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2018 2nd INTERNATIONAL CONFERENCE
FIRST
FORUM IN RESEARCH, SCIENCE, AND TECHNOLOGY (FIRST)
**CONFERENCE PROGRAMS
AND ABSTRACT**

**INTERNATIONAL CONFERENCE
FORUM IN RESEARCH, SCIENCE, AND TECHNOLOGY 2018**

OCTOBER 30-31, 2018

*Palembang, Province of South Sumatera
Indonesia*

Organized By :



Collaborate With :





FOREWORD FROM GENERAL CHAIR 2nd FIRST 2018 INTERNATIONAL CONFERENCE

Welcome to 2nd FIRST 2018, It is with a great pleasure that we extend our warm welcome to all the participants of the 2nd FIRST 2018 International Conference, Forum in Research, Science, and Technology. This conference is held for second times and organized by State Polytechnic of Sriwijaya. The first conference in the series was held in State Polytechnic of Sriwijaya, Palembang, South Sumatera, Indonesia on October 18-19, 2016. It is a good collaboration of State Polytechnic of Sriwijaya, University of Cologne, University of Sunderland, International Islamic University Malaysia, and Politeknik Seberang Perai Malaysia. The 2nd FIRST 2018 International Conference has attracted 109 participants from 6 countries.

The 2nd FIRST 2018 particularly encouraged research students and developing academics to present and to discuss new and current work in the field of 3 Tracks, including Engineering and Science (Track 1), Computer Science and ICT (Track 2), and Social Science (Track 3). 109 selected papers were presented from 137 peer reviewed paper by reviewers drawn from the scientific committee, external reviewers and editorial board.

Finally, as the General Chair of the Conference, I would like to express my deep appreciation to all members of the Steering Committee, Technical Program Committee, Organizing Committee and Reviewers who have devoted their time and energy for the success of the event.

In the end, I hope you enjoy the conference and the beauty of Palembang.

Dr.Ir. Rusdianasari, M.Si.
General Chair of 2nd FIRST 2018



FOREWORD FROM DIRECTOR OF STATE POLYTECHNIC OF SRIWIJAYA

Dear all participants, welcome to Palembang, Indonesia. It is my great pleasure to have all of you who have come from many parts of the world, to join the 2nd FIRST 2018 International Conference, Forum in Research, Science, and Technology. This conference is initiated and organized by State Polytechnic of Sriwijaya in collaboration with State University of Cologne, University of Sunderland, International Islamic University Malaysia, and Politeknik Seberang Perai Malaysia.

It is also my great pleasure to see that this conference is an effective media to link the researchers from many parts of the world. The theme for the 2nd FIRST 2018 is “Applied Technology for Sustainable Development in Supporting Prosperous Human Existence”. It is expected it will be worthwhile platform for researchers to present their finding in the areas on multidisciplinary of Engineering and Science (Track 1), Computer Science and ICT (Track 2), and Social Science (Track 3). It has also provided an opportunity for the professionals and researchers to learn and share about the latest development and research in those 3 tracks.

Finally, on behalf of the conference committee, I would like to express my gratitude and great appreciation towards all of the authors, reviewers, and participants for the great contribution to ensure the success of this event.

Dr. Ing. Ahmad Taqwa, M.T.
Director of State Polytechnic of Sriwijaya

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RUNDOWN
2nd FIRST 2018 INTERNATIONAL CONFERENCE
(FORUM IN RESEARCH SCIENCE AND TECHNOLOGY)
Horison Ultima Hotel, Palembang, South Sumatera, Indonesia
Tuesday – Wednesday, October 30-31, 2018

TUESDAY, October 30, 2018					
Horison Hotel Ultima, KERINCI Room, 3 rd Floor					
No.	Session	Person in Charge	Time Allotment	Liaison Officer	
1.	Registration	Event Section Committee	07.00 – 07.30	M.Miftakhul Amin, S.Kom., M.Eng	
2.	The Opening Ceremony	Event Section Committee	07.30 – 08.30		
	Tari Tanggai				
	Indonesian National Anthem				
	Do’a				
	Chair Report Speech				
	Speech and Opening Remarks by Director of State Polytechnic of Sriwijaya				
	Souvenirs Gift, Group Photos				
3.	Coffee Break	Event Section Committee	08.35 – 08.45		
PLENARY SESSION					
No.	Keynote Speaker	Affiliation	Time Allotment	Moderator	Liaison Officer
1.	Dr. Ing. Ahmad Taqwa, M.T.	Politenik Negeri Sriwijaya	08.45 – 09.15	Mr. Firdaus, S.T., M.T.	Dr. Eng. Herlambang, M.Kom
2.	Prof. Dr. Rahmat Budiarto	Al Baha University, Saudi Arabia	09.15 – 09.45		
3.	Prof. Dr. Werner Rammensee	Cologne University, Germany	09.45 – 10.15		
4.	Prof. Erry Yulia Triblas Adesta	International Islamic University, Malaysia	10.15 – 10.45		
5.	Assoc. Prof. Dr. Augustus E. Osseo-Asare	University of Sunderland, United Kingdom	10.45 – 11.15	Dr. Markoni Badri, S.E., M.B.A.	M.Miftakhul Amin, S.Kom., M.Eng
6.	Prof. Badri Munir Sukoco, S.E., MBA.,Ph.D	Universitas Airlangga	11.15 – 11.45		

No.	Invited Speaker	Affiliation	Time Allotment	Moderator	Liaison Officer
1.	Assoc. Prof. Pindo Tutuko, Ph.D.	University of Merdeka Malang	11.45 – 12.30	Dr. Nurul Aryanti	Dr. Eng. Herlambang, M.Kom
2.	Ir. Indra Chandra Setiawan, M.T.	Senior Manager PT. Toyota Motor Manufacturing Indonesia			
3.	Dr. Mohammed Yahya Azahrani	Al Baha University, Saudi Arabia			
Break, Sholat Dzuhur, Lunch			12.30 – 13.15		
PARALEL SESSION					
No.	Theme	Room	Time	Moderator	Articles
1.	TRACK 1 (Electrical Engineering, Mechanical Engineering, Civil Engineering)	ROOM 1 (Leuser)	13.30 – 17.20	Agus Subriyanto, S.T., M.T. / Deris Stiawan, M.T., Ph.D./ Nyayu Latifah Husni, S.T., M.T.	22
2.	TRACK 1 (Industrial Engineering, Energy, Biology, Cehmical Engineering)	ROOM 2 (Dempo I)	13.30 – 17.30	Ir. Jaksen M. Amin, M.Si. / Doeslohal Djumrianti, S.E.MIS., Ph.D / Koryati, M.Pd	23
3.	TRACK 1 (Chemical Engineering)	ROOM 3 (Dempo II)	13.30 – 17.20	Anerasari, M.B.Eng., M.Si / Dr. Welly / M.Miftakhul Amin, S.Kom., M.Eng	22
4.	TRACK 2 (Computer Science, , Computer Engineering, Information System, Informatics Management) TRACK 3 (English)	ROOM 4 (Semeru I)	13.30 – 16.40	Ummasyro, S.E. Med.M / Dr. Eng. Herlambang, M. Kom /	18
5.	TRACK 3 (Management Economics, Business Administration, Accounting)	ROOM 5 (Semeru II)	13.30 – 17.40	Dr. Jalaluddin Sayuti / Dr. Periansyah / Dr. Sari Lestari ZR	24

WEDNESDAY, October 31, 2018
Horison Hotel Ultima, GOLDEN Room, 2nd Floor

No.	Session	Person in Charge	Time Allotment	Liaison Officer
1.	Registration	Event Section Committee	07.30 – 08.00	Event Section Committee
No.	Session	Speakers	Time Allotment	Liaison Officer
1.	Materi 1: 7 Things to Do to Publish Your Paper in Accredited & International Journal (IRJBS):	M. Eko Y. Napitupulu M. Ikom	08.00 – 09.00	M.Miftakhul Amin, S.Kom., M.Eng
2.	Cofee Break		09.00 – 09.15	Event Section Committee
3.	Materi 2 : How to Write Reseach Paper	Marieska Verawaty, S.Si., M.Si, Ph.D / Deris Stiawan, M.T., Ph.D	09.15 – 12.30	Nyayu Latifah Husni, S.T., M.T.
4.	Break, Sholat Dzuhur, Lunch		12.30 – 13.30	Event Section Committee
No.	Session	Speakers	Time Allotment	Liaison Officer
1.	Couching Clinic and Workshop Session 1	Couching Clinic and Workshop Team	13.30 – 15.00	Ade Silvia Handayani, S.T., M.T.
2.	Cofee Break		15.15 – 15.30	Event Section Committee
3.	Couching Clinic and Workshop Session 2	Couching Clinic and Workshop Team	15.30 – 16.30	Dr. Sari Lestari ZR
4.	Closing		16.30 – 17.00	Dr. Marieska Lupikawaty

Theme : TRACK 1 (Electrical Engineering, Mechanical Engineering, Civil Engineering)
Room : ROOM 1 (Leuser)
Moderator : Agus Subiyanto, S.T., M.T. / Deris Stiawan, M.T., Ph.D./
Nyayu Latifah Husni, S.T., M.T.
Time : 13.30 – 18.05 WIB
Articles : 22

