

INTERNATIONAL CONFERENCE



The Second International Conference on
Engineering and Technology Development

2nd ICETD 2013

27, 28, 29 August 2013, Bandar Lampung, Indonesia



PROCEEDINGS



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Hosted by :

Faculty of Engineering and Faculty of Computer Science,
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2nd ICETD 2013

THE SECOND INTERNATIONAL CONFERENCE
ON ENGINEERING AND TECHNOLOGY DEVELOPMENT

28 -30 January 2013
Bandar Lampung University (UBL)
Lampung, Indonesia

PROCEEDINGS

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PREFACE

The Activities of the International Conference is in line and very appropriate with the vision and mission of Bandar Lampung University (UBL) to promote training and education as well as research in these areas.

On behalf of the Second International Conference on Engineering and Technology Development (2nd ICETD 2013) organizing committee, we are very pleased with the very good response especially from the keynote speaker and from the participans. It is noteworthy to point out that about 80 technical papers were received for this conference.

The participants of the conference come from many well known universities, among others : University Kebangsaan Malaysia – Malaysia, APTIKOM – Indonesia, Institut Teknologi sepuluh November – Indonesia, Surya Institute – Indonesia, International Islamic University – Malaysia, STMIK Mitra Lampung – lampung, Bandung Institut of Technology – Bandung, Lecture of The Malahayati University, B2TP – BPPT Researcher – lampung, Starch Technology Center – Lampung, Universitas Islam Indonesia – Indonesia, Politeknik Negeri Malang – Malang, University of Kitakyushu – Japan, Gadjah Mada University – Indonesia, Universitas Malahayati – Lampung, Lampung University – lampung, Starch Technology Center – Lampung, Universitas Riau – Riau, Hasanuddin University – Indonesia, Diponegoro University – Indonesia, King Abdulaziz University – Saudi Arabia, Parahyangan Catholic University – Indonesia , National Taiwan University–Taiwan, Surakarta Christian University – Indonesia, Sugijapranata Catholic University – Indonesia, Semarang University – Indonesia, University of Brawijaya – Indonesia, PPKIA Tarakanita Rahmawati – Indonesia, Kyushu University, Fukuoka – Japan, Science and Technology Beijing – China, Institut Teknologi Sepuluh Nopember – Surabaya, Researcher of Starch Technology Center, Universitas Muhammadiyah Metro – Metro, National University of Malaysia – Malaysia.

I would like to express my deepest gratitude to the International Advisory Board members, sponsor and also to all keynote speakers and all participants. I am also gratefull to all organizing committee and all of the reviewers who contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector of Bandar Lampung University (UBL) who give us endless support to these activities, so that the conference can be administrated on time

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Table Of Content

Organizing Committee	i
Table Of Content.....	v
Keynote Speaker	
1. Recent Advances in Biofuel Cell and Emerging Hybrid System Abdul Aziz Ahmad and Raihan Othman	1
2. Waste Utilization Study Tailing Gold Mine in Way Linggo-Lampung, as Fine Aggregate Materials for Producing Mortar Materials based on concept of Green Technology Lilies Widodojoko & Susilawati	8
3. Infrastructure Health Monitoring System (SHM) Development, a Necessity for Maintance and Investigation Prof. Dr. Priyo Suprobo, Faimun, Arie Febry	17
4. Four Phases Quality Function Deployment (Qfd) By Considering Kano Concept, Time And Manufacturing Cost Prof. Dr. Moses L Singgih, Dyah L. Trenggonowati, Putu D. Karningsih	22

