SURAT TUGAS
No.: 03/ST-TI/FT/UEU/VII/2021

Yang bertanda tangan dibawah ini:

    Nama   : Dr. Arief Suwandi, ST., MT

    Jabatan : Ketua Program Studi Teknik Industri Universitas Esa Unggul

    Alamat   : Fakultas Teknik – Universitas Esa Unggul

                Jl. Arjuna Utara No. 9, Kebon Jeruk, Jakarta 11510

Menugaskan kepada dosen-dosen yang tertera berikut ini:

No.	Nama Dosen (Kode Dosen/ NIDN)	Nomor dan Judul Paper
1	Dr. Ir. Nofi Erni, MM (1034 / 0315116701)	13th-ISIEM-Paper 141-QM Improvement of Process Quality Using Taguchi Method on Solvent Production
2	Dr. Arief Suwandi, ST., MT (6848 / 0302046805)	13th-ISIEM-Paper 149-QM Reduction of Bolt Product Defects at PT. GIP Using Six Sigma Method
3	Taufiqur Rachman, ST., MT (6623 / 0315077803)	13th-ISIEM-Paper 107-QM Performance Maintenance Evaluation and Determination of Machine Maintenance Schedule in PT. Hamdan Jaya Makmur Workshop Division

Untuk mendiseminasikan hasil penelitian yang telah dibuat pada "13th International Seminar on Industrial Engineering and Management (13th ISIEM)" yang diselenggarakan pada 28 Juli 2021.

Demikian surat tugas ini dibuat untuk digunakan sebagaimana mestinya.

Jakarta, 15 Juli 2021

Ketua Program Studi Teknik Industri Universitas Esa Unggul

(Dr. Arief Suwandi, ST., MT)
NIP/NIK. 211080436

PROGRAM BOOK
13th ISIEM 2021

INTERNATIONAL SEMINAR ON INDUSTRIAL ENGINEERING AND MANAGEMENT

[Production and Service System in The New Normal Era]

Bandung, West Java, Indonesia

July 28, 2021

ISIEM

Organized by:
INDUSTRIAL ENGINEERING DEPT.

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PREFACE

Bismillahirrahmanirrahim,
Assalamu'alaikum Warrahmatullah Wabarrakatuh,

First of all, we apologize for the inconvience in the 13th ISIEM 2021 event, due to current condition and situation of COVID 19. The situation made us has to make some critical modification in the event, including: online presentation of keynote speaker, online presentation for all candidates that cannot attend the seminar. but we hope we all remain excited to continue to contribute to research publications. Nonetheless, we are trying to prepare this seminar as best we can.

This issue is published in line with the Thirteen International Seminar on Industrial Engineering and Management (13th ISIEM) 2021. The articles cover a broad spectrum of topics in Industrial Engineering and Management, which are Quality Engineering Management, Decision Support System and Artificial Intelligent, Ergonomics, Supply Chain Management, Production System, Operation Research, and Industrial Management. These articles provide an overview of critical research issues reflecting on past achievements and future challenges. Those papers were selected from 137 abstracts, and we send these papers to AIP to be published there as an Open Access Proceeding Scopus. This statistic shows the high competition to get published on this proceeding. This issue and seminar become special as more delegates come and join from various country as well as universities. We host 90 delegates both from abroad and local.

The 13th ISIEM is hosted by eight universities, which are Universitas Pasundan, Universitas Esa Unggul, Universitas Trisakti, Universitas Tarumanagara, Universitas Al-Azhar Indonesia, Atma Jaya Catholic University of Indonesia, Universitas Pancasila and Universitas Mercubuana. This is the thirteenth years of the collaboration of those universities, and the first time we had MOU with AIP in America to publishing the papers that is indexed by Scopus. This is also the second years of our international partnership join committee with Chung Yuan Christian University – Taiwan, Yuan Ze University – Taiwan, Kasetsart University – Thailand and Bright Star University – Libya.

In this occasion, let us give special thanks to Prof.Yung-Tsan Jou, PhD (Professor and Chair Department of Industrial and Systems Engineering, Chung Yuan Christian University – Taiwan), Prof. Yun-Chia Liang, PhD (Professor and Chair, Department of Industrial Engineering and Management, Yuan Ze University – Taiwan), Elisa Lumbantoruan (President Director & CEO at ISS Indonesia, Independent Commissioner at PT Indosat Tbk, and Independent Commissioner at Garuda Indonesia) and Naraphorn Paoprasert, Ph.D (Researcher, Department of Industrial Engineering, Faculty of Engineering, Kasetsart University – Thailand), for their contribution as keynote speakers, to Prof. Abdelnaser Omran from Brightstar University, and supported by Indonesian Association of Industrial Engineering Higher Education (BKSTI) and the Institution of Engineer Indonesia – Industrial Engineering Chapter (BKTI-PII). We are also grateful to all reviewers and editors, for their commitment, effort and dedication in undertaking the task of reviewing all of the abstracts and full papers. Without their help and dedication, it would not be possible to produce this proceeding in such a short time frame. I highly appreciate all members of committees (advisory, steering, and organizing committees) for mutual efforts and invaluable contribution for the success of seminar.

Wassalamu'alaikum Warrahmatullah Wabarrakatuh.

Dr. Winnie Septiani, ST, MSi, CIQaR
Chairman

The Conference Program

0830
Zoom Meeting Open,
Welcoming, Informations,
by the Committee

0900
Welcoming Remarks,
Code of Silence, National Anthem
by MC: Dr. Ir. Yogi Yogaswara,MT.

0915
Greeting Speech by Chairman
Dr. Winnie Septiani, ST, MSi, CIQaR

0920
Opening Speech by
Prof. Dr. Ir. H. Eddy Jusuf, SP. MSi., MKom.
Rector of Universitas Pasundan

0925
Partnership Ceremony by
Representation of University Committee
and Partner University

The Keynote Session

Modertator,
Riana Magdalena, SSi., MBA.

0930
Prof. Yung-Tsan Jou, Ph.D.,
Chung Yuan Christian University
Taiwan

1000
Naraphorn Paoprasert, Ph.D
Kasetsart University
Thailand

1030
Prof. Yun-Chia Liang, Ph.D.
Yuan Ze University
Taiwan

1100
Elisa Lumbantoruan,
Independent Commissioner
at Garuda Indonesia

Question and Answer 1130 – 1200

Lunch Break 1200 – 1300

PARALLEL SESSION 1300 – 1700

*All time in WIB (Western Indonesian Zone - GMT+7)

Join the 13th ISIEM Seminar Guideline

Dress appropriately. This is an international event with huge number of participants coming from many countries.

Please be aware of your surroundings. Adjust your work setup so that you face a window or are exposed to plenty of light, and make sure you use the virtual background given by the committee. It is recommended to put on the earpiece or headset equipped with microphone.
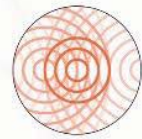
Leave the keyboard alone. It will prevent you from devoting your full attention to the meeting

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Stay seated and stay present. This conference will take around 8 hours of your day. It may be tempting to do other things during the meeting, but please refrain in doing so. Because you might miss out on key information or an opportunity to give input.

