

ISSN: 2477-1899

Proceeding

The 1st Almuslim International Conference
on Science, Technology, and Society



The Institute of Research and Community Services
ALMUSLIM UNIVERSITY BIREUEN - ACEH



**COORDINATION OF PRIVATE HIGHER
EDUCATION REGIONAL XIII ACEH**

Editor in Chief : Prof. Dr. Drh. Darmawi (University of Syiah Kuala, Indonesia)

Editors :

Prof. Mohamad Ali Fulazzaky (University Teknologi Malaysia)

Prof. Gloria Sheila E. Coyoca (Mindanao State University – Iligan Institute of
Technology, Philippines)

Prof. Dr. Jamaluddin Iddris, M.Ed (UIN Arraniry, Indonesia)

Prof. Dr. Abdul Hamid, M.Pd (State University of Medan, Indonesia)

Dr. Gregory Vanderbilt (*Department of History, UCLA/ CRCS*)

Natsuko Saeki, P.hD (Nagoya Gaekin University, Japan)

Dr. Boriboon Pinprayong (AIT, Thailand)

Dr. H.M. Sayuti, M.Sc (Malikussaleh University, Indonesia)

Dr. Halus Satriawan, S.P, M.Si (Almuslim University, Indonesia)

ISSN : 2477-1899

Copyright © 2015

Printed November 2015

Message from the Rector

Assalamu'alaikum Wr. Wb.

Greetings.

Ladies and gentlemen,

It is an honor indeed to open this conference, the 1stAlmuslim International Conference on Science, Technology, and Society (AICSTS). On behalf of Almuslim University (Umuslim), I would like to extend a warm welcome to all participants and our speakers who are with us to make this a notable and exciting event a success.

At Almuslim University, we emphasize the best possible achievements in education and research and are also committed to innovation and technology. Today, we are faced with more challenges in these spheres, and therefore, as members of the academic community, we have a duty to find innovative research solutions for them. Hence, this conference is an excellent forum for experts, professionals, researchers, and students as well, to present, share, and discuss their knowledge and experiences with all of us. In line with such idealism, it is really a privilege for us to host you, not just this year, but for years to come, to give and provide opportunities to contribute lasting and practical solutions to the challenges that confront us from time to time. This conference includes keynote speeches, oral and poster parallel sessions on topics in the field of sciences, life sciences, engineering, social sciences and humanities.

Finally, we know that in the origination of this conference there may be some shortcomings, for which we would like deeply apologize in advance to all of you. This is the University's first experience in organizing an international conference like this. With deepest sincerity hereby we would also like to thank all the keynote speakers for your contribution, time and support for this conference. Our heartfelt appreciation goes to all the authors of the selected papers for their effort and hard work. I also would like thank the organizing committee of the conference for their hard work in making this event a success. I wish to encourage them to continue organizing more events and to take other initiatives as well in future. To support and sustain important research linkages for dialogue and facilitate exchanges of ideas such as this will certainly generate more new discoveries and innovations in years to come. It is everyone's optimism that all we will learn from this first international conference in 2015 will be used as a reference for the development of research, as well as guidance for the readers in education and in academic profession.

I am sure the committee of this conference has served you in the best way they can to make your brief stay with us a lasting memory.

Thank you.

Dr. Amiruddin Idris, SE, M.Si

Message from the Committee Chairman

Assalamu'alaikum Wr. Wb.

Greetings,

Ladies and Gentlemen,

I would like to take this occasion to cordially welcome all participants of the 1stAlmuslim International Conference on Science, Technology, and Society (AICSTS). This conference is held at our beloved campus of Almuslim University (Umuslim), Bireuen, from November 7th to November 8th, 2015. Almuslim University, the home of 7 faculties, is one of the major private universities in Aceh. We are assured that the 416 scientific participants will contribute to productive discussions and exchanges of scientific experiences that will bring about success to this conference. Participants from 9 countries, Indonesia, Malaysia, Thailand, Philippines, United States, India, Taiwan, England, and Qatar, have optimally marked an international scope to the conference.

