



Jakarta, 4 November 2019

No. : 160-TIM/7440/UNTAR/IX/2019

FULL PAPER ACCEPTANCE NOTIFICATION

Reference Number : TICATE-130

Title : Aggregate and Disaggregate Production Planning, Material Requirement, and Capacity Requirement in PT. XYZ

Authors : Fransiska Lefta, Lina Gozali and Iveline Anne Marie

Dear Mr./Madam

Thank you for your paper submission to Tarumanagara International Conference on the Application of Technology and Engineering 2019.

We are pleased to inform you that your submission is accepted for presentation in TICATE 2019. Due to some outstanding reviews for other submissions, however, the review result is not available for viewing yet. We expect to publish the review results will begin on 12 November 2019, you need to register to conference before 9 November 2019.

In the meantime, we recommend that you check your manuscript to minimize obvious errors, such as formatting and grammatical errors.

If you have further questions, please don't hesitate to contact us. We are looking forward to seeing you at UNTAR. Thank you very much for your cooperation.

Sincerely,

Dr. Hugeng, S.T., M.T. (SMIEEE)

Chairman

PROGRAM AT A GLANCE

Tarumanagara International Conference on the Applications of Technology and Engineering
 Jakarta, 21-22 November 2019

Day 1 (Thursday, 21 November 2019)

TIME	ACTIVITY
08.30 – 09.00	Registration & Coffee Morning
09.00 – 09.15	Opening Ceremony <ul style="list-style-type: none"> • Singing “National Anthem” & “ Mars Tarumanagara” • Traditional Dance • Report from Chairman: Dr. Hugeng (SMIEEE)
09.15 – 09.30	Welcome Speech: Rector of Universitas Tarumanagara Prof. Dr. Agustinus Purna Irawan (ASEAN Engineer)
	Untar Video Profile
09.30 – 11.45	Keynote Speaker: <ol style="list-style-type: none"> 1. Dr. Ing. Joewono Prasetijo (Universiti Tun Hussein Onn Malaysia, Malaysia) 2. Prof. Dr. Tjokorda Gde Tirta Nindhia (Udayana University, Indonesia) Invited Speakers: <ol style="list-style-type: none"> 1. Prof. Dr. Srikantappa. A.S. (Cauvry Institute of Technology India, India) 2. Prof. Dr. Mohd Zulkifli Abdullah (Universiti Sains Malaysia, Malaysia) 3. Prof. Yasuyuki Nemoto, Ph.D. (Ashikaga University)
11.45 - 12.00	Souvenir Presentation & Photo Session
12.00 - 13.00	Lunch Break
13.00 – 15.00	Paper Presentation Session I
15.00 – 15.15	Coffee & Tea break
15.15 – 17.15	Paper Presentation Session II

Day 2 (Friday, 22 November 2019)

TIME	Activity
08.30 – 08.30	Registration & Coffee Morning
08.30 – 11.30	Paper Presentation Session III
11.30 – 13.00	Lunch Break
13.00 – 16.00	Paper Presentation Session IV

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 1
Time : 13.00 – 15.00
Track : Mechanical Engineering & Technology

NO	SCHEDULE	PAPER TITLE	AUTHOR	INSTITUTION
1	13.00-13.15	Smart Brake Monitoring System with Brake Failure Indication for Automobile Vehicles	Srikantappa. A. S	Cauvery Institute of Technology
2	13.15-13.30	Tensile Behaviour of Kevlar Fibre & Coir Fibre Reinforced with Epoxy	Srikantappa. A. S	Cauvery Institute of Technology
3	13.30-13.45	Flexural & Impact Characteristics of Kevlar Fibre & Coir Fibre Reinforced with Epoxy Hybrid Composites	Srikantappa. A. S	Cauvery Institute of Technology
4	13.45-14.00	A Study on Tool Characteristics for better Performance in machining OHNS Steel using TiAlN Coated Tungsten Carbide tool inserts	Srikantappa. A. S, Shivakumara. C. M, Adaveesha. B	Cauvery Institute of Technology
5	14.00-14.15	Comparative study between MSC Marc/Mentat student version and Simufact Welding for three-passed butt joint	Richard A.M. Napitupulu, Chilinton Hutabarat, Charles S.P Manurung, Yupiter HP Manurung, Marcel Graf	Nommensen HKBP University Medan
6	14.15-14.30	Simufact Welding for three-passed butt joint	Prince Marbun, Richard A.M. Napitupulu, Charles SP Manurung, Sutan Simanjuntak, Yung-Chou Kao	Nommensen HKBP University Medan
7	14.30-14.45	Influence Of Fillers On Tribological Behaviour Of Glass-Coir Reinforced Epoxy Composites – An Ann Approach	Vijay B R and Dr. Srikantappa A S	Cauvery Institute of Technology

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 2
Time : 13.00 – 14.45
Track : Mechanical Engineering & Information Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Aluminum Frame Product Development Using Quality Function Deployment and Value Engineering at PT KSN	Surya Perdana, Ridwan Usman and Zeny Fatimah Hunusalela	Universitas Indraprasta PGRI
2	13.15-13.30	Modeling of Prediction Bandwidth Density with Backpropagation Neural Network (BPNN) Methods	Cynthia Hayat, Iwan Aang Soenandi, Samuel Limong, Johan Kurnia	Universitas Kristen Krida Wacana
3	13.30-13.45	Experimental Analysis of Semi-Open Impeller Pump as Turbine	Dede Lia Zariatn, Risdianto, Amat Chaeroni and Ismail Ismail	Universitas Pancasila
4	13.45-14.00	Redox Flow Batteries as Energy Storage Devices	Septiani Silitonga, Richard A.M Napitupulu, Charles SP Manurung, Sibuk Ginting, Parulian Siagian, Yong-Song Chen	Nommensen HKBP University
5	14.00-14.15	An Experimental Study on the Response of Composite Plate Due to Granade Explosion	Gunaryo, Heriana, Andi Kuswoyo, Djarot Widagdo and Bambang K. Hadi	Institut Teknologi Bandung
6	14.15-14.30	Statistical Analysis of CFRP Mechanical Properties using B-Basis Based on Weibull and ANOVA Distribution Analysis	Yurviany, Djarot Widagdo, Muhammad Kusni and Bambang K. Hadi	Kementrian Pertahanan

PARALLEL SESSION SCHEDULE

Thursday, 21 November , 2019

Room : Conference Room 3
 Time : 13.00 – 14.45
 Track : Mechanical Engineering & Electrical Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Design of an autonomous electric vehicle for assistance in the movement of people with visual disabilities using vision algorithms and artificial intelligence	Juan José Encinas Cantaro and Mario Chauca Saavedra	Ricardo Palma University
2	13.15-13.30	Characterization of Predictive Control Based on Model (MPC) in Multivariable Process of Milling in a Mineral Concentrator Plant	Juan Tisza, Mario Chauca	Universidad Nacional de Ingeniería
3	13.30-13.45	Development of Testing Equipment of Hydrokinetic Turbine Model to Support Implementation of the Laboratory Work	Jorfri Boike Sinaga, Novi Tanti and M.Dyan Susiala	Universitas Lampung
4	13.45-14.00	The Study Experimental of The Solar Collector Performance of Adsorption Refrigerator in Medan City	Syahrul Abda, Jaya Arjuna, Tulus B. Sitorus	Universitas Sumatera Utara
5	14.00-14.15	Automatic Statistics Measurement Antenna Performance Towards Virtual Ground Station	Arif Hidayat, Hidayat Gunawan, Ali Syahputra Nasution, Andrianingsih, Diki Wahyudi	Pusat Teknologi dan Data Penginderaan Jauh
6	14.15-14.30	The use of MNCP-5 particle transport program for calculation of flux radiation exposure in object surface	Tumpal Pandiangan, Ika Bali and Alexander R.J. Silalahi	Matana University
7	14.30-14.45	Design of Multiband MIMO Antenna for 5G Millimeter-wave Application	Rusmono, Efri Sandi and Teresa Marani	Universitas Negeri Jakarta
8.	15.00 – 15.15	Optimization of PJU LED luminaires based on lamp housings, drivers and optics	Endah Setyaningsih, Yohanes Calvinus	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 4
Time : 13.00 – 15.00
Track : Civil & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Vehicle Road Accident Prediction Model along Federal Road FT050 Kluang-A/Hitam-B/Pahat Route Using Excess Zero Data	Joewono Prasetijo	Universiti Tun Hussein Onn Malaysia,
2	13.15-13.30	The compressive strength behavior of mahogany wood connections with bolt-ring connectors	Wiryanto Dewobroto, Ika Bali, Lodia Semaya Amnifu	Universitas Pelita Harapan,
3	13.30-13.45	Correlation of Undrained Shear Strength and Liquidity Index of Fine-Grained Soils in West Java, Indonesia	Gilberta Miranda Hutabarat and Budijanto Widjaja	Parahyangan Catholic University
4	13.45-14.00	Analysis of online-taxi service quality and passenger satisfaction	Tarita Aprilani Sitinjak, Ludfi Djakfar and Achmad Wicaksono	Palangka Raya University
5	14.00-14.15	The effect of addition of polypropylene fibers on crushed glass concrete mixed	Albert Aun Umbu Nday, Theresia Avila Bria and Deasi D. A. A. Daud	Politek Kupang
6	14.15-14.30	Utilization of roof garden installation to reduce rainwater runoff in urban residential	Endah Lestari	STT PLN
7	14.30-14.45	Natural Flocculant VS Chemical Flocculant Where Is Better To Used In Wastewater Treatment	Badrus Zaman*, Nurandani Hardyanti ¹ , M. Arief Budihardjo, Budi Prasetyo S., Aldiansyah Ramadhandi, Arum Tri Listiyawati	Universitas Diponegoro
8	14.45-15.00	Assessing the Potential of Delivery Consolidation to Campus Center	Alfiora Santoni, Nahry Nahry and Sarini Abdullah	Universitas Indonesia
9	14.45 – 15.00	Comparation Between Suspended or Seabed Pipeline Installation for Inter Island Fresh Water System.	Try Suyono, Agustinus Purna Irawan and Wati Asriningsih	Universitas Khairun

