

1st NICTE

NOMMENSEN INTERNATIONAL CONFERENCE
ON TECHNOLOGY AND ENGINEERING



ADVANCEMENTS IN TECHNOLOGY
AND ENGINEERING

ABSTRACT

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MEDAN, INDONESIA



CHUNG YUAN
Christian University

IOP
Publishing

PBN
Pangeran Beton Nusantara
Ready Mix Concrete & Scaffolding Plant

Organized by:
Faculty of Engineering
Nommensen HKBP University

1st NICTE

Conference Organization

INITIATOR INSTITUTION

Faculty of Engineering
Nommensen HKBP University

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Opening Speech

Dear conference participants, invitees and government, I was asked by the committee chairman to give a kind of opening speech. So, let me address to all of you the warmest welcome, and wish bless of God to all of us in this "1st Nommensen International Conference on Technology and Engineering 2017" held in Nommensen HKBP University.

Science, technology and engineering in broad since have been developing very fast in the last 50 years like repeated sigmoid curves. Academicians, scientists, and researchers contributed very significantly to these developments. Publication, seminar, workshop and conference are the most popular media for them where they can interact with each other. Here in this conference, all of you can exchange and share your research results, knowledge, experiences and idea.

I do hope this conference meets not only the needs of science, technology and engineering but also the needs of human being and nature so that people can live more comfortably, more prosperous, healthier and more peaceful as well as the universe can be more preserved.

Last but not least, I would like to express my sincere appreciation to all keynote speakers, participants, and members of committee such as honorary chair, international advisory board, editorial boards, chairman, co-chairman, secretary, parallel & scientific session, and treasurer. I do thank Prof David Herak who has contributed significant to the positive development of Nommensen HKBP University and to this conference from the beginning. I address my special appreciation also to Dean of Faculty of Engineering of Nommensen HKBP University Dr Richard Napitupulu who has worked hard and successfully to manage this conference.

Have nice stay in Medan. Have fruitful conference. Be blessed.

Dr. Ir. Sabam Malau
Rector
Nommensen HKBP University
July 11, 2017

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 THE
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Suitability of aquatic biomass from Lake Toba (North Sumatra, Indonesia) for energy generation by combustion process

A Brunerová¹, H Roubík², D Herák³

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²Department of Sustainable Technologies, Czech University of Life Sciences Prague, Prague, Czech Republic

³Department of Mechanical Engineering, Czech University of Life Sciences Prague, Prague, Czech Republic

Abstract: Several aquatic plant species were identified as aquatic pollution of Lake Toba, North Sumatra (Indonesia); specifically, water hyacinth *Eichhornia crassipes* and aquatic weeds *Hydrilla verticillata* and *Myriophyllum spicatum* due to their high biomass yield which causes impenetrable mats at the bottom and surface of the lake. That complicates other vegetation growth and utilization of water areas for fishing or recreation. In attempt to clean the lake and prevent plants expansion, great amount of plants populations are removed from water but subsequent efficient utilization of such aquatic biomass is not ensured. Present research investigated energy potential of aquatic biomass originated from mentioned aquatic plants from Lake Toba and its possible utilization for energy production by direct combustion. Performed chemical analysis contained from determination of moisture, ash and volatile matter contents and calorific values. Evaluation of results proved highest suitability and energy potential of *Eichhornia crassipes* with gross calorific value (GCV) $16.31 \text{ MJ}\cdot\text{kg}^{-1}$, followed by *Hydrilla verticillata* with GCV $15.24 \text{ MJ}\cdot\text{kg}^{-1}$. Samples of *Myriophyllum spicatum* exhibited unsatisfactory results due to its low GCV ($11.27 \text{ MJ}\cdot\text{kg}^{-1}$) in combination with high ash content (36.99%) which indicates complications during combustion, thus, low energy production efficiency and overall unsuitability for combustion purposes.

Keywords: suitability, aquatic biomass, Lake Toba, combustion process

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The analysis of waste treatment methods and managerial skills towards the effectiveness of CO₂ emissions (an *ex post facto* study at TPA Bantar Gebang Bekasi)

Jenni Ria Rajagukguk,

Mechanical Engineering Department, Krisnadwipayana University, Jakarta, Indonesia