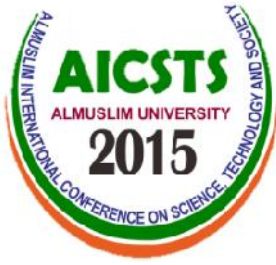
I would like to express my gratitude to the Coordination of Private Higher Education Regional XIII Aceh, the Institute of Research and Community Services of Almuslim University and the committee members for helping us in organizing the conference. The conference and proceedings are a credit to a large group of people and everyone should be proud of the outcome.

We are delighted with the vast responses of 152 submissions from researchers and practitioners. The knowledge bases that we are aiming to generate in the conferences topics are overwhelming due to the involvement of these experts from various fields of studies. Their papers will be published in the proceedings to provide permanent records of what has been presented. The proceedings are divided into four, Life Sciences, Engineering, Social Sciences and Humanities (Science Educations), and Social Sciences and Humanities (Economics, Social and Arts), and the papers published here will exhibit the current state of development in all aspects of important topics that are instrumental to all researchers in the various fields. They have succeeded in bringing together various aspects of developments and innovations in knowledge and technology that will benefit not only the academic community, but the society itself as well.

We realize that there are still many shortcomings in the implementation of the arrangements of this conference. Therefore at this opportunity we also expect criticism and constructive suggestions from all stakeholders so that the conference arrangements in future will be more successful. Finally we would like to thank you all for all the support and assistance you have contributed to making this conference and its proceedings successful.

Thank you,

Drs. Marwan Hamid, M.Pd



KEYNOTE SPEAKERS

Boriboon Pinprayong:

ASEAN ICT Manpower: (Case Study of Thailand, Indonesia, and Vietnam) 1

Mohamad Ali Fulazzaky:

Water Quality Evaluation System for Assessing the Status and Suitability of the Citarum River Water for Various Uses and Its Aquatic Ecosystem 12

Gregory Vanderbilt:

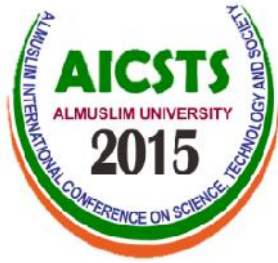
Religious Memory and Scientific Ethics after Hiroshima and Nagasaki 28

Gloria Shiela E Coyoca:

Undertaking Global Health Issues through Research and Innovation 36

Cornelis Johan (Keess) Stigter:

Climate Change: Its Danger for Our Production and Why it Escapes Our Prediction 38



SCIENCE and ENGINEERING CHAPTER

Razali Thaib, Hamdani, Teuku Azuar Rizal:	
Experimental Study on Cooling of Solar Panel Using Airas Cooling Medium	39
Alchalil, Fauzan:	
Surface Roughness Optimizationin Machining of Face Turning	45
Azhar, Hasyimi Abdullah, Zaini, Muhaimin:	
Design and Development of Micro Hydropower by Using Pump Centrifugal To Supply the Water Into Turbin	51
Azwar, Saifuddin, Adi Saputra Ismi:	
Experimental Study on Mechanical Properties of Wood Flour Polyester Sandwich Composite Reinforced With Glass Fiber	58
Edi Majuar, Cut Azizah, Kurniati, Abdullah Irwansyah, Rizal Syahyadi:	
Performance Assessment Method of Irrigation Water Practices to Enhance Efficiency and Rice Productivity: A Survey Approach	68
Elfiana, Saiful Bahri:	
Utilizing Cacao Crust as the Bio Adsorbent of Manganese (Mn) in Water	76
Faisal:	
Advanced Improvement of Gahegi Biomass Stove for Salt Manufacture	85
Faridah, Fahcraniah, Zahra Fona, Cut Putri Daryanti:	
Effect of Heating Time and Concentration Enzyme Papain from Papaya Latex Friut as Coaglant in Tofu Production	92
Fauzan:	
Effect of MachiningParameters on Surface Roughness in Turning Operation	100
Jufriadi, Hens Saputra, A.G.E Sutjipto, Hamdani, Zulkifli:	
Preparation and Characterization of Zeolite MFI Membrane For Biofuels Purification Application	107
A.Rahman, Alva Edi Tantowi, Suryono, Ika Dewi Ana, Sayuti, M:	
Hardness Properties, Microstructure and X-raydiffraction of <i>Hydroxyapatite-Glass Ionomer Cement Biocomposites</i>	114
Diana Khairani Sofyan, Syarifuddin, Sayuti, M:	
Fasilities Relayout by Using Conventional Method based on 5S (Seiri, Seiton, Seiso, Seiketsu and Shitsuke)	121
Maryana, Sri Meutia, Diana Khairani Sofyan:	
Improvement of Working Methods on Production Department by Using Man and Machine Chart	129
Maliya Syabriyana, Chih-Hao Lee:	
The Structural Trans Formation between Thin Film Phase and Bulk Phase of Pentacene Films Grown on Different Substrates	137
Rahmad Syah, Marischa Elveny, Ummul Khair:	
Disaster Forecasting Approach in Indonesia: a Fuzzy Time Series - Markov Chain Model	144