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 5
Time : 13.00 – 15.00
Track : Industrial Engineering, Mechanical Engineering & Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Implementation of Lean Warehousing to Improve Warehouse Performance of Plastic Packaging Company	Yudha Prasetyawan, Alfia Khairani Simanjuntak, Lulu Auliya Andrian and Nauval Rifqy	Institut Teknologi Sepuluh Nopember
2	13.15-13.30	Simple automation for pineapple processing combining with karakuri design	Yudha Prasetyawan, Atiya Arifiyana Agustin and Dewanti Anggrahini	Institut Teknologi Sepuluh Nopember
3	13.30-13.45	Lean Manufacturing Implementation on Extrude Process with Value Stream Mapping: Study Case in Tyre Manufacture	Teguh Sri Ngadono, Muh Rokhim and Zulfa Fitri Ikatrinasari	Mercu Buana University
4	13.45-14.00	Kinematics analyses for robot motion	Wandro Siregar, Parulian Siagian, Lin Rong-Shine, Richard AM.Napitupulu, MidukTampubolon,Sutan LMH Simanjuntak	Nommensen HKBP University Medan
5	14.00-14.15	Slicing Methodology of A CAD File for 3D Printing	Prince Marbun, Richard A.M. Napitupulu, Charles SP Manurung, Sutan Simanjuntak1, Yung-Chou Kao	Nommensen HKBP University Medan

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 6
Time : 13.00 – 15.00
Track : Mechanical Engineering & Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Experimental analysis on combustion characteristics of single layer porous media for various burner sizes	M.Z. Abdullah	Universiti Sains Malaysia
2	13.15-13.30	Viscosity of Mono vs Hybrid Nanofluids: Measurement and Comparison	Khairil Fadzli and Mz Abdullah	Universiti Putra Malaysia
3	13.30-13.45	Lead-free solder SAC 305 Volume Reduction and Cold Slump after Stencil Printing Process	Mz Abdullah	Universiti Sains Malaysia
4	13.45-14.00	The Role of Technology Savviness in Muslim Online Shopping (MOS)	Jhanghiz Syahrivar Frangky Selamat ² , Hetty Karunia Tunjungsari, Chairy	President University
5	14.00-14.15	Measurement of risk project maturity using organizational project management maturity model (OPM3): Study case of construction project in Bandung	Fanjar Wijaksono, Devi Pratami and Achmad Fuad Bay	Telkom University
6	14.15-14.30	Designing Procurement Process Monitoring Dashboard for Supporting Food Security Supply Chain Risk Management System in Indonesian Bureau of Logistics	Detha Aulia Alfazah, Ari Yanuar Ridwan, Femi Yulianti and Putu Giri Artha Kusuma	Telkom University
7	14.30– 14.45	The Use of Quality Metric To Control Quality Of Telecommunication Project (Case Study: Regional Metro Junction)	Naufal Muhammad Zaki, Imam Haryono and Devi Pratami	Telkom University
8	14.45-15.00	Personal Performance Measurement of Project Manager using Project Manager Competency Development Framework (PMCDF®) (Case Study PT.XYZ)	Sarah Wahyuni, Devi Pratami and Achmad Fuad Bay	Telkom University

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 7
Time : 13.00–15.00
Track : Industrial Engineering, Mechanical Engineering , Civil Engineering & Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Project Acceleration of Outside Plant-Fiber Optic (OSP-FO) Project in PT. XYZ Using Time Cost Trade Off (TCTO) Method by Adding Overtime Hours	Syifa Nur Hasyati, Ika Arum Puspita and Wawan Tripiawan	Telkom University
2	13.15-13.30	On Preparation of Advance Ceramic for Single-edge V-Notch Beam Fracture Toughness Test of ISO/FDIS 23146:2008(E) Standards	Tjokorda Gde Tirta Nindhia	Udayana University
3	13.30-13.45	Comparison of fracture toughness testing by the single edge v-notch beam and the surface crack in flexure method on silicon nitride	Tjokorda Gde Tirta Nindhia	Udayana University
4	13.45-14.00	Implementation of Statistical Quality Control to Reduce Defects in Mabell Nugget Products (Case Study at PT. Petra Sejahtera Abadi)	Rini Alfatiyah, Sofian Bastuti, Dadang Kurnia	Universitas Pamulang
5	14.00-14.15	Determined Consumers Online Purchase Intention Factors by Considering Risk and E-Trust	Aulia Fasha	Universitas Singaperbangsa Karawang
6	14.15-14.30	Analysis improvement process of making joint care air filter mitsubishi (CJM) with overall equipment effectiveness and six big loses PT. Nichirindo Pratama Duta	Syahreen Nurmutia, Adi Chandra, Muhammad Shobur	Pamulang University

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 8
Time : 13.00 – 15.00
Track : Civil Engineering & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	The Effect of High-Density Polyethylene (HDPE) and Low-Density Polyethylene (LDPE) on Characteristics of Asphalt Concrete with Dry and Wet Mixing Process	Eduardi Prahara and Fennysia Aswita	Bina Nusantara
2	13.15-13.30	Passenger Satisfaction Assessment On The Performance Of The Flight Of Balikpapan-Yogyakarta Route Flights (Case Study: International Airport Sultan Aji Muhammad Sulaiman Balikpapan Sepinggan)	Yanti, M.Eriko.T, Pius, Leksmono Suryo Putranto	Universitas Tarumanagara
3	14.00 – 14.15	Reducing Project Duration of An Apartment Project by Waskita Karya using Crashing Method	Kirana Rukmayuninda Ririh and Nur Yulianti Hidayah	Universitas Pancasila

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 1
Time : 15.15 –17.45
Track : Industrial Engineering, Civil & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Strategies in increasing willingness to lend toward peer to peer lending companies operated in Indonesia	Niko Iskandar and Erlinda Muslim	Universitas Indonesia
2	15.30-15.45	Designing a performance measurement system for the human resources division using the human resource scorecard method: case study at PT KBN	Andi Yolanda and Erlinda Muslim	Universitas Indonesia
3	15.45-16.00	Detection of Cholesterol Levels by Analyzing Iris Patterns using Back Propagation Neural Network	Liani Budi Rachman and Basari Basari	University of Indonesia
4	16.00-16.15	Innovation of quality improvement to reduce weld defect through six sigma methods in the fabrication process of power plant component	Ayu Puspa Wirani, Dana Santoso Saroso and Humiras Hardi Purba	Mercu Buana University
5	16.15-16.30	Reducing of Defects in the Drug Tablets Production Process with DMAIC to Improve Quality – Study Case of Pharmaceutical Industry	Adha Winatie, Dana Santoso Saroso and Humiras Hardi Purba	Mercu Buana University
6	16.30-16.45	Determination Of Priority Criteria Which Influences CPO Factory Productivity	Nurhayati Sembiring and Imam Ramzani	Universitas Sumatera Utara
7	16.45-17.00	Analysing Company's Performance by Using Sustainable Supply Chain Management (SSCM)	Nurhayati Sembiring	Universitas Sumatera Utara
8	17.00-17.15	Determination Of Priority Criteria Which Influences CPO Factory Productivity	Nurhayati Sembiring, M. Imam Ramzani	Universitas Sumatera Utara
9	17.15-17.30	The strategy improvement of the engine maintenance	Nurhayati Sembiring and Diva Varian Koto Deli	Universitas Sumatera Utara

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 2
Time : 15.15 –17.00
Track : Informatic Engineering and Technologies

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Medical Diagnosis System in Healthcare Industry: A Fuzzy Approach	Nina Sevani, Andrih Setiawan, Fajar Saputra, Richardo Kusuma Sali and Oki Sunardi	Krida Wacana Christian University
2	15.30-15.45	Comparative Study Between the Integration of ITIL and ISO / IEC 27001 with the Integration of COBIT and ISO / IEC 27001	Nur Kholis Gunawan, Raden Budiarto Hadiprakoso and Herman Kabetta	Sekolah Tinggi Sandi Negara
3	15.45-16.00	A review of attacks, objects, and mitigations on web services	Rafif Masrur Rauf, Tubagus Eiffel Rivaldo, and Amiruddin Amiruddin	Sekolah Tinggi Sandi Negara
4	16.00-16.15	A brief review of attacks and mitigations on smartphone infrastructure	Rico Setyawan, Allicia A. Rahayu, Nur Annisa K. F., Amiruddin Amiruddin	Sekolah Tinggi Sandi Negara
5	16.15-17.00	Designing the QuickCash Payment System prototype by using cash withdrawal services through minimarket as an alternative solution for secure money transfer from bank customers to non-bank customers	Prasetyo Adi Wibowo Putro and Gagas Paras Mulati	Sekolah Tinggi Sandi Negara

PARALLEL SESSION SCHEDULE

Thursday, 21 November , 2019

Room : Conference Room 3
 Time : 15.15 –16.45
 Track : Informatic Engineering and Technologies