ID	Time	Title	Authors with affiliation and country
864	13.30 – 13.40	Coffee grouping Control System using TCS3200 Sensor based on XBEE PRO	Sarjana, Emilia Hesti, Sholihin, Halimah Tussyadyah (Politeknik Negeri Sriwijaya)
865	13.40 – 13.50	Mimo Printed Dipole Antenna For WIMAX Network Usage Application	Suzanzefi, Ciksadan, Irawan Hadi, R.A. Halimah Thusyadiyah (Politeknik Negeri Sriwijaya)
1010	13.50 – 14.00	Motion Control Analysis of a Spherical Robot as a Surveillance Robot	Tresna Dewi, Pola Risma, Yurni Oktarina, RD Kusumanto (Politeknik Negeri Sriwijaya)
1030	14.00 – 14.10	Wajanbolic Reflection Antenna For 4G Service in Urban and Sub Urban Areas	Jon Endri, Ade Silvia Handayani, Raudatul Jannah (Politeknik Negeri Sriwijaya)
1082	14.10 – 14.20	Enhancement of Navigation Systems of Mobile Robots in Gas Leakage Searching	Nyayu Latifah Husni (Politeknik Negeri Sriwijaya), Nadya Lukita(Politeknik Negeri Sriwijaya), Masayu Annisah(Politeknik Negeri Sriwijaya), Ade Silvia Hadayani(Politeknik Negeri Sriwijaya), Adella Rialita(Politeknik Negeri Sriwijaya), Siti Nurmaini (Universitas Sriwijaya), Irsyadi Yani (Universitas Sriwijaya),
1126	14.20 – 14.30	Higher Education Role in Supporting Indonesian Government Policy in Developing Renewable Energy	Ahmad Taqwa (Politeknik Negeri Sriwijaya)
1137	14.30 – 14.40	Energy Transfer Provision Based on RF- Radio Frequency as Established Solution of Learning Process Using Laptop and Wireless Projector	Suroso, Sopian Soim, Ade Silvia Handayani, Ahmad Taqwa (Politeknik Negeri Sriwijaya)
1164	14.40 – 14.50	Transmission Performance Analysis of TDMA Radio and MAC Communication of TDMA Protocol in TDMA Radio	Ferry Nando, (Nittan Valve Kabushiki Kaisha, Japan) A. Permatasari (Telecommunication Engineering, Politeknik Negeri Sriwijaya), Lindawati (Telecommunication Engineering, Politeknik Negeri Sriwijaya) , Ade Silvia Handayani (Telecommunication Engineering, Politeknik Negeri Sriwijaya)
921	14.50 – 15.00	Milling Process Prediction Model of Sugarcane Juice Using Artificial Neural Networks (ANN)	Devie Oktarini (Department of Industrial Engineering, University of Tridinanti (UTP), Amrifan Saladin Mohruni (Universitas Sriwijaya), Safian Sharif (Dept. of Materials Manuf. and Ind. Engineering, Universiti Teknologi Malaysia), Muhammad Yanis (Associate Professor in Mechanical Engineering Sriwijaya University), Madagaskar (Indonesia)

1007	15.00 – 15.10	Experimental Study of Low-Rank Coal From South Sumatra used in Humidifier and Flash Dryer	Irwin – Bizzzy (Mechanical Engineering Department Sriwijaya University), Riman Sipahutar (Mechanical Engineering Department Sriwijaya University), Eddy Ibrahim (Mining Engineering Department Sriwijaya University), Muhammad Faizal (Chemical Engineering Department Sriwijaya University)
1024	15.10 – 15.20	Investigation of Finite Element Modelling on Thin-Walled Machining of Ti6Al4V using DEFORM-3D	Amrifan Saladin Mohruni (Mechanical engineering Department Faculty of Engineering Sriwijaya University), Muhammad Zahir (Mechanical Engineering Department Sriwijaya University), Muhammad Yanis (Mechanical Engineering Department Sriwijaya University), Safian Sharif (Department of Materials Manufacture and Industrial Engineering Universiti Teknologi Malaysia), Irsyadi Yani (Mechanical Engineering Department Sriwijaya University)
1031	15.20 – 15.30	Optimization of Molding Parameters for a Micro Gear with Taguchi Method	Min-Wen Wang (Mechanical Engineering Department, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan), Fatahul Arifin (Mechanical Engineering Department, National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan), Thi Truc-Ngan Huynh (Industrial Engineering and Management Department, National Kaohsiung University of Applied Sciences, Kaohsiung, Taiwan)
	15.30 – 15.40		BREAK
1032	15.40 – 15.50	The effect of Air Flow Rate and Ratio between Coal and Coconut Shell on Heat Energy Produced in an Updraft Gassifier	Riman Sipahutar (Mechanical Engineering Department Sriwijaya University), Diah Kusuma Pratiwi (Mechanical Engineering Department, Engineering Faculty, Sriwijaya University), Amir Arifin ((Mechanical Engineering Department, Engineering Faculty, Sriwijaya University), Irwin Bizzzy ((Mechanical Engineering Department, Engineering Faculty, Sriwijaya University)
1161	15.50 – 16.00	Toward Real Time IoT Based Paste Monitoring System for Small to Medium Enterprise (SME)	Erry YT Adesta (Department of Manufacturing and Materials Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia), I Hilmy (Department of Manufacturing and Materials Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia), Avicenna (Department of Manufacturing and Materials Engineering, International Islamic University Malaysia (IIUM), Jalan Gombak, 53100 Kuala Lumpur, Malaysia) and D Agusman (Jurusan TeknikMesin, FakultasTeknik, UniversitasMuhammadiyah Prof. Dr. HAMKA, Jl. Limau 2 KebayoranBaru, Jakarta Selatan, Indonesia)
1163	16.00 – 16.10	Reducing CO ₂ Emissions from Land Transport Sector in Indonesia: Case Study Automobiles Sector	Indra Chandra Setiawan (Department of Mechanical & Industrial Engineering, Faculty of Engineering, GadjahMada University, Indonesia), Indarto (Department of Mechanical & Industrial Engineering, Faculty of Engineering, GadjahMada University, Indonesia), and Deendarlianto (Department of Mechanical & Industrial Engineering, Faculty of Engineering, GadjahMada University, Indonesia)
898	16.10 – 16.20	High Quality Concrete by Using Admixture Superplasticizer and Additional Lime Off	Kosim (Politeknik Negeri Sriwijaya), Raja Marpaung (Politeknik Negeri Sriwijaya)), Zainuddin (Politeknik Negeri Sriwijaya), Darma Prabudi (Politeknik Negeri Sriwijaya)
925	16.20 – 16.30	Criteria Analysis, Weight and Priority for Handling Bridges in Kudus District using	Erwin DW Prasetyo (Dinas Pekerjaan Umum dan Penataan Ruang Kabupaten Kudus, Jawa Tengah, Indonesia), Mudjiastuti Handajani (Magister Teknik Sipil Universitas Diponegoro Semarang) dan Ismiyati (Magister Teknik Sipil Universitas Diponegoro Semarang).

		AHP and Promethee II methods	
997	16.30 – 16.40	A Scouring Patterns Around Pillars of Sekanak River Bridge	Achmad Syarifudin (Civil Engineering department, Universitas Bina Darma, Palembang), Dewi Sartika (Balai Besar Wilayah Sungai Sumatera VIII, Ministry of Public Works and Housing Settlement, Indonesia)
1022	16.40 – 16.50	Irrigation Maintenance Priority Analysis (Case Study: Irrigation Areas in Salatiga City)	Hendarto Efendi (Public Works and Spatial Planning Department of Salatiga City, Central Java, Indonesia), Sri Sangkawati (Master in Civil Engineering Diponegoro University Semarang, Indonesia), Pranoto Samto Atmodjo (Master in Civil Engineering Diponegoro University Semarang, Indonesia)
1034	16.50 – 17.00	The Influence of Temperature Changes on Performance Latson (AC-WC) Plastic Waste with the Marshall Method	Mahmuda (Civil Engineering Departement, Sriwijaya State Polytechnic,Indonesia), Sumiati (Civil Engineering Departement, Sriwijaya State Polytechnic,Indonesia), Puryanto (Civil Engineering Departement, Sriwijaya State Polytechnic,Indonesia) and M. Prawira. W (Civil Engineering Departement, Sriwijaya State Polytechnic,Indonesia)
1084	17.00 – 17.10	Utilization of Local Material of South Sumatra for Porous Asphalt Type AC-WC to Improve Security Levels of Road and Environmentally Friendly	Amiruddin (State Polytechnic of Sriwijaya, Indonesia), Ibrahim (State Polytechnic of Sriwijaya, Indonesia), I Sulianti (State Polytechnic of Sriwijaya, Indonesia) and Agus Subrianto (State Polytechnic of Sriwijaya, Indonesia)
1162	17.10 – 17.20	Tracing the City Pattern of Netherlands and Indonesia using Depth Calculation and Connectivity	Pindo Tutuko (Department of Architecture, University of Merdeka Malang, Indonesia), Nurhamdoko Bonifacius (Department of Architecture, University of Merdeka Malang, Indonesia), Dani Yuniawan (Department of Industrial Engineering, University of Merdeka Malang, Indonesia Department of Industrial Engineering, University of Merdeka Malang, Indonesia), Adisti Safrilia (Department of Architecture, University of Merdeka Malang, Indonesia), Nurhamdoko Bonifacius (Department of Architecture, University of Merdeka Malang, Indonesia), Mochamad Rizqi Junianto (Master Program, Department of Architecture, University of Merdeka Malang, Malang 65146, Indonesia), Reynold Johan Aleksander Telnoni (Master Program, Department of Architecture, University of Merdeka Malang, Malang 65146, Indonesia)

Theme : TRACK 1 (Industrial Engineering, Energy, Biology)
Room : ROOM 2 (Dempo I)
Moderator : Ir. Jaksen M. Amin, M.Si. / Doeslohal Djumrianti, S.E.MIS., Ph.D / Koryati, M.Pd
Time : 13.30 – 17.35 WIB
Articles : 23