Richki Hardi:	
Tourism Information System Analysis Using End User Computing Satisfaction (EUCS)	151
Rokhmat Hidayat, Taufiq:	
System Control on Off Mobile With the Android Application	160
Saiman, Zainal Abidin, T.A.Rizal:	
Molecular Dynamics on Phase Change Material Using Fokker Planck Equation	169
Harunsyah, Ridwan, Salahuddin:	
Effect of Plastilizer Concentration on Bioplastics Based on Mixture of Cassava Starch With Polylactic Acid	175

Facilities Relayout by Using Conventional Method based on 5S (Seiri, Seiton, Seiso, Seiketsu and Shitsuke)

*1) Diana Khairani Sofyan, ²Syarifuddin and ³Sayuti, M

^{1,2,3} Departement of Industrial Engineering, Faculty of Engineering, Universitas Malikussaleh 24351
Aceh-Indonesia

* *Corresponding Author.* *hatikue@yahoo.com; 085297821421

Abstract

Production facilities design is one of many factors that influence company performance. This was caused by ineffective facilities layout which make material flow poor, and the movement of material, product, information, equipment and labor cost is relatively high, that caused delay in finishing the product and of course adding the cost of production. Layout design in manufacturing industry is the first step in organizing production facilities layout and to have benefit of the area as much as possible. This was made to create smooth condition in materials flow, so that later can achieve material flow which is efficient and working conditions that are orderly. The layout factory problems that cannot be avoided by companies is in its operation. The distance of material movement from one department to other will create influence on increasing productivity and profitability. With high total material movement/year, it can make material handling costs will be high too. The research purpose is to know minimum material handling total, so that later on the best of final layout and can minimize cost of material handling. The Results of facilities relayout drinking water in PT Ima Montaz Sejahtera consists of some department must be added which in the beginning there are 7 (seven) department and after the design become 12 area Therefore the additional department don't need additional area. This can be done by relayout and give the region or area for the part that there was not exist before. This research use method 5S in drawing up the facilities relayout in PT Ima Montaz Sejahtera to obtain layout that is more efficient, which is The Seiri and Seiton in mechanical warehouse, Seiso in production warehouse and all department, Seiketsu and Shitsuke in all departments.

Key words: *Factory Relayout, 5S, conventional method, facilities design*

Introduction

Production facility design is one of the factors that is very influential in a company performance. This was caused by not good layout facilities, that will cause not so good pattern material flow and movement material, product, information, equipment and labor is relatively high that cause a delay settlement

products and add production costs. The plant layout can be defined as how to setting these facilities factory will support the process of production (Yamit, 1998). Settings will use area to place machine or supporting facilities, smooth motion another production moves good material is schedule as well as permanent, personal workers and others. In the layout factory there are 2 (two) thing that must be noted that is a setting of machine and setting of department in the factory. With good factory layout plan, then the back tracking, the distance of transfer material and material handling can be minimized. Kaizen was the instrument to unify philosophy, the system and a tool to solve the problems that developed in Japan for 30 years in a company to do better. Kaizen can begin to realize that each company has a problem. Kaizen solve the problem by establishing a corporate culture in which everyone can apply the problem freely (Imai, 1998). A large Definition of 5S was to use the workplace (which includes equipment, documents, the building and the space) to train habit of workers in an effort to increase work discipline that begins with Division (Seiri), arrangement (Seiton), cleansing (Seiso), Fortifying (Seiketsu), Discipline (Shitsuke) or has participated fully in the development customs work according to the rules set (Imai, 1998).

