic environment all over Europe. Removal during conventional wastewater treatment is unsatisfactory knowing that only 20 to 50% of micropollutants are removed in current waste water treatment plants. Analytical methods become more and more sensitive so that traces of organic compounds are nowadays detected in waste, surface and ground waters. The Water Framework Directive listed 45 priority substances to be controlled. Two hormones and one painkiller have been added in 2013 in this directive as well as three antibiotics macrolides, one pesticide, one anti-UV and one anti-oxidant in 2015.
The objective of the AOPTi project is to develop and validate an innovative technology to ensure efficient elimination of different types of micropollutants and toxic effects in waste water. Relevance and behaviour of transformation products in the treated water is investigated as second issue. The process is a tertiary treatment process, which can be easily integrated into municipal and industrial WWTPs. It is an economical physico-chemical treatment step after the conventional biological treatment. The process is based on oxidation by ozone and a subsequent photocatalytic treatment combined with a biological active adsorption step as final finishing process. The technology is developed for companies involved in the water purification sector and for companies with toxic effluents loaded with micropollutants. Process parameters have to be determined depending on the type of waste water in order to lead to almost total degradation of all micropollutants and to ensure absence of toxicity of the resulting water. Treated water will be characterized in term of chemical transformation

products (TPs) and toxicity.

At the laboratory scale, 24 major micropollutants have been chosen to model waste water like pesticides (simazine, diuron, isoproturon, DTT, atrazine, lindane), plasticizers (DEHP, tributyl phosphate), brominated compounds (PBDE), pharmaceuticals (metoprolol, diclofenac, carbamazepine…), industrial chemicals (PFOS), contrast agent (iohexol, iopromide)… Their degradations are quantified by GC-MS/MS and UHPLC-MS.

Photocatalysts have been synthesized by organic sol-gel methods and deposited as thin transparent films by dip-coating on alkaline-free glass substrate: pure TiO_2 and doped titanium dioxide (with Ag, Degussa P25). Compared to the conventional processes for the preparation of thin films, the sol-gel process works at room temperature, requires less equipment and is potentially less expensive. Samples were characterized by profilometry, GIRXD, UV-Vis transmission. The absence of leaching was characterized by ICP-AES and MS.

The best photocatalyst for the degradation of the 24 micropollutants is TiO_2 doped with 2 wt.% of Ag and 10% P25. A film was then deposited inside the long alkaline-free tube for a pilot test. Experiments were conducted on 150 L of model water and on toxic industrial waste water at the exit of a WWTP. Both experiments have confirmed laboratory results for degradation of micropollutants in water.

Waters toxicity is evaluated before and after ozonation + UV photocatalytic treatments with *daphnia magma* microorganisms according to ISO Standards methods.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0021 Presentation 2 (15:20~15:35)
Reaction law of high purity chlorine dioxide and typical substances in raw water
Zhuoyue Wang, Wei Song, Ji Li, Xiaolei Zhang, and Mengxun Wu
Harbin Institute of Technology, China

Abstract—Great concern has been risen due to the harmful by-product formation in chlorine dioxide disinfection. To control the by-product formation, we need to know the factor that make a great contribution to generate by-product in drinking water treatment. The Fe2+, Mn2+, organic matter and algae are the most presenting matters that could cause the formation of chlorite; thus, they were selected as factors in the study. The results showed that the amount of by-product chlorite produced increased along with the increase of the concentrations of organic matter, algae and Fe2+ in water, but the presence of Mn2+ didn’t impact on the formation of chlorite. In addition, the interaction between Fe2+ and Mn2+ was observed, but no obvious interaction between other factors was found. So when the concentration of above factors exceed the standard, the chlorine dioxide is not recommended in any step of the water treatment.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0023-A Presentation 3 (15:35~15:50)

Water Resource Allocation Review in the Humid Tropics : Case Study of Singkarak Watershed, Indonesia

Farida, Y Koesmaryono, B D Dasanto, I P Santikayasa

Bogor Agricultural University, Indonesia

STKIP PGRI Sumatera Barat, Indonesia

Abstract—Increasing demand for water, especially freshwater for urban household correspond with increasing population, economic growth, and competition among water users. Water supply and availability becomes a crucial issue in a region. Water has economic value for various users so its demand for water becomes faster than its supply growth. Application of water resource allocation in Indonesia mostly related to agricultural water requirement. Studies that combine optimal water resource allocation models with climate change scenarios are still limited for Indonesia case study. Increasing the efficiency of water use by optimizing the current water resources is considered as a fundamental approach in solving the water competition problem in the watershed. The Singkarak watershed located in central highland of West Sumatra province and it has Singkarak lake as outlet for rivers from surrounding watershed. Rivers in the watershed and Singkarak lake provides water for agricultural for its surrounding and downstream area, fishery, intake for hydro power plant and tourism purposes. The hydropower plant produces electricity of 175 MW during the rainy season and 60 MW in dry season for West Sumatra province and its neigbouring provinces. Change in rainfall amount and pattern due to climate change will have impacts on hydropower plant productions. Change in forest cover over time in the watershed have influence the amount of river flow into the lake. Singkarak watershed facing the problem of water quantity and quality feed into the lake. Moreover, the qualtitative change of ecological land, climate change projection and competition among the water users will effect water allocation. To ensure the regional sustainable developmnet of the area, it is important that reasonable water allocation scheme for various sector can be allocated in based on optimal social, economy and ecological benefit.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0037 Presentation 4 (15:50~16:05)
Can sustainable water monitoring be a reality?
Tahmina Ajmal, Laura Guimarães, Bettina Genthe and Ulrike Rivett
University of Bedfordshire, Luton, LU1 3JU United Kingdom

Abstract—In this paper, authors discuss the current methods used for surface water monitoring and the gaps left in monitoring in context of a low resourced area. Water quality monitoring is a complex problem that can only be tackled through a systemic application of a transdisciplinary approach. This paper suggests use of a variety of innovative solutions adapted to the local conditions encouraging the prospect of sustainability. The approach relies on an emphasis on environmental and water quality for human life that will contribute to: 1) improved capacity building of local actors, including the role of women; 2) increased economic and social well-being at local and regional levels; and 3) protect natural capital in the region. This article reviews the state of water monitoring in low resourced area, example is taken here from Southern Arica and attempts to establish a sustainable water quality monitoring plan for application to cross-boundary water resources in the region. These are essential to diagnose and raise understanding on water quality problems in resources shared by countries with contrasting development levels. The innovative vision presented here proposes to resolve this multidimensional water quality problem by considering the broader system ranging from aquatic ecosystems providing this service to supply systems serving final consumers.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0050-A Presentation 5 (16:05~16:20)
Community participation management planning for water security in Klong Natom watershed, Thailand
Nantida Sutummawong, Arpron Song Sang, Usa Onthong, Benjawan Buakhaun, Wikanda Thong-Nua Khaeng, Sinchia Sillapasuwan, and Pitpimon Choorod
Thaksin University, Thailand

Abstract—Community management has become the widespread popularity prevalent model for water management. Aim to answer: how could people in a community access and use the information technology to adapt for activities and projects on water solutions building up, and the draft water resources management plan to meet their needs? The processes involved in collaborative research with the community, added filed surveys, and applying Geographic Information System to analyze the problem and take the lessons of water management by using seminars and workshops as for brainstorming water resources management plan. Klong Natom watershed in Phatthalung province,cover area of sub-districts Khao-Jeak, Kok-Changay, Na-Tom, and Room-Muang. Mean annual rainfall is 2,065 mm per year, water storages capacity of 16.53 million cubic meters of water have potential for agriculture area of 30,232 rai with a population of 20,247 people, small local industry were found. Those required amount of water with 6.62 million cubic meters per year. Various problems were flash flood, damaging of riverbank, high erosion and sediment reducing capacity of watercourses during the heavy rain, and shortage of water consumption. Therefore, strategies to manage natural resources and environmental watershed through community participation process with "Khlong Na Tom Conservation network" as 5 goals 1) increase knowledge, 2) participation on water management and conservation, 3) adequate infrastructure development and quality, 4) development of water management in the community, and 5) protect and mitigate both drought and flood problems.
Highlights of the Klong Natom watershed is not lack of water resources as annual rainfall high, eight months of rain, and water system network covering all region. Communities are unity and able to join the development. However, lack of funding, technology and knowledge to manage water resources and to set up a state grant has been neglected to some extent. These weaknesses should be solved.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0057 Presentation 6 (16:20~16:35)
Development of Storm Water Monitoring Strategy for Multiple land use sites: A case study in South Korea
Sheeraz Memon, Iqra Panhwar, Ma. Cristina Paule, Bum-Yeon Lee, Raja Umer, Imran Saleem, Chang-Hee Lee
Mehran University of Engineering & Technology Jamshoro