ID	Time	Title	Authors with affiliation and country
778	13.30 – 13.40	IoT Technology Monitoring, Controlling and Data Logging for ATS on Grid Connected Solar-Wind Hybrid System	Budiman (Applied Master of Renewable Energy Engineering, Renewable Energy Engineering Department, Politeknik Negeri Sriwijaya, Jalan Srijaya Negara Bukit Besar, Palembang, South Sumatera Indonesia 30139), Ahmad Taqwa (Electrical Engineering, Electronics Department, Politeknik Negeri Sriwijaya, Jalan Srijaya Negara Bukit Besar, Palembang, South Sumatera Indonesia 30139), RD.Kusumanto (Electrical Engineering, Electronics Department, Politeknik Negeri Sriwijaya, Jalan Srijaya Negara Bukit Besar, Palembang, South Sumatera Indonesia)
783	13.40 – 13.50	Design of Mini Horizontal Wind Turbine for Low Wind Speed Area	Agum Try Wardhana (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang, 30139, Indonesia ¹), Ahmad Taqwa (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, 30139, Indonesia), Tresna Dewi (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, 30139, Indonesia).
877	13.50 – 14.00	A Micro Hydro Pelton Turbine Prototype (Review of the effect of water debit and nozzle angle to rotation and pelton turbine power)	Septa Eka Lesmana (Applied Master of Renewable Energy Engineering, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia), Leila Kalsum (Chemical Engineering Department, Renewable Energy Engineering, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia), and Tri Widagdo (Mechanical Engineering Department, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia).
922	14.00 – 14.10	Optimalization of Antimicrobial Production from Endophytic Fungus Sporothrix sp. LBKURCC43 by Modifying Carbon and Nitrogen Sources of Fermentation Media	Abdul Rohman Wali (Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Riau), Nursyirwani (Department of Marine Sciences, Faculty of Fishery and Marine Sciences, Universitas Riau), Saryono (Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Riau)
929	14.10 – 14.20	Achievement Analysis of One Cylinder Diesel Engine Using Virgin Coconut Oil Biodiesel	Burhan Yuliansyah (Applied Master of Renewable Energy Engineering Politeknik Negeri Sriwijaya, Palembang 30139, Indonesia), Triwidagdo (Mechanical Engineering Department Politeknik Negeri Sriwijaya Palembang 30139,Indonesia), Abuhasan (Chemical Engineering Department Politeknik Negeri Sriwijaya, Palembang 30139, Indonesia)
980	14.20 – 14.30	Optimization of Monocrystalline Solar Panels Using Reflector Scanning Technology	Fiqri Al Faruqi (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya,Palembang 30139, Indonesia), RD. Kusumanto (Electrical Engineering Department, Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang 30139, Indonesia), and Abu Hasan (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang 30139, Indonesia).
988	14.30 – 14.40	Performance Test of Pelton Micro-Hydro Turbine With The Variations of Nozzle Output Angle, Blades	Echa Okdinata (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya,Palembang ,Indonesia), Abu Hasan (Chemical Engineering Department, Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Indonesia), and Carlos Sitompul (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Indonesia)

		Number and Water Flow Discharge to Produce The Maximum Output Power	
992	14.40 – 14.50	Minimum Power of Solar Panel Movement in Solar Tracker System Prototype	Aldony Reco Putra (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang Indonesia), RD Kusumanto (Electrical Engineering Department, Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang, Indonesia), and Ahmad Taqwa (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia.)
995	14.50 – 15.00	PLC Application as an Automatic Transfer Switch for On-Grid PV System; Case Study PLTS Jakabaring Palembang	Achmad Kurniawan (Politeknik Negeri Sriwijaya, Palembang, Indonesia), Ahmad Taqwa (Politeknik Negeri Sriwijaya, Palembang, Indonesia),, and Yohandri Bow (Politeknik Negeri Sriwijaya, Palembang, Indonesia)
1035	15.00 – 15.10	Automatic Cooling System For Efficiency and Output Enhancement of a Pv System Application in Palembang, Indonesia	Hadli Harahap (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Tresna Dewi (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Rusdianasari (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia)
1053	15.10 – 15.20	Sea Salt Deposition Effect On Output And Efficiency Losses Of The Photovoltaic Installation System; A Case Study In Palembang, South Sumatera	Firdaus Setiawan (Renewable Energy Department, Politeknik Negeri Sriwijaya Palembang, Indonesia), Tresna Dewi (Electro Department, Politeknik Negeri Sriwijaya Palembang, Indonesia) and Syahirman Yusi (Bussiness Administration Department, Politeknik Negeri Sriwijaya Palembang, Indonesia)
1066	15.20 – 15.30	Effects of Direct Glass Film Installation on to Photovoltaic Solar Panel	Hendra Kusuma Negara (Applied Master of Renewable Energy Engineering, PoliteknikNegeriSriwijaya Palembang), RD. Kusumanto (Electrical Engineering Department, PoliteknikNegeriSriwijaya Palembang), Abu Hasan (Chemical Engineering Department, Gajah Mada University)
	15.30 – 15.40		BREAK
1070	15.40 – 15.50	FFA Reduction in A Waste Cooking Oil as A Raw Material For Biodiesel With Activated Coal Ash Adsorbent	Endang Susilowati (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Indonesia), Abu Hasan (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara, Bukit Besar, Palembang), and Aida Syarif (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara, Bukit Besar, Palembang)
1087	15.50 – 16.00	Cooling Effect With Heat Sink Fan to Improve Solar Panel (Photovoltaic) Performance	Efsilon K.A. Fatoni (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya Palembang, Indonesia), Ahmad Taqwa (Electrical Engineering Department Politeknik Negeri Sriwijaya Palembang, Indonesia), Rd. Kusumanto (Electrical Engineering Department Politeknik Negeri Sriwijaya Palembang, Indonesia)
1103	16.00 – 16.10	Effect of Reaction Temperature for Biodiesel Quality Using Microwaves Technology	RA Nurul Moulita (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang), Rusdianasari (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang), and Leila Kalsum(Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang)
1105	16.10 – 16.20	The Potential of Microwave in the	Sandhy Yunsari (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Indonesia), Rusdianasari (Chemical

		manufacture of Biodiesel by Using Crude Palm Oil (CPO)	Engineering Department, Politeknik Negeri Sriwijaya, Indonesia), and A. Husaini (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Indonesia)
1116	16.20 – 16.30	Experimental Investigation Scenarios of Partial Shade On The PV (Photovoltaic) Module Application in Palembang, Indonesia	Herdian Wibowo (Applied Master of Renewable Energy Engineering, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Yohandri Bow (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Carlos, RS (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia)
1129	16.30 – 16.40	Community Empowerment at Sri Tiga Village, Sumber Marga Telang Sub-District, Banyuasin Regency, The Province of South Sumatera; Technology for Green Production of Nata De Coco and Swamp Water Filtration	Marieskaverawaty (Biology Department, Faculty of Math and Natural Science, Sriwijaya University, South Sumatera, Indonesia), B. Lakitan (Faculty of Agriculture, Sriwijaya University, South Sumatera, Indonesia) and S.Herlinda (Plant Pest and Disease Department, Faculty of Agriculture, Sriwijaya University, Indonesia)
1130	16.40 – 16.50	Effect of Potential Toxic Cyanobacteria Planktothrix agardhii isolated from A Retention Pond in Palembang to Cyprinus carpio L: A Preliminary Study	R. Wulandari (Biology Department, Faculty of Math and Natural Science, Sriwijaya University, South Sumatera, Indonesia), M. Amalia (Biology Department, Faculty of Math and Natural Science, Sriwijaya University, South Sumatera, Indonesia), R. Aryawati (Marine Department, Faculty of Math and Natural Science, Sriwijaya University, South Sumatera, Indonesia), SA. Hamim (Faculty of Engineering, University of Indo Global Mandiri, South Sumatera, Indonesia) and M. Verawaty (Biology Department, Faculty of Math and Natural Science, Sriwijaya University, South Sumatera, Indonesia)
1140	16.50 – 17.00	Analysis of Biodiesel Conversion on Raw Material Variation Using Statistical Process Control Method	Winny Andalia (Department of Industrial Engineering Faculty of Engineering, Universitas Tridianti, Palembang, 30129, Indonesia), , I Pratiwi (Department of Industrial Engineering Faculty of Engineering, Universitas Tridianti, Palembang, 30129, Indonesia), S Arita (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya, Palembang, 30139, Indonesia)
1141	17.00 – 17.10	Nitrogen Gas Production By Pressure Swing Adsorption (Psa) Method Using Carbon Molecular Sieve (Cms) As Oxygen Adsorption	Agus Manggala (Energy Engineering, Polytechnic State of Sriwijaya), A Zikri (Energy Engineering, Polytechnic State of Sriwijaya), Erlinawati (Energy Engineering, Polytechnic State of Sriwijaya), Sutini PL (Energy Engineering, Polytechnic State of Sriwijaya), M Arifin (Energy Engineering, Polytechnic State of Sriwijaya)
1142	17.10 – 17.20	Hydrogen Storage From The Result Of Reactor Ace (Aluminium Corrosion And Electrolysis) Production By Pysisorption Method	A Zikri (Energy Engineering, Polytechnic State of Sriwijaya), Erlinawati (Energy Engineering, Polytechnic State of Sriwijaya), L Trisnaliani (Energy Engineering, Polytechnic State of Sriwijaya), A Aswan (Energy Engineering, Polytechnic State of Sriwijaya), A Firdausia (Energy Engineering, Polytechnic State of Sriwijaya)
1160	17.20 – 17.30	Effectiveness of Electrocoagulation Method in Processing Integrated Wastewater Using Aluminum and Stainless Steel Electrodes	Rusdianasari (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang), Jaksen (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang), Ahmad Taqwa (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang), Yudi Wijarnako (Electrical Engineering Department, Politeknik Negeri Sriwijaya, Palembang)

Theme : TRACK 1 (Chemical Engineering)
Room : ROOM 3 (Dempo II)
Moderator : Anerasari, M.B.Eng., M.Si / Dr. Welly / M.Miftakhul Amin, S.Kom., M.Eng
Time : 13.30 – 17.20 WIB
Articles : 22

