ISST 2019

THE 5th INTERNATIONAL SEMINAR ON SCIENCE AND TECHNOLOGY

“Toward Industry 4.0 with Multidiciplinary Research”

July, 23rd 2019

Hotel Bumi Surabaya
Surabaya, Indonesia

PROGRAM BOOK
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PREFACE

Dear Participants of ISST 2019,

Welcome to 5th International Seminar on Science and Technology (ISST 2019)!

It is a pleasure to announce that Graduate Program of Institut Teknologi Sepuluh Nopember via Graduate Program of Information System becomes an organizer for the 5th International Seminar on Science and Technology 2019 (ISST 2019) that will be held on 23 July 2019 at Hotel Bumi Surabaya. For this year ISST 2019 is in conjunction with Information System International Conference (ISICO) 2019, https://www.isico.info

This year, the theme of ISST 2019 is “Toward Industry 4.0 with Multidisciplinary Research”. This theme is chosen because the Era of Industry 4.0 has been playing a great role in creating a better life for human beings since the past, present, and future. In addition, it is expected to occur knowledge sharing between academics, industry, businessmen, regulators, and implementers of rules in government to realize a better life by applying sustainable science and technology development and realize the atmosphere of creative research.

ISST 2019 also brings a mission to increase the number of scientific publications from Indonesian researchers in internationally reputable scientific journals and encourage cooperation between Indonesian researchers with renowned researchers who field from universities and research institutions around the world.

Yours very truly,

Conference Chair of ISST 2019

Dr. Apol Pribadi Subradi, S.T., M.T
ORGANIZING COMMITTEE

General Chair : Dr. Apol Pribadi Subriadi, S.T., M.T
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             Raras Tyasurita S.Kom, MBA
Treasurer : Rini Setyowati, Amd

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• Fathiya Hasyifah Sibarani, S.Kom.
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• Risa Perdana Sujanawati, S.Kom.
• Li'ulliyah, S.Kom.
• M. Afif Atho'Ilah, S.T.
• Ahmad Choirun Najib, S.Kom.
• Taufiqr Rohman, S.Kom.
• Nur Shabrina Meutia, S.T.
• Nurrida Aini Zuhroh, S.Kom.
• Emha Diambang Ramadhany, S.Kom

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• Dr. Tantular Nurtono, ST., M.Eng
• Dr. rer. nat. Ir. Aulia Muhammad T. N., M.Sc
• Sigit Tri Wicaksono, S.Si, M.Si., Ph.D
• Ir. I Putu Artama Wiguna, MT., Ph.D
• Prof. Dr. Ir. Ellina S. Pandebesie, MT
• Ira Mutiara Anjasmara, ST., M.Phil., Ph.D
• Dr. Ir. Wahyudi, MSc
• Dr. Mahmud Yunus, M.Si
• Dr. rer. Pol. Heri Kuswanto, S.Si., M.Si
• Dewi Septanti, S.Pd., S.T., M.T., PhD
• Dr. Techn, Ir. Raden Venantius H. G., M.Sc
Reviewer:

- Dr. Yuly Kusumawati, M.Si.
- Prof. Mardi Santoso, Ph.D
- Dr. Yudhi Lastiasih, ST, MT
- Ir. I Putu Artama Wiguna, MT, Ph.D
- Data Iranata, ST, MT, Ph.D
- Dr. Tantular Nurtono ST., M.Eng
- Ipung Fitri Purwanti S.T., M.T., Ph.D
- Prof. Dr. Ir. Ellina Sitepu Pandebesie MT
- Arseto Yeki Bagastyo S.T., M.T., M.Phil
- Dedy Dwi Prasetyo, ST., M.Si
- Santi Puteri Rahayu, M.Si, Ph.D
- Dr. Apol Pribadi Subriadi ST., MT
- Retno Aulia Vinarti S.Kom., M.Kom. Ph.D
- Ira Mutiara Anjasamara ST, M.Phil, Ph.D
- Prof. Dr. Bagus Jaya Santosa
- Dr. Yono Hadi Pramono M.Eng
- Feby Artwodini Muqtadiroh S.Kom., MT
- Dr.techn. Ir. Raden Venantius Hari Ginardi M.Sc
- Dewi Septanti S.Pd, ST, MT, Ph.D
- FX. Teddy Badai Samodra ST., MT
- Mudjahidin ST., MT, Ph.D
- Mokhamad Nur Cahyadi ST., M.Sc., Ph.D
- Ir. Purwanita Setijanti M.Sc., Ph.D
- Raja Oloan Saut Gurning S.T, M.Sc, Ph.D
- Erma Suryani ST., MT., Ph.D
- Raras Tyasnurita S.Kom, MBA
- Sholiq ST., M.Kom
- Dr. rer. nat. Ir. Aulia Muhammad Taufiq Nasution M.Sc.
- Dr. Ir. Wahyudi Citrosiswoyo M.Sc
- Dr.Eng. Widiyastuti ST., MT.
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- Dr. Arina Hayati S.T., M.T.
- Dr. Eng. Dipl Ing. Ir. Sri Nastiti Nugrahani Ekasiwi M.T.
- Ir. I Gusti Ngurah Antaryama Ph.D.
- Danar Guruh Pratomo ST.MT.
- Lukman Noerochim S.T, M.Sc.(Eng),Ph.D
- Fenty Ratna Indarti S.T., M.Arch
All Papers by ISST 2019 after peer review will be published on:
IPTEK Journal series
e-ISSN: 2088-2033

IPTEK Journal is accessible at: http://www.iptek.its.ac.id/index.php/jts
SPEAKER PROFILE

In the Implementation of the ISST 2019 Conjunction with ISICO 2019 with speakers from the information system field with profiles as follows:

Prof. Hyerim Bae, PhD

Professor in the Industrial Engineering Department at Pusan National University (PNU), Korea.

Hyerim Bae is a professor in the Industrial Engineering Department at Pusan National University (PNU), Korea. He received PhD, MS, and BS degrees from the Industrial Engineering Department, Seoul National University (SNU), Korea. He had been a manager of information strategic planning team at Samsung Card Corporation before he joined PNU. He has been an executive chair of AP – BPM Steering Committee since September 2012, committee chair of Busan Global Data Hub Center since July 2014 and a member of the advisory board for Busan Metropolitan City, since September 2016. He was recently a visiting scholar at the Georgia Institute of Technology from March 2016 to February 2017. Currently, Prof. Bae is leading BAB – Best of Big Data Analytics project which is an open source operational big data analysis tool.
Prof. Robert M. Davison

Professor of Information Systems, City University of Hong Kong.

Robert Davison is a Professor of Information Systems at the City University of Hong Kong. His research focuses on the use and misuse of information systems, especially with respect to problem solving, guanxi formation and knowledge management, in Chinese organizations. He has published over 90 articles in a variety of journals such as MIS Quarterly, Information Systems Journal, IT & People, Journal of IT, Journal of the AIS, Journal of the American Society for Information Science & Technology, IEEE Transactions on Engineering Management, Decision Support Systems, Communications of the AIS, and Communications of the ACM. Robert chairs the IFIP WG 9.4 (Social Implications of Computing in Developing Countries) and is the Editor-in-Chief of the Information Systems Journal and the Electronic Journal of Information Systems in Developing Countries. Robert travels extensively, seeking to understand how people in different contexts and cultures make sense of their lives with IS. As a researcher and as an editor, he seeks to promote both an inclusive and a local perspective to research. Home Page: http://www.is.cityu.edu.hk/staff/isrobert
Prof. Michael Rosemann, Ph.D, FACS, FQA, MAICD*

Professor and Head of the Information Systems School, Science and Engineering Faculty, Queensland University of Technology (QUT), Brisbane, Australia.

Dr. Michael Rosemann is Professor and Head of the Information Systems School, Science and Engineering Faculty, Queensland University of Technology. Currently, he is the Executive Director, Corporate Engagement International & Development, Queensland University of Technology, Brisbane, Australia. QUT’s Information Systems research received a ranking of ‘well above world standard (5/5)’ in this area of research in Australia (ERA, December 2015) and includes QUT’s Business Process Management Discipline, one of the largest BPM research groups in the world. Under his leadership as a Head of School, he established three industry-funded Chairs in the Information Systems School, i.e. the Woolworths Chair in Retail Innovation, the Brisbane Airport Corporation Chair in Airport Innovation and the PwC Chair in Digital Economy. Besides his role in academia, he is also served as Honorary Consul of the Federal Republic of Germany (SE Queensland).
Dr. Torsten Reiners*

Senior Lecturer in Logistics and Supply Chain Management at the Curtin University, Australia

Dr Torsten Reiners is a project leader on the OLT Grant (2012) “Development of an authentic training environment to support skill acquisition in Logistics & Supply Chain Management” and participated in VirtualPREX (ALTC grant, lead is Sue Gregory). He participated in multiple projects to use 3D spaces for learning support; i.e. to improve the authenticity of learning in classes about production and simulation as well as developing a theoretical framework for authentic and immersive education with gamified elements. Recent research interests include disruptive technology in the supply chain, the relation of deception and sustainability on the impact on consumer, event studies on the impact of sustainability practice implementations, and big data analytics. The over 100 publications include published journal articles in reputable journals; i.e. European Journal of Operation Research, International Journal of Production Economics, Journal of Business Research, International Journal of Logistics Research and Applications, and Transportation Research Part E: Logistics and Transportation Review.

*Especially for participants who are taking part in ISST and ISICO 2019
## RUNDOWN

### DAY 1 (July 23, 2019): BUMI SURABAYA HOTEL, SURABAYA

<table>
<thead>
<tr>
<th>TIME (GMT+8)</th>
<th>SESSIONS</th>
<th>ROOM</th>
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</thead>
<tbody>
<tr>
<td>07.30 – 08.00</td>
<td>Registration</td>
<td>Lobby Level</td>
</tr>
<tr>
<td>08.00 – 09.00</td>
<td><strong>Conference Track Presentation of ISST 2019 (classrooms) Session 1</strong></td>
<td>Track 1: Trowulan 2 Room Track 2: Gajahmada Room Track 3: Trowulan 3 Room Track 4: Wijaya Room Track 5: Airlangga Room Track 6: Trowulan 1 Track 8: Tribuana Room</td>
</tr>
<tr>
<td></td>
<td>Track 1: Environmental Engineering</td>
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<td>Track 2: Chemical Engineering</td>
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<td></td>
<td>Track 3: Civil Engineering, Geomatics, Material and Metallurgical</td>
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<td>Track 4: Architectural Engineering</td>
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<td>Track 5: Chemistry</td>
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<td>Track 6: Physics, Physics Engineering</td>
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<td></td>
<td>Track 8: Marine Systems Engineering, Marine Engineering</td>
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<td>09.00 – 09.20</td>
<td>Opening Ceremony*)</td>
<td>Isyana Ballroom</td>
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<td>Together with Opening Ceremony of ISICO 2019 (<a href="http://isico.info">http://isico.info</a>)</td>
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<tr>
<td>09.20 – 09.30</td>
<td>Performance</td>
<td>Isyana Ballroom</td>
</tr>
<tr>
<td>09.30 – 12.00</td>
<td><strong>Keynote Speaker:</strong></td>
<td>Isyana Ballroom</td>
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<tr>
<td></td>
<td>1. Prof. Hyerim Bae, PhD, Professor in the Industrial Engineering</td>
<td></td>
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<td></td>
<td>Department at Pusan National University (PNU), Korea</td>
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<tr>
<td></td>
<td>2. Prof. Robert M. Davison, Professor of Information Systems, City</td>
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<td></td>
<td>University of Hong Kong</td>
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<tr>
<td>12.00 – 13.00</td>
<td>Lunch Break &amp; Networking</td>
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<td>13.00 – 15.30</td>
<td><strong>Conference Track Presentation of ISST 2019 (classrooms) Session 2</strong></td>
<td>Track 1: Trowulan 2 Room</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>Location</td>
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<tr>
<td>15.30 – 16.30</td>
<td>Closing Ceremony* )</td>
<td>Isyana Ballroom</td>
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<tr>
<td></td>
<td>Notification and announcement of Best Presenter of ISST 2019 - Awarded for 3 Presenters</td>
<td></td>
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**Notes:** For other hospitality in regard with
- **Infirmary Room** (medical assistance)
- **(Moslem) Praying Room**

**Please contact:** Secretariat at Registration desk of ISST 2019 or Fathiya Hasyifah Sibarani (Fathiya) mobile phone +62 822-8826-5028
VENUE MAPS
## PRESENTATION SCHEDULE