Abstract—Urban expansion leads in change from natural land and pervious cover to unnatural land and impervious cover, which results two major runoff effects on storm water quality and quantity. Monitoring types can be described in three ways for storm water study, i.e. baseline monitoring, wet weather Event based monitoring and management facilities performance monitoring. In this research, focuses on individual land use type as a single site monitoring to prevent, control and reduce the pollution at the source. This includes detailed descriptions of site selection, measurement of changes in surface water quality, and how monitoring frequency is decided. Therefore monitoring sites selection criteria was expanded from a specific land use type to a small watershed scale. The study was extended due to on-site difficulties of diverse flow patterns, unsafe conditions to select catchment area during construction phase and to investigate impact of construction site industry on small scale watershed catchment.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0015 Presentation 7 (16:35~16:50)
The Struggle of Indigenous People : An Overview Recognition of Customary Forest in Minangkabau, Indonesia
Dasrizal, Eri Barlian, Afrital Rezki, Rio Tutri and Farida
Padang State University, Indonesia

Abstract—Customary forest and state forest are still a dichotomy contested by indigenous peoples and the state. The forests around Singkarak Lake, West Sumatra are managed in different ways which are related to the capacity of indigenous communities around the forest. The indigenous Minangkabau people of Nagari Malalo Tigo Jurai have local wisdom for the management of customary forests, but the recognition of their customary forest is beginning to be disturbed by the new recognition of this forest as state forest. This study examines the communal efforts carried out by the indigenous peoples in recognizing the customary forest management rights in Nagari Malalo Tigo Jurai customary forest. This study using a qualitative approach with in-depth interview techniques, observation and literature study. This research shows that there have some local wisdom practiced for forest management in the customary forest area for many years. Lately, there is a strong communal movement of the indigenous peoples for recognition of their customary forest areas.

Session 1

Afternoon, March 20 (Wednesday)

Time: 15:05~17:05

Venue: Erasmus 2

8 presentations-Topic: “Water Treatment and Resource Management”

Session Chair: Prof. Raf Dewil

M0066 Presentation 8 (16:50~17:05)
Model of Municipal Solid Waste Treatment using Mixture Design
CHRISTIA Meidiana, FEBRINA Ambar and WAWARGITA Permata Wijayanti
Universitas Brawijaya, Malang, Indonesia

Abstract—A model describing the relationship between waste treatment method and GHGs emission is proposed in this study. Three constituents, i.e. composting, reuse and recycle are analyzed using extreme lattice mixture design to determine the model. Mixture design enables identifying of optimum combination of each constituent which produces the lowest GHG emission. Greenhouse gas (GHG) emission as a regressand is analyzed to how it changes as the waste amount is changed. The result showed that there are 4 possible models. One best model is chosen for its least standard deviation, lowest P-value and the highest adjusted R-squared which is 5.764E-003, less than 0.005, and 0.9908 respectively. The model describes that lowest GHGs emission can be achieved by maximizing plastic recycle (into flakes), limiting composting and increasing paper, glass and metal reuse. Composting, reuse and recycle is proportional to the GHGs emission individually, while combination of two constituents is inversely proportional to the GHGs emission. The lowest GHGs may be emitted from the plant is 0.107 Gg CO2e/y with the composition of constituents as followed: 14 % composting, 50 % reuse, and 26 % recycle equals to 1.3 m3, 4.7 m3 and 2.1 m3 waste from each method.

Session 2

Morning, March 21 (Thursday)

Time: 10:50~12:05

Venue: Erasmus 2

5 presentations-Topic: "Waste Management and Sustainable Development"

Session Chair: Prof. Zhijun Peng

M1009 Presentation 1 (10:50~11:05)
Implementation of new concepts in waste management in tourist metropolitan areas
J Burlakovs, Y Jani, M Kriipsalu, **I Grinfelde**, J Pilecka,W Hogland
Latvia University of Life Sciences and Technologies, Latvia

Abstract—The urban waste in tourist cities needs comprehensive global research efforts and proceeded action as for metropolitan areas huge impact and load on waste management is generated. Waste management and resource conservation strategies are prepared in state-of-the-art level however implementation and future improvement of the current situation is crucial. Some examples in waste prevention and management for better tourism, waste and resource management are provided in the paper as outcomes from Horizon2020 project "Urban Strategies for Waste Management in Tourist Cities". The policy and tools based on information gathered by scientists, municipal and NGOs experience (e.g. separation of bio-waste in catering industries, "sin-wastes" as from the bars, nightclubs and smoker places, reuse of unnecessary items that can serve for others and many more) are described. In addition, regulatory instruments (e.g. ban of plastic bags, reduction of allowed bio-waste in landfilling), economic instruments (taxes) and voluntary agreements (e.g. deposit systems; cleaning actions by volunteers) might be used to implement and elaborate the situation within environmental management and prevention practices in tourist metropolitan cities. Food waste prevention, beach and littoral management, special practices for festival waste and large amount specific waste generating facilities (e.g., entertainment industry, cruises etc.) are of high importance. The future outlook may be concentrated on digitalizing of waste flows and using the "big data" concept for better and smarter waste management.

Session 2

Morning, March 21 (Thursday)

Time: 10:50~12:05

Venue: Erasmus 2

5 presentations-Topic: “Waste Management and Sustainable Development”

Session Chair: Prof. Zhijun Peng

M0013-A Presentation 2 (11:05~11:20)
Developing a Sustainability Rating System for New and Existing Healthcare Facilities in Egypt
Esraa ElMitainy and S. M. El-Haggar
The American University in Cairo

Abstract—Healthcare is one of the core operating sectors all over the world, to the extent that the International Sustainable Development Goals (SDGs) addressed the importance of Universal Healthcare directly in goal number 3 “Good Health and Well-being” and the eradication of healthcare problems in 3 other different goals. The World Health Organization (WHO) estimated the increase of healthcare expenditure to be $2 - $4 Billion USD by the year 2030 as a result of Climate change. As a developing country, Egypt has a fast growing healthcare sector with expenditure of 157 US$ per capita in the year 2015, increasing 216% over a 16 year period.

This rapid increase requires immediate intervention to direct the healthcare sector towards a more sustainable development scheme to reduce the cost of the service, while maintaining a high service level for the patience and reducing the environmental impacts of operation, which are the pillars of sustainable development. The aim of the work presented is to develop Sustainability guidelines for New and Existing Healthcare facilities suitable to the Egyptian context that encourages the facilities to operate more sustainably. With more than 2,000 existing hospitals and around 150,000 smaller healthcare facilities, sustainable operation in such an important sector becomes a necessity.

The proposed rating system is based on a points system with the awardable levels of achievement: Bronze, Silver, Gold and Platinum. The points divided among three main categories: Energy, Water and Habitat, and additionally, a general prerequisite is added for the top management commitment towards sustainability. The Habitat category is further divided into three different sections covering the site sustainability, indoor environmental quality and materials. The system divides the facilities into new and existing, with each type having different awardable points that takes into consideration the differences in applicability between the two types of facilities.