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You can download Zoom at https://www.zoom.us/
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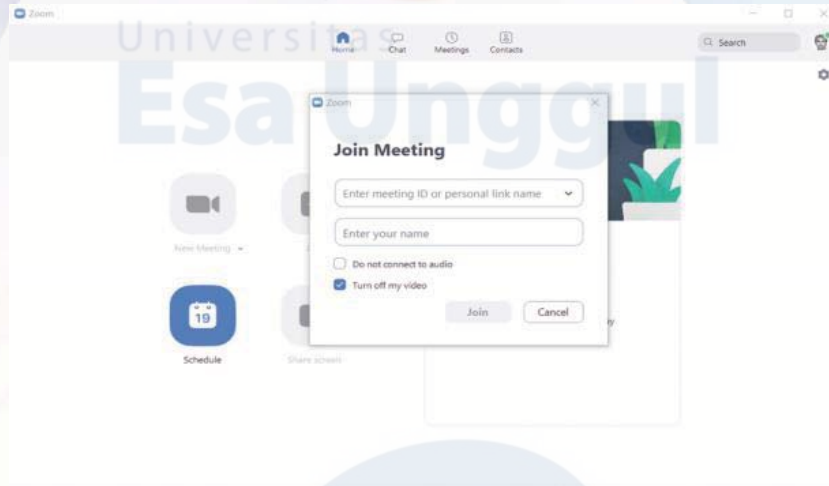
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https://drive.google.com/drive/folders/1ujOHaht9cvOKLXXNOvK7IsJAdWuzSpZZ?usp=sharing
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The morning session is a Keynote Speeches session. During this session there will be no breakout room in Zoom platform. The noon session is a parallel session. Breakout room will be applied.
The Author may enter the room as shown on the schedule of parallel session in the Program Book by click on [Breakout Rooms], then choose the room that you will make a presentation

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KEYNOTE SPEAKERS

Prof. Yung-Tsan Jou, Ph.D., received his Ph.D. degree in Integrated (ME, ISE) engineering from Ohio University, Athens, OH, in 2003. He is the Chair and Associate Professor of Industrial and Systems Engineering at Chung Yuan Christian University, Taiwan. His research has made contributions in green design, human–system interface design, senior assistive devices, and usability or quality evaluation by using virtual reality tools, smart manufacturing, machine learning, and data analysis.

Naraphorn Paoprasert, Ph.D., is an associated professor at the Department of Industrial Engineering, Kasetsart University, Thailand. She received her Ph.D. from the Department of Industrial Engineering, University of Wisconsin-Madison, USA. Currently, she is a director of the International Graduate Program under the Department of Industrial Engineering. Her past research studies have been focusing on decision analysis and game theory, risk analysis, system simulation, process improvement, and economics analysis. The first research exposures were focusing on decision making to protect the system against natural disasters and terrorism. Later on, the focuses were on decision making in various fields such as agriculture, research fund allocation, education, etc.

Prof. Yun-Chia Liang, Ph.D., received his Ph.D. form Industrial and Systems Engineering, Auburn University – Alabama USA. He actives as Professor and Chair, Department of Industrial Engineering and Management, Yuan Ze University – Taiwan, Vice Director, the Smart Production and Innovation Management Research Center (SPIM), Yuan Ze University, Associate Editor, Journal of Industrial and Production Engineering (JIPE), Planning Committee, IEM Division, Ministry of Science and Technology (MOST), Taiwan, and many more academic activities.

Elisa Lumbantoruan, received Bachelor degree in Institut Teknologi Bandung on Mathematics. He has skill in Business Strategy, Strategic Planning, Business Planning, Business Development, Business Analysis, Risk Management, Management Telecommunications, Business Intelligence, Negotiation.
He experiences in many enterprises and until now is the President Director & CEO at ISS Indonesia, Independent Commissioner at PT Indosat Tbk, and Independent Commissioner at Garuda Indonesia

GLOSSARY

QM   = Quality Management
SCM   = Supply Chain Management
IECS   = Industrial Engineering, Computer Science
EPD   = Ergonomic, Product Design
PS   = Production System
DAIS   = Decision Analysis and Information System
OR   = Operation Research
IS   = Industrial System

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13th ISIEM PARALLEL SESSION SCHEDULE
Wednesday, 28 July 2021

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Session Chair:		Prof. Dr. Abdelnaser Omran Ali			
Session Parallel:		Dr. Ir. Nofi Erni, MM / Taufiqur Rachman, ST, MT			
Paper ID	Time		Name	Title	University
45	13.00	- 13.10	Sri Raharno, **Ari Setiawan**, Rachmad Hartono, Harry Prayoga, Muhammad Zulfahmi, Vina S. Yosephine	The Smart Factory Model for Bogie Assembly Workshop in the Rolling Stock Industry	Institut Teknologi Bandung, Universitas Pasundan
100	13.10	- 13.20	**Docki Saraswati**, Debbie Kemala Sari, Fani Puspitasari and Fitri Amalia	Forecasting Product Returns using Artificial Neural Network for Remanufacturing Processes	Universitas Trisakti
50	13.20	- 13.30	Sri Raharno, **Muhammad Zulfahmi Febriansyah**, and Yatna Yuwana Martawirya	Development of Operation Scheduling Systems at Workstations with the Autonomous Distributed Manufacturing Systems (ADiMS) Concept	Institut Teknologi Bandung
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			Rosihan, Ismaniah and Sumanto	Case Study Bottled Drinking Water	
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Session 2 (15.00 – 17.00)					
Track : Production System (PS)					
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Session Chair:			**Dr. Ir. Nofi Erni, MM**		
Session Parallel:			**Taufiqur Rachman, ST, MT**		
Paper ID	Time			Name	Title	University
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142	15.10	-	15.20	**Iphov Kumala Sriwana**, Citra Putri Hutami, Nofi Erni and Taufiqur Rachman	Age Replacement Scheduling on Total Organic Carbon (TOC) Analyzer Instrument at XYZ Pharmaceutical, Ltd	Telkom University, Esa Unggul University
107	15.20	-	15.30	**Taufiqur Rachman**, Briliany Dewinda Mokoginta, Iphov Kumala Sriwana and Septian Rahmat Adnan	Performance Maintenance Evaluation and Determination of Machine Maintenance Schedule in PT. Hamdan Jaya Makmur Workshop Division	Esa Unggul University
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149	15.30 - 15.40	**Arief Suwandi**, M. Derajat Amperajaya and Septian Hadi Cahyo	Reduction Of Defects of Bolts Products at PT. GIP using Six Sigma Method	Esa Unggul University
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44	16.00 - 16.10	**Sarah Isniah,** Zulfa Fitri Ikatrinasari and Torik Husein	Increasing Consumer Satisfaction and Loyalty with Product Innovation, E-Commerce and Reward Factors	Universitas Mercu Buana
65	16.10 - 16.20	**Audira Zuraida** and Endang Chumaidiyah	Design of Website and Web-Based Information System User Interface of PT XYZ with Human Centered Design Method	Telkom University
88	16.20 - 16.30	**Yudha Aprilianto** and Muhammad Asrol	Decision Support System for Business Location Selection and Economic Feasibility	Bina Nusantara University
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Session 2 (15.00 – 17.00)				
Track : Industrial System (IS)				
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Session Parallel:		**Aisyah Sabrina Aprilia**		
Paper ID	Time	Name	Title	University
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PAPERS AND ABSTRACTS