### Tuesday, 23 July 2019

**Trowulan 2 Room**  
**TRACK 1: Environmental Engineering**

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<th>No</th>
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<th>ID</th>
<th>Paper Title</th>
<th>Author(s)</th>
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<tbody>
<tr>
<td>1</td>
<td>08.00 - 08.12 (Session I)</td>
<td>13</td>
<td>Range Finding Phytotoxicity Test of Lead to Mangrove Plants of Rhizophora mucronata</td>
<td>Lina Hanarisanty, Harmin Sulistiyaning Titah</td>
</tr>
<tr>
<td>2</td>
<td>08.12 - 08.24 (Session I)</td>
<td>15</td>
<td>Ensuring Water Availability in Surabaya Through Integrated Water Resources Management Implementation</td>
<td>Murti S. Amalia, Eddy S. Soedjono</td>
</tr>
<tr>
<td>3</td>
<td>08.24 - 08.36 (Session I)</td>
<td>34</td>
<td>Leachate Production Analysis and Arrangement of Gas Vent Pipelines in Ex-Landfill Sarbagita’s Regional Landfill</td>
<td>Putu Ari Gayatri, Ellina Pandebesie</td>
</tr>
<tr>
<td>4</td>
<td>08.36 - 08.48 (Session I)</td>
<td>38</td>
<td>Study of Septage Treatment Plant Necessity in Urban Areas, Blitar Regency</td>
<td>Yeni Pratiwi, Ipung Fitri Purwanti, Joni Hermana</td>
</tr>
<tr>
<td>5</td>
<td>08.48 - 09.00 (Session I)</td>
<td>44</td>
<td>Aeration - Advanced Filtration (AAF) Treatment for Reducing Iron and Chloride in Natural Groundwater</td>
<td>Nur Aini Febriyana, Ali Masduqi</td>
</tr>
<tr>
<td>6</td>
<td>13.00 - 13.12 (Session II)</td>
<td>45</td>
<td>Land Stability at the Final Closing of Waste Final Disposal (TPA) Supit Urang in Malang City</td>
<td>Yustika Aristya Widyasari, I.D.A.A Warmadewanthi</td>
</tr>
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<td>8</td>
<td>13.24 - 13.36 (Session II)</td>
<td>72</td>
<td>Study of Economic Waste Exchange in Batam City</td>
<td>Yuvita Siswanti, Wahyono Hadi</td>
</tr>
<tr>
<td>No</td>
<td>Time</td>
<td>ID</td>
<td>Paper Title</td>
<td>Author(s)</td>
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<td>1</td>
<td>08.00 - 08.12</td>
<td>3</td>
<td>Optimization Using Solvent-Free Microwave Hydro-diffusion Gravity Extraction of Onion Oil from Allium cepa by Response Surface Methodology</td>
<td>Yeni VARIYANA, Mahfud Mahfud</td>
</tr>
<tr>
<td>2</td>
<td>08.12 - 08.24</td>
<td>6</td>
<td>Study of UV-B Mutation Effect on pH Resistance and Lipid Production of Microalgae Botryococcus braunii</td>
<td>Thea Prastiwi Soedarmodjo, Fanina Aulia Rachma, Hakun Wirawawista Aparamarta, Arief Widjaja</td>
</tr>
<tr>
<td>3</td>
<td>08.24 - 08.36</td>
<td>22</td>
<td>Erosion Rate Prediction on The Cyclones Wall at Coal Boiler Plant Using Computational Fluid Dynamics</td>
<td>Brario Anindito, Tantular Nurtono, Sugeng Winardi</td>
</tr>
<tr>
<td>4</td>
<td>08.36 - 08.48</td>
<td>23</td>
<td>Electrospraying Micronization of Phytochemical Compounds Extract from Eucheuma cottonii</td>
<td>Dwi Setyorini, Siti Machmudah, Sugeng Winardi, Kusdianto, Wahyudiono, Hideki Kanda, Monotobu Goto</td>
</tr>
<tr>
<td>5</td>
<td>08.48 - 09.00 (Session I)</td>
<td>24</td>
<td>Reducing Sugar Production in Subcritical Water and Enzymatic Hydrolysis using Plackett-Burman Design and Response Surface Methodology</td>
<td>Maktum Muharja, Irfan Albana, Jayyid Zuhdan, Agra Bachtir, Arief Widjaja</td>
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<tr>
<td>6</td>
<td>13.00 - 13.12 (Session II)</td>
<td>26</td>
<td>Study of Extraction Calophyllum inophyllum L using Microwave Hydrodiffusion Gravity And Chemical Extraction method</td>
<td>Lailatul Qadariyah, Mahfud Mahfud, Raka Selaksma Charisma M</td>
</tr>
<tr>
<td>8</td>
<td>13.24 - 13.36 (Session II)</td>
<td>28</td>
<td>Study of Hydrodynamics and Overall Gas Hold Up Validation in Bubble Column By Computational Fluid Dynamics (CFD)</td>
<td>Yukh Ihsana, Sugeng Winardi, Tantular Nurtono</td>
</tr>
<tr>
<td>10</td>
<td>13.48 - 14.00 (Session II)</td>
<td>32</td>
<td>Effect of Dilute Acid Pretreatment of Vegetable Waste on Sugar Production and Inhibitor Formation</td>
<td>Denistira Fazlur Rahman, Hakun Wirawasista Aparamarta, Arief Widjaja</td>
</tr>
<tr>
<td>11</td>
<td>14.00 - 14.12 (Session II)</td>
<td>49</td>
<td>Preliminary Study of Binahong (Anredera cordifolia (Ten.) Steenis) Medicinal Plant Extract as a Glucose Biosensor</td>
<td>Dennis Farina Nury, Tri Widjaja, Fredy Kurniawan</td>
</tr>
<tr>
<td>12</td>
<td>14.12 - 14.24 (Session II)</td>
<td>59</td>
<td>A Mathematical Modelling of a Rotary Cement Kilns</td>
<td>Serlya Aldina, Juwari Purwo Sutikno, Renanto Handogo</td>
</tr>
<tr>
<td>13</td>
<td>14.24 - 14.36</td>
<td>64</td>
<td>Kinetics study of cellulose</td>
<td>Christian J Wijaya, Suryadi</td>
</tr>
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</table>
(Session II) nanocrystals modification using rarasaponins by Elovich equation

Trowulan III Room
TRACK 3: Civil Engineering, Geomathics, Material and Metallurgical

<table>
<thead>
<tr>
<th>No</th>
<th>Time</th>
<th>ID</th>
<th>Paper Title</th>
<th>Author(s)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>08.00 - 08.12</td>
<td>2</td>
<td>Fluid-Soil-Structure Interaction Phenomena on Vibration Case at Pump Station Building</td>
<td>Hendri Hermawan, Data Iranata, Djoko Irawan</td>
</tr>
<tr>
<td>2</td>
<td>08.12 - 08.24</td>
<td>21</td>
<td>Strategy Analysis to Improve Consultant Qualification In Surabaya</td>
<td>Faris Afif Octavio, I Putu Artama Wiguna</td>
</tr>
<tr>
<td>3</td>
<td>08.24 - 08.36</td>
<td>35</td>
<td>Analysis of Creep Test Mixture of Asphalt Concrete Using Fly Ash for Runway Pavement</td>
<td>Anwar Efendy, Ervina Ahyudanari</td>
</tr>
<tr>
<td>4</td>
<td>08.36 - 08.48</td>
<td>50</td>
<td>Analysis of Stiffness Modulus of Asphalt Concrete Mixture by Using Artificial Aggregates</td>
<td>Gusti Made Bagus Baskara, Ervina Ahyudanani, I Nyoman Arya Thanaya</td>
</tr>
<tr>
<td>5</td>
<td>08.48 - 09.00</td>
<td>60</td>
<td>The Study of the Usage of Vacuum Preloading Method in the Construction Project of Palembang - Indralaya Toll road</td>
<td>Laili Ervianty, Hary Christady, Suryo Utomo</td>
</tr>
<tr>
<td>6</td>
<td>13.00 -13.12</td>
<td>61</td>
<td>Analysis the use of artificial aggregates as a substitute of coarse aggregates for surface of flexible pavement on optimum bitumen content</td>
<td>Mirza Al Mahbubi, Ervina Ahyudanari</td>
</tr>
<tr>
<td>7</td>
<td>13.12 - 13.24</td>
<td>66</td>
<td>Investigation of Water Absorption For Concrete Using Supplementary Materials</td>
<td>Gabriel Jose Posenti Ghewa, Priyo Suprobo, Djoko Irawan</td>
</tr>
<tr>
<td>8</td>
<td>13.24 -13.36</td>
<td>71</td>
<td>Analysis of Creep Test Mixture of Asphalt Concrete Using Fly Ash for Runway</td>
<td>Ervina Ahyudanari, Anwar Efendy</td>
</tr>
<tr>
<td>No</td>
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<tr>
<td>9</td>
<td>13.36 - 13.48</td>
<td>11</td>
<td>Analysis Cid Volcanic Earthquake in the Sunda Strait Due to the Eruption of Anak Gunung Krakatau</td>
<td>Atika Sari, Mokhamad Nur Cahyadi</td>
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<tr>
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<td>(Session II)</td>
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ABSTRACT

**TRACK: Environmental Engineering**

**Paper ID: 13**

**RANGE FINDING PHYTOTOXICITY TEST OF LEAD TO MANGROVE PLANTS OF RHIZOPHORA MUCRONATA**  
*Lina Hanarisanty*, Harmin Sulistiyaning Titah  
linarisanty17@gmail.com

Pollution of heavy metals can occurred in river and estuary area. Lead (Pb) was one type of heavy metals that was found in river and estuary area. Pb was one of the conservative heavy metals and Pb can be toxic to human being, animals and plants. The aim of this study was to determine the survival of mangrove of Rhizophora mucronata against the Pb in range finding phytotoxicity test with various concentration of Pb. Pb in various of concentration were exposured to Rhizophora mucronata for 7 days. Variations of Pb concentrations were 0 mg/L as control, 50 mg/L, 100 mg/L, 300 mg/L, 500 mg/L, and 700 mg/L. The physical observation was conducted during the range finding phytotoxicity test. The results showed that the Rhizophora mucronata was able to survive with Pb concentration of 100 mg/L. While the concentration of mortality (LC50) was at a concentration of 367.58 mg Pb /L. The death effects can be caused that the plants can absorb/accumulate contaminants in their bodies. In conclusion Rhizophora mucronata can survive at 100 mg/L Pb concentration.  
**Keywords**: heavy metals, mangrove, range finding test, phytotoxicity, pollution

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**Paper ID: 15**

**ENSURING WATER AVAILABILITY IN SURABAYA THROUGH INTEGRATED WATER RESOURCES MANAGEMENT IMPLEMENTATION**  
*Murti S. Amalia*, Eddy S. Soedjono  
murtisaramalia@gmail.com

Surabaya is inhabited by 3.074.883 lives with majority drinking water comes from local water company (97%). It uses raw water from Surabaya River that is located in the downstream of Brantas River Basin. The streamflow is smaller than upstream because it is used by another water user. Moreover, the pollution load is accumulated so that the degree of treatment is complicated. Brantas River Basin management is needed to ensure water availability, especially in Surabaya. It can be achieved with the implementation of integrated water resources management (IWRM). A survey using in-depth interview (IDI) were conducted to management agency of Brantas River Basin called Jasa Tirta 1 Public Company (Perum Jasa Tirta 1). It will be compared with the principle of IWRM to assess the state of implementation on the Brantas River Basin. The result shows that the management pattern corresponding with IWRM, except for the mitigation of climate change. Climate change influences water availability and sustainability. An important factor in ensuring water availability in Surabaya is the adoption of effective water management. Even though the implementation of IWRM is not complete yet, it can be achieved by making water supply and demand effectively.
**Program Book: The 5th International Seminar On Science & Technology 2019 (ISST2019)**

July, 23rd 2019 - Hotel Bumi, Surabaya - Indonesia

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**Keywords**: Surabaya, water availability, Brantas River Basin, management pattern, IWRM, mitigation of climate change;

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**Paper ID: 34**

**LEACHATE PRODUCTION ANALYSIS AND ARRANGEMENT OF GAS VENT PIPELINES IN EX-LANDFILL SARBAGITA’S REGIONAL LANDFILL**

*Putu Ari Gayatri*, Ellina Pandebesie  
Gayatri.PutuAri@gmail.com

Sarbagita Regional Landfill is a regional landfill which is located in Denpasar. At this time, there were closure and landfill arrangement in Sarbagita Regional Landfill. Utilization of ex-landfill land used as green open space requires leachate and gas handling as a result of the process waste decomposition is still ongoing. Analysis of gas and leachate potential is needed for further management so that the surrounding environment is not polluted. Analysis of potential gas generation using triangular method and analysis of leachate generation potential using Thornwaite method. The maximum gas production occurs in 2023 at 43,367,678,25 m³/year. Gas production gradually declined until it’s estimated to run out in 2034. The number of gas pipe points needed is 19 points. Treatment methods that can be considered are the gas conversion to electricity method and the flaring method. The results of the calculation from leachate potential is 3.84 liters/second. The result will be used to planning leachate processing installation. Processing system through 4 processing stages, namely processing in anaerobic ponds, facultative ponds, aerobic ponds and biofilter ponds. Besides considering the technical aspects of technology selection, also must be considered the capability / commitment of the Regional Government as the manager.

**Keywords**: Gas, leachate, thornwaite, triangular method;

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**Paper ID: 38**

**STUDY OF SEPTAGE TREATMENT PLANT NECESSITY IN URBAN AREAS, BLITAR REGENCY**

*Yeni Pratiwi*, Ipung Fitri Purwanti, Joni Hermana  
pratiwiyeni89@gmail.com

Blitar is one of regencies in Indonesia which doesn’t have Septage Treatment Plant (STP). The high coverage of on-site wastewater system access, as well as routine desludging needs in the Decentralized Wastewater Treatment Plant (DWWTP), required further processing of septage in the form of STP. However, almost 90% of STP in Indonesia didn’t work properly due to inappropriate effluent quality and inadequate operational and maintenance costs. This study referred to the current conditions of domestic wastewater management obtained from interviews and questionnaires to identify the real needs of establishing STP efficiently and sustainably. Furthermore, this paper was contained the analysis of STP capacity, site selection, sludge treatment units, land requirements, capital costs, operational and maintenance costs. By considering the existing desludging activity, the capacity of STP in 2019 was 19,30 m³/day. Whereas the capacity of STP at the end of the 20-year design period was 45,48 m³/day. Although the location of the service area was spread out, the location of STP was selected centrally in one
location, namely Sutojayan Sub-District with the highest score, because of more efficient according to the factors of land necessity, capital cost, operational and maintenance costs. The total land requirement of the STP was 2354,06 m2. The capital cost in 2018 as the initial year was IDR 6.405.647.000, while the operational and maintenance costs were IDR 241.324/ day. The basic service tariff charged to the community was IDR 190.183/ septic tank.