PT. Ima Montaz Sejahtera is one of the companies which is located on the way in to Public Port Krueng Geukueh, Blang Naleung Mameh, Muara satu Lhokseumawe city. This industry is moved in production bottled water (bottled mineral water). Products that are produced by consists of 4 (four) categories which are the aqua cup 220 ml, aqua medium 550 ml, aqua large 1,500 ml and aqua gallon 5 liters. The marketing region include Lhokseumawe city and north Aceh Regency in particular and the whole Aceh in general. Some problems which have the companies are a number of areas accumulations of finished goods in some places that located not uniform means that their proliferation was located where there is a place that is empty. This is the work of fork lift led to widespread; where fork lifts moving erratically follow their proliferation. In addition, this company is also not hold the standard parking lot vehicles, it meant that there were some areas empty that were made to the parking lot and mechanical equipment that fall to pieces in the work station, so the employees requires a long period of time when improving machine that were damaged, because they have to look for equipment that is needed, And in the company also there had not been musalla a standard and the rest are qualified. Working condition at PT Ima montaz sejahtera requires a number of efforts improve layout facilities by applying methods 5S. This Research purpose is to relay layout facilities factory by using implementation methods 5S

Research problem is not well of organizing factory layout, the distance between one department to the other have back tracking between labor, so it need facilities layout improvement in conventional method based on 5S (seiri, seiton, seiso, seiketsu and shisuke). The purpose that want to be achieved in this research is to design relay layout /new facility layout, saving the area for production, warehouse and service, get the solution and new alternative to the issues in a company, which are related to the layout factory that effective and efficient.

Methods

The method used is conventional design method by using 5S application, that is Seiri (selection) is applied to the mechanical room that is putting the equipment in place and separate unnecessary so it

does not take a long time to finish the work, Seiton (arrangement) that the goods have through the seiri process followed arrangement of equipment that have been mentioned, Seiso (cleaning) is cleaning on the production floor and equipment needed in the production process such as machines and others, Seiketsu (strengthening) is the stabilization of the methods of 5S has been applied, and Shitsuke (habituation) of this section is more focused on how to accustom them selves to the application of this 5S method.

Results and Discussion

Operations Process chart

Production process bottled mineral water 220 ml (cup) to start from material in the raw materials warehouse. Materials being transported and brought to production area. Glass cup material unpacking to then flowed through conveyor to cup wash station. After washing cup is completed, then is flowed into the filling water (filler). From filler, cup that are filled with water and then flowed through conveyor is closed with plastic as a label. Plastic label has been written expired date before by using inject print. After an operator paste label, then cup will pass shrink tunnel that produce heat and function to paste back the cup. And then, Cup goes through conveyor for packaging by using carton sealer. Finished goods are transported by using fork truck and stored in warehouse. The process of production description is described in the form Operation process chart that can be seen in the Figure 1.

Before drafting the layout plants, it is done descriptions for factory layout planning phase, first phase is planning Activity Relationship Chart (ARC) with result 12 departments, there are: Raw materials Warehouse, production department, a reservoir of water, Toilet, finish goods warehouse, office, genset warehouse, parking, mechanic warehouse, Rest room, Mushalla and Canteen.

From the ARC planning and design, then followed work sheet, block templates, Activity Relationship diagram, calculating production space requirement sheet, plant service area planning sheet, the total space requirement sheet, area template, space relationship diagram and the last is Final layout. Final layout desing from the research can be seen in the Figure 2.

5S Methods

The 5S application methods employed at PT Ima Montaz Sejahtera is as follows:

Seiri (election), method seiri be applied to the warehouse mechanics because in this department many mechanical equipment strewn on the floor. Equipment not required at this mechanic warehouse. It's make the floor becomes full. So that a worker doing repairs to damaged engine becomes narrower. Looking at the situation so needed applied seiri methods. Seiri placing equipment in their place and removing unnecessary so that workers do not need a long time to finish the job.