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Smart Chicken Farming: Monitoring System for Temperature, Ammonia Levels, Feed in Chicken Farms	Raden Budiarto	STSN
2	15.30-15.45	BCube and DCell Topology Data Center Infrastructures Performance	Edi Surya Negara, Keni Keni and Ria Andryani	Universitas Bina Darma
3	15.45-16.00	Analysis of Supply Chain Risk Mitigation Strategies in the Bogor Compressor Company with the House of Risk Method	Surya Perdana, Ridwan Usman, Nur Arifiya	Universitas Indraprasta PGRI
4	16.00-16.15	Networks Status Notification using Telegram Messenger	Erika Ramadhani and Akhmad Syarifurrahman	Universitas Islam Indonesia
5	16.15-16.30	Implementation of Incognito and SHA-3 Methods as Alternative to PIN Selection in Web Login	Gesi Deta and Yogha Restu Pramadi	STSN
6	16.30-16.45	Software-Defined Wireless Sensor Networks: A Systematic Review, Architecture and Challenges	Tony Tony and Lely Hiryanto	Curtin University

PARALLEL SESSION SCHEDULE
Thursday, 21 November, 2019

Room : Conference Room 4
Time : 15.15 –17.00
Track : Medical & Health Technology, Industrial Engineering, Information Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Cardiac Arrhythmia classification using deep learning	Alexander R. J. Silalahi and Tumpal Pandiangan	Matana University
2	15.30-15.45	Designing and Building Secure Electronic Medical Record Application by Applying AES-256 and RSA Digital Signature	Galih Wening and Hermawan Setiawan	Sekolah Tinggi Sandi Negara
3	15.45-16.00	The Effectiveness of Massage Therapy and Music Therapy in Reducing Fear in Dental Spa	Siti Istingsih and Basuki Wibawa	Universitas Mataram a
4	16.00-16.15	Modeling On Group Decision Support System to Determine Accreditation of Early Childhood Education Institutions	Muhammad Syaukani	STMIK Banjarmasin
5	16.15-16.30	Design of expert system for tool selection in digital forensics investigation	Erika Ramadhani, Elyza Gustris Wahyuni and Hanif Rizal Pratama	Universitas Islam Indonesia
6	16.30 - 16.45	Early Assesment Dyslexia	Wiryasaputra	Universitas Kristen Krida Wacana
7	16.45 – 17.00	Analysis Improvement Production Process of Making Joint Care Air Filter Mitsubishi (CJM) With Overall Equipment Effectiveness and Six Big Losses PT. Nichirindo Pratama Duta	Syahreen Nurmutia, Adi Chandra, Muhammad Shobur	Pamulang University

PARALLEL SESSION SCHEDULE
Thursday, 21 November, 2019

Room : Conference Room 5
Time : 15.15 –16.30
Track : Medical & Health Technology, Civil & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Dynamic Modeling to Predict The Availability of Premium Rice in Karawang Regency	Ekaterina Setyawati	Institut Pertanian Bogor
2	15.30-15.45	Distribution of Story Shear and Reinforcement in Dual System	Daud Rahmat Wiyono, Roi Milyardi and Cindrawaty Lesmana	Universitas Kristen Maranatha
3	15.45-16.00	Curve Number Method to Determine the Runoff Height in the Upper Cimanuk Watershed	Dwi Ariyani	Universitas Pancasila
4	16.00-16.15	Benefits of the Opex Pro Application in Online Project Monitoring and Evaluation at PT. XYZ	Manlian A. Ronald Simanjuntak, Mustafa Nahdi	Universitas Pelita Harapan
5	16.15-16.30	The Identification of Risk Factors of Quality that Affecting Contractors' Performance at XYZ Company	Edward Rizky Tatimu and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan

PARALLEL SESSION SCHEDULE
Thursday, 21 November , 2019

Room : Conference Room 6
Time : 15.15 –16.30
Track : Civil & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	The Study of Quality Control Management that Influence the Implementation of Technical Standards for Class C Hospital Buildings in Tangerang Districts	Milla Andina Fajriah and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
2	15.30-15.45	The study of the identification of using the supply chain to increasing financing efficiency of management project for building construction x in Jakarta	Mukhamad Risa Diki Pratama and Manlian Ronald A Simanjuntak	Universitas Pelita Harapan
3	15.45-16.00	Cost Risk Analysis Method for Construction Project in Kuala Tanjung	Eko Handoyo Cahyo Pranoto and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
4	16.00-16.15	Cost Performance Study on EPC Projects in Banten Province (Case Study: Substation and Transmission lines 150 kV EPC Project)	Arif Deni Rahmat and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
5	16.15-16.30	Project Cost Risk Identification and Construction Performance Indicators of High-rise Building in DKI Jakarta (Case Study: PT. X)	Manlian Ronald A. Simanjuntak and Intan Virgina Suryaningrum	Universitas Pelita Harapan

PARALLEL SESSION SCHEDULE
Thursday, 21 November, 2019

Room : Conference Room 7
Time : 15.15 –17.00
Track : Civil & Environmental Technology and Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	15.15-15.30	Risk Identification in Procurement of Glass facade in High-Rise Office Buildings in Jakarta	Reinaldi Tanumihardja and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
2	15.30-15.45	Identification of Design And Build Risks in School Building Construction Projects in Central Jakarta	Andreas Suharyanto and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
3	15.45-16.00	Study Phase of Operational Management Process X Building	Janerizka Bari Putri and Manlian Ronal A Simanjuntak	Universitas Pelita Harapan
4	16.00-16.15	Risk Identification in Procurement of Precast Facade Procurement on High Rise Buildings in Jakarta	Ardian Sulistianto and Manlian Ronald A. Simanjuntak	Universitas Pelita Harapan
5	16.15-16.30	Traffic Management and Engineering Analysis of the Manahan Flyover Area by using Traffic Micro-Simulation VISSIM	Budi Yulianto	Universitas Sebelas Maret
6	16.30-16.45	Control of Quality Concrete Base on Curing Methods	Anisah, Prihantono	State University of Jakarta
7	16.45-17.00	Increasing Production Efficiency using Karakuri Principle (A Case Study in Small and Medium Enterprise)	Dewanti Anggrahini, Yudha Prasetyawan and Sri Indriyani Diartiwi	Institut Teknologi Sepuluh Nopember

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 1
Time : 08.30 – 11.30
Track : Civil & Environmental Technology and Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Calibration and Validation Indonesian Highway Capacity Manual 1997 Model	Budi Yulianto, Setiono Yulianto, Rizki Putri, Stevani Prastica and Felix Hartono	Universitas Sebelas Maret
2	08.45-09.00	Evaluation and Decrease of The Likelihood of Risks in Mass Floor Excavations According to Your Texture in Peru	Jhannel Lourdes Arteaga Ramos, Giancarlo Enrique Andia Alvarez and Mario Bernabe Chauca Saavedra	Ricardo Palma University
3	09.00-09.15	Feasibility of Well Water as a Source of Clean Water in the Coastal Coastal Settlement Area	Idawarni Asmal	Universitas Hasanuddin
4	09.15-09.30	Graph Model of Reporting Engine Performance Results in The Business	Bambang Prasetya Adhi, Widodo Widodo and Dendy Nanda Prasetya	Universitas Negeri Jakarta
5	09.30-09.45	New theory in strategic management of Industry 4.0 and Society 5.0 within Industrial and System Engineering and Business Engineering	Khristian Edi Nugroho Soebandrija	Bina Nusantara University
6	09.45-10.00	Lean Six Sigma and Business Engineering Perspective of Electrical Energy Optimization	Khristian Edi Nugroho Soebandrija, Dendhy Indra Wijaya and Fauzi Khair	Bina Nusantara University
7	10.15-10.30	Industry 4.0 and Society 5.0 through Lens of Condition Based Maintenance (CBM) and Machine Learning of Artificial Intelligence (MLAI)	Khristian Edi Nugroho Soebandrija, Fauzi Khair and Dendhy Indra Wijaya	Bina Nusantara University
8	10.30-10.45	Risk Analysis The Construction Use Of Soft Toll Road System Metodologi (Ssm) Case Study: Trans Toll Road Sec Sumatra 1 Bakauheni - Kalianda	Enriko Tosulpa	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 1
Time : 08.30 – 11.30
Track : Civil & Environmental Engineering , Industrial Engineering

9	10.45-11.00	Development of unskilled labour into skilled labour at the jetty project of PLTU Tanjung Jati B Units 5 and 6	Jegoteluko	Universitas Tarumanagara
10	11.00-11.15	Designing marketing strategies based on factors affecting purchase intention of hotel voucher through Online Travel Agent's website	Cindy Yunitasari and Erlinda Muslim	Universitas Indonesia
11	11.15-11.30	Millennials employee retention strategies planning based on job satisfaction in Indonesia banking industry	Siti Rohmah As'Ad and Erlinda Muslim	Universitas Indonesia
12	11.30 – 11.45	Correlation between Plasticity Index and Methylene Blue Value to Determining Soil Classification	Andrias Suhendra Nugraha, Paulus P. Rahardjo, Bigman M. Hutapea, and Imam A. Sadisun	Universitas Kristen Maranatha