13th-ISIEM-Paper 002 – QM

Reducing Defect Products in Instant Noodles Production with Six Sigma

R M Silitonga[1], Y T Jou[1], and M C Lin[1]
[1]Chung Yuan Christian University, Taoyuan, Taiwan

Abstract. Quality control is an essential thing in running a company, especially in the production process. The resulting product is inseparable from failure or nonconformity, as is the case experienced by Indofood (M) Food Industries Sdn. Bhd. It has a defect rate of 2.84% of instant noodle product scrap, which occurs in the middle of the production process, resulting in waste and loss. The purpose of this research includes the DMAIC (Define, Measure, Analyze, Improve, Control) approach, which is to define problems experienced by the company, measure current quality conditions, analyze things that cause product defects, provide solutions to overcome the causes of these problems and calculate design control measures. The results of this research indicate that the company's quality conditions from April to September 2018 suggest that the process does not meet specifications and must be improved even though the average sigma value produced has reached 4.24. The results show that three types of defects were found as the main contributor to the problems, namely dirty crushed, finely crushed, and broken crushed. The root cause of the problems was based on personal factors (operator problem), work method factors (process standard problem), and machine factors (machine problem), respectively.
Keywords: DMAIC, Instant Noodles, Quality Control, Six Sigma

13th-ISIEM-Paper 006 – IECS

Structural Health Monitoring for Intelligence Structure: Damage Feature

F E Gunawan[1,a], Y Kanto[2], T H Nhan[3], I Kamil[4], Sutikno[5]
[1]Industrial Engineering Department, BINUS Graduate Program, Master of Industrial Engineering, Bina Nusantara University Jakarta, Indonesia 11480,
[2]Mechanical Systems Engineering, College of Engineering, Ibaraki University, Ibaraki, Japan,
[3]Department of Automotive Engineering, Faculty of Transportation Engineering, Ho Chi Minh City University of Technology, Ho Chi Minh City, Viet Nam,
[4]Department of Industrial Engineering, Faculty of Engineering, Andalas University, Andalas, Indonesia,
[5]Department of Mechanical Engineering, Faculty of Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

Abstract. Structural Health Monitoring (SHM) is a system to monitor and assess engineering structure's integrity. It is crucial to avoid catastrophic failure, which often leads to material and immaterial loss. For the system to work, sensors should be placed on the structure to measure its deformation: strain, acceleration, velocity, or displacement. Then, the recorded data are analyzed to obtain damage-sensitive features, quantities for predicting the structural integrity. So far, the widely used features are natural frequency and mode shape. Vast engineers and scientists understand both. However, empirical evidence suggests the damage should have grown significantly to alter the natural frequency and mode shape to a detectable amount. This work intends to propose a feature that is more sensitive to damage than the natural frequency. We derive the feature from the Euler-Bernoulli Beam theory and evaluate its performance empirically for the case involving a cracked beam. The beam responses with and without crack subjected to loads are computed by the finite-element method. The proposed damage index is computed in the time domain at some observation points around the damaged area. The results are compared to those predicted by the change of natural frequency.
Keywords: Structural Health Monitoring (SHM), Damage Feature, Machine Learning, Natural Frequency, Mode Shapes, Beam Deformation, Euler-Bernoulli Beam.

13th-ISIEM-Paper 007 – PS

Inventory Level Improvement with a Forecasting Methods in the Taxi Transportation Industry

Muhamat Arifin[1,a] and Hasbullah[2,b]
[1]Student at Mercu Buana University (Jl. Alam Parung Raya, Bogor, Indonesia), [2]Lecturer at Mercu Buana University

Abstract. The transportation service industry in Indonesia has developed quite rapidly. Inventory control is still not right, and found that the problem of spare parts overstock was 84% of the company's standard value is 20%. This study's suitable forecasting method uses a double moving average (DMA) with the smallest MSE value of 2.466. The purpose of this research for the company is to prove the proposed effective inventory method to the company to exploit inventory costs and to avoid dead stock/waiting parts. The research on radiator materials. The optimal inventory planning system uses the Fixed Period Requirements (FPR) method. Ordering with the lot size provides the smallest cost for the ordering and storage process by 47% compared to conventional methods carried out by the company and can provide an idea of when to order and how many orders per period. It can help coordinate with suppliers to meet company needs with routine supplier evaluations with a delivery lead time of 0 days.
Keywords: Fixed Period Requirements, inventory, forecasting, moving average.

13th-ISIEM-Paper 008 – SCM

Bibliometric Mapping Of Biomass For Energy Supply Chain Model: Review and Future Research agenda

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Abstract. Biomass is a waste that can be utilized for energy, with conversion technology can produce useful energy and can support activities in the agroindustry supply chain. The purpose of this study was to determine the trend of research in the field of biomass supply chain models for energy by analyzing through the review of several joint articles and the incorporation of bibliography, the frequency of joint appearance, and consideration of citations from the authors of articles, keywords, as well as providing direction on the focus of future research, the scope of research based on metadata four hundred articles in the Google Scholar database. Bibliometric Analysis Tool using VOSviewer, Harzing's Perish, or Publish software is used to analyze h-indexes. Mapping Conversion technology, Decision-making level at every stage in the biomass supply chain into energy using VOSviewer. The results of the bibliometric analysis concluded that biomass supply chain model into energy by using Thermochemical, Biochemical, and Physicochemical technology as well as the type of biomass used is biomass-derived from plant waste remains most widely used while the use of biomass-derived from rice-based crop waste, residential and industrial waste has not been optimal. For future research biomass as an energy source is focused on rice-based crop waste with consideration of rice-based biomass availability is quite abundant, but its utilization is not optimal.
Keywords: Bibliometric, Mapping, Biomass supply chain, Google scholar, VOSviewer

13th-ISIEM-Paper 009 – EPD

Finding a Research Gap on Service Quality and Safety Improvement in Public Transportation

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Abstract. Safety has become an essential issue in public transportation service quality. This literature review aims to identify the research trend and research gap in service quality and public transportation safety. Literature searching was directed using keywords of public transportation, service quality, road safety, bus rapid transit, and macroergonomics published at Science Direct, Proquest, Emerald Insight, and Springer. Articles being reviewed were published in the last fifteen years, 2005 to 2020. They were classified by the aim of the study and the methods. There are three primary topics in this literature review; public service quality, study of bus rapid transit (BRT) operation worldwide, and public transportation safety. From the review, there is a conclusion that the research agenda on public transportation using the macroergonomics approach is a novelty.
Keywords: public transportation, service quality, bus rapid transit, safety, macroergonomics.