Abstract: In the last three years, Java Island produces 29,413.336 m³/year of waste, coming from settlement (house hold) and non-settlement waste. Recently, this waste is managed with conventional technology, composting and recycling. Based on law No. 18 of 2008 on waste management, chapter III article 5, it is firmly stated that the government and regional governments are responsible for ensuring proper and environmentally sound waste management in accordance with the objectives. The observation of managerial skills is highly needed to investigate the operation of waste management at TPA Bantar Gebang towards the effectiveness of CO₂ emissions. The problems are (1) Whether there is any influence between the method of waste management through biogas technology to the effectiveness of CO₂ emissions. (2) Whether there is any influence between managerial skills to effectiveness of CO₂ emission. (3) Whether there is any simultaneous influence between waste management method and managerial skill to CO₂ emission effectiveness and (4) how is the method of waste management. Quantitative and engineering method were used to process the data. Biogas technology variables and managerial skill are simultaneously and significantly influenced to CO₂ emission effectiveness, this is based on $F_h > F_t$ value of $168,453 > 3,072467$ and its significance is $0,000 < 0,05$. Then H_0 was rejected and H_a was accepted which means that variable of Managerial Skills have influence or very big influence to effectiveness of CO₂ emission, correlation coefficient value 94,1% which means there is very strong relation between variable of Biogas technology, managerial skill to effectiveness of CO₂ emission. Then Technology management through biogas technology is anaerobic biology.

Keywords: CO₂ emissions, waste treatment methods, biogas technology, managerial skills

Stabilization/solidification of polluted marine dredged sediment of Port en Bessin France, using hydraulic binders and silica fume

Ernesio Silitonga

Universitas Negeri Medan, Medan, North Sumatera, Indonesia.

Abstract. A large amount of sediment is dredged in France every year. Due to the increase of the amount of marine dredged sediments, environmentally reuse of dredged sediment is urgently needed in France. The first objective of this study is to find an application for reuse of marine dredged sediments materials, as a new material for road construction. Hence, serial tests need to be realized to identify if marine dredged sediment could be utilized for road construction. The second goal is to enhance the physical, mechanical and chemical characteristics of the mix, by incorporating binders and sediments, and revealed the identification of the mechanical characteristics measured on

the mixes is compatible with their use as a base course material. The results show that the treatment by hydraulics binders could satisfy the needed mechanical characteristics. The present of Silica Fume is aimed to reduce the pollution level, especially the heavy metal content. However, the proportion of hydraulics binders and silica fume needed to meet prescribed specification is important, so the reuse of the marine dredged sediments of Port-en-Bessin, France in road construction, as an alternative material could be achieved. After the geo technical study in laboratory results show as expected then the study to identify the chemical characteristic realized. To evaluate the environmental impacts of the used material, leaching test is performed. The leaching test was performed to verify the predicted release of pollutants based on total dissolution. And for the final part, the test results show that the polluted marine dredged sediments could be safely used (in term of environmental impact) as a new material in road construction

Keywords:

The effect of concrete compressive strength by mixing bacillus subtilis bacteria in an encapsulated calcium lactate

Rahmi Karolina and Pangeran

Civil Engineering Department, University of Sumatera Utara, Medan, Indonesia

Abstract: in accordance with the development of innovation, concrete mixing technology using basillus subtilis bacteria has started to be developed, because the resulting impact in this study increased the compressive strength as much as 10%. Where in the Scanning Electron Microscope test showed that the bacteria grow and cover the cracks like micro cracks with 40000 x magnification. The research methodology used is planting bacteria on agar medium, and encapsulated by using calcium lactate, and on the concrete itself, curing method is used which is suitable to hold the ph temperature suitable with mixing bacteria-contained capsule to the concrete.

Based on the analysis in this study, it is found that the Compressive Strength results showed the concrete with a mixture of Bacteria Bacillus Subtilis+Natrium Agar (10gr)+Calcium Lactate(40gr) are increase by 10,21%, Bacteria Bacillus Subtilis+Natrium Agar(5gr)+Calcium Lactate(30gr) are increase by 7,6%, and the test variation of Normal Concrete increased significantly over the quality of the original mix design, by 10%. From the SEM results, it is obtained that the development of bacteria that has been reviewed for 2 months is not too significant due to the many factors that can affect the bacteria in the concrete

Key Word: bacteria bacillus subtilis, bacteria concrete, SEM concrete subtilis

Panel Session 1

Moderator : Dr. Mula Sigiyo, PhD

Tuesday, 11 July 2017, 10.00 – 10.50 a.m

Venue : Library Hall

Time	No	Authors	Affiliation	Title
10.00-10.10 a.m	01	Sahernadi, Muhammad Zaefis, Sahat Parulian Sitoras	Department of Electrical Engineering, Universitas Samudera Utara, Medan	Applying a Rateless Code in Content Delivery Networks
10.10-10.20 a.m	02	R. Tambur, R. R. H. Purba, B. K. Gioting	Department of Chemical Engineering, Universitas Sumatera Utara, Medan	Extraction of Basil Leaves (Ocimum sanctum) Oecons in With Ethyl Acetate Solvent by Using Soxhletation Method
10.20-10.30 a.m	03	Kuan-Chuan Chan, Cheng-Yiuan Chang, Sen M. Kuo	Department of Electrical Engineering, Chung Yuan Christian University, Taiwan	Active noise control in a duct to cancel broadband noise
10.30-10.40 a.m	04	Pandaprasan Singha, Sindak Hutauruk, Kistno	Institut Teknologi Del, Faculty of Informatics and Electrical Engineering, Computer Network Management Study Program, Tebo Samosir, Indonesia	Dashboard Real Time PLC Based Control Pasteurize Mix "Es-Dawet" Using WSN
10.40-10.50 a.m			Discussion	