Speaker

1. Comparative Analysis for The Multi Period Degree Minimum Spanning Tree Problem
Wamiliana, Amanto, and Mustofa Usman..... 39
2. Choosing The Right Software In Supporting The Successful of Enterprise ERP Implementation
Yodhie Yuniarthe, Idris Asmuni..... 44
3. Climate Adaptive Technology In Maintaining Vernacularism Of Urban Kampong Case study: Kampung Adat (Indiginous) Mahmud, Bandung District, West Java
Marcus Gartiwa..... 50
4. The Prospect Of Diesohol In Facing Fossil Fuel Crissis
M.C. Tri Atmodjo..... 63
5. The Potential Of Agriculture And Forestry Biomass Wastes As Source Of Bioenergy
Hardoyo..... 66
6. The Importance of Education Facility as Sustainable Urban Generation Tool
Fritz Akhmad Nuzir, Haris Murwadi and Bart Julien Dewancker 71
7. The implementation of Secton Method for Solving Systems of Non Linear Equations
Nur Rokhman 80
8. Quality Control Analysis Into Decrease The Level Defects On Coffee Product
Heri Wibowo, Sulastri and Emy Khikmawati 85
9. Public Transpotion Crisis In Bandar Lampung
Ida Bagus Ilham Malik 89
10. Geospatial Analysis of Land Use Change in Way Kuripan Watershed, Bandar Lampung City
Candra Hakim Van Rafi'1., Dyah Indriana Kusumastuti2., Dwi Jokowinarno..... 99
11. Material Utilization Technology Of Agriculture And Forestry Waste
Hardoyo..... 105
12. The Supply Chain System Of Cassava On The Tapioca Industry
Hardoyo..... 108
13. Glass Technology In Natural Light Glasses On Aperture Element In The Architecture World
Muhammad Rija & MT Pedia Aldy 113

14. An Eksperimental Permeable Asphalt Pavement Using Local Material Domato Stone On Quality Of Porous Asphalt
Firdaus Chairuddin, Wihardi Tjaronge, Muhammad Ramli, Johannes Patanduk 117
15. Coordination Of Architectural Concepts And Construction Systems
Eddy Hermanto. 129
16. Seismic Assessment of RC Building Using Pushover Analysis
Riza Ainul Hakim...... 136
17. Viscosity and Liquidity Index Relation for Elucidating Mudflow Behavior
Budijanto Widjaja and Shannon Hsien-Heng Lee...... 143
18. The Use of Pozzolanic Material for Improving Quality of Strontium Liquid Waste Cementation in Saline Environment during Nuclear Waste Immobilization Process
Muhammad Yusuf, HayuTyasUtami, Tri SulistiyoHariNugroho, SusetyoHarioPutero 148
19. Geospatial Analysis Of Land Use And Land Cover Changes For Discharge At Way Kualagaruntang Watershed In Bandar Lampung
Fieni Yuniarti, Dyah Indriana K, Dwi Joko Winarno...... 153
20. Wifi Network Design For High Performance
Heru Nurwarsito, KasyfulAmron,BektiWidyaningsih 161
21. Studi on The Efficiency Using Nature Materials in The Structural Elements of Reinforced Concrete Beam
Yasser, Herman Parung, M. Wihardi Tjaronge, Rudy Djamaluddin...... 167
22. The Research Of Slow Release Nitrogen Fertilizer Applied In Sugarcane (Saccharum Officinarum) For Green Energy Bioethanol
M.C. Tri Atmodjo, Agus Eko T. Nurul Rusdi, Sigit Setiadi, and Rina...... 179
23. Energy Utilization Technology Of Agriculture And Forestry Waste
Hardoyo...... 185
24. Implementation Of Fuzzy Inference System With Tsukamoto Method For Study Programme Selection
Fenty Ariani and Robby Yuli Endra. 189
25. The Analysis of Video Conference With ITU Standarization (International Telecommunication Union) That Joining in Inherent At Bandar Lampung University
Maria Shusanti F, Happy Reksa 201