Session 2

Morning, March 21 (Thursday)

Time: 10:50~12:05

Venue: Erasmus 2

5 presentations-Topic: “Waste Management and Sustainable Development”

Session Chair: Prof. Zhijun Peng

M0064-A Presentation 3 (11:20~11:35)
Public participation on Solid waste Management for Motels in Phatthalung Province, Thailand
Sunisa Kongprasit, Peeranart Kiddee, Anut Kiriratnikom
Thaksin University, Thailand

Abstract—Waste management is a direct impact by tourist business for the community. Lan Khoi Municipality is another area in Phatthalung Province that has faced with tourists as it famous for water rafting activity. The purpose of this action research was to study and promote public participation in solid waste management for motels in the area. The study drew on in-depth interviews of key informants and focus groups. The data were analyzed using content analysis, descriptive statistics, i.e., frequency, and percentage. Three phases of public participation were applied during 2017; action plan, in situ survey and finding solutions. The study revealed that public participation was divided into 6 steps comprising; 1) inviting for participants 2) informing the participants 3) making decision 4) involvement 5) collaboration and networking and 6) community empowerment. Stakeholders involvement including 23 motels, Lan Khoi Municipality Papayom District, Thaksin University and Phatthalung Provincial Offices of Natural Resources and Environment. Impacts of participatory processes in this study revealed some beneficial and academic relationships. To promote the public participation in community, community should be participating ongoing plans and management of solid waste management. Moreover, the community required a clear mandate for solid waste management and enhancing the potential of leadership and the board. Apart from this, stakeholder’s knowledge on waste separating and waste management were also significant to promote the sustainable development.

Session 2

Morning, March 21 (Thursday)

Time: 10:50~12:05

Venue: Erasmus 2

5 presentations-Topic: “Waste Management and Sustainable Development”

Session Chair: Prof. Zhijun Peng

M0054 Presentation 4 (11:35~11:50)
Technical and Social Assessment of Biogas in Yogyakarta and Gorontalo, Indonesia
Dintani Y.N. Naimah, **Margaretha Arnita Wuri**, Ambar Pertiwiningrum, Rachmawan Budiarto, Tri Pratiwi Handayani Gyeongsang
Universitas Gadjah Mada, Indonesia

Abstract—As an agricultural country, Indonesia try to diverse its energy sources to biogas, especially to reduce fossil energy in household sector. However, biogas plants in Indonesia are barely evaluated after the installation. Therefore, this study was conducted to fill this gap. This study investigated technical and social conditions of biogas implementation in Plosokerep and Wonolelo village, Yogyakarta and Tanjung Harapan and Dumati village in Gorontalo. Three out of four communal biogas plants assessed in this study are still operating. Yet, sustainability of the plants faces several challenges, i.e. poor biogas installation (e.g. missing water trap and leaking gas holder), missing system for equal biogas distribution, missing supply chain for biogas spare parts, and weak polycentric local governance. Several recommendations to improve this condition are installation of biogas monitoring in distribution pipeline, regular monitoring and assistance, development of supply chain network with commercial entities, and distribution of power and responsibility to ensure operation of the system if one of the stakeholders failed to perform.

Session 2

Morning, March 21 (Thursday)

Time: 10:50~12:05

Venue: Erasmus 2

5 presentations-Topic: “Waste Management and Sustainable Development”

Session Chair: Prof. Zhijun Peng

M0064-A Presentation 5 (11:50~12:05)
Public participation on Solid waste Management for Motels in Phatthalung Province, Thailand
Sunisa Kongprasit, Peeranart Kiddee, Anut Kiriratnikom
Thaksin University, Thailand

Abstract—Waste management is a direct impact by tourist business for the community. Lan Khoi Municipality is another area in Phatthalung Province that has faced with tourists as it famous for water rafting activity. The purpose of this action research was to study and promote public participation in solid waste management for motels in the area. The study drew on in-depth interviews of key informants and focus groups. The data were analyzed using content analysis, descriptive statistics, i.e., frequency, and percentage. Three phases of public participation were applied during 2017; action plan, in situ survey and finding solutions. The study revealed that public participation was divided into 6 steps comprising; 1) inviting for participants 2) informing the participants 3) making decision 4) involvement 5) collaboration and networking and 6) community empowerment. Stakeholders involvement including 23 motels, Lan Khoi Municipality Papayom District, Thaksin University and Phatthalung Provincial Offices of Natural Resources and Environment. Impacts of participatory processes in this study revealed some beneficial and academic relationships. To promote the public participation in community, community should be participating ongoing plans and management of solid waste management. Moreover, the community required a clear mandate for solid waste management and enhancing the potential of leadership and the board. Apart from this, stakeholder’s knowledge on waste separating and waste management were also significant to promote the sustainable development.


Lunch	**12:05~13:30**

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M4003 Presentation 1 (13:30~13:45)
Mechanical Characterstics of Hardened Concrete with the Usage of C.E.T.P. Sludge as Replacement of Cement
Satvik Pratap Singh, Anantha Singh T.S., Niragi Dave, Manish Upadhyay, Pranjal Chaudhary
School of Technology, Pandit Deendayal Petroleum University, India

Abstract—The objective of this paper is to present the development and assessment of finite element (FE) models used for analyzing projectile penetration depth in targets made from conventional (23 MPa) to very-high strength concretes (157 MPa). Results from the FE models were compared with experimental values. The effects of varying concrete compressive strength, projectile diameter, nose shape, and striking velocity on the penetration depth of the targets were captured. Two concrete constitutive material models, the Holmquist-Johnson-Cook and the Advanced Fundamental Concrete models, were implemented in the FE analyses for determining their suitability in predicting penetration mechanics with reasonable accuracy. In most cases, the finite element results were able to predict penetration depth experimental values within a total root mean square of 10% or less considering a wide-range of projectile striking velocities. Both concrete constitutive models were shown to be suitable for penetration mechanics problems. However, based on the findings of this paper, caution should be exercised in applying the material models for targets made from harder aggregates such as quartz.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M2004 Presentation 2 (13:45~14:00)
3D Printable Composites for Productive and Sustainable Built Environment
Sook-Fun Wong, Kim-Cheng Tan, Wen-Suey Ferne Leong, and Yin-Yen Lim
Temasek Polytechnic, Singapore

Abstract—This paper reports the development of 3D printable composites and laboratory-scale 3D printing technology, which are capable of producing building and construction components of properties and performance comparable to conventional casting methods. The slump test was carried out to examine the consistency and workability of fresh 3D printable eementitious mixtures; whereas the hardened density and compressive strength measurements were conducted to assess the performance of hardened 3D printable cementitious composites.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: "Building Materials and Concrete Technology"

Session Chair: Professor Hasan N. Katkhuda

M4011 Presentation 3 (14:00~14:15)
Compressive Strength of Marginal Lateritic Soil Stabilized with Bottom Ash Geopolymer as a Pavement Material
Cherdsak Suksiripattanapong, Niti Tuntawoot, Jaksada Thumrongvut, Nattiya Wonglakorn, Suppharutchaya Chongutsah and Wisitsak Tabyang
Department of Civil Engineering, Faculty of Engineering and Architecture, Rajamangala University of Technology Isan, Thailand

Abstract—This research investigated compressive strength and microstructure of marginal lateritic soil stabilized with bottom ash geopolymer as a pavement material. The marginal lateritic soil (MLS) was obtained from a borrow pit in Chaiyaphum Province. Bottom ash (BA) was obtained from the Mae Moh power plant of the Electricity Generating Authority of Lampang Province. This research used the MLS:BA ratios of 70:30, 50:50 and 30:70 and Na_2SiO_3:NaOH ratios were 0:100, 10:90, 30:70, 50:50, 70:30 and 80:20. The test results showed that the Na_2SiO_3:NaOH ratios do not affect the unit weight of marginal lateritic soil stabilized with bottom ash geopolymer. The 7-day compressive strength of marginal lateritic soil stabilized with bottom ash geopolymer increases with the increase in Na_2SiO_3:NaOH ratio (higher Na_2SiO_3 content) because silica from Na_2SiO_3 reacts with silica and alumina from bottom ash resulting in geopolymer gel or sodium aluminosilicate hydrate (N-A-S-H). All 7-day UCS values are greater than the minimum strength requirement for UCS of 689 kPa specified by the Department of Highways, Thailand.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M4023 Presentation 4 (14:15~14:30)
Enhancing the Mechanical Properties of Concrete Using Pitch-Based Carbon Fibers
H. Almuhanna
Energy and Building Research Center (EBRC), Kuwait

