



**unimma**  
Universitas Muhammadiyah Magelang



# Book of Abstracts

**2<sup>nd</sup>** **BOROBUDUR  
INTERNATIONAL  
SYMPOSIUM  
2020**

on Science and Technology

November 18, 2020



**Book of Abstracts**

**2<sup>nd</sup> Borobudur International Symposium on Science and  
Engineering (BIS-STE) 2020**

*'Reinforcement of the Sustainable Development Goals post Pandemic'*

**Virtual Conference**

**Universitas Muhammadiyah Magelang**

**Magelang, November 18, 2020**

**UNIMMA  
PRESS**  
UNIVERSITAS MUHAMMADIYAH MAGELANG

## **Book of Abstracts**

# **2<sup>nd</sup> Borobudur International Symposium on Science and Engineering (BIS-STE) 2020**

**Perpustakaan Nasional: Katalog Dalam Terbitan (KDT)**

**ISBN: 978-623-7261-21-6**

xii, 80 pages, size 21x29.7 cm

Copyright 2020 to the author

Publishing rights at UNIMMA PRESS. For those who wish to reproduce a portion of this book in any form or manner must obtain written permission from the author and UNIMMA PRESS publisher.

### **Editors:**

Dr. Muji Setiyo, ST., MT. (Unimma)

Zulfikar Bagus Pambuko, SEL., MEI. (Unimma)

Chrisna Bagus Edhita Praja, SH., MH. (Unimma)

Agus Setiawan, M.Eng. (Unimma)

Fitriana Yuliasuti, S.Farm., M.Sc., Apt. (Unimma)

Veni Soraya Dewi, SE., M.Si. (Unimma)

Dr. Pusparatu, MT. (PEM Akamigas)

Dr. Siska Desy Fatmaryanti, S.Si., M.Si. (UM Purworejo)

Umar, S.Pd.I., M.Pd.I. (IAIM Sinjai)

Amiril Azizah, SE., MSI., Ph.D. (Politeknik Negeri Samarinda)

Yusuf Adam Hilman, SIP., M.Si. (UM Ponorogo)

Erik Saut H Hutahaean, S.Psi., M.Si. (Universitas Bhayangkara Jakarta Raya)

Anita Setyowati Srie Gunarti, ST., MT. (Universitas Islam 45 Bekasi)

Dr. Suwito, M.Ag. (IAIN Purwokerto)

Faujia Umasugi, S.Pd., M.Pd.B.I. (UM Maluku Utara)

Nuniek Nizmah Fajriyah, S.Kp., M.Kep., Sp. KMB. (UM Pekajangan Pekalongan)

Dr. Mardiana, M.Pd.I (UM Lampung)

Dr. Damayanti, SE., M.Si. (STIE YPPI Rembang)

Arnika Dwi Asti, S.Kep., Ns., M.Kep. (Stikes Muhammadiyah Gombang)

Dr. Dewi Rahayu, SE., MP. (Universitas Lambung Mangkurat)

Ari Waluyo, S.ST., MM. (Politeknik Dharma Patria)

Ahmad Damiri, S,Sy., M.Ag. (STIE Syariah Indonesia Purwakarta)

### **Cover:**

Adi Suprayitno

## **UNIMMA PRESS**

**Anggota APPTI Nomor 003.083.1.02.2019**

Gedung Rektorat Lt. 3 Kampus 2 Universitas Muhammadiyah Magelang

Jalan Mayjend. Bambang Soegeng, Mertoyudan, Magelang 56172

Phone. (0293) 326945

E-Mail: unimmapress@ummgl.ac.id

All Right Reserved

November, 2020

## Organizing Committee

### Advisory Board

---

1. Dr. Suliswiyadi, M.Ag. (Universitas Muhammadiyah Magelang, Indonesia)
2. Prof. H. Lincoln Arsyad, M.Sc., Ph.D. (Universitas Gadjah Mada, Indonesia)
3. Prof. Shi-Jinn Horng, PhD. (National Taiwan University of Science and Technology, Taiwan)
4. Assoc. Prof. Lukas G. Swan (Dalhousie University, Canada)
5. Rafał Drezewski, PhD. (AGH University of Science and Technology, Poland)
6. Prof. Wolfgang Keller, PhD. (University of Colorado, Colorado, US)
7. Prof. Dr. H. M. Noor Rochman Hadjam, S.U. (Universitas Gadjah Mada, Indonesia)
8. Prof. Ir. Djoko Wahyu Karmiadji, MSME, PhD, APU (Badan Pengkajian dan Penerapan Teknologi, Indonesia)
9. Prof. Dr. H. Khudzaifah Dimiyati, SH., M. Hum. (Universitas Muhammadiyah Surakarta, Indonesia)
10. Prof. Dr. Harun Joko Prayitno (Universitas Muhammadiyah Surakarta, Indonesia)
11. Prof. Dr. H. Abdul Munir Mul Khan, S.U. (Universitas Islam Negeri Sunan Kalijaga, Indonesia)
12. Prof. Dr. Chairil Anwar (Universitas Gadjah Mada, Indonesia)
13. Dr. H.K. Prihartono AH, Drs., S.Sos., S.Kom., MM. (Politeknik Dharma Patria / Politeknik Piksi Ganesha, Indonesia)
14. Ahmad Damiri, S.Sy., M.Ag. (STIE Syariah Indonesia Purwakarta, Indonesia)
15. Dr. Firdaus, M.Ag. (IAIM Sinjai, Indonesia)
16. Dr. KH., Moh. Roqib, M.Ag. (IAIN Purwokerto, Indonesia)
17. Dr. Rofiq Nurhadi, M.Ag. (Universitas Muhammadiyah Purworejo, Indonesia)
18. Hj. Herniyatun, S.Kep., Sp.Mat (Stikes Muhammadiyah Gombang, Indonesia)
19. Dr. Saeful Deni, S.Ag., M.Si (Universitas Muhammadiyah Maluku Utara, Indonesia)
20. Dr. Nur Izzah, S.Kp., M.Kes. (Universitas Muhammadiyah Pekajangan Pekalongan, Indonesia)
21. Ramli, ST., M.Eng. (Politeknik Negeri Samarinda, Indonesia)
22. Dr. H. Dalman, M.Pd. (Universitas Muhammadiyah Lampung, Indonesia)
23. Drs. H. Muhammad Asrori, M.Si. (STIE YPPI Rembang, Indonesia)
24. Dr. Nandang Najmulmunir, Ir., M.S. (Universitas Islam 45 Bekasi, Indonesia)
25. Dr. Happy Susanto, M.A. (Universitas Muhammadiyah Ponorogo, Indonesia)
26. Prof. Dr. R. Y. Perry Burhan, M.Sc. (PEM Akamigas, Indonesia)
27. Dr. Drs. Bambang Karsono, SH., MM. (Universitas Bhayangkara Jakarta Raya, Indonesia)
28. Dr. Dewi Rahayu, SE, MP. (Universitas Lambung Mangkurat, Indonesia)

### Scientific Committee

---

1. Prof. Dr. Noreffendy Tamaldin (Universiti Teknikal Malaysia Melaka, Malaysia)
2. Prof. Tony Lucey, PhD. (Curtin University, Australia)

3. Yun Arifatul Fatimah, ST., MT., Ph.D. (Universitas Muhammadiyah Magelang, Indonesia)
4. Dr. Heni Setyowati Esti Rahayu, M.Kes. (Universitas Muhammadiyah Magelang, Indonesia)
5. Dr. Budi Waluyo, ST, MT. (Universitas Muhammadiyah Magelang, Indonesia)
6. Dr. rer. nat., Fredy Kurniawan, S.Si., M.Si (Institut Teknologi Sepuluh November, Indonesia)
7. Prof. Suharso, Ph.D. (Universitas Lampung, Indonesia)
8. Fajar Suryawan, Ph.D (Universitas Muhammadiyah Surakarta, Indonesia)
9. Dr. Retno Susilorini, S.T, M.T (UNIKA Soegijapranoto, Indonesia)
10. Andri Pranolo, M.CS. (Universitas Ahmad Dahlan, Indonesia)
11. Dr. Siska Desy Fatmaryanti, M.Si. (Universitas Muhammadiyah Purworejo)
12. Rizal Arifin, Ph.D. (Universitas Muhammadiyah Ponorogo, Indonesia)
13. Dr. Uky Yudatama (Universitas Muhammadiyah Magelang, Indonesia)
14. Prof. Dr. Muhammad Japar, M.Kons. (Universitas Muhammadiyah Magelang, Indonesia)
15. Dr. Dyah Adriantini Sintha Dewi, SH., M.Hum (Universitas Muhammadiyah Magelang, Indonesia)
16. Dr. Rochiyati Murniningsih, SE., MP (Universitas Muhammadiyah Magelang, Indonesia)
17. Dr. Teguh Kurniawan, S.Sos, M.Sc, CSRS, CPC (Universitas Indonesia, Indonesia)
18. Rofah Setyowati, S.H., M.H., Ph.D. (Universitas Diponegoro, Indonesia)
19. Dr. Khotibul Umam, S.H., LL.M (Universitas Gadjah Mada, Indonesia)
20. Dr. Lastuti Abubakar, S.H., M.H. (Universitas Padjadjaran, Indonesia)
21. Prof. Noorhaidi, M.A, M.Phil., Ph.D (UIN Sunan Kalijaga, Indonesia)
22. Prof. Ainul Jaria Bt Maidin, Ph.D. (International Islamic University Malaysia, Malaysia)
23. Dr. Jaka Sriana, SE., M.Si. (Universitas Islam Indonesia, Indonesia)

## Organizing Committee

---

### Conference Chair

- Assoc. Prof. Dr. Muji Setiyo, ST., MT. (Universitas Muhammadiyah Magelang)

### Secretary

- Zulfikar Bagus Pambuko, MEI. (Universitas Muhammadiyah Magelang)

### Members

- Agus Setiawan, M.Eng (Universitas Muhammadiyah Magelang)
- Chrisna Bagus Edhita Praja, SH., MH. (Universitas Muhammadiyah Magelang)
- Fitriana Yuliasuti, S.Farm., M.Sc., Apt. (Universitas Muhammadiyah Magelang)
- Veni Soraya Dewi, M.Si. (Universitas Muhammadiyah Magelang)

## Greeting from the Chairman

*Assalamualaikum warahmatullahi wabarakatuh*

Good morning the honorable:  
Rectors, Faculty members, Keynote speakers, and participants,



Welcome to the 2nd Borobudur International Symposium.

Ladies and Gentlemen,

The Covid-19 pandemic has changed our activities, like teaching, researching and socializing. We are in confusion because we have not had previous experiences. However, as Earth's smartest inhabitants, we can adapt new ways to survive the pandemic without losing enthusiasm. Therefore, even in pandemic conditions, we can still have scientific discussions, even though virtually.

The main theme of this symposium is "Reinforcement of the Sustainable Development Goals post Pandemic" as a part of the masterplan of United Nations for sustainable development goals in 2030 (twenty thirty).

I report, this symposium is attended by 348 (three hundred and forty-eight) participants, including from Indonesia, Malaysia, United Kingdom, Scotland, Thailand, Taiwan, Tanzania, and Timor Leste.

Certainly, this event will not be successful without the support of co-hosts. On behalf of the Committee, I thank the co-hosts:

1. Universitas Muhammadiyah Purworejo
2. Universitas Muhammadiyah Ponorogo
3. Universitas Muhammadiyah Pekajangan Pekalongan
4. Universitas Muhammadiyah Maluku Utara
5. Universitas Muhammadiyah Lampung
6. Universitas Lambung Mangkurat
7. Universitas Islam 45 Bekasi
8. Universitas Bhayangkara Jakarta Raya
9. Sekolah Tinggi Ilmu Kesehatan Muhammadiyah Gombong
10. Sekolah Tinggi Ilmu Ekonomi YPPI Rembang
11. Sekolah Tinggi Ilmu Ekonomi Syariah Indonesia Purwakarta
12. Politeknik Piksi Ganesha Bandung
13. Politeknik Negeri Samarinda
14. Politeknik Dharma Patria Kebumen
15. Politeknik Energi dan Mineral Akamigas Blora
16. Institut Agama Islam Negeri Purwokerto
17. Institut Agama Islam Muhammadiyah Sinjai



I'm absolutely aware, the major comment for this event must be: why were the symposium in engineering and applied sciences combined with social and humanities?

I'll answer: for now, to the future, there is no barrier between hard and soft sciences. For example, economics and education need technological touch. Likewise, technological findings need social science for culture implementation.

Therefore, I present you world-class keynote speakers whom able to capture these scientific topics, they are:

First, Assoc. Prof. Dr. Thomas Kivevele, from The Nelson Mandela African Institution of Science and Technology, Tanzania;

Second, Assoc. Prof. Pensri Jaroenwanit, Ph.D from Khon Kaen Business School, Thailand;

Third, Prof. Yinghuei Chen, Dean of International College, Asia University, Taiwan;

Forth, Drs. Hajriyanto Y Tohari, The Indonesian Embassy in Beirut, Lebanon;

Fifth, Mrs Dr. Heni Setyowati Esti Rahayu, M.Kes., Dean of the Faculty of Health Science, Universitas Muhammadiyah Magelang, Indonesia.

I hope our later discussion may result transfer of experiences and research findings from participants to others, from keynote speakers to you, from social to engineering researcher and vice versa. Also, I hope this event can create further research network.

Finally,

Have a nice discussion and I love you all

Thank you very much,

*Wassalamualaikum warahmatullahi wabarakatuh*

## Table of Content

<b>Cover Page</b> .....	
<b>Organizing Committee</b> .....	<b>iii</b>
<b>Greeting from the Chairman</b> .....	<b>v</b>
<b>Table of Content</b> .....	<b>vii</b>
<b>2<sup>nd</sup> BIS 2020 Program</b> .....	<b>1</b>
<b>Keynote Speakers' Profile</b> .....	<b>2</b>
<b>List of Abstracts</b> .....	<b>7</b>
[ABS-257] Detection of Criticism and Hate Speech on Online Social Network Twitter for Semantic Recommendation System.....	7
[ABS-258] Motorbikes Automatic Module for Hand Brake and Fuel Cut Off Relay ...	7
[ABS-5] Social Media Effectiveness as a Line Learner Pattern in Pandemic Period (Covid-19).....	8
[ABS-8] The Effect of Using Variations of Fuel on the Performance of Honda CB 150 R Motorcycles .....	9
[ABS-9] The Relationship Between Risk Taker Personality and Aberrant Driving Behavior of Teen Drivers in Semarang .....	9
[ABS-10] Smart Survey Model of Average Daily Traffic (ADT) for Pavement Planning and Monitoring .....	10
[ABS-266] Level of Land Degradation in West Lombok.....	11
[ABS-45] Android Based Information System and SMS Gateway to Improve PMI Donors .....	11
[ABS-268] Syn Gas to Syn Fuel Plant for Eastern Indonesia .....	12
[ABS-16] Experimental Study of Porous Paving using Kalimantan Local Materials .....	12
[ABS-18] Simulation Experiment to Predict the Critical Friction Area of Acetabular Liner Component on Hip Joint Replacement Implant During Movement	13
[ABS-21] Orientation of Equipment Technology in Improving Production Performance in Batik SMEs.....	13
[ABS-22] Design of Environmental Pollution Monitoring Tool Based on Internet of Things (IoT) .....	14
[ABS-26] Detection and Control System of Electricity Consumption Towards Smart Vocational Education (SVE).....	15
[ABS-28] Development of 500-kV XLPE Underground Cable in Capital City for Sustainability of Electric Energy for Community.....	16
[ABS-285] Rhizomes Classification Using Deep Neural Network Based on Odor.....	16



[ABS-32]	Study of Utilizations Coconut Fiber with Kalimantan Local Material on The Concrete Compressive and flexural Strength.....	17
[ABS-35]	Advanced manufacturing process of orthotic shoe insoles using a new material based on the Taguchi Methodology .....	18
[ABS-36]	Optimization of the toolpath strategy for the master ceramic jewelry mold pattern using the Rhinoceros software and Retrovit CNC machine.....	18
[ABS-37]	Development of the Ceramic Jewelry Industry for Necklace with Indonesian Batik Motifs .....	19
[ABS-297]	Population Dynamics of Loligo sp in the Waters of the Island of Ternate	20
[ABS-42]	Digital Sector Innovation to Support Less Contact Economy in Indonesia .....	20
[ABS-298]	Elastohydrodynamic Lubrication Analysis on the Performance of Artificial Hip Joint for Sitting (Iftirasy) Movements in Muslim Prayer (Salat) Activity.....	21
[ABS-43]	Design of Fixed Fire Protection with the Total Flooding System Method of AF11E Extinguisher Media in the HSSE Training Center Building of PT X.....	22
[ABS-49]	Assessment of Non-Verbal Communication Online Job Recruitment Using Gray Level Co-Occurrence Matrix (GLCM) and Fuzzy C-Means Algorithm (FCM) .....	23
[ABS-51]	Optimization of Neural Network Based PSO Feature Selection in the Classification of Graduates Working According Their Field .....	23
[ABS-52]	Comparative Study of Municipal Solid Waste Fuel and Refuse Derived Fuel in the Gasification Process Using Multi-Stage Downdraft Gasifier...24	
[ABS-53]	Design of Robot Arm to Coffee Maker Based Arduino .....	25
[ABS-69]	Synthesis of Bio-additive for Low Sulfur Diesel: Chemical Transesterification of Soybean Oil and Ethylene Glycol using K <sub>2</sub> CO <sub>3</sub> Catalyst.....	25
[ABS-77]	Synthesis of 2-Hydroxy-Ethyl Ester Based on Peanut Oil as a Bio-Additive for Diesel Fuel .....	26
[ABS-310]	The effect of holding and stirring time on porosity of aluminium copper alloy in rheocasting process .....	27
[ABS-55]	Improving Quality Level of Dining Table Through Painting Process by Using Taguchi Method.....	27
[ABS-312]	Performance Analysis of Solar and Wind-Based Hybrid Power Plant Using HOMER Software (Case Study: Emas Bayu Hybrid Power Plant in Dusun Bondan, Cilacap) .....	28
[ABS-313]	Little Story from Traditional Coffee Business in Temanggung Indonesia: University-Business-Government Collaboration .....	29
[ABS-60]	The Analysis of Determining Cost of Products and the Application of Cost-Plus Price Methods in Ordering Natural Gas Sell Prices in the	

	Gundih area of PT Pertamina Asset EP 4 Field Cepu, in Sumber Village, Kradenan Sub-District, Blora District.....	30
[ABS-62]	Microstrip Antenna 2.4 GHZ U-Slot Patch Dual Slit Vertical with Ground Square Design for Zigbee Technology .....	30
[ABS-320]	The Addition of Fresh Air to Steel Sponge Oxidation to Reduce Vehicle Exhaust Emissions .....	31
[ABS-65]	Effect Methanol, Ethanol, Butanol on the Emissions Characteristics of Gasoline Engines.....	32
[ABS-322]	Development of a Low-Cost LED-Halogen Solar Simulator for Indoor Experiments on the Performance of Photovoltaic Modules Affected by Various Light Intensity and Temperature Environments.....	32
[ABS-325]	Building Durian Seed Marketing Web as an Alternative Marketing Media During the Pandemic.....	33
[ABS-68]	Forecasting Dengue Hemorrhagic Fever Incidents: A Machine Learning Approach.....	34
[ABS-334]	Use of Medical Record Data to Simplify the Hospital Decision Making System.....	35
[ABS-337]	Disaster Mitigation: Design of Portable Toilet for People with Disabilities in Refugee Camp.....	35
[ABS-83]	Comparative Study on Fuzzy Supervision and Gain Scheduling for Nonlinear Level Control System .....	36
[ABS-48]	Synthesis of Acetin: Bio-Based Additive for Low Sulfur Petrodiesel .....	36
[ABS-85]	Economic and Spatial Development in Greater of Yogyakarta.....	37
[ABS-344]	Internalization of Local Wisdom Values in Handling the Waste of The Stone Handicraft Industry Towards a Sustainable Industry .....	37
[ABS-89]	Quality Optimization of Data Rate Video Streaming Over Bluetooth Network.....	38
[ABS-95]	Presence System Application of Lecturers and Students Using Web-Based RFID and Raspberry Pi 3+ .....	39
[ABS-352]	A Literature Review of Coding for Early Childhood.....	39
[ABS-97]	Pectin Isolation from Sentul Peel (Sandorium Koetjape) with Assisted Microwave Extraction.....	40
[ABS-102]	Measurement Analysis of Box Girder Production Cycle Times in Indonesian Infrastructure Projects .....	40
[ABS-103]	Solar Tracking Using Extended Mean Shift Based Color Histogram .....	41
[ABS-105]	Design and Implementation of Data Acquisition Device and Instrumentation Based on Microcontroller for Electric Motorcycle.....	42
[ABS-361]	Machine Learning Approach for Rhizomes Classification Based on Color .....	43
[ABS-367]	Optimization Algorithm for Digital Payments of Online Transportation.....	43

[ABS-112]	Corrosion Study of Graphene Coatings on Carbon Steels.....	44
[ABS-114]	Modeling of Spray Characteristics of Biodiesel Based on Vegetative Energy Resources Found in Tropical Forest inside Leuser Area .....	45
[ABS-80]	Synthesis and Characterization of Diesel Lubricity Enhancer through Transesterification of Palm Oil .....	45
[ABS-356]	Waqf Co-funding Information System Management .....	46
[ABS-360]	Clustering Crime Theft: A Datamining in Urban Areas .....	46
[ABS-123]	Preliminary Study of the Best Variables using Surfactant SLS in EOR Application with Crude Oil Ledok.....	47
[ABS-370]	Optimize Design Impeller to Increase Efficiency Centrifugal Pump that Functioned as a Turbine Use Computational Fluid Dynamics (CFD).....	48
[ABS-116]	Internet-Based Multi-Platform Thermometer Using WhatsApp and Sensor MLX90614 With Location Tracker Feature For Covid-19 Surveillance .....	48
[ABS-118]	ANP And AHP Method Approach in Selecting Tourism Objects In Samarinda.....	49
[ABS-122]	The Effect of Using Sawdust as Mixture of Concrete Pipe on Water Absorption and Compressive Strength.....	50
[ABS-383]	Modeling of Automatic Transmission Control Systems on LPG Vehicles	50
[ABS-128]	Development of Indonesian Well Head Generation Unit (Small Scale) Based on Regulation and Law in The PT. Geo Dipa Unit Dieng Case Study.....	51
[ABS-129]	Rig Time Reduction During Kick Handling Operation in Exploration Well X by Applying Drillers Method .....	52
[ABS-130]	Design of PV-Wind Turbine Mobile Container for Disaster Area Using HOMER, A Case study: Cepu - Central Java.....	52
[ABS-131]	Mechanical Properties Identification of Vulcanized Rubber by Using Mooney-Rivlin Method .....	53
[ABS-132]	Application of Polymerization Technology for Increasing of Quality Oil and Gas Production .....	54
[ABS-388]	The Effect of Fuel Injection Pressure on the Diesel Engine Performances	54
[ABS-134]	Temperature Control in the R-101 Reactor With Comparing the Ziegler Nichols And Tyreus-Luyben Tuning Methods .....	55
[ABS-139]	The Impacts of a Long Residue Addition to the Briquette Quality of Ketapang Fruit and Siwalan Skin Fruit Charcoals Using Amylum as Additive and a Manual Briquette Machine .....	56
[ABS-395]	Effect of The Number of FRP layers on Axial Compressive Behavior of High Strength Lightweight Concrete Wrapped with Carbon Fiber Reinforced Polymer .....	56
[ABS-140]	The Influence of Lamina Wood on The Physical Properties, The Nature of Mechanics, The Strong Class on The Combination of Sengon Wood and Merbau Wood .....	57