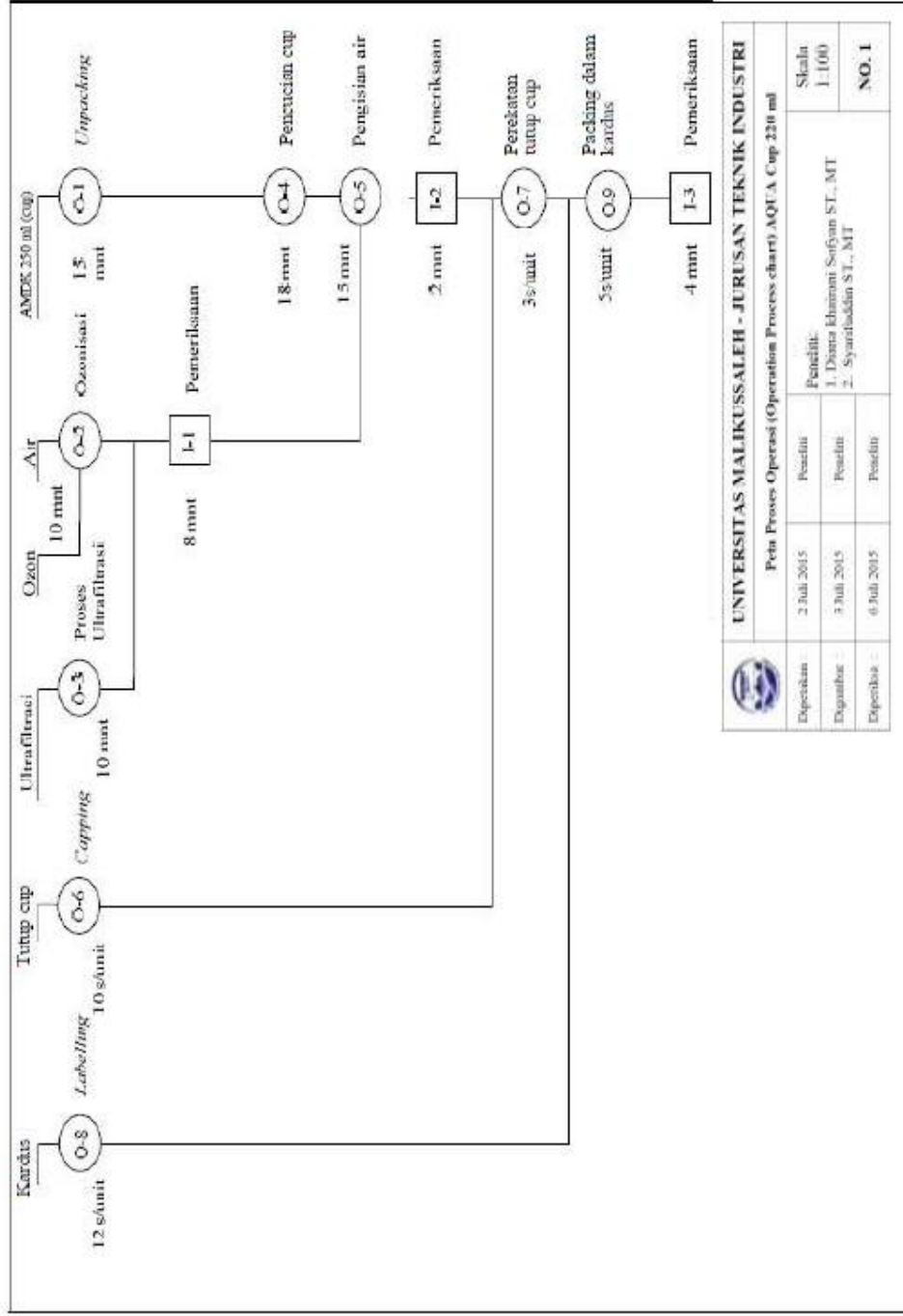