Abstract—This paper tested the mechanical properties of adding pitch-based carbon to the concrete mix, and investigated the thermal behavior and electrical conductivity. The experiment made use of recycled pitch-based carbon fibers with length ranging from 7 mm to 15 mm. The recycled carbon fibers were added to the concrete mix in proportions of 0.5%, 1%, 1.5% and 2% of the concrete weight. The American Society for Testing and Materials (ASTM) procedure was used in the mix design and testing of the concrete specimens. The use of short carbon fibers in the concrete mix led to improvement in its tensile and compressive strengths. The thermal conductivity of the concrete composite decreases with increasing fibers. The use of fibers creates void in the concrete leading to a higher thermal resistivity of the concrete composite. The carbon fiber reinforced concrete creates a higher electrical conductivity.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: "Building Materials and Concrete Technology"

Session Chair: Professor Hasan N. Katkhuda

M4036 Presentation 5 (14:30~14:45)
Effect of C.E.T.P Sludge on the Physical and Elastic Behaviour of Concrete
Pranjal Chaudhary
Pandit Deendayal Petroleum University, India

Abstract—Production of C.E.T.P sludge and its recycling is a major concern in today's world. The major part of the dry matter content of this sludge consist of nontoxic inorganic compounds. The large volume of sludge is dumped in grounds for disposal which leads to wastage of the land in huge mass. The construction sector seeks economic and ecological cement replacement materials in order to meet an increasing demand for concrete. The physical, mechanical properties and the effect of dry sludge on concrete performance was observed. This paper presents the research which was conducted to observe the role of sludge waste in different proportion so that the final property of concrete mix was as same as the control mix. The cement has been replaced by CETP sludge accordingly in the range of 2%, 5% and 10% and a reference concrete mix was also made to compare the results with these cubes. Concrete mixtures were produced, tested and compared in terms of compressive strength to understand its mechanical behavior. This was done by the means of UTM (universal testing machine) after an interval of 28, 90, 180 days respectively. The concrete mixes were also subjected to flexural testing which comes out in the range of 10% of the compressive strength of respective mixes. Water absorption values were also calculated on a period of 28 days, 90 days and 180 days. The compressive strength values got decreases as the sludge content got increase.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M1001 Presentation 6 (14:45~15:00)
Finite Element Analyses of the Penetration Depth of Ogive-nosed Projectiles into Conventional and Very-High Strength Concrete Targets
Girum Urgessa and Robert Sobeski
George Mason University, Fairfax, VA, USA

Abstract—In the present age, the waste generated from the industries is the major concern for the environment, health and cause of land filling. To reduce disposal and pollution problems emanating from these industrial waste, it is essential to develop profitable building material from them. Recycling of such wastes and using them in construction materials appears to be viable solution not only to the pollution problem but also an economical option in construction. In view of utilisation of such waste in construction materials, this paper reports on the mechanical properties of utilisation of waste sludge obtained from Common Effluent Treatment Plant(C.E.T.P) in concrete. To evaluate the effect of dry sludge on concrete performance, its physical and mechanical properties were studied. In this research an attempt is taken to bring a comparison of the sludge waste in various proportions so that the final product property of concrete mixture is same as the reference (with 0% sludge) mix. Waste sludge material was replaced with cement in various percentages as 2%, 5%, 10%. Reference concrete mix is also made for comparative reasons. To characterise the mechanical behaviour of the concrete, compressive strength test was conducted by means of Universal Testing Machine (destructive) after interval of 28 days, 90 days, 180 days respectively. Water absorption test was also conducted at interval of 28, 90, 180 days so as to get an idea of change in the water percolation property of concrete. Tests results indicated the positive relationship between 2% 5% replacement of C.E.T.P. sludge with compressive strengths. The same results obtained for 10% replacement for Water absorption ratios likely to be unfavourable.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M4004 Presentation 7(15:00~15:15)
Correlation between compressive strength using Schmidt Rebound Hammer Testing Method and Universal Testing Machine Method (non-destructive v/s destructive testing method) of Concrete (Replacement of cement with C.E.T.P sludge by 2%, 5% and 10%)
Neelabh Singh, Anantha T. S., Niragi Dave, Satvik Pratap Singh, Pranjal Chaudhary
School of Technology, Pandit Deendayal Petroleum University, India

Abstract—This paper aims to study the correlation between Non-destructive testing of concrete also known as Schmidt Rebound Hammer Testing and Destructive testing methods which is testing in Universal Testing Machine (UTM). The rebound hammer was invented by Ernst Schmidt. The hammer measures the rebound of a spring-loaded mass impacting against the surface of the sample. The test hammer will hit the concrete at a defined energy. Its rebound is dependent on the hardness of the concrete and is measured by the test equipment. By reference to the conversion chart, the rebound value can be used to determine the compressive strength. The universal testing machine of 1000kN capacity was used to test the compressive strength of concrete. In this research work, industrial sludge from a common effluent treatment plant was utilized as a replacement of cement. This sludge was recovered from The Green Environment Services Co-op Society Ltd., Vatva, Gujarat. Cement is replaced by C.E.T.P (Common Effluent Treatment Plant) sludge by 2%, 5% and 10%, where cubes of different ages such as 28 days, 90 days and 180 days were casted.

Session 3

Afternoon, March 21 (Thursday)

Time: 13:30~15:30

Venue: Erasmus 2

8 presentations-Topic: “Building Materials and Concrete Technology”

Session Chair: Professor Hasan N. Katkhuda

M4043 Presentation 8(15:15~15:30)
Seismic Retrofitting of Reinforced Concrete Structures under Different Retrofitting Schemes
Archana T. Kandy, Gul Jokhio and **Abid Abu-Tair**
The British University in Dubai, Dubai, UAE

Abstract—The buildings that were designed and constructed according to old codes may not satisfy the requirements of the presently used seismic codes and design practices. Therefore, it is crucial to reassess these buildings. Buildings, which were damaged in past earthquakes or the existing buildings which are deficient at resisting seismic forces need to be retrofitted for better performance. Seismic evaluation is a necessary step before the retrofitting procedure to identify the most vulnerable components of a building during an expected earthquake. The seismic rehabilitation process aims to correct these deficiencies by increasing strength, stiffness or deformation capacity, and improving connections. The present study deals with the seismic retrofitting of two structures located in diverse seismic zones i.e. New Delhi and Mexico City. Each structure was retrofitted under two different schemes and the results were compared to identify the better method of retrofitting.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M1011 Presentation 1 (13:30~13:45)
Visible light driven photocatalytic nanocomposite for the degradation of Rhodamine B in water
Rodrigo Rubio-Govea, Carolina Orona-Návar, Netzahualpille Hernández, Alejandra García-García, and Nancy E. Ornelas-Soto
Tecnológico de Monterrey, Mexico

Abstract—Parallel to the fast growing of population around the world, there has been a rapid increase in the amount of toxic organic waste that end up in water bodies, which is a threat to human health and to the environment. Because of this, there is need for the development of materials that are able to degrade them while using the sunlight. In this work, a Bi2O3/rGO/MoO3 composite was successfully synthesized by a solvothermal method under ambient pressure and low temperature. SEM, STEM and XRD techniques were used to characterize the morphological and crystallographic properties of the composite. It was demonstrated that the amount of GO in the synthesis of the composite has a great effect in the photocatalytic activity and it was found that the best ratio between Bi2O3 and GO was 300:1. The synthesized composite photocatalyst with ratio of 300:1 presented and enhanced photocatalytic activity for Rhodamine B as it was able to degrade around 70 % after 240 min under visible light irradiation, compared to pristine Bi2O3 that was able to degrade around 55 %. Results from this study illustrate the fabrication of a new ternary composite, which shows promising results for its application in the degradation of organic pollutants in water.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M0068 Presentation 2 (13:45~14:00)
Ethylendiamine (EDA) loading on MOF-5 for enhanced carbon dioxide capture applications
Aisha Asghar, Naseem Iqbal, Tayyaba Noor, Junaid Khan
National University of Sciences and Technology, Pakistan.