13th-ISIEM-Paper 010 – DAIS

Decision Support System for Raw Material Supplier Selection by Using Fuzzy AHP-TOPSIS Method in PT Mulia Glass

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Abstract. PT. Mulia Glass is a company that produces glass sheets. The raw materials procurement process which is conducted by previous purchasing division is only emphasized price and other subjective criteria. This research aims to design a Decision Support system (DSS) selection of raw material suppliers using the Fuzzy-AHP and TOPSIS methods. The design of a decision support system begins with the initiation and analysis system. System databases consist of the user database, suppliers, raw materials, criteria, comparison of criteria, master TFN, criteria weights and alternative values. Model Base consists of a Fuzzy-AHP model to determine the value of the criterion weights and TOPSIS model is used for supplier alternative alignment. The DSS implementation is designed using the PHP and MySQL programming languages. Criteria for the selection of raw material suppliers such as price, quality, time of payment, customer care, and service. Result of Fuzzy-AHP TOPSIS consists of rank with the first place is PT.C with evaluation value 0.578, second and place PT.A with a value of 0.414. The validation result of a manual calculation and DSS shows the same result, it is concluded that the raw material supplier selection DSS is valid.
Keywords: Supplier selection, raw material, DSS , Fuzzy AHP, TOPSIS

13th-ISIEM-Paper 011 – SCM

Methods and Approaches Mapping for Supplier Selection: Literature Review

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Abstract. Supplier selection is one of the important stages that should be considered in supply chain management. Some researchers have researched the supplier's selection with different methods or approaches. This research aims to map the use of methods or approaches and criteria in the selection of suppliers. Article research was done through relevant journals selected by the selection of suppliers issued from 2013 to 2020. A total of 42 article journals were selected and analyzed. The stages start from the article research related to supplier selection. Then, the articles are identified and classified based on their method or approach. The grouping of supplier selection methods is divided into two namely a single model and an integrated model. The commonly used methods of the selection of suppliers in the single model are AHP, TOPSIS, VIKOR, SAW, and WP. Whereas, the integrated models that are commonly used are Fuzzy AHP, Fuzzy TOPSIS, Fuzzy AHP-TOPSIS, AHP-VIKOR, and Fuzzy-AHP & Fuzzy-TOPSIS. The use of a Decision Support System (DSS) assisting supplier decision making, is widely supported by a unified model group. The results of this research are expected to help researchers and companies choose methods to determine suppliers.
Keywords: Literature review, Supplier Selection, Criteria, Supplier Selection Method, DSS.

13th-ISIEM-Paper 012 – EPD

Redesign Plastic Waste Processing Machine by Using the Lean Product Development Method

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Abstract. It is known that the amount of plastic waste have increased for years and it has the potential to become dangerous for environment. There is a study that developed an integrated plastic waste processing machine called Creatics which have chopper and heating machine into one machine as alternatives to process plastic waste but it still have problems and room for improvement. It is necessary to develop a new design to redesign Creatics into a machine that could fix its constraints and a design that could meet the attributes that customer needs. The methods used in this research are Garvin's dimension and Lean Design Solution Tools. Garvin's dimension is used to identify which attributes of customer needs that must be prioritized and Lean Design is used to identify the problems that Creatics had clearly then make improvement based on it. Based on Garvin's dimensions, five attributes of customer needs that must be prioritized are processed products must be useful, machine equipped with safety, environment friendly, ergonomic design, and easy to be repaired. By using the Lean Design Solution Tools, improvement have been made to fix problems that Creatics had into a new design that was carried out by CATIA Software.
Keywords: customer needs, garvin dimension, lean design

simulation approach. The method used in this research is discrete simulation using Pro Model software. Based on the simulation, it is known that in order to maximize the utilization of the furnace production facility, the company must increase the utilization of the crucible production facility according to the input requirements for the furnace production facility. Based on the simulation results, it was found that the strategy can increase the utilization of crucible production facilities from 47,16% to 70,71%.

Keywords: simulation, Pro Model, utilization of production facility, aluminum bars

Agglomerative Hierarchical Clustering in Determining the Location of Bio-briquette Plant in Majalengka Regency

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Abstract. Due to the limited availability of fossil fuels, it is necessary to look for renewable-based energy sources, as an alternative. One of them, is a bio-briquette made from corn cob. The purpose of this research is to determine the location of bio-briquette plant in Majalengka Regency. This problem needs to be considered carefully, because it will require considerable costs, and because the establishment of the plant is generally planned for a long period of time. Since the selection involving 26 sub-districts as candidates, where each sub-district has different infrastructure and physical environmental conditions, in this study the selection process was conducted using Cluster Analysis Algorithm. The clustering method used in the study was Agglomerative Hierarchical Clustering, and the result shows that the selected sub-districts is Majalengka.

Keywords: Majalengka, Bio-briquette, Plant-location, Agglomerative Hierarchical Clustering

Eye-Tracking Approach for Analyzing the Advertisement Criteria of the Most Attractive Sports Drinks

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Abstract. This paper presents an application of the Eye-Tracking approach to evaluate some kinds of Sports Drinks Advertisement with using a bottle packaging. It is significant because a lot of advertisements involving mankind especially females for attracting customers to buy the drink. The fact brings out an impression to exploit them and not focusing on the product such that occasionally some customer is dissatisfied with the real product. In order to reveal how attractive advertising model should be, five models of advertisements were analyzed are 'Text and the Sports Drink Product' model, 'One Sports Drink and Other Products' model, 'A Lot of Sports Drink Products' model, 'One Sports Drink and One Different Product' model, and 'Single Sports Drink Product' model on basis fixation time and heat map parameter through Eye-Tracking. Forty experienced respondents in consuming the drink have participated with ages between 19-25 years old. Statistical analysis was conducted to test the hypothesis. The result of this study shows the 'Single Sports Drink Product' advertisement has the highest average fixation time (5,08 seconds) and the heat map is a red spot as the area of the primary interest to the user. This model is valid to be the best attractive advertisement.

Keywords: Eye Tracking. Fixation Time, Heat Map, Sports Drink, Advertisement

Performance Maintenance Evaluation and Determination of Machine Maintenance Schedule in PT. Hamdan Jaya Makmur Workshop Division

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Abstract. Machinery is one form of the physical assets of the company PT. Hamdan Jaya Makmur that must be properly maintained in order to always full-fill its function in carrying out operational activities. Some of the aims of this research are to determine the value of performance maintenance, evaluating machines that are experiencing poor maintenance performance, and creating maintenance intervals using Reliability Centered Maintenance (RCM) II method. The research results found that the Miyano CNC Lathe Machine has the lowest performance maintenance, with MTTF 20669.93 minutes and MTTR 56.30 minutes. The inspection time interval for the automatic tool changer component was carried

out every 0.554 times/month with time interval 955 hours after the last examination with MTTF 2820.01 minutes and MTTR 10.76 minutes with an average maintenance time of 30 minutes. The memory component it is carried out every 0.905 times/month with an interval 519 hours after the last examination with MTTF 6614.72 minutes and MTTR 10.24 minutes with an average maintenance time of 25 minutes. The relay unit component carried out every 1,116 times/month with an interval 401 hours after the last examination with MTTF 6899.4 minutes and MTTR 18.66 minutes with an average maintenance time of 35 minutes.

Keywords: maintenance, performance maintenance, reliability centered maintenance, RCM II, MTTF, MTTR.