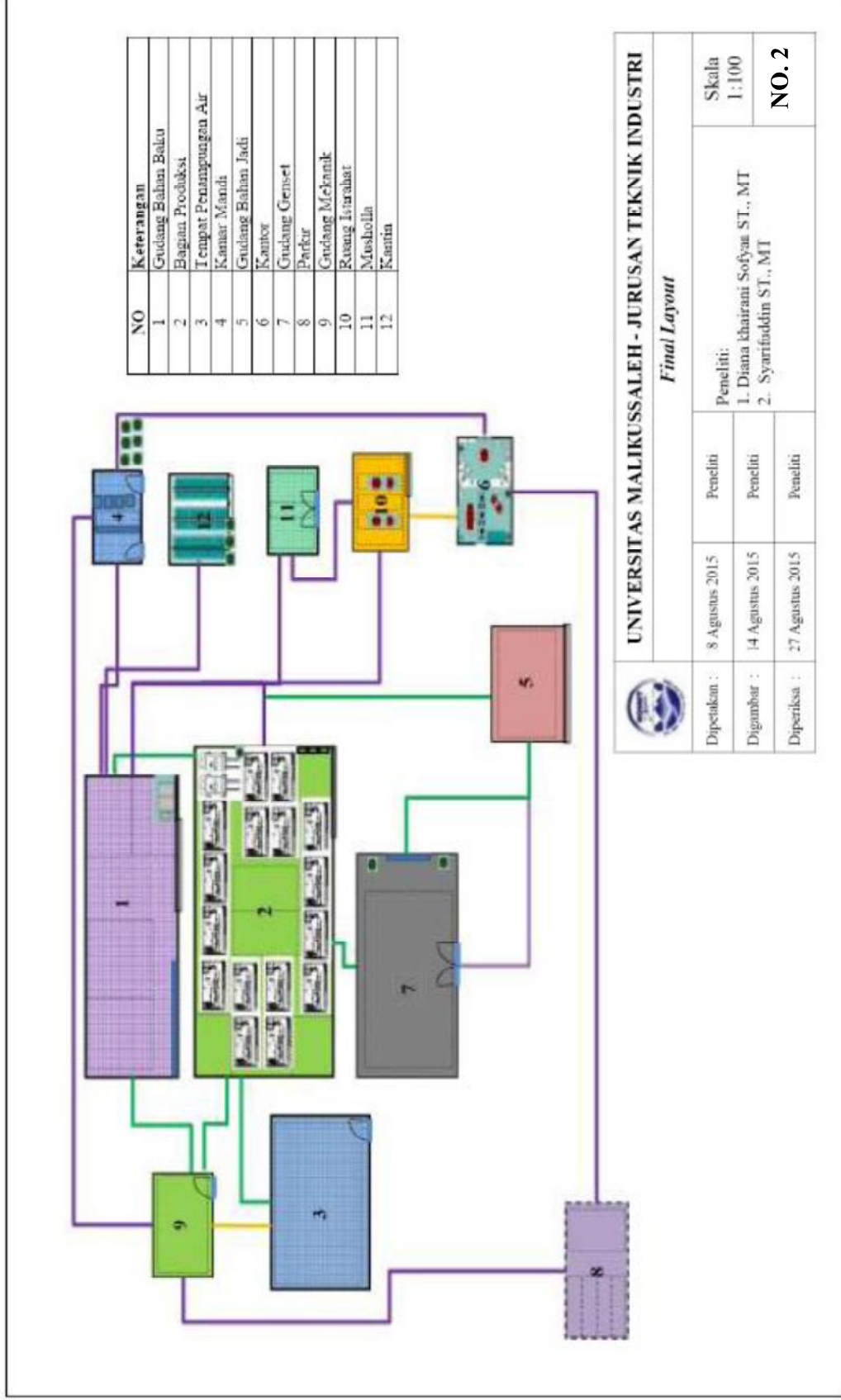