Abstract—Reducing carbon dioxide levels in atmosphere presents greatest challenge in controlling global climate change. Each stage of Carbon Capture and Storage (CCS) strategy requires specialized materials. Metal–organic framework, being highly porous and crystalline materials are captivating vast scientific attention for exploring their potential in gas adsorption applications. This research work presents an attempt to synthesis post amine modified MOF materials for enhanced carbon dioxide capture applications. Thermogravimetic studies reveal that EDA MOF-5 is far more thermally stable then MOF-5; moreover synthesis can be performed successfully with recycled solvent (DMF). Carbon dioxide adsorption studies represents better carbon dioxide capture tendency for MOF-5 and EDA MOF-5 i.e., 5 mmol/g and 3.9 mmol/g respectively at 0°C.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M1012 Presentation 3 (14:00~14:15)
Dye Sensitized Solar Cell (DSSC) by using a natural pigment from microalgae
Angelica Orona-Navar, I. Aguilar-Hernández, T. López-Luke, Adriana Pacheco, N. Ornelas-Soto
Tecnológico de Monterrey, Mexico

Abstract—Photovoltaic devices such as dye sensitized solar cells (DSSC), are an interesting alternative source of renewable energy because they convert solar radiation into electric current. In these solar cells, the use of natural pigments as sensitizers represents complete biodegradation, simple preparation technique, low cost, non-toxic pigments, high reduction of use of noble metals and cost of chemical synthesis. A natural pigment obtained from the microalga Scenedesmus obliquus was tested as sensitizer of a DSSC. The absorption characteristics and the photoelectrochemical parameters were studied to determine the photoconversion efficiency of the cell sensitized with this pigment. The sensitization was carried out by the pipetting technique and the photovoltaic efficiency was obtained under standard conditions under 1 sun illumination (AM 1.5G at 100mW/cm2). The dye-sensitized solar cell was assembled as a sandwich scheme, where the photoelectrode faced the platinum counter electrode and an iodide electrolyte solution was between them. The energy conversion efficiency reached was 0.064%, the fill factor 69.3%, open circuit voltage 0.502 V and short-circuit photocurrent density 0.185 mA cm-2. According to these results, the extract obtained from the microalga Scenedesmus obliquus shows promise as a sensitizer for solar cells.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M1013 Presentation 4 (14:15~14:30)
Removal of Triclosan in Municipal Wastewater by Using an Enzymatic Method
S. Lugo-Bueno, J. E. Becerril-Bravo, J. A. Barrios-Perez, A. Cano, and N. Ornelas-Soto
Tecnológico de Monterrey, Mexico

Abstract—Currently, wastewater treatment has received attention as one of the most relevant activities to ensure environmental sustainability. This is due to the increased consumption of chemicals as many of them enter directly or indirectly into the environment through effluent discharge, causing pollution of water bodies, which consequently have negative effects in humans.
Herein, in this study was focused on the elimination of Triclosan (Contaminant of Emerging Concern, CEC) in wastewater, by using immobilized lignolitic enzymes (laccases). Moreover, an electrochemical oxidation pretreatment was applied over the effluents in order to improve the biocatalytic removal performance of Triclosan. Laccase from P. sanguineus CS43 was covalently bonded onto titanium dioxide (TiO2) nanoparticles whose surface was previously functionalized with (3-aminopropyl)-triethoxysilane (APTES) and glutaraldehyde. The optimized parameters used in the electrooxidation for pH, current density and treatment time were 2, 10 mA/cm2, and 76 min, respectively. The monitoring of triclosan concentration was carried out by means of gas chromatography coupled to mass spectroscopy (GC-MS).

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M0081-A Presentation 5 (14:30~14:45)
Influence of pH and Natural Organic Matter on the Removal of CuO Nanoparticles form Aqueous Suspension via Coagulation
Rizwan Khan, Muhammad Ali Inam, Saba Zam Zam and Ick Tae Yeom
Graduate School of Water Resources, Sungkyunkwan University (SKKU) 2066, Suwon 16419, Korea

Abstract—The increased use of engineered nanoparticles (ENPs), such as copper oxide nanoparticles (CuO NPs) in commercial products and application raises concern regarding its possible release into freshwater sources as well as its adverse effects on the ecosystem. Therefore, it is essential to investigate the coagulation efficiency of CuO NPs during the water treatment process. In the present study, the effect of pH and hydrophobic /hydrophilic natural organic matter (NOM), i.e., humic acid (HA) and salicylic acid (SA) on the removal of CuO NPs by ferric chloride (FC) coagulation was evaluated. The results indicated that pH significantly affects the coagulation efficiency, where 10-60% CuO NPs removal was achieved under extreme acidic/alkaline conditions. However, at neutral pH, up to 90% removal rate was observed with lower FC dosage (0.2 mM). The coagulation efficiency and mechanism were strongly affected by the type of Fe species present in the aqueous phase, which is mainly controlled by pH. The higher concentration of both HA and SA slowed CuO NPs agglomeration rate, thereby improve the colloidal stability due to adsorbed NOM molecules onto NPs surface. The presence of hydrophobic NOM needs higher FC dosage (0.6-0.8 mM) than hydrophilic NOMs (0.25-0.35 mM) to achieve the similar CuO NPs coagulation efficiency. The result of Fourier transform infrared (FT-IR) analysis of FC composite flocs confirm that the effect of charge neutralization and enmeshment of coagulant might be a possible removal mechanism. The finding of the current study may provide critical information in the prediction of fate, mobility, and removal of CuO NPs during FC coagulation phase of the water treatment process.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M0017 Presentation 6 (14:45~15:00)
The study progress and application of dithionite reduction technology in the treatment of environmental pollutants
Wei Song, Zhuoyue Wang, **Ji Li**, Caixia Fu, and Xiaolei Zhang
Huazhong University of science and technology(HUST),China

Abstract—Environmental pollution has seriously influenced the human health and ecological security. As a strong reducing agent, dithionite has been gradually drawing the attention of researchers and engineers in the environmental field. Studies had been conducted by employing dithionite to treat the pollutants such as halogenated organic compounds, oxyacid salts, and heavy metals. However, few works were focusing on the dithionite reduction, especially the dithionite detection. This report aimed to review the characteristic of dithionite including the chemical properties and detection methods. The research progressing on the treatment of environmental pollutants by the reactive species generated from dithionite was also summarised. However, ultraviolet seemed to be the only choice of the dithionite activation methods, no matter what pollutant was to be degraded. Accordingly, the research, on the development of dithionite detection and activation methods, was prospected.

Session 4

Afternoon, March 21 (Thursday)

Time: 13:30~15:15

Venue: Mercator 1

7 presentations-Topic: “Environmental and Chemical Engineering”

Session Chair: Prof. Raf Dewil

M1006 Presentation 7 (15:00~15:15)
Amperometric biosensor based on electrodes modified with GO, ERGO and immobilization of oxidoreductase enzymes
Nancy E. Ornelas-Soto, Rodrigo Rubio-Govea, David P. Hickey, Shelley D. Minteer, and Alejandra García-García
Tecnológico de Monterrey, Mexico

Abstract—A novel laccase-based amperometric biosensor was developed through the modification of Toray Paper electrodes with layered two-dimensional (2D) graphene oxide (GO) and electrochemically reduced graphene oxide (ERGO). The effects of the electrochemical reduction were evaluated in the performance of the electrodes in detection of dopamine (DA). Evaluation of biosensors made with two isoforms of the enzyme laccase from the white-rot fungi Pycnoporus sanguineus CS43 (LacI and LacII) was demonstrated for the first time. It was found that when electrodes were modified with GO and ERGO their performance was enhanced as they presented an increase in the maximum current density (Jmax) and the Michaelis-Menten constant (KM), when compared to unmodified electrodes. These results confirm that electrodes prepared with GO, ERGO, LacI and LacII are excellent candidates to produce sensing platforms with good sensitivity.