26. The E-internal audit iso 9001:2008 based on accreditation form assessment matrix in study program for effectiveness of monitoring accreditation Marzuki, Maria Shusanti F.	207
27. The Developing Of e-Consultations For Effectiveness of Mentoring Academy Ahmad Cucus, Endang K	214
28. The Evaluation of information system performance in higher education case study with EUCS model at bandar lampung university Reni Nursyanti, Erlangga.	221
29. The Analysis Of History Collection System Based On AndroidSmartphone With Qr Code Using Qr CodeCase Study: Museum Lampung Usman Rizal, Wiwin Susanty, Sutrisno.	230
30. Application of Complaint Handling by Approach Model of ISO 10002 : 2004 to Increase Complaint Services Agus Sukoco and Yuthsi Aprilinda.	235
31. Towards Indonesian Cloud Campus Taqwan Thamrin, Iing Lukman, Dina Ika Wahyuningsih	252
32. Bridging Router to ADSL Modem for Stability Network Connection Arnes Yuli Vandika and Ruri Koesliandana.	257
33. The Effect of Use Styrofoam for Flexural Characteristics of Reinforced Concrete Beams Yasser , Herman Parung, M. Wihardi Tjaronge, Rudy Djamaluddin	261
34. The Estimation Of Bioethanol Yield From Some Cassava Variety M.C. Tri Atmodjo	273
35. Effect of Superficial Velocity of Pressure Difference on The Separation of Oil And Water by Using The T-Pipe Junctionl Kms. Ridhuan and Indarto.	277
36. The use of CRM for Customer Management at Cellular Telecommunications Industry Ayu Kartika Puspa.	293
37. Indonesian Puslit (Centre Of IT Solution) Website Analysis Using Webqual For Measuring Website Quality Maria Shusanti Febrianti and Nurhayati.	297
38. The E-internal audit iso 9001:2008 based on accreditation form assessment matrix in study program for effectiveness of monitoring accreditation Marzuki, Maria Shusanti F.	307

39. Enhancing Quality Software Through CMMI-ISO 9001:2008 and ISO 9126 Agus Sukoco	320
40. Value Analysis Of Passenger Car Equivalent Motorcycle (Case Study Kartini Road Bandar Lampung) Juniardi, Aflah Efendi	337
41. Alternative Analysis Of Flood Control Downstream Of Way Sekampung River Sugito, Maulana Febramsyah.	347
42. Analysis Of Fitness Facilities And Effective Use Of Crossing Road Juniardi, Edi Haryanto.	353
43. Study On Regional Development Work Environment Panjang Port Lands In Support Bandar Lampung City As A Service And Trade Ir. A. Karim Iksan, MT, Yohn Ferry.	359
44. Analytical And Experimental Study Bamboo Beam Concrete Hery Riyanto, Sugito, Juli	370
45. Comparative Analysis Of Load Factor Method Static And Dynamic Method (Case Study Akdp Bus Route Rajabasa - Bakauheni) A. Ikhsan Karim, MT., Ahmad Zulkily.	378
46. Optimization Utilization Of Water Resources dam Batutegei Using Method Of Linear Program Aprizal, Hery Fitriyansyah	386
47. Characteristics Generation Traffic Patterns And Movement In Residential Area (Case Study Way Kandis Residential Bandar Lampung) Fery Hendi Jaya, Juniardi,	392
48. Use Study On Slight Beam Reinforced Concrete Floor Plate in Lieu Of Secondary Beam Hery Riyanto, Sugito, Lilies Widodjoko, Sjamsu Iskandar	399
49. Observation Of The Effect Of Static Magnetic Field 0.1 Mt On A-Amylase Activity In Legume Germination Rochmah Agustrina, Tundjung T. Handayani, and Sumardi.	405
50. Effectiveness Analysis Of Applications Netsupport School 10 Based Iso / Iec 9126-4 Metrics Effectiveness Ahmad Cucus, Nelcy Novelia	413
51. Comparative Performance Analysis Of Banking For Implementing Internet Banking Reza Kurniawan	418

MATERIAL UTILIZATION TECHNOLOGY OF AGRICULTURE AND FORESTRY WASTE

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Abstract : *Indonesia have a large amount of biomass wastes, either species or quantity. If those biomass were not be treatment will be give some negative environmental impacts. To eliminate the negative impact, the biomass waste must be treatment to produce a new product with higher added value. The material utilization of biomass can mainly be categorized into the utilization of the material applying its own property, the utilization of raw material applying its composition and the utilization of it as fertilizer and feed. Conversion into fertilizer, feed, ligneous plastic, biomass mixing, biodegradable plastic are the kind of material utilizations of agriculture and forest waste*