ID	Time	Title	Authors with affiliation and country
899	13.30 – 13.40	Potential of Clay in Coal Mining of Tanjung Enim Area As a Filler on Rubber Compound	Abu Hasan (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), L. Kalsum (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), , M Yerizam (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), Robert Junaidi (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), M Taufik (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), M Aznury (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia), and Fatria (Chemical Engineering Department, State Polytechnic of Sriwijaya Palembang Indonesia)
900	13.40 – 13.50	Influence The Addition of Lapindo Mud is Calcined to the Quality of Cement Podzoland by Using Electric Furnace	Robert Junaidi (teaching staff Bachelor Degree (D IV) Chemical Engineering State Polytechnic of Sriwijaya), Abu Hasan (teaching staff of Master of Applied Renewable Energy Technique of State Polytechnic of Sriwijaya), dan Mustain Zamhari (teaching staff Bachelor Degree (D IV) Chemical Engineering State Polytechnic of Sriwijaya)
959	13.50 – 14.00	An Analysis Of The Impact Of The Coal Mining Activities On The Condition Of Water Quality In The Coal Mining Areas In South Sumatra	Marhaini (Department of Chemical Engineering, Faculty of Engineering, Muhammadiyah University, Palembang, Indonesia), Legiso (Department of Chemical Engineering, Faculty of Engineering, Muhammadiyah University, Palembang, Indonesia), Heny Juniar (Department of Chemical Engineering, Faculty of Engineering, Muhammadiyah University, Palembang, Indonesia), Mubin (Department of Chemical Engineering, Faculty of Engineering, Muhammadiyah University, Palembang, Indonesia)
1014	14.00 – 14.10	Sodium silicate composite filled by zinc oxide as low resistance thermal grease	Wahyu Jati Kusuma (¹ Department of Chemical Engineering, State Polytechnic of Sriwijaya, Srijaya Negara Street, Palembang 30139, Indonesia), Fadarina (Department of Chemical Engineering, State Polytechnic of Sriwijaya, Srijaya Negara Street, Palembang 30139, Indonesia), and Abu Hasan (¹ Department of Chemical Engineering, State Polytechnic of Sriwijaya, Srijaya Negara Street, Palembang 30139, Indonesia)
1068	14.10 – 14.20	Adsorption Model in Removal of Direct Synthetic Dyes in Aqueous Solution onto Tea Waste	Lia Cundari (Chemical Engineering Department Faculty of Engineering Universitas Sriwijaya Indralaya Indonesia), Bazlina Dawami Afrah (Chemical Engineering Department Faculty of Engineering Universitas Sriwijaya Indralaya Indonesia), Dwi Indah Utami (Chemical Engineering Department Faculty of Engineering Universitas Sriwijaya Indralaya Indonesia), Natra Ilhani Matondang (Chemical Engineering Department Faculty of Engineering Universitas Sriwijaya Indralaya Indonesia)
1071	14.20 – 14.30	Production of Biogas from Artificial Substrates (Oil, Protein and Cellulose) by Indigenous Anaerob Bacteria	Putri Agustriyani, Muhammad Said (Chemical Engineering Department, Faculty of Engineering, Universitas Sriwijaya, Palembang, 30139, Indonesia), Muhammad Faizal (Chemical Engineering Department, Faculty of Engineering, Universitas Sriwijaya, Palembang, 30139, Indonesia), Bazlina Dawami Afrah (Chemical Engineering Department, Faculty of Engineering, Universitas Sriwijaya, Palembang, 30139, Indonesia)
1076	14.30 – 14.40	Mechanical properties of bioplastics product from	Sopiah Zainal (Teknik Kimia, Politeknik Negeri Sriwijaya), Yuniar (Teknik Kimia, Politeknik Negeri Sriwijaya), Martha Aznury (Teknik

		Musa paradisica formatypica concentrate with plasticiser variables	Kimia, Politeknik Negeri Sriwijaya), and Melianti (Teknik Kimia, Politeknik Negeri Sriwijaya)
1077	14.40 – 14.50	Oxygen Adsorption Kinetics Study in PSA (Pressure Swing Adsorber) for Nitrogen Production	Indah Purnamasari (Chemical Engineering Department, State Polytechnic of Sriwijaya), M Yerizam (Chemical Engineering Department, State Polytechnic of Sriwijaya), A Hasan (Chemical Engineering Department, State Polytechnic of Sriwijaya), and R Junaidi (Chemical Engineering Department, State Polytechnic of Sriwijaya)
1078	14.50 – 15.00	Characteristics of Activated Charcoal from Coconut Midribs in Jumputan Waste Adsorption Process	Enggal Nurisman (Chemical Engineering Department Sriwijaya University, Palembang Indonesia), Syaiful (Chemical Engineering Department Sriwijaya University, Palembang Indonesia), Rahmatullah (Chemical Engineering Department Sriwijaya University, Palembang Indonesia)
1089	15.00 – 15.10	Geochemical Organic of Airbenakat Black shale in Berau Areas, Jambi	Putri Dwi Afifah (Sriwijaya University), Budhi Setiawan (Sriwijaya University)
1091	15.10 – 15.20	O-rings material deterioration due to contact with biodiesel blends in a dynamic fuel flow	Leily Nurul Komariah (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya, Palembang, Indonesia), S Arita (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya, Palembang, Indonesia), F Aprianjaya (Energy and Environmental Engineering Laboratory Universitas Sriwijaya, Indralaya Ogan Ilir Indonesia), M G Novaldi (Energy and Environmental Engineering Laboratory Universitas Sriwijaya, Indralaya Ogan Ilir, Indonesia), M F Fathullah (Energy and Environmental Engineering Laboratory Universitas Sriwijaya, Indralaya Ogan Ilir, Indonesia)
1092	15.20 – 15.30	Mathematics Instructional Package Based on Creative Problem Solving to Improve Additive Reasoning Ability and Creative Thinking Ability	Yulianto Wasiran (Departement of Chemical Engineering, State of Polytechnic Sriwijaya. Jalan Srijaya Negara Bukit Besar. Palembang, Indonesia)
	15.30 – 15.40		BREAK
1097	15.40 – 15.50	Lipid Extraction from Mikroalgae Spirulina Platensis for Raw Materials Biodiesel	Leila Kalsum (Applied Renewable Energy Engineering Study Program, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia), Erwana Dewi (Chemical Engineering Study Program, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia), Elina Margarety (Chemical Engineering Study Program, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia) and Aisyah Suci Ningsih (Chemical Engineering Study Program, State Polytechnic of Sriwijaya, Palembang 30139, Indonesia)
1099	15.50 – 16.00	The Characteristics of Particle Board from Empty Fruit Palm Oil (Elaeis guineensis Jacq) by using an Adhesive of Liquid Guava Rod Bark	Siti Chodijah (Staff Edukatif of Chemical Engineering Department, Polytechnic Negeri Sriwijaya), Erwana Dewi (Staff Edukatif of Chemical Engineering Department, Polytechnic Negeri Sriwijaya) and Jaksen (Staff Edukatif of Chemical Engineering Department, Polytechnic Negeri Sriwijaya)
1100	16.00 – 16.10	Production of Glucose From Waste Bark Acacia Mangium Using Delignification and Chemical Hydrolysis Process	Susila Arita (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya Jl. Raya Prabumulih Indralaya-Palembang-South Sumatra), Fitri Hadiyah (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya Jl. Raya Prabumulih Indralaya-Palembang-South Sumatra), Rizky Amalia (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya Jl. Raya Prabumulih Indralaya-Palembang-South Sumatra), Elsi Rosmalisa (Department of Chemical Engineering Faculty of Engineering, Universitas Sriwijaya Jl. Raya Prabumulih Indralaya-

			Palembang-South Sumatra)
1107	16.10 – 16.20	Pectin Ekstraktion From Kepok Banana Peels (Musa paradisiaca fomatypica) As Biodegradable Film Plastic	Siti Chodijah (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia), M Husaini (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia), M Zaman (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia) and Hilwatulisan (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia)
1109	16.20 – 16.30	The Effect of Reaction Time and pH on the Modification Process of Sago Starch Oxidation	Yuniar (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia), Elina Margaretty (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia), Fadarina (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia), Anerasari M (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia) and Ida Febriana (Chemical Engineering Department, State Polytechnic of Sriwijaya, South Sumatera, Indonesia)
1117	16.30 – 16.40	Treatment of Leachate from Garbage using Electrocoagulation Type MP-P (MonoPolar-Paralel) Methode	Anerasari Meidinariasty (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Rusdianasari (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Yohandri Bow (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), Irawan Rusnadi (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia), A. Lutfi Fuadi (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Palembang, Indonesia.)
1125	16.40 – 16.50	Analysis Of Cooler Performance In Supply Air Feed For Nitrogen Production Process Using Pressure Swing Adsorption (PSA) Method	Adi Syakdani (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), Yohandri Bow (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), Rusdianasari (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), and Muhammad Taufik (Chemical Engineering Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia)
1131	16.50 – 17.00	Fuel Production from LDPE and HDPE Plastic Waste	Netty Herawati (Chemical Engineering Department, Faculty of Engineering, Universitas Muhammadiyah Palembang, Indonesia), Mardwita Mardwita (Chemical Engineering Department, Faculty of Engineering, Universitas Muhammadiyah Palembang, Palembang 30263, Indonesia), Eka Sri Yusmartini (Chemical Engineering Department, Faculty of Engineering, Universitas Muhammadiyah Palembang, Indonesia), Robiah Robiah (Chemical Engineering Department, Faculty of Engineering, Universitas Muhammadiyah Palembang Indonesia)
1133	17.00 – 17.10	Effect of Time and Concentration of Sulfuric Acid on Yield Bioethanol Produced In Making Bioethanol from Peat Soil	Kiagus Ahmad Roni (Chemical Engineering Study Program, Engineering Faculty, Muhammadiyah University of Palembang), Merisha Hastarina (Industrial Engineering Study Program, Engineering Faculty, Muhammadiyah University of Palembang), Netty Herawati (Chemical Engineering Study Program, Engineering Faculty, Muhammadiyah University of Palembang)
1138	17.10 – 17.20	Banana Midrib as Substitute for Pulp Production	Fadarin (Jurusan Teknik Kimia, Politeknik Negeri Sriwijaya, Palembang 30139), Mustain Zamhari (Jurusan Teknik Kimia, Politeknik Negeri Sriwijaya, Palembang), Selastia Yulianti (Jurusan Teknik Kimia, Politeknik Negeri Sriwijaya, Palembang), Ibnu Hajar (Jurusan Teknik Kimia, Politeknik Negeri Sriwijaya, Palembang), Wahyu Jati Kusuma (Jurusan Teknik Kimia, Politeknik Negeri Sriwijaya, Palembang)