13th-ISIEM-Paper 108 – QM

Quality Improvement on Pipe Production Using Six Sigma and Data Mining in PT. FIP

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Abstract. PT.FIP is an industrial company engaged in manufacturing oil and gas pipelines. PT FIP wants to reduce the product defect percentage by more than 6% in the welding process. This research aims to improve the product quality by using Six Sigma and Data Mining also DMAIC (Define, Measure, Analyze, Improve, and Control) approach. At the Define stage, SIPOC (Supplier-Input-Process-Output-Customer) diagram was used to determine CTQ (Critical to Quality resulted 4 CTQs, namely porosity, hot crack, undercut, distortion. At the measuring stage, the sigma level is 3.54, still, needs to be improved. At the analysis stage, 80% of product defects are dominated by porosity and undercut. Another defect, the hot crack was identified using Ishikawa Diagram and FMEA (Failure Mode and Effect Analyzes). The highest Risk Priority Number (RPN) is porosity caused by a failure in welding conditions and humid pipes, and hot crack is the most significant defect. There is a QC PASS decision standardization with the IF-THEN Rule function from Classification and Regression Tree (CART) at the Improve stage. The improvement was made by applying the welding area cleaning form. After the improvement, the sigma level increase to 3.60.

Keywords: DMAIC (Define, Measure, Analyze, Improve, Control), FMEA (Failure Mode and Effect Analysis), CART (Classification and Regression Tree), six sigma, data mining

13th-ISIEM-Paper 109 – DAIS

Hospitality Food and Beverage Production with ERP System Using Odoo and Rapid Application Development (RAD) Method

Salma Jumaizar Hanif[1,a)], Avon Budiyono[1,b)] and R Wahjoe Witjaksono[1,c)]
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Abstract. The development of the hospitality tourism sector in Indonesia requires the hotel business, especially in XYZ hotels, to improve, apart from managing the existing hotel's lodging service provision system. The need for a planning system to support food and beverage production in hotels is one of the important things to provide satisfaction to customers, both hotel guests and customers outside of hotel guests. The Food and Beverage Department (FnB) is a department that supports operations in processing to serving food and beverages. They have complete responsibility for production activities based on ordering menus and events at the hotel, namely ala-carte and table de'hote. This research focuses on designing a food and beverage production system for managing ala-carte and table de'hote in ERP-based hotels with the Odoo module manufacturing system using the Rapid Application Development (RAD) method. The results of this research are in the form of a system design as a solution needed to support the smooth operation of the FnB department to automate the production planning of table de'hote and production on ala-carte sales. The scheduling, monitoring of production materials selects quality raw materials for star hotels in stores, purchases requests, and produces reports for XYZ hotels.

Keywords: Information Systems, ERP Odoo, Food and Beverage Hospotality System. Manufacturing System, Rapid Application Development (RAD).

projects in Indonesia. This year, PT XYZ has website and Information System Project of Smart Campus ABC. In completing the project, PT. XYZ requires good planning, so they need a master plan as a reference used in the project. Designing a master plan requires input such as project charter, project documents, enterprise environmental factors and organizational process assets. These inputs are processed to produce plan scope management, plan schedule management, plan resource management, plan stakeholder management. The processing produces an output in the form of an information technology project master plan in 4 knowledge such as scope, stakeholder, resource and schedule. This master plan consist scope which include product scope description, deliverables and acceptance criteria. Then consist stakeholder register that is used to identify the power and interest of the project. Resource to estimate the resource requirements of the project, and schedule baseline aims to plan project schedule control based on the activities that have been made in the Work Breakdown Structure of website and information system project of smart campus ABC University.
Keywords: Master Plan, Project, Project Management, Planning, Information Technology

13th-ISIEM-Paper 141 – QM

Improvement of Process Quality Using Taguchi Method on Solvent Production

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Abstract. Taguchi method is one of a design of experimental by using statistical approach to optimize the process parameters and maintaining the minimum variability of product. This study aim to improve the process quality of solvent production at PT. HF that produces adhesive products used for the footwear industry. The problem is how to make solvent production with one process and produce that has good quality in one check, and does not need for adjustments. Based on measurement processed with X-bar and R-bar control charts and the Cp and Cpk process capabilities, it is known that these processes still uncontrolled and the process uncapable with the value of Cp as 0.64 and Cpk as 0.04. The Taguchi and ANOVA methods were used in this study to improve the process design. The experiment will conducted after determination the factors can affect the quality of viscosity. The result is shown by orthogonal array, Signal-to-Noise (S/N) Ratio and analysis of variances (ANOVA). The experiment obtained the optimum levels are addition of solvent (70%), TPU material (2.3%), middle product material 27.85% and mixing time (7 hours). This experiment verification was the the Taguchi method can improve the process capability at the value of Cp as 2.0 and Cpk as 1.98, its shown that the process parameter can meet the process specification.
Keywords: Taguchi, Solvent Production, ANOVA, Process Quality

13th-ISIEM-Paper 142 – IS

Age Replacement Scheduling On Total Organic Carbon Analyzer Instrument (TOC) at XYZ Pharmaceutical, Ltd

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Abstract. XYZ Pharmaceutical, Ltd is a company engaged in pharmaceutical industry. One of problems arising in this company is a delayed production process caused by damage on a Total Organic Carbon Analyzer instrument (TOC). This research was aimed to determine a time interval for replacing critical components of the TOC and to reduce cost of replacing components. Method used to deal with the damage of this instruments is an age replacement. It was found that the optimal replacement time interval is 23 days for filter components and 34 days for a Restrictor tubing component. Furthermore, the use of age replacement could provide enormous benefits for the company through maintenance cost savings, i.e. approximately 4.01% or IDR 907,213 for filter components and approximately 6.04% or IDR 650,436 for a restrictor tubing component.
Keywords: cost savings, TOC, cost, age replacement.

13th-ISIEM-Paper 143 – IS

The Utilization of Information Technology: Live Stream Shopping as an Innovation Strategy to Increase Online Store Sales in the Pandemic Period

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floor in the FTUP Building to the 1st floor is 613.3 seconds or 11.892 minutes. The time to evacuate everyone from the 1st floor to a safe gathering place is 270.91 seconds or 4.51 minutes. The results of the queue analysis are used as material for consideration and follow-up to be taken in the design of the emergency staircase for the evacuation of victims of fires. The results of this study indicate the influence between the area of the FTUP building (A) and the evacuation time every person (Te) is 88.375% and the remaining 11.625% is influenced by other factors, as evidenced in the non-linear polynomial model $A = 522 (Te)^2 - 1825.3(Te) + 2512.8$, where the determinant coefficient is $R^2 = 0.88375$, and the relationship between A and Te is very high, it is proven that the correlation coefficient R is 0.940079784. This corresponds to element No. 5 SMK3 regulations, namely work safety based on SMK3, in order in campus implementation requirement.
Keywords: Safety, Queue, Fire, green Campus

13th-ISIEM-Paper 149 – QM

Reduction of Bolt Product Defects at PT. GIP Using Six Sigma Method

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Abstract. PT. GIP is a company that produces fastening products, including: Self Drilling Screw, Drywall Screw, Rivet, Furniture Screw, Tapping Screw, Bicycle Part, Euro Screw, Special Screw, Furniture Hi Lo Screw, Bolts, Chipboard Screw, Automotive Screw with a production system. by order. Currently, there are still many customer complaints about Bolt products. Production data shows defective products during the last 2 months amounted to 7 percent of the total production. The research objective is to improve the quality of production in order to reduce the defect rate of Bolt products. Research using the Six Sigma method consists of DMAIC stages (Define, Measure, Analyze, Improve, Control). The calculation results show that the biggest product defect in the Bolts production process is a dimensional defect with a number of defects of 442 pcs with a percentage of 59.5% of the total defects that occurred in the last 2 months. The overall average sigma level is 3.6993, this indicates that the company has not optimally implemented good quality control. After implementing the priority implementation of increasing production, there was an increase in the sigma level to 3,8457, this shows that there is an increase in the quality and performance of the company.
Keywords: Bolts, SIPOC, Six sigma, Quality.