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 2
Time : 08.30 – 11.30
Track : Civil & Environmental Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Performance evaluation, violations and driver's perception of the Yellow Box Junction in the city of Surabaya (Case study of the junction of Jl. Ir. Sukarno - Jl. Dharmahusada and the junction of Jl. Kutai - Jl. Adityawarman)	Leksmono Suryo Putranto, Rpx Rooswan Happono	Universitas Tarumanagara
2	08.45-09.00	Preliminary cost in industrial building at Sumatra, Kalimantan, and Papua	Christian Satrija S and Onnyxiforus Gondokusumo	Universitas Tarumanagara
3	09.00-09.15	The Use of Quality Metric to Control Quality of Telecommunication Project (Case Study: Regional Metro Junction)	Naufal Muhammad Zaki, Imam Haryono and Devi Pratami	Universitas Tarumanagara
4	09.15-09.30	Factors affecting residential choice in Greater Jakarta	L S Putranto, P Louis	Universitas Tarumanagara
5	09.30-09.45	Discovering Authenticity as an Architect Through Psychological Analysis. Case study: The Church of the Light, Tadao Ando	M Clara, R Trisno, P R Kasimun, F Lianto	Universitas Tarumanagara
6	09.45-10.00	Mechanical properties of powder concrete with a geopolymer bond	W Kushartomo, Sofianto	Universitas Tarumanagara
7	10.15-10.30	Whitmore Section and Block Shear Failure Analysis on a Bolted Gusset Plate using Finite Element Method	Yoses Riadi and Leo S Tediando	Universitas Tarumanagara
8	10.30-10.45	Concrete Structure Condition Rating in Buildings with NonDestructive Testing	Henny Wiyanto, Joshua Chang, Yohanes Dennis	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 2
Time : 08.30 – 11.30
Track : Civil & Environmental Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
9	10.45 – 11.00	Application of life cycle cost in the construction of soil retaining wall replacing soldier pile with diaphragm wall (case studi of Pejaten Apartment Projects)	Lidya Monalisa and Chaidir Anwar Makarim	Universitas Tarumanagara
10	11.00 – 11.15	Climate Responsive Architecture in Jakarta's Apartments	Christine Tjie, Fermanto Lianto and Naniek Widayati Priyomarsono	Universitas Tarumanagara
11	11.15-11.30	Natural Lighting Analysis in Plaza Senayan, Jakarta, Indonesia	Silvia Gunawan, Naniek Widayati Priyomarsono, Rudy Trisno	Universitas Tarumanagara
12	11.30 – 11.45	Correlation between Plasticity Index and Methylene Blue Value to Determining Soil Classification	Andrias Suhendra Nugraha, Paulus P. Rahardjo, Bigman M. Hutapea, and Imam A. Sadisun	Universitas Kristen Maranatha

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 3
Time : 08.30 – 11.30
Track : Civil & Environmental Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Structural design of airport runway Case study: Jos Orno Imsula MOA Airport	Kelly V Khoemarga, Anissa Noor Tajudin	Universitas Tarumanagara
2	08.45-09.00	Emergency Shelter Design For Disaster Preparation	Abdel Mounaim, Naniek Widayati Priyomarsono, Rudy Trisno	Universitas Tarumanagara
3	09.00-09.15	Encapsulated Lime Peel Essential Oil (Citrus hystrix) Into Chitosan Nanoparticle: New Entity to Enhanced Effectivity Against Propionilbacterium Acne in Vitro	Linda Julianti Wijayadi , Taty Rusliati Rusli6	Universitas Tarumanagara
4	09.15-09.30	Determine The Value of Mark Up at Bid Price Hotel Buildings	Melisa Dwijayanti and Johny Johan	Universitas Tarumanagara
5	09.30-09.45	Decision making analysis for water distribution improvement projects	Dedi Alfa Julian Purba	Universitas Tarumanagara
6	09.45-10.00	Decision making application for housing development investment	Harun Immanuel	Universitas Tarumanagara
7	10.15-10.30	Study of Factors Affecting Productivity of Portable Concrete Pump for Slab and Beam Construction Project X	Arianti Sutandi	Universitas Tarumanagara
8	10.30-10.45	Designing Procurement Process Monitoring Dashboard for Supporting Food Security Supply Chain Risk Management System in Indonesian Bureau of Logistics	Detha Aulia Alfazah, Ari Yanuar Ridwan, Femi Yulianti and Putu Giri Artha Kusuma	Telkom University
9.	10.45– 11.00	Kapuas river sediment fall velocity analysis with withdrawal tube.	Wati Asriningsih Pranoto	Universitas Tarumanagara
10	11.00-11.15	Designing a marketing strategy for food products sold online	Septiana Pratama Nugraheni and Erlinda Muslim	Universitas Indonesia

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 4
Time : 08.30 – 11.30
Track : Civil & Environmental Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Ground Water Potencial Analisis In Saolat And Waijoi Area East Halmahera	Wati Asriningsih Pranoto and Tri Suyono	Universitas Tarumanagara
2	08.45-09.00	Analysis of the Potential of Crust Formation and Corrosiveness in the Way Rilau PDAM Lampung Distribution Network Using the Langelier Saturation Index Method	Anwar	Universitas Tarumanagara
3	09.00-09.15	Market Analysis Consumer Profile And Product Test Apartments Near Campus Project Plan Puncak Kertajaya Apartment Surabaya	Syahrial Firdausi	Universitas Tarumanagara
4	09.15-09.30	Characteristics Analysis of Slum Area in the Region of Rw 16 Kapuk, West Jakarta	Jemima Devina Halim	Universitas Tarumanagara
5	09.30-09.45	Analysis of value engineering application at the design stage of a deep excavation system	Benjamin Benjamin and Johny Johan	Universitas Tarumanagara
6	09.45-10.00	Maintenance Building Strategies in a private University in Jakarta	Febry Triwijayanty and Wahyu Indra Sakti	Universitas Tarumanagara
7	10.15-10.30	Measurement of Risk Project Maturity Model (OPM3): Study case of construction project in Bandung	Fanjar Wijaksono, Devi Pratami and Achmad Fuad Bay	Telkom University
8	10.30-10.45	Climate Responsive Architecture in Jakarta's Apartments	C Tjie1, F Lianto, and Naniek Widayati Priyomarsono	Universitas Tarumanagara
9	10.45 – 11.00	Analysis of Affecting Factors Housing Prices in Indonesian Cities	Ibrahim Ibrahim and Nurahma Tresani	Universitas Tarumanagara
10	11.00-11.15	North Coast Jakarta Land Reclamation as a Solution of Land Requirements	Agustina Tjoi	Universitas Tarumanagara
11	11.15-11.30	The Impact of Online Travel Agents (OTA) towards Hotel Real Estate Market : Jakarta, Indonesia	Charles Tahir, Nurahma Tresani and Nasirrudin Mahmud	Universitas Tarumanagara

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Friday, 22 November, 2019

Room : Conference Room 5
Time : 08.30 – 11.30
Track : Civil & Environmental, Electrical, & Industrial Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Flexible Pavement Mechanistic Response to the 2017 Indonesian Road Pavement Manual with Cement-Treated Base (CTB)	Anissa Noor Tajudin	Universitas Tarumanagara
2	08.45-09.00	Utilization of rainwater harvesting installation to fulfil water needs in educational buildings	Endah Lestari	Universitas Tarumanagara
3	09.00-09.15	Determine The Value of Mark Up at Bid Price Hotel Buildings	Dwijayanti	Universitas Tarumanagara
4	09.15-09.30	Expanded Coverage Remote Control	Hadian Satria Utama, Tryas Honorris and Indra Surjati	Universitas Tarumanagara
5	09.30-09.45	Analysis the measurement quality system of clearance tappet using measurement system analysis on motorcycle manufacturing company	Carla Olyvia Doaly, Iphov Kumala Sriwana, Lithrone Laricha Salomon and Farrell Farrell	Universitas Tarumanagara
6	09.45-10.00	Interior Design Of Postgraduate Library Based On Cyber Technology By Applying Javanese Cultural Ornaments And Eco-Friendly Materials	Hartini Laswandi, Basuki Wibawa, Robinson Situmorang and Stephanie Efendy	Universitas Tarumanagara
7	10.15-10.30	Risk Assessment Of Working Posture And Implementation Of New Workstation To Increase Productivity	I Wayan Sukania	Universitas Tarumanagara
8	10.30-10.45	Application Of Six Sigma Method As A Quality Control Tool Tool With DMAIC Concept In PT. XYZ.	Ahmad Ahmad, Lina Gozali, Lamto Widodo and Cristin Natalina	Universitas Tarumanagara
9	10.45 – 11.00	Performance Anakysis Of Employees At PT. Sungai Berkat Serani Sukses Using Human Resource Scorecard Method	Ahmad Ahmad, Lithrone Laricha Salomon and Dean Alexander	Universitas Tarumanagara
10	11.00 – 11.15	The Key Factors Influencing Consumers' Level of Satisfaction of Subsidized Housing in Puri Harmoni 8, Parung Panjang	Hendri Viandra Reza, Lana Winayanti, Liong Ju Tjung	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 6
Time : 08.30 – 11.45
Track : Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	08.30-08.45	Calculation of Labor Amount with Theory of Constraints and Line Balancing Method in PT. XYZ Fish Crackers Factory	Lina Gozali, Frans Jusuf Daywin and Alvin Jestinus	Universitas Tarumanagara
2	08.45-09.00	Research Gap of Facility Planning and Layouts Studies	Bintang Bagaskara	Universitas Tarumanagara
3	09.00-09.15	Comparison Study about Production Scheduling System from Some Paper Case Studies	Vania Eliyanti, Lina Gozali, Lamto Widodo and Frans Jusuf Daywin	Universitas Tarumanagara
4	09.15-09.30	Comparison Study about Inventory Control System from Some Papers in Indonesia Case Study	Shelinsca Hoswari, Lina Gozali, Iveline Anne Marie and I Wayan Sukania	Universitas Tarumanagara
5	09.30-09.45	Comparison Study of the Application of Line Balancing and the Theory of Constraint	Jessica Sagitta, Lina Gozali and Frans Daywin	Universitas Tarumanagara
6	09.45-10.00	Comparison Study about Warehouse Layout from Some Paper Case Studies	Natalia Sudiarta, Lina Gozali, Iveline Anne Marie and I Wayan Sukania	Universitas Tarumanagara
7	10.15-10.30	Designing Press Tool For Carton Finishing Process To Improve Productivity And Efficiency	Lamto Widodo, Adianto Adianto, Siti Rohana Nasution and Priadi Wijaya	Universitas Tarumanagara
8	10.30-10.45	Consumer Preference Analysis Of Snack With Conjoint Analysis Method Approach (Case Study : Telur Gabus).	Lithrone Laricha Salomon, Wilson Kosasih and Carla Doaly	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 6
Time : 08.30 – 11.45
Track : Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
9	10.45 – 11.00	Application of quality control of carton box in quality control department at PT Purinusa Ekapersada	Clara Puspita Ningrum, Lina Gozali and Lamto Widodo	Universitas Tarumanagara
10	11.00 – 11.15	Redesign Layout Planning of Raw Material Area and Production Area Using Systematic Layout Planning (SLP) Methods (Case Study of CV Oto Boga Jaya)	Bintang Bagaskara Korda, Lina Gozali and Lamto Widodo	Universitas Tarumanagara
11	11.15 – 11.30	Understanding of Customer Services Based on Value Chain Strategy and Practical Instructions for Hospital Financial Management at Miriam Pratama Clinic, Kudus, Central Java	Roni Setyawan	Universitas Tarumanagara
12	11.30 – 11.45	Aggregate and Disaggregate Production Planning, Material Requirement, and Capacity Requirement in PT. XYZ	Fransiska Lefta, Lina Gozali and Iveline Anne Marie	Universitas Tarumanagara