Figure 1. Operation process chart of AQUA Cup 220 ml



UNIVERSITAS MALIKUSSALEH - JURUSAN TEKNIK INDUSTRI			
Final Layout			
Dipetakan :	8 Agustus 2015	Peneliti	Skala 1:100
Digambar :	14 Agustus 2015	Peneliti	NO. 2
Diperiksa :	27 Agustus 2015	Peneliti	

Figure 2. Final layout of PT Ima Montaz Peace

Seiton method is the continuation of seiri, where the division that has been done will be followed by ordering process equipment that has been sorted. In this equipment that is in warehouse mechanics are arranged neatly are placed in a rack mechanical equipment that is made of planks and put the names of the work for example screwdriver, hammer, bolts and so on, so that workers are easier to take and use it, do not need a long period of time when they were looking for equipment that is needed because there are already name and sets be disintegrated area, where mechanical area is no longer a room with production area, so neat mechanical equipment can be in the room and the workers is more broadly based move, not hindered by mechanical equipment that are scattered on the floor production.

Seiso, At this stage it is done is a cleansing process. The cleaning done is dust and debris spread on production and equipment that is used for the process of production, equipment which are clean up is production machines. Floor factory had been cleaned up from garbage, the dust and the oil, that they are attached to the floor, because if floor slippery and dirty can make workers stumble and fall, so that this situation is very dangerous for the labors. Disk Cleanup floor production is aimed at for the safety and comfort workers at the time his work. While for the purification equipment work was done with the aim to treatment equipment. Seiso is applied to all departments at PT Ima Montaz Sejahtera

Seiketsu, at this stage which lead to the establishment of methods to 5S that had been implemented. This stage conducted an effort how the application that has been done on continuous not for a while it's just a way of making label working areas such as the raw material, finish goods area, warehouse mechanics and other departments. In addition, is also conducted by making line area that was intended to work more organized arrangement equipment with good. With the line-making working areas can make employees know where the placement equipment and know border areas had been damaged, so that the application can take place continuously.

Shitsuke, this step is part of the latest 5S method. In this section which focuses on how to get used to it in the implementation this method, so needed awareness of the workers work pattern to have a method in accordance with 5S in comfort and safety in work. Remember that human nature is different, it is necessary to a man who could control it. in this case the role the leadership is needed to care about and able to control workers to keep working environment based on 5S method that had been implemented.

Conclusions

The conclusion from the research has been done is:

1. Relayout facilities in PT. Ima Montaz Sejahtera consists of some part and department which should be supplemented and corrected from only 7 (seven) to 12 areas, adding this department does not necessarily need additional area, this can be done by relayout and give the region or area for the part that is not yet available.
2. This research method 5S in drawing up the layout facilities in PT. Ima Montaz Sejahtera to obtain layout that is more efficient, that is Seiri and Seiton in mechanical warehouse, Seiso in warehouse production and all the department, Seiketsu and Shitsuke in all departments.

Acknowledgements

Thanks to higher Education and LPPM-UNIMAL and Mr. H. Fathani that has facilitated the activity research.

References

- Aiello, S., O'Hara, A. dan Saing, S. 2007. *Systematic Layout Plant for Baystate Benefit Services*, Northeastern University Spring, www.baystatebenefits.com.
- Apple, James M. 1977. *Plant Layout and Material Handling* (3rd ed). New York. John Wiley dan Sons.
- Dini Endah Setyo Rahaju dan Sari Dewi. 2012. *Perbaikan Tata Letak Fasilitas Produksi dengan pengelompokan fasilitas dan Lmip 4 (studi kasus PT. Sumber Makmur)*, Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST) Periode III ISSN:1979-911X Yogyakarta,3 November 2012.
- Dian Retno Sari Dewi, Yohanes Agus Prianto, Julius Mulyono. 2012. *Perbaikan Tata Letak Pabrik Dengan Metode Clustering*, Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST) Periode III ISSN: 1979-911X Yogyakarta, 3 November 2012.
- Djunaidi, Much. 2006. *Simulasi Group Technology System untuk Meminimalkan Biaya Material Handling dengan Metode Heuristic*. Jurnal Ilmiah Teknik Industri Universitas Muhammadiyah. Surakarta. Vol. 4, No. 3.
- Eko Hadi Nur Effendy. 2012. *Usulan Perbaikan Tata Letak Fasilitas pada Industri Sandal Improvements Proposal Of Facility Layout on Sandal Industry* pada CV. Indra Jaya, Tugas Akhir, Jurusan Teknik Industri, Fakultas Teknologi Industri, Universitas Gunadarma, 2012.
- Gede Umbaran Dipodjoyo. 2012. *"5/S Sebagai Salah Satu Pendidikan Etos Kerja"* Di PT. XYZ Tangerang, prosiding seminar nasional psikologi islam, Surakarta 21 April 2012.
- Hadiguna, R. A dan Setiawan, H. 2008. *Tata Letak Pabrik*. Andi. Yogyakarta.
- Hayu Kartika dan Tri Hastuti. 2011. *Analisa Pengaruh Sikap Kerja 5S dan Faktor Penghambat Penerapan 5S Terhadap Efektivitas Kerja Departemen Produksi di Perusahaan Sepatu* Tugas Akhir, Jurusan Teknik Industri, Universitas Mercu Buana, 2011.
- Hendri. 2010. *Perencanaan Tata Letak Pabrik. Modul 10 PTLP secara sistematis*. Jurusan Teknik Industri. Universitas Mercu Buana
- Hidayati. 2005. *Rancang Ulang Tata Letak Fasilitas Produksi dengan Metode Systematic Layout Planning Richard Muther (Studi Kasus : CV. Usaha Maju, Gandapura-Bireuen)*. Laporan Tugas Akhir Jurusan Teknik Industri. Universitas Malikussaleh
- Iswanto Paulus. 2011. *Perancangan Ulang Tata Letak Workshop untuk Produksi Cover Bushing dan Sliding Bushing*. Laporan Tugas Akhir Program Studi Teknik Industri. Universitas Indonesia.
- Joko Susetyo, Risma Adelina Simanjuntak dan Joao Magno Ramos. 2010. *"Perancangan Ulang Tata Letak Fasilitas Produksi Dengan Pendekatan Group Technology Dan Algoritma Blocplan Untuk*