Theme : Computer Science, Computer Engineering, Information System, Informatics Management, English,
Room : ROOM 4 (Semeru I)
Moderator : Ummasyro, S.E. Med.M / Dr. Eng. Herlambang, M. Kom
Time : 13.30 – 16.40 WIB
Articles : 18

ID	Time	Title	Authors with affiliation and country
785	13.30 – 13.40	Implementation of Customer Relationship Management (CRM) With User Centered Design (UCD) User Satisfaction to Measure E-Library PT. Pupuk Sriwidjaja Palembang	Ali Ibrahim(Research laboratory Entreprenuer Resource Planning Faculty of Computer Science), Dahlia(Department of Information Systems Faculty of Computer Science Sriwijaya University), Derdi Kurniawa(Department of Information Systems Faculty of Computer Science Sriwijaya University), Dini Ayu Lestari(Department of Information Systems Faculty of Computer Science Sriwijaya University), Enky Ratnasari(Department of Information Systems Faculty of Computer Science Sriwijaya University), M.Hengky Setiawan(Department of Information Systems Faculty of Computer Science Sriwijaya University)
1080	13.40 – 13.50	Weather Classification based on Hybrid Cloud Image Using Principal Component Analysis(PCA) and Linear Discriminant Analysis(LDA)	Yulia Hapsari(Master of Informatics Engineering, Universitas Sriwijaya, Palembang, 30139, Indonesia), Syamsuryadi(Department of Informatics, Faculty of Computer Science, Universitas Sriwijaya, Palembang, 30139, Indonesia)
1017	13.50 – 14.00	Implementation of Calibration in Gas Hazardous CO and CO2 in Closed Room Using Fuzzy Logic	Slamet Widodo(Department Polytechnic of Sriwijaya, Srijaya Negera Street, Bukit Besar, Palembang - Indonesia), M.Miftakhul Amin(Department Polytechnic of Sriwijaya, Srijaya Negera Street, Bukit Besar, Palembang - Indonesia), A.Bahri Joni M(Department of Polytechnic of Sriwijaya, Srijaya Negera Street, Bukit Besar, Palembang - Indonesia)
1025	14.00 – 14.10	A Framework of Promoting Government Services Using Social Media: Sudan E-Government Case Study	M. S. Adrees(College of Computer Science and Information Technology, Albaha University, Albaha, Saudi Arabia), O. E. Sheta(College of Computer Science and Information Technology, Albaha University, Albaha, Saudi Arabia), M. K. Omer(College of Computer Science and Information Technology, Albaha University, Albaha, Saudi Arabia), D. Stiawan(Dept. of Computer Engineering, Faculty of Computer Science, Universitas Sriwijaya, Palembang, Indonesia), R. Budiarto(College of Computer Science and Information Technology, Albaha University, Albaha, Saudi Arabia)
989	14.10 – 14.20	Geographic Information System of Health Service Place in Palembang	Arsia Rini(Informatics Management Study Program, Politeknik PalComTech, Palembang, 30129, Indonesia), Heki Aprianto(Informatics Management Study Program, Politeknik PalComTech, Palembang, 30129, Indonesia)
991	14.20 – 14.30	Database Design for Website Service Guide “Waterfall Tour South Sumatera	Meidyan Permata Putri(Information Systems Study Program, STMIK PalComTech Palembang), Hendra Effendi(Informatics Engineering Study Program,STMIK PalComTech Palembang)
1012	14.30 – 14.40	The Small and Medium Enterprise (SME) Promotion Website of Pedado Village	Rezania Agramanisti Azdy(Informatics Study Program, STMIK PalComTech, Indonesia), Febriyanti Darnis (Information System Study Program, STMIK PalComTech, Indonesia)

853	14.40 – 14.50	Advancement Parking Application Using MEAN Stack: A Narrative Review	Dian Nugraha (School of Graduates Studies, Management and Science University, Shah Alam, Selangor Malaysia), Falah Y. H. Ahmed (Faculty of Information Science & Engineering, Management and Science University, Shah Alam, Selangor, Malaysia)
927	14.50 – 15.00	Review of Progress Expert System: to Detect Diseases in Humans, Plants, and Animals	Febria Anjara(Management and Science University, Malaysia), Adam Amril Jaharadak (Management and Science University, Malaysia)
928	15.00 – 15.10	Blended Learning as Instructional Media : A review of The Literature	Nora Listiana(School of Graduate Studies, Management and Science University, University Drive, Seksyen 13,40100 Shah Alam, Selangor, Malaysia), Dr. Adam AmrilJaharadak(School of Graduate Studies, Management and Science University, University Drive, Seksyen 13,40100 Shah Alam, Selangor, Malaysia)
1054	15.10 – 15.20	Quality Control System (QCS) of Tourism Industry Sector in Palembang City	Fatmariyani(Informatics Management, Palcomtech Polytechnic, Palembang,Indonesia), Alan Saputro(Informatics Management, Palcomtech Polytechnic, Palembang,Indonesia)
1065	15.20 – 15.30	The Implementation of Ant Colony Algorithm in Finding The Shortest Travel Route of Palembang Tourism by Android Based	Safira Faizah(Studi Program DIV Informatics Management Informatics Management Department, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar Street, Bukit Lama, Ilir Barat I, Palembang 30139), Leni Novianti, S.Kom., M.Kom.(Studi Program DIV Informatics Management Informatics Management Department, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar Street, Bukit Lama, Ilir Barat I, Palembang 30139), Nita Novita, S.E., M.M.(Studi Program DIV Informatics Management Informatics Management Department, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar Street, Bukit Lama, Ilir Barat I, Palembang 30139) ³
	15.30 – 15.40		BREAK
1106	15.40 – 15.50	The Application of Supply Chain Management (SCM) Methods in Practicum Material Supply in Informatics Management Major, State Polytechnic of Sriwijaya	Sony Oktapriandi S.Kom., M.Kom.(Informatics Management D4 Study Program Informatics Management Major, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar, Bukit Lama, Ilir Barat I, Palembang 30139), Indra Satriadi S.T. M.Kom.(Informatics Management D4 Study Program Informatics Management Major, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar, Bukit Lama, Ilir Barat I, Palembang 30139), Hetty Meileni S.Kom., M.T.(Informatics Management D4 Study Program Informatics Management Major, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar, Bukit Lama, Ilir Barat I, Palembang 30139), Desi Apriyanty S.E., M.Si (Informatics Management D4 Study Program Informatics Management Major, State Polytechnic of Sriwijaya Jl. Srijaya Negara Bukit Besar, Bukit Lama, Ilir Barat I, Palembang 30139),
1110	15.50 – 16.00	Application of Mapping of The Raskin Aid Using AHP Fuzzy Method based on Geographic Information System	Leni N, S.Kom., M.Kom.(Study Program of Informatics Management Diploma IV Polytechnic of Sriwijaya, Palembang), Isnaini Azro, S.Kom., M.Kom.(Study Program of Computer Engineering Department of Informatics Management, Polytechnic of Sriwijaya, Palembang), Robinson, S.Kom.,M.Kom.(Study Program of Informatics Management Diploma IV Polytechnic of Sriwijaya, Palembang)
1112	16.00 – 16.10	Design of Mobile Campus Sriwijaya State Polytechnic Application for Android	Dewi Irmawati.(Informatics Management of Diploma IV Informatics Management Major, State Polytechnic of Sriwijaya, Palembang), Leni N(), Devi Sartika(Informatics Management of Diploma IV Informatics Management Major, State Polytechnic of Sriwijaya, Palembang), Ienda Meiriska(Informatics Management of Diploma IV Informatics Management Major, State Polytechnic of Sriwijaya, Palembang)

1127	16.10 – 16.20	Application Design for Lecturer Advancement in Sriwijaya State Polytechnic Palembang	Indri Ariyanti(Informatic Management Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), Delta Khairunnisa(Informatic Management Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), Nita Novita(), and M. Aris Ganiardi(Informatic Management Department, Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia)
1135	16.20 – 16.30	The Implementation of E-Tourism in South Sumatera Province	Hetty Meileni(Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), Sony Oktapriandi(Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia), and Desi Apriyanty(Politeknik Negeri Sriwijaya, Jl. Srijaya Negara Palembang, 30139, Indonesia)
1155	16.30 – 16.40	Using Microsoft Office: Powerpoints in Making Picture-Strips to Improve Students' Speaking and Writing Skills in ELT	Ida Machdarifah (State Polytechnic of Sriwijaya), Zakaria (State Polytechnic of Sriwijaya)

Theme : TRACK 3 (Economy Management, Administration Bussiness, Accounting)
Room : ROOM 5 (Semeru II)
Moderator : Dr. Jalaluddin Sayuti / Dr. Periansyah / Dr. Sari Lestari ZR
Time : 13.30 – 17.30 WIB
Articles : 23