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Friday, 22 November , 2019

Room : Conference Room 1
Time : 13.00 – 15.15
Track : Industrial Engineering, Mechanical and Civil Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	The Influence Of IOT (Internet Of Things) Against Industrial Development In Tanah Abang Market	Yorent Natanael	Universitas Tarumanagara
2	13.15-13.30	Potential of processed timber for preserving the Chinese traditional buildings	James Rilatupa, Rudy Trisno and Fermanto Lianto	Universitas Tarumanagara
3	13.30-13.45	Comparison Study Among Production Planning Research in Some Papers and Industries in Indonesia	Fransiska Lefta, Lina Gozali and Iveline Anne Marie	Universitas Tarumanagara
4	13.45-14.00	Flexural properties of bamboo strip composites on lamina configuration	Sofyan Djamil	Universitas Tarumanagara
5	14.00-14.15	Cipali Toll Road Safety Audit	Ni Luh Shinta Eka Setyarini Setyarini, Lekmono Suryo Putranto Putranto and Najid Najid	Universitas Tarumanagara
6	14.15-14.30	Project Manager Classification for Design and Build Construction of State Buildings	Jujuk Kusumawati, Khrisna M, and Najid	Universitas Tarumanagara
7	14.30-14.45	Evaluation of Side Friction in IHCM For Highway 4 Lanes 2 Ways Divide	Najid	Universitas Tarumanagara
8	14.45-15.00	Personal Performance Measurement of Project Manager Using Project Manager Competency Development Framework (PMCDF) (Case Study PT.XYZ)	Sarah Wahyuni, Devi Pratami and Achmad Fuad Bay	Telkom University
9	15.00 – 15.15	Mapping and Measuring IT Governance Performance in Higher Education	Bagus Mulyawan, Raymon Kosala, Benny Ranti, Suhono Haryo Supangat	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 2
Time : 13.00–15.30
Track : Informatic Engineering and Technology

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Comments Scraping Application For Review Youtube Content	Viny Christanti M	Universitas Tarumanagara
2	13.15-13.30	Tourism Destination Grouping Systems With Partitioning Clustering Method from Geotagged Photo using Android	Maya Retnosari, Wasino Wasino and Desi Arisandi	Universitas Tarumanagara
3	13.30-13.45	Prediction Analysis Of Criminal Data Using Mechine Learning	Meiliana Meiliana, Dedi Trisnawarman, Muhammad Choirul Imam and Ziad Rusdi	Universitas Tarumanagara
4	13.45-14.00	Sentiment Analysis Ford Opinion Classification Of Smart Farming In Indonesia	James Nata Salim, Dedi Trisnawarman, Ziad Rusdi and Muhammad Choirul Imam	Universitas Tarumanagara
5	14.00-14.15	Decision Support System Model Determines The Type Of Road Construction In Indonesia	Henderi Henderi, Endang Kusnadi and Dedi Trisnawarman	Universitas Tarumanagara
6	14.15-14.30	Business Intelligence Framework for Performance Measurement in Higher Education Study Programs	Dedi Trisnawarman and Muhammad Choirul Imam	Universitas Tarumanagara
7	14.30-14.45	Start to End: Recommended Travel Routes Based on Tourist Preference	Vivien H. Wangi, Jap Tji Beng and Wasino	Universitas Tarumanagara
8	14.45-15.00	Vowel Recognition Based on Face Images Using Fisher Linear Discriminant Analysis	Lina and Desi Arisandi	Universitas Tarumanagara
9	15.00 – 15.15	Segmentation of White Blood Cell Areas from Colour Degraded Microscope Slide Images	Lina, Ery Dewayani and Arlends Chris	Universitas Tarumanagara
10.	15.15 – 15.30	Grouping of Tourism Objects Using Geotagged Photo with Hierarchical Clustering Method in Bantul and Sleman	Fenny Lusiana, Jap Tji Beng and Wasino	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

Room : Conference Room 3
Time : 13.00–15.00
Track : Industrial Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Comparison Study of Facility Planning and Layouts Studies	Bintang Bagaskara Korda, Lina Gozali, Lamto Widodo and Frans Jusuf Daywin	Universitas Tarumanagara
2	13.15-13.30	Establishment of An Application for Quality Detection of Photographs Based on Sharpness and Light Intensity	Hugeng Hugeng, Ardis Jevon Tjahyadi	Universitas Tarumanagara
3	13.30-13.45	Public Housing Savings (TAPERA) and The Application In DKI Jakarta	Henriko Ganesha Putra	Universitas Tarumanagara
4	13.45-14.00	Community Service Report : Designing The Ergonomic Roasting Machine For Coffe Seed With Additional Engine at Seduh Kopi Coffe Shop	Frans Yusuf Daywin, Lina Gozali, Lamto Widodo, Carla Olyvia Doaly and Wildan Hendri Ross	Universitas Tarumanagara
5	14.00-14.15	Factors affecting potential customers in choosing an apartment	Suryanto and Nurahma Tresani	Universitas Tarumanagara
6	14.15-14.30	Driving Factors and Occupant Satisfaction Riving Factors and Occupant Satisfaction Choosing Residential Apartment Near Campus University of Indonesia Locations Taman Melati Apartments Margonda	Syahrial Firdausi, Nurahma Tresani and Suryono Herlambang	Universitas Tarumanagara
7	14.30-14.45	Comparison study between nearest neighbor and farthest insert algorithms for solving VRP model using heuristic method approach	Wilson Kosasih, Ahmad, Lithrone Laricha Salomon and Febricky	Universitas Tarumanagara
8.	14.45 – 15.00	Facial Skin Disease Recognition Using Backpropagation Neural Network (Bpnn)	Chairisni Lubis and Krisna Susanti	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
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Room : Conference Room 4
Time : 13.00–15.00
Track : Industrial Engineering & Mechanical Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Concept design for adjustable motorcycle handlebar	Aldo Salim Sandy Yehezkiel, Bready Fernando, Tasya Monica, Joshua Ricardo, Agustinus Purna Irawan	Universitas Tarumanagara
2	13.15-13.30	Development of Wood Carving Furniture Technology in Jepara	Eddy Supriyatna Marizar	Universitas Tarumanagara
3	13.30-13.45	Study of Vertical Residential Development in the Poris Plawad Mass Transportation Development Area (TOD) in Tangerang City	Megawati	Universitas Tarumanagara
4	13.45-14.00	The Characterizing of Ageing Temperature of Lead-Free Solder Sn-0,7Cu x Zn on Mechanical, Physical Properties, and Microstructure	Erwin Siahaan, Abrar Riza	Universitas Tarumanagara
5	14.00-14.15	The effect of maximum cross-section Reduction and Rolling Temperature on Formability and Mechanical Properties of Al-Cu.	Erwin Siahaan	Universitas Tarumanagara
6	14.15-14.30	The influence of Silver content in Lead-Free Solder Sn-0,7Cu xAg (SAC) on Physical and Mechanical Properties.	Erwin Siahaan	Universitas Tarumanagara
7	14.30-14.45	The Characterizing on Corrosion Rate and Mechanical Properties of Low Carbon Steel in Potassium Chromate Solution.	Erwin Siahaan	Universitas Tarumanagara
8	14.45-15.00	Concept design of solar cell satellite dish	Steven Teja Nicholas Travis Adrianto, Louis Martin JM3, Nicholas Kurniawan, Agustinus Purna Irawan	Universitas Tarumanagara