**Keywords**: capacity, land requirement, capital cost, operational and maintenance costs, efficiency

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**Paper ID: 44**

**AERATION - ADVANCED FILTRATION (AAF) TREATMENT FOR REDUCING IRON AND CHLORIDE IN NATURAL GROUNDWATER**

*Nur Aini Febriyana*, Ali Masduqi

nurainifebriyana@gmail.com

Drinking water needs of rural communities generally still depend on natural water sources. Communities in rural areas usually be using groundwater for their daily needed. Water Supply System (SPAM) in Sampang Regency has groundwater problems used in iron, and chloride parameters that have not met the quality standard PERMENKES No. 492 of 2010. Based on these problems, it is necessary to conduct research and study on drinking water treatment. Research method for water treatment, one of the systems in drinking water treatment with diffused aeration as pretreatment for the reduction of iron, and followed by filtration processing. Filtration is carried out in stages with advanced filter of uplow continuous discharge. Filter media used with anion-cation resin, activated carbon and micromembrane to remove dissolved ions. The results of aeration and filtration processing (AAF) then analyzed the water quality so that it reached aeration micromembrane and resins with Cl-removal of 98,39%, TDS allowance 97,394% and allowance for ferrum 97.41%.

**Keywords**: Advance Filtration, Aeration, Natural Groundwater, Treatment

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**Paper ID: 45**

**LAND STABILITY AT THE FINAL CLOSING OF WASTE FINAL DISPOSAL (TPA) SUPIT URANG IN MALANG CITY**

*Yustika Aristya Widyasari*, I.D.A.A Warmadewanthi

awe.yustika@gmail.com

Amount of waste that enters waste final disposal (TPA) Supit Urang is 833.625 m3/day, with a gradual pile pattern up to ± 15 meters. From 2018 until 2020, new cell was being established. On 13th July 2018, landslide hit the active cell area so that it was necessary to close the landfill zone at the TPA. Based on this background, it is necessary to calculate the landfill stability in landfill management until the new cell is done. The stability calculation also anticipates the subgrade strength and remaining waste cell capacity. Research method was carried out by observing the amount of incoming waste, characteristics of waste at the TPA, topography measurement and the results of observations of subgrade strength. In determining the calculation of land stability analysis, Geo 5 program was used. For technical data, topographic measurement was conducted directly at the TPA and compared with existing topography obtained from secondary data. Based on the topography result, it will be determined the contour slice in the field and a total slice of
landfill plan. The result of this study shows that the landfill stability depends on subgrade type and landfill structuring at the TPA.

**Keywords**: landfill stability, TPA, waste management

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**Paper ID: 51**

**SYNTHESIS COMPOSITE TIO2/ZEOLITE-A FOR REMOVAL METHYLENE BLUE ON DIRECT SUNLIGHT**

Yasokhi Fatkhasari*, Nafiah Afuw Rouf, Wahida Annisa Ermadayanti, Randy Yusuf Kurniawan, Arseto Yeki Bagastyo

yasokhiftkh@gmail.com

Wastewater generated from textile industry contains azo dye, (e.g., methylene blue), which is inefficient to decompose by using biological processes, and generally requires long treatment time. TiO2 is the most widely used adsorbent for the industrial applications and the photocatalytic degradation of various azo dyes in textile wastewater. Its anatase is the most effective and widely used photocatalyst, however the wide band gap of TiO2 has limited its widespread application in industry since it needs to be excited by ultraviolet (UV) light. In order to overcome this issue, combination of adsorbent zeolite and TiO2 into the composite was used in this study so that TiO2 can adsorb methylene blue under direct sunlight. A composition of 1 g TiO2 and 1 g Zeolite composite were used in batch method to eliminate different methylene blue concentrations, i.e., 25; 50; 75; 100; 125; 150; 200; and 250 ppm by means of adsorption process under direct sunlight. The experimental result showed that the addition of zeolite was able to considerably improve the adsorption capacity of TiO2 on direct sunlight in the range of 97.2 – 99.3 % of methylene blue removal. The highest removal was observed in the case of lower concentrations of methylene blue, i.e., in the range of 25-50 ppm.

**Keywords**: Azo dye, Direct Sunlight, TiO2/Zeolite-A

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**Paper ID: 72**

**STUDY OF ECONOMIC WASTE EXCHANGE IN BATAM CITY**

Yuvita Dian S*, Wahyono Hadi

yuvita.dian@yahoo.com

Waste exchange is a profitable concept both in terms of environment and efficiency to an industry. This activity, besides aiming to retrieve relatively cheap raw materials, can be used for monitoring of transactions and waste traffic demanded too. So they have a security guarantee and does not have an impact on the environment. The purpose of this study are to determine the potential of various types of waste in Batam and determine the influence of formation waste exchange. The method in this study was through in depth interviews and consulting. After that it will be carried out an analysis using an AHP method. The results are that waste from industrial activities both in the category of household and B3 waste still has the potential to be reused as raw material and recycled. Total of economic value waste transactions in the city of Batam are Rp. 97,841,280,000. Based on analysis using Expert Choice software 11. the priority of consideration in the formation of waste exchanges in Batam City with agency respondents are economic factors (0.324) and the lowest priority factor is organizational governance (1.171). For
respondents who use waste, the availability factor of technology has a high priority (0.431) and the waste characteristic factor has the lowest one (0.200).

**Keywords**: Waste Exchange, AHP Method, Batam City, Expert Choice Software

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**Paper ID: 74**

**ESTIMATION OF POLLUTANT SOURCES OF PM$_{2.5}$ AND PM$_{10}$ IN WARU, SIDOARJO, EAST JAVA**

*Gita Pati Humairoh*, Arie Dipareza Syafei  
gita.pati.humairoh@gmail.com

Air pollution have a very detrimental effect, not only for humans but also impact on the ecosystem of animals and plants. In this study, we will examine air pollution in March 2019 around Waru, Sidoarjo, East Java sub-district through research on air particulate concentrations with the size of PM$_{2.5}$ and PM$_{10}$. This study aims to determine the estimation of the origin of pollution around the Waru District, Sidoarjo, East Java so that can be used as a scientific reference as a step to make the right decisions and policies in overcoming the effects of pollution. The data processing method in this study is with use the Conditional Probability Function (CPF) method to find out the estimated source the origin of pollution is based on meteorological data (wind direction and speed). The highest measurement results obtained at PM$_{2.5}$ concentration was 24.13 μg/m$^3$ still fulfilling the daily quality standards set by Government Regulations No. 41/1999 and WHO, whereas at PM$_{10}$ concentration was 66.53 μg/m$^3$ still met the daily quality standards has been established Government Regulations No. 41/1999 but has exceeded the quality standards set by WHO. While the results of the analysis of the CPF Method are obtained from the original source pollutants for PM$_{2.5}$ come from vehicle activities on the highway, while the source of pollutants for PM$_{10}$ comes from industrial activities.

**Keywords**: Air Particles, PM$_{2.5}$, PM$_{10}$, CPF

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**Paper ID: 75**

**DEVELOPMENT OF DRINKING WATER SUPPLY SERVICE IN PURWOREJO DISTRICT**

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Domestic Water Company (PDAM) in Purworejo District is a responsible institution in serving and fulfilling the need of clean water for the local people in Purworejo. The current service coverage of the Domestic Water Company in Purworejo was 52.60%. This branch unit in Purworejo had served 14 urban villages and had 5 planned development villages. However, out of 19 urban villages, the clean water distribution network system was not evenly distributed to customers and the amount of water loss was quite high. To overcome these problems, it was necessary to do an analysis and development plan for the clean water distribution network system. The application used to analyze the existing conditions and the development was the Epanet 2.0 application. The results of the existing condition analysis showed that running was not successful. The planning period will be carried out in 2018 until 2037 which is divided into 2 stages, namely year (2018-2027) and year (2028-2037). The planning was done by calculating projections of the population and public facilities to determine water requirements. The results of the development plan analysis showed that there were 2 additional blocks in stage 2 so that the total blocks formed were 24 blocks. The pipeline repairs carried out are also divided into stages, namely in
The efforts to increase the waste reduction through the development of waste banks in South Surabaya

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Waste Bank is one of the government’s efforts in reducing the inorganic waste by involving the role of the community in sorting out the waste. In 2016, Surabaya had 240 waste bank units. The effort to reduce waste through the Waste Bank in Surabaya was still relatively small at 0.55 tons/day. The waste reduction through the Waste Bank needed to be improved so as to reduce the load of garbage accumulation in the landfill site. Currently, South Surabaya has 60 Waste Banks, however only very few of those Waste Bank units are still operating. Therefore, this research was conducted to determine the potential for waste reduction that could be done through the development of a Waste Bank in South Surabaya. The STELLA 9.1.3 dynamic program was used to predict the potential waste reduction through the development of a Waste Bank in the next 3 years. The results showed that the waste reduction through the Waste Bank in the next 3 years was 257,978.30 kg/month.

Keywords: community participation, reduction, system dynamic, waste bank

The feasibility study of the drinking water supply at Grand Dharmahusada Lagoon apartment of Surabaya

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The city of Surabaya has become the most targeted city for developers to set up apartments. Many residents outside Surabaya want to live in Surabaya because of their work or business. No wonder the number of water needs in Surabaya is increasing. The Grand Dharmahusada Lagoon apartment is the location to be studied for the feasibility of developing a ready-to-drink system. There are three alternatives offered to provide ar ready to drink, namely (1). Everything that comes out of the apartment faucet is ready to drink water; (2) ready-to-drink water only in kitchen units of apartment units; and (3) ready-to-drink water is provided by the apartment for each unit in the form of Gallon packaging. From the results of a comparison of the water quality test of PDAM Kota Surabaya with the quality standards of bottled drinking water, several parameters were obtained which still exceeded the applicable quality standards. The technology used to treat PDAM water into ready-to-drink water is to use Ultrafiltration, Carbon Filter and Ozone.

Keywords: Apartment, Drinking Water, Drinking Water Technology
OPTIMIZATION USING SOLVENT-FREE MICROWAVE HYDRO-DIFFUSION GRAVITY EXTRACTION OF ONION OIL FROM ALLIUM CEPA BY RESPONSE SURFACE METHODOLOGY

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Abstract—Extraction from Allium cepa using solvent-free microwave extraction (SFME) was chosen as a method in the extraction process. The method is combined with microwave hydro-diffusion gravity (MHG) technique. In this paper, onion oil was extracted from Allium cepa using solvent-free microwave and hydro-diffusion gravity extraction which is as an alternative technique to produce onion oil and it has several advantages in terms of product quality and quantity. Furthermore, response surface methodology (RSM) was designed to evaluate the single factor and interaction effects of mass of raw material (g), microwave power (W) and extraction time (min) for optimization from experimental data. The highest yield was obtained from this research at 100 g, 450 W and 15 min is 2.5875%. Response surface methodology gave the optimum condition at 99.738 g, 465.067 W, and 17.817 min is 2.677%. The error rates between the experimental and predicted model which are less than 5% indicate that values obtained in optimal conditions correspond to theoretical values and it can be used as a reference for optimizing.

Keywords: Allium cepa, SFME, MHG, onion oil, yield, RSM, optimal conditions

STUDY OF UV-B MUTATION EFFECT ON PH RESISTANCE AND LIPID PRODUCTION OF MICROALGAE BOTRYOCOCUS BRAUNII

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Microalgae Botryococcus braunii is a potential biodiesel producer as an alternative for fossil fuels due to its high lipid content. UV-B mutations were carried out to see the effect in microalgae growth at various pHs (3-8). Reduction of nitrogen levels was carried out to see the effect on the growth and lipid production of microalgae. UV-B mutation increased the ability of growth and resistance of B. braunii against low pH. Under low nitrogen conditions, the growth of B. braunii cells would not continue for a longer time. B. braunii which grow in nitrogen depletion medium produced lipid content greater than normal nitrogen. UV-B light mutation also increased the lipid content of B. braunii. At 7 days of incubation, the mutation not only increased lipid content, but also significantly increased the TAG content of B. braunii lipids.
EROSION RATE PREDICTION ON THE CYCLONES WALL AT COAL BOILER PLANT USING COMPUTATIONAL FLUID DYNAMICS

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In the coal boiler industry, cyclone is used to separate silica sands (as a fluidizing medium) from combustion gas from furnace. A gas-solid separation system with turbulent swirling flow that occurs in the cyclone will cause erosion on the cyclone wall. Erosion can cause a decrease the performance and increase the maintenance cost of cyclone. CFD simulation was conducted on actual cyclone dimensions used in the coal boiler industry with a diameter of 5120 mm and height of 13970 mm. It was performed using the Reynolds Stress Model (RSM) for turbulence flow in the gas phase and Oka model for the erosion model. The inlet velocities ranged from 7 to 8 m/s and the solid rates ranged from 30 to 40 kg/s with silica sands as solid particles (diameter between 0.075 and 1.5 mm). This study will analyze the erosion rate on the cyclone wall at various gas inlet velocity and solid rate variations. at Selected local area , the results shown that the higher gas inlet velocity for the same solid rate will increase the erosion rate (about 25%) and the higher solid rate for the same velocity will also increase erosion rate on the cyclone wall (about 18%).