Key word : material utilization, agriculture and forest waste, fertilizer, feed, biodegradable plasti

1. INTRODUCTION

As a agrarian country, Indonesia have a large amount of biomass waste, that carried out from domestic, agriculture and forestry activity. Those biomass waste will give negative environmental impact if not be treated. For eliminate the environmental impact, the biomass waste must be treatment to produce new product with higher added value

In the regard to the utilization of biomass, three major point must be considered. First, as biomass is generally thinly and widely dispersed, there is a large amount of biomass not easily collectable, thus there is a need to establish a more efficient way of transportation and collected method. Second, in order to effectively utilize the transported and collected biomass, it is necessary to develop also highly effective ways for practical utilization of the biomass. Third, there is need to fully consider the business feasibility, where cost reduction plays an nimportant role. That mean reducing running costs such as for collection, transportation, management and developing effective technologies as business grows.

The material utilization of biomass can mainly be categorized into the utilization of the material applying its own property, the utilization of raw material applying its composition and the utilization of it as fertilizer and feed. Of these categories, the utilization of biomass waste as fertilizier and feed continues to be widely accepted. The reasons being that are as waste material it is cheaper to convert the biomass waste into fertilizier and feed than to implement adqute treatment, in terms of strategic utilization of the raw materials, better economical ways are a crucial factor.

AGRICULTURE AND FOREST WASTE

The agriculture and forestry waste are content of major lignocellulosic material. Garotte et.al.were reported compilation of lignocellulosic waste material of different hardwoods, softwood and agriculture residue. The hardwoods contain 39-54% cellulose, 14-37% hemicelluloses and 17-30% lignin. The softwoods contain 41-50% cellulose, 11-27% hemicelluloses and 20-30% lignin. The composition of agriculture residues are ries widely.

THE MATERIAL UTILIZATION TECHNOLOGY OF BIOMASS WASTE

Details of the technologies available with material utilizations of biomass waste are given in the figure 1.

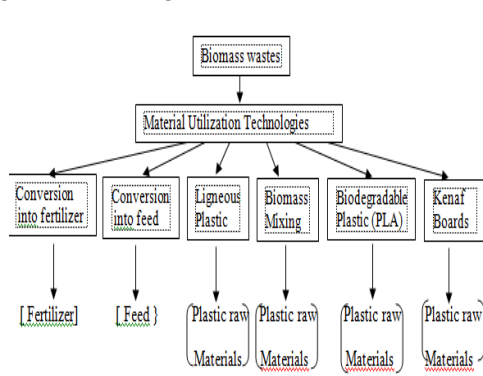


Figure 1 : Material Utilization Technologies of Biomass Waste

Composting

The composting of the biomass is a technology where the organic and inorganic substances making up the biomass are adequately converted into nutrients necessary for the growth of plants. When added to the soil without conversion, the acid created during the decomposition of organic substances, that can cause harm to plant growth. To utilized the biomass as fertilizer, it is necessary to allow air contact with organic substances for oxidation, treat the biomass above a set temperature for over a set period to destroy the bacteria and bring the decomposition to a level where all acid is eliminated. As for liquid fertilizer, the liquid containing nutrient yielded during the wet process, such as methane fermentation.

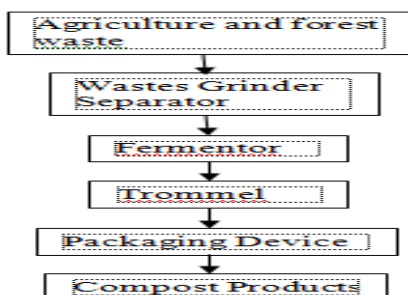


Figure 2 . Example of composting system flow chart

Conversion into feed

The conversion into feed is a technique applied to wastes rendered unusable as feed without conversion, it involves the removal of unwanted substances from the biomass, followed by adequately crushing, heating and adjusting the content of the biomass to convert it into usable feed.