PARALLEL SESSION SCHEDULE
Friday, 22 November, 2019

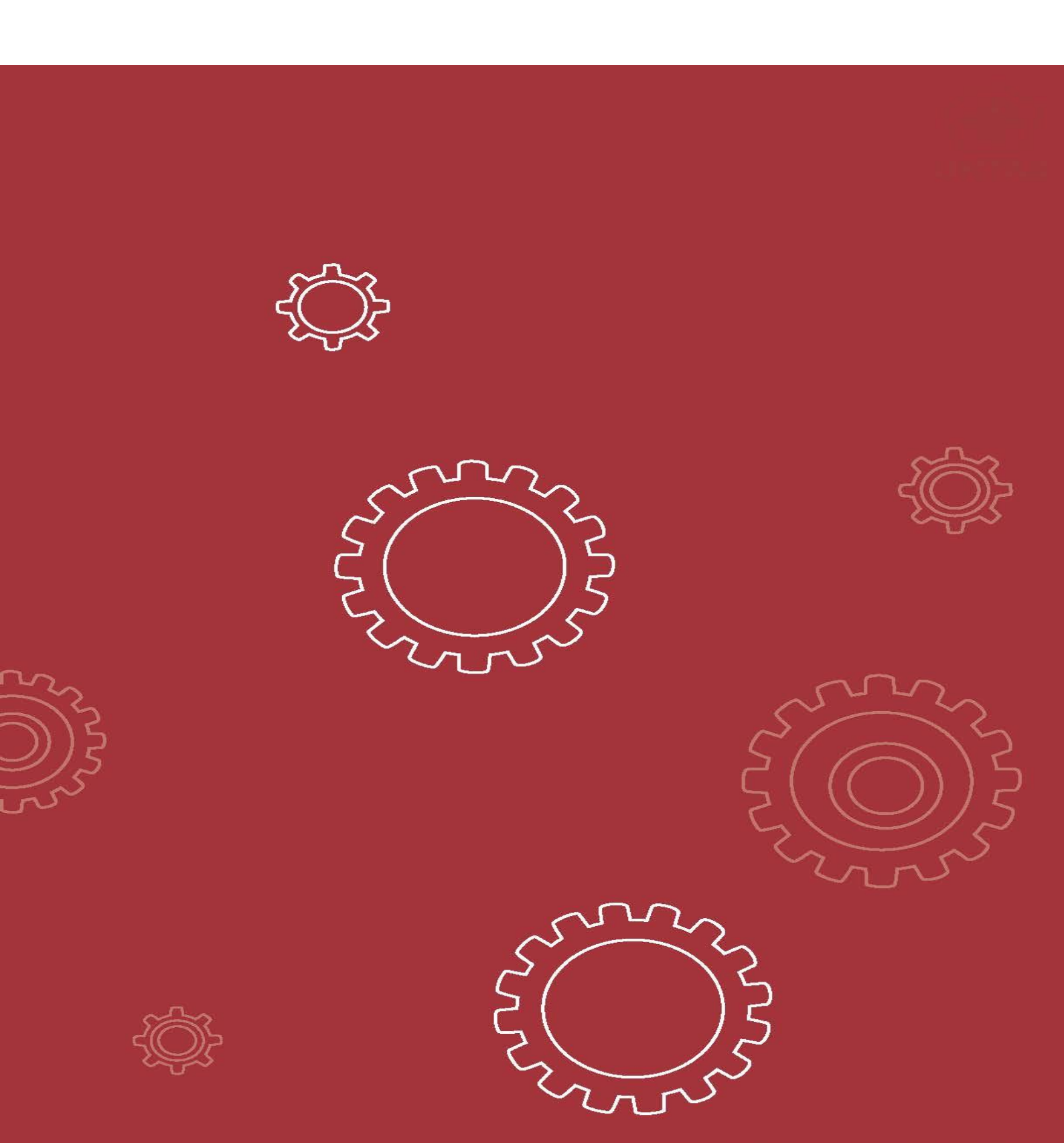
Room : Conference Room 5
Time : 13.00–15.30
Track : Industrial Engineering & Mechanical Engineering

NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Concept design of high interface powerbank	Verry Gunawan, Nicholaus Christiardy , Agustinus Purna Irawan	Universitas Tarumanagara
2	13.15-13.30	Potential of Process Timber for Preserving the Chinese Traditional Buildings	J. Rilatupa and F Lanto	Universitas Tarumanagara
3	13.30-13.45	Reynolds Number Effects on Swirling Flows Intensity and Reattachment Length over a Backward Facing Step Geometry Using STD k-e Turbulance Model	Steven Darmawan	Universitas Tarumanagara
4	13.45-14.00	The Effects of Brand Loyalty and Brand Image on Repurchase Intention of Premium Priced High-Tech Product in Indonesia	Hetty Karunia Tunjungsari	Universitas Tarumanagara
5	14.00-14.15	Investment Analysis of Boarding House in Tanah Abang District	Arnold Pramudita	Universitas Tarumanagara
6	14.15-14.30	Tool Wear Analysis of Coated Carbide Tools on Cutting Force in Machining Process of AISI 4140 Steel	Sobron Lubis	Universitas Tarumanagara
7	14.30-14.45	The role of technology in reshaping the payment method among Indonesians	Keni Keni, Hendry Tjoe and Nicholas Wilson	Universitas Tarumanagara

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Room : Conference Room 6
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NO	SCHEDULE	PAPER TITLE	AUTHORS	INSTITUTION
1	13.00-13.15	Resistance of Residents In The Klender Public Housing Revitalization Program	Maya Sari, Nurahma Tresani and Wita Simatupang	Universitas Tarumanagara
2	13.15-13.30	Does Go-Jek affected Smart City Operational in Jakarta	Jevon Atmabrata and Nurahma Tresani	Universitas Tarumanagara
3	13.30-13.45	Podcast Technology as a Favorable Media-on-Demand for Indonesian Young Generation	Diah Ayu Candraningrum, Joni Welman Simatupang and Fransisca Iriani Roesmala Dewi	Universitas Tarumanagara
4	13.45-14.00	Travel App - showing nearest tourism site using Haversine formula and directions with Google Maps	Grace Tarani Sridevi Lee, Desi Arisandi and Wasino Wasino	Universitas Tarumanagara
5	14.00-14.15	Website Application for Visualizing Reports of Intangible Cultural Heritage Integrated with Google Maps : Case Study in Balai Pelestarian Nilai Budaya Jawa Barat	Andre Laverius, Wasino Wasino and Ery Dewayani	Universitas Tarumanagara
6	14.15-14.30	Curve Number Method to Determine the Runoff Height in the Upper Cimanuk Watershed	Dwi Ariyani	Universitas Pancasila
7	14.30-14.45	Dry Land Irrigation In Kandar, Tanimbar Islands Regency	Ony Frengky Rumihin	Universitas Tarumanagara
8	14.45-15.00	Development of Transit Oriented Development (TOD) Areas in Improving Public Transport Services and Traffic Engineering in DKI Jakarta Province	Baidowi	Universitas Tarumanagara
9	15.00-15.15	Dynamics Of Land Value Change	Juntrisnawati Loi, Nurahma Tresani and Nasiruddin Mahmud	Universitas Tarumanagara



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Aggregate and Disaggregate Production Planning, Material Requirement, and Capacity Requirement in PT. XYZ

To cite this article: F Lefta *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **852** 012123

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Aggregate and Disaggregate Production Planning, Material Requirement, and Capacity Requirement in PT. XYZ

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Abstract. Good production planning which suitable for the company in fulfilling demand will increase amount of profits. PT. XYZ is a company which produce talc powder in lots of type, such as Globe 107 sterile, Globe 107 non-sterile, Globe 207 sterile, Globe 207 non-sterile, Globe 307 sterile, Globe 307 non-sterile, Globe 407 sterile, Globe 407 non-sterile, Globe 507 sterile, and Globe 507 is non-sterile. PT. XYZ problem is they can't fulfil all of their demands. Data used in this research are demand data from August 2015 until July 2019, company's cost component, and capacity of each machine used in the production process. The aim of this research is to project the next 12 months demands, determine the best lot sizing technique, and determine the capacity requirement for PT. XYZ. Based on the research, the best forecasting method is using artificial neural network, the best lot sizing technique is using AWW method with total cost Rp 2.310.465.513. The capacity problems in crusher and sterile machine are solved by implementing overtime, while in jet mill, sieve screening, and packaging can reduce their working shift.

Keyword: Forecast, Aggregate, Disaggregate, RCCP, MRP, CRP

1. Introduction

Companies goal is keeping exist and having a great amount of profits by fulfilling all of their customers' demands. In order to achieve the goal, good production planning which suitable for the company is needed. Production planning is the planning of production and manufacturing modules in company or industry which utilizes the activities of employees, materials, and production capacity resources allocation in order to meet customers' needs (Fargher et al., 1996)[1].

PT. XYZ is a company which produce talc powder in lots of type, such as Globe 107 sterile, Globe 107 non-sterile, Globe 207 sterile, Globe 207 non-sterile, Globe 307 sterile, Globe 307 non-sterile, Globe 407 sterile, Globe 407 non-sterile, Globe 507 sterile, and Globe 507 is non-sterile. PT. XYZ problem is they can't fulfil all of their demand which cause company can not obtain maximum profit. In order to solve their problem, PT. XYZ needs a suitable production plan to be implemented.

Production planning starts from making forecast for the upcoming period to making capacity requirement planning. Implementing production planning which is suitable for the company is crucial for maximizing profits and minimizing production costs. The aim of this research is determining the best suitable technique for PT. XYZ in order to fulfil their customers' demand for the upcoming period.



2. Methods and Data

2.1 Data Preparation

Data used in this research are demand data from August 2015 until July 2019, company's cost component, and capacity of each machine used in the production process.

2.2 Methods

Methods used to obtain the suitable production plan for PT. XYZ are forecasting, aggregate and disaggregate planning, rough cut capacity planning, materials requirement planning, and capacity requirement planning.

Forecasting is activity to forecast demand for the upcoming period which include the size of quantity, quality, time and location needed to fulfill the demand of product or service (Nasution and Prasetyawan, 2008:29)[2]. The best suitable forecast method is having the smallest error. Having upcoming demand forecast can help company to decide which strategy is the most suitable for the next period planning (Lina Gozali, 2013)[3].