Keywords: Apartment, Drinking Water, Drinking Water Technology

ELECTROSPRAYING MICRONIZATION OF PHYTOCHEMICAL COMPOUNDS EXTRACT FROM EUCHEUMA COTTONII

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Aside from being a raw material for agar, Eucheuma cottonii algae have many other benefits because they contain various phytochemical compounds. The phytochemical compounds in Eucheuma cottonii have many benefits in the industrial and pharmaceutical fields. A method to get phytochemical compounds is through the extraction process. In the traditional method, the extraction is using organic solvents that dangerous to the environment. Therefore, this study used an environmentally friendly hydrothermal extraction method. Extraction was carried out at 1600°C and a pressure of 7 MPa. The extraction results were then micronized using electrosparying. The electrospaying process was carried out with precursor solution concentration of 4 and 6% w/v, the applied voltage of 12, 14 and 16 kV, and the distance between the tip and collector of 6.8 and 10 cm. The particles produced was characterized by Scanning Electron Microscope (SEM), Thermal Gravimetry Analysis (TGA), and antioxidant efficiency (AE) analysis. The morphological form of particles were spheres with a diameter below 3 μm. The
largest AE value was 0.1818 obtained at operating conditions of 6% precursor solution, 10 cm tip distance, 16 kV applied voltage. The Operating conditions did not affect the TGA results.

**Keywords:** eucheuma cottonii, hydrothermal, electrospaying

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**Paper ID: 24**

**REDUCING SUGAR PRODUCTION IN SUBCRITICAL WATER AND ENZYMATIC HYDROLYSIS USING PLACKETT-BURMAN DESIGN AND RESPONSE SURFACE METHODOLOGY**

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Subcritical water is one method of hydrolysis that can convert coconut husk to produce reducing sugars. However, this method has the disadvantage of producing derivative products such as furfural and phenolic compounds that act as inhibitors. One effective method is the addition of additives to the subcritical water process. The purpose of this study was to determine the effect of adding additives to subcritical water processes and optimizing the operating conditions on the production of reducing sugars. The analysis of reducing sugar was conducted by the dinitrosalicylic acid (DNS) method. Variables used in this study were time, temperature, pressure, water volume, pH, and several types of additives. Plackett-Burman was used for screening significant factors for the production of reducing sugars. The three most affecting factors were further investigated to find out the optimum point using Response Surface Methodology (RSM). The optimum point for subcritical water pretreatment operating conditions was the addition of sodium dodecyl sulfate (SDS) of 0.24 grams, reaction time for 80 minutes, and pH 11 yielding a reducing sugar yield of 22.7%, energy use of 291.3 kJ/g with desirability of 85%. Furfural content of all liquids after pretreatment was neglected (<2 ppm) because of the effect of surfactant.

**Keywords:** coconut husk, plackett-burman, response surface methodology, reducing sugar, and subcritical water

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**Paper ID: 26**

**STUDY OF EXTRACTION CALOPHYLLUM INOPHYLLUM L USING MICROWAVE HYDRODIFFUSION GRAVITY AND CHEMICAL EXTRACTION METHOD**

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In this study, the oil extraction of Calophyllum inophyllum L using microwave hydro-diffusion gravity method and chemical extraction method were elaborated. MHG method new green technique combining microwave assisted technology and gravitation is used to produce oil yield faster and low cost. In comparison, a conventional method to extract is a chemical extraction method. Raw material pre-treatment, extraction time, microwave power, and the material size have become a crucial factor of extraction. In general, Microwave Hydro-diffusion Gravity method gives a higher yield than that of the chemical extraction method. MHG method is a simple method, less solvent, and faster extraction time, and higher oil yield.

**Keywords:** Calophyllum inophyllum L; chemical extraction method; microwave hydrodiffusion gravity method I.
DEGRADATION OF HYDROGEN SULFIDE IN STILLAGE AS ETHANOL INDUSTRIAL WASTE BY ACIDITHIOBACILLUS THIOOXIDANS AND PSEUDOMONAS PUTIDA WITH AEROBIC BIOFILTRATION METHOD IN BIOREACTOR
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Stillage or vinasse is a by-product or waste from the fermentation-distillation process of the bioethanol industry. Stillage is the bottom product of the ideal distillation column. Stillage has a high sulfur content. In this waste, the sulfur content was 1680 mg/L. This liquid waste is dangerous if it discharges directly into the environment without pretreatment. For this reason, pretreatment is needed to reduce the sulfur concentration of liquid waste (stillage) using biofiltration method. The objective of this research is to eliminate the content of H2S or sulfur in the wastewater of the bioethanol industry (stillage) by using aerobic bacteria such as Acidithiobacillus thiooxidans dan Pseudomonas putida. The method of this experimental work used biofiltration which are attached on wood chips by aerobic bacterial to form biofilms in the reactor. The process in this study was conducted in two steps. The first step was carried out by sulfur oxidizing bacteria such as A.thiooxidans and P. putida with a concentration of 10% and 20% (v/v) that growth on packing to form biofilms in the reactor for 13 days. Furthermore, as the second step the bacteria degraded H2S content of liquid waste with attached bacteria on packing for 15 days in biofiltration reactor. From the preliminary results of this study, reactor with 10% (v/v) A. thiooxidans on wood chips packing and 30% (v/v) concentration stillage can degraded H2S from 4.90 mg/L to 2.61 mg/L (46.73% removal efficiency) and for reactor with 20% (v/v) A. thiooxidans can degraded H2S from 4.90 mg/L to 2.43 mg/L (50.41% removal efficiency). Meanwhile, reactor with 10% (v/v) P. putida can degraded H2S from 4.90 mg/L to 2.90 mg/L (40.82% removal efficiency) and for reactor with 20% (v/v) P. putida can degraded H2S from 4.90 mg/L to 2.84 mg/L (42.04% removal efficiency).

Keywords: Acidithiobacillus thiooxidans, Biofiltration, Pseudomonas putida, Stillage, Wood Chips

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STUDY OF HYDRODYNAMICS AND OVERALL GAS HOLD UP VALIDATION IN BUBBLE COLUMN BY COMPUTATIONAL FLUID DYNAMICS (CFD)
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The study of overall gas hold up has been carried out experimentally with the bed expansion. The superficial gas velocities used for the experiments are 6.369 m/s and 10.616 m/s. The experiment is carried out in a bubble column with inside diameters of 7 cm and a height of 100 cm. Gas from the gas cylinder is supplied through a distributor consisting of a perforated plate and glass beads. The perforated plate has a hole diameter of 1 mm and 0.5 mm. Computational Fluid Dynamic (CFD) using a Eulerian coupled with Population Balance model is developed to predict overall gas hold up, and bubble size distribution. The effect of superficial gas velocity, perforated plate diameter, gas properties, and initial liquid level on gas hold up will be studied. The used of population balance can improve the overall gas hold up results significantly compared to constant bubble diameter. It is found that there are several operating conditions that affect overall gas hold up, namely initial liquid level, superficial gas velocity, and differences in gas properties. While the influence of the difference in perforated plate diameter to overall gas hold up results is small compared to the influence of other operating conditions.

**Keywords**: CFD; bubble column; gas hold up; perforated plate distributor; population balance

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**Paper ID: 30**

**PRELIMINARY STUDY OF REDUCING SUGAR PRODUCTION FROM COCONUT HUSK BY ENZYMATIC HYDROLYSIS USING CHITOSAN IMMobilIZED CRude AND COMMERCIAL CELLULASE**

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The objective of this research was to study the production of sugar from coconut husk using immobilized crude and commercial cellulase, including temperature and mixing speed during immobilization. The enzyme from Aspergillus niger were immobilized on chitosan alone and chitosan cross-linked with Glutaric dialdehyde (GDA). Coconut husk waste was grinded and chemically pretreated using NaOH 1% (w/v). Fourier Transform Infrared Spectroscopy (FT-IR) measurement revealed that the enzyme was covalently bonded to the support. Cellulase immobilized on chitosan cross-linked with GDA produced more sugar than immobilized on chitosan alone. Both the crude and commercial enzyme had their yield decreased after immobilization. In spite of its less enzyme coupled on micro-sized chitosan, reducing sugar yielded by immobilized enzyme on micro-sized chitosan had competitive result with macro-sized chitosan. This may due to decreasing of mass transfer resistance when using smaller size of chitosan. Several important factors such as temperature, mixing speed and purity of enzyme responsible for performance of sugar produced from insoluble cellulose using cellulase immobilized on insoluble support was thoroughly discussed.

**Keywords**: coconut husk, cellulase, crude, immobilized, reducing sugar
Paper ID: 32
EFFECT OF DILUTE ACID PRETREATMENT OF VEGETABLE WASTE ON SUGAR PRODUCTION AND INHIBITOR FORMATION

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Vegetable waste is an organic waste with high cellulose and hemicellulose and low lignin content. The cellulose and hemicellulose chains can be broken down by pretreatment using sulfuric acid to obtain reducing sugar. To avoid the formation of degradation products that have the potential as inhibitor compounds, the temperature of the pretreatment operation was carried out at 121 °C and 125 °C for 60 min with sulfuric acid concentrations varying from 0.5% to 1.5% (v/v). The solid and liquid ratio (S/L) was 5% (w/v). From the experiments, the highest total reducing sugars of 7.068 g / L was obtained by pretreatment conditions at 121 °C for 60 min with sulfuric acid concentration of 1% (v/v). Meanwhile, the lowest total reducing sugar of 2,764 g/L was produced during the pretreatment operating conditions at 125 °C for 60 min with sulfuric acid concentration of 1.5% (v/v). Under the present experimental condition, it was found that only low level of degradation product was formed which ensure a good performance of bacterial growth in the subsequent fermentation process.

Keywords: dilute sulfuric acid, reducing sugar, inhibitor compounds

Paper ID: 49
PRELIMINARY STUDY OF BINAHONG (ANREDERA CORDIFOLIA (TEN.) STEENIS) MEDICINAL PLANT EXTRACT AS A GLUCOSE BIOSENSOR

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The potential of binahong (Anredera cordifolia (Ten.) Steenis) medicinal plant extract as glucose biosensor have been analyzed using cyclic voltammetry (CV) method. Glucose biosensor was prepared by modified electropolymerization technique of polypyrrole (PPy) to the active materials, such as binahong (Anredera cordifolia (Ten.) Steenis on the surface of gold electrode. Modified pyrrole polymerization was conducted at potential -1.3 to +1.3 V using voltammetry method with sweep rate 50mV/s for 30 cycles at pH 6.8. The performance of the modified sensor was tested in samples: glucose, urea, ascorbic acid and uric acid at the same concentration 10 mM, respectively. All samples were analysed using cyclic voltammetry method from -1.3 to +1.3 V with sweep rate of 50 mV/s in 0.1 M phosphate buffer at neutral condition (pH 7) room temperature. The best response of polypyrrole-binahong (Anredera cordifolia (Ten.) Steenis)-modified gold electrode was obtained during glucose measurement. No response detected from urea, ascorbic acid and uric acid. The result was proved that the modified electrode has a good potential for selective electrochemical sensor in determination of glucose.

Keywords: binahong, biosensor, cyclic voltammetry, glucose, gold electrode, medicinal plant
Paper ID: 59
A MATHEMATICAL MODELLING OF A ROTARY CEMENT KILNS
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Rotary cement kiln is a main equipment in the cement industry that have a complex dynamic behaviour, where any changes will affect to the quality of the product that produced and the consumed energy required. One-dimensional model of rotary kiln is required to understanding of kilns behaviour and improving the kiln operating and design to achieve the optimum condition of product quality and energy required. In this study, one-dimensional mathematical model of dry rotary cement kiln with pulverized coal combustion is developed. This model consists of a set of nonlinear ordinary differential equation and nonlinear algebraic equation that describe material and energy balance equation. The model has been solved numerically by using Matlab R2015a and it has been validated by comparing the result with published experimental data. Based on the result, the steady-state simulation shows that the behavior of the model developed is appropriate with the results presented in the literature. It can be concluded that the model is accurate enough (error < 6%) to describe the profile of temperature and bed composition along the kiln and it can be used for obtaining a better understanding of kilns behaviour and improving the kiln operating and design to achieve the optimum condition.

Keywords: Calcination, Clinker, One-dimensional model, Pulverized coal, Rotary cement kiln

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Paper ID: 64
KINETICS STUDY OF CELLULOSE NANOCRYSTALS MODIFICATION USING RARASAPONINS BY ELOVICH EQUATION
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The modification of cellulose nanocrystals (CNCs) using rarasaponins (RSs) was carried out to enhance the hydrophobicity of the CNCs. The RSs are a natural surfactant that has hydrophilic and hydrophobic sides. The linked RSs on the CNCs surface can be used to bond the hydrophobic drugs so that the modified CNCs can be applied as the hydrophobic drugs carrier in the medical field. The kinetics study was successfully carried out using the Elovich equation as the modelling equation. The Elovich equation fits the modification results well based on two parameters, i.e. the RSs/CNCs ratios and the times. The dispersion characteristics analysis was carried out to figure the enhancement of the hydrophobicity on the modified CNCs compared to the unmodified CNCs. According to the kinetics study and the dispersion characteristics analysis, the modification of CNCs using RSs could be used to enhance the application of CNCs utilization in the hydrophobic drugs delivery system.

Keywords: cellulose nanocrystals, rarasaponins, modification process, Elovich equation, kinetics study
**TRACK: Material and Metallurgical**

**Paper ID: 25**

**The Effect of Gamma Irradiation on HDPE/HA Composite as Candidate Material Dental Implant**

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Hydroxyapatite (HA) Ca$_{10}$(PO$_4$)$_6$(OH)$_2$ is the main component of calcium phosphate-based bone which is most widely used in biomaterial applications because it has non-toxic and biocompatible properties. But if used alone, HA does not have good mechanical strength and is not resistant to pressure. High Density Polyethylene (HDPE) is a high density of synthetic polymers and hydroxyapatite (HA) as important bone components, composites of them will make synthetic bones, with HDPE as matrix and HA as fillers. HDPE/HA composites with a composition variation of 0%, 5%, 10% HA were compacted and heated at 180°C for 90 minutes, and then irradiated at a dose of 60 kGy. The effect of adding HA composition and gamma irradiation was observed by hardness testing and characterized using XRD and FTIR. The results showed that the addition of HA increased the hardness of HDPE. From the XRD and FTIR analysis, there was no change in the composite phase after irradiation.