[ABS-396]	Influence of the number of FRP layers on Compressive Behavior of Glass Fiber Reinforced Polymer Confined High Strength Concrete Made of Lightweight Artificial Aggregates.....	58
[ABS-142]	Evaluation Factors Causing a Losses in the System of Receiving, Storage and Distribution Diesel Fuel in PT Badak NGL .....	58
[ABS-143]	The Readiness of Batur Metal Casting Industry to Face Society 5.0 .....	59
[ABS-151]	Study of Wear on The Metal on Polycarbonate Urethane (PCU) Contact in Total Hip Arthroplasty using Finite Element Method Study of Wear on The Metal on Polycarbonate Urethane (PCU) Contact in Total Hip Arthroplasty using Finite Element Method .....	60
[ABS-155]	Formation of Struvite from Dairy Cow Urine by Aeration and Crystallization Using a Vertical Reactor .....	60
[ABS-168]	Military Type III Anodizing: The Optimal Limit Within Hardening Process of Aluminium Alloy at Near Zero Temperature .....	61
[ABS-173]	Comparison of Effectiveness of Stemming Algorithms in Indonesian Documents.....	62
[ABS-176]	The Design and Analysis of Oil Cooler System on Motorcycle 100 CC of Engine Volume.....	62
[ABS-179]	The Classification for Corroded Reinforced Concrete Beams using Linear Discriminant Analysis .....	63
[ABS-185]	Proposed Reversed Supply Chain as Problem Solver for Case of Returned Beef Products during the Covid-19 Pandemic.....	64
[ABS-208]	CFD Simulation Analysis of Thrust Bearing Lubrication Performance with Height of Texture Variation and Cavitation Modeling.....	64
[ABS-209]	Validity of Navier-Stokes Equation in Single-Textured Thrust Bearing by Considering Reynolds Number and Cell Aspect Ratio .....	65
[ABS-210]	Utilization of Industrial Waste as Soil Stabilizer to Enhance Direct Shear Strength .....	66
[ABS-216]	Application of Continuous Wavelet Transform to Layer Boundaries from Gamma Ray Log .....	66
[ABS-225]	Effect of Rubber Deformation Along Sliding Contact on its Stress and Friction Force: a Numerical Investigation.....	67
[ABS-227]	Low Level Controller Analysis using Digital PID Controller on Self Balancing Robot in Corrugated Path.....	68
[ABS-229]	The Application of Haversine Formula in Education Game Landmark Nusantara .....	68
[ABS-232]	Optimization of Expert System for Agriculture Development of Salak Tree in Srumbung: A Literature Study .....	69
[ABS-234]	The Use of IRE's LWD for Overlay Design of Flexible Pavement .....	69
[ABS-239]	Hand and Foot Movement of Motor Imagery Classification using Wavelet Packet Decomposition and Multilayer Perceptron Backpropagation.....	70

[ABS-240]	Development of the Delay Factor Model for Substructure Works in Building Construction .....	71
[ABS-241]	Typosquatting Potential on the Official Website (an Empirical Study of Popular Websites in Indonesia) .....	72
[ABS-244]	Identification of Precast Box Girder Erection Activities to Develop Work Breakdown Structure in Elevated Railway Infrastructure Project .....	72
[ABS-245]	Mechanical Properties of a biomass Eichhronia Crassipes Plant (ECP) fibre: Case study of Lost Circulation Material utilization .....	73
[ABS-248]	CO <sub>2</sub> Removal Design at PT Pertamina EP Asset 3 with Zeolite Contacting Tower .....	74
[ABS-249]	Design Fuel Efficiency on a Gas Turbine Generator Using a Fuzzy Logic Controller .....	75
[ABS-251]	Analysis of Life Cycle Cost in Developing Capital City of East Bogor Regency .....	75
[ABS-41]	Economic Growth and Deforestation: a Study of Changes in Land Coverage in West Nusa Tenggara Province .....	76
[ABS-110]	The Catalytic Conversion of PPSDM Oil and Gas Residues into Liquid Fuel with Heterogeneous Catalysts .....	77
[ABS-133]	Macroscopic Appearance of The Freezed Sperm Quality of Kebumen Ongole Breeds Bulls Without Thawing Media .....	77
[ABS-272]	Water Resources Sustainability Assessed Based on Villagers and Village Institutions Engagement in Water Resources Conservation Activities .....	78
[ABS-217]	Sustainability Analysis of Stone Carving Industries: Life Cycle Analysis Approach .....	79
[ABS-247]	The Effectivity of Virtual Tour as an Alternative of Ecotourism Method. A Case Study of Tambora National Geopark, Indonesia .....	80

## 2<sup>nd</sup> BIS 2020 Program

Wednesday, November 18, 2020

TIME	EVENT
08.00 – 08.30	Preparation (Participants enter the virtual conference room)
08.30 – 09.00	<b>Opening Ceremony</b> <ul style="list-style-type: none"><li>▪ Chairman of 2<sup>nd</sup> BIS 2020</li><li>▪ Rector of Universitas Muhammadiyah Magelang</li></ul>
09.00 – 11.30	<b>Main Session</b> <ul style="list-style-type: none"><li>▪ Keynote Speaker I <b>Pensri Jaroenwanit, Ph.D.</b> Khon Kaen Business School, THAILAND</li><li>▪ Keynote Speaker II <b>Dr. Heni Setyowati Esti Rahayu, M.Kes.</b> Universitas Muhammadiyah Magelang, INDONESIA</li><li>▪ Keynote Speaker III <b>Prof. Yinghuei Chen</b> Asia University, TAIWAN</li><li>▪ Keynote Speaker IV <b>Drs. H. Hajriyanto Y. T, MA.</b> The Indonesian Embassy in Beirut, LEBANON</li><li>▪ Keynote Speaker V <b>Dr. Eng. Thomas Kivevele</b> The Nelson Mandela African Institution of Science and Technology, TANZANIA</li></ul>
11.30 – 12.00	<b>Discussion</b>
12.00 – 13.00	Break
13.00 – 14.00	<b>Online Q&amp;A Forum via <i>Confgate</i> (Question Session)</b>
14.00 – 15.00	<b>Online Q&amp;A Forum via <i>Confgate</i> (Answer Session)</b>
15.00 – 16.00	Closing and Announcement



## Keynote Speakers' Profile



### **Dr. Eng. Thomas Kivevele**

The Nelson Mandela African Institution of Science and Technology, TANZANIA

- Position : Senior Lecturer
- Organisation : The Nelson Mandela African Institution of Science and Technology
- Department/Division : The School of Materials, Energy, Water and Environmental Sciences (MEWES)
- Primary Areas : Clean Energy Technologies
- Expertise : Bio-fuels - Solar energy applications - drying technologies - HVAC



**Pensri Jaroenwanit, Ph.D.**

Khon Kaen Business School, THAILAND

- Position : Dean of Faculty of Business Administration and  
Accountancy of Khon Kaen University
- Organisation : Khon Kaen University
- Department/Division : Faculty of Business and Accountancy
- Primary Areas : Business Management
- Expertise : Green Product, Marketing



**Dr. Heni Setyowati Esti Rahayu, M.Kes.**  
Universitas Muhammadiyah Magelang, INDONESIA

Position : Dean of Faculty of Health Science  
Organisation : Universitas Muhammadiyah Magelang  
Department/Division : Faculty of Health Science  
Primary Areas : Nursing Science  
Expertise : maternity nursing - labor pain – accupressure -  
complementary nursing



**Drs. H. Hajriyanto Y. Tohari, MA.**

The Indonesian Embassy in Beirut, LEBANON

- Position : The Indonesian Embassy in LEBANON
- Organisation : Embassy of the Republic of Indonesia
- Career : 1. Chairman of the Muhammadiyah Central Executive  
2. Deputy Secretary of PH Muhammadiyah Central Executive  
3. Chair of the Golkar Party DPP Research and Development Department  
4. Chairman of the DPP Golkar Party  
5. Chairman of the Muhammadiyah LAZIS Management Board  
6. Chairman of the GOZIS Governing Body DPP Golkar Party  
7. The Indonesian Embassy in LEBANON



**Prof. Yinghuei Chen**

Asia University, TAIWAN

- Position : Dean of College of Humanities and Social Science
- Organisation : Asia University
- Department/Division : College of Humanities and Social Science
- Primary Areas : English Literature
- Expertise : Victorian Literature - The English Novel - Cultural Studies - Business English - English for Specific Purposes (ESP) - Material Writer

[ABS-257]

### Detection of Criticism and Hate Speech on Online Social Network Twitter for Semantic Recommendation System

Migunani\*, Adi Setiawan, and Irwan Sembiring  
*Science and Computer Technology University  
Satya Wacana Christian University*

#### Abstract

User opinions on high-volume social media and various themes provide relevant information for sentiment analysis. This information can be collected and analyzed using a natural language processing with a monitoring system to support classification of criticism and hate speech. Regarding monitoring results, a knowledge-based recommendation system with sentiment analysis is supported to send messages to user in order to use positive sentences are not offensive, polite, wise and motivational for users with hateful attitudes. Detection of sentences containing criticism and hate speech using Bag of Word and Convolutional Neural Network to detect hate speech and criticism sentence via Tweeter. The detection results are used for the semantic recommendation system framework that includes sentiment analysis and predicts hate speech through similarities between previous cases by finding the value of proximity or closeness between text to be a measurement baseline to criticism and hate speech classification. Output performance will be measure by RMSE, MAE, Accuracy and F-Score.

**Keywords:** Social Media, Hate Speech, Bage of Word, Convolutional Neural Network, Recommendation System

**Topic:** Engineering

[ABS-258]

### Motorbikes Automatic Module for Hand Brake and Fuel Cut Off Relay

Muhammad Firdaus Jauhari\*, Dwi Abdurahman, and Yuly Triono  
*Automotive Engineering, Mechanical Engineering, Politeknik Negeri Banjarmasin*

#### Abstract

There are many ways we can do to ensure the security of our motorbikes to avoid vehicle theft. Motorcycle theft is one of the dominant crimes with a total of 27,731 cases a year. The use of microcontrollers is now increasingly widespread to support various vehicle functions. This research discusses the design of a dual function module to support the security of our motorbikes. Creating an additional security system for motorbikes to avoid theft crimes, by working as a hand brake and a fuel cut off relay. Arduino Microcontroller, Arduino IDE Software, Bluetooth HC-06,



Smartphone, DC Motor, Step Down Module, Relay Module, APK Boarduino, DC Jack Power Male Connector, Experimental Method. The implementation of the Automatic Module for Hand Brake and Fuel Cut Off Relay has a dual function, namely as a parking function and motorbike security from theft attempts. The module works when the motorbike is parked by using an Arduino microcontroller to activate the brake locking and fuel cut-off features via a smartphone, and normalizing both functions when the motorbike is going to run. The results of this study add to the innovation for vehicle security systems in the automotive engineering field. Useful as additional security for vehicles to avoid theft. Potential to be developed into a product that can be sold as a result of creativity.

**Keywords:** motorbikes, handbrake, fuel cut off, microcontroller

**Topic:** Engineering

## [ABS-5]

### **Social Media Effectiveness as a Line Learner Pattern in Pandemic Period (Covid-19)**

Dedy Ricardo Serumena and Febi Marice Erni Utan  
*Politeknik eL Bajo Commodus, NTT, Indonesia*

#### **Abstract**

Covid-19 has an important note to the revolution of human civilization, the speculation to review the negative impact of more intensive than the positive impact of this problem (case study of one of the colleges private sector in Manggarai Barat, East Nusa Tenggara). The use and utilization of technology is an alternative to an educational institution. Higher education institutions respond to government instructions to conduct face-to-face learning with online learning. After this method was implemented, problems began to arrive from the students and teaching staff regarding the effectiveness of online learning with the constraints of inadequate network technology in their area. Utilizing social media as an effective learning tool during a pandemic is an easy alternative to implement. Research on students and teaching staff can affect the level of effectiveness of online learning. Bloom's Taxonomy Learning Theory is used to identify the ability of students at level five and six as Technicians and Analysis by paying attention to three domains of intellectual ability, namely. Cognitive, Affective and Psychomotor. Quantitative descriptive methods and critical success factors are used as data collection techniques to measure the level of effectiveness of online learning. The Essence of the research objective is Utilizing social media as an effective learning tool during a pandemic. Social media is a means of proving the effectiveness of online learning applied to students, by conducting research and development on thinking skills in the teaching and learning process to produce students who are competent in their fields.

**Keywords:** Social Media, Online Learning Patterns, Pandemic Period

**Topic:** Engineering

## [ABS-8]

### **The Effect of Using Variations of Fuel on the Performance of Honda CB 150 R Motorcycles**

Hamid Nasrullah\*, Bahtiar Wilantara, Parikhin, and Fadil Jatmiko  
*Program Studi Mesin Otomotif, Politeknik Dharma Patria Kebumen*

#### **Abstract**

Performance including the power and torque of a Honda CB 150 R motorcycle is influenced by several factors, including the type of fuel used, the amount of fuel consumption used and the environmental impact it causes. The purpose of this study was to determine the effect of fuel on power, torque, and exhaust emissions of Honda CB 150 R motorcycles using pertalite, pertamax, and Pertamina turbo fuels. Torque and power tests were carried out with a Rextor Pro Dyno type dynamometer and emission testing was carried out with the Heshbon HG-510 type gas analyzer engine. The object of research is a Honda CB 150 R. The results showed an increase in power and torque in pertalite fuel 4.5 kW and torque of 0.08 Nm, Pertamina 4.4 kW and torque of 0.06 Nm, Pertamina turbo 4.1 kW and torque of 0.27 Nm. The results of the emission test at 1500 to 7500 rpm levels of HC and CO were reduced to > 150 ppm and > 2%. There is a difference in power and torque generated in the use of pertalite, Pertamina, and Pertamina turbo fuels on Honda CB 150 R motorbikes, namely 0.1-0.4 kW power and 0.1-0.2 Nm of torque. The emission test takes into account the use of high-octane fuel resulting in a smaller impact on environmental pollution.

**Keywords:** Engine Performance, Pertalite, Pertamina, Pertamina Turbo

**Topic:** Engineering

## [ABS-9]

### **The Relationship Between Risk Taker Personality and Aberrant Driving Behavior of Teen Drivers in Semarang**

Manik Mahachandra, Yusuf Widharto, Muhammad Andhyka Putra, Muhammad Ragil Suryoputro, and Heru Prastawa  
*Industrial Engineering Study Program, Faculty of Engineering, Diponegoro University*  
*Industrial Engineering Department, Faculty of Industrial Technology, Universitas Islam Indonesia*

#### **Abstract**

Semarang is one of the cities with a high number of accident cases. The majority of traffic accidents can be attributed to driving behavior. Aberrant driving behavior can arise from the driver's internal factors, namely the attitude and certain psychological characteristics of a person that also named personality. Accidents among adolescence are caused due to the nature of risk taking rather than the driving skills they possess. So based on this statement, the study aims to determine whether age can affect the relationship between risk-taking personality and aberrant driving behavior. This research uses cross sectional method. The instruments used in this study

were the 18 Items Risk Taking Questionnaire from Verster (2011) and the Aberrant Driving Behavior Questionnaire from Steg L (2009). The sample of this study amounted to 215 people who are vehicle drivers in Semarang aged 17-45 years who already have a driving license (SIM). The statistical test method used in this study was Moderated Regression Analysis. The results of this study indicate an increase in the coefficient of determination from 0.078 with a df value of 1 to 0.222 with a df value of 3 which indicates that age plays a significant role in influencing the strength of the relationship between risk taker personality and deviant driving behavior.

**Keywords:** risk taking behavior, aberrant driving behavior, RT-18, DBQ, young drivers, MRA

**Topic:** Engineering

[ABS-10]

## **Smart Survey Model of Average Daily Traffic (ADT) for Pavement Planning and Monitoring**

Arthur Daniel Limantara<sup>1\*</sup>, Tjahjaning Tingastuti Surjosuseno<sup>1</sup>, Bambang Subiyanto<sup>2</sup>, Fauzie Nursandah<sup>2</sup>, Sri Wiwoho Mudjanarko<sup>3</sup>, Muhammad Ikhsan Setiawan<sup>3</sup>, and Nawir Rasidi<sup>4</sup>

<sup>1</sup> *Department of Informatics, Cahaya Surya College of Technology, Indonesia*

<sup>2</sup> *Department of Civil Engineering, Kadiri University, Indonesia*

<sup>3</sup> *Department of Civil Engineering, Narotama University, Indonesia*

<sup>4</sup> *Department of Civil Engineering, State Polytechnic of Malang, Indonesia*

### **Abstract**

Daily traffic volume surveys for manual pavement planning and supervision require labor, time, and are not cheap. Besides that, the accuracy and speed of obtaining the data are not timely. This study aims to obtain a smart survey model that will function to obtain daily traffic volume data automatically and in real-time, as well as processing it. The methodology used modeling the survey process by utilizing smart devices, microcontrollers, sensors, and the internet of things, as well as cloud programming and client servers. The survey process model can be divided into 2 parts, namely part 1 which is in charge of collecting vehicle data, and part 2 to collect the axle load of each vehicle, then the data will be sent via the access point to the cloud, cloud data is taken by the data processing center server for data processing. The model produces traffic volume data information with speeds of up to 67.4 Mbps, data accuracy of 98%, and real-time data processing results can be used as monitoring of pavement age.

**Keywords:** Traffic Volume Survey, Smart Survey Modeling, Internet of Things (IoT), Pavement Planning, Monitoring

**Topic:** Engineering

[ABS-266]

## Level of Land Degradation in West Lombok

Barzian Ali Aktab, Febrita Susanti, and Sri Apriani Puji Lestari  
*Muhammadiyah University of Mataram*

### Abstract

Critical land is land that is caused by a decrease in the quality of the land as a medium for vegetation and a medium for water management, which causes the land to be degraded due to various types of land resource use that do not pay attention to the land. continuity. This study aims to analyze and map the level of criticality of land in the spatial pattern of West Lombok Regency. The analytical method used in determining the critical level of land in this study is the overlay method of spatial data based on parameters from the Regulation of the Director General of Watershed Management and Social Forestry Number: P.4 / V-SET / 2013 Regarding Technical Guidelines for Compiling Spatial Data for Critical Land, which consists of: indicators of land cover, slope, erosion hazard level, productivity, and management. The results of this study are the classification of the criticality level of land in protected forest areas, agricultural cultivation areas and areas outside forest areas which consist of lands with critical, moderately critical, potentially critical, and non-critical calcifications.

**Keywords:** Land, Level of Criticality, Area, Agriculture, West Lombok

**Topic:** Engineering

[ABS-45]

## Android Based Information System and SMS Gateway to Improve PMI Donors

Jatmiko Indriyanto, Miftakhul Huda, and Qirom  
*Politeknik Harapan Bersama*

### Abstract

Researchers conducted research at PMI (Indonesian Red Cross) in Tegal City. After visiting PMI, the researchers found that PMI often held blood donor activities in various places. However, the efforts made are still unable to cover the blood needs that are needed each month. PMI has made efforts to send text messages manually to blood donors who have been donors before, but because there are thousands, so many are often missed. Therefore, an automatic sms system is needed, or often called an sms gateway based on existing donor databases, and data. that has been sent can be seen on android. The sequence of research methods, data collection, system analysis, problem identification, application design, application development and application implementation. With the existence of an Android-based information system and an SMS gateway, it certainly makes it very easy for PMI to raise blood donors, it can even increase the number of blood donors. With the Android-based information system and SMS gateway, it will certainly make it easier for

PMI Tegal City to collect blood donors. This research succeeded in bringing in donors to donate blood regularly.

**Keywords:** PMI, blood donation, sms gateway

**Topic:** Engineering

**[ABS-268]**

### **Syn Gas to Syn Fuel Plant for Eastern Indonesia**

Silvya Yusnica Agnesty, Abdurrahman Wibawa, Muhammad Aidil Asri, Muhammad Farel Daniswara, and Haris Nu'man Aulia  
*Polytechnic of Energy and Mineral Akamigas*

**Abstract**

As we know, proven oil reserves in the world have decreased, as well as in Indonesia. Currently, proven oil reserves in Indonesia are about 3.3 barrels. Assuming a constant production of 800,000 per day without the discovery of new reserves, then in the next 11 to 12 years Indonesia will not be able to produce petroleum anymore. On the other hand, compared to proven petroleum reserves in Indonesia, natural gas reserves in Indonesia are quite large. It is around 100 trillion cubic feet. Therefore, in this work, a syngas to synfuel plant has been prepared as a contribution for preparation of a shifting from producing fuel with petroleum as raw material, to fuel with natural gas as raw material. Particularly for eastern Indonesia, where access to several areas is difficult to reach so that the distribution of gas products is less relevant.

**Keywords:** syngas, synfuel, gas to liquid, refinery

**Topic:** Engineering

**[ABS-16]**

### **Experimental Study of Porous Paving using Kalimantan Local Materials**

Yudi Pranoto\*, Anung Sudiby, Eza Rangga Rivelda  
*Civil Engineering Department, Samarinda State Polytechnic, Indonesia*

**Abstract**

Floods in Samarinda occur every year. It's because the infiltration area is getting narrower, the drainage conditions are full of garbage, high rainfall, and the behavior of people who litter. So, it needs improvement technology to reduce these problems. One way is to make porous paving that can absorb water from the soil surface into the ground of soil, use local materials. The purpose of this study was to investigate the effect of local Kalimantan material on the strength and porosity of porous paving. This research begins with a literature review, then material

procurement, and material testing. After that, make a mix design paving. Make of specimens with a variation of fly ash 10% and sand 0%, 2.5%, 5%, and 7.5%. Then the paving compression test at the age of 7, 14, 21, and 28 days. From the research results, it indicated that the maximum compressive strength in the addition of 7.5% sand with the compressive strength of porous paving is 11.6 MPa, while for the highest porosity of paving with the addition of 0% sand.

**Keywords:** Porous paving, compression strength, flexural strength

**Topic:** Engineering

## [ABS-18]

### **Simulation Experiment to Predict the Critical Friction Area of Acetabular Liner Component on Hip Joint Replacement Implant During Movement**

Tresna P. Soemardi<sup>1\*</sup>, Agri Suwandi<sup>2</sup>, and Anwar Soefi Ibrahim<sup>3</sup>

<sup>1</sup> *Departemen Teknik Mesin, Fakultas Teknik Universitas Indonesia, Depok, Indonesia*

<sup>2</sup> *Jurusan Teknik Mesin, Fakultas Teknik, Universitas Pancasila, Jakarta Selatan, Indonesia*

<sup>3</sup> *Departemen Fisika Medis, Fakultas Kedokteran, Universitas Indonesia, Jakarta Pusat, Indonesia*

#### **Abstract**

There are four factors for the success of the total hip joint replacement implant surgery, that is, patient- surgical technique- implant design- and implant manufacturing. Implant design is the most critical factor and easy to perform optimization. Compatibility of dimension, contact area and material are the three crucial points in implant design. Critical contact during friction movement is one of the causes of implant damage. With the simulation software will get a mapping critical contact area to do the development of the component design.

**Keywords:** Simulation, prediction, friction, hip joint replacement

**Topic:** Engineering

## [ABS-21]

### **Orientation of Equipment Technology in Improving Production Performance in Batik SMEs**

Chauliah Fatma Putri and Muhammad Agus Sahbana

*University of Widyagama Malang*

#### **Abstract**

Handmade batik is a work of art that is recognized worldwide as an original Indonesian cultural heritage. The production process of handmade batik is carried out traditionally and from



generation to generation in Solo and Yogyakarta as the oldest batik development areas in Indonesia. The challenge in making handmade batik is a very long process and increased productivity is a paradoxical fact. The extent to which the use of batik production equipment technology is used to produce handmade batik products is a concern in this study. The purpose is to analyze each of the effects of the equipment technology orientation of the drawing table, canting, canting cap, padder, and kenceng on the handmade batik production process and the effect of equipment technology orientation simultaneously on the production performance of handmade batik SMEs in Central Java. The method used is the multiple linear regression statistical test with SPSS. Applied to test the effect of using each equipment on handmade batik SMEs in Solo and Yogyakarta. The results showed that the production performance of batik SMEs in Central Java was influenced by the technology orientation of the equipment used simultaneously. The technology orientation of each equipment, namely canting cap, padder and kenceng, affects the performance of handmade batik production. Meanwhile, the orientation of the drawing table and canting technology has no effect on the performance of handmade batik production. As the oldest batik producing city in Indonesia, without abandoning the true principles of handmade batik, batik SMEs in Solo and Yogyakarta use slightly more modern and technology-oriented production equipment to make handmade batik. Batik SMEs in other regions in Indonesia, can develop handmade batik production with canting cap, padder, and kenceng with a more modern orientation technology to improve the performance of their handmade batik production.