ID	Time	Title	Authors with affiliation and country
1069	13.30 – 13.40	The Analysis of Commitment, Discipline and Motivation Effects on The Non-Domiciled Civil Servants` Performance in Prabumulih Mayor Office	Dibyantoro L. Suhairi Hazisma.(Lecturers of Business Administration Department - State Polytechnic of Sriwijaya), Jalaluddin Sayuti.(Lecturers of Business Administration Department - State Polytechnic of Sriwijaya), Munparidi(Lecturers of Business Administration Department - State Polytechnic of Sriwijaya)
1072	13.40 – 13.50	The Influence of Training on Lecturer`s Performance at Politeknik Negeri Sriwijaya Palembang	Muhammad Noval, Ida Wahyuningrum ^h Yusniarti, Henny Madora (Management Informatic Department Politeknik Negeri Sriwijaya Jl. Srijaya Negara Bukit Besar-Palembang South Sumatera Indonesia 30139
1108	13.50 – 14.00	Strategic Sustainable Development for A Prosperous Human Existence Through Applied Technological Innovations	Augustus Ernest Osseo-Asare (Senior Lecturer, Strategy and International Management, Sunderland Business School, Faculty of Business, Law and Tourism, University of Sunderland, St Peter`s Way, Sunderland, SR6 0DD, England, United Kingdom.)
1006	14.00 – 14.10	Market Orientation, Environmental Orientation, Characteristics of Individual Entrepreneurs, and Broadscope Information on Performance of Smes in Palembang City Through Entrepreneurship Orientation as Mediated Variable (Case Study: Three Years Established Smes)	Fetty Maretha(Business Administration Major, Sriwijaya State Polytechnic, Palembang, Indonesia), Ahmad Ari Gunawan (Informatics Management Major, Sriwijaya State Polytechnic, Palembang, Indonesia)
1019	14.10 – 14.20	The Revitalization of Indonesian Vocational Education Through The Public - Private Partnership	Delfiazi Puji Lestari (LPDP / BUDI DN Batch 2017 awardee, Lecturer at STIA & P Annisa Dwi Salfarizi Palembang, South Sumatera, Indonesia. Student of doctoral program in Doctor of Public Administration at Diponegoro University Semarang Indonesia)
1095	14.20 – 14.30	The Readiness of Hospitality Service of Drivers Online to Serve International Visitors: A Case Study Go Car and Go Grab in Palembang	Desloehal Djumrianti (Senior Lecturer at Department of Business Administration, State Polytechnic of Sriwijaya, Indonesia), Hanifati(Senior Lecturer at Department of Business Administration, State Polytechnic of Sriwijaya, Indonesia),N Rasyid(Senior Lecturer at Department of Business Administration, State Polytechnic of Sriwijaya, Indonesia), and P Mandiangan(Senior Lecturer at Department of Business Administration, State Polytechnic of

			Sriwijaya, Indonesia)
1114	14.30 – 14.40	The Factors Affecting Students for Choosing The Business Administration Departement as A College in Higher Education	Afrizawati, SE, M.Si (Business Administration State Polytechnic Sriwijaya Palembang Indonesia), Dr. Paisal, SE, M.Si (Business Administration State Polytechnic Sriwijaya Palembang Indonesia) Hendra Sastrawinata, SE, M.M (Business Administration State Polytechnic Sriwijaya Palembang Indonesia)
1120	14.40 – 14.50	Ownership Structure, Corporate Social Responsibility (CSR) Disclosure and Company's Financial Performance	Neneng Miskiyah(Department of business administration, Polytechnic State of Sriwijaya, Indonesia), Hadi Jauhari(Department of business administration, Polytechnic State of Sriwijaya, Indonesia), Sari Lestari Zainal Ridho(Department of business administration, Polytechnic State of Sriwijaya, Indonesia)
990	14.50 – 15.00	Analysis of the Influence of Tourist / Tourism Satisfaction on Competitiveness of Tourism Destination in Palembang Citi	Mutiara Lusiana Annisa (Accounting Study Program, Politeknik PalComTech, Palembang, 30129, Indonesia), Ganda Hutasoit (Accounting Study Program, Politeknik PalComTech, Palembang, 30129, Indonesia)
993	15.00 – 15.10	Multimedia Implementation in Tourism Promotion for Increase Regional Original Revenue by Pagaram City Government	J Febriantoko(Accounting Study Program, Politeknik Palcomtech, Palembang, Indonesia), Hendra Rotama (Visual Communication Design Study Program, Politeknik Palcomtech, Palembang, Indonesia)
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1049	15.40 – 15.50	The Application Factors of Good Government Governance for New Expansion Area	Maria (Accounting Department State Polytechnic of Sriwijaya, Jl. Srijaya Negara -Bukit Besar Palembang), Rosy Armaini(Accounting Department State Polytechnic of Sriwijaya, Jl. Srijaya Negara -Bukit Besar Palembang), Nurhasanah(Accounting Department State Polytechnic of Sriwijaya, Jl. Srijaya Negara -Bukit Besar Palembang), Yevi Dwitayani(Accounting Department State Polytechnic of Sriwijaya, Jl. Srijaya Negara -Bukit Besar Palembang)
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1111	16.20 – 16.30	The Effect of Good Governance and Accrual Accounting on Apparatus Behavior with Supporting Devices as Moderators	Henny Yulsiati, SE, M.Ak.(Lecturer in Accounting Department State Polytechnic of Sriwijaya), Sandrayati, SE, M.Sc., Ak.(Lecturer in Accounting Department State Polytechnic of Sriwijaya), Dra. Susi Ardiani, M.Si.(Lecturer in Accounting Department State Polytechnic of Sriwijaya), Sarikadarwati, SE, M.Sc., Ak., CA(Lecturer in Accounting Department State Polytechnic of Sriwijaya)
1113	16.30 – 16.40	The Quality Of SIMDA BMD and User Satisfaction : Study on The Government of South Sumatera Province	Kartika Rachma Sari(Department of Accounting, Sriwijaya State Polytechnic, Palembang , Indonesia), Zainal Arifin(Department of Accounting, Sriwijaya State Polytechnic, Palembang , Indonesia), Desi Indriasari(Department of Accounting, Sriwijaya State Polytechnic, Palembang , Indonesia) , Choirudin ³ , and Rita Martini(Department of Accounting, Sriwijaya State Polytechnic, Palembang , Indonesia)
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Analysis of Cooler Performance in Air Supply Feed for Nitrogen Production Process Using Pressure Swing Adsorption (PSA) Method

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Analysis of Cooler Performance in Air Supply Feed for Nitrogen Production Process Using Pressure Swing Adsorption (PSA) Method

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Abstract. Air is one of the essential needs that used by living things either directly or indirectly. The demand for nitrogen in the chemical industry in the world continues to increase every year, especially in the fertilizer industry. In the industry, nitrogen can be used to manufacture ammonia or start tipping on an ammonia plant, also to protect materials from bacterial and fungal disorders. In addition, in the field of nitrogen transport is often to add to vehicle restrictions Pump the wheels using nitrogen will make the wheels more durable and the wheel rim is not easily damaged. Based on the amount of demand for nitrogen gas, the nitrogen production process is conducted by Pressure Swing Adsorption (PSA) method. The adsorption capacity of the adsorbent depends on the temperature, pressure, type of adsorbent and characteristic of the adsorbent. In this case, the temperature at the process is one of the most important parameters, the temperature, in this case, is the temperature of the adsorbate. When a gas or adsorbate molecule is attached to the surface of the adsorbent, there will be an energy release called an exothermic event. The reduced temperature will increase the amount of adsorbate adsorbed and also for the opposite event. Because of that, it is needed an air conditioner in the form of a cooler that serves to maintain and reduce the air temperature of the feed (adsorbate) does not experience an increase when operating conditions take place. The highest nitrogen purity was 95.7%, at 7 bar PSA, cooling fluid flow rate 35.4 m/s, daily cooling 41.58%, and air feed temperature 30.7°C.

1. Introduction

Nitrogen is a principal compound in the chemical industry. Nitrogen is an inert compound so it is suitable for a wide range of applications covering various aspects of chemical manufacturing, processing, handling and shipping [1]. Nitrogen demand in the chemical industry in the world continues to increase every year, especially in the fertilizer industry. Among Asian countries, Indonesia's nitrogen demand is 6% of world demand. Besides being used in the fertilizer industry, nitrogen is also used in various other industries such as the food industry, electronics, manufacturing, medical, mining, and transportation. Considering the high demand for nitrogen in various industries, it takes a high nitrogen production. Ordinary nitrogen is obtained from free air, this is because the content of the air is mostly composed of nitrogen as much as 78% [2]. In general, nitrogen is separated from the air using cryogenic methods. This method is conducted by decreasing the temperature to reach a very low temperature until the critical temperature is reached. The main disadvantage of cryogenic distillation is an ineffective use of energy [3]. Energy is wasted by converting gas to liquid, and a lot of pure gas is wasted during the process [4]. In addition, nitrogen products in the form of



liquid make nitrogen cannot be used directly by the public because temperatures of -196°C must be understood in their use. [4]. The energy use of cryogenic systems is 2.56 kWh / kg liquid nitrogen. Along with the development of technology, the process of nitrogen production is also developing. This is proven by the non-cryogenic technologies in the form of membrane systems and the Pressure Swing Adsorption system [5]. PSA technology is a technology that separates air by the method of adsorption. In this technology, the air component is adsorbed based on differences in adsorption equilibrium and differences levels of diffusion [6]. Nitrogen production using the PSA system uses the energy of $0.31\text{--}0.63\text{ kWh / kg}$ nitrogen gas. And also nitrogen products using the PSA method can be purchased and sent quickly [7]. In the PSA system, there is two adsorber containing adsorbents in the form of Carbon Molecular Sieve (CMS). At high pressure, the CMS will absorb oxygen and allow nitrogen to pass through the desired purity level. In the nitrogen production process with the PSA method, the resulting nitrogen purity is influenced by the adsorption power of the adsorbent used. The adsorption power of the adsorbent depends on temperature, pressure, contact time, type of adsorbent and adsorbent characteristics [8].