**Keywords**: HDPE, Hydroxyapatite, Gamma Irradiation

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**TRACK: Chemistry**

**Paper ID: 1**

**SYNTHESIS N-DOPED ACTIVATED CARBON FROM SUGARCANE BAGASSE FOR CO$_2$ ADSORPTION**

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Nitrogen-doped activated carbon (SBACN) was synthesized from sugarcane bagasse waste as a carbon source and urea as nitrogen source through potassium hydroxide (KOH) activation for 2 h at high temperature via two step methods. The synthesized SBCN was characterized using X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM), and Fourier Transform Infrared (FTIR). The results showed that the SBCN has low degree crystallinity and graphitization with highly developed micropores due to synergistik activation effect of KOH and urea. These characteristics provide an important contribution to carbon dioxide adsorption capacity, which can reach up to 11,20% wt and this value is higher than pristine activated carbon. The results indicating that the presence of this nitrogen functionalities is found to have a beneficial influence on the carbon dioxide adsorption characteristic in standard condition and exhibit considerable potential in solid adsorption.
Keywords: Nitrogen-doped nitrogen-doped activated carbon, sugarcane bagasse, KOH and urea activation, CO₂ adsorption


Paper ID: 9

DEVELOPMENT OF ACTIVATED CARBON MATERIAL FROM OIL PALM EMPTY FRUIT BUNCH FOR CO₂ ADSORPTION
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This study aims to determine the CO₂ adsorption capacity of activated carbon doped with nitrogen. Activated carbon is carbonized from oil palm empty fruit bunches (OPEFB). The results of lignocellulose analysis from OPEFB, 42.87 wt% of hemicellulose, 27.31 wt% of lignin, 23.02 wt% of cellulose and 6.80 wt% of ash. Potassium hydroxide is used as an activating agent and urea as a nitrogen precursor with an OPEFB mass: urea is 1: 1 to 1: 5. The method used is single-step, where carbonization-activation-doping is made into one process. Activated activated carbon is characterized by Fourier-Transform Infrared (FTIR), X-ray diffraction (XRD), Brunauer–Emmett–Teller (BET) isotherm, and scanning electron microscope (SEM) with energy dispersive X-ray. Infrared spectra showed that N-doped activated carbon was successfully synthesized. Diffractogram shows an amorphous structure with graphitic plane (002) and (100). ACN11 produces the highest surface area of 1309.47 m² g⁻¹. The results of gravimetric CO₂ adsorption at 30°C and 1 atm conditions resulted in the largest CO₂ adsorption capacity of ACN14 at 15.02 wt%. The ACN11 and ACN14 adsorption kinetics models followed the intraparticle diffusion model with R² values of 0.95 and 0.97.

Keywords: empty fruit bunch, N-doped activated carbon, urea, single-step method, gravimetric, CO₂ adsorption


Paper ID: 12

PHYSICAL AND CHEMICAL PROPERTIES OF GELATIN FROM RED SNAPPER SCALES: TEMPERATURE EFFECTS
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The extent of applications in various fields makes the need for gelatin continue to increase in the global market. Fish gelatin is an alternative to mammalian gelatin and its use is more universal because it can be consumed by all religious followers. The high variability of fish gelatin properties is caused by the availability of many extraction methods to obtain it. This preliminary study was carried out to find the optimum range of gelatin extraction procedures using Red Snapper scales because it had not been widely studied, although it was reported that gelatin yield was not significantly different from the bone and skin part. The optimum condition of the extraction procedure was obtained by pre-treatment using 5 % CH₃COOH with extraction temperature of 60 °C which produces 58.19% swelling of fish scales and yield of gelatin is 8.76% with the moisture quality of 6.68%, pH of 6.225, viscosity of 15.54 cP and the melting point of 60 °C. The functional groups of gelatin was also successfully confirmed by FT-IR spectra.
Keywords: Gelatin, acid pre-treatment, fish scales, extraction temperature

Paper ID: 14
MODIFICATION OF CHITOSAN-CHITOSAN PHTHALATE ANHYRIDES MATRICES
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Chitin and chitosan are natural biopolymers on shrimp shells. Chitosan is used extensively as a raw material in various industries. The study aimed to extract chitin and chitosan from fanami shrimp skin through deproteinization, demineralization, and deastilation reactions and to modify the matrix to improve the physical properties. The results of the analysis of the FTIR chitin spectrum shows several major peaks at wave number 3446.91 cm\(^{-1}\) which showed the vibrations of bending secondary amide and amine (NH) secondary amides at 1654.98 cm\(^{-1}\) indicating the presence of vibration stretching CH. The results of the chitosan FTIR spectrum analysis shows symmetrical stretching vibrations at 3433.41 cm\(^{-1}\) due to overlapping OH and amines (NH), stretching vibrations of 1653.05 cm\(^{-1}\) caused by the propagation of C = O stretching and stretching vibrations of 1587.47 cm\(^{-1}\) indicating secondary amide. The results of the characterization with XRD shows that the extracted compounds were chitin and chitosan. In modifying the chitosan matrix, the spectra result show peak at 1656.91 - 1564.32 cm\(^{-1}\) indicating the presence of an amide group. New aromatic group peak found in the area of 1631.83 cm\(^{-1}\) which not found in chitosan. Diffract gram XRD from pure chitosan shows three highest peak peaks at 2θ equal to 609.2; 609.88 and 550 while chitosan-anhydrous modification shows a peak at 2θ equal to 609.8. The addition of anhydrous phthalates to chitosan has reduced its crystallinity which results in an increase in the hydrophilic characteristics of the membrane. The results of this study are expected to be one of the references in further research regarding the manufacture of phthalate chitosan-anhydrous based composite membranes for DMFC applications.

Keywords: chitin, chitosan, Phthalic Anhydride

Paper ID: 19
SYNTHESIS AND CHARACTERIZATION OF ZEOLITIC IMIDAZOLATE FRAMEWORK-8 (ZIF-8)/Al\(_2\)O\(_3\) COMPOSITE
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Metal-organic framework(MOF) such as ZIF-8 is the tremendous porous material which applied in many fields due to high specific surface area and good regularity of pores. One technique to improve the physical properties of ZIF-8 with the formation of composite between metal oxide and MOF. ZIF-8 and ZIF-8/Al\(_2\)O\(_3\) were successfully synthesized by the solvothermal method with Al variation of 19, 38, and 76%. The ZIF-8/Al\(_2\)O\(_3\) were characterized by XRD, FTIR, SEM, and N2 Physisorption. The diffractogram shows that the appearing of ZIF-8’s peak on 2θ = 7.26; 10.41, 12.66, 16.41, and 17.95°. The morphological of ZIF-8 crystals had cubic shape, then the ZIF-8/Al\(_2\)O\(_3\) had different shape with ZIF-8. Based on FTIR result, Zn-N peak appears on 420 cm\(^{-1}\) which indicates the bonding between metal and organic ligand, for ZIF-8/Al\(_2\)O\(_3\) has addition peak on 825 cm\(^{-1}\) due to vibration of Al-O-Al.
Keywords: Synthesis, ZIF 8, Al₂O₃, Metal Organic Framework

Paper ID: 20
SYNTHESIS, CHARACTERIZATION, AND PERFORMANCE OF TiO₂-N AS FILLER IN POLYETHERSULFONE MEMBRANES FOR LAUNDRY WASTE TREATMENT
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The synthesis of TiO₂-N has been done by the sol gel method. The results of XRD characterization of TiO₂ doping cannot destroy the anatase structure because the TiO₂-N diffractogram represents peaks similar to TiO₂. In the N-doped TiO₂, peaks around 1160, 1274, 1430, 1340, and 1490 cm⁻¹ represent to nitrogen atoms which are processed as substitutes for the interstitial form of the TiO₂ lattice. From the results of processing data from UV-DRS characterization, it was found that the TiO₂ band gap energy value was 3.33 eV, whereas the TiO₂-N photocatalyst of the band gap energy was 3.08 eV. BET results state that TiO₂ has a higher surface area compared to TiO₂-N. In this study, the highest results of pure water flux and laundry waste flux were found in PES/PEG/TiO₂-N membrane, which was 116.91 L/m².h in the first 2 minutes for pure water flux and 98.636 L/m².h in the first 2 minutes for waste flux and rejection produced reached 84.328% for COD and 82.75% reduction values for BOD reduction values so that the addition of TiO₂-N to the membrane can improve membrane performance for ultrafiltration.

Keywords: Synthesis, TiO₂-N, Membrane

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Paper ID: 57
EXPLORATION OF PHENOLIC COMPOUND FROM THE STEM BARK OF GARCINIA LATISSIMA MIQ
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Genus Garcinia, well known as mangosteen family, consists of over 100 species and is widely distributed in Southeast Asia. Around 77 species of this genus grows throughout Indonesia. Garcinia plants have been identified to be a rich source of phenolic compounds, including xanthones, biflavonoids, benzophenones, depsidones, and triterpenoids. Some of those have been reported to have several biological activities, such as antioxidant, antidiabetic, and anticancer. Garcinia latissima Miq. is an endemic plant growing in Indonesia, especially in Papua Island, and its neighbouring country, Papua New Guinea. Previous reports have revealed antimicrobial and antioxidant activites of the leaves, fruits, and stem bark extracts of the plant. Phytochemical investigation of the stem bark of G. latissima Miq. led to the isolation of new pyranoxanthones, latisxanthones-A-D. In this work, the isolation and structural elucidation of secondary metabolites from the stem bark of G. latissima Miq. will be conducted. Four known compounds such as kaempferol (1,2), 1,3,6,7- Tetrahydroxy-2-(3-methyl-but-2-enyl)-xanthen-9-one (3), 1,3,7 trihydroxy xanthone (4) were isolated from the ethyl acetat fraction.

Keywords: Garcinia latissima Miq., phenolic compounds, stem bark, ethyl acetat extract
Paper ID: 68
ORGANIC GEOCHEMISTRY CHARACTERISTICS OF ALIPHATIC HYDROCARBON FRACTION OF CRUDE OIL FROM TARAKAN BASIN, NORTH BORNEO, INDONESIA
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The study of organic geochemistry of crude oil from Pamusian field, Tarakan Basin, North Borneo has been done. The oil is fractionated by column chromatography and identified using gas chromatography-mass spectrometer (GC-MS). The presence of long chain n-alkanes, cadinane, 4β(H)-eudesmane, and 18α (H)-oleanane indicates organic matter derived from resin dammar Angiospermae family Dipterocarpaceae. It is also reported that there are drimane together with homodrimane and hopane as an indicator of bacterial input. The LHCPI value of 2.03 also indicates a high input of photosynthetic bacteria. Pr/Ph ratio of 3.76 and a drimane/homodrimane ratio of 1.058 indicating the oxic depositional environment of the sample. Isomer analysis of 18α(H)-oleanane and 17α(H),21β(H)-hopane provides information that the crude oil from Tarakan Basin is mature.

Keywords: Tarakan Basin Crude Oil, Organic Geochemistry, Aliphatic Hydrocarbon Biomarker, GC-MS

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Paper ID: 69
BIOMARKING STUDY OF AROMATIC HYDROCARBON FRACTION CRUDE OIL TARAKAN, NORTH KALIMANTAN
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The study of the aromatics of aromatic hydrocarbons from Tarakan crude oil, North Kalimantan, has been carried out through the analysis of Gas Chromatography-Mass Spectroscopy (GC-MS) analysis. The biomarkers identified showed the presence of naphthalene groups, phenanthrene and pentacyclic triterpenoids where the pentacyclic triterpenoid showed the highest abundance. The presence of 3,3,7-trimethyl-1,2,3,4-tetrahydrochrysene biomarkers; 1,2,9-trimethyl- 1,2,3,4-tetrahydropicene; 2,7-dimethyl-1,2- (isopropylpenteno) -1,2,3,4-tetrahydrochrysene and dinorursa-1,3,5 (10), 13 (18) -tetraene as indicators of plants Angiosperms and chrysene indicate input bacteria. The existence of 1,3,7 + 2,6,9 + 2,7,9-TMP biomarkers; 3-MC and 2-MC indicate mature oil samples. The presence of DMP, TMP and chrysene biomarkers indicates terrestrial and marine depositional environments.

Keywords: Tarakan oil, aromatic fraction, terrestrial, marine, oxic
**TRACK: Architectural Engineering**

**Paper ID: 33**

**REDUCING DUST IN LOW RISE HOUSING DESIGN THROUGH SURFACE: A LITERATURE REVIEW**

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The existence of dust in a building environment can cause many problems for those who continually exposed especially for residential housing which is located near the industrial area. So, it needs a treatment process for reducing the dust intensity, one of the ways is through exploring surface as the highlight of this paper in which in much previous research often use tree. In this paper highlighted about literature review for knowing the element surfaces that related to the way for reducing dust. Therefore, in this stage need to addressed the following questions (1) what’s element that influence the moving of dust itself (2) What kinds of matter in designing low rise housing related to dust pollution (3) how the responsibility the surface to dust. From those questions, it can be concluded that the selection of building mass is needed for controlling dust from the outside to the building. Then, in the residential housing needs to aware with view and shading aspect so that controlling dust through surfaces must be able to adjust those matters before.