**Keywords:** handmade batik, machine, production performance, SMEs, tools

**Topic:** Engineering

[ABS-22]

## **Design of Environmental Pollution Monitoring Tool Based on Internet of Things (IoT)**

Febrin Aulia Batubara, Bakti Viyata Sundawa, and Meidi Wani Lestari  
*Electrical Engineering Department, Politeknik Negeri Medan, Medan, Indonesia*

### **Abstract**

Monitoring of environmental pollution level on campus is very important to do. According to UI GreenMetric 2018 data, there are 719 campuses to participate in the developing of green campus and issues of sustainability. One of assessment is implementation of smart system to solve environmental problems in the campus area. The purpose is to develop a monitoring tool for environmental pollution levels in campus of Politeknik Negeri Medan. Device is consisting of hardware and software. The hardware is sensors, OBD module, SIM808, RTC module, micro-SD and ESP32 microcontroller. Software is done based on webserver and database server. There are several parameters that changes if pollution has occurred, namely the density of dust particles, humidity, light intensity, CO<sub>2</sub> levels and noise. Furthermore, information about environmental pollution data can be displayed and accessed in real-time via smartphones and computers. Environmental Pollution Monitoring Tool will be installed 2 places in Politeknik Negeri Medan

campus area, one of close to parking area and one of lecture building. This is in preparation for development a green campus.

**Keywords:** Internet of Things (IoT), Sensors, Green Campus

**Topic:** Engineering

**[ABS-26]**

## **Detection and Control System of Electricity Consumption Towards Smart Vocational Education (SVE)**

Roslina<sup>1</sup>, Afritha Amelia<sup>2</sup>, Heru Pranoto<sup>2</sup>, Bakti Viyata Sundawa<sup>2</sup>, Nurul Fahmi<sup>3</sup>, Abdullah Arief<sup>2</sup>, Irwan Saputra Hutaauruk<sup>2</sup>, Nurhafni Carol<sup>2</sup>, and Suherman<sup>2</sup>

<sup>1</sup>*Informatics and Computer Engineering Department, Politeknik Negeri Medan, Medan, Indonesia*

<sup>2</sup>*Electrical Engineering Department, Politeknik Negeri Medan, Medan, Indonesia*

<sup>3</sup>*Informatics Engineering Department, Politeknik Negeri Bengkalis, Bengkalis, Indonesia*

### **Abstract**

This research is a follow-up previous research to improve performance of Smart Control Electrical Energy (SiSCE) at idle time. Now, product performance is improved to able to detect activities in one room and control consumption of electrical energy operational hours of institution. This research aims to measure the saving in electrical energy at idle time and operational hours of lecture and office buildings. The tool is a combination of PIR, WSN, IoT sensor and mobile-based monitoring. The tool works for detecting activities in room, if there is no activity, electrical current will be stopped. Calculation of saving electrical energy increasing using Energy Smart Control System (SiSCE) with addition of feature for activities detection during operational hours. Software was developed in Informatics and Computer Engineering Laboratory. Hardware was installed in Telecommunication Engineering Laboratory as well as testing, data acquisition and sending data to mobile device.

**Keywords:** Idle Time, Smart, Control, Detection, IoT

**Topic:** Engineering

## [ABS-28]

### **Development of 500-kV XLPE Underground Cable in Capital City for Sustainability of Electric Energy for Community**

Edy Roy Antonius S  
*University of Indonesia*

#### **Abstract**

500-kV Underground Cable transmission line design is a type of design that has never been applied in transmission line construction in Indonesia. Even around the world, 500 kV Underground Cable designs are still limited scale. Actually, electric power transmission line grid systems in Indonesia with a voltage rating 500 kV has been applied, but only in Java island with Overhead Line transmission line model, and it's a backbone of the Java-Bali power grid system. Currently, PLN have a Jakarta Looping transmission system project 500 kV Extra High Voltage. This project has a potential delay due to land problems and social constraints along the route. Given that Jakarta is a capital city with a very high population, the construction of a tower transmission line will be a special challenge to complete the transmission project, where the process of land acquisition and compensation costs under along the route (ROW) will also be a special thing. In this research, we will try to estimate the construction cost for the 500 KV Underground Cable as an alternative to the project for other types of aerial cables. The route length will be adjusted into 4 categories of the overhead line route 1) a half of the overhead line route, 2) same with the overhead line, 3) 1.5 times of overhead line, and last 4) 2 times of overhead line. From the estimated calculations with these 4 categories, it is obtained the ratio of construction costs with underground cable designs to the overhead line design is smaller than cost of ratio for the same project design in Europe and/or America. It's feasible to execute in urban area like Jakarta, Surabaya and Bandung, but not feasible for outside urban area

**Keywords:** Overhead line, Underground cable, 500 kV, Construction Cost, Ratio

**Topic:** Engineering

## [ABS-285]

### **Rhizomes Classification Using Deep Neural Network Based on Odor**

Maimunah<sup>1</sup> and Seta Samsiana<sup>2</sup>

<sup>1</sup>*Universitas Muhammadiyah Magelang*

<sup>2</sup>*Universitas Islam 45 Bekasi*

#### **Abstract**

Rhizomes are kind of herbal plant that has many benefits for health. There are many kinds of rhizomes in Indonesia, such as temuireng, temulawak and temumangga, which have similarities in color, shape and odor. Therefore, for ordinary people, they are difficult to be identified. In this reasearch, some rhizomes were classified into three classes, namely the class of temuireng, temulawak and temumangga based on their odor. The odor of a rhizome was captured by a

TGS2600 sensor which was connected to the raspberry phi 3B in the voltage value. The voltage data were taken in 20 minutes for each class before classification process using deep neural network. Results showed that deep neural network could classify the type of a rhizome based on its odor with 98.8% accuracy

**Keywords:** deep neural network, classification, rhizomes

**Topic:** Engineering

**[ABS-32]**

## **Study of Utilizations Coconut Fiber with Kalimantan Local Material on The Concrete Compressive and flexural Strength**

Yudi Pranoto\* and Joko Suryono

*Civil Engineering Department, Samarinda State Polytechnic, Indonesia*

### **Abstract**

East Kalimantan is an area which rich in natural resources, as a Mahakam sand and local stones. They also have coconut fiber waste to increase the flexural strength of concrete. This material is still underutilized by the people of East Kalimantan. But They prefer to use materials imported from Palu, Sulawesi, so the unit price of concrete is Very Expensive. The purpose of this study was to investigate the effect of local Kalimantan material and coconut fiber on the strength of concrete. This research begins with a literature review, then material procurement, and material testing. After that, make a concrete mix design. Make of specimens with a variation of coconut fiber 0%, 0.4%, 0.5% and 0.6. Then the compression test at the age of 7, 14, 21, and 28 days. The flexural strength testing at the ages of 28 days. From the test results can make analysis and conclusions. From the research results, it indicated that the maximum compressive strength in the addition of coconut fiber 0.6% with the compressive strength 21.74 Mpa, and the maximum of flexural strength in the additional of coconut fiber 0.6 % with flexural strength 2.83 Mpa.

**Keywords:** Local material, Coconut fiber, Compression strength, Flexural strength

**Topic:** Engineering

## [ABS-35]

### **Advanced manufacturing process of orthotic shoe insoles using a new material based on the Taguchi Methodology**

A.A. Anthony<sup>1</sup>, P.W. Anggoro<sup>2\*</sup>, J. Jamari<sup>1</sup>, and A.P. Bayuseno<sup>1</sup>

<sup>1</sup> *Department of Mechanical Engineering, University of Diponegoro, Indonesia.*

<sup>2</sup> *Department of Industrial Engineering, University of Atma Jaya Yogyakarta, Indonesia*

#### **Abstract**

Some people who have foot deformities such as diabetes often experience pain and difficulty wearing shoes. The optimization of advanced manufacturing based on CAM - CNC with EVA rubber foam material has not been optimal. Two new materials are proposed in this paper for manufacturing optimization through the experimental stage. This paper demonstrates the optimization of orthotic shoe insole manufacturing in a CNC machine so that optimal conditions for cutting parameters and material types can be obtained. The Taguchi method, Orthogonal Array L2735, PowerMill 2017, Minitab v2019, and 5 cutting parameters on CNC machines that are significant to the measured data response are used in this paper. The two new materials proposed in this paper provide very significant results when compared with EVA rubber Foam. This new material can reduce the time needed to work on one pair of insoles to 5.8 hours / pair (72.5% faster) with an average surface smoothness of 7.63 micrometer (91.49% smoother). The output of this research has significant implications for researchers and the manufacturing industry in the field of the shoe design- optimization of shoe manufacturing on CAM and CNC machining. This research also has implications for the use of modern computer-aided reverse engineering systems.

**Keywords:** Foot deformity, new material insole, CAM, Taguchi method

**Topic:** Engineering

## [ABS-36]

### **Optimization of the toolpath strategy for the master ceramic jewelry mold pattern using the Rhinoceros software and Retrovit CNC machine**

Stefanus W. Ratnanta<sup>1</sup> (a), P.W. Anggoro<sup>1\*</sup>, P.K. Fergiawan<sup>2</sup>, J. Jamari<sup>2</sup>, and A.P. Bayuseno<sup>2</sup>

<sup>1</sup> *Department of Industrial Engineering, University of Atma Jaya Yogyakarta, Indonesia*

<sup>2</sup> *Department of Mechanical Engineering, University of Diponegoro, Indonesia*

#### **Abstract**

Jewelry ceramic is a jewelry type product. Creative ceramic jewelry designs with distinctive textures, precision, detail and can be mass-produced can be produced through the collaboration of modern advanced manufacturing technology based on Computer-Aided Manufacturing (CAM) and CNC machines. This pendant mold pattern using Rhinoceros software and CNC machine retrovit. This paper demonstrates the optimization of toolpath strategy machining of

jewelry liontin with batik texturing in a CNC retrovit machine on a small enterprise industry that can be obtained. Manufacturing product, optimization toolpath strategy machining on Rhinoceros CAM, CNC retrovit machine, some parameter cutting machining used in this paper to obtained the ceramic mold of jewelry. Four types of pendant designs with Indonesian batik textures from Zbrush are set as 3D CAD models. The optimization of manufacturing CAM was carried out using Rhinoceros software. The pendant manufacturing process using CNC machine with china ash bone. The results of this product were used as a ceramic mold. The output of this research has significant implications for researchers and the manufacturing industry in the field of ceramic design - manufacturing - fabrication even though Digital Marketing. This research also has implications for the use of modern computer-aided reverse engineering systems.

**Keywords:** Jewelry ceramic, CAM, CNC machine retrovit, pendant design

**Topic:** Engineering

[ABS-37]

## **Development of the Ceramic Jewelry Industry for Necklace with Indonesian Batik Motifs**

C.D. Mahendri<sup>1</sup>, P.W. Anggoro<sup>1\*</sup>, P.K. Fergiawan<sup>2</sup>, T. Yuniarto<sup>1</sup>, A.P. Bayuseno<sup>2</sup>, and Jamari<sup>2</sup>

<sup>1</sup> *Department of Industrial Engineering, University of Atma Jaya Yogyakarta, Indonesia*

<sup>2</sup> *Department of Mechanical Engineering, University of Diponegoro, Indonesia*

### **Abstract**

Currently, the national ceramic industry has developed products based on culture and creative economy. This product is increasingly sought after by local and foreign consumers. Design development is carried out to face competition in the Asean Economic Community (AEC) in order to avoid decreasing the quality and quantity of Indonesian ceramic export products. The effort that every ceramic industry player must always make is to innovate products by making new breakthroughs. Breakthroughs are no longer carried out conventionally but use advances in computer aided design (CAD) based design technology, and reverse engineering (RE) which is often called the Computer Aided Reverse Engineering System (CARESystem). This paper demonstrates the Development of Ceramic industry to make Jewellery ceramic for Necklace with Indonesian Batik motifs on small enterprise ceramic industry. Manufacturing Product with CNC Retrovit to make master mold of jewelry, Fabrication Product of jewelry ceramic, Assembly product of jewelry ceramic to be necklace. Four types of master pattern jewelry print with Indonesian batik textures. the process of making gypsum-based jewelry mold patterns. The process of making a pendant with ash bone china ceramic. the result of this product is a necklace made from ceramic. The output of this study has significant implications for researchers and the manufacturing industry in the field of ceramic manufacturing. This research also has implications for the use of modern computer-aided reverse-engineering systems to improve product quality and capacity.

**Keywords:** Ceramic industry, Creative economy, Fabrication, Ceramic, Jewelry Ceramic

**Topic:** Engineering

[ABS-297]

## Population Dynamics of *Loligo* sp in the Waters of the Island of Ternate

Umar Tangke

*Universitas Muhammadiyah Maluku Utara, Indonesia*

### Abstract

*Loligo* sp is a group of cephalopods or mollusks that live in the sea, with a horizontal distribution area from the coast to the open sea and a vertical spread from the surface to a depth of several thousand meters in the water column. Until now, the production of squid is still dependent on natural stocks because there has been no study on technology in cultivating it, so there is a concern that if the increased production continues to threaten the sustainability of these resources. Therefore, in the interest of sustainable management, it is necessary to assess the parameters of the population and biomass of the squid resource through analysis of population dynamics including age, growth and mortality and yield per recruit. This research was conducted for 3 months from June to August 2019 with the aim of analyzing the parameters of the population of squid resources and the level of exploitation in the waters of Ternate Island using survey methods and stock assessment and population analysis. The results showed that the squid resources landed in the Hygienic Market in Ternate City had stable growth parameters including the maximum length (L<sub>∞</sub>) 97.13 mm, growth coefficient (K) 0.23 per month, t<sub>0</sub> 1.26. The total mortality, natural, and catch mortality values were 0.74, 0.50, 0.24 and the level of exploitation was 0.32, respectively, where this value indicates that the exploitation rate is smaller than the estimated utilization value of 46.0%.

**Keywords:** Population Dynamics, *Loligo* sp, Mortality, cephalopods

**Topic:** Engineering

[ABS-42]

## Digital Sector Innovation to Support Less Contact Economy in Indonesia

Yuda Syahidin

*Information Technology faculty, Information System Department, Piksi Ganesha Polytechni*

### Abstract

It is predicted that the Corona virus will not pass quickly from the world. The Indonesian government is currently preparing a way to coexist with the COVID-19 outbreak. Now the government is preparing a way through the preparation of the concept of reducing physical interaction. Then Indonesia is said to be included in the list of 170 countries that will experience a decline in economic growth due to Covid-19, so digital transactions must be a mainstay. Digital businesses use technology to create new value in business models, customer experiences and the internal capabilities that support its core operations. The term includes both digital-only brands and traditional players that are transforming their businesses. When face-to-face activities are difficult to do like today, digital technology is the only solution that is able to force business



people to try this technology. From this research will produce digital sector innovations that produce several technology platforms in this new normal, namely Logistics and Supply Chain, EduTech, FinTech, AgriTech, HealthTech, SecurityTech. So, with the hope that the digital sector is encouraged to be able to reduce the worst impact of the economy, for example, being a substitute for economic activity that is currently limited and also the retail sector, the service sector that is directly affected in the midst of the Covid-19 outbreak. in the future is less contact economy. Innovation in the digital sector is increasingly needed to fill the diminishing face-to-face activities.

**Keywords:** Innovation, Digital Sector, Less Contact Economy

**Topic:** Engineering

[ABS-298]

### **Elastohydrodynamic Lubrication Analysis on the Performance of Artificial Hip Joint for Sitting (Iftirasy) Movements in Muslim Prayer (Salat) Activity.**

Jamari, Mohammad Tauviqirrahman, Havilla Rizieq Husein, and Muchammad  
*Department of Mechanical Engineering, Faculty of Engineering, Diponegoro University, Indonesia*

#### **Abstract**

The Patients of artificial hip joint are recommended to limit the extreme movements that could cause damage of the device, such as salat movement. As many studies performed the simulation by neglecting the presence of synovial fluid, in this study we examined the performance of artificial hip joint under elastohydrodynamic boundary condition which close to realistic state. To investigated the effect of the existence of the lubricant in the artificial hip joint on the lubrication performance including the structure of artificial hip joint during sitting ('Iftirasy') salat movement. Fluid-Structure Interaction (FSI) method employed to solve the mechanism of elastohydrodynamic lubrication in the artificial hip joint during sitting ('Iftirasy') in salat movements are of particular interest. The simulation results show that in order to obtain more accurate result, the lubricant of the synovial fluid should be considered and modeled, additionally, the existence of the lubricant is proven to prevent the solid contact as well as impingement between the component during sitting ('Iftirasy') salat movement. In this study we investigated the lubrication and structural performance of artificial hip joint in salat activity to accommodate the major religious practice of Muslim community. The impact of this study are useful in continuing development of bio tribology and biomedical aspect of the device.

**Keywords:** artificial hip joint, synovial fluid, elastohydrodynamic lubrication, computational fluid dynamic (CFD), fluid-structure interaction (FSI), Muslim prayer (salat)

**Topic:** Engineering



[ABS-43]

## **Design of Fixed Fire Protection with the Total Flooding System Method of AF11E Extinguisher Media in the HSSE Training Center Building of PT X**

Tengku Ferdy Hendrawan, Putut Suprijadi, and Budi Sulistiyo Nugroho  
*Oil and Gas Refinery Department, Politeknik Energi dan Mineral Akamigas*

### **Abstract**

PT X is one of the subsidiaries of PT X engaged in upstream oil and gas with a working area of 24,450 km<sup>2</sup> located in Cepu District, Blora Regency, Central Java. Operational requirements in HSSE competency development require Demo Room facilities, namely a room that is useful as a place for implementing HSSE induction/training for visitors/new workers/contractors before entering the Pertamina Operations Unit. Judging from the literature that the Demo Room as an exhibition room is categorized high ease of combustion if a fire will release high heat, the fire spreads rapidly. The accuracy of fire protection design of fixed fire protection using clean agents uses a total flooding system to overcome this problem and function optimally in meeting fire protection needs. Aim to equip fire extinguishers (fixed fire protection) HSSE training center buildings that are not yet available and are very useful so that they can be used as consideration in the formulation of policies, plans and programs in increasing or increasing the reliability of countermeasure operations in the event of a fire. The method used is the design of fixed fire protection methods of total flooding system from the calculation of hydraulics to the quantity requirements of clean agent extinguishing media and calculation of the piping system needed. The design of a fixed fire protection total flooding system method uses AF11E clean agent media with a volume of 144 m<sup>3</sup> of space requiring 60 kg using a K63016 tube which has a weight of 86.04 liters. Fixed fire protection has a total length of 13.836 m with a volume of 13.4 liters requiring 2 nozzles with a flow rate of 7.5 kg/s using pipe 1.25 with a pipe thickness of 0.5 mm requiring a 41-liter volume clean agent and mid discharge storage pressure 17.37 bar with a total pressure drop of 132.335 KPa and the final total in the nozzle 8.68 bar

**Keywords:** fixed fire protection, total flooding system, clean agent

**Topic:** Engineering

[ABS-49]

## **Assessment of Non-Verbal Communication Online Job Recruitment Using Gray Level Co-Occurrence Matrix (GLCM) and Fuzzy C-Means Algorithm (FCM)**

Anita Sindar Sinaga  
*STMIK Pelita Nusantara*

### **Abstract**

Online recruitment, interviewers are more focused on the applicant's body language. Through video recordings from Skype, video calls anyone can apply. An online recruitment system can be used to analyze body language. Communication contains two dimensions, verbal and non-verbal. Non-verbal communication behavior was evaluated using the feature extract calculation of the Gray Level Co-Occurrence Matrix (GLCM). Body language assessed by eyes, facial expressions, intonation, volume of voice and physical appearance. Applicants' videos are extracted to take eye, mouth and head gestures. Grayscale gestures were converted using the Local Binary Pattern (LBP) method. Image analysis based on order 1 and order 2 statistical distribution using GLCM. The feature extraction formula consists of feature, contrast, energy, entropy and homogeneity at rotation 00, 450, 900 and 1350. The GLCM method is an effective texture descriptor method and has better computation time and accuracy than other texture extraction methods. The results of the GLCM extraction calculation are then classified using the Fuzzy C-Means algorithm. Fuzzy C-Means (FCM) is used in pattern recognition. Data identification on the FCM is determined based on the degree of membership which has a value between 0 and 1. This study processes the applicant's offline video data. Identify expressions that indicate doubt, confusion and optimism. The assessment of the 10 videos was taken with the dominant optimistic expression extraction loop, it was obtained that the 7th video had the highest percentage of optimistic facial expressions.

**Keywords:** Offline Video, Non-Verbal Communication, LBP, FCM, GLCM

**Topic:** Engineering

[ABS-51]

## **Optimization of Neural Network Based PSO Feature Selection in the Classification of Graduates Working According Their Field**

Very Kurnia Bakti, Dairoh, and Muhammad Naufal  
*Politeknik Harapan Bersama, Tegal, Indonesia*

### **Abstract**

The many college graduates who work not in accordance with their field of knowledge. The figures obtained show that the horizontal alignment <80% in the last three years has not reached the idea value. The question that often arises is why this can happen and what influences can

determine the quality result of graduates why they don't work in their fields. we need a model that is used in order to see a pattern of graduates in order to work according to their scientific fields. Neural network is an algorithm method that can be used as a reliable classification algorithm but has shortcomings in its selection of features, where with the combination PSO has a good ability to solve problems that have non-linear and non-differentiable characteristics, multiple optima, large dimensions through good adaptations. derived from social psychological theory. The combination method between the Neural Network and the PSO selection feature obtained an output accuracy of 71.51% greater than the accuracy of the Neural Network method alone, namely with a value of 64.32%.

**Keywords:** College, neural network, PSOPSO Feature Selection, Graduate

**Topic:** Engineering

[ABS-52]

## **Comparative Study of Municipal Solid Waste Fuel and Refuse Derived Fuel in the Gasification Process Using Multi-Stage Downdraft Gasifier**

Sigit Mujiarto, Bambang Sudarmanta, and Arif Rahman Saleh

<sup>1</sup> *Department of Mechanical Engineering, Faculty of Engineering, Sepuluh Nopember Institute of Technology, Surabaya, Indonesia*

<sup>2</sup> *Department of Mechanical Engineering, Faculty of Engineering, Tidar University, Magelang, Indonesia*

### **Abstract**

RDF is obtained from MSW waste which cannot be used anymore, which is flammable waste and is separated from parts that are difficult to burn through the process of counting, sieving, and air classification. Refuse Derived Fuel (RDF) has potential as an alternative energy source. Comparing RDF fuel and MSW fuel with a gasification process using a downdraft multi-stage gasifier. The experimental method is the proximate test and calorific value test, then the gasification process is carried out using a multi-stage downdraft gasifier. The performance indicator for RDF biomass resulted in the syngas composition of CO gas: 18.68% v, H<sub>2</sub>: 9.5446% v, and CH<sub>4</sub>: 0% v. The maximum LHV syngas is 3365.08 kJ / kg, the efficiency of cold gas is 57.19%, and the smallest tar content is 80.24 mg / Nm<sup>3</sup>. RDF can be used as an alternative energy source by using the gasification process. The results of this study can be used to optimize the further RDF gasification process.