Aggregate planning is planning process and setting output time in a certain time by adjusting the variables that can be managed (T. Hani Handoko, 1984:234)[4]. In aggregate planning, facility is considered to be permanent and can not be expand (Noegraheni, 2016:40)[5]. By considering the company's condition, mixed strategy is the chosen strategy.

Disaggregate planning is converting aggregate planning into the quantity of each product items needed to be produced. Disaggregate planning in this research uses percentage disaggregate technique.

Rough cut capacity planning is a calculation which will decide whether the planned resources enough to implement the number of items need to be produce for the upcoming period. (Gasperz, 2001:128)[6]. There are 3 technique to make rough cut capacity planning, such as CPOF, BOLA, and resource profile.

Material requirement planning is a dependent technique which use a list of material requirements, inventory, estimated acceptance, and master production sheet to determine the material needed (Heizer and Render, 2009:276)[7]. Implementing material requirement planning can reduce inventory, reduce lead time, and make a realistic shipping commitment for potential customers (Herjanto, 2009:275)[8].

Capacity requirement will show how many people, machines, and resources needed to fulfill the production target (Orlicky, 2010:67)[9]. The purpose of making capacity requirement planning is to know which workstation is overloaded and which workstation is underloaded.

3. Results and Discussion

3.1 Forecast result

Choosing which forecast technique is the most suitable can be done by calculating error of each technique. Forecast's error calculation shows that the technique which has the smallest error for every item produced in PT. XYZ is by using artificial neural network. Artificial neural network error for each item are summarized and can be seen in Table 1.

Table 1. Artificial Neural Network Forecast's Error Summary for Each Type

Error	Globe 107 Steril	Globe 107 Non Steril	Globe 207 Steril	Globe 207 Non Steril	Globe 307 Steril	Globe 307 Non Steril	Globe 407 Steril	Globe 407 Non Steril	Globe 507 Steril	Globe 507 Non Steril
MAD	0.56729	0.00000	1.68175	0.00000	0.00333	0.00933	1.67188	0.00725	0.00937	0.00696
MSE	0.65909	0.00846	3.38191	0.00021	0.00002	0.00018	4.60750	0.00009	0.00016	0.00008
MAPE	0.00501	0.00747	0.01790	0.08520	0.02825	0.05729	0.01527	0.00797	0.03437	0.02206

Error shown for artificial neural network forecast is very small which prove the forecast is representable to do the demand projection for upcoming 12 months. Forecast for the upcoming 12 months by using artificial neural network can be seen in Table 2.

Table 2. Forecast Result for Upcoming 12 Months Using Artificial Neural Network

Period	Globe 107 non steril	Globe 107 steril	Globe 207 non steril	Globe 207 steril	Globe 307 non steril	Globe 307 steril	Globe 407 non steril	Globe 407 steril	Globe 507 non steril	Globe 507 steril
Aug-19	2496	12193	47	11445	15	6	151	12300	70	60
Sep-19	584	10356	6	11444	12	6	159	6619	6	16
Oct-19	1245	11920	59	11445	18	19	123	13875	70	14
Nov-19	528	13512	52	11445	16	22	89	7956	6	23
Dec-19	460	12480	59	11445	41	30	94	13875	70	51
Jan-20	460	13320	6	11445	26	9	99	7693	6	60
Feb-20	460	13470	57	11441	38	30	116	13875	70	60
Mar-20	618	11980	6	11445	17	8	164	11644	6	16
Apr-20	506	13170	45	11392	19	17	163	11610	70	6
May-20	460	13354	6	11445	17	24	130	12619	6	8
Jun-20	473	12248	60	11445	23	30	112	11683	70	51
Jul-20	3078	13535	6	11445	37	6	88	11960	6	60

3.2 Aggregate and disaggregate planning result

Aggregate planning scenario chosen in order to balance demand with production capacity is multiplying working shift in some months and implementing inventory for finish goods, because this scenario has the smallest cost needed. Aggregate planning can be seen in Table 3.

Table 3. Aggregate Planning Result

Period	Avg Production/hour	Working Days (Monday-Friday)	Working Days (Saturday)	Total Working Hour	Demand Forecast (Unit)	Regular Time Production (Unit)	Initial Inventory	Overtime Production (Unit)	Final Inventory	RT+OT Production (Unit)	Overtime Cost	Salary	Inventory Cost	Total Cost	
Aug-19	170	22	4	348	36783	59160	20377	0	0	20377	59160	Rp -	Rp 309,600,000	Rp 33,961,667	Rp 343,561,667
Sep-19	170	21	4	167	23208	28390	19559	0	0	19559	28390	Rp -	Rp 154,800,000	Rp 32,598,333	Rp 187,398,333
Oct-19	170	23	4	181	38788	30770	11541	0	0	11541	30770	Rp -	Rp 154,800,000	Rp 19,235,000	Rp 174,035,000
Nov-19	170	21	4	334	33629	56780	34632	0	0	34632	56780	Rp -	Rp 309,600,000	Rp 57,820,000	Rp 367,420,000
Dec-19	170	20	4	160	38805	27200	23287	0	0	23287	27200	Rp -	Rp 154,800,000	Rp 38,811,667	Rp 193,611,667
Jan-20	170	22	3	169	33134	28730	18883	0	0	18883	28730	Rp -	Rp 154,800,000	Rp 31,471,667	Rp 186,271,667
Feb-20	170	20	5	330	39617	56100	35366	0	0	35366	56100	Rp -	Rp 309,600,000	Rp 59,343,333	Rp 368,943,333
Mar-20	170	21	4	167	35304	28390	27852	0	0	27852	28390	Rp -	Rp 154,800,000	Rp 46,420,000	Rp 201,220,000
Apr-20	170	21	4	334	36998	56780	47634	0	0	47634	56780	Rp -	Rp 309,600,000	Rp 79,390,000	Rp 388,990,000
May-20	170	13	4	111	38063	18870	28435	0	0	28435	18870	Rp -	Rp 154,800,000	Rp 47,391,667	Rp 202,191,667
Jun-20	170	21	4	167	36195	28390	20630	0	0	20630	28390	Rp -	Rp 154,800,000	Rp 34,383,333	Rp 189,183,333
Jul-20	170	22	4	174	40221	29580	9989	0	0	9989	29580	Rp -	Rp 154,800,000	Rp 16,648,333	Rp 171,448,333
Total												Rp -	Rp 2,476,800,000	Rp 497,075,000	Rp 2,973,875,000

Result of making disaggregate planning using percentage technique can be seen in Table 4.

Table 4. Disaggregate Planning Result

Period	Globe 107 non steril	Globe 107 steril	Globe 207 non steril	Globe 207 steril	Globe 307 non steril	Globe 307 steril	Globe 407 non steril	Globe 407 steril	Globe 507 non steril	Globe 507 steril
Aug-19	1532	20416	56	18494	36	28	201	18290	62	58
Sep-19	735	9798	27	8875	19	14	97	8772	30	28
Oct-19	797	10619	29	9619	20	15	105	9508	32	30
Nov-19	1470	19595	53	17750	37	27	193	17544	59	55
Dec-19	705	9387	26	8503	18	13	93	8405	29	27
Jan-20	744	9915	27	8982	19	14	98	8878	30	28
Feb-20	1453	19360	53	17538	36	27	191	17334	59	55
Mar-20	735	9798	27	8875	19	14	97	8772	30	28
Apr-20	1470	19595	53	17750	37	27	193	17544	59	55
May-20	489	6512	18	5899	12	9	64	5831	20	19
Jun-20	735	9798	27	8875	19	14	97	8772	30	28
Jul-20	766	10208	28	9247	19	14	101	9140	31	29

3.3 Rough cut capacity planning

Rough cut capacity will compare the rough capacity needed by each machine in production process with available working time. Available working time for the upcoming period can be seen in Table 5.

Table 5. Available Working Time in Minutes

Work Center	Period											
	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Crusher Machine	20880	10020	10860	20040	9600	10140	19800	10020	20040	6660	10020	10440
Jet mill Machine	125280	60120	65160	120240	57600	60840	118800	60120	120240	39960	60120	62640
Sieve Screening Machine	20880	10020	10860	20040	9600	10140	19800	10020	20040	6660	10020	10440
Packaging Machine	83520	40080	43440	80160	38400	40560	79200	40080	80160	26640	40080	41760
Sterilization Machine	20880	10020	10860	20040	9600	10140	19800	10020	20040	6660	10020	10440

Rough cut capacity planning calculation by using all of the 3 technique, such as CPOF, BOLA, and Resource Profile are having the same result which show that considering the available working time,

crusher machine in each month in upcoming period is lack of capacity to do the production. Result of rough cut capacity planning calculation can be seen in Table 6.

Table 6. Rough Cut Capacity Planning Calculation Result in Minutes

Work Center	Period											
	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Crusher Process	20881.76	10021.76	10861.41	20041.06	9602.12	10141.76	19802.12	10021.76	20041.06	6661.06	10021.76	10441.06
Jet mill Process	88747.50	42592.50	46161.00	85174.50	40809.00	43102.50	84159.00	42592.50	85174.50	28309.50	42592.50	44374.50
Sieve Screening Process	16135.91	7744.09	8392.91	15486.27	7419.82	7836.82	15301.64	7744.09	15486.27	5147.18	7744.09	8068.09
Packaging Process	59165.00	28395.00	30774.00	56783.00	27206.00	28735.00	56106.00	28395.00	56783.00	18873.00	28395.00	29583.00
Sterilizing Process	20215.06	9701.29	10514.47	19401.53	9294.71	9817.76	19169.65	9701.29	19401.53	6448.24	9701.29	10107.53
Total Capacity Requirement	205145.23	98454.65	106703.79	196886.36	94331.64	99633.85	194538.40	98454.65	196886.36	65438.98	98454.65	102574.18

3.4 Materials requirement planning

Knowing the quantity of each material needed for each item can be known by converting the number of item that need to be produced into each item bill of material. Bill of material from each item can be seen in Figure 1 until Figure 10.