Coffee Break	**15:15~15:45**

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4013 Presentation 1 (15:45~16:00)
Flexural Response of JFRP and BFRP strengthened RC Beams
Panuwat Joyklad, Suniti Suparp and Qudeer Hussain
The Department of Civil and Environmental Engineering, Srinakharinwirot University Thailand

Abstract—In the last few decades, many studies have been conducted on the flexural strengthening of reinforced concrete (RC) beams using different strengthening techniques such as concrete, steel and artificial fiber reinforced polymer composites (FRP). Among artificial FRPs, mainly glass, carbon and aramid fibers have been considered extensively. This study presents an experimental investigation on the flexural strengthening of small scale RC beams using natural fibers such as jute fiber reinforced polymer composites (JFRP) and basalt fiber reinforced polymer (BFRP) composites. A total number of five RC beams were constructed and tested under three point bending loading scheme to investigate the flexural response of both un-strengthened and FRP strengthened RC beams. Two types of strengthening techniques were adopted to strengthen RC beams. In strengthening technique A, the fiber was applied only at the tension side of the RC beams whereas in strengthening technique B, the fiber was applied both at sides and at the bottom in the form of U shape. The results indicate that use of both strengthening materials such as JFRP and BFRP is very effective to enhance ultimate load carrying capacity of RC beams. Further it was found that strengthening technique B is more efficient as compared with the strengthening technique A.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4037 Presentation 2 (16:00~16:15)
Improving the Torsional Capacity of Reinforced Concrete Beams with Spiral Reinforcement
Hasan N. Katkhuda, Nasim K. Shatarat and Ahmad A. AL-Rakhameen
The Hashemite University/Civil Engineering Department, Zarqa, Jordan

Abstract—An experimental program is carried out in this paper to test nine reinforced concrete (RC) beams in order to study the torsional behavior of the beams using transverse reinforcement under different configurations: ordinary, continuous rectangular spiral, continuous circular spiral, and continuous advanced rectangular spiral configuration. The experimental torsional capacity results are compared with the theoretical values determined by the ACI 318-14 code. The results showed that the use of continuous spiral and rectangular reinforcement as transverse reinforcement enhanced the torsional capacity up to 17 % higher than using traditional reinforcements, and the ACI318-14 torsion equations are applicable and conservative for predicting the ultimate torsional capacity for beams with continuous rectangular and spiral reinforcement.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4010 Presentation 3 (16:15~16:30)
Shear Strengthening of RC Beams using Polyester Rope
Suniti Suparp, Panuwat Joyklad, and Qudeer Hussain
The Department of Civil and Environmental Engineering, Faculty of Engineering, Srinakharinwirot University, Thailand

Abstract—This paper presents an experimental investigation on the shear strengthening of reinforced concrete (RC) beams using polyester rope (PR). A total of five small scale RC beams were cost and tested under four point bending scheme. One beam was tested as un-strengthen to serve as a control beam whereas remaining four beams were strengthened using polyester rope prior to the test. PR was applied in the shear critical region using two different kinds of configurations such as configuration A and B. In the configuration A, the PR was applied in the form of strips whereas in configuration B, the PR was applied over the whole shear critical region of beams. Further in both strengthening configurations, the PR was applied in two different thicknesses i.e., one layer and three layers. The experimental results indicate that use of PR is every effective to alter the response of RC beams and to enhance the shear strength of RC beams. There is found increase in load carrying capacity with an increase in the PR thickness. It was also observed that strengthening configuration B is superior to the strengthening configuration A in terms of ultimate load carrying capacity of RC beams.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4025 Presentation 4 (16:30~16:45)

Experimental Investigation of GFRP Hybrid Full-scale Bridge Deck Panels Subjected to AASHTO Design Truck Wheel Load

Hesham Tuwair, Jonathan Drury, and Jeffery Volz

Department of Civil and Environmental Engineering, Dhofar University, Salalah, Sultanate of Oman

Abstract—This paper aims to demonstrate the feasibility of using a novel glass fiber-reinforced polymer (GFRP) sandwich panel in bridge deck applications. This new system integrates a polyurethane foam core that is sandwiched between two GFRP facings. With the purpose of investigating the performance of this new system, experimental static testing was performed. The investigation focused on the ultimate flexural strength capacity, stiffness, and panel-to-panel connection of the proposed bridge deck. The results of the flexural testing showed that the tested bridge deck panels exceeded the AASHTO Design Code Strength requirements by nearly three times. In addition, the bonded butt-type sandwich panel-to-panel connection transferred the loading between the panels beyond that required by code.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M1002 Presentation 5 (16:45~17:00)
A comparative study of the environmental impact from transportation of prefabricated building elements using wood or concrete
Fredrik Lindblad, Karolina Lehman and Elina Aggerstam
Linnaeus University – Faculty of Technology, Institution of Mechanical Engineering, Växjö, Sweden

Abstract—As many as 240 of Sweden's 290 municipalities estimated that there existed a housing shortage within their region. Therefore, many homes are required to be built in a relatively short period to fulfil the demand. Production is required to take into consideration sustainable building solutions to reduce climate impact. Hence, logistics must become more efficient to contribute to an environmental solution, and the use of transports should be examined reducing the effect of heavy vehicles to meet the climate objectives.
The focus of this study is to identify differences between the transportation of materials for building projects based on wood or concrete. Different key performance indicators were derived from the collected data and presented in this study, which resulted in two formulas focusing on transport- and environmental impact.
The KPI’s indicates that the weight of the load does not have an important impact on the amount of emitted CO2, but it is the number of transports associated with the projects that are the main problem regarding emissions and environmental impact. Hence, the number of transports and the amount of CO2 emissions can be calculated by the support of the formulas derived from this study.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4006 Presentation 6 (17:00~17:15)
Implementation of Real-time Seismic Diagnostic System on Emergency Management Center Buildings: In Case of the 2018 Osaka earthquake
Kazuhiro Hayashi and Taiki Saito
Department of Arch. and Civil Eng., Toyohashi University of Technology Toyohashi, Japan

Abstract—Currently in Japan, a field survey by building experts is required to determine whether earthquake-afflicted buildings can continue to be used after an earthquake, so that official decisions on national and municipal-level assistance cannot be made without the completed survey results. Authors plan to introduce an automated real time seismic diagnostic system to the disaster prevention centers. This system consists of the seismometers installed in the building and observation data are saved in Internet clouds. Immediately after the earthquake, the system performs a simple diagnosis on the residual seismic performance of the building and notifies the results by e-mail. The MDOF lumped-mass model for use in the simple diagnosis is assumed to have normal tri-linear hysteretic characteristics at each story, using constants determined by referring to the analytical 3D frame model. This paper explains the proposed system and introduces the results of trial operation to the actual city hall buildings at the 2018 Osaka earthquake. After the Osaka Earthquake, the system was able to notify disaster prevention officials at the city hall of the results of the simple diagnosis within two minutes after the earthquake ended.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4012 Presentation 7 (17:15~17:30)
Discrete element modelling of triaxial compression test of QH-E lunar soil simulant under hydrostatic compression
Yunli Li, Weilie Zou, Wenping Wu, Xihua Chu
School of Civil Engineering,Wuhan University, China

Abstract—In this paper, triaxial compression mechanical properties of QH-E lunar soil simulant under hydrostatic compression path is investigated by using discrete element method (DEM) simulations. The volumetric strain characteristics of QH-E lunar soil simulant under hydrostatic compression path are discussed. The results show that volumetric strain gradually increases with the increase of confining stress. At low confining stress levels, volumetric strain increases quickly, when the confining stress increased gradually to the conventional levels, volumetric strain increases slowly, the volumetric strain curve becomes more and more flat. At the same confining stress, the volumetric strain increases with the increase of the initial porosity, while decreases with the increase of the friction coefficient. Under low confining stress, the gaps of volumetric strain caused by the change of porosity is not large, but at the conventional stress levels, the gaps of volumetric strain caused by the change of porosity become more and more larger. Meanwhile, the reduction of volumetric strain caused by the increase of friction coefficient under low confining stress is smaller than under conventional confining stress.