**Keywords:** MSW, RDF, gasification, downdraft gasifier, syngas

**Topic:** Engineering

## [ABS-53]

### Design of Robot Arm to Coffee Maker Based Arduino

Ari Waluyo, Asni Tafrikhatin, and Sri Rahandika Heri  
*Politeknik Dharma Patria*

#### Abstract

Coffee is one of the favorite drinks in Indonesia. The way of making coffee is brewed and using a machine. Most coffee machines use a manual system, so it is less effective and attractive. The purpose of this study was to design a coffee machine using a robotic arm. This coffee machine can also be controlled remotely using a smartphone. Design of robot arm to coffee maker included hardware and software design. Hardware design used blender, while the software design used Arduino IDE. Design of robot arm to coffee maker produces 4 parts, namely (1) the controller uses a smartphone, (2) the receiver will check the water level, water temperature, and water adequacy, (3) notification via voice (4) the robot arm will make a cup of brewed coffee. Automatic coffee makers not only use a coffee machine but can also be used robot arm.

**Keywords:** Robot arm, coffee maker, Arduino

**Topic:** Engineering

## [ABS-69]

### Synthesis of Bio-additive for Low Sulfur Diesel: Chemical Transesterification of Soybean Oil and Ethylene Glycol using K<sub>2</sub>CO<sub>3</sub> Catalyst

Rhiby Ainur Basit Hariyanto<sup>1</sup>, R. Arizal Firmansyah<sup>1,3</sup>, R.Y Perry Burhan<sup>1,2\*</sup>, and Yulfi Zetra<sup>1</sup>

<sup>1</sup> *Department of Chemistry, Faculty of Science and Data Analytics, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia.*

<sup>2</sup> *Oil and Gas Processing Technique, PEM Akamigas, Cepu, Indonesia.*

<sup>3</sup> *Department of Chemistry Education, Faculty of Science and Technology, Uin Walisongo, Semarang, Indonesia.*

#### Abstract

Due to the concerns on environmental preservation, acts on low sulfur diesel oil are ratified. The desulfurization of diesel causes its lubricity to decline. One applicable alternative is to add lubricity improver additives. In this research, 2-hydroxyethyl ester (HEE) was synthesized as it has potential for that purpose. The additive was synthesized by transesterification of soybean oil (SO) and ethylene glycol (EG) using K<sub>2</sub>CO<sub>3</sub> catalyst with the following parameters such as reaction temperature is at 150 degrees Celcius, 5 hours reaction time, the molar ratio of SO: EG is 1:10, and catalyst amount is 7% mole of SO. The composition and structure of HEE compounds were determined using Gas Chromatography-Mass Spectrometry (GCMS). According to GCMS,

it can be concluded that the additive is a mixture of HEE compounds. Synthesized product has the potential to be a good lubricity improver additive

**Keywords:** Low Sulfur Diesel, Lubricity Improver, bio additive, transesterification

**Topic:** Engineering

**[ABS-77]**

## **Synthesis of 2-Hydroxy-Ethyl Ester Based on Peanut Oil as a Bio-Additive for Diesel Fuel**

Laila Sukria<sup>1</sup>, R. Arizal Firmansyah<sup>1,3</sup>, R.Y Perry Burhan<sup>1,3\*</sup>, and Yulfi Zetra<sup>1</sup>

<sup>1</sup> *Department of Chemistry, Faculty of Science and Data Analytics, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia.*

<sup>2</sup> *Oil and Gas Processing Technique, PEM Akamigas, Cepu, Indonesia*

<sup>3</sup> *Department of Chemistry Education, Faculty of Science and Technology, Uin Walisongo, Semarang, Indonesia*

### **Abstract**

Greenhouse gas emissions are increasing along with industrialization and modernization due to the use of diesel fuel. The reduction of greenhouse gas emissions can use the desulphuration method. However, low sulfur in diesel fuel causes low lubricity values. One solution to this is by adding a bio-additive compound. In this research, the synthesis of 2-hydroxyethyl ester compounds obtained through the transesterification reaction of peanut oil with ethylene glycol and K<sub>2</sub>CO<sub>3</sub> catalyst will be carried out. The simple reflux is used with a molar ratio of ethylene glycol and triglycerides of 10: 1 with K<sub>2</sub>CO<sub>3</sub> of 9% mole of triglycerides. the conversion to the product was 77.47%. Product characterization was carried out using Mass Spectrometry Gas Chromatography (GC-MS). Based on chromatograms, the total abundance of the 2-hydroxyethyl ester is 54.69%. this compound can be used as an alternative to lubrication enhancing bio-additive.

**Keywords:** Bio-additive, Transesterification, Peanut oil, 2-hydroxy-ethyl ester

**Topic:** Engineering

## [ABS-310]

### **The effect of holding and stirring time on porosity of aluminium copper alloy in rheocasting process**

Maruf maruf<sup>1,2</sup>, Rudy Soenoko<sup>3</sup>, Wahyono Suprpto<sup>3</sup>, and Ahmad As'ad Sonief<sup>3</sup>

<sup>1</sup>*Mechanical Engineering Department, Lambung Mangkurat University, Banjarmasin, Indonesia*

<sup>2</sup>*Doctoral Program of Mechanical Engineering Department, Brawijaya University, Malang, Indonesia*

<sup>3</sup>*Mechanical Engineering Department, Brawijaya University, Malang, Indonesia*

#### **Abstract**

Aluminum and its alloys are among the most used materials in design and engineering applications after steel. The most widely used copper aluminum alloys are those containing 4 to 10% Cu. Aluminum-copper alloy can reduce the castability or flowability of the alloy. This deficiency can lead to porosity defects, thereby reducing product quality, and the rheocasting process is expected to improve castability. This research aims to investigate effect of holding and stirring time on porosity of aluminium copper alloy in rheocasting process. Casting process using rheocasting with variation of holding and stirring time. the specimens were tested for elemental composition using spectrometry. The percentage value of specimen porosity is done by comparing apparent density using the pycnometer method and true density using ASTM E252-84. Based on the research that has been done regarding the effect of holding time, stirring time on porosity, it can be concluded as follows: The longer the stirring time and the holding time, the lower the porosity value. The current article is to highlight the implication of rheology are effect of several process and metallurgical parameters, fraction solid of the primary phase and its morphology, size and distribution micro structure

**Keywords:** Rheocasting, aluminum copper alloys, porosity

**Topic:** Engineering

## [ABS-55]

### **Improving Quality Level of Dining Table Through Painting Process by Using Taguchi Method**

Eko Muh Widodo, Oesman Raliby, Tuesi Ari Purnomo, and Candra Widiarso

*Industrial Engineering Departement, Faculty of Engineering, Muhammadiyah University of Magelang*

#### **Abstract**

In the process of painting a product, it commonly occurs defect results including corrugated painting, perforated, less smooth, speckled and uneven surface of painting. This can occur due to the setting parameters in the process of painting is not appropriate. This research is done to reduce the high rate of defects in the process of painting products of table by setting parameters using the Taguchi method. Processing data using the Taguchi method are distinguished by two ways: (1) to see the impact of uncontrollable factors on the percentage of defective products and (2) to see the controllable factors to the variability of the number of defective products.

Controllable factors in this study are: composition of paint, painting distance, pressure and temperature. The research results revealed that a significant factor level against average and variability of percentage number of defective products are composition of the paint level 2 (0.75: 1), the distance painting level 2 (20-25 cm), pressure level 1 (50 psi fluid tip round 1.88 mm), temperature level 2 (60 C), sanding sealer level 2 (15-20 cm) and a clear top coat level 1 (20-25 cm).

**Keywords:** Product Defects, Level factor, Taguchi

**Topic:** Engineering

[ABS-312]

## **Performance Analysis of Solar and Wind-Based Hybrid Power Plant Using HOMER Software (Case Study: Emas Bayu Hybrid Power Plant in Dusun Bondan, Cilacap)**

Supriyono<sup>1</sup>, Devi Taufiq Nurrohman<sup>1</sup>, Agus Santoso<sup>2</sup>, and Betti Widianingsih<sup>1</sup>

<sup>1</sup>*Department of Electronics Engineering, Politeknik Negeri Cilacap, Cilacap, Indonesia*

<sup>2</sup>*Department of Mechanical Engineering, Politeknik Negeri Cilacap, Cilacap, Indonesia*

### **Abstract**

Solar energy is a renewable energy source that is still being utilized today. Despite solar energy is free energy, it is very abundant and eco-friendly. However, the energy obtained from solar energy is inconsistent energy because the sun does not shine for one full day. Environmental factors, such as trees and tall buildings will also affect the energy obtained so that the performance of this power plant from solar energy is not optimal. Recently, many researchers have developed hybrid power plants which combine two or more different energy sources in the same system. In this paper, we develop a hybrid power plant with an off-grid system (not connected to PLN) that utilizes solar energy and wind energy. The hybrid power plant being developed is installed in Dusun Bondan, Kampung Laut District, Cilacap Regency. The installed power plant is determined for its performance by analyzing several parameters such as total energy production, net present cost (NPC) and cost of energy (COE). These parameters are analyzed using software which called hybrid optimization of multiple energy resources (HOMER). The simulation results show that the total energy production is 12,285 kWh/year, consisting of 10,480 kWh/year from solar energy, 1,805 kWh/year from wind energy. For the COE and NPC values are IDR 14,266/kWh and IDR 1,190,000,000, respectively.

**Keywords:** Hybrid Power Plant, Solar Energy, Wind Energy, HOMER

**Topic:** Engineering

[ABS-313]

## Little Story from Traditional Coffee Business in Temanggung Indonesia: University-Business-Government Collaboration

Chrisna Bagus Edhita Praja<sup>1\*</sup>, Heni Lutfiyati<sup>2</sup>, and Muji Setiyo<sup>3</sup>

<sup>1</sup> Faculty of Law, Universitas Muhammadiyah Magelang, Indonesia

<sup>2</sup> Department of Pharmacy, Universitas Muhammadiyah Magelang, Indonesia

<sup>3</sup> Center of Research and Community Empowerment, Universitas Muhammadiyah Magelang, Indonesia

### Abstract

Since 2011, coffee products were designated as one of the leading products in Temanggung Regency. Since then, coffee SMEs have sprung up in Temanggung and are mostly traditionally managed home producers enjoyed by many coffee connoisseurs in Indonesia. However, customer demand for Temanggung coffee is not comparable to the production capacity produced by coffee producers. Therefore, as a strengthening of Temanggung Coffee products, collaboration between the University-Business-Government is needed through the Regional Superior Product Development Program. Through this activity, 2 (two) partners who had been producing ground coffee for 2 (two) years were selected and needed science and technology diffusion in the fields of processing technology, improved production management, product development, management of brand rights, and marketing. At first partner (Manunggal Coffee), the current production uses a roaster machine and there is an increase in production reaching 150 kg from the previous average of only 100 kg per month. Currently also serving roasting services for communities around SMEs. On the financial management side, currently the SME standard administration is in order. Meanwhile, for second partner (Gesing Coffee), it has coordinated with farmers and the village government for uniform quality of picking and post-harvest handling for stocks. Currently, Gesing Coffee has produced its own roaster machine. In addition, this SMEs has also served roaster services. The test results showed that the roaster was able to process 36 kg of coffee with 3 kg of LPG.

**Keywords:** Traditional Coffee Business, Robusta Coffee, University-Business-Government Collaboration

**Topic:** Engineering



## [ABS-60]

### **The Analysis of Determining Cost of Products and the Application of Cost-Plus Price Methods in Ordering Natural Gas Sell Prices in the Gundih area of PT Pertamina Asset EP 4 Field Cepu, in Sumber Village, Kradenan Sub-District, Blora District**

Yunanik, Andian Ari Istiningrum, and Tri Warcono Adi  
*Politeknik Energi dan Mineral Akamigas*

#### **Abstract**

This study was to determine the determination of the Cost of Goods Sold (COGS) for natural gas produced by the Central Processing Plant (CPP) in Blora District. Total production of natural gas distribution in 2019 through the Natural Gas Distribution Network is 2.36 MMCFD. The cost of natural gas products which has a value is Rp. 3,333, - / M3, 4000, - / M3, and the determination of the cost of gas based on recalculation by researchers, the natural gas that can be produced by the Central Processing Plant (CPP) scenario I is IDR 5,771 / M3 and the calculation of COGS according to the regulations to the calculation of the researcher results in a higher cost of goods. Selling prices according to the company and the Cost-Plus Pricing Method per 1 M3 of natural gas in scenario I is Rp. 6,638, - / M3. This costing plus pricing method uses the cost factor as a calculation.

**Keywords:** COGS, Natural Gas

**Topic:** Engineering

## [ABS-62]

### **Microstrip Antenna 2.4 GHZ U-Slot Patch Dual Slit Vertical with Ground Square Design for Zigbee Technology**

Sri Marini<sup>1\*</sup>, Sukwati Dewi Asrika<sup>1</sup>, Andi Hasad<sup>1</sup>, Muhammad Fikri Bivani Al Qohar<sup>2</sup>, and Muhammad Viki Nisfani Al Azis<sup>3</sup>

<sup>1</sup> *Faculty of Engineering, University of Universitas Islam 45 Bekasi*

<sup>2</sup> *Faculty of Engineering, University of Universitas Singa Perbangsa Karawang*

<sup>3</sup> *faculty of Social Sciences and Political Sciences, University of Singaperbangsa Karawang*

#### **Abstract**

In recent years, many significant developments and high attention are being paid to ZigBee technology since the license free ISM frequency spectrum for commercial communications and applications. The attractive nature of ZigBee coupled with the rapid growth in wireless communication systems has made ZigBee an outstanding technology to replace the conventional and popular wireless technology in use today like Bluetooth. U-Slot Patch Dual Slit Vertical with Ground Square Design Microstrip Antenna is presented in this paper for 2.4 GHZ band applications. These applications include ZigBee. The potential of ZigBee technology is enormous

due to its tremendous advantages such as the capability to provide extremely fast data rates at short transmission distances while requiring very low power dissipation. Recently, printed antennas have played a major role in development of antennas with different frequencies. The construction of proposed antenna is done on FR-4 epoxy substrate with thickness of 1.6 mm and  $\epsilon_r = 4.4$ . technique on ground plane using proximity coupled feed, the proposed antenna operates 2.4 GHz with good Vertical radiation patterns, its narrow band impedance bandwidth protects it from interference problem from other applications in ISM band. Proposed antenna has compact size of (12x12) mm<sup>2</sup> the conductor material uses copper with a thickness of 0.035 mm. It has advantages in simple design, narrow bandwidth, and compact in size and easy in fabrication. The measured result is in good agreement with simulated one, that worked at 2.4 GHz frequency with Vertical radiation pattern, gain  $\approx -3$  dBi, input impedance 50 ohm, Returnloss  $\leq -13$  dB and VSWR  $\leq 1.7$

**Keywords:** Microstrip Antenna, Zigbee Technology, WPAN, U-Slot, Dual Slit Vertical

**Topic:** Engineering

[ABS-320]

## The Addition of Fresh Air to Steel Sponge Oxidation to Reduce Vehicle Exhaust Emissions

Budi Waluyo<sup>1</sup>, Suroto Munahar<sup>1</sup>, Bagiyo Condro Purnomo<sup>1</sup>, Muji Setiyo<sup>1</sup>, Saifudin<sup>1</sup>, Noto Widodo<sup>1</sup>, and Bambang Pujiarto<sup>2</sup>

<sup>1</sup> *Department of Automotive Engineering, Universitas Muhammadiyah Magelang, Indonesia*

<sup>2</sup> *Department of Informatic Engineering, Universitas Muhammadiyah Magelang, Indonesia*

### Abstract

Nowadays, after treatment, technology has been widely applied by oxidizing harmful exhaust emissions into more environmentally friendly gases. However, the technology for oxidizing these emissions uses relatively expensive platinum and rhodium catalysts. This study offers a simple exhaust gas oxidation technology by utilizing heat energy and a very cheap steel sponge material. The method used in this study is to utilize exhaust gas energy to the oxidation chamber of a steel sponge through an exhaust manifold with a heat-insulating layer. The steel sponge oxidation chamber is also lined with heat insulation for the steel sponge's optimal heat absorption. Fresh air is entered through the non-return valve due to the difference in environmental pressure with low pressure due to exhaust gas flow velocity. The results of this study indicate that the addition of fresh air is effectively applied to reduce carbon monoxide emissions, but does not significantly reduce hydrocarbon emissions. Carbon monoxide is polar, so it is very easily oxidized with the addition of fresh air so that this system is effectively applied

**Keywords:** exhaust emissions, steel sponge, fresh air

**Topic:** Engineering

[ABS-65]

## Effect Methanol, Ethanol, Butanol on the Emissions Characteristics of Gasoline Engines

Syarifudin<sup>1</sup>, Firman Lukman Sanjaya<sup>1</sup>, M. Khumaidi Usman<sup>1</sup>, and Yohanes Sibagariang<sup>2</sup>

<sup>1</sup>*Department of Mechanical Engineering, Harapan Bersama Politechnic, Tegal, Indonesia.*

<sup>2</sup>*Department of Civil Engineering, Quality University, Sumatera Utara, Indonesia*

### Abstract

The increasing of the volume of motorized vehicles leads to an increase in dependence on fossil fuels and an increase in air pollution. The problem can be reduced by utilizing renewable alcohol fuels such as methanol, ethanol, and butanol. High number of octane and oxygen content is the main reasons. This study aims to observing the exhaust emissions of the gasoline engine with a mixture of methanol, ethanol, and butanol. The percentage of alcohol that used is 0% to 30% by volume. The test was carried out in 2000, 3000, and 4000 rounds. The results of the study explained that the use of methanol, ethanol, butanol in the fuel mixture was proven to reduce exhaust emissions. CO and HC emissions decrease during the percentage of alcohol in the fuel increased. The highest reduction in CO and HC emission in methanol blended fuel was 30%, respectively 94.55% and 82.71%. Meanwhile, CO<sub>2</sub> emissions increased by 34.37% at 2000 rpm engine speed. Based on this test, the addition of methanol to fuel can reduce exhaust emissions better than ethanol and butanol.

**Keywords:** renewable, fuel, methanol, ethanol, butanol, reduce, emissions

**Topic:** Engineering

[ABS-322]

## Development of a Low-Cost LED-Halogen Solar Simulator for Indoor Experiments on the Performance of Photovoltaic Modules Affected by Various Light Intensity and Temperature Environments

Yohanes S. Peli, Julius Tanesab\*, and Muchammad Ali

*Electrical Engineering Department, Politeknik Negeri Kupang, Indonesia*

### Abstract

The aim of this article was to discuss in detail, the development of a low-cost LED-halogen solar simulator, including characteristics. The LED-halogen was chosen because of its accessible, cheap and work steadily with simple power supply. It was also quick and easy to construct with simple equipment. The construction of the simulator consisted of two main parts- the collector module and LED-halogen light sources. The collector module faced upwards to the light source, which was placed at the top of the unit. In addition, the simulator was equipped with proper cover to reduce the interference of light entering from the outside. The optimal distance between the light surface simulator and the test plane was 50 cm, giving the maximum non-uniformity of 9.2%.

Experiment results showed that the output power of the tested PV module strongly depends upon the solar irradiation falling on it. The power output of the module increases linearly with the increase in the incident solar radiation. With the increase in the incident solar radiation more number of photons will be available to move the electrons from balance band to conduction band resulting into production of more current. Furthermore, the increase in temperature result in the reduction of band gap of the PV cells in the module. This leads to the increase in Isc but decrease in Voc. The decrease in Voc is more prominent than increase in the Isc. Therefore, overall power output and efficiency of the PV module decreases with the increase in its operating temperature.

**Keywords:** LED-halogen solar simulator, PV performance, irradiance, temperature

**Topic:** Engineering

[ABS-325]

### **Building Durian Seed Marketing Web as an Alternative Marketing Media During the Pandemic**

Anggun Dwi Agustina, Fardani Irvan, Ray Miftakhul Ilmi, R. Arri Widyanto\*, Dimas Sasongko, Agus Setiawan, and Bambang Pujiarto  
*Universitas Muhammadiyah Magelang, Indonesia*

#### **Abstract**

The pandemic period caused various businesses to become paralyzed, especially secondary needs such as the fruit nursery business. Likewise happened to Argo Bibit, experiencing problems in its marketing so it is necessary to create web-based alternative marketing media. This media is used to facilitate interaction between managers and customers in placing orders, customizing durian seeds and making transactions without having to meet in person.

**Keywords:** Content Management System, Fruit seed, Marketing, Customize

**Topic:** Engineering

[ABS-68]

## Forecasting Dengue Hemorrhagic Fever Incidents: A Machine Learning Approach

Tien Rahayu Tulili<sup>1\*</sup>, Yohanes K. Windi<sup>2</sup>, Bambang Cahyono<sup>1</sup>, Damar Nurcahyono<sup>1</sup>, Karyo Budi Utomo<sup>1</sup>, and Ahmad Rofiq Hakim<sup>1</sup>

<sup>1</sup> *Department of Computer Engineering, Politeknik Negeri Samarinda, Indonesia*

<sup>2</sup> *Politeknik Kesehatan Kemenkes, Surabaya, Indonesia*

### Abstract

Dengue is a viral infection transmitted by *Aedes* mosquitos. This disease mostly spread in the tropical and sub-tropical countries and according to WHO, the dengue outbreaks has increased 30-fold over the last five decades. The disease is still an ongoing burden of throughout the world. In Indonesia, for example, the incident of dengue hemorrhagic fever (DHF) has shown up 8,056 cases spread in the last five years. One of the ways to help the government to mitigate any possible of the spread is by utilizing a nearly accurate forecast system in predicting the cases. This study aims to develop machine learning as the most accurate predicting method of DHF cases in East Kalimantan. Various kinds of data are used in developing some machine learning models. Furthermore, identifying variables prior the models' development is done to achieve the best model of prediction- furthermore, a comparative study of the models built is discussed. Monthly dengue cases, incidence rate (IR), climate factors (rainfall, atmospheric pressure, the duration of the sun) and socio-economic conditions (population density, the number of inhabitants) from three different cities/districts (Samarinda, Balikpapan, and Berau) in East Kalimantan from 2007-2019 become data of the study. Those data are collected from the Local Department of Ministry of Heath Republic Indonesia, and Indonesia Central Bureau of Statistics (CBS). Prior machine learning's modeling, all data are analyzed with Pearson Correlation method to identify which variables has a positive correlation with DHF cases. Several machine learning algorithms, those are: Neural Network, Deep Learning, Generalized Linier Model, Generated Boast Tree and KNN, implemented in the modelling and forecasting. The results showed that some climatic factors are negatively correlated to DHF cases in East Kalimantan. Furthermore, the best method for forecasting the incidence is neural network with the RMSE value was 8.660%.

**Keywords:** forecast, dengue hemorrhagic fever, machine learning, deep learning, neural network, generalized linier model, KNN

**Topic:** Engineering

**[ABS-334]**

## **Use of Medical Record Data to Simplify the Hospital Decision Making System**

Edy Kurniawan

*Universitas Muhammadiyah Ponorogo*

### **Abstract**

Electrical Engineering, Faculty of Engineering, Muhammadiyah Ponorogo of University, Ponorogo, Indonesia. Medical records in hospital are only a pile of data that cannot provide detailed information. These data piles can be processed to provide information to related departments (hospitals, health offices, communities). So that the related parties if they will carry out development and counseling can be right on target. to get the information contained in the pile of medical records at the hospital. explore the information contained in patient medical record data in private hospitals using the Weka application with the decision tree j45 method. From the results of extracting medical record data, it is hoped that it can be used by various parties (hospital, health office) to make decisions. In addition, the community can also encourage them to choose a suitable hospital if they are going for treatment. This research was conducted at Aisiyah Ponorogo hospital, in the Medical records section

**Keywords:** Data mining, medical record, public health

**Topic:** Engineering

**[ABS-337]**

## **Disaster Mitigation: Design of Portable Toilet for People with Disabilities in Refugee Camp**

Oesman Raliby and Muhamad Khoirul Amin

*Universitas Muhammadiyah Magelang, Indonesia*

### **Abstract**

Disasters that occur in various regions have the potential to increase the number of new people with disabilities and exacerbate existing ones. This group will eventually become very vulnerable to multiple risks in refugee camps and socially marginalized. This study aims to reduce the risk of disaster impacts on these vulnerable groups so that during the evacuation in the holding camps, they can still overcome the problems independently without much dependence on others. Providing inclusive toilets is an option to answer this problem. The method used in this research is to use a universal design approach and set standard standards. Universal design is a design product that can create a conducive environment for every user with disabilities to be used together without any discrimination. The results showed that the resulting toilet design met the standard principles of the American with Disabilities Act - ADA.