In this case, the temperature of the adsorption process is one of the most important parameters. It is the adsorbate temperature. When the gas or adsorbate molecules attach to the surface of the adsorbent, there will be a release of a number of energies called exothermic events. The reduced temperature will increase the amount of adsorbate adsorbed and also for the opposite event. It is also because if the adsorbate temperature is passing through the adsorbent with high temperature conditions, it will cause the adsorbate molecule to diffuse more quickly into the adsorbent pores. Therefore, there will be competition between adsorbates which will cause a decrease in the amount of adsorption [9]. So, before reaching the specified cycle time, the CMS has saturated faster. And then this will cause CMS is not able to adsorb O_2 molecules and cause O_2 molecules to be missed together with N_2 molecules. If this happens, it will affect the level of purity of the nitrogen product produced. In this case, it is needed an air conditioner in the form of a cooler that serves to maintain and reduce the air temperature of the feed (adsorbate) does not experience an increase when operating conditions take place. Under these conditions, the authors take the title Analysis of Cooler Performance In Supply Air Feed For Nitrogen Production Process Using Pressure Swing Adsorption (PSA) Method.

1.1. Air

Air is a mixture of gases that make up the earth's atmosphere. The composition of air consists of nitrogen, oxygen, argon, and carbon dioxide and the number of other constituents that are very small. The atmospheric air composition can be seen in Table 1[10].

Table 1. Atmospheric air composition

Gas	Volume (%)
Nitrogen (N_2)	78.08
Oxygen (O_2)	20.94
Carbon dioxide (CO_2)	0.03
Argon (Ar)	0.093
Neon (Ne)	0.0018
Helium (He)	0.0005
Krypton (Kr)	Trace
Xenon (Xe)	Trace
Ozone (O_3)	0.00006
Hydrogen (H_2)	0.00005

1.2. PSA System

PSA technology originally came from laboratory studies from Skarstom [11], Montgareuil and Domine [12]. The change from laboratory scale to industrial scale tends to slow down but has been growing over the past few decades.

PSA is one of the technologies used to separate several types of gases from a gas mixture according to the type of molecular characteristics and their affinity from the adsorbent material. Special adsorption materials such as carbon, are used as molecular sieves so it is easier to absorb the main gas at high pressure. The next process is the swing process, which is the process of changing from high pressure to low pressure to dissipate or release compounds absorbed by adsorbent materials [13].

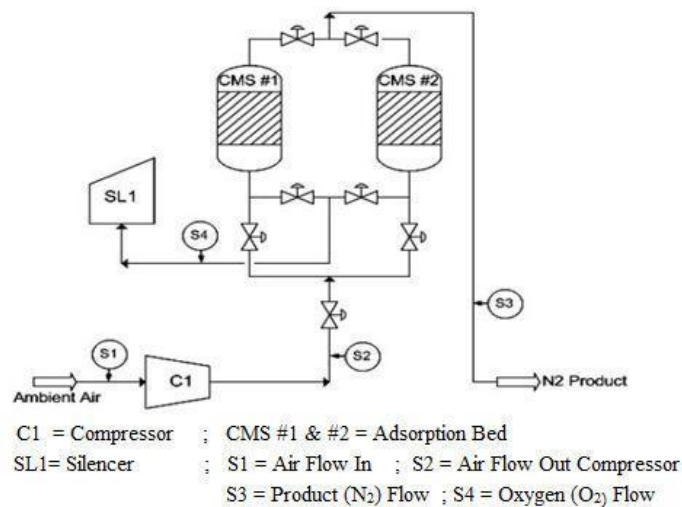


Figure 1. Flowsheet PSA Process

The technology of separating nitrogen from the air with the PSA process has the advantages, that if the nitrogen needed is less than 560 m³ / hr (20,000 SCFH) then this process is cheaper compared to cryogenic processes. Also, other advantages of the PSA process is during the shutdown, losing its components is smaller than cryogenic, and PSA Products can be sent and used quickly. For the disadvantages of PSA process itself are, if the flow rate increases to 1120 m³ / hr (40,000 SCFH), it is cheaper if it is produced with cryogenic processes, another downside is it takes a long time to repair and maintain compressor and it is very noisy compared to other processes.

1.3. Adsorption

Adsorption is the process of accumulating adsorbate on the surface of the adsorbent caused by the pulling force between molecules or a result of the force field on the surface of the solid (adsorbent) which attracts gas, vapor, or liquid molecules. Adsorption power on adsorbent depends on temperature, pressure, type of adsorbent and adsorbent characteristics.

The factors that could influence the adsorption power on the adsorbent [14] are first, Adsorbate Pressure for each type of adsorption based on molecular interactions that occur, the adsorbate pressure will affect the number of adsorbate molecules. In physical adsorption, if the adsorbate pressure increases, the number of adsorbate molecules will also increase. However, in chemical adsorption, the number of moles of the adsorbate will decrease if the adsorbate pressure increases. Second, Temperature of the adsorbate when gas molecules or adsorbates attach to the surface of the adsorbent, there will be a release of a certain amount of energy called an exothermic condition. The reduced

temperature will increase the amount of adsorbate adsorbed as well for vice versa, heating or activating the adsorbent will increase the adsorption capacity of the adsorbate than could affect the adsorbent pores to open and damaging the adsorbent so that the absorption ability can be decrease. Third, Time Contact produces maximum adsorption capacity at equilibrium time. Fourth, Types of Adsorbates, can affect the absorption of adsorption, which are: Molecular Size, the appropriate adsorbate is important so that the adsorption process can occur, because molecules that can be adsorbed are molecules which have smaller or equal diameters with adsorbent pore diameter and Polarity Substances when the diameter is the same, polar molecules are stronger adsorbed than non-polar molecules. More polar molecules can replace less polar molecules which are first adsorbed. Fifth, Characteristics of adsorbent surface area and pore volume could affect the adsorption process where the adsorbate number of adsorbed molecules increases with increasing surface area and pore volume of the adsorbent.

1.4. Carbon Molecular Sieve (CMS)

A molecular sieve is a material unit that has small/fine pores where the size is very standardized and uniform. These pores can selectively "continue" and "capture" passing molecules based on molecular size. Material that can be used as a molecular sieve including zeolite and carbon. Molecular sieve from carbon or Carbon Molecular Sieve (CMS) is produced through special manufacturing procedures so that it has a selective and very narrow pore size. Raw materials can be in the form of chemicals such as polyvinylidene dichloride and phenolic resin or using natural materials in the form of anthracite coal and coconut shells. The surface of CMS is basically non-polar and is often used in nitrogen production processes with high purity by the PSA method [15].

CMS is an adsorbent that has an important role in the process of gas separation. Various types of adsorbents derived from carbon such as activated carbon and CMS has different pore sizes. This is because each adsorbent is produced differently. In general, the physical properties of CMS can be seen in Table 2.

Table 2. Physical Properties of Carbon Molecular Sieve

Particle Shape	: C
Internal Porosity	: 35 – 50%
Density	: 0,5 – 0,7 kg/L
Pore diameter	: 0,3 – 0,6 nm
Adsorptive capacity kg/kg (dry)	: 0,5-0,2

CMS included in Molecular Sieve 3A. Molecular Sieve type 3Å has a composition of 0.4 K₂O: 0.6 Na₂O: 1.0 Al₂O₃: 2.0 SiO₂: 4.5 H₂O, made by substituting potassium cations from sodium ions in the 4A structure so that it can reduce porosity effective up to 3Å [16]. When CMSN2 is used in separation in the PSA process, oxygen molecules have a smaller diameter than nitrogen molecules. So that oxygen molecules can penetrate pores faster. Therefore, nitrogen will achieve a higher purity while almost all oxygen is absorbed [17].

2. Research Method

The design of nitrogen production equipment can be seen in Figure 2. In general, this design consists of 5 parts, which are a compressor, air tank, adsorber column, buffer tank, and a nitrogen tank. A 7 bar compressor is installed at the beginning of the process to increase atmospheric air pressure. Then, this

pressurized air is filtered using a filter, and the process of reducing the water content by absorption by silica gel is occurred.

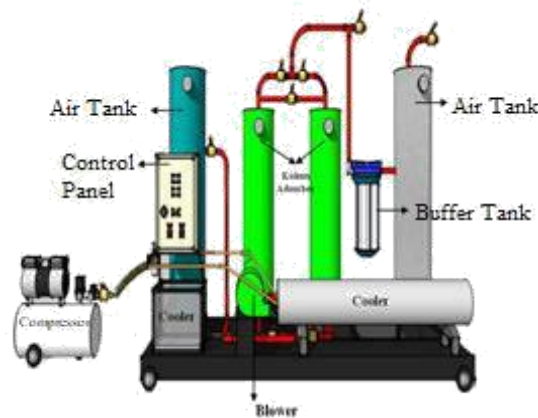


Figure 2. Design of Nitrogen Production Equipment using the PSA method

The air tank used is made of a capacity of 20.10 L. The adsorber column consists of 2 columns with a capacity of 14.62 L each. The adsorber column is made of stainless steel, this material is chosen because the pressure on the adsorber column will reach a maximum pressure of 7 bar. In each adsorber column, there is an adsorbent bed. Inside the adsorbent bed with a capacity of 10 L contains adsorbents in the form of CMS each of 8 kg.

3. Results And Discussion

Cooler is a heat exchanger used to cool liquids or gases by using water or gas as a coolant medium. In the cooler, there is no phase change, and along with the development of current technology, the cooler uses air as a coolant with the help of a fan. The type of cooler used in this study is the Double-Pipe Exchanger because it can be used in small fluid flow rates and high operating pressure. Heat transfer that occurs in the fluid is a convection process, while the conduction process occurs in the pipe wall. According to Sholeh [18] heat flows from high temperature fluids to low temperature fluids. In this research, cooler performance, in this case, is how much cooler ability to reduce the temperature of the hot air from the compressor which will be used as raw material for nitrogen production, because that the reduced temperature will increase the amount of adsorbate that adsorbed as well as for the opposite event.