- Meminimasi Ongkos Material Handling*” Jurnal Teknologi vol 3 no.1, juni 2010, Jurusan Teknik Industri AKPRIND, Yogyakarta
- Merry Siska dan Henriadi. 2012. *Perancangan Ulang Tata Letak Fasilitas Pabrik Tahu dan Penerapan Metode 5S*. Jurnal Ilmiah Teknik Industri Vol. 11, No. 2 Desember 2012, ISSN 1412-6869, Jurusan Teknik Industri, Fakultas Sains dan Teknologi, UIN Sultan Syarif Kasim Simpang Baru Panam, Pekanbaru.
- Meyers, F.E. 1993. *Plant Layout and Material Handling*. New Jersey. Regents/Prentice Hall, Englewood Cliffs.
- Purnomo, Hari. 2004. *Perencanaan dan Perancangan Fasilitas*. Edisi Pertama. Yogyakarta. Graha Ilmu.
- Risma A. Simanjuntak dan Dian Hernita. 2012. *“Usulan Perbaikan Metode Kerja Berdasarkan Micromotion Study Dan Penerapan Metode 5S Untuk Meningkatkan Produktifitas”* Jurnal Teknologi, Institut Sains & Teknologi AKPRIND Yogyakarta Volume. 1 Nomor 2 , Desember 2008, 191–203.
- Septaviani. 2012. *“Faktor-Faktor Yang Berhubungan Dengan Praktik 5s (Seiri, Seiton, Seiso, Seiketsu, Shitsuke)”* Pada Mekanik Bengkel Sepeda Motor X Kota Semarang tahun 2012, Jurnal Kesehatan Masyarakat, Volume 1, Nomor 2, Tahun 2012, Halaman 785 - 792 Online di <http://ejournals1.undip.ac.id/index.php/jkm>.
- Sila Santy .2012. *“Usulan Perbaikan Tata Letak Produksi Keripik Kentang Di Industri Kecil Menengah Bencok 26 Proposed Improvement Of Potato Chips Production Layout In Small And Medium Industries Bencok 26”*, Tugas Akhir, Jurusan Teknik Industri, Fakultas Teknologi Industri, Universitas Gunadarma, 2012.
- Sitanggang N Dameyanti. 2009. *Perancangan Ulang Tata Letak Menggunakan Travel Chart pada Bagian Produksi di PT. Cahaya Kawi Ultra Polyintraco*. Laporan Tugas Akhir Departemen Teknik Industri Universitas Sumatera Utara.
- Wignjosoebroto, S. 2000. *Pengantar Teknik dan Manajemen Industri*. Surabaya. Prima Printing.
- Wignjosoebroto, S. 2009. *Tata Letak Pabrik dan Pindahan Bahan*. Edisi ketiga. Surabaya. Penerbit Widya Guna.