**Keywords:** Toilet Design, Portable, disability

**Topic:** Engineering

[ABS-83]

## Comparative Study on Fuzzy Supervision and Gain Scheduling for Nonlinear Level Control System

Chalidia Nurin Hamdani<sup>1\*</sup>, Wasis Waskito Adi<sup>1</sup>, and Dimas Okky Anggriawan<sup>2</sup>

<sup>1</sup> *Refinery Instrumentation Engineering, Politeknik Energi dan Mineral Akamigas*

<sup>2</sup> *Electrical Engineering, Politeknik Elektronika Negeri Surabaya*

### Abstract

Nonlinear system is always become interesting topic to be researched. Level system is the one of them. Deadtime, changeable dynamics, etc make the conventional controller like PID have to be improved and optimized to face this system. In this paper, we propose a comparative study about PID control which is optimized using two different methods. First method is fuzzy supervision: the fuzzy is used to supervise the PID parameters based on desired operating points and performance. Using the same operating points and desired performance, the second method, gain scheduling, is designed: the optimal PID parameters is mapped in scheduling algorithm. Both methods is evaluated and compared in terms of settling time and maximum overshoot in some set point conditions by MATLAB simulation. The results show that fuzzy supervision provide better performance as compared to gain scheduling: small settling time, zero overshoot and zero offset.

**Keywords:** nonlinear system- fuzzy supervision- gain scheduling

**Topic:** Engineering

[ABS-48]

## Synthesis of Acetin: Bio-Based Additive for Low Sulfur Petrodiesel

R. Arizal Firmansyah<sup>1,3</sup>, R. Y. Perry Burhan<sup>2,3\*</sup>, Pusparatu<sup>2</sup>, Yulfi Zetra<sup>3</sup>, and Aditya Dharmawan<sup>2</sup>

<sup>1</sup> *Department of Chemistry Education, Faculty of Science and Technology, UIN Walisongo, Indonesia*

<sup>2</sup> *Politeknik Energi dan Mineral Akamigas, Cepu, Indonesia*

<sup>3</sup> *Department of Chemistry, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia*

### Abstract

Valorization of glycerol as a by-product of biodiesel production is the main reason researchers to synthesis acetin. It is known as a cold flow improver and emission CO reducer of petrodiesel. Generally, it can be applied as a supplement to diesel and biodiesel. Another route to synthesis it is trans-esterification of glycerol with ethyl acetate. In this work, the product has been synthesized by simple reflux methods. The conversion of glycerol to the product of acetin was 85.82%. Although the result is not significant, this research revealed that glycerol ether and acetin are potentially synthesized from renewable feedstock using a simple method.

**Keywords:** Bio-additive, low sulfur, acetin

**Topic:** Engineering



[ABS-85]

## **Economic and Spatial Development in Greater of Yogyakarta**

Ratika Tulus Wahyuhana, Hanna Amalia Putri, and Ryan Hidayat

*Perencanaan Wilayah dan Kota, Fakultas Sains dan Teknologi, Universitas Teknologi Yogyakarta, Indonesia*

### **Abstract**

65% of Yogyakarta land use is used for settlements with open space only 2%. Limited land does not support urban development, thus indicating the expansion of the surrounding area. In addition, the level of economic inequality is quite high, so it is necessary to study the development and economy. This study aims to see the development of the expansion of the city of Yogyakarta and economic performance through mapping and income distribution. This research uses quantitative research methods with quantitative descriptive analysis techniques. The analytical method used is spatial analysis through mapping, economic growth, Williamson Index analysis, Klassen Typology, and Location Quotient. The performance of Yogyakarta region shows the secondary and tertiary sectors are developing towards the outskirts of the city and do not dominate the city center. The sector of function transfer and physical development, especially in housing, service and industrial sectors. High economic inequality with an IW > 0.5

**Keywords:** Greater Yogyakarta, development, economic, spatial

**Topic:** Engineering

[ABS-344]

## **Internalization of Local Wisdom Values in Handling the Waste of The Stone Handicraft Industry Towards a Sustainable Industry**

Oesman Raliby<sup>1</sup>, Effendi Bin Mohamad<sup>2</sup>, and Hambali Bin Arep<sup>2</sup>

<sup>1</sup> *Industrial Engineering Department, Universitas Muhammadiyah Magelang, Indonesia*

<sup>2</sup> *Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka, Malaysia*

### **Abstract**

The small and medium industry is one of the strategic pillars in promoting economic growth but can damage the environment, moreover if the use of these natural resources without responsibility will undoubtedly reduce the quality of the environment and become unsustainable. The purpose of this research is to encourage business actors to align aspects of natural resource sustainability with waste minimization and internalize social aspects towards environmentally-friendly industries as local wisdom values. The approach method is to investigate the local geniuses concept whose constituent variables have never been tested before. The data collected is processed and analyzed using the Cradle-to-Cradle concept by modeling industrial processes in natural processes known as the 'biomimetic' approach. The test results show that the variables forming the structure of the local genius concept contribute to the performance of MSMEs and impact business sustainability. So that can be concluded that the



institution can use this study's findings as a reference for fostering stone handicraft MSMEs towards sustainable small craft industries.

**Keywords:** Local genius, Sustainable, Industry, Stone Craft

**Topic:** Engineering

**[ABS-89]**

## **Quality Optimization of Data Rate Video Streaming Over Bluetooth Network**

Andi Hasad\*, Muhammad Amin Bakri, Abdul Hafid Paronda, and Sri Marini  
*Electronic Department, Faculty of Engineering, Universitas Islam 45*

### **Abstract**

Video streaming over Bluetooth network as a medium of learning at higher education in the world began in 2004, in Indonesia it began in 2012. Unfortunately, the development of video streaming using Bluetooth network has not been used optimally in the field of higher education, especially at client-server distances reaching 50 m. This is caused by the video quality received on the client is not good and not according to Cisco standards. This paper, proposes a solution by providing a good video quality based on optimizing the performance of video streaming data rate transmission over Bluetooth Piconet Pervasive network, with Android OS on the client-side. This research is quantitative research with experiments method. All average values of throughput, delay, jitter and packet loss parameters are eligible for Cisco standard video streaming for 50 m measurements, where packet loss is below 5%, the value of packet loss parameters obtained has the highest value of 4.97% and the lowest of 4.88% with an average value of 4.92%. This research contributed in providing a good quality of video streaming over Bluetooth networks. The results showed that the greater the interference of Wi-Fi on the Bluetooth piconet pervasive network, the quality of video received by the client (mobile phone) decreased, marked by the increasing value of the average packet loss obtained during the video streaming.

**Keywords:** Bluetooth, Quality optimization, Data rate video streaming, Piconet pervasive, Client-server

**Topic:** Engineering

## [ABS-95]

### Presence System Application of Lecturers and Students Using Web-Based RFID and Raspberry Pi 3+

Agus Triyono

*Politeknik Negeri Samarinda*

#### **Abstract**

To ensure the teaching and learning process in the classroom requires the presence of lecturers and students. When the lecturer is not present, the learning and teaching process will not be carried out, nor will their presence. For that we need an integrated system in the form of the presence of lecturers and students in the form of raspberries and RFID as input media. The assumption of this system is that it is independent of the lecturers' RFID card storage mechanism when the lecturer is not present. The solution of this mechanism can be developed later through other research that will provide improvement in this system. RFID is used because of its practicality, apart from being a contactless reader, it has a long operating duration. Raspberries are installed in each room as a means of transacting presence.

**Keywords:** RFID, Presence, Raspberry Pi

**Topic:** Engineering

## [ABS-352]

### A Literature Review of Coding for Early Childhood

Reza Edwin Sulistyanningtyas<sup>1</sup>, Prasetyo Yuliantoro<sup>2</sup>, Dian Astiyani<sup>1</sup>, and Chomisah Nugraheni<sup>1</sup>

<sup>1</sup> *Early Childhood Education, Universitas Muhammadiyah Magelang*

<sup>2</sup> *Telecommunication Engineering, Intitut Teknologi Telkom Purwokerto*

#### **Abstract**

Coding is an important skill in the 21st century. At the root of coding, computational thinking must first be built as a foundation. This article did a systematic search for articles on early childhood coding. A total of eight articles discusses coding for early childhood, the tools used, and the influence on early childhood development. The articles were selected based on the classification of the year published, age group, and learning outcome. The results show that the introduction of coding for early childhood can be carried out through plugged-in and unplugged activities. The effects of coding on early childhood development include increasing cognition abilities, communication, collaboration, creativity, executive function (planning, completing tasks, and decrease inhibition).

**Keywords:** coding, early childhood, computational thinking

**Topic:** Engineering

[ABS-97]

## **Pectin Isolation from Sentul Peel (*Sandorium Koetjape*) with Assisted Microwave Extraction**

Medyan Riza<sup>1\*</sup>, Mukhlisien<sup>1</sup>, Ika Zuwana<sup>2</sup>, and Rozanna Dewi<sup>3</sup>

<sup>1</sup> *Chemical Engineering Department, Universitas Syiah Kuala, Indonesia*

<sup>2</sup> *Post-Graduate Study Program, Chemical Engineering Department, Universitas Syiah Kuala, Indonesia*

<sup>3</sup> *Chemical Engineering Department, Universitas Malikussaleh, Indonesia*

### **Abstract**

Pectin is usually isolated using the conventional extraction methods are time consuming. Pectin from sentul peel has been successfully isolated by using Microwave Assisted Extraction (MAE). This method has a short processing time and little solvent needed. This study is aimed to determine the effect of extraction time on the characteristics of pectin produced from sentul peel. The extraction process was conducted using HCl and soaked using 96% ethanol. The parameters analyzed were pectin yield, moisture content, equivalent weight, methoxyl content and functional group analysis using FTIR. The results of this study indicated that the yield of pectin obtained is in the range of 5.16-12.66%. The highest yield at the extraction time of 30 minutes was 12.66%, 16% moisture content, 526 mg equivalent weight and 9.85% methoxyl content and FTIR analysis showed carbonyl and ester groups. Pectin is used in food industry as gelling agents and as an ingredient for forming edible film.

**Keywords:** Sentul peel, microwave assisted extraction, pectin

**Topic:** Engineering

[ABS-102]

## **Measurement Analysis of Box Girder Production Cycle Times in Indonesian Infrastructure Projects**

Verly Widiantoro\* and Pungky Dharma Saputra

*Department of Civil Engineering, Faculty of Engineering, Universitas Indonesia, Indonesia*

### **Abstract**

Infrastructure is one of the important elements in the development of a country. The number of bridge infrastructure projects that can increase the growth of the construction industry in Indonesia must be supported by construction technology as well as the use of precast box girders. Problems arise due to inaccurate planning and production scheduling of box girder which causes the project delay. For this reason, it is necessary to carry out an analysis of the measurement of the box girder production cycle time as soon as possible so that it can provide an overview and reference in planning and scheduling elevated infrastructure projects. The purpose of this research is to measure the box girder production cycle times in Indonesian infrastructure projects. The main variable is the box girder production cycle time. The projects observed were projects in

the last 3 years from 2016 to 2020. And the segment production chosen were segments with straight alignment. Average analysis is used to know the average of cycle times. Based on the results of the analysis, the average production cycle time is 38.95 hours with an average delay time of 6.28 hours. The average production cycle time can be used as a reference for planning and developing schedules for elevated infrastructure projects.

**Keywords:** box girder, production, cycle times

**Topic:** Engineering

**[ABS-103]**

## **Solar Tracking Using Extended Mean Shift Based Color Histogram**

Asepta Surya Wardhana and Astrie Kusuma Dewi

*Department of Instrumentation Refinery Engineering, Politeknik Energi dan Mineral Akamigas, Indonesia*

### **Abstract**

Nowadays, there are many solar tracking applications using photodiode sensors and Solar Position Algorithm. This tracking depends on the power of light and natural conditions. Inaccurate sun tracking causes the heat concentration to become weak and miss focus on heat-receiving objects. We developed a tracking algorithm to track the sun to support the control system of the dual parabolic concentrator. This algorithm is based on Extended Mean shift to find the tracking position of an object in a video sequence. This algorithm is effective since it exploits the estimation of kernel density for searching the local maximum of a similarity measurement of the color histogram. Expectation Maximization algorithm is also employed to estimate the model parameters and to update the appearance of histogram. The updating histogram would improve the mean shift tracking accuracy and reliability. We successfully applied this algorithm for solar tracking using 148 frames of data. In this experiment, the results obtained in the form of the average value of the color similarity of an object tracking with a truth tolerance percentage of 98.39%.

**Keywords:** Dual parabolic concentrator, solar tracking, histogram, Extended Mean shift, Expectation Maximization

**Topic:** Engineering

[ABS-105]

## **Design and Implementation of Data Acquisition Device and Instrumentation Based on Microcontroller for Electric Motorcycle**

Agus Ulinuha\*, Jatmiko, and Almas Ghulam Riza

*Department of Electrical Engineering, Universitas Muhammadiyah Surakarta, Indonesia*

### **Abstract**

Along with intensive people activities in different places, the demand on transportation increases. For some dense road, motorcycle might be the better choice due to its ability to move flexibly. This may lead to massive use of motorcycle powered by fossil fuel engine. Beside causing severe air pollution, this also causes high fuel consumption. Electric motorcycle is expected to be the answer for the both problems, since it does not cause air pollution and does not require fossil fuel to operate. However, this motorcycle solely depends on energy stored in battery that needs some time to recharge. This difficulty makes the good points of electric motorcycle unattractive. The development of battery with high capacity and requires shorter time to charge is still on process. Therefore, optimal battery energy use is another solution for this case. This may be assisted with instrumentation system that presents some useful information for the driver regarding real-time system operating condition. This paper presents development of instrumentation system including data acquisition that employs a microcontroller of Arduino Mega. A number of sensors are employed in the system including hall-effect sensor, current and voltage sensors. The system is implemented in a motorcycle powered by 1000 W, 48/36 V DC motor energized by 17.5 Ah 48 V Lithium-Ion Battery. Some measured data are processed and presented in an LCD in the dashboard, including RPM, speed, torque, the distance travelled, the remaining battery capacity and the distance that may still be achieved. An automatic data logger of DS3231RTC is used for recording the data and it is saved in a SD Card Memory. For verification purpose, the displayed data are benchmarked with those measured with standard measurement devices. It was confirmed that the data presented by the instrumentation system is sufficiently accurate.

**Keywords:** Data Acquisition, Instrumentation System, Real-time Operating Condition, Optimal Energy Use, Data Accuracy

**Topic:** Engineering

**[ABS-361]**

## **Machine Learning Approach for Rhizomes Classification Based on Color**

Bayu Agustian and Maimunah  
*Universitas Muhammadiyah Magelang*

### **Abstract**

Rhizome plants that are often used as traditional ingredients or herbs such as temu hitam, temulawak, and temumangga. The types of rhizome are similar in color, shape, and odor feature. In this study, the types of rhizomes based on their color were classified into three classes, namely temu hitam, temulawak, and temumangga. The color of the rhizomes is obtained from image which is taken using camera. Image feature extraction process is done to get the color characteristics of the image by calculating the image RGB value. The values that have been obtained are classified using several methods in machine learning, namely Decision Tree, Naive Bayes, and KNN. The amount of data used in this study was 120 for all classes with the ratio of the number of training data and testing data is 70% and 30%. At the beginning of the classification stage, data cleaning is carried out then make training data and testing data to create a classification model. The classification results obtained the accuracy value of each method and then the method with the best accuracy was selected.

**Keywords:** machine learning, classification, herbal plant

**Topic:** Engineering

**[ABS-367]**

## **Optimization Algorithm for Digital Payments of Online Transportation**

Fatkhur Rohman and Endah Ratna Arumi  
*Universitas Muhammadiyah Magelang*

### **Abstract**

Online transportation applications have been widely used by all people. Various kinds of information / news about online transportation on online news sites such as the development of application features, their impact on society, competition between online transportation developer applications, and digital payments. Related topics user experience in using transportation applications online, the experience of the driver's side too many presented. Decision Tree algorithm is used as an algorithm for classification. The decision tree consists of several nodes, namely the tree root, internal nodes, and leaves. The concept of entropy is used to determine which attributes will split the tree. In the Decision Tree algorithm, each node internally divide the space into two or more in accordance with a discrete function of the attribute value input. In the case of the simplest and most often, each test it as a single attribute, so that the empty space is partitioned adjusted to the value of the attribute. The process of data classification determines the most optimal solutions appropriate data to analyze trends in user experience to

make payments online digital transport. The results of this research has been done can be concluded that in the last 3 years, there are 108 negative news, positive news 115, and 142 neutral news which is the content of the online news that talks about digital payment. From the overall news is found, the highest rating on the news about OVO applications where the error occurs at the time of purchase and top up.

**Keywords:** decision tree, algorithm, digital payment, online transportation, classification

**Topic:** Engineering

## [ABS-112]

### Corrosion Study of Graphene Coatings on Carbon Steels

Hafid Suharyadi and Toegas Soegeng Soegiarto

*Mechanical Engineering Dept., Politeknik Energi dan Mineral Akamigas, Ministry of Energy and Mineral Resources*

#### **Abstract**

The corrosion on carbon steels used for the heat exchangers has been a problem in oil and gas industries. In this work, the influence of graphene-epoxy composite coating as corrosion inhibitors on the carbon steel substrates is presented. Tube and plate carbon steels are used as the materials substrate. Graphene-epoxy composite coatings with various graphene contents were applied on the carbon steel substrates by bath method. The substrate samples are evaluated by potentiodynamic polarization and scanning electron microscopy (SEM). Potentiodynamic polarization is performed in 1 M sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) solution at room temperature. With the addition of graphene content, the corrosion rates decrease to a minimum value. This is attributed to the high surface area, electrically conductive layers, and impermeability of graphene leading to the enhanced corrosion resistance. The elemental mapping by SEM also suggests homogeneous dispersion of graphene throughout the coating composite layers that increase the effectiveness of the protective properties.

**Keywords:** carbon steels, graphene, corrosion inhibitor

**Topic:** Engineering

[ABS-114]

## Modeling of Spray Characteristics of Biodiesel Based on Vegetative Energy Resources Found in Tropical Forest inside Leuser Area

Teuku Azuar Rizal, Hamdani, and Taufan Arif Adlie  
*Department of Mechanical Engineering, Universitas Samudra*

### Abstract

The depleting reserves of fossil fuels encourage the arrangement of biodiesel as an increasingly popular alternative. The fuel is also more environmentally friendly, and at the same time, low in emission content. The source of biodiesel feedstock is also easily found in tropical forests in Indonesia. This paper try to investigate the behavior of biodiesel spray inside the combustion chamber. The research utilizes software Diesel RK to perform a computer simulation that will show biodiesel spray behavior. The simulation depicts that the density and/or kinematic viscosity of the biodiesel contributes inversely to the desired model of biodiesel spray. This research delivers an alternative point of view related to unique Indonesian biodiversity related to energy issues. The rain forest can become a highly potential complementary energy resource. It provides the local community with different energy buffer as a stock of a relatively close source of energy.

**Keywords:** modeling, spray-characteristics, biodiesel, vegetative-energy-resources, diesel-RK

**Topic:** Engineering

[ABS-80]

## Synthesis and Characterization of Diesel Lubricity Enhancer through Transesterification of Palm Oil

Sovia Masfuri Walidatus Sholihah<sup>1</sup>, R. Arizal Firmansyah<sup>1,3</sup>, R.Y Perry Burhan<sup>1,2\*</sup>, and Yulfi Zetra<sup>1</sup>  
<sup>1</sup> *Department of Chemistry, Faculty of Science and Data Analytics, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia.*

<sup>2</sup> *Politeknik Energi dan Mineral Akamigas, Jl Gajah Mada 38, Cepu, Indonesia.*

<sup>3</sup> *Department of Chemistry Education, Faculty of Science and Technology, UIN Walisongo, Semarang, Indonesia*

### Abstract

Desulphurization of diesel fuel is necessary to be done to reduce sulphur content in the air. However, the desulphurization process will reduce the lubrication properties of diesel fuel. In order to overcome the problem, bioadditive is needed to improve the lubricity. Lubricity of diesel fuel can be improved by subsistence of chemical compound that is hydroxy ethyl ester (HEE). HEE is synthesized through the transesterification reaction of palm oil (triglycerides) at 150 degrees celcius for 5 hours and K<sub>2</sub>CO<sub>3</sub> catalyst as well. 72,90% of triglycerides was sucessfully converted into products. The results of characterization using Gas Chromatography-Mass Spectrometry (GC-MS) indicate that the chemical compound in synthesis products consist of free



fatty acids, hydroxy ethyl esters and by-products. The obtained products is potential as bioadditives to improve the lubricity of diesel fuel.

**Keywords:** palm oil, bioadditive, lubricity enhancer, transesterification

**Topic:** Engineering

**[ABS-356]**

### **Waqf Co-funding Information System Management**

Emilya Ully Artha, Fahmi Medias, and Zulfikar Bagus Pambuko  
*Universitas Muhammadiyah Magelang*

**Abstract**

Muhammadiyah, which has many assets and its scattered throughout Indonesia, even some of them are outside the country. In raising funds, they still use conventional collective methods. It is necessary to have an application for raising waqf projects massively and efficiently. The join waqf application is made to facilitate fundraising and its reporting can make it easier for donors and managers to manage waqf. Using Agile method to developed application co-funding waqf

**Keywords:** Co-funding, waqf, Muhammadiyah, Agile, developpe application

**Topic:** Engineering

**[ABS-360]**

### **Clustering Crime Theft: A Datamining in Urban Areas**

Emilya Ully Artha, Aditya Arif Nugroho, Agus Setiawan, Endah Ratna Arumi, Ardhin Primadewi, Setiya Nugroho, and Sunarni  
*Universitas Muhammadiyah Magelang*

**Abstract**

In the Temanggung District Court, case data handled is only stored without further analysis. In the last three years, the types of cases that are often handled are criminal acts of theft. The case of criminal theft in 2013 is 37 cases, 2014 is 54 cases and 2015 is 83 cases. Based on these data, there is no further analysis on the characteristics of the tendency of theft and prone areas of criminal acts of theft and related matters such as the level of education, occupation and age of the perpetrator and the place of the incident. It affects law enforcement agencies have not been able to determine the strategic steps to reduce the theft rate in the jurisdiction of Temanggung Regency. Proposed a cluster-labeling strategy based on a combination of clustering evaluation techniques. They consider the compactness of the corresponding clusters and the separation between them ant the principal parameters which distinguish between 'normal' and 'abnormal'

behavior in the analyzed network. To overcome this problem, K-Means Algorithm clustering method can be applied to analyze data of theft case which handled in Temanggung Regency area in 2013-2015. The use of this technique is expected to provide knowledge previously hidden in the data warehouse so it becomes valuable information. With the method of K-Means clustering algorithm is expected to be known areas that are prone to criminal theft by comparing the level of vulnerability in each region.