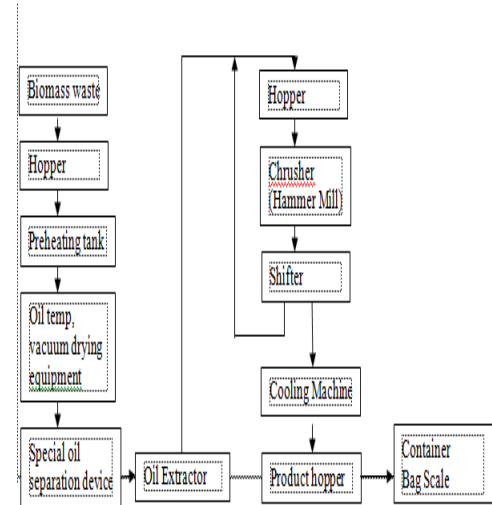


Figure 3. Example of Conversion of Biomass Waste Into Feed

Ligneous Plastic

Wood materials contain mainly cellulose, hemicelluloses and lignin. Lignin is a substance that has phenol skeleton and can be utilized to produce resin via polymerization reaction. There is technology that involves the separation of lignin and the compounding with used paper to produce ligneous plastic that has been developed. In this way, components in ligneous biomass such as thinned timber or waste timber are separated and restructured to develop ligneous plastic, thus making it possible to utilize ligneous content that are unusable as building material. However, separation of ligneous components is not an easy process, and with only lignin being utilized it remains an issue how the remaining components should be effectively used.

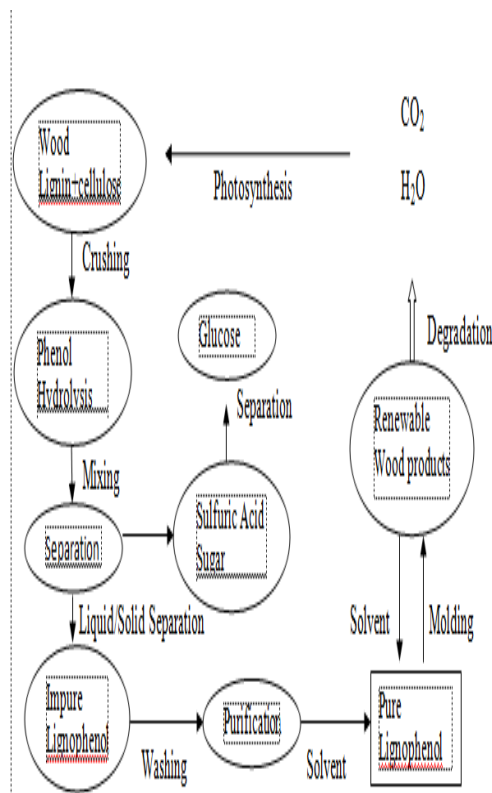


Figure 4 Utilization of Lignophenol

Biomass Mixing

The technology of biomass mixing involves the mixing of biomass with thermoplastic resin. It is the efficient utilization biomass as supplement materials fully into thermoplastic, i.e. biomass plastic. With this technology, through chemical treatment of the biomass such as esterification and oligoesterification, it is possible to bring affinity with the main ingredient thermoplastic, and to evenly disperse the uneven dispersion of biomass particles

Biodegradable Plastic

This is a utilization where plastic is produced from sugar and starchy-containing biomass waste. Lactic acid is obtained via fermentation of sugar and by polymerizing it, plastic can be made. Due to the biodegradable nature of this type of plastic, it has the merit of becoming less threatening to animals and the natural environment, since it differs from petroleum-based plastics.

2. CONCLUSION

1. The material utilization of agriculture and forest wastes can mainly be categorized into the utilization of the material applying its own property, the utilization of the material applying its composition and the utilization of it as fertilizer and feed.

2. The kind of material utilization of agriculture and forestry wastes are conversion into fertilizer, feed, ligneous plastic, biomass mixing, biodegradable plastic

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