Panel Session 2

Moderator : Dr. Mula Sigiyo, PhD

Tuesday, 11 July 2017, 11.20 a.m – 12.10 p.m

Venue : Library Hall

Time	No	Authors	Affiliation	Title
11.20-11.30 a.m	05	A Bruncovsky, H. P. Joubek, D Herák	Department of Material Science and Manufacturing Technology, Czech University of Life Sciences Prague, Czech Republic	Suitability of aquatic biomass from Lake Toze (North Sumatra, Indonesia) for energy generation by combustion process
11.30-11.40 a.m	06	Nerdy	Department of Pharmacy, Academy of Pharmacy Yayasan Fevga Pembangunan Arjasa, Tebo Samosir, Indonesia	Determination Of Sodium, Potassium, Magnesium, And Calcium Mineral Level In Fresh And Boiled Broccoli And Cauliflower By Atomic Absorption Spectrometry
11.40-11.50 a.m	07	Alia Rizkiyah, David Habbara Hareva, Dina Stefani Saryud Lukka	Universitas Vellore Harappan, Fakultas Ilmu Komputer, Teknik Informatika, Tangerang	Driver Drowsiness Detection Using Vision Information On Android Device
11.50-12.00 p.m	08	Ikhwan Siregar, Khairi Fadillah, and Aji Prasetyo	Department of Industrial Engineering, Universitas Sumatera Utara, Medan	Analysis of Production Flow Process with Lean Manufacturing Approach
12.00-12.10 p.m			Discussion	

Panel Session 3

Moderator : Dr. Sindak Hutauruk

Tuesday, 11 July 2017, 14.00-14.50 p.m

Venue : Library Hall

Time	No	Authors	Affiliation	Title
14.00-14.10 p.m	09	Suberman, Arel, and Widiarto Hutazehat	Department of Electrical Engineering, Universitas Sumatera Utara, Medan	Impact of Window Decrement Rate on TCP Performance in an Ad-hoc Network
14.10-14.20 p.m	10	Rimbawati, Whic, Agus Hutazehat, Faisal Irsan Pasarlau, Cholis	Electrical Engineering, University of Muhammadiyah Sumatera Utara, Medan	Experiment of 3-Phase Induction Motor From the Best of the Industry to be a Hydroelectric Generator for PLTMH
14.20-14.30 p.m	11	K S Andarany, A Sagir, A Ahmad, S K Deni and W Gunawan	Mechanical Engineering Department, Mercu Buana University, Jakarta	Cellulose acetate layer effect toward aluminium corrosion rate in Hydrochloric acid media
14.30-14.40 p.m	12	Ermesto Siberoaga	Universitas Negeri Medan, North Sumatera, Indonesia	Stabilization / Solidification of Polluted Marine Dredged Sediment of Port en Bessin France, Using Hydraulic Bindings and Silica Fume
14.40-14.50 p.m			Discussion	

Panel Session 4

Moderator : Parahi Lumbangaöl, MSc

Tuesday, 11 July 2017, 14.00-14.50 p.m

Venue : Engineering Faculty Meeting Room

Time	No	Authors	Affiliation	Title
14.00-14.10 p.m	13	Roebi Rahme Iskandar Zulkarnain and Hendra Jaya	Ph.D. Student, Universiti Malaysia Perlis, Malaysia	A Review: Search Visualization with Knuth Morris Pratt Algorithm
14.10-14.20 p.m	14	Sabam Mhazni, Alimur Siagian, Bilter Sirait, Samise Pandiangan	Agrotechnology Department, Nommensen HKBP University, Medan, Indonesia	Performance of coffee origin and genotype in organoleptic and physical quality of arabica coffee in North Sumatra province of Indonesia
14.20-14.30 p.m	15	Raher Kero Ina, Pangran	Civil Engineering Department, University of Sumatera Utara, Medan	The effect of concrete compressive strength by making bacillus subtilis bacteria in an encapsulated calcium lactate
14.30-14.40 p.m	16	Suberman	Electrical Engineering Department, Universitas Sumatera Utara	A subjective Scheduler for Subjective Deduction Networks
14.40-14.50 p.m			Discussion	