**Keywords:** data mining, k-means, clustering, criminal theft, data

**Topic:** Engineering

**[ABS-123]**

## **Preliminary Study of the Best Variables using Surfactant SLS in EOR Application with Crude Oil Ledok**

Edi Untoro<sup>1\*</sup> and Slamet Priyanto<sup>2</sup>

<sup>1</sup> *Ministry of Energy and Mineral Resources Education and Training Agency (ESDM) Akamigas Cepu Mineral Energy Polytechnic (PEM), Cepu, Central Java, Indonesia*

<sup>2</sup> *Department of Chemical Engineering, Faculty of Engineering, Diponegoro University, Semarang, Indonesia*

### **Abstract**

The demand for fuel oil in various industries, households, vehicles is increasing. This has resulted in decreased petroleum production in line with the decline in oil reserves in Indonesia. Therefore, Enhanced Oil Recovery (EOR) technology is needed to maximize old wells with large oil reserves, for example in the Ledok oil well, Cepu, Central Java, Indonesia. The purpose of this study was to study the best variables in the manufacture of surfactants from pulp-paper industrial waste in the form of black liquor. From the oil wells in Ledok-Cepu, crude oil and natural formation water were carried out. After that the SLS surfactant obtained was carried out by a qualitative FTIR test and its potential on the core flooding EOR, the results showed that the surfactants tested for compatibility with natural formation water met the requirements as surfactants for EOR. In qualitative analysis, FTIR shows the presence of sulfonate groups and ether groups in the surfactant, that the sulfonation reaction has gone well as a surfactant for EOR. After that, the core flooding test was carried out by injecting oil, brine, and surfactants, the best yield was with a formation water concentration of 5,000 ppm with a yield of 79 percent, and IFT reached 10-1 dyne cm.

**Keywords:** SLS surfactant, SLS potential, Core Flooding, Enhanced Oil Recovery (EOR)

**Topic:** Engineering

[ABS-370]

## **Optimize Design Impeller to Increase Efficiency Centrifugal Pump that Functioned as a Turbine Use Computational Fluid Dynamics (CFD)**

Akhmad Fauzan Al Ansory<sup>1\*</sup> and Istianto Budhi Rahardja<sup>2</sup>

<sup>1</sup> Faculty Engineering, Sekolah Tinggi Ilmu Teknik Bina Putera, Indonesia

<sup>2</sup> Process Technology Plantation Products, Politeknik Kelapa Sawit Citra Widya Edukasi, Indonesia

### **Abstract**

A centrifugal pump is used for water turbine from the pump channels. The technology of the pump as turbine is expected to provide an alternative energy solution for the manufacture of micro hydro small scale and costs more economical and affordable. The purpose of the study is knowing the influence of modelling the geometry on the impeller centrifugal pumps that can affect the performance of Pump As Turbine (PAT) with the value of the surface roughness of the impeller 0,16mikrometer using forward blade close impeller model. The method of research analysis design and fluid flow at the impeller by use CFD software.

**Keywords:** Pump as Turbine, Computational Fluid Dynamics, backward impeller

**Topic:** Engineering

[ABS-116]

## **Internet-Based Multi-Platform Thermometer Using WhatsApp and Sensor MLX90614 With Location Tracker Feature For Covid-19 Surveillance**

Putra Wisnu Agung Sucipto, and Annisa Firasanti

Program Studi Sarjana Teknik Elektro, Fakultas Teknik, Universitas Islam 45, Bekasi, Indonesia

### **Abstract**

Due to COVID19, a contactless technology for scanning the human body temperature is indispensable. Afterwards, in case a person is detected with a high body temperature, it would be very appropriate if there was a way to detect and remember the identity of that person once after the scanning process and then track the movement of that person. It will simplify the daily monitoring in health surveillance activities during this pandemic. This research integrated infrared-based temperature sensors, microcontrollers, social media networks and google cloud platforms to optimize the scanning and recording of body temperature and the location of people with high fever symptoms. An experiment was conducted to review the performance of the non-contact thermometer prototype built using the MLX90614 sensor, Arduino Uno, ultrasonic sensor, LED, buzzer, and 128x32 OLED LCD. This prototype is also integrated with a gateway server, WhatsApp API, a smartphone with WhatsApp installed, Google Map and Google Cloud Platform. A non-contact thermometer has been obtained- a device that is able to scan human body temperature without touching the skin that features a reminder of the identity of a person with

high fever symptoms and a tracking of the person's position shortly after the scan. The temperature scan results tab is stored on WhatsApp while the traces of the targeted people are stored on the google map. This research has successfully made an appropriate technology that can be used to support the COVID-19 surveillance process. With the contactless temperature scanning feature and location tracker, it is expected to obtain one equipment which is safe for humans and the details of the identity and location of the person being scanned are recorded, in an easily accessible data container. This feature is expected to help related parties to track the movements of suspected people.

**Keywords:** Fever, Position, MLX90614, WhatsApp, COVID-19

**Topic:** Engineering

**[ABS-118]**

## **ANP And AHP Method Approach in Selecting Tourism Objects In Samarinda**

Noor Alam Hadiwijaya and Arbain  
*Politeknik Negeri Samarinda*

### **Abstract**

The tourism sector is a sector that can be relied on in economic growth in an area, especially in the city of Samarinda. Apart from being one of the centers of education, Samarinda is also part of a tourist destination city in East Kalimantan. The objectives to be achieved in this research are to analyze and design, as well as to find out as well as compare the outputs or rankings of the two methods that will be used in supporting decisions for the selection of tourism attraction in Samarinda. The determination of criteria and sub-criteria in this study was carried out through literature studies, surveys and interviews with relevant stakeholders, especially at the Samarinda Tourism Office. Furthermore, the criteria are given a pairwise comparison assessment with a preference between 1-9 for the AHP method, then the ANP method will add inner/outer dependence and feedback between the criteria. The results to be obtained in this study can determine the best tourism object from several existing alternatives based on ranking as well as to determine the comparison of the final result (output) or ranking or based on each of the existing criteria of the two methods whether the same or different.

**Keywords:** Tourism Attraction, ANP, AHP, Multi-criteria decision-making

**Topic:** Engineering

[ABS-122]

## The Effect of Using Sawdust as Mixture of Concrete Pipe on Water Absorption and Compressive Strength

Ayende and Hernawan Novianto  
*Energy and Mineral Polytechnic of Akamigas*

### Abstract

This article describes an experimental study of the effect of using sawdust as a mixture of concrete pipe on water absorption and compressive strength. This research was inspired by amount of sawdust waste from sawmills that had not been utilized. For this purpose, 18 specimens were made with four different values for sawdust: iron ore (5%, 10%, 15%, and 20%). Each specimen has the composition of cement: iron ore (1:4), and water: cement (0,5%). The research was conducted at PT. Indal Steel Pipe. This research to analyze the effect of using sawdust as a mixture of concrete pipe on water absorption and compressive strength. Experimental method using compression test and water absorption test has been used to this study. Main finding from this study showed the higher the composition of sawdust increased water absorption and reduced the compressive strength of the concrete pipe. This study will be useful to reduce waste pollution and improved concrete pipe material in term of production cost.

**Keywords:** sawdust, concrete pipe, water absorption, compressive strength

**Topic:** Engineering

[ABS-383]

## Modeling of Automatic Transmission Control Systems on LPG Vehicles

Suroto Munahar, Muji Setiyo, and Bagiyo Condro Purnomo  
*Muhammadiyah University of Magelang*

### Abstract

Currently, vehicles with the concept of bi-fuel (gasoline / LPG) are being developed. Given this concept offers many advantages, including higher efficiency, lower emissions and high octane content. However, the application of bi-fuel vehicles has many problems, especially in the automatic transmission control system. This happens because LPG / gasoline has different characteristics. LPG combustion engines have a longer flame propagation speed than gasoline. This condition causes the energy response generated to be slower. In addition, the current automatic transmission control system has not been able to read the angle of the road so that, in many cases the engine suddenly turns off when climbing because the system is not able to read road conditions. Because of this, this study develops an automatic transmission control system model for LPG vehicles that can adjust the angle of the road. The method applied is using a fuzzy logic controller (FLC). The simulation results show that the control system is able to adjust the characteristics of LPG and the angle of the road. In conclusion, the model made is very promising to be implemented in real vehicles.

**Keywords:** LPG, automatic transmission, control systems, gasoline

**Topic:** Engineering

[ABS-128]

## **Development of Indonesian Well Head Generation Unit (Small Scale) Based on Regulation and Law in The PT. Geo Dipa Unit Dieng Case Study**

Akhmad Sofyan, Hari Sumantri Aka, Ade Maulana Rizaldy, and Bambang Yudho Suranta  
*Politeknik Energi dan Mineral Akamigas*

### **Abstract**

Geothermal energy is one of the environmentally friendly energy to generate electricity. Heat energy in the form of steam and hot water that existed inside the earth is flowed to the surface and goes into production and generator facilities to generate electrical energy. Currently, there are many types of electricity generation for geothermal, such as separated cycle, single flash, binary cycle and combined cycle. These types of generators are power plants with a capacity of 65-110 MWe and require a large area, many wells, large facilities and of course large capital. However, there are types of power plants that can be developed in a fast time, namely Wellhead Generating Unit. In the manufacture of a Wellhead Generating Unit, steam is extracted from the well and converted to electricity at the wellhead. This type of generator can produce electricity in relatively short time and simpler equipment. Indonesia has only one example of developing a Wellhead Generating Unit (Small Scale) in the PLTP PT. Geo Dipa Energi Dieng with a capacity of 10 MWe. In addition, the following are some of the regulations governing geothermal energy in Indonesia, namely Law No. 21 of 2014 concerning Geothermal Energy, Presidential Regulation No. 3 of 2016 concerning the Acceleration of the Implementation of National Strategic Projects, Government Regulation No. 7/2017 concerning Geothermal Energy for Indirect Use, the aspect of land clearing is regulated in Law number 4/2009 concerning Minerba. The sale and purchase agreement is regulated in the Minister of Energy and Mineral Resources Regulation Number 10 of 2017 and environmental impact is regulated in the Government Regulation of the Republic of Indonesia Number 27 of 1999 concerning Environmental Impact Analysis. Enacted on May 7, 1999. From the above legislation, the Wellhead Generating Unit (Small Scale) is the same as an ordinary conventional generator, but what distinguishes only the capacity generated by this generator.

**Keywords:** Geothermal Energy, Well Head Generating Unit, Law, Presidential Regulation, Government Regulation

**Topic:** Engineering

[ABS-129]

## **Rig Time Reduction During Kick Handling Operation in Exploration Well X by Applying Drillers Method**

Bambang Yudho Suranta, Akhmad Sofyan, and Didin Chaerudin Irwansyah  
*PEM AKAMIGAS*

### **Abstract**

This journal will describe on how the kick handling time is reduced from the actual condition by applying Drillers Method in Well X. This well is an exploration well with the main objective at the 9,000 ft range of depth in Kujung Formation, which has been identified as a gas hydrocarbon reservoir zone. Before reaching the total depth, the drilling operation involves four kick occurrences. This Kick happened for the last time at the depth of 8,525 ft and it needed two times kill mud circulation to handle the kick. Furthermore, the time needed to control the kick was 13.5 hours by applying the Engineers Method. Moreover, even the well control operation was successfully done, Engineers Method may cause some serious problems since this method allows gas migration to the surface without expansion when the kill mud preparation needs longer time. Thus, this method is evaluated with the Drillers Method as the comparison, resulting the recommendation of well control method for Exploration Well X by considering the kick handling time, produced pressure, operational complexity, and hole problem aspect. Then the recommended well control method is simulated with Landmark software to predict the produced pressure during the well control operation in Exploration Well X. Through this recommendation, kick handling time in Exploration Well X is reduced to be 4.3 hours only with 69,493.39 USD of cost saving.

**Keywords:** Kick, Well Control, Drillers Method, Engineers Method, Blowout

**Topic:** Engineering

[ABS-130]

## **Design of PV-Wind Turbine Mobile Container for Disaster Area Using HOMER, A Case study: Cepu - Central Java**

A Sahrin\*, E Utami, and MA Fathoni  
*Politeknik Energi dan Mineral Akamigas*

### **Abstract**

This paper aims to design a system in the form of a PV (module) - Wind Turbine Mobile container for the first solution of the disaster area application in the Cepu city of Blora, Central Java. The solution given is to make a mobile container that can assemble a short time as an independent renewable energy source with the devices used to help supply energy and easy to move. The design use hybrid energy consist of PV (module), wind turbine, inverter, water pump, reverse osmosis, lighting, and charger facilities for communication equipment. In the design process

using the HOMER (Hybrid Optimization of Multiple Energy Resources) software, it can design a system and simulate and determine the best system configuration. In this paper, model four configurations between the power capacity of the PV (module) and the wind turbine to obtain the optimal configuration. The simulation result show configuration of 1 proposed grid-connected with load profile load is 9267-watt using capacity PV (module) 250 WP and a wind turbine 1 kW, and this system is feasible to apply.

**Keywords:** mobile container, disaster area, hybrid energy, Homer software

**Topic:** Engineering

**[ABS-131]**

## **Mechanical Properties Identification of Vulcanized Rubber by Using Mooney-Rivlin Method**

Budi Setiyana, Rifky Ismail, S. Sugiyanto, and J. Jamari

*Mechanical Engineering Department, Faculty of Engineering, University of Diponegoro*

### **Abstract**

Identification of the mechanical properties of rubber is important to predict its performance. Due to hyper-elastic and nonlinear properties of rubber behavior, identification of its mechanical properties is more difficult than on metals. The mechanical properties of rubber are often expressed as a Strain Energy Function (SEF). Mechanical properties identification to obtain the SEF data is studied here. The analyzed rubber is vulcanized rubber, both hard and soft compound that are usually used as tire. Based on Mooney-Rivlin method, analysis of the tensile test results was conducted to obtain the SEF data. Verification was carried out by entering the SEF data into numerical simulation. Simulation using FE software was constructed as the friction contact between the rubber and its counter-surface. Results show that the values of stress and friction force in the hard compound is slightly greater than soft compound in the same cases. Fluctuating values was obtained along friction that was commonly seen in rubber friction. Additionally, by obtaining the SEF data, other mechanical properties can be predicted such as rubber hardness and rubber deformation when subjected to loading. Therefore, the mechanical performance of the rubber can be easily investigated

**Keywords:** Mechanical properties, Strain Energy Function, Vulcanized rubber

**Topic:** Engineering



**[ABS-132]**

## **Application of Polymerization Technology for Increasing of Quality Oil and Gas Production**

Oksil Venriza\*, Pusparatu, and Andian Ari Istiningrum  
*Politeknik Energi Dan Mineral AKAMIGAS, Cepu, Jawa Tengah, Indonesia*

### **Abstract**

Polymer is a chemical injection at EOR study that have expected to increasing production oil and gas, the pressing efficiency and good sweeping efficiency so that the oil recovery can be increased after water flooding from the initial oil reserve (OOIP) in the reservoir. This research will carry out the stages of making a hygroscopic polymer that is resistant to EOR conditions. This time the polymer is made using Glycidyl Methacrylate (GMA) as a monomer, Ethylene Dymethacrylate (EDMA) as a croslinker and alcohol group solvent as a porogen and trimethylamine and arginine as active group formers. This polymer is expected to be a polymer that has amine and hydroxyl functionalities and is synthetic organic polymer. The scenarios for variations in polymer concentration are 10 ppm, 20 ppm, and 50 ppm, as well as for variations in salinity of 1000 and 10,000 ppm. Meanwhile, the Trimetylamine concentration was 0.5% and 1%. In this situation, the optimum conditions were obtained at a polymer concentration of 50 ppm with Trimeylamine 1% at a salinity of 10,000 ppm, meaning that there is a linearity relationship between the increase in concentration and the resulting interface interaction. This condition needs to be developed again to get stabilization and ripeability in the repetition process in increasing the production of old wells. The test will be carried out at a temperature of 85-730-C and observations are made of the physical properties of the fluid, including viscosity and interface interaction to seem a comparison of the physical properties of the fluid between the polymer and production water.

**Keywords:** GMA, EDMA, Polymer, Interface Interaction, Salinity.

**Topic:** Engineering

**[ABS-388]**

## **The Effect of Fuel Injection Pressure on the Diesel Engine Performances**

Toto Sugiarto, Wawan Purwanto, Dwi Sudarno Putra, Multharizal Khidayat, and Alim Kusuma  
*Universitas Negeri Padang*

### **Abstract**

The purpose of this paper is to reveal the effect of fuel injection pressure on the power and torque of a diesel engine. The research method used is the experimental method. Pressure variations of 110 kg/cm<sup>2</sup>, 120 kg/cm<sup>2</sup> and 130 kg/cm<sup>2</sup> were applied to a 1981 Chevrolet LUV diesel car. From the experimental results of research conducted at the Automotive Engineering Vehicle Workshop, Faculty of Engineering, Universitas Negeri Padang, it was found that, at a standard pressure of 120 kg/cm<sup>2</sup> obtained an average car power of 29.6 kW at 4470 RPM and 81.65 Nm of torque at 2455 RPM. When the injector pressure is reduced by 110 kg/cm<sup>2</sup>, engine power

decreases by 17.1% and torque decreases by 16.2%. When the injector pressure is increased to 130 kg/cm<sup>2</sup>, there is an increase in engine power by 4.05% and a decrease in torque by 14.89%.

**Keywords:** Diesel Engine, Power, Torque, injection pressure, variations

**Topic:** Engineering

[ABS-134]

## Temperature Control in the R-101 Reactor With Comparing the Ziegler Nichols And Tyreus-Luyben Tuning Methods

E Utami\*, A Sahrin, and N Maulidya

*Refinery Instrumentation Engineering, Politeknik Energi dan Mineral Akamigas*

### Abstract

The R-101 reactor is one of the units in the Catalytic Condensation Unit (CCU), XXX Refinery. This reactor functions to reprocess the mixed C4 feed originating from the RCC Complex processing to have a higher selling value such as propylene and LPG. In this reactor, there is a polymerization reaction between the feed and the catalyst and exothermic heat transfer so that a series of control instrumentation is needed to maintain the temperature of the incoming feed at the reactor inlet. Temperature is a factor influencing conversion. The temperature control system in the reactor R-101 is a series of cascade controls by temperature outlet heater E-102 with flow steam flowing in heater E-102. This control system will be more effective if the system response is stable, namely the shorter ascent and steady-state parameters, as well as the small overshoot value. One way to do this is by tuning the PID parameters of the controller. After tuning the PID parameters for temperature control in the Reactor R 101A, it can be seen that the response graph with the Ziegler Nichols method has the most stable response compared to the actual process response and the Tyreus-Luyben tuning method but still has the same delay time parameter of 90 seconds, the long incline and steady-state is 500 seconds, but the smallest overshoot is only 0.9%.

**Keywords:** Temperature Control, Ziegler Nichols method, Tyreus-Luyben method, Reactor process, tuning method

**Topic:** Engineering

[ABS-139]

## **The Impacts of a Long Residue Addition to the Briquette Quality of Ketapang Fruit and Siwalan Skin Fruit Charcoals Using Amylum as Additive and a Manual Briquette Machine**

Suparno<sup>1</sup>, W.R. Hatiningrum<sup>1</sup>, A. Huzein<sup>2</sup>, R.D. Syahputra<sup>2</sup>, A.D Rahangmetang<sup>2</sup>, and HH Naim<sup>2</sup>

<sup>1</sup> *Politeknik Energi dan Mineral AKAMIGAS, Indonesia*

<sup>2</sup> *Students at Politeknik Energi dan Mineral AKAMIGAS, Indonesia*

### **Abstract**

Long residue is a bottom product of an atmospheric distillation unit of crude oil. Generally, this product is further processed in refinery secondary unit to produce more yield. In case there is no refinery secondary process this bottom product is mixed with chemicals to produce marine fuel oil. This paper aims to describe the impacts of a long residue addition to the briquette quality of ketapang or Terminalia catappa fruit and siwalan or Borassus flabellifer L skin fruit charcoals using amyllum as additive and a manual briquet machine. The each briquette composition consisted 10 %, 20 % and 30 % weight of long residue and 5 %, weight of amyllum. A manual briquette machine was used to mold the briquette. The Briquette results, then, were analyzed based on their proximate parameters and porosity. The analysis shows that the higher the long residue addition the better the briquette proximate analysis result. Some parameters such as porosity, moisture content, ash content and calorific value fulfil the Briquette Indonesian standard nevertheless parameters such as compressive strength and volatile matter content need to be improved. These two last parameters relate to the performance of a charcoal furnace used and the use of a manual moulding machine during briquette process.

**Keywords:** long residue, Ketapang, siwalan, briquette, proximate analysis

**Topic:** Engineering

[ABS-395]

## **Effect of The Number of FRP layers on Axial Compressive Behavior of High Strength Lightweight Concrete Wrapped with Carbon Fiber Reinforced Polymer**

Butje A. Louk Fanggi, Obed O. N. Nenobais, Anie A. Tuati, and Abia E. Mata

*Politeknik Negeri Kupang*

### **Abstract**

Lightweight concrete has unique properties. However, the performance of such concrete that is wrapped with fiber-reinforced polymer is less investigated. This study investigates the effectiveness of covering high strength light weight concrete with carbon fiber reinforced polymer. Fourteen specimens with a different number of FRP layers were cast and tested. It is

observed that increasing the number of FRP layers reduced the effectiveness of wrapping the concrete with carbon FRP.

**Keywords:** Lightweight concrete, High Strength Concrete, FRP

**Topic:** Engineering

**[ABS-140]**

## **The Influence of Lamina Wood on The Physical Properties, The Nature of Mechanics, The Strong Class on The Combination of Sengon Wood and Merbau Wood**

Joko Suryono and Yudi Pranoto

*Civil Engineering Department of Samarinda State Polytechnic, Indonesia*

### **Abstract**

Wood is a material used by man to meet his life needs, both as building materials and other tools. Conditions as a construction component require large size, one that can be by making lamina wood. This study is the influence of lamina on physical properties, mechanical properties, healthy classes using MUF adhesives, which can provide knowledge, so it is utilized as an alternative to solid wood. Static bending strength test objects for 3 layers are 0.6 cm each (each layer 0.6 cm x 2 cm x 36 cm), while the thickness of the material size tests static bending strength for 5 layers of 0.4 cm (size 0.4 cm x 2 cm x 36 cm). Sliding Strength test object 2 layers thick size 2.5 cm (size 2.5 cm x 5 cm x 5 cm). Deutsches Institut for Normung Standard (DIN) 52186. The value of lamina wood content is between 21.19% to 12.43%, density value between 0.58 g/cm<sup>3</sup> to 0.73 g/cm<sup>3</sup>, lamina wood shear strength between 0.31 kN/cm<sup>2</sup> to 0.64 kN/cm<sup>2</sup>, MOE between 619.17 kN/cm<sup>2</sup> to 1327.50 kN/cm<sup>2</sup>, MOR between 5.11 kN/cm<sup>2</sup> to 8.45 kN/cm<sup>2</sup>. Diversity analysis shows that the combination of wood type factor (A) and layer count factor (B) significantly affects MOE diversity analysis of 100.93\*\* and 16.77\*\*. For (MOR) significant influences of 5.66\* and 7.07\*. In contrast, adhesive and shear strength significantly affect on diversity analysis of 11.71\*\* and 9.03\*\*. Merbau wood as face/back and Sengon wood as core (p. 3 and 5) can be classified as strong grade II-III. For Modulus Of Rupture (MOR) on the treatment of Sengon wood as face/back and Merbau wood as core (3 and 5) as well as Merbau wood as face/end and Sengon wood as meat ( 3 and 5) can be classified into strong grades II-III.