To find out the cooler performance used in the research, it is necessary to know the effect of the variation of the cooling fluid velocity with the operating conditions of the constant heat fluid velocity on the cooler efficiency produced, it can be seen from the value of Long Mean Temperature Difference (LMTD), the overall heat transfer coefficient (U) produced, and heat received by the cooling fluid (Q). So that it can be known the relationship between cooler efficiency and the temperature of feed air produced on nitrogen purity, it is because of the value of the feed temperature that influenced by how the cooler works. Based on the results of the research and calculations, we got the graphs 3 and 4 below.

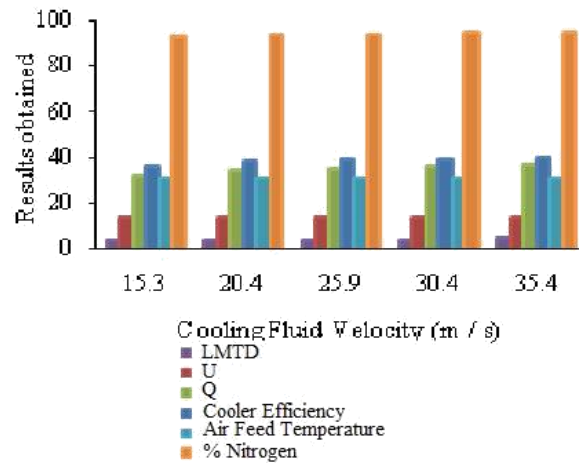


Figure 3. Graph of Effect of Cooling Fluid Velocity on LMTD, U, Q, Cooler Efficiency, Air Feed Temperature, % Nitrogen produced during PSA 6 Bar Pressure Conditions.

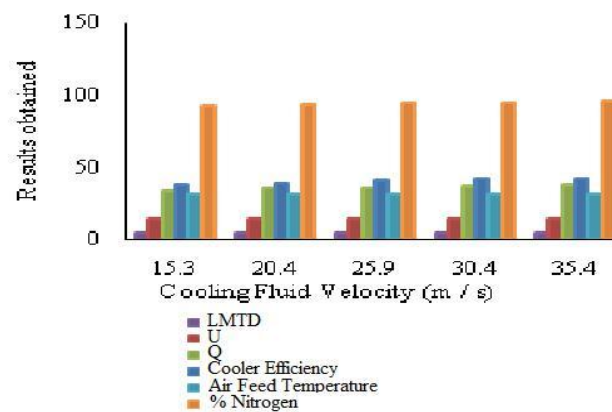


Figure 4. Graph of Effect of Cooling Fluid Speed on LMTD, U, Q, Cooler Efficiency, Air Feed Temperature, % Nitrogen produced during PSA 7 Bar Pressure Conditions

Based on Figure 3 and 4, it can be seen that the faster the velocity of the cooling fluid is, the greater its efficiency of the cooler produced due to the influence of the amount of heat received by the cooling fluid (Q), LMTD and the overall heat transfer coefficient (U) produced. So that the greater the efficiency of the cooler is, the greater its % nitrogen produced due to a decrease in feed air temperature. It can be seen from the data of research observations and the results of the condition of 6 bar PSA pressure, with hot fluid velocity as a steady operating condition was 44.45 m/s, when the cooling fluid velocity at 15.3 m/s, the heat received by the cold fluid (Q) was 32.16 Btu/hr, LMTD was obtained 4.1330°F , and the overall heat transfer coefficient (U) was obtained $13.71 \text{ Btu/hr.ft}^2.^{\circ}\text{F}$, thus the result of cooler efficiency was obtained at 36.4%, and with the flow rate, the feed air temperature was obtained 31.1°C , and the nitrogen concentration was 92.5%. When the cooling fluid velocity was 20.4 m/s, the heat received by the cold fluid (Q) was obtained 34.50 Btu/hr, the LMTD was obtained 4.1820°F , and the overall heat transfer coefficient (U) was obtained $13.63 \text{ Btu/hr.ft}^2.^{\circ}\text{F}$, thus the result of cooler efficiency was obtained at 38.25%, and with the flow rate, a feed air temperature was 31°C , and a nitrogen concentration was obtained at 93.1%. When the cooling fluid velocity was 25.9 m/s, the

heat received by cold fluid (Q) was obtained 35.17 Btu / hr, the LMTD was obtained 4.3104 F, and the overall heat transfer coefficient (U) was obtained 13,66 Btu/hr.ft².°F, thus the result of cooler efficiency was obtained at 38.99%, and with the flow rate, the feed air temperature was 30.9°C, and the nitrogen concentration was obtained at 93.5%. When the cooling fluid velocity was 30.4 m/s, the heat received by cold fluid (Q) was obtained 35.83 Btu/hr, LMTD was obtained 4.5040°F, and the overall heat transfer coefficient (U) was obtained 13.68 Btu/hr.ft².°F, the result of cooler efficiency was 39,73%, and with this flow rate, the feed air temperature was 30.9°C and a nitrogen concentration was obtained by 94.2%. When the cooling fluid velocity was 35.4 m / s, the heat received by cold fluid (Q) was obtained 36.50 Btu/day, LMTD was obtained 4,7379 °F, and the overall heat transfer coefficient (U) was obtained 13.70 Btu/hr.ft².°F, thus the result of cooler efficiency was 40.47%, and with this flow rate, the feed air temperature was 30.8°C, and nitrogen concentration was obtained at 94.2%. However, when the cooling fluid velocity was 30.4 m / s and 35 m / s, the result of % nitrogen is equal to 94.2%, although the efficiency has increased and the feed air temperature has decreased, it is because the saturation factor of the CMS in absorbing oxygen, because the CMS regeneration process is not good, so there are still oxygen molecules trapped inside the CMS pores. Likewise the result of observations and calculations at 7 bars. For the relationship between fluid velocity and the value of efficiency produced is in accordance with the theory according to Irvan Prananda and Prabowo on his research that the faster the air velocity, the greater the potential for heat transfer is, the greater the effectiveness its tool. And also supported by the results of research by Irvan Paramananda and Prabowo that the increase in air velocity (coolant) with the same water discharge (hot liquid), water particles that carry heat energy transferred to the air will be greater. And the greater the air velocity is the greater its mass flow rate, thus causing the effectiveness value to increase. Because this research is in accordance with the results of research from [19], the relationship between the effect of fluid flow discharge on heat transfer rate and heat exchanger efficiency was obtained from the research that the greater the fluid flow discharge is, the greater its heat transfer rate and the greater its efficiency of the tool. According to [20] the greater the fluid mass flow rate is, the greater its coefficient of convection. This is in accordance with the theory according to Cengel, 2003 that the **value of ΔT LMTD is directly proportional to the value of U and also directly proportional to the value of Q.**

However, in this study, neither the efficiency produced by the cooler nor the result of LMTD is not too high, because the inlet temperature of the hot fluid and the inlet temperature of the cold fluid are not much different from one another. It is in accordance with the results of research by Miranto, I Made Adi Sayoga, and Zulkarnain. The effect of discharge on the rate of heat transfer becomes **insignificant so that a high ΔT cannot** be obtained because the difference between the inlet water and air temperature before the water was flowed has not much different, it was only about 20-30°C. And also it has been explained that the faster the velocity of the cooling fluid is, the more its temperature of the feed air decreases. This is also in accordance with the theory in the research of Miranto, I Made Adi Sayoga, and Zulkarnain, that the outlet temperature of the fluid from HE is not affected by the shape of HE, but it is affected by flow discharge. It is acceptable because, with a high fluid discharge which in this research is the cooling fluid discharge, the heat from the cold fluid absorbed by the hot fluid will also increase, so that the temperature decreases in the hot fluid. As a result, the lower the feed air temperature is, the higher its Nitrogen produced. It is because the temperature of the feed air will affect the adsorbate in the O₂ absorption process. According to the theory of that, the increase in temperature is the main cause of the decrease in purity of N₂ [21].

4. Conclusion

Based on the results of research on nitrogen production equipment using the Pressure Swings Adsorption (PSA) method and the results of data processing, it can be concluded:

1. From the research was obtained one unit of nitrogen production using the Pressure Swings Adsorption (PSA) method, which can produce nitrogen from the air.
2. Effect of cooling fluid flow rate on cooler performance and the temperature of the feed air produced. The greater the coolant fluid flow rate under 6 bar PSA operating conditions, the greater the thermal efficiency of the cooler produced. And the greater the coolant fluid flow rate

with the same operating conditions, the lower the temperature of the feed air temperature. The same operating conditions occur at 7 bar PSA

3. Effect of temperature and cooler performance on% nitrogen produced. The lower the air feed temperature under 6 bar PSA operating conditions, the higher the purity of nitrogen produced. The greater the thermal efficiency of the cooler, the greater the purity of nitrogen produced. The same operating conditions occur at 7 bar PSA.
4. The optimal operating conditions obtained in this study were⁰ at 7 bar operating conditions, cooling fluid flow rate 35.4 m / s, feed air temperature 30.7 C, and nitrogen purity 95.7% with thermal cooler efficiency 41.58%.

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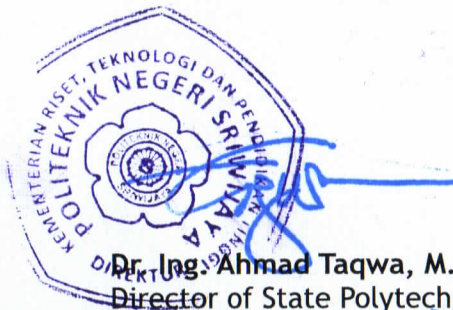
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