Session 5

Afternoon, March 21 (Thursday)

Time: 15:45~17:45

Venue: Erasmus 2

8 presentations-Topic: “Architectural and Civil Engineering”

Session Chair: Assoc. Prof. Girum Urgessa

M4022 Presentation 8 (17:30~17:45)
Experimental Study on Fracture Behavior of RC Piles and Superstructure Dynamic Response using Centrifuge Model
Yuichi Miyachi, Kazuhiro Hayashi, Taiki Saito
Department of Arch. and Civil Eng., Toyohashi University of Technology, Japan

Abstract—In past earthquake disasters, many pile foundations of building were damaged. Although many researchers have examined the relationships related to soil-pile-superstructure interaction, few studies have been conducted to examine the damage of piles based on experiment. This study investigated the relationship between the pile fracture and dynamic response of a superstructure when the footing is embedded. Also, we tried evaluating the ultimate shear strength of a pile foundation when the pile was shear fractured. The shaking table test under a centrifuge field was conducted to investigate the behavior of the RC pile foundation. The diameter of the pile model is 25mm (1.25m in prototype scale). This pile model consists of mortar, four main reinforcement bars and a hoop reinforcement bar. The experimental model was set in a laminar shear box filled with Toyoura dry sand. The density of the soil was 60%. In the shaking table test, 11 different amplitude Rinkai waves were input under a 50G field. In the result of the experiment, the heads of the pile models were shear fractured. It caused the reduction of vibration transmissibility between the superstructure and the ground surface. The maximum inertial force of the superstructure mostly corresponded to the total value of the ultimate shear strength calculated using the shear strength of the pile model, the coefficient of pile group effect, and the resistance force of footing.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4031 Presentation 1 (15:45~16:00)
The Application of Road Safety Audit on Motorways Thailand
Sakchai Rakkarn, Tassana Boonyoo, Bhawat Chaichannawatik, Chalat Tipakornkiat, Pramuk Prabjabok
Graduate School, Kasem Bundit University, Bangkok, Thailand

Abstract—Road Safety Audit (RSA) is the formal process of assessment for a safer road by an independent, multidisciplinary experts. This article shows an application of RSA on Inter City Motorway Route No. 7 (Bangkok - Chonburi) and No. 9 (Outer Bangkok Ring Road from Bang Pa In to Bang Plee). Safety problems were found and grouped on 9 main topics. They were 1) Alignment and Cross-Section, 2) Drainage, 3) Signs, 4) Markings and delineation, 5) Roadside Hazards, 6) Pavement, 7) Lighting, 8) Auxiliary lanes and 9) Others. According to the problems, the Inter City Motorway Divisions, Department of Highways had pay attention and adopted the corrections to obtain a safer driving for motorway users.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M0032 Presentation 2 (16:00~16:15)
Anthropogenic Heat Implications of Colombo Core Area Development Plan
N U Rathnayake, N G R Perera and M P R Emmanuel
University of Moratuwa, Sri Lanka

Abstract—Statistics on energy use and built density portrays Colombo as the largest consumer of energy and producer of waste heat in Sri Lanka, and the city is facing extensive growth permitted by current development plans. However, Colombo Core Area is threatened by Urban Heat Island effect (UHI). Anthropogenic heat impact on UHI is crucial and its future trends need to be studied before facilitating further development. In this paper we use Local Climate Zone classification to typify the study area into zones of similar climate. This is then integrated with population data, building electricity consumption and vehicle counts to map anthropogenic heat emission at local scale, under current and projected land-use change in Colombo. Results reveal that building waste heat makes the highest impact, in comparison to vehicle and metabolic heat. Thus, building density change, electricity consumption in each building and projected land use change, could have greater impact on anthropogenic heat flux at neighbourhood scale, which would further exacerbate the UHI problem at city scale.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4038 Presentation 3 (16:15~16:30)
Comparison Between Rental Housing Construction in China and the United States and Its Reflection
Jun Wang, Xi Chen
East China University of Science and Technology, China

Abstract—The problem of rental housing and affordable housing in China became important in recent years, especially on the mechanism system. This paper focuses on the phenomenon of the rapid development of rental housing construction in China in recent years, and sorts out the policy systems of the central government and local governments in the filed of rental housing. Meanwhile, this paper gives an introduction to the development process of rental housing in the United States, as well as its regulations, management, operation and other aspects, and expounds the experience of USA on the development of rental housing. Based on the experience of USA, this paper discusses issues that need to be considered in terms of laws and regulations on leasing, subjects of supply, applicable cities, management systems and derivative industries by combining China’s actual situation.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M2001 Presentation 4 (16:30~16:45)
Market development barriers for the Swedish wooden multi-family house industry
Fredrik Lindblad
Linnaeus University – Faculty of Technology, Institution of Mechanical Engineering, Växjö, Sweden

Abstract—The Swedish industry for wooden multi-family houses have in comparison with houses in concrete had a relatively small market share. This contradicts EU’s ambitions defined in the Europe 2020 strategy, focusing on development towards innovation, bio-economy and sustainability. These strategies highlight the importance of developing the wooden multi-family houses industry to fulfil the increased market demand combined with increased sustainability in the building industry.
This study aims to identify barriers enabling market growth for the Swedish industry producing wooden multi-family houses. Current barriers within the industry are reviewed by identifying areas restricting the development, e.g. the building process and procurement cycle. Thus, the goal is to find ways in which wooden multi-family houses could improve competitiveness compared to established solutions and increase its market share. The study was conducted with representatives from municipalities, developers, contractors, architects and real estate companies providing insights on new strategic possibilities in the building process.
The result identifies different barriers that exist in various stages of the value chain, from procurement to construction. Furthermore, it indicates that wooden multi-family houses could be a competitive solution by developing new strategies, mitigating the identified market barriers facilitating growth towards sustainable building solutions. These instructions give you basic guidelines for preparing camera-ready papers.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4027 Presentation 5 (16:45~17:00)
Comparing Roundabout and Metered Roundabout Performance under Different Traffic Conditions
Akmal Abdelfatah and Mohammad Alozn
the American University of Sharjah, Sharjah, UAE

Abstract—At-grade intersections are one of the most critical components of urban transportation networks. They are major impedance, which create a significant interruption to traffic flow. Traffic control is required to regulate the flow of at-grade intersections to achieve the greatest efficiency and reduce traffic delay for road network users. Several models and studies are performed to determine the control type while designing new at- grade intersections. This research focuses on comparing the performance of an intersection under two types of control, roundabouts and metered roundabouts. The experimental design evaluated a four-leg at-grade roundabout with several traffic congestion levels and different traffic distribution scenarios on the approaches. The research results show that metered roundabouts increase delay at high traffic volumes and does not improve the operation of roundabouts. In addition, the metered roundabouts may increase the delay at an intersection when the traffic on the approaches does not show a major approach or when there is a major approach with a significantly high left-turn percentage.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4040 Presentation 6 (17:00~17:15)
Renovation of flat roofs without the need to remove the existing roof deck
Lukáš Janda, Marek Kervitcer, Vladimír Tichomirov, Jiří Rozsypal
Faculty of Civil Engineering, Brno University of Technology, Czech Republic

Abstract—The solution principle: ,,Renovation of flat roofs without the need to remove the existing roof deck’’ is based on the calculation procedure of W. van der Spoela, based on the point or line perforation, when diffusion-open termination of the new waterproofing layer allows expansion of the water vapor from the existing layers. It leads to the improvement of the thermal-technical properties of the original thermal insulation during a short time. The aim of the whole project is to create complex methodology enabling sophisticated approach to the design solution for the repair or renovation of roof deck without the need for their complete remove. The project leads to considerable cost saving and loads by reduce of ecological loads by landfilling or waste disposal.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4032 Presentation 7 (17:15~17:30)
The Effect of Highway Gradient on Passenger Car Equivalents (PCE) of Two-Lane Highways in Thailand
Bhawat Chaichannawatik, Tassana Boonyoo
Department of Civil Engineering, Faculty of Engineering, Kasem Bundit University, Thailand