**Keywords:** Lamina wood, Physical properties, Mechanics, MOE and MOR

**Topic:** Engineering

[ABS-396]

## **Influence of the number of FRP layers on Compressive Behavior of Glass Fiber Reinforced Polymer Confined High Strength Concrete Made of Lightweight Artificial Aggregates**

Butje A. Louk Fanggi, Ambros R. L. Wayan, Jusuf W. M. Rafael, and Abia E. Mata  
*Politeknik Negeri Kupang*

### **Abstract**

Lightweight concrete has some advantages that are not owned by other types of concrete. However, the performance of such concrete when wrapping with fiber-reinforced polymer is less investigated. This study investigates the effectiveness of covering high strength lightweight concrete with glass fiber reinforced polymer. Fourteen specimens made of lightweight artificial aggregate wrapped with a different number of FRP layers were cast and tested. It is shown that increasing the number of FRP layers reduced the effectiveness of wrapping the concrete with carbon FRP.

**Keywords:** Lightweight concrete, High Strength Concrete, FRP

**Topic:** Engineering

[ABS-142]

## **Evaluation Factors Causing a Losses in the System of Receiving, Storage and Distribution Diesel Fuel in PT Badak NGL**

Oksil Venriza<sup>1\*</sup>, Miftahul Jannah<sup>1</sup>, Tri Warcono<sup>1</sup>, and Adi Luhung Pekerti<sup>2</sup>

<sup>1</sup> *Logistic Oil and Gas, Politeknik Energi dan Mineral Akamigas, Cepu, Jawa Tengah, Indonesia*

<sup>2</sup> *PT. Badak NGL*

### **Abstract**

Diesel fuel is a liquid fuel used in diesel engines. Diesel fuel is a petroleum fraction that has gone through a series of fraction separations. Petroleum is a mixture of hydrocarbons that are formed naturally. In general, in the liquid phase which is stored in the fuel storage tank under certain conditions. variance is a plan or target of an outcome. The variance gives an indication or a warning that the operation did not go as planned. Variance in this study is divided into two possibilities, namely losses and gains. Losses are a decrease in product volume (quantity) in each product movement and storage. While the gain is the increase in volume (quantity) of the product in each product movement and storage. PT Badak NGL has three diesel fuel operation categories, namely receiving, storage, and distribution. In the diesel fuel reception system, variance losses of -8.25% are obtained in liters units of 15&#8304-C. In the internal diesel fuel distribution system the loss value of 24,742 liters is observed. Based on the results of the calculation of losses, a fishbone diagram is made to analyze the factors causing losses in the company. Fishbone diagram analysis shows that there are several things the company needs to improve to reduce the

possibilities of losses in the future. Based on observations made, recommendations that can be considered by companies include- implementation of SOPs, improve procedures considered to be lacking, addendums related to addition of clauses to limit losses, custody transfers, and determination of units used, perform maintenance of facilities and facilities in reception, hoarding and distribution operations, and improve employee competence by providing special diesel fuel handling training.

**Keywords:** Diesel fuel, fishbone diagram, variance, losses and gain, receiving, storage, distribution of diesel fuel, control system

**Topic:** Engineering

**[ABS-143]**

## **The Readiness of Batur Metal Casting Industry to Face Society 5.0**

Vivin Zulfa Atina and Anas Yusuf Mahmudi  
*Politeknik Manufaktur Ceper Klaten*

### **Abstract**

The Batur Metal Casting Industry is a metal casting industrial area that has been established since ancient times. The development of the industrial society 5.0 will certainly be a new problem if it is not accompanied by technological developments. Therefore, this study focuses on discussing the knowledge and readiness of the metal casting industry technology for the industrial society 5.0. This research has an important goal which is to be reference data as a foundation for determining policies to government, to provide protection and support the metal casting industry players. The method used in collecting this data was interviews and questionnaires involving 80 respondents. Data obtained from filling out the questionnaire by respondents consisting of three Metal Casting Industries in Batur village, Ceper, Klaten. These companies are Kop. Batur Jaya, PT. Aneka Adhi Logam and PT. Cipta Guna Lestari. The method in processing data uses SPSS 18 and Excel. 30 respondents outside the sample have been tested for validity and reliability using SPSS. The results are reliable, 76.5. The results of data processing showed that 64% of respondents thought that their industries had not yet used automatic machines. 61% of respondents think that the metal casting industry still uses manual systems in the manufacturing process. Therefore the conclusion is that the industrial society 5.0 has not yet been fully implemented in the metal casting industry because the technology used is still manual and not yet automatic.

**Keywords:** Technology, Metal, Casting, Society 5.0

**Topic:** Engineering

### [ABS-151]

## **Study of Wear on The Metal on Polycarbonate Urethane (PCU) Contact in Total Hip Arthroplasty using Finite Element Method Study of Wear on The Metal on Polycarbonate Urethane (PCU) Contact in Total Hip Arthroplasty using Finite Element Method**

Wahyu Dwi Lestari<sup>1\*</sup>, Luluk Edahwati<sup>1</sup>, Rifky Ismail<sup>2</sup>, J Jamari<sup>2</sup>, and A P Bayuseno<sup>2</sup>

<sup>1</sup> *Department of Mechanical Engineering, Faculty of Engineering, University of Pembangunan Nasional 'Veteran' Jawa Timur, East Java, Indonesia,*

<sup>2</sup> *Department of Mechanical Engineering, Faculty of Engineering, Diponegoro University, Indonesia*

### **Abstract**

Latterly, the polycarbonate urethane (PCU) has suggested a viable substitute to conventional bearings. The aim of this study is to determine the von Mises stress and contact pressure as a function of different of acetabular cup thickness. The analysis of this study was conducted by the finite element method. Six variation of acetabular liner thickness (5mm, 10mm, 15mm, 20mm, 30mm, and 40mm) were used in this simulation. The contact pressure was determined to predict the wear performance of PCU acetabular liner. The result shown that the thicker of the acetabular liner, the smaller the contact pressure and the smaller the contact radius. Thus predictable that the thinner the PCU acetabular liner, the higher the wear rate

**Keywords:** PCU, contact pressure, von Mises

**Topic:** Engineering

### [ABS-155]

## **Formation of Struvite from Dairy Cow Urine by Aeration and Crystallization Using a Vertical Reactor**

Luluk Edahwati<sup>1\*</sup>, Wahyu Dwi Lestari<sup>1</sup>, Sutiyono<sup>2</sup>, J Jamari<sup>2</sup>, and A P Bayuseno<sup>2</sup>

<sup>1</sup> *Department of Mechanical Engineering, Faculty of Engineering, University of Pembangunan Nasional 'Veteran' Jawa Timur, East Java, Indonesia,*

<sup>2</sup> *Department of Mechanical Engineering, Faculty of Engineering, Diponegoro University, Indonesia*

### **Abstract**

Struvite is a white crystal which is chemically known as magnesium ammonium phosphorus hexahydrate ( $\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$ ) which is formed with the same molar ratio. Struvite dissolves readily in acidic conditions and slightly soluble in neutral and alkaline conditions. The phosphate and ammonium content in the urine of dairy cows has a high amount too. The process of forming struvite from dairy cow urine is carried out using the aeration method in a vertical reactor. MAP solution was prepared by reacting Mg: NH<sub>4</sub>: PO<sub>4</sub> using a molar ratio of 1: 1: 1. The solution was made at pH 9 while temperature variations were 25, 35, 45 °C. The air rate is kept at a cost of 0.5 liters / minute. The struvite precipitate obtained was filtered and then dried. The

results showed that the percentage of phosphate and ammonium as the best struvite formers at 45°C was 33.2% and 26.9%.

**Keywords:** #aeration #crystallization #struvite #urine #vertical reactor

**Topic:** Engineering

[ABS-168]

### **Military Type III Anodizing: The Optimal Limit Within Hardening Process of Aluminium Alloy at Near Zero Temperature**

Ndaru Adyono

*Universitas Pembangunan Nasional Veteran Jawa Timur*

#### **Abstract**

Hard anodizing was a solutions to increase the surface toughness of aluminum alloys through the growth mechanism of an aluminum anodic oxide (AAO) films. The effect of oxalic acid addition into sulfuric acid solution and target voltage variations to the films growth rate was observed as well as the characteristics of hardness, friction coefficient and material wear rate. The results showed that the addition of oxalic acid could optimize the films growth rate in a specific condition. The AAO films that has formed on the metal surface increase the hardness, friction coefficient and wear resistance of the aluminum alloy. AAO layers had better coefficient performance in applications with a low operating speed (1 m/s). The Al6061 aluminum alloy wear rate drops from  $50 \times 10^{-6}$  mm<sup>3</sup>/Nm to  $3 \times 10^{-6}$  mm<sup>3</sup>/Nm (94%). The results of this study could be synergized with the manufacturing process of aluminum alloy-based (Al6061) components at the product finishing stage. The logarithmic regression in the function of target voltage could be used to estimate film thickness, hardness and lifetime performance of the films.

**Keywords:** Aluminium Alloy 6061, Aluminium Anodic Oxide, Hard Anodizing

**Topic:** Engineering



**[ABS-173]**

## **Comparison of Effectiveness of Stemming Algorithms in Indonesian Documents**

Dyah Mustikasari, Ida Widaningrum\*, Rizal Arifin, and Wahyu Henggal Eka Putri  
*Universitas Muhammadiyah Ponorogo*

### **Abstract**

Stemming is a process to determine basic word with some rules. In Bahasa Indonesia, the way is to eliminate prefixes, infixes, suffixes, or combination of prefixes and suffixes in derivative words. Several stemming algorithms for Bahasa Indonesia have been developed, namely the Nazief & Adriani Algorithm (1996) which was later refined by Jelita Asian (2005), Arifin Setiono's Algorithm (2002), and Sastrawi's Algorithm. But their effectiveness has not been studied. In this study, these three stemming algorithms will be compared. We used 363 affix words to conduct the comparison. Each word is searched for its basic words using the three algorithms, that have been programmed in Python language. The basic word resulted then referred to KBBI or Indonesian dictionary to see whether it is right. Sastrawi's could do the best stemming that 93% of the affix words tested could be root words. The Nazief & Adriani Algorithm resulted 85%, while Arifin Setiono's finished at 43%. It could state that Arifin Setiono's needs a lot of improvement because many affixed words could not return to the root word.

**Keywords:** Effectiveness, Stemming, Indonesian

**Topic:** Engineering

**[ABS-176]**

## **The Design and Analysis of Oil Cooler System on Motorcycle 100 CC of Engine Volume**

Rinasa Agistya Anugrah and Muhammad Hanif Darminto  
*Universitas Muhammadiyah Yogyakarta*

### **Abstract**

The oil cooler cooling system is a cooling system engine that serves to reduce the temperature of lubricating oil contained in the cylinder. The oil cooler system aims to keep the oil temperatures stable to keep the maximum lubrication system. This temperature measurement aims to determine the difference between engine temperature before and after the installation of the oil cooler system on the Honda Supra X 100 motorcycle and to know the influence of track variation on engine temperature. The result of the data obtained from the engine temperature data before and after the installation of oil cooler system is that there is a difference of engine temperature before and after the installation of oil cooler system on the Honda Supra X 100 motorcycle with an average of 25% reduction and there is the influence of track variation to engine temperature. The effect makes the temperature drop in the front of the head is larger than the other surfaces.

**Keywords:** Analysis, design, oil cooler, engine temperature

**Topic:** Engineering

[ABS-179]

## **The Classification for Corroded Reinforced Concrete Beams using Linear Discriminant Analysis**

Ahmad Zaki<sup>1\*</sup>, Zainah Ibrahim<sup>2</sup>, and Yessi Jusman<sup>3</sup>

<sup>1</sup> *Department of Civil Engineering, Faculty of Engineering, Universitas Muhammadiyah Yogyakarta*

<sup>2</sup> *Department of Civil Engineering, Faculty of Engineering, University of Malaya*

<sup>3</sup> *Department of Electrical Engineering, Faculty of Engineering, Universitas Muhammadiyah Yogyakarta*

### **Abstract**

Corrosion of the steel reinforcements in RC structures is a worldwide problem. The corrosion has been recognized as the major deterioration mechanism which affects RC degradation due to the environmental actions. The costs of repair and maintenance of corroded structures worldwide exceed billions of dollars per year. It becomes necessary that the effects of steel reinforcement corrosion to the functionality of RC structures be detected at an early stage and studied in detail using acoustic emission (AE) technique in order to provide effective means of remedial. The purpose of the study is damage classification method for corroded reinforced concrete (RC) beams using AE data. This study proposes a damage classification method for corroded reinforced concrete (RC) beams subjected to flexural loading by linear discriminant analysis (LDA) of acoustic emission (AE) data. In this study, damage classification of the corroded beam specimens using AE parameters and LDA has been successfully conducted. RA value of AE parameter experienced a significant drop at Stage 2. Furthermore, the drop of RA value is used for the classification using LDA. The classification data give information in terms of statistical features based on the correlation of the distribution data. The effectiveness of LDA has been demonstrated empirically to classify the corroded beam to the classification with the high accuracy. The promising results obtained in the analysis are proposed to classify the fracture type of the corroded specimens.

**Keywords:** Corrosion, Concrete, Acoustic Emission, AE parameters, LDA

**Topic:** Engineering

[ABS-185]

## **Proposed Reversed Supply Chain as Problem Solver for Case of Returned Beef Products during the Covid-19 Pandemic**

Paduloh Paduloh<sup>1\*</sup> and Taufik Djatna<sup>2</sup>

<sup>1</sup>*Industrial Engineering, Bhayangkara Jakarta Raya University, 12140, Indonesia*

<sup>2</sup>*Agro-Industrial Engineering, IPB University, 16680, Indonesia*

### **Abstract**

Beef is an agro-industrial product that is perishable has a high risk in the pandemic era. Where the Covid-19 pandemic has an impact on decreasing consumption of products in various sectors, including beef, with the closure of restaurants and cafes, it will affect the accumulation of beef supplies so that the quality decreases and causes multiple problems. This study aims to provide solutions for beef products returned from customers not to become waste and have a detrimental impact on the company. To design a reverse supply chain model research, it begins with field observations, designing a reverse supply chain network strategy, and creating a reverse supply chain flow process. The economic value of beef returned from customers is maximized by selling it to customers who do not store meat, and it runs out quickly or to meat-based industries. Products that cannot be consumed by humans can be used as animal or livestock feed. From the research, it was found that the reverse supply chain can have a positive impact on the economic value of the product and an indirect effect on the environment by preventing the product from turning into waste.

**Keywords:** Reverse Supply Chain, Beef, Returned product, Covid-19

**Topic:** Engineering

[ABS-208]

## **CFD Simulation Analysis of Thrust Bearing Lubrication Performance with Height of Texture Variation and Cavitation Modeling**

M Muchammad\*, M Tauviqirrahman, H Nurahman, and J Jamari (a)

*Laboratory for Engineering Design and Tribology, Mechanical Engineering Department, Diponegoro University, Indonesia*

### **Abstract**

Increasing bearing performance can be done in load support by adding texture on the bearing surfaces. In this paper, a study of height textured effect on hydrodynamic thrust bearing by considering cavitation is presented. The textured surface is applied in rectangular geometric with several dimension. Single-textured thrust bearing with several height was analyzed by numerical methods based on Reynolds equation and 2D CFD model analysis based on Navier-Stokes equation. The result showed that the pressure distribution with higher textured surfaces can

increases the load support in hydrodynamic thrust bearings, in other words height of the texture will affect thrust bearing performance.

**Keywords:** Thrust bearing, cavitation, load support, texture

**Topic:** Engineering

[ABS-209]

## **Validity of Navier-Stokes Equation in Single-Textured Thrust Bearing by Considering Reynolds Number and Cell Aspect Ratio**

M Muchammad\*, M Tauviqirrahman, H Nurahman, and J Jamari

*Laboratory for Engineering Design and Tribology, Mechanical Engineering Department, Diponegoro University, Indonesia*

### **Abstract**

Research about hydrodynamic thrust bearing always been developed, the most concern is case about texture with several configuration. Numerical approaches using Reynolds equations and CFD simulation based on Navier-Stokes equations are a common method that used to analyze bearing performance, but not all bearings can be examined by these two methods. Therefore, to find out parameter and boundary, it is necessary to analyze the effect of thrust bearing geometry by using Reynolds equation and Navier-Stokes equation. Single-textured thrust bearing with several geometry by certain reynolds number and cell aspect ratio was analyzed by CFD, and will be compared with the results based on the Reynolds equation. The result showed that the thrust bearing with proper cell aspect ratio and reynold number configuration could be analyzed using both methods, so we must configure velocity and use geometry correctly

**Keywords:** Thrust bearings, texture, cell aspect ratio, reynolds number

**Topic:** Engineering

## [ABS-210]

### Utilization of Industrial Waste as Soil Stabilizer to Enhance Direct Shear Strength

Anita Setyowati Srie Gunarti<sup>1\*</sup> and Irwan Raharja<sup>2</sup>

<sup>1</sup> Faculty of Engineering, Universitas Islam 45

<sup>2</sup> Faculty of Information Technology, Universitas Bina Sarana Informatika

#### Abstract

A problem that often occurs in industrial areas is roads damage that are caused by the low carrying capacity of their subgrade as well as by over capacity of heavy vehicles passing through that roads. A lot of waste that is produced in industrial areas, which also another problem, can be used as soil stabilizers. This study proposed a method to improve the carrying capacity of the soil using industrial waste as stabilization material. Testing materials are prepared for both original and stabilized soil using three types of industrial waste, namely Dry Dust Collector, Silica Sand, and Dust Sand Foundry. One of mechanical property tests, i.e. direct shear test, was conducted with different percentage of waste for each sample. Result showed that there was 36.8% increase in the internal friction angle of the modified soil with 5% Dust Sand Foundry additives without the addition of Dry Dust Collector and Silica sand compared to the internal friction angle of the original soil.

**Keywords:** waste, direct shear, clay, dust sand foundry, silica sand

**Topic:** Engineering

## [ABS-216]

### Application of Continuous Wavelet Transform to Layer Boundaries from Gamma Ray Log

Arya Dwi Candra<sup>1</sup>, Sungkono<sup>2\*</sup>, Bambang Yudho Suranta<sup>1</sup>, Sulistyono<sup>1</sup>, Nur L. Maulidiyah<sup>2</sup>, Dessy Widya<sup>3</sup>, and Andri Syafriya<sup>4</sup>

<sup>1</sup> Oil & Gas Production Engineering Department, Politeknik Energi dan Mineral Akamigas, Indonesia

<sup>2</sup> Department of Physics, Institut Teknologi Sepuluh Nopember, Indonesia

<sup>3</sup> PetroChina

<sup>4</sup> Department of Geophysics, Sekolah Tinggi Teknologi Minyak dan Gas Bumi, Indonesia

#### Abstract

Layer boundary analysis is an important process in determining the net pay (ft) value, namely the productive zone of the reservoir. Besides being able to be known manually through mud log data, layer boundaries can also be known automatically by signal analysis, namely wavelet transform. This analysis uses log data, namely the GR log and the resistivity log. The type of wavelet used is Continuous Wavelet Transform (CWT). The CWT workflow begins with a blocking trace process to find inflection points in the GR log data and resistivity logs based on

derivative analysis by cooling the signal with the wavelet operator that matches the original frequency. In the input part of the wavelet algorithm, several parameters are needed, namely the number of layers detected and the minimum thickness requirement which is 3 and 1. As for the input, the percentage of layer extract is varied from 25%, 30% and 35%. The result of the comparison of the layer boundary from the mud log data with CWT has the lowest difference in the result of the layer extract 35%. Where the results of the layer boundaries on the mud log data on wells NP 1, NP 2, P 1, P 2 and P 3 are 155, 248, 29, 10 and 343, respectively. and the results of the bed boundary with 35% layer extract in wells NP 1, NP 2, P 1, P 2 and P 3 were 168, 192, 30, 11 and 312 layers, respectively. The biggest difference is in the NP Well 2. This is because the CWT algorithm does not involve thin layer analysis (less than 1 ft).

**Keywords:** Layer Boundaries, CWT, Log Gamma Ray, Mud Log, Reservoir

**Topic:** Engineering

[ABS-225]

## **Effect of Rubber Deformation Along Sliding Contact on its Stress and Friction Force: a Numerical Investigation**

Budi Setiyana, Rifky Ismail, S. Sugiyanto, and J. Jamari

*Mechanical Engineering Department, Faculty of Engineering, University of Diponegoro*

### **Abstract**

Rubber is a material that easily deforms when subjected to friction, such as in tires, seals and transmission belts. It is very important to understand the relationship of deformation to its stress and friction forces that occur on the rubber. The stress and friction force that occur are closely related to the strength and braking capacity of the rubber, especially for the rubber used in tires. This paper investigates the effect of rubber deformation along friction on its stress and friction force of the rubber surface. Friction contact between the rubber surface and a rigid indenter is modelled numerically using Finite Element (FE) software. Analyzed rubber is Styrene Butadiene Rubber (SBR) and considered as a hyper-elastic material based on Mooney-Rivlin model. Analysis is carried out at specified depth of indentation, surface roughness and sliding speed. Results show that the degree of deformation will be higher for the larger indentation depth and surface roughness. Along friction, the high degree of deformation causes high stress and friction forces of the rubber surface, however, fluctuating value of those parameters is obtained here.

**Keywords:** deformation, Finite Element, friction, rubber

**Topic:** Engineering

[ABS-227]

## Low Level Controller Analysis using Digital PID Controller on Self Balancing Robot in Corrugated Path

Seta Samsiana, Setyo Supratno, and Bayu Cendana  
*Faculty of Engineering, Universitas Islam 45 Bekasi*

### Abstract

Two-wheel self-balancing robot is a mobile robot that has two wheels on the right and left that will not be balanced without the controller. The PID controller can be used to control the robot's position in order to maintain its balance while runs on a bumpy road by adjusting the corresponding proportional constant ( $K_p$ ), integral constant ( $K_i$ ) and derivative constant ( $K_d$ ) by using trial and error method. Control system analysis is based on 3 aspects of analysis, those are transient response analysis, steady state response analysis and stability analysis. The results of the trial-and-error method in this study are that the robot can maintain its balance while runs on a bumpy road with values of  $K_p = 50$ ,  $K_i = 170$  and  $K_d = 2.2$ . The results of the analysis of the PID parameters are the self-balancing robot's responses included in the overdamped category, with a value of % error steady state = 1.078% and robot stability included in the marginal stable category.

**Keywords:** Self Balancing Robot, PID, Trial and Error

**Topic:** Engineering

[ABS-229]

## The Application of Haversine Formula in Education Game Landmark Nusantara

Heliza Rahmania Hatta\*, Muhammad Hadi Suroso, Indah Fitri Astuti, Dyna Marisa Khairina, and Septya Maharani  
*Mulawarman University*

### Abstract

Indonesia is the largest archipelago state is therefore also called Nusantara. Almost every region in Indonesia has a characteristic landmark that describe each area that has a tremendous potential in form of lore and attraction. The tremendous potential of this must be backed up with a nice introduction. One medium that can be used is an educational game in which the process can be done with the concept of learning while playing. Therefore, designed and built an educational game titled Landmark Nusantara, where the game is aimed to provide knowledge about landmarks that exist in Indonesia. The Game that was built have 30 landmark data samples regions in Indonesia. The game is based Geographic Information System with the help of Google maps which also features geolocation that can be used to determine the location you want to tag based on latitude and longitude, and supported by a method of Haversine Formula. A method that has been testing the system using Microsoft Excel manualisation (Ms.Excel) where the results

of the distance calculation system using Haversine Formula methods have the same result with manual calculations.

**Keywords:** Game, Google Maps, Haversine Formula, Indonesia, Landmark

**Topic:** Engineering

**[ABS-232]**

### **Optimization of Expert System for Agriculture Development of Salak Tree in Srumbung: A Literature Study**

Desi Nada Winarti, Atina Hana Maulidina, Nida Muna Fadhillah, and Endah Ratna Arumi  
*Universitas Muhammadiyah Magelang*

#### **Abstract**

The people of Srumbung need knowledge in determining the suitability of land for planting salak plants. This is due to the lack of information on determining the suitability of land for planting salak plants and the limited knowledge of the Srumbung community. So we need a system that can help the community in determining the land for the development of zalacca plants. In this research, an expert system will be built that can help determine the suitability of land for zalacca plants. The method used is literature study, namely by analyzing the literature that has been selected from various sources through an online database. Based on the results of a review of several literature, it was found that an expert system of land adjustment for zalacca plants. The development of this expert system is expected to be a solution to community problems in determining the land to be used for planting zalacca.