13th-ISIEM-Paper 150 – OR

Applying Genetic Algorithm for Capacitated Vehicle Routing Problem and Vehicle Selection- Case Study of Vietnam Logsitcs Company

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Abstract. Logistics is becoming an important field which is spearheading the economic development of Vietnam. However, the current logistics status in Vietnam still has a number of issues, such as high costs and low competitiveness in comparison with other countries in the world. Specifically, transportation costs account for a very large share of total logistical costs. Therefore, in today's world, the improvement of the transportation network and the optimization of the distribution of goods are key priorities. In this article, we focus on the development of a transportation optimization algorithm for logistics companies in order to minimize the total travel distance. In particular, by using a genetic algorithm (GA) to solve the vehicle routing problem (VRP), which is the ideal method to enhance transport performance. This research also modifies the basic capacitated vehicle routing problem (CVRP) with a vehicle selection algorithm to improve the flexibility and accuracy of the model. The results of research show that the total travel distance is reduced by 39,5% and consequently, overall CO_2 emission rates is decreased of about 27.1%. In addition, using the vehicle selection algorithm in the CVRP issue, the average fill rate of the vehicle's capacity increases from 56.38% to 97.14%. As a result, logistics companies can establish a plan to optimize transportation, reduce transportation costs and improve competitiveness, reducing national logistics costs as a whole.
Keywords: Vehicle Routing Problem - VRP, Capacitated Vehicle Routing Problem - CVRP, Genetic Algorithm - GA, Vehicle selection, Vietnam Logistics Cost, Transport Optimization.

13th-ISIEM-Paper 151 – QM

Risk analysis of the Madura-3 corn supply chain using the FMEA Method

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Abstract. The objectives of this study were: 1. Identify risks at each level of the Madura-3 maize supply chain, 2. Evaluate and mitigate the risks of the Madura-3 maize supply chain. The type of research is survey and literature study. The research location is in Dukotambin and Banyubesi Villages, Tragah District, Bangkalan Regency, as well as in PT. Giri Agro Raya Sejahtera in Pamekasan Regency). The data used are primary data and secondary data. The research method used is a descriptive method that describes the facts that exist in the research location. The results of the description of the Madura-3 corn supply chain risk were then evaluated using FMEA method. The results showed that: 1. Risk occurs at every level of the Madura-3 corn supply chain; and 2. Efforts to mitigate the risk of the Madura-3 corn supply chain need to be carried out by utilizing technology to facilitate work and monitor market developments and facilitate business development, for example by online marketing.
Keywords: risk, supply chain, FMEA method.

13th-ISIEM-Paper 152 – IS

Environmental, Social and Governance (ESG) Strategy Implementation Plan During the Covid-19 Pandemic at Retail Company "X" in Jakarta

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[2]Industrial Engineering Department, Tarumanagara University

Abstract. Covid-19 affects most of the retail industry in Indonesia, including PT "X". With 99% of sales coming from offline store channels, PT "X" needs to analyze a systematic framework to integrate ESG into its business in order to improve its ESG ranking. For this reason, PT "X" needs to reformulate its business strategy in order to survive and even win retail competition during the Covid-19 pandemic. Considering that ESG is an important factor for a public company such as PT "X", it is very important for PT "X" to raise its ESG rating in order to increase its competitive advantage and competitiveness in the global retail industry. This study analyzes ESG integration strategies during the pandemic within the scope of retail management to maximize value and minimize company risk. Therefore, PT "X" created a framework to integrate ESG into the business and then communicated that framework internally and externally to the organization. This qualitative research uses primary data through Focus Group Discussions to the company's top management, as well as secondary data obtained through literature studies, journals, and company internal data. The ESG integration steps undertaken by PT "X" are setting overall goals, budgeting, evaluating opportunities, building an ESG framework, building a sustainability team, checking progress, and improving performance. PT "X" then analyzes the steps for implementing ESG in order to increase competitive advantage and competitiveness in the global retail market that leads to company sustainability. For companies looking to strengthen environmental, social and corporate governance (ESG) practices, it is necessary to fully review the business and reorganize it responsibly through a holistic, top-down approach to implementing an ESG strategy, implementing elements of objectives, and sustainability at the core towards successful ESG implementation.
Keywords: ESG, Strategy, Retail, Pandemic, Sustainability, Integration

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Practice Sharing of The Introduction of Smart Manufacturing into Traditional Industries

Practice sharing of the introduction of smart manufacturing into traditional industries

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2021/07/28

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A Signaling Game for Research Fund Allocation in Thailand

Modelling Research Fund Allocation

THITI DUANGSONG

NARAPHORN PAOPRASERT

SUWITCHAPHON WITCHAKUL

SASAROSE JAIJIT

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KASETSART UNIVERSITY, BANGKOK, THAILAND

Prof. YUN-CHIA LIANG, Ph.D.
Professor and Chair, Department of Industrial Engineering and Management, Yuan Ze University – Taiwan.

Smart Life_short Version

How to Make Our Lives Better?

Yun-Chia Liang

Department of Industrial Engineering and Management

Yuan Ze University

元智大學工業工程與管理學系
Department of Industrial Engineering and Management

Global Logistics and Innovative Optimization Lab.

YZU IEM
HERE IS FUTURE

KEYNOTE SPEAKER PERSENTATION

ELISA LUMBANTORUAN
President Director & CEO at ISS Indonesia, Independent Commissioner at PT Indosat Tbk, and Independent Commissioner at Garuda Indonesia

Production and Service System in the New Normal Era

"Production and Service System in the New Normal Era"

Connecting people and places to make the world work better.

Elisa Lumbantoruan

ISS Indonesia, CEO & President Director

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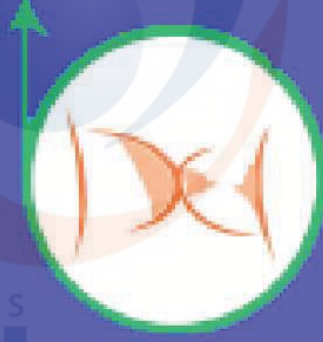Kasetsart University || Bright Star University

NOTIFICATION OF PAPER ACCEPTANCE

Dear Respected Authors,

It is a pleasure to inform that your submission (detailed below) is *accepted* at the 13th International Seminar on Industrial Engineering and Management (13th ISIEM). As you are aware of, 13th ISIEM will be held on July 28, 2021 in Bandung, Indonesia.