Abstract—This paper is aimed to introduce the effect of highway gradient on Passenger Car Equivalent (PCE) values of the 13 types of vehicles on two-lane highways in Thailand. The study began with a literature review of PCEs, and then 12 sections of two-lane highway were intentionally selected and traffic data collected by using digital video cameras during 6:00 A.M. to 6:00 P.M. for two days for each site. After decoding video signals to identify traffic volumes, speeds, and time headways for all vehicle types. Next, the Lagging Time Headway (LTH) method was selected and applied to find the average 15-minute PCE values for every site. The analysis results showed that a highway gradient is a significant factor related to the PCE value. Moreover, the recommended PCE value of a two-lane highway under uninterrupted traffic flow according to the highway gradient was proposed in this study.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4021 Presentation 8 (17:30~17:45)
Identification of Parameters for a Social Force Model in Evacuation Simulation Using Evolutionary Computation
Tetsuya Miyoshi
Hannan University, Japan

Abstract—Preparations for possible disasters should be made to minimize the damage caused by events such as fires and earthquakes. Several kinds of disaster simulations have been developed for this reason. Many evacuation simulation methods are based on multi-agent systems. These are considered to be useful and powerful methods of dealing with complex systems containing several elements, and have been proposed for safely guiding evacuees. The social force model is one approach that considers the influences and interactions between evacuees. When aiming to improve the precision of social force model simulations, the model parameters should be appropriately determined. In this paper, a method for determining the parameters used in the social force model is proposed by applying an evolutionary computing method to collect evacuee flow data.

Session 6

Afternoon, March 21 (Thursday)

Time: 15:45~18:00

Venue: Mercator 1

9 presentations-Topic: “Urban and Transportation Engineering”

Session Chair: Prof. Jan Baeyens and Prof. Akmal Abdelfatah

M4033 Presentation 9 (17:45~18:00)
In-depth Accident Investigation: Case Studies in Motorway of Department of Highways Thailand
Atitep Srikongsri, Tassana Boonyoo, Chalat Tipakornkiat, Usanee Raha, Kraisri Tippayawong
Graduate School, Kasem Bundit University, Bangkok, Thailand

Abstract—Accident investigation (AI) aim to answer what, how, why, when of accident happens. Moreover, we need to know what can be done to prevent a reoccurrence and what can be done to minimize accident consequences. Thirteen serious accidents were in-depth investigated by an expert team. Almost accident factors were human errors which occurred in daytime. Human errors are doze off, lack of driving experience, speeding and suddenly brake and lane changing of passenger drivers and pickup drivers. Accident causes by vehicle defects are related with wheel system such as exploding of tire and malfunction of braking system. Severity level could be reduced by fasten seatbelt, lower speed, non-illegal parking, truck protection system, reinstall and redesign of guardrail, crash cushion providing and budget allocation. We suggest engineering, education and law enforcement to minimize accident consequences.

Poster Session

March 21 (Thursday)

Time: 08:55-18:00

Venue: Erasmus 2

M0012 Presentation 1
Enhancement of Biogas Production from Pineapple Waste by Acid-Alkaline Pretreatment
B. Wichitsathian, J. Yimrattanabavorn and W.Wonglertarak
Suranaree University of Technology, Thailand

Abstract—The present study examined the effect of acid-alkaline pretreatment on pineapple waste for the performance on the anaerobic digestion. The acid-alkaline pretreatment was carried out by varying pH values from 2 to 12 using HCl and NaOH, and the mixtures were agitated at 250 rpm with the contact time of 24 hrs. The overall result showed that SCOD concentrations increased when pH values were increased. The value of biodegradability of raw waste was about 0.304. The BOD/COD ratios increased to 0.439 and 0.473 for pH 7 and pH 9, respectively. However, the BOD/COD ratios decreased for adjusted pH 12. For BMP test at pH 7, the removal efficiencies were 76.34%, 91.69% and 84.69% for TS, VS and COD, respectively, which were the higher efficiency than other conditions. It was also the optimal condition for the gas production rate because the pretreated pine apple waste was hydrolyzed much the organic matter into the soluble forms that can be immediately consumed by the anaerobic digestion process.

Poster Session

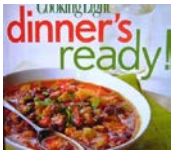
March 21 (Thursday)

Time: 08:55-18:00

Venue: Erasmus 2

M1023-A Presentation 2
Health Risk Assessment from PM10 Exposure in Bus Terminal, Phitsanulok, Thailand
Thunwadee Srithawirat
Pibulsongkram Rajabhat University, Phitsanulok, 65000, Thailand

Abstract—This research aimed to study indoor particles smaller than 10 microns (PM10) concentrations in ticket rooms of Phitsanulok bus terminal. The indoor PM10 were collected by a personal air pump for 8 hours/day at flow rate of 2.5 L/min. Results showed that the indoor PM10 concentrations of air conditioning system rooms were in the range of 25.73-188.41 µg/m3 (101.31 ± 39.15 µg/m3). For natural ventilation rooms, PM10 concentrations were in the range of 51.36-342.09 µg/m3 (154.93 ± 97.11 µg/m3). These indoor PM10 concentrations exceed the standard of indoor air quality for buildings in Thailand (an acceptable 8-hour value is 50 µg/m3). For heavy metal analysis, Fe was found to be highest, followed by Zn, Pb, Cu and Cd, respectively. However, the Pb content not exceed ambient air quality standard at 1.5 µg/m3. For exposure assessment in terms of Average Daily Intake (ADI) (in the unit of mg./kg.-body weight /day), as in adult group; staff in natural ventilation rooms had a highest ADI. Based on the results, improvement of the ventilation systems together with cleaning up the staff rooms regularly was recommended, especially in natural ventilation rooms.



Dinner	**18:00**

One Day Visit

March 22, 2019. (Friday) 9:00~17:00

(Tip: Please arrive at "Park Inn" at 8:50 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. (9:00-12:00am) Morning Visit

Oude Markt

Visiting the Old Market Square is like taking a seat at the longest bar in Europe. Nowhere will you find as high a concentration of restaurants and cafés than on this unique square. No wonder the Old Market Square is the perfect meeting place in Leuven, especially when the weather is good and the numerous pavement cafés are overflowing with people.

Town Hall

The town hall is Leuven's pride and joy. Moreover, it's one of the best-known Gothic town halls worldwide. It took three architects and thirty years to build it. Leuven's 'Hall of Fame' features 236 statues, which were only added to the façade after 1850.

2. (12:00-13:30) Lunch time

3. (14:00-16:30) Afternoon visit

Saint Peter's Church (Sint-Pieterskerk)

As you enter this Gothic church, you are immediately struck by the splendour of this unique building. In M-the Treasury of Saint Peter, you will see the last painting of a Flemish Primitive painter, still displayed in the place for which it was ordered: "Het Laatste Avondmaal" (The Last Supper) by Dirk Bouts. But Saint Peter's Church is unique for other reasons as well. For example, the belfry has been recognised as a UNESCO World Heritage monument.

Botanical Garden

This is the oldest botanical garden in Belgium. The university laid out the garden in 1738 for its medical students. Today, this unique place is managed by the city of Leuven. It has created a tropical conservatory, a water and fruit garden and the sunken garden. This, together with the picnic benches, the sea of flowers and art projects, make the Botanical Garden a favourite resting place for inhabitants and visitors.

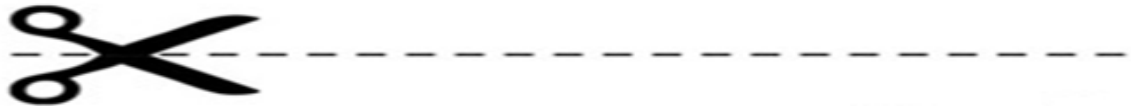
4. (16:30) Back to Park Inn.

(Please note that the tickets will be at guest's own expense)

Note

Note

Note



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