**Keywords**: Airflow; Dust; Literature Review; Low rise housing Design ; Surface

**Paper ID: 36**

**VARIETY IN DESIGNING A TRADING AREA (CASE STUDY: DAUH PURI KANGIN DISTRICT, DENPASAR CITY, INDONESIA)**

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Variety is the extent to which design can give a choice of activities, types of users, functions, and meanings that occur in an environment. Feasibility of variety is fundamental in supporting the design quality of the trading area, especially in regions that have priority in developing the trading area, such as in Denpasar City. The economy of Denpasar City depends mostly on the trading sector. However, Dauh Puri Kangin, as the trade center area in the city, still has physical and non-physical problems and has not been well developed. In getting a solution, this place needs research to find design criteria that can increase environmental variety. The study used cognitive mapping methods for data collection and qualitative assessment techniques for analysis methods. The analysis process results in the conditions of the problem and the potential related to variations in the study site. Then, it becomes a consideration in the design criteria of the trading area. From the results of the analysis, the problem that occurs in the corridor facilities is have not been able to accommodate the activities of all types of users, both regular users and users with special needs. Based on the results of the analysis, some considerations for the redesign of the area proposed several design proposals related to architectural design, landscape planning, and pedestrian facilities.
Keywords: Design criteria, Cognitive mapping, Qualitative assessment, Urban studies

Paper ID: 40

A LITERATURE REVIEW: STRATEGY DESIGN OF TRANSITION SPACE USING WIND POTENTIAL

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Transition space is a link between one space and another space where this space has a function of adaptation to changing conditions from the previous space to the next space, this study discusses some transition space design strategies in building skyscrapers and groundscrapers by utilizing wind potential through building elements. By implementing a transitional space strategy in building skyscrapers or groundscrapers where buildings can adapt energy-efficient buildings. Energy savings can be applied through available natural elements, one of which is wind potential. This research phase requires literature review and transitional space theory to translate the role of transition space in buildings to achieve energy-efficient buildings by utilizing wind. The case study will provide a direct example of the building of transitional space functions to anticipate the wind. The results of this study will provide a transitional space design strategy through architectural passive elements that respond to wind so as to provide comfort for building users using natural ventilation so that energy use is more efficient.

Keywords: Transition space; Airflow; Skyscrapers/Groundscrapers; Energy; Literature review

Paper ID: 41

REVIEW ON DESIGN STRATEGIES OF ENERGY SAVING OFFICE BUILDING WITH EVAPORATIVE COOLING IN TROPICAL REGION

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This research aims to review the theories and design of energy saving office buildings that apply evaporative cooling concept as effort to inhibit solar heat and improve natural cooling. The method used is literature searching (theory, journal and precedent) that relates to energy saving buildings (passive design), building geometry (s/v ratio), and passive cooling with evaporative cooling techniques. Review of design strategies can be used as a reference for general criteria applied at the design stage of designing energy saving office building in tropical area. As a limitation, questions are needed to find related theories such as (1) what are the factors of building heat control and the criteria needed in designing energy saving office building (2) how to apply evaporative cooling techniques on design energy saving office building. Solar heat is a key factor in building heat gain. So it must be noticed to control building heat for protect heat transfer into buildings. The results of the design energy saving office buildings in tropical areas are required by the application of passive designs (building core placement, building orientation,
building ratio), application of shading elements, consider to building s/v ratio, and application of evaporative cooling on the side which exposed solar radiation.

**Keywords:** Energy saving, Evaporative cooling, Literature review, Office building, Passive design

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**Paper ID: 47**

**NOISE CHARACTERISTICS AND SOUND PRESSURE LEVEL PREDICTION OF LOGGIA BALCONY IN APARTMENT**

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Many residential areas are in the street class with high noise including the apartment. Noise is often overlooked when it will have an impact on the health of residents. The balcony design in apartments has the potential to capture even reduce noise so this needs to be further investigated with the most widely used balcony in the apartment is a loggia type balcony. To find out the noise level of a place from a certain source such as traffic noise can be done by direct measurement, by knowing the ratio of the noise level, the method taken is field measurement, simulation and mathematical calculations. The method of measuring the field using the Gunawangsa Manyar Apartment object by measuring noise levels carried out for 24 hours on the balcony of the apartment, the noise level simulation method was carried out with I-Simpa, and the calculation method used a mathematical model. The results obtained are two types of noise on the apartment balcony, namely vehicle noise is steady and vehicle noise is impulsive with noisy air-conditioner. The results of the comparison of field measurements with simulation methods and calculations show a high relationship. So that the I-Simpa simulation method and calculation can be used to predict the desired noise level on a certain floor.

**Keywords:** Sound pressure level measurement, I-Simpa, ASJ RTN-Model 2013;
Geometry, Double L Geometry, and Quadruple L Geometry. The method of this research is experimental research with simulation as tactic. Design Builder by EnergyPlus is used as simulation tools in this research. The result reveals that courtyard with aspect ratio 1:2 tends perform better than square courtyard. Elongating the courtyard of H and U Geometry will reduce the annual cooling energy in all orientation. Elongating the courtyard of Double U, Double L, and Quadruple L Geometries will reduce the annual cooling energy in northwest-southeast orientation, but will increase annual cooling energy if the building is elongated alongside north east axis.

**Keywords:** Courtyard, high rise apartment, cooling energy, geometry.

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**Paper ID: 55**

**VALIDATION OF CFD SIMULATION FOR WIND VELOCITY MEASUREMENT IN HIGH-RISE APARTMENT BUILDINGS IN SURABAYA**

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The double-loaded circulation system makes the performance of cross ventilation in apartment buildings to be ineffective. Therefore, the alternative of the ventilation system is necessary to be examined in order to obtain an adequate velocity comfort. To determine the appropriate alternatives, we need to discover the suitable software. In this study, a validation of a simulation method using Computational Fluid Dynamics (CFD) is carried out to determine whether the software is capable to provide useful analysis for high-rise apartments. Based on the results, the validation of the correlation value ($R^2$) between the measurement and simulation is 0.67. It shows that the influence between variables is sufficient.

**Keywords:** High-rise apartment, wind velocity, field measurement, CFD simulation;

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**Paper ID: 56**

**DESIGN STRATEGIES for WORKING SPACE to REDUCE THE BEHAVIOR of STRESS and PRESERVE THE HERITAGE VALUES of BANJARBARU CITY HALL BUILDING**

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Designing government working space is proposed to solve the productivity issues among the workers inside the city hall office of Banjarbaru city, South Borneo. This caused either by their work span inside the office and the style of working cubical or the interior element which has colonialism values. The design of the building case is using the colonial style which is this building’s materials have color dominated with white colour and the architecture elements are containing a heritage value. Therefore, in this paper discusses the literature review to make a design strategy for working space inside the office with building heritage’s values that suitable
to maximizing the productivity of the workers by involving them in the process of design in advance, for instance, the design process will use a participatory design paradigm that will be reviewed before apply it in the Banjarbaru government office design proposal. From those theories can be concluded that field area like shapes, colors, and perception of space which related to an interior element can be controlled to maximize the productivity and preserving the values of building heritage.

**Keywords**: City Hall Office; Productivity; Space Perception; Participatory Design; Literature review.

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**Paper ID: 78**

**CROWDING AND TERRITORIALITY WITHIN URBAN SAFETY (CASE STUDY: KETABANG, SURABAYA, INDONESIA)**

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The city of Surabaya is one of the largest metropolitan cities in Indonesia with positive city growth and development. Along with this, the wave of urbanization and the increase in safety threats also increased. The increased threats triggered the procurement of facilities related to high safety. However, Ketabang, as one of the regions that have the availability of complete safety facilities, still has a great record of safety threats, especially in public space. Thus, an evaluation of the effectiveness of the facility needs to be carried out, especially on the topic of controlling the crowd and clear territorial boundaries. The control itself is related to the limitation of public activities, which can be one of the factors that cause reduced awareness and surveillance of the perpetrators of safety threats. Because of it, this region needs further research on each level of territorial crowds and territorial boundaries that can affect safety in public spaces. This study uses qualitative data analysis, character appraisal of related facilities, and cognitive mapping as a research method. The results of the analysis process outline the influence of crowds and territorial boundary on the safety of users of public spaces in the study area. These results are the main handle in providing an evaluation of the design and provision of facilities that can improve the safety of public space users.

**Keywords**: Crowding, territorial, urban design, public space, safety;

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**Paper ID: 79**

**RESTORING IMAGE AND IDENTITY OF OLD CITY KUPANG THROUGH VISUAL ENHANCEMENT**

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The old city in Kupang is a dense area that has multicultural ethnicity with its own history. With long historical background influenced by colonialism and multicultural diversity, the old city of Kupang has strong and unique images. This paper aims to find the image and the identity of the
old city area in Kupang supported by using factors in Lynch’s the image of city theory. Using descriptive-qualitative research method, this research applied several data collection techniques such as field observation through walkthrough analysis and documentation. Results show that the old city’s image and identity are identified; (1) path that is Soekarno Street and Siliwangi Street; (2) Nodes is known from the meeting point of main streets and streets around the old city area including Soekarno and Siliwangi street; (3) Landmark is identified by Pancasila Monument. The result of this study is important as a reference to enhance the visual quality of Kupang old city by strengthening the character of the image and identity of the old city area.

Keywords: Image and Identity, Old city, Urban design, Lynch theory;

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**TRACK: Geomathics**

**Paper ID: 11**

ANALYSIS CID VOLCANIC EARTHQUAKE IN THE SUNDA STRAIT DUE TO THE ERUPTION OF ANAK GUNUNG KRAKATAU

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In earthquakes occur three types of waves, namely acoustic waves with vertical directions from the epicenter to the ionosphere F, gravity waves are waves generated from the tsunami, and the resulting Rayleigh waves move away from the epicenter. These waves create disturbances in the ionosphere, namely at electron density. The electron density in the ionosphere layer is called Total Electron Content (TEC). This phenomenon is detected as CID (Coseismic Ionosphere Disturbance), ie TEC fluctuations that occur ` 10 minutes after the earthquake. Earthquakes that are used as case studies are earthquakes that occur in the volcanic earthquake in the Sunda strait due to volcanic eruptions of krakatau children resulting in tsunamis on the Sunda Strait on December 22, 2018 (doy 356) with magnitude 5 SR at 13.55 UTC. In this study using the data of GNS (Global Navigation Satellite System) BIG CORS (Continuous Operating Reference Station) (Geospatial Information Agency uses CRKS, CPSR and CGON stations. The results of this study note that GPS number 3 detects TEC fluctuations after a volcanic earthquake. The biggest fluctuation worth 0.422 TECU which is at 9 minutes after the volcanic earthquake of the child of Mount Krakatau.

Keywords: ionosphere, TEC volcanic earthquake

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**Paper ID: 52**

EVALUATING GPS CORS DATA FOR CRUSTAL DEFORMATION ANALYSIS IN EAST JAVA

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Indonesia is located at the boundary of several tectonic plates; due to this situation the tectonic setting of Indonesia is very complex. The complexity of the tectonics also makes Indonesia prone to natural disasters such as earthquakes, tsunamis, volcanic eruptions etc. In this study we use GAMIT/GLOBK to analyze the data from 10 GPS continuous reference station (CORS) in the time span of four years (2015, 2016, 2017 and 2018), the stations mentioned above are located in the north-eastern part of Java. In this paper we present GPS derived velocity of ten GPS CORS stations installed in the northeastern part of Java for deformation monitoring purposes. The results of this study show that all GPS stations in the study area move in South East direction with subsidence at six stations and uplift at four stations. The data used in this research is from GPS CORS(Ina-CORS) stations provided by the Geospatial Information Agency of Indonesia (also known as BIG). GPS is currently the most effective tool for the determination of the deformation due to an active fault, the surface movement or displacement during or after earthquake and relative motion between tectonic plates.

Keywords: GPS derived Velocity, North-East Java, GPS CORS stations, GAMIT/GLOBK

TRACK: Civil Engineering

Paper ID: 2

FLUID-SOIL-STRUCTURE INTERACTION PHENOMENA ON VIBRATION CASE AT PUMP STATION BUILDING
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Excitation at low-rise reinforced concrete building had occurred within the first-year post-construction phase. It is found that the structures laying on thick soil layer while performing up to 4 kPa water transport activity. Three approaches have been adopted to investigate the dynamic behavior and the interaction the phenomenon commonly called fluid-soil-structure interaction. Applying the finite element computation to represent the dynamic of the soil-fluid and structure, existing and ideal-fixed base condition are modeled and compared each. It was found that the structure’s modes frequencies, much depends on the rigidity of the base and the fluids traffic on the pump station. Time history string of displacements at the arbitrary point shows that the vibration does occurs and it tendentious increase by time.

Keywords: Excitation, Coupled, Interaction, Frequency, Finite element, Dynamic

Paper ID: 21

STRATEGY ANALYSIS TO IMPROVE CONSULTANT QUALIFICATION IN SURABAYA
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Electronic Procurement Agency indicated that in 2015 up to 2017 project for infrastructure consulting services with qualifying middle to upper class in the Minister for Republic Works and Human Settlements increased 5% per year. The Development Institution Construction Services shows that number of consulting firm in Surabaya city with qualifying middle to upper level less than 20 company, while the company consultant were at the middle to lower is very much. This research aimed to producing strategy in the qualification a consulting firm in Surabaya city. The variables used in a study are internal and external factors in increasing the consultant qualification. This variables analysis using Strength Weakness Opportunity Threats Matrix (SWOT), External Internal Matrix (I-E), and Quantities Strategic Planning Matrix (QSPM) used to determine the best strategy. The result of the study indicate several strategies that can be used to improve consultant qualification. The first strategy is a joint venture with other consulting firms to enhance experiences and increase the income of the company. The second strategy is to improve the quality of human resources and adjust infrastructure facilities with international quality standard namely ISO 9001. The third strategy is work on projects that have high risk.