Author(s)	:	**Taufiqur Rachman, Briliany Dewinda Mokoginta, Iphov Kumala Sriwana and Septian Rahmat Adnan**
Title	:	**Performance Maintenance Evaluation and Determination of Machine Maintenance Schedule in The Workshop Division of PT. Hamdan Jaya Makmur**
Paper Code	:	**107**
Review result	:	**Accepted, with revision**

Kindly refer to Reviewers' and Editor's comments for any necessary revision. Please submit the final version of your manuscript on or before **April 17, 2021**. Please ensure that the submitted final version of your manuscript is in accordance with the prescribed format.

On behalf of the Organizing Committee of 13th ISIEM, I would like to *congratulate you for the acceptance of your paper and to thank you for participating in 13th ISIEM.*

Other arrangements regarding the conference will be informed through you or updated through the website. Should you have any inquiry, please do not hesitate to contact us. Looking forward to see you in Bandung for 13th ISIEM.

Jakarta April 13th, 2021

13th International Seminar on Industrial Engineering and Management Committee Chairman,

Dr. Winnie Septiani, S.T., M.Si., IPM

13th ISIEM 2021

Performance Maintenance Evaluation and Determination of Machine Maintenance Schedule at PT. Hamdan Jaya Makmur Workshop Division

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OUTLINE

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INTRODUCTION

- The challenges facing the world of manufacturing are changing and getting tougher from time to time (productivity, efficiency, and utility of the production system are three keywords).
- PT. Hamdan Jaya Makmur is one of the makers and suppliers of manufactured products and even customized products (machine spare-parts, conveyor system products, products for industry, racks, material handling lorry, tools, hospital equipment, etc).
- Machinery is one form of the physical assets of the company, PT. Hamdan Jaya Makmur that must be properly maintained in order to always full-fill its function in carrying out operational activities.
- Maintenance is an activity directed at the goal of ensuring the functional continuity of a production system, so that the system can be expected to produce the desired output.
- Based on the observations, it can be seen that the CNC lathe experienced a very high breakdown in September. Many problems will be encountered in the use of machines, such as machine failure, machine settings, momentary errors, low speed, quality defects and rework.
- The problem in this research is whether the CNC machines that experience the most breakdowns also have poor maintenance performance, and how the maintenance intervals can be carried out for critical components found on CNC machines.

OBJECTIVES

Determine the value of performance maintenance at PT. Hamdan Jaya Makmur workshop division

Evaluating machines that are experiencing poor maintenance performance at PT. Hamdan Jaya Makmur workshop division

Creating maintenance intervals at PT. Hamdan Jaya Makmur workshop division

RESEARCH METHODS

- The RCM II (Reliability Centered Maintenance II) method is used in this study to evaluate performance maintenance and determine machine maintenance scheduling at PT. Hamdan Jaya Makmur workshop division.

- There are several stages in this research, among others:
  1. Determine the MTTF and MTTR values of the machine
  2. Creating Functional Block Diagram (FBD) from the machine that has the lowest maintenance performance value
  3. Creating FMEA worksheet
  4. Creating Logic Tree Analysis (LTA)
  5. Creating RCM decision worksheet
  6. Determine the MTTF and MTTR values of the critical component
  7. Determining maintenance schedule (periodic inspection interval)

RESULTS (STAGE 1)

Table performance maintenance of the machines at PT. Hamdan Jaya Makmur workshop division

Machine	Data	Distribution	β	α	θ	μ	σ	Index of Fit	MTTF (minute)	MTTR (minute)
Miyano CNC Lathe	Failure	Weibull	1.65	−16.58	23120.73	−	−	0.984	20669.93	−
	Repair	Lognormal	−	−	−	3.87	0.567	0.987	−	56.30
Milling Eagle Type SW5S	Failure	Weibull	0.0086	−0.547	63.60	−	−	0.989	5012.45	−
	Repair	Lognormal	−	−	−	3.44	0.643	0.983	−	38.35
Tap Machine	Failure	Lognormal	−	−	−	11.19	0.714	0.968	73507.15	−
	Repair	Normal	0.187	−3.29	−	17.59	5.35	0.954	−	17.59
Lathe Type C6266A1	Failure	Weibull	1.34	−15.17	82528.22	−	−	0.989	75848.38	−
	Repair	Weibull	3.401	−9.08	14.44	−	−	0.994	−	12.98
Lathe Type SS-850	Failure	Lognormal	−	−	−	10.28	0.761	0.984	38931.56	−
	Repair	Weibull	2.44	−8.573	33.57	−	−	0.973	−	29.77

Miyano CNC lathe machines has the lowest MTTF value and the highest MTTR value, which will be the focus for improvement in this research.
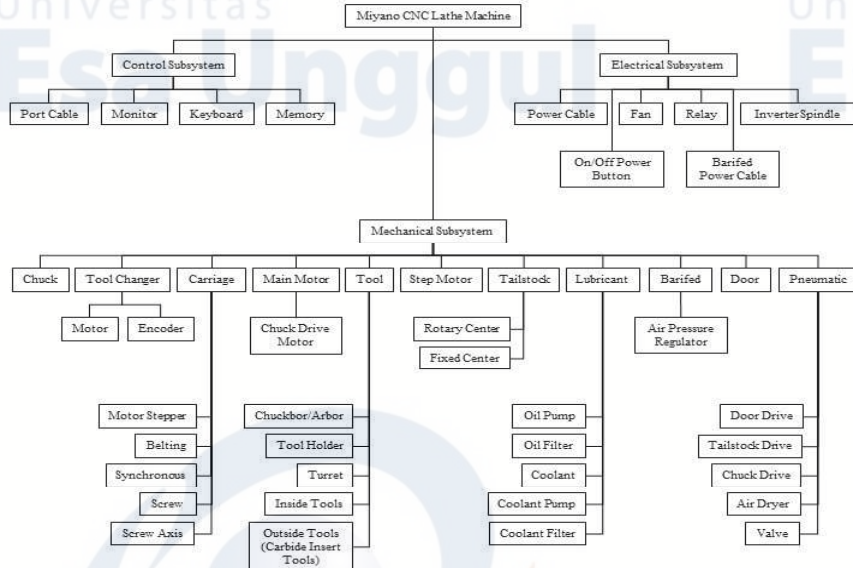
RESULTS (STAGE 2)

Figure functional block diagram (FBD) Miyano CNC lathe machine

- There are 3 subsystems on the Miyano CNC lathe machines:
    1. Mechanical subsystem
    2. Control subsystem
    3. Electrical subsystem
- Each of which has several components.

RESULTS (STAGE 3)

- There are 6 components on the Miyano CNC lathe machine that can be identified as having malfunctions based on the results of the FMEA worksheet.
- Using a Pareto diagram based on the RPN value on the FMEA worksheet of a Miyano CNC lathe machine, obtained 3 components have the highest RPN value:
    1. Relay Unit (electrical subsystem),
    2. Memory (control subsystem)
    3. Automatic Tool Changer (mechanical subsystem).