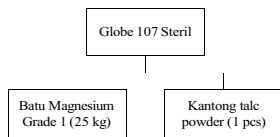


Figure 1. BOM of Globe 107 Sterile

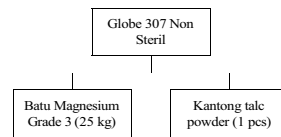


Figure 6. BOM of Globe 307 Non Sterile

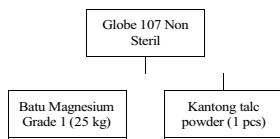


Figure 2. BOM of Globe 107 Non Sterile

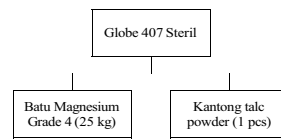


Figure 7. BOM of Globe 407 Sterile

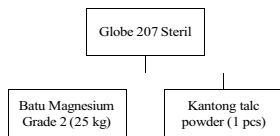


Figure 3. BOM of Globe 207 Sterile

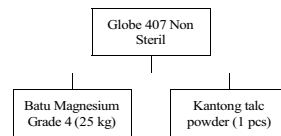


Figure 8. BOM of Globe 407 Non Sterile

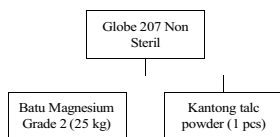


Figure 4. BOM of Globe 207 Non Sterile

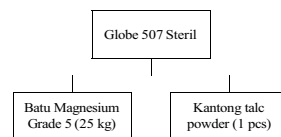


Figure 9. BOM of Globe 507 Sterile

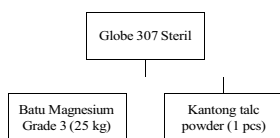


Figure 5. BOM of Globe 307 Sterile

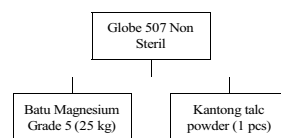


Figure 10. BOM of Globe 507 Non Sterile

Based on the result comparison of some lot sizing technique, Algorithm Wagner Within (AWW) is being the best technique because it has the smallest cost needed, Rp 806,911,811.53 for Grade 1, Rp 637,433,810.43 for Grade 2, Rp 150,364,839.87 for Grade 3, Rp 554,205,532.50 for Grade 4, Rp

151,385,143 for Grade 5, and Rp 10,170,400 for Kantong Talc Powder, which make the total cost is Rp 2,310,471,537.33. Comparison of cost needed for each type in lot sizing methods can be seen in Figure 16.

Table 7. Lot Sizing Calculation Result Comparison

Lot Sizing Technique	Raw Material						Kantong Talc Powder
	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5		
LFL	Rp 1,895,839,596.80	Rp 1,858,727,314.60	Rp 1,779,791,403.20	Rp 1,839,392,410.00	Rp 1,779,908,468.00	Rp	10,170,400.00
EOQ	Rp 911,020,055.87	Rp 734,924,411.63	Rp 541,849,439.47	Rp 4,833,370,064.23	Rp 629,153,448.73		Unfeasible
AWW	Rp 806,911,811.53	Rp 637,433,810.43	Rp 150,364,839.87	Rp 554,205,532.50	Rp 151,385,143.00	Rp	10,170,400.00
SILVER MEAL	Rp 887,081,961.80	Rp 637,433,810.43	Rp 150,364,839.87	Rp 554,205,532.50	Rp 151,385,143.00	Rp	10,170,400.00
LUC	Rp 818,295,741.80	Rp 739,538,527.93	Rp 150,772,442.58	Rp 554,205,532.50	Rp 151,385,143.00	Rp	10,170,400.00
POQ	Rp 966,709,302.87	Rp 876,166,910.23	Unfeasible	Rp 874,232,470.27	Unfeasible	Rp	304,951,907.73

3.5 Capacity Requirement Planning

Rough cut capacity planning calculation already show that crusher machine is lack of capacity in each month in the upcoming period. Capacity requirement planning calculation will show the calculation result for each machine capacity by considering utilization, efficiency, number of machine, quantity of each item needed to be produce, cycle time of each item, and setup time for every machine if it is needed for each item, changing item type production, or each day. Available working time by considering utilization is 95% and efficiency is 95% in minutes can be seen in Table 8.

Table 8. Available Work Time in Minutes Considering Utilization and Efficiency

WC	Number of Machines Available	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Crusher Machine	1	18844.2	9043.05	9801.15	18086.1	8664	9151.35	17869.5	9043.05	18086.1	6010.65	9043.05	9422.1
Jet Mill Machine	5	94221	45215.25	49005.75	90430.5	43320	45756.75	89347.5	45215.25	90430.5	30053.25	45215.25	47110.5
Sieve Screening	1	18844.2	9043.05	9801.15	18086.1	8664	9151.35	17869.5	9043.05	18086.1	6010.65	9043.05	9422.1
Packaging	4	75376.8	36172.2	39204.6	72344.4	34656	36605.4	71478	36172.2	72344.4	24042.6	36172.2	37688.4
Sterilization Machine	1	19836	9519	10317	19038	9120	9633	18810	9519	19038	6327	9519	9918

Capacity requirement planning calculation result after considering number of machine available, production quantity for each item type, cycle time for each item type, and setup time for each machine in each month can be seen in Table 9.

Table 9. Capacity Needed in Minutes for Each Machine in Each Month

WC	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Crusher Machine	21011.76	10144.29	10995.71	20158.65	9730.24	10269.24	19927.82	10146.06	20159.71	6747.82	10148.18	10577.41
Jet Mill Machine	88878.50	42708.00	46294.00	85269.00	40964.50	43239.00	84288.00	42715.50	85273.50	28403.00	42724.50	44532.50
Sieve Screening Machine	16305.91	7907.18	8567.36	15645.55	7586.09	8003.73	15467.18	7908.55	15646.36	5273.55	7910.18	8243.00
Packaging	68299.75	32896.20	35657.80	65526.30	31553.35	33303.30	64774.20	32901.95	65529.75	21879.70	32908.85	34301.15
Sterilization Machine	20500.06	9376.29	10809.47	19676.53	9559.71	10092.76	19444.65	9376.29	19676.53	6643.24	9376.29	10392.53

Based on the capacity requirement calculation result, can be seen that crusher machine and sterilization machine are lack of capacity for every months in upcoming period in order to fulfil demand on that month while sieve screening machine and packaging are excess of capacity. Solution for the capacity problems and the cost needed for each alternative are summarized and can be seen in Table 10.

Table 10. Cost Needed for Each Alternative Solution for Capacity Problem

Solution Alternatives	Crusher Machine	Jet Mill Machine	Sieve Screening Machine	Packaging	Sterilization Machine
Add Work Shifts	Rp 632,263,333.33	Rp 1,547,020,000.00	Rp 1,048,998,333.33	Rp 1,634,708,333.33	Rp 603,084,000.00
Reduce Work Shifts	Impossible	Rp 1,547,020,000.00	Rp 543,888,333.33	Rp 703,778,333.33	Impossible
Overtime	Rp 310,743,409.09	Rp 1,547,020,000.00	Rp 1,048,998,333.33	Rp 1,634,708,333.33	Rp 392,936,931.82
Buy Machine	Rp 8,491,035,000.00	Rp 1,568,753,333.33	Rp 3,709,946,666.67	Rp 1,032,303,333.33	Rp 3,479,976,666.67
Reject Demand	Rp 728,070,000.00	Rp 1,547,020,000.00	Rp 1,048,998,333.33	Rp 1,634,708,333.33	Rp 412,920,000.00

4. Conclusion

As a result of this research, can be concluded:

1. The best forecasting technique to project the upcoming demand for PT. XYZ is using artificial neural network because it has the smallest error for all of the item type.
2. Aggregate planning for PT. XYZ can be done by using *mixed strategy* with total cost Rp 2,973,875,000 for the upcoming period while disaggregate planning can be done by using percentage technique.
3. Rough cut capacity planning calculation show that crusher machine is lack of capacity for each month in upcoming period in order to fulfil all of the demand.
4. The best lot sizing technique for PT. XYZ is by using Algorithm Wagner Within (AWW) to obtain the smallest cost needed, Rp 806,911,811.53 for Grade 1, Rp 637,433,810.43 for Grade 2, Rp 150,364,839.87 for Grade 3, Rp 554,205,532.50 for Grade 4, Rp 151,385,143 for Grade 5, and Rp 10,170,400 for Kantong Talc Powder, which make the total cost is Rp 2,310,471,537.33
5. The main cause of PT. XYZ's problem is capacity, which proved by the calculation which show crusher machine and sterilization machine are lack of capacity to fulfill all of the demand while sieve screening and packaging are having excessive of capacity. Lack of capacity solution chosen for crusher machine and sterilize machine is implementing overtime because it has the smallest operation cost needed, Rp 310,743,409.09 for crusher machine and Rp 392,936,931.82 while excessive capacity solution for sieve screening machine and packaging can reduce their working shift, which will decrease operation costs needed, Rp 1,048,998,333.33 to Rp 543,888,333.33 for sieve screening machine and Rp 1,634,708,333.33 to Rp 703,778,333.33 for packaging.

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