**Keywords**: Analysis strategy, qualifications consultant, quantitative strategic planning matrix, ISO 9001, joint venture, conservative, selective work.

**Paper ID**: 35

**ANALYSIS OF CREEP TEST MIXTURE OF ASPHALT CONCRETE USING FLYASH FOR RUNWAY PAVEMENT**

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There are some factors that cause deformation on the runway, such as the pressure of repeated loads caused by large queues of aircraft. The aggregate available in nature has begun to decrease in amount caused considering that infrastructure development in Indonesia continues to increase. Therefore, new material innovations are needed to overcome this, such as the use of flyash as an artificial aggregate of geopolymers in concrete asphalt mixtures. This research was carried out in some tests including Marshall testing which intended to determine the characteristics of artificial aggregate pavement mixtures, using open gradations with specification BBA. Then testing the resistance to deformation (Creep) on the artificial aggregate gradation pavement mixture using the UTM30 Dynapave. Based on the characteristics of the Marshall test the optimum bitumen content value was obtained, with open gradations has OBC value is 6.1%. Results of Creep test (deformation) with load 400 kPa obtained, strain value is 93520 μƐ and stiffness value is 13,27 MPa (sample collapse at cycle 1559 times). It can be concluded that the pavement mixture with open graded artificial aggregate (BBA) has not able to survive deformation.

**Keywords**: Runway Pavement, Artificial Aggregate of Geopolymer, Marshall Properties, OBC, Creep Test
Paper ID: 50

ANALYSIS OF STIFFNESS MODULUS OF ASPHALT CONCRETE MIXTURE BY USING ARTIFICIAL AGGREGATES
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Abstract
The type of damage to the pavement layer is cracking and permanent deformation. The mechanism of cracking in the pavement layer occurs because of the tensile force at the bottom of the pavement layer due to the wheel load of the vehicle. One parameter of a mixture to achieve strength and durability as needed is the relationship of stress and strain which shows the stiffness of a mixture. Indirect Tensile Strength is a method used to show the stiffness of a mixture. As infrastructure development in Indonesia continues to increase, the availability of natural aggregate materials is decreasing. One of the uses of geopolymer can be used as artificial aggregates to replace the depleted natural aggregates. The purpose of this study was to review the stiffness modulus of concrete asphalt mixture with the use of artificial aggregates made from geopolymer by using open gradations of BBA (Beton Bitumineux pour chaussees Aeronautiques).

From the test results using the Dynapave UTM30 tool at 20 Celsius and 60 Celsius, stiffness modulus values of the asphalt mixture are 3542 MPa and 147 MPa. The increase in temperature causes a decrease in the stiffness modulus value of 96%, so that the increase in temperature will be accompanied by a decrease in the stiffness modulus.

Keywords: Indirect Tensile Modulus Test, Runway Pavement, Marshall Test, Artificial Aggregates

Paper ID: 60

THE STUDY OF THE USAGE OF VACUUM PRELOADING METHOD IN THE CONSTRUCTION PROJECT OF PALEMBANG - INDRALAYA TOLL ROAD
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Palembang – Indralaya (Palindra) Toll Road is part of the Trans Sumatera Toll Road built on soft soil. Soil improvement using vacuum preloading method has been conducted to resolve the problem. The method involves replacing a surcharge load with an atmospheric pressure and utilizing vertical and horizontal drains, as well as sand blanket. Factors that influence the effectiveness of the performance of the vacuum method comprise the settlement, the time of settlement, the speed of settlement, the degree of consolidation, the distance of Prefabricated Vertical Drain or PVD, and so forth. The result of the settlement using Terzaghi’s equation combined with Indraratna showed that the addition of the height of the fill would have been effective if it had been equal or larger than the vacuum pressure that was used (80 kPa). It could be observed from attaining faster consolidation time of 56 days. The analysis result was, then compared with the final settlement by using Asaoka method. The design of the PVD distance by using vacuum method showed that the spacing (S) was less restrained, which was 1,23 m, compared to the one using with extra load (surcharge) which was 1,2 m. The settlement of vacuum consolidation was 1,98 m, which was smaller than the surcharge one that reached 2,11 m.
Keywords: vacuum preloading, consolidation, PVD, Terzaghi, Indraratna, Asaoka

Paper ID: 61

ANALYSIS THE USE OF ARTIFICIAL AGGREGATES AS A SUBSTITUTE OF COARSE AGGREGATES FOR SURFACE OF FLEXIBLE PAVEMENT ON OPTIMUM BITUMEN CONTENT
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The quality of flexible pavement construction is strongly influenced by the composition of the material used, including the type of aggregate, and asphalt. Aggregates are generally defined as hard and dense earth shell formation. The mechanical properties of the asphalt mixture are strongly influenced by the fraction and aggregate properties, because the aggregate fills the majority of the asphalt mixture volume (more than 80%) and mass (about 95%). Aggregates have various forms and textures including round and cube shapes. At present, infrastructure development in Indonesia continues to increase the amount of natural aggregate usage, so this will cause the availability of materials to continue to thin out. For this reason, an effort needs to be made to find an alternative to the use of natural aggregate, one of which is the utilization of waste generated by the steam power plant (PLTU), namely fly ash. In this study the artificial aggregate was varied in spherical (AB) form from processed granular and angular (ABSC) from processed stone crusher. The results obtained in each variation provide a value that meets the specifications. The full use of artificial aggregates of 25% AB 75% ABSC on dense gradations provides stability of 1258.13 kg. In this study, the use of artificial aggregates can be used as an alternative as an aggregate substitute for nature. In addition to improving mixed quality, the use of artificial aggregates can be an alternative use of waste.

Keywords: Stability, Marshall, Artificial Aggregate, Pavement Design

Paper ID: 66

INVESTIGATION OF WATER ABSORPTION FOR CONCRETE USING SUPPLEMENTARY MATERIALS
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Concrete’s durability is the key factor that affect the service life of the concrete structure. One factor that affect the durability properties of concrete is their pore structure which can be investigated by analyzing rate of absorption of the materials. For the structures which has direct contact with water, water absorption is a factor that can lead into changing behavior of the pore structure which in long term can affect the durability of concrete. Based on that, it is important to conduct a research to find the water absorption properties of concrete with different mixtures. This research investigate the rate of absorption of concrete by using fly ash and silica fume. The result, based on secondary absorption properties, shows that the usage of 15% fly ash in normal concrete increases the resistance to water penetration by 23%, the usage of 5 % Silica
Fume increases the resistance by 11.8%, and the usage of 5% silica fume + 10% fly ash increases the resistance by 16.2%. It shows that the using of supplementary materials in concrete increase the resistance of water penetration, and in this research, the usage of 15% fly ash as cement replacement shows the best result.

Keywords: Concrete, durability, structure, materials, absorption, sorptivity

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Paper ID: 71

ANALYSIS OF CREEP TEST MIXTURE OF ASPHALT CONCRETE USING FLYASH FOR RUNWAY

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There are some factors that cause deformation on the runway, such as the pressure of repeated loads caused by large queues of aircraft. The aggregate available in nature has begun to decrease in amount caused considering that infrastructure development in Indonesia continues to increase. Therefore, new material innovations are needed to overcome this, such as the use of flyash as an artificial aggregate of geopolymers in concrete asphalt mixtures. This research was carried out in some tests including Marshall testing which intended to determine the characteristics of artificial aggregate pavement mixtures, using open gradations with specification BBA. Then testing the resistance to deformation (Creep) on the artificial aggregate gradation pavement mixture using the UTM30 Dynapave. Based on the characteristics of the Marshall test the optimum bitumen content value was obtained, with open gradations has OBC value is 6.1%. Results of Creep test (deformation) with load 400 kPa obtained, strain value is 93520 μƐ and stiffness value is 13.27 MPa (sample collapse at cycle 1559 times). It can be concluded that the pavement mixture with open graded artificial aggregate (BBA) has not able to survive deformation.

Keywords: Runway Pavement, Artificial Aggregate of Geopolymer, Marshall Properties, OBC, Creep Test
TRACK: Marine Systems Engineering

Paper ID: 58

ANALYSIS OF SHIPYARD TO MEET FISH SHIP PROCUREMENT PLAN FOR THE MINISTRY OF MARINE AND FISHERIES
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To improve the national fishing vessels and the welfare of fishermen, the government will provide fishing vessels grant through the KKP. The current capacity of fiberglass shipyards is unclear, so the realization of the procurement of fishing vessels is not accordance with the planned targets. This study aims to analyze shipyard capacity to support the plan for the procurement of KKP fishing vessels grant in 2019. First classify fishing vessels based on their respective GT sizes, which are <5 GT (type A), 5-10 GT (type B), and 20-30 GT (type C). Second, make the minimum shipyard criteria in building fishing vessels. Third, count the number of ships that can be built by the shipyard. The results of the shipyard analysis of the minimum criteria found that 43% of shipyards have the ability to build type A vessels, about 38% of shipyards have the ability to build type B vessels, and around 19% of shipyards have the ability to build type C vessels. Which can be built is 1625 units / period. Referring to shipyard capacity, it can be said that the entire shipyard is able to fulfill the plan to procure assistance for KKP fishing vessels in the 2019 budget year.

Keywords: Fishing vessel, ships procurement, fiberglass shipyard;

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TRACK: Marine Engineering

Paper ID: 8

EXPERIMENTAL AND NUMERICAL BENDING ANALYSIS OF STEEL/RESIN-TALK SANDWICH MATERIAL
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Sandwich material can be used as a substitute for the ship conventional material. The core sandwich material used in this study consisted of a talk-resin-catalyst. The core mixture proportion is 90% resin and 10% talk. A thick steel plates is used as the face of the core sandwich material. Both experimental and numerical simulations are carried out to investigate the bending or flexural behavior of the proposed sandwich material. Three-point bending test has been carried out to determine the yield stress and maximum stress as well as the damage mechanism of the specimen up-to failure. From the investigation, the first failure process occurred at the mid-span as flexural cracks. As the load continue, these flexural cracks progressed until fully fracture of the core material take places. From the experimental investigation, it was found that the yield stress and maximum stress of the sandwich panel are 22.88 MPa and 28.63 MPa. On
the other hand, numerical simulation is carried out using ABAQUS which has shown to be sufficient to predict the response of the sandwich-panel. However, a more sophisticated constitutive model is required to successfully model the experimental behavior in close agreement.

**Keywords**: Bending Test, Sandwich Structure, Failure Mechanism, Talk, Unsaturated Polyester Resin

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**Paper ID: 29**

**SHIP MANEUVERABILITY EXPERIMENTS ON OPEN WATER WITH RUDDER MODEL VARIATIONS: CASE STUDY OF SPB-XXOO**

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Ship maneuverability is important to study because it affect to the safety. Moreover if the ship operates in a narrow and winding shipping lane, as experienced by SPUB Pusri Indonesia I. This research focuses on the experimental process of SPUB maneuvers in open waters, especially for the turning circles movement. The experiment was conducted using a prototype, model SPB-XXOO, which was equipped with instrumentation system components; data logger and propulsion. Both are integrated to the remote control and computers to perform control functions, calculations, data logging and data transfer through wireless communication system. The main controller of the propulsion system is implanted a program to deflect the rudder automatically. Three rudder models with variations in aspect ratios of 1.10, 1.65 and 2.20, and 3 variations of the rudder angle; 30° and 35° are used to test the model. Data acquisition process is done by GPS for each experimental process. The results are analyzed using formula vincenty method. Based on the analysis of the effect of the rudder model, it was found that rudder with a large aspect ratio provides better performance than a lower aspect ratio.

**Keywords**: Maneuver experiment, self-propelled barge, turning circle, instrumentation, rudder variation, GPS, drone and open water

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**Paper ID: 65**

**RISK ANALYSIS USING JSA-FUZZY INTEGRATION FOR SHIP MAINTENANCE OPERATION**

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Shipyard is an industry engaged in the maintenance and repair of ship and construction of a new ship. In ship repair operations, there are many activities in this operation. Propeller inspection, blasting, replating, welding, general work, electric work is an activity in ship repair operation. This research proposed a methodology to risk analysis ship maintenance operation, integrating Job Safety Analysis (JSA) with Bayesian Network (BN) and Fuzzy Inferences System (FIS). JSA method is used to find the hazards and the consequences of the maintenance operation. BN is developed for probability calculating of likelihood factors. Meanwhile, the FIS are used as a method to calculate the risk level. The FIS using Mamdani algorithm based on expert’s knowledge and experience. The integration of three methods is use too complete the risk assessment for
replating activities. The proposed method is used to find out the risk level of replating activity on ship maintenance. Based on the result, the proposed model is more accurate, precise, and flexible depend on the basic factor that influence the operation. It will help to reduce the potential accident on operation. This proposed method could be the other option as a tool to calculate risk assessment in other operations.