Table FMEA worksheet of relay unit (electric subsystem) of Miyano CNC lathe machine

RCM INFORMATION WORKSHEET (FMEA)	SYTEM : MIYANO CNC LATHE		Facilitator: -			Date:	Sheet No.	
	SUBSYSTEM : ELECTRICAL		Auditor: -			-	3 of 3	
FUNCTION	FUNCTIONAL FAILURE (Loss of Function)	FAILURE MODE (Cause of Failure)	FAILURE EFFECT	SEV	OCC	DET	RPN	RANK
3 The unit used to start, control, stop systems on a CNC lathe which is operated by the operator and as a regulator of the power supply required in the operation of a CNC lathe	A Cannot set up a CNC lathe	1 Power On/Off button (Relay Unit) has malfunctioned	The relay unit does not work because the coil or spool coil is broken	6	6	6	216	1
		2 The servo drive unit is malfunctioning due to overheating	Time running at low speed is too long	3	3	4	36	4

RESULTS (STAGE 4)

Table Logic Tree Analysis (LTA) for the 3 critical components of the Miyano CNC lathe machine

RCM INFORMATION WORKSHEET (LTA)	SYTEM	: MIYANO CNC LATHE		Facilitator: –		Date:	Sheet No.
	SUBSYSTEM	: 1. MECHANICAL 2. CONTROL 3. ELECTRICAL		Auditor: –		–	1 of 1

	FUNCTION		FUNCTIONAL FAILURE (Loss of Function)		FAILURE MODE (Cause of Failure)	Critical Analysis			
						Evident	Safety	Outage	Category
1	Unit that performs turning and finishing product	A	The motor cannot rotate optimally, so it is unable to move the turret	1	Automatic Tool Changer is worn out, so it can't rotate the turret when changing tools	No	No	Yes	D/B
2	Unit to input the size of the product to be made using programming, then it will automatically be conveyed to the machine	B	Can't do the setting process on tool post movement	1	Memory has reached maximum storage capacity (full)	Yes	No	No	C
3	Unit used to start, control, stop systems on a CNC lathe which is operated by the operator and as a regulator of the power supply required in the operation of a CNC lathe	A	Cannot set up a CNC lathe	1	Power on/off button (Relay Unit) has malfunctioned	Yes	No	Yes	C

RESULTS (STAGE 5)

Table RCM decision worksheet for the 3 critical components of the Miyano CNC lathe machine

RCM II DECISION WORKSHEET	SYTEM	: MIYANO CNC LATHE		Facilitator: –		Date:	Sheet No.
	SUB SYSTEM	: 1. MECHANICAL 2. CONTROL 3. ELECTRICAL		Auditor: –		–	1 of 1

FMEA			LTA				PREV. TASK			DEF. TASK			PROPOSED TASK	INITIAL INTERVAL	PIC
F	FF	FM	H	S	E	O	H1 S1 O1 N1	H2 S2 O2 N2	H3 S3 O3 N3	H4	H5	H6			
1	A	1	Y	N	N	Y	N	N	Y				Change Tool Changer	3 years	MTC
2	B	1	Y	Y	N	N	Y	Y	N				Change RAM with a larger capacity or removing unused programming	1 day	Operator
3	A	1	Y	Y	N	Y	N	N	Y				Change timer	1 year	MTC

RESULTS (STAGE 6 and 7)

Table MTTF and MTTR values from 3 critical components of Miyano CNC lathe machine (Relay Unit, Memory, and Automatic Tool Changer components) with the selected distribution types is the Weibull distribution for MTTF and the Lognormal distribution for MTTR.

Component	Data	Distribution	β	α	θ	μ	σ	MTTF (minute)	MTTR (minute)
Relay Unit	Failure	Weibull	1.61	−14.41	6899.4	–	–	6899.4	–
	Repair	Lognormal	–	–	–	2.77	0.559	–	18.66
Memory	Failure	Weibull	1.66	−14.79	7402.98	–	–	6614.72	–
	Repair	Lognormal	–	–	–	2.72	0.334	–	10.24
Automatic Tool Changer	Failure	Weibull	1.66	−13.92	3156.07	–	–	2820.01	–
	Repair	Lognormal	–	–	–	2.21	0.575	–	10.75

Table maintenance schedule (periodic inspection interval) of important components of Miyano CNC lathe machine.

Component	MTTF (minute)	MTTR (minute)	Inspection Frequency	Time Interval (hour)
Relay Unit	6899.4	18.66	2 times per month	401
Memory	6614.72	10.24	1 time per 2 months	519
Automatic Tool Changer	2820.01	10.75	1 time per 3 months	955

RESULTS (2021 maintenance schedule (periodic inspection interval) for for the Relay Unit, Memory, and Automatic Tool Changer components)

Note:
- (green) = Periodic inspection for Relay Unit component
- (yellow) = Periodic inspection for Memory component
- (blue) = Periodic inspection for Automatic Tool Changer component

DISCUSSION

There are discussions for future research, are:

- Implementation of maintenance models resulting from this research can be done well if each of the parties involved do its work in accordance with a predetermined schedule.

- Companies are advised to always update data regarding aspects of potential machine failures on the production floor in an effort to overcome future failures.

- For further research in the same field, it is expected that the reliability analysis and maintenance scheduling are carried out in accordance with the maintenance and repair costs of the machine

CONCLUSION

1. Miyano CNC lathe machine has the lowest performance maintenance of all machines at PT. Hamdan Jaya Makmur workshop division, with a breakdown interval value of 20669.93 minutes and a machine repair interval of 56.30 minutes.

2. There are three components on the Miyano CNC lathe machine that have the highest RPN values, including:
   a. The Relay Unit has MTTF value of 6899.4 minutes and MTTR value of 18.66 minutes.
   b. The Memory has MTTF value of 6614.72 minutes and MTTR value of 10.24 minutes.
   c. The Automatic Tool Changer has MTTF value of 2820.01 minutes and MTTR value of 10.75 minutes.

3. Maintenance scheduling (periodic inspection interval) for Miyano CNC lathe machine component, are:
   a. The last maintenance for the Relay Unit component occurred on January 1, 2021, then the next maintenance activity was carried out on February 10, 2021 with an interval between activities is 401 hours or about 40 days.
   b. The last maintenance for Memory components occurred on January 1, 2021, then the next maintenance activity was carried out on February 20, 2021 with an interval between activities is 519 hours or about 51 days.
   c. The last maintenance for the Automatic Tool Changer occurred on January 1, 2021, then the next maintenance activity was carried out on March 22, 2021 with an interval between activities is 955 hours or about 96 days.

THANK YOU

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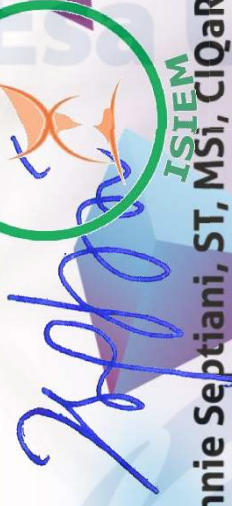INDUSTRIAL ENGINEERING AND MANAGEMENT

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