**Keywords:** Expert System, Land Suitability, Salak Plants

**Topic:** Engineering

**[ABS-234]**

### **The Use of IRE's LWD for Overlay Design of Flexible Pavement**

Siegfried<sup>1</sup>, F. Mulyawati<sup>2</sup>, and I. Sudarsono<sup>2</sup>

<sup>1</sup>*Institute of Road Engineering, Directorate General of Highways, Bandung*

<sup>2</sup>*Department of Civil Engineering, University of Langlang Buana, Bandung*

#### **Abstract**

One activity of pavement management system is to design the overlay thickness need of a road link to accommodate design traffic. To do so the main data required is the surface deflection tested on the evaluated road links. Most of current design method suggest to use Falling Weight Deflectometer (FWD) as the standard testing equipment. Because of the limited number of FWD



available in Indonesia, The Institute of Road Engineering (IRE) as the government research center in Indonesia carried out the research about the Light Weight Deflectometer (LWD) as an alternative equipment for FWD. The research was done in the fiscal year of 2012 - 2014 and performed a prototype called IRE's LWD. To conform the suitability of the use of LWD on overlay design some other research has also been done by comparing the results of overlay design by using this two equipment. The research is done by taking 3 location in indoor road trial section of Alusan laboratory using FWD and IRE's LWD successively. The deflection data is then used to design overlay for 5 million CESA. The results found that the difference between each other is below 10% in thickness. This finding brings to the conclusion that the use of IRE's LWD for design overlay thickness of flexible pavement is acceptable especially for the road links classified as medium to low traffic.

**Keywords:** Overlay design, IRE's LWD, FWD

**Topic:** Engineering

[ABS-239]

## **Hand and Foot Movement of Motor Imagery Classification using Wavelet Packet Decomposition and Multilayer Perceptron Backpropagation**

Prasetyo Cahyo Nugroho, Rahmat Widadi, and Dodi Zulherman\*

*Faculty of Telecommunication and Electrical Engineering, Institut Teknologi Telkom Purwokerto, Indonesia*

### **Abstract**

The development of bionic aids for paralyzed patients leads to the implementation of the Brain Computer Interface (BCI) that has various obstacles, especially in interpreting brain signals as triggers for the bionic organ. The reading of electrical signal activity in the brain in the BCI system uses signal electroencephalography (EEG), which comes from many electrodes in the head area and is non-stationary. The measured EEG signal contains much information, including information for the hands and feet motor imagery, so a classification system is needed to separate the information to be processed, such as hand and foot movements. This research aims to develop an imagery motor classification system for the hands and feet so that signals can be classified correctly. The system design is made through several stages of the signal processing process consisting of the pre-processing stage using centering, the feature extraction stage with Wavelet Packet Decomposition (WPD), and Multilayer Perceptron Back Propagation (MLP-BP) as the classifier. Based on the result, this study gets the highest accuracy value about 26.8% at level three and gain above 0.02. This small accuracy is due to the large error due to underfitting.

**Keywords:** EEG, wavelet packet decomposition, MLP-BP

**Topic:** Engineering

[ABS-240]

## Development of the Delay Factor Model for Substructure Works in Building Construction

Iwan Kurniawan<sup>1\*</sup>, Pungky Dharma Saputra<sup>1,2</sup>, Safri<sup>3</sup>, and Ridwan Saputro<sup>1</sup>

<sup>1</sup> *Civil Engineering Study Program, School of Engineering & Technology, Tanri Abeng University, Jakarta, Indonesia*

<sup>2</sup> *Military Building Construction Engineering, Faculty of Military Engineering, Indonesia Defense University, Bogor, Indonesia*

<sup>3</sup> *Civil Engineering Study Program, Faculty of Science and Technology, Institut Sains dan Teknologi Al-Kamal, Jakarta, Indonesia*

### Abstract

Building construction is one of the most complex construction hence construction delay is always happened. Substructure work is the first stage of building construction work. If a delay occurs in the substructure work stage, it will cause a snowball effect which can cause all of the building construction stage to be delayed. Therefore, research on delay factor in substructure work is urgent in order to be mitigated at the beginning of the construction process. Identifying the delay factor is the main objective of this research. Furthermore, this research also tries to develop a model of delay factor in the substructure work stage. This research was conducted on high-risk building construction work, mix used area, and integrated with a railway station. The survey was conducted on 30 professional engineers in building constructions. This research was started in identifying the delay factor and analyzed using multiple regression methods to determine the influence delay factors. The analysis showed that 13 delay factors that have a significant influence on project delay with a value of  $p < 0,050$ . The three highest correlated delay factors are government policy factor ( $r=0,880$ ), construction work accident factor ( $r=0,847$ ), and design factor ( $r=0,843$ ). The identified delay factors can be intervened by mitigating that at the beginning of the project in order the future projects not to be late.

**Keywords:** Delay factors, Substructure works, Building construction

**Topic:** Engineering

[ABS-241]

## **Typosquatting Potential on the Official Website (an Empirical Study of Popular Websites in Indonesia)**

Dimas Sasongko<sup>1\*</sup>, Agung Suprpto<sup>2</sup>, and Purwono Hendradi<sup>1</sup>

<sup>1</sup> *Department of Informatics Engineering, Faculty of Engineering, Universitas Muhammadiyah Magelang, Magelang, Indonesia*

<sup>2</sup> *Department Islamic Broadcast and Communication Studies, Faculty of Da'wa, IAIN Salatiga, Salatiga, Indonesia*

### **Abstract**

When typing the URL, users often make mistakes (typos) so that they cannot visit the desired website. The situation is made worse when the wrong URL leads to another website that the user does not wish to visit and may have been created for cybercrime purposes. This condition is called Typosquatting. Typosquatting is often used to carry out dangerous cyberattacks. This research will focus on the potential of Typosquatting popular website domains in Indonesia based on Similarweb and Alexa rankings. The purpose of the website is to see the potential for Typosquatting attacks on the website's domain. Typosquatting potential observations were carried out using the Domain Security Test owned by Immuniweb. The results obtained from the study are the number of active domains contained in the potential domain of Typosquatting has a proportion above 70%. Typosquatting models that are most commonly used are substitution and addition and the most commonly used website destinations are Hit Stealing and Parking Domain / For Sale. Results that can be used by companies or authorized domain owners to take a precautionary strategy against user incorrect site visits resulting from typos.

**Keywords:** Typosquatting, Website, Domain Name System, Cyberattacks, Typo

**Topic:** Engineering

[ABS-244]

## **Identification of Precast Box Girder Erection Activities to Develop Work Breakdown Structure in Elevated Railway Infrastructure Project**

Nina Purwanti\*, Pungky Dharma Saputra, and Muhammad Hamzah Fansuri

*Military Building Construction Engineering, Faculty of Military Engineering, Indonesia Defense University, Bogor, Indonesia*

### **Abstract**

The railway infrastructure development is being a concern to the government of Indonesia nowadays. One of construction methods mostly applied in building the railway infrastructure is box girder application with launching gantry. After observing several big projects with this method, some problems are identified. One of the problems is different work activities conducted during box girder erection. According to this situation, this research was conducted to identify

precast box girder erection activities to develop work breakdown structure. The WBS will enhance the efficiency and effectivity of similar projects in the future. To conduct the analysis, there are three steps to be executed. They are archive analysis, expert judgement and surveys. For archive analysis, two big projects are observed and compared. Secondly, the judgements are obtained from five experts who have fulfilled more than ten years working experiences especially in public infrastructure construction. Thirdly, the direct surveys were held to thirty elected respondents regarding this topic. Finally, the descriptive analysis was applied to draw the result. This research conveys the WBS which has been developed according to aforementioned analysis method. There are 13 identified activities. They are preparation, box girder transportation, box girder lifting, position setting, epoxy gluing, temporary PT bar stressing, alignment surveying, PC stand and accessories installment, permanent stressing, patching, grouting and bearing installation re-surveying. This WBS is necessary to be used as a reference standard for future similar projects.

**Keywords:** activities, box girder, erection, work breakdown structure, railway, infrastructure

**Topic:** Engineering

[ABS-245]

## **Mechanical Properties of a biomass *Eichhronia Crassipes* Plant (ECP) fibre: Case study of Lost Circulation Material utilization**

Purnomosidi<sup>1</sup>, Waheed Afzal<sup>2</sup>, Paul D. Hallett<sup>2</sup>, and Erdila Indriani<sup>1</sup>

<sup>1</sup>PEM Akamigas, Indonesia

<sup>2</sup>University of Aberdeen, Skotlandia

### **Abstract**

In Indonesia, people have long produced *Eichhronia Crassipes* Plant (ECP) stalks as raw materials for handicraft products. Other research has demonstrated that the tensile testing of individual fibres provides relevant data to assess their integrity in drilling muds. Whilst data on the mechanical properties of other natural fibres used as lost circulation material in drilling muds have been collected, the behaviour of ECP is unknown. This study proposes an alternative solution to combat the vast growth of this invasive species through utilising it as lost circulation material for oil and gas drilling operations. The plant fragments studied originated from plant stalks and were extracted as individual fibres. The study describes tensile tests to characterise stiffness and strength. Mechanical tests were conducted on ECP fibres to determine their stiffness under dried and water-wet conditions. Initial tensile tests on nylon fibre determined potential experimental artefacts with the experimental approach. The dried fibres had a water content of 8.163 wt. % (SE 0.636), whereas the wet fibres were 93.43 wt.% (SE 0.294). Water wet fibres had a lower modulus of elasticity than dried fibres and therefore, dried fibres have less tensile strength than wet fibres (Mean = 45.16 MPa- SE = 5.023- N = 41)

**Keywords:** *Eichhornia crassipes*, lost circulation material, invasive plant, tensile test, fibre

**Topic:** Engineering

[ABS-248]

## CO<sub>2</sub> Removal Design at PT Pertamina EP Asset 3 with Zeolite Contacting Tower

Erdila Indriani<sup>1</sup>, Pradini Rahalintar<sup>1</sup>, Simon Sinaga<sup>1</sup>, Dwi Hardi P<sup>2</sup>, and Purnomosidi<sup>1</sup>

<sup>1</sup>PEM Akamigas

<sup>2</sup>PT. Pertamina EP Asset 3

### Abstract

Impurities of carbon dioxide become an obstacle to gas production activities because it can cause damage (corrosiveness) to production equipment and reduce the calorific value of gas. One of the methods commonly used in handling CO<sub>2</sub> is the use of an amine unit. PT Pertamina EP Asset 3, precisely at SP Bangoduwa Cirebon, has a gas well with very large carbon dioxide impurities and has problems when it is planned to build an amine unit due to low pressure and other economic reasons. Therefore, research studies as another alternative method of handling carbon dioxide produced are an interesting topic to be raised. The method used in this research is to use a filtering mechanism with a laboratory-scale column containing zeolite and activated carbon, which is expected to reduce the carbon dioxide content effectively and economically. In this study, carbon dioxide filtering was carried out with three prototype models. The first model is a filter form made with stratified (as many as 4 levels), with each level given 250 gr of zeolite. The second model has a long filter shape, with a zeolite capacity that fills each stick of 250 gr. Meanwhile, the third model is a filter form that is made in stages (as many as 4 levels), with each level given as much as 250 grams of activated carbon and it is hoped that it can reduce the CO<sub>2</sub> content in natural gas in the Bangoduwa SPC Cirebon PT PERTAMINA EP Asset 3. In testing using CO<sub>2</sub> Monitoring, the results of reducing CO<sub>2</sub> levels are 0.9-1% for the first prototype model and 0.8 - 0.9% for the second model by testing the gas sample. The third model increases CO<sub>2</sub> levels by 1% from the same gas sample passed for each prototype model. Potention of zeolit to be applied as CO<sub>2</sub> removal in sour gas is revealed however need much progress to enhanced the removal tower in order to get higher CO<sub>2</sub> stripping presentage.

**Keywords:** CO<sub>2</sub> removal, Zeolite contactor, Sour gas, Natural gas

**Topic:** Engineering

[ABS-249]

## Design Fuel Efficiency on a Gas Turbine Generator Using a Fuzzy Logic Controller

Astrie Kusuma Dewi\*, Chalidia Nurin Hamdani, Damita Adhi Pratama, and Agus Heriyanto  
*Polytechnic of Energy and Mineral Akamigas*

### Abstract

The Gas Turbine Generator (GTG) is an important part of the utility unit at PT. XYZ, namely as a supplier of electricity for the entire plant. The performance of the control system needs to be considered because it is related to efficiency factors, especially to regulate the amount of fuel gas burned. Currently, the Gas Turbine Generator (GTG) installed on the Taurus 60 Solar Turbine using PID\_E Autotuning as the controller. It takes a dynamic process for the reliability of the control system used. Fuzzy Logic Control design on fuel gas system aims to produce better efficiency. The results of the Fuzzy Logic Controller design using MatLab simulation obtained a dead time (td) of 2.5 s, a rise time (tr) of 69.87 s, a time constant (tc) of 39.89 s and a settling time (ts) of 95.36 s.

**Keywords:** Gas Turbine Generator, Fuzzy Logic, Fuel Efficiency

**Topic:** Engineering

[ABS-251]

## Analysis of Life Cycle Cost in Developing Capital City of East Bogor Regency

Rizal Kurniyawan<sup>1\*</sup>, Pungky Dharma Saputra<sup>1,2</sup>, Safri<sup>3</sup>, and Ridwan Saputro<sup>1</sup>

<sup>1</sup> *Civil Engineering Study Program, School of Engineering & Technology, Tanri Abeng University, Jakarta, Indonesia*

<sup>2</sup> *Military Building Construction Engineering, Faculty of Military Engineering, Indonesia Defense University, Bogor, Indonesia*

<sup>3</sup> *Civil Engineering Study Program, Faculty of Science and Technology, Institut Sains dan Teknologi Al-Kamal, Jakarta, Indonesia*

### Abstract

Bogor Regency is the most populous area in West Java. Currently it is facing the problem of increasing population, decreasing agricultural area and community dissatisfaction with government services. The expansion of Bogor Regency into East Bogor Regency is a demand for the formation of a new autonomous regency. However, it is necessary to conduct a financial feasibility study which is involving the government and the private sector in investing in the development of this new regency and its capital city. This research is focusing on calculating the life cycle cost and finding the optimum investment scheme to provide benefits for both parties. Life cycle cost method was used to analyze initial costs, operational and maintenance costs and

revenue to assess feasibility of this project and then evaluating the scenario of sharing. The capital city of East Bogor regency is planned to be developed in Jonggol area by developing transportation infrastructure, micro business, government area, housing and tourism based on smart city. The results of the analysis show that the optimum Net Present Value (NPV) is IDR27,488,111,287,722.20, the Benefit Cost Ratio (BCR) is 4.28 and the Internal Rate of Return (IRR) is 17.97% with private sharing for initial costs is 60%, for operational and maintenance costs is 50% and 60% for revenue. The evaluation results can become government consideration in making decision.

**Keywords:** Life cycle cost, Investment, Capital city, East Bogor Regency

**Topic:** Engineering

**[ABS-41]**

## **Economic Growth and Deforestation: a Study of Changes in Land Coverage in West Nusa Tenggara Province**

James Sinurat and Yunus Arifien  
*Universitas Nusa Bangsa*

### **Abstract**

In every region that is transitioning from agrarian economic activity to industrial economic activity, it is always faced with deforestation or changes in forest cover, including in West Nusa Tenggara. This study aims to determine the effect of economic growth and population on land cover change and deforestation in West Nusa Tenggara Province. The research was conducted in March - August 2020, which consisted of activities to determine land cover changes through processing satellite image data, which was matched with data from BPS. Data on economic growth and population are obtained from BPS. Modeling with multiple linear regression. The results of regression modeling show that economic growth and population growth significantly increase land for building and reduce forest land cover.

**Keywords:** economic growth, deforestation, and land cover

**Topic:** Life Sciences

[ABS-110]

## The Catalytic Conversion of PPSDM Oil and Gas Residues into Liquid Fuel with Heterogeneous Catalysts

Pusparatu<sup>1\*</sup>, R.Y. Perry Burhan<sup>1,2</sup>, Silvy Yusnica<sup>1</sup>, and Oksil Venriza<sup>1</sup>

<sup>1</sup> *Politeknik Energi Dan Mineral AKAMIGAS, Cepu, Jawa Tengah, Indonesia*

<sup>2</sup> *Department of Chemistry, Science and Data Analytics, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia*

### Abstract

Petroleum residue is a byproduct of oil refineries that has not been utilized optimally so that it accumulates in the stockpile tank causing disruption of the processing of petroleum into motor vehicle fuel. The catalytic conversion of the PPSDM oil and gas residue into liquid fuel has been carried out using a heterogeneous acid catalyst over a bath reactor which has produced a conversion of 70% with a temperature of 200 °C for 60 minutes with a pressure of 1 atm. The resulting product was analyzed using Gas Chromatography Mass Spectro (GCMS) with components from C1 to C17 Hydrocarbon.

**Keywords:** Catalytic, conversion, residues, heterogeneous catalysts

**Topic:** Life Sciences

[ABS-133]

## Macroscopic Appearance of The Freezed Sperm Quality of Kebumen Ongole Breeds Bulls Without Thawing Media

Faruq Iskandar<sup>\*</sup>, Riawan Yudi Purwoko and Zulfanita

*Universitas Muhammadiyah Purworejo*

### Abstract

This research was conducted to determine the effect of thawing time without using media (water) on the macroscopic quality of frozen sperm. The research was conducted from March to May 2020 at the Laboratory of Integrated Animal Husbandry, Muhammadiyah University of Purworejo, Purworejo Regency, Central Java. The study used 20 strow of Kebumen Ongole Breeds Bulls which was used for insemination artificial (IA) in Kebumen Regency. The experimental design used a completely randomized design (CRD) with four treatments and five replications. Thawing duration treatments was 20, 40, 60 and 80 seconds. The research parameters were consistency, colour, odour and pH. The data obtained were analyzed by t-test and descriptive analysis. The results showed that thawing time without using media had no significant effect ( $P > 0.05$ ) on the macroscopic appearance of frozen sperm quality. The 60 second thawing time without using media meets the standards for performing IA.

**Keywords:** Kebumen PO cattle, macroscopic and frozen sperm

**Topic:** Life Sciences



[ABS-272]

## Water Resources Sustainability Assessed Based on Villagers and Village Institutions Engagement in Water Resources Conservation Activities

Suryatri Darmiatun<sup>1</sup> and Harsuko Riniwati<sup>2</sup>

<sup>1</sup> BBPPMPV BOE Malang

<sup>2</sup> Brawijaya University, Malang

### Abstract

The source of drinking water for most of the villagers in Malang Regency, East Java comes from springs. 60 springs in Malang Regency- 3 points for surface water, 41 springs, and 16 points for deep wells- experience shrinkage. Protection / conservation of water resources by the government and non-government is a prerequisite for the sustainability of access to drinking water for rural communities. Research has not been carried out on a water resources sustainability model, based on water resources conservation by villagers and village institutions. Research objectives are knowing the magnitude of the villagers and village institutions effects on water conservation and formulating a sustainable, community-based rural water conservation model. Methods of data collection are surveys, interviews, and document studies. Data were analyzed using WarpPLS. These are the main findings. The sustainability of water resources in rural areas is directly affected by the implementation of water conservation ( $f^2 = 0.250$ ). The implementation of water conservation mediates the effect of community-village institution collaboration ( $f^2 = 0.134$ ) and the performance of village institutions ( $f^2 = 0.189$ ) on the sustainability of water resources. Meanwhile, the social ( $f^2 = 0.092$ ) and economic conditions of the community ( $f^2 = 0.024$ ) have a direct effect on the performance of village institutions, but they do not have a significant effect on the implementation of water conservation. The research implication is being the recommendation for Malang Regency government. The government must ensure the effectiveness of water conservation, through strengthening the performance of village institutions. The HRD of village institutions is the main key in determining local water conservation regulations and assisting the community to implement them.

**Keywords:** Conservation, Water resources, village, structural model

**Topic:** Life Sciences

[ABS-217]

## Sustainability Analysis of Stone Carving Industries: Life Cycle Analysis Approach

Retno Rusdijati<sup>1,2</sup>, Agus Widodo<sup>2</sup>, Jack Roebijoso<sup>2</sup>, and Harsuko Riniwati<sup>2</sup>

<sup>1</sup>Universitas Muhammadiyah Magelang

<sup>2</sup>Universitas Brawijaya Malang

### Abstract

Stone carving are a regional superior product in Magelang Regency, Central Java. The total number of stone carving industries that have been identified is 181 units involving 456 workers. The process of producing stone carving has an impact that has the potential to cause harm to workers and the environment. The results of the measurement of the noise level at the center of the stone carving of Sedayu, Muntilan, have an average of 104.13 dB; 98.51 dB; and 102.78 dB originating from production machines. The noise level exceeds the NAB stipulated by the Minister of Manpower Decree Number 51/Men/1999, namely 85 dB for a maximum working time of 8 hours/day. The results of examination of the hearing conditions of 30 workers showed that 46.6% of respondents experienced moderate deafness. The measurement of dust levels show a value that also exceeds the TLV, namely 15.49 mg/m<sup>3</sup>. TLV for dust levels according to the Minister of Manpower and Transmigration Regulation Number 5 of 2018 concerning Occupational Safety and Health in the Work Environment is 10 mg/m<sup>3</sup>. Examination of the respiratory conditions of 30 workers showed that 66.6% of respondents experienced mild lung restrictions. Therefore, this study was conducted to further identify the impact of the stone carving industry on human health, ecosystem quality, and resources. Data collection was carried out through observation and interviews with stone carving industry players, and data analysis using Life Cycle Analysis (LCA). Data analysis shows that the impact of the stone carving industry on human health, especially on respiratory inorganics; in ecosystem quality, the biggest is ecotoxicity; and the resources most affected are fossil fuels. Human health is most affected by the existence of the stone carving industry, followed by resources and finally ecosystem quality. This should be the concern of all parties, especially the Government in providing optimal protection for workers for the sustainability of the stone carving industry.

**Keywords:** stone carving industry, LCA, human health, ecosystem quality, resources

**Topic:** Life Sciences

[ABS-247]

## **The Effectivity of Virtual Tour as an Alternative of Ecotourism Method. A Case Study of Tambora National Geopark, Indonesia**

Diah Rahmawati, Alpiana, and Joni Safaat Adiansyah

*Mining Engineering Department, Engineering Faculty, Universitas Muhammadiyah Mataram,  
Mataram, Indonesia*

### **Abstract**

The Covid-19 pandemic has an impact on the tourism sector. Virtual tours become an alternative to adapt to the Covid-19 pandemic. The Geotourism Festival held online in June 2020. However, the virtual tour presented has not yet touched on environmental conditions such as endemic flora, fauna, landscapes, and ecosystem services. This paper is aimed to find out the prospect of a virtual tour as an alternative method for ecotourism in Tambora Geopark. The method used in this paper is interviews with Tambora's Geopark Managers and virtual tour participants at the Geotourism Festival Event. The results were analyzed using SWOT analysis to obtain a virtual tour effectivity. Virtual tours can be accessed internationally and provide information about the entire geopark area. A virtual tour's disadvantage is high cost. It requires many video/documentary films to present the whole geopark area. virtual tour is effective to promote ecotourism in Geopark Tambora. A virtual tour can be at home activity during the Covid-19 pandemic. Virtual tour can be a source of knowledge not only in Geology but also in Environmental and socio-economic fields.

**Keywords:** ecotourism, Tambora Geopark, virtual tour

**Topic:** Life Sciences