Keywords: Job Safety Analysis, Bayesian Networks, Fuzzy, Replating, Risk Assessment

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**TRACK: Physics**

**Paper ID:** 16

**EFFECT OF PERFORATION HOLES TO SOUND ATTENUATION ON PVC PIPE OF SONIC CRYSTAL**

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The use of sonic crystals is one of the alternative acoustic materials in controlling noise because of its easy installation, adjustable sound resonance frequency and no effect on air circulation. In this paper, the sonic crystals that have been studied are made of 1.5 inch PVC pipes with a length of 1.05 m. While the number of perforation holes is 2, 4, 6 and 8. Sonic crystals have a design that supports the occurrence of sound attenuation at a frequency of 200-500 Hz. Sonic crystals made have Filling Ratio (Fr) 0.5, because sonic crystals square configuration will effectively attenuate sound when the Fr value is between 0.4 to 0.6. Characterization of sonic crystal performance was obtained through Insertion loss measurements. The measurement results show attenuation values occur at sonic crystal resonance frequencies. The details are as follows, sonic crystals with the number of two perforation holes produce maximum attenuation of -10.34 dB at a frequency of 217 Hz, the number of perforation holes four produces maximum attenuation of -10.23 dB at a frequency of 335 Hz, the number of perforation holes six produces a maximum attenuation of -13.43 dB at a frequency of 387 Hz and the number of eight perforated holes resulting in a maximum attenuation of -11.52 dB at a frequency of 434 HZ. From the results of these measurements, increasing the number of perforated holes on the sonic crystal noise barrier causes a shift in the sonic crystal base resonance frequency. The bigger / more perforation holes the greater the resonance frequency value that occurs. This is in harmony with the Helmholtz resonator principle.

Keywords: Noise Control, Helmholtz Resonator, RLC Circuit, Resonance Frequency, Mass of Acoustic, Compliance of Acoustic and Insertion Loss
Paper ID: 43

OXIDATION STATE OF MN IN ZN1-XMNXO NANOPARTICLES STUDIED BY X-RAY ABSORPTION NEAR EDGE SPECTROSCOPY

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Zn1-xMnxO \((0,00 \leq x \leq 0,10)\) nanoparticle was obtained through the coprecipitation method by doping Mn transition metals on ZnO nanoparticles. Characterization using X-ray absorption near edge spectroscopy (XANES) showed a formation of pre-edge with an intensity of around 6539.49 eV. Zn1-xMnxO edge energy values range 6549.16 eV- 6551.30 eV. Zn1-xMnxO \((x = 0,03 - 0,05)\) spectrum Mn-K edge to obtain the edge energy and oxidation state on Zn1-xMnxO. The approached Mn2O3 and \(x \geq 0,05\) approached MnO2 which indicated the presence of divalent in absorber atom Mn \((\text{Mn}^{3+}/\text{Mn}^{4+})\). The oxidation number obtained is 3+ which the energy value that increases with the dopant atom Mn and higher oxidation level +3 shows the formation of paramagnetic properties.

**Keywords:** XANES, edge energy, oxidation state and magnetic

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Paper ID: 46

PREDICTION TURBULENCE THROUGH PARAMETERS OF WIND SPEED, HIGHT, AIR TEMPERATURE, AND AIR PRESSURE OPTIMIZATION

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Analysis of turbulence prediction is needed to determine atmospheric conditions. Turbulence is a random and very fast wind movement. Turbulence that exceeds the safe limit can be dangerous for the aviation world. The magnitude that affects turbulence is temperature, air pressure, altitude from the ground and wind speed. Wind speed can be dangerous for the aircraft during wind shear. Wind Shear is a change of wind that is very fast and in a short time. In this study an analysis will be carried out related to turbulence and the effect of the amount of air pressure, air temperature, wind speed and altitude from the ground level. This research is expected to be able to predict turbulence based on the results obtained on the optimization of wind speed, altitude, air temperature and air pressure parameters. The results of turbulence parameter optimization show the optimum height is 32 meters. Turbulence is determined based on wind speed and atmospheric stability parameters. At a height of 32 meters the turbulence detection design is fulfilled when the pressure is 100307-101088 Pa and the temperature is 28-00 Celsius. Low turbulence occurs when the difference in wind speed at altitudes of 10 and 32 meters is less than 3 knots. Turbulence is occurring during the difference in wind speed at altitudes of 10 and 32 meters between 4 to 6 knots. High turbulence occurs when the difference in wind speed at altitudes of 10 and 32 meters is greater than 7 knots.

**Keywords:** Pressure, Temperature, Turbulence, Wind, Wind Shear
EFFECT OF FLOW RATE ON CONCENTRATION SUBSTRATE USING KINETIC MONOD EQUATION IN STEADY-STATE

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In every industrial activity, it has a role in environmental pollution, especially water pollution due to liquid waste. According to Government Regulation No. 82 of 2001 concerning Environmental Management, in determining water quality several parameters must be observed, namely Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), acidity (pH) and Total Suspended Solids (TSS). Therefore, before the disposal of liquid waste into the river, it is necessary to process waste first. One of the wastewater treatment processes is anaerobic, which has a positive impact such as increasing the value of Organic Loading Rate (OLR), decreasing sludge production, eliminating pathogenic bacteria, Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD), producing biogas which rich in methane gas and low energy consumption. In mathematical modeling, this research was obtained from Monod kinetic equations in a steady-state to produce a solution in the form of an equation of the concentration of substrate effluent (Si) or called COD to the influent (q) flow rate. In this study, the reactor volume was 150m3. The solution was optimized by using Particle Swarm Optimization (PSO) using MATLAB software to find the minimum value. In the simulation that has been done, the results obtained that the best influent flow rate to minimize substrate concentration (S) is 190m3/h. With this flow rate can reduce substrate concentration up to 99.6%, where the initial substrate concentration (S0) from tapioca industrial wastewater of 11kg/m3 to 0.039kg/m3 at the effluent substrate concentration (Si). This proves that anaerobic wastewater treatment process can reduce the COD value so that it is safe for the environment and following the quality standards set by the Ministry of Environment.

Keywords: Concentration Substrate, Liquid Waste, Mathematical model, Monod kinetic, Particle Swarm Optimization, Tapioca Industry

TRACK: Physics Engineering

DEEP LEARNING-BASED CATEGORICAL AND DIMENSIONAL EMOTION RECOGNITION FOR WRITTEN AND SPOKEN TEXT

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The demand for recognizing emotion in text has grown increasingly as human emotion can be expressed via text and many technologies, such as product reviews and speech transcription, can benefit from text emotion recognition. The study of text emotion recognition was established some decades ago using unsupervised learning and a small amount of data. Advancements in computation hardware and in the development of larger text corpus have enabled us to analyze
emotion in the text by more sophisticated techniques. This paper presents a deep learning-based approach for the recognition of categorical and dimensional emotion from both written and spoken texts. The result shows that the system performs better on both categorical and dimensional task (> 60% accuracy and < 20% error) with a larger dataset compared to a smaller dataset. We also found the recognition rate is affected by both the size of the data and the number of emotion categories. On the dimensional task, a larger amount of data consistently provided a better result. Recognition of categorical emotion on a spoken text is easier than on a written text, while on dimensional task, the written text yielded better performance.

**Keywords**: Deep learning, recurrent neural network, text emotion recognition, categorical emotion, dimensional emotion, spoken text.

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**TRACK: Management Technology**

**Paper ID: 17**

**REDUCING PRODUCTION WASTE USING LEAN MANUFACTURE (CASE STUDY AT PT JM FERTILIZO)**

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Currently, in globalization era, business competition in the fertilizer industry in Indonesia is very tight. This spurred the company to continue improving production results in terms of quality, quantity, price, and timeline of delivery to its customers. PT. JM Fertilizo (PT. JMF) is a company engaged in the processing of mining products that produce fertilizer for export purposes. One of the products delivered by PT. JMF is fosfat powder and Granule fertilizer. The company data shows in 2016 the company able to produce 550 tones / month and in 2017 able to produce 350 tones / month. Furthermore, there are still many products that can't meet customers requirement and several delays in product delivery. This problem causing inefficiency and decrease in production capacity. Therefore, this study was conducted to reduce the problems that exist in PT. JMF. The study which applied tools from Lean manufacturing, named value stream mapping and root cause analysis method has a conclusion that inappropriate process and waiting are the most dominant waste. The suggestions from this study are improving information flow, training production operators, and investing in new machinery.

**Keywords**: root cause analysis, value stream mapping, waste;
ANALYSIS OF QUALITY IMPROVEMENT OF FINISHING WORK IN THE DEVELOPMENT OF PUNCAK CBD SURABAYA APARTMENT
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The quality is one of the important factors in the success of construction project. In fact, the cost of construction is vain until 6-15% because reworking and process of work is late. Wika Building Contractor have standard of quality, name is QPASS (Quality Performance Assessment Support System) for all projects. Puncak CBD Surabaya Apartment, is one of Wika Building Project that having lower quality standard value in 2018. In this study, the six sigma method with the DMAIC (Define, Measure, Analyze, Improve, Control) approach was used to improve low quality values. Starting with identify works with defect largest based on QPASS monthly report, then calculate the dominant defect using a level of sigma. The research results show the wall work having highest total number of defects. The wall work defect with sigma value under 3 level are joint of wall is not perpendicular, cracked plaster seen from 1.5 m distance and flaking paint. At the improve phase, determined the best action plan for handle cause factor of the three such defect. The best action was determined are do thickening and adjust the angle of wall for defect “Joint of wall is not perpendicular”, giving direction for workers about correct plaster mixture for defect “Cracked plaster seen from 1.5 m distance”, and cleaning of wall before painting for defect “Flaking paint”.

Keywords: Quality, Six Sigma, DMAIC, Qpass, Defect of Finishing Work

MEASURE THE SIGNIFICANT OF LEARNING VALUE AND TRUST FACTORS FOR ONLINE LEARNING TECHNOLOGY ACCEPTANCE IN INDONESIA
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One of the main stages to achieve the success of online learning technology is the acceptance of the technology by its users. Therefore, identifying how significant the influence of a factor in the success of technology acceptance is very important. This study aims to learn the impact of learning value and trust factors on the acceptance of online learning technology. To test the research hypothesis used the Partial Least Square Structural Equation Modeling (PLS-SEM) method. This research is a quantitative study with a survey approach to respondents, where respondents must have used online learning technology. The results of the study show that the influence of learning value and trust factors on the adoption of online learning technology is significant. The results of the testing of these two factors can be taken into consideration for providers of online learning technology in Indonesia as a reference in making strategic decisions for further development.

Keywords: Online Learning, Partial Least Square, Structural Equation Modeling, Technology Adoption, Technology Acceptance
DETERMINANTS OF BEHAVIOUR INTENTION AND USE BEHAVIOUR AMONG BUKALAPAK’S CONSUMERS

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The development of communication and information technology has touched the marketing and sales industry. In recent years, there have been a lot of market places in Indonesia that are places where people buy and sell without having to meet in person. This study objective is looking the influence of people’s intention on use behavior to buy at market place in Indonesia. The market which become the object of this research is Bukapalak. The data of this study were obtained using the questionnaire method. This study obtained respondents as many as 210 respondents and the data was processed by the method of partial least square. The results of this study are that there is a positive and significant influence of behavioral intention from non-consumer consumers on use behavior. The dominant determinant indicator in this study is the degree of purpose of using market place.

Keywords: Market Place, Bukalapak, Partial Least Square, Behavioural Intention, Use Behaviour.

TRACK: Statistics

QUANTILE MATCHING METHOD: A CASE OF PRECIPITATION AND MAXIMUM TEMPERATURE IN MANGGARAI DISTRICT, EAST NUSA TENGGARA

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The Intergovernmental Panel on Climate Change (IPCC) states that the issue of global climate change has influenced the opinions of most of the world community and has begun to influence various development policies in many countries, including Indonesia. Manggarai District in East Nusa Tenggara Province is one of the first priorities in the classification of districts that experience the effects of drought from climate change that occur in Indonesia. The Global Climate Model (GCM) is the main predictor of climate and weather numerically and as a primary information source for assessing the effects of climate change. The Quantile Matching method is applied in this study with quantile projections in terms of making projections for climate change, where the data used is GCM data and observed data in the form of daily precipitation and daily maximum temperature. Regression between GCM data covariates with precipitation and maximum temperatures for projections of 0.1, 0.5 and 0.9 quantiles gives an accuracy value of around 50%. In this study, the results of error correction values for daily projection data are based on quantile projection values and Quantile Matching functions.
Keywords: Global Climate Model, Maximum Temperature, Precipitation, Quantile Matching

TRACK: Information Systems

Paper ID: 37

THE ANALYSIS OF TECHNOLOGY ADMISSION OF GOODS / SERVICES PROCUREMENT APPLICATION IN REGIONAL DEVICES ORGANIZATION IN THE GOVERNMENT OF EAST JAVA PROVINCE USING TECHNOLOGY ACCEPTANCE MODEL (TAM) METHOD

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Technological developments have changed the system of the government. The East Java Provincial Government utilizes Information and Communication Technology for the procurement of goods and services. This study aims to measure the level of acceptance of technology in the system and the level of satisfaction of applications for the goods and services procurement in East Java Province. The results of this study can be used to improve the system that has been made. This study uses the Technology Acceptance Model (TAM) method, in measuring using (5) aspects, namely Perception of Ease of Use, Benefits of Use, Attitudes toward behavior, Interest in Behavior, and Behavior. This study used 90 respondents. The results showed that from the regression test on the variable Perception of Ease of Use with Benefits of Use of 13.5%, Perception of Ease of Use with Attitudes Against Behavior amounted to 38.7%. Benefits of Using Attitudes Against Behavior was 23.9%, Benefits of Use with Interest Behavior amounted to 11.5%, Attitudes toward Behavior were Large with Interest in Behavior at 22.2%. Benefits of Use with Behavior amounted to 10.1%, and Interests in Behavior with Behavior were 13.2%. The results of the study show that the ease and attitude of the user have the highest value and interest in behavior. Therefore the East Java provincial government can maintain the procurement application.

Keywords: Goods/Services Procurement Application, Technology Acceptance Model (TAM), influences of admission, convenience of use, users satisfaction level;
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