

INTERNSHIP REPORT
PT. MEGA ANDALAN PLASTIK INDUSTRI (MAPI)



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INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM
FACULTY OF INDUSTRIAL TECHNOLOGY
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APPROVAL

The internship report which is written basen on the internship at PT. Mega Andalan Plastik Industri (MAPI) during the period from June 25, 2018 until July 28, 2018 by:

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has been approved.

Yogyakarta, November 4, 2018

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CERTIFICATE OF INTERNSHIP



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Telah Melaksanakan Kerja Praktek di Perusahaan kami, PT. Mega Andalan Plastik Industri yang bergerak dalam bidang plastik selama 1 (satu) bulan terhitung mulai tanggal 25 Juni 2018 sampai dengan 28 Juli 2018 dengan predikat Cukup/Baik/Memuaskan. * Lembar Penilaian Terlampir.

Demikian Surat keterangan ini dibuat untuk dapat dipergunakan sabagaimana mestinya.

Yogyakarta, 30 Juli 2018

PT. MAPI



Andreas Adi Kurniawan
General Manager

ACKNOWLEDGEMENT

Praise be to God Almighty who has bestowed blessings that have provided many opportunities, so that Students can complete the Internship report properly.

This report is prepared to complete one of the requirements in completing the Internship for students of the International Industrial Engineering Class at the Faculty of Industrial Technology at the University of Atma Jaya Yogyakarta.

In the progress of this Internship report, the student is fully aware that the completion of the Job Training report is inseparable from the support, enthusiasm, and guidance from various parties, both moral and material, because of him, the student would like to express many thanks, among others:

1. PT. MAPI (Mega Andalan Plastik Industri) which has been willing to give the student the opportunity to do the Internship.
2. Mr. Andreas Adi Kurniawan as a supervisor field who has accompanied students during the Internship.
3. Mr. Gatot who help the student during the Internship in PT. MAPI.
4. All employees and worker of PT. MAPI who help the student during the Internship in PT. MAPI.
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6. My best friend Bryant Sukoputra as a partner of the Internship who help and support the student and able to cover all the weaknesses of the student during the Internship.
7. And other parties that directly involved.

The prgress of this Internship report report is prepared as well as possible, but there are still weaknesses in the preparation of this report, therefore some suggestions and criticisms from all parties are expected, not forgetting our hope that all these Internship reports can be useful for the student and can add knowledge to us all.

4 November 2018

Paulus Damasus Dwi Putranto

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CHAPTER 1

INTRODUCTION

1.1. Background

Industrial Engineering Program, Faculty of Industrial Technology, University of Atma Jaya Yogyakarta (PSTI UAJY) requires all students to carry out Internship in accordance with Curriculum in PSTI UAJY. The UAJY PSTI sees practical work as a mode or means for students to recognize the atmosphere in the industry as well as grow, improve, and develop a professional work ethic as a candidate for Industrial Engineering graduate.

Internship can be said as a venue for the simulation of industrial engineering profession. The paradigm that must be invested is that during the practical work student's work in companies that they choose. Work, in this case includes the activities of planning, design, improvement, implementation and problem solving. Therefore, in Internship activities undertaken by students are:

- a. Recognize the scope of the company
- b. Following the work process in the company continuously
- c. Perform and do tasks assigned by boss, supervisor, or field supervisor
- d. Observe system behavior
- e. Compile reports in written form
- f. Carry out the practical work exams

1.2. Aim

Things to be achieved through the implementation of this Internship are:

- a. Practicing self-discipline.
- b. Exercise ability to interact with subordinates, coworkers, and bosses within the company.
- c. Train the ability to adapt to the work environment.
- d. Directly observe the company's activities in producing and running a business.
- e. Complete the theory acquired in lectures with existing practices in the company.
- f. Add insight into production systems and business systems

1.3. Place and Time of Internship

This Internship was held in June 25th 2018 until July 28th 2018 at PT. Mega Andalan Plastik Industri (MAPI) which is located at Tirtomartani Street, Kalasan, Sleman, Special Region of Yogyakarta. In this Internship, the student was given a project that had to be done. The student wasn't placed in any departement.



CHAPTER 2

COMPANY OVERVIEW

2.1. Brief Company History

The development of the plastic industry in Indonesia or in the international market is growing rapidly. The potential consumption of plastic products and packaging in Indonesia is also very large. PT Mega Andalan Kalasan collaborates with the plastic industry manager from Yogyakarta, Pakem, in 2015 built a subsidiary called PT Mega Andalan Plastik Industri (MAPI) in the Kalasan area of Yogyakarta with its full address on Cangkringan Street Km. 1 Dusun Dhuri, Tirtomartani, Kalasan, Sleman, Special Region of Yogyakarta, Indonesia. PT MAPI is located not far from its headquarters.

As one of the subsidiaries of PT Mega Andalan Kalasan, PT Mega Andalan Plastik Industri (MAPI) is committed to becoming a trusted plastic industry company in Indonesia that is able to become the pride of the Indonesian people. PT MAPI operates as a domestic plastic industry that promotes technological advances.

By continuing to process technology progress, PT MAPI currently has the latest technology plastic printing machines. The machines used at PT MAPI, are able to produce consistently, stable and fast. Currently, PT MAPI has 2 types of plastic packaging machines, namely inject system printers and blow-molding machines. With the capabilities that we already have, there are several products that have been widely circulated in the national market. There have been many companies that entrust their plastic packaging from PT MAPI, these products include: packaging bottles of fertilizer, vinegar bottles, jerry cans, vaccine bottles, cosmetic packaging, medicine spoons, jars, electric casing and many more

The need for plastic packaging from the design, shape, size, color, identity or logo of each company varies. PT MAPI provides solutions to beautify or give a different look to the packaging of your product in accordance with the demand and needs. Assisted by the Engineer and supported by trained and competent Human Resources, PT MAPI provides drawing services and plastic packaging solutions for products that are in line with the wishes. Stock inventory and distribution of PT MAPI products are scheduled precisely according to demand, and very competitive prices can be adjusted to the consumer budget. PT MAPI

also has a complaint service regarding the quality of the product or other service that has been received if it is not in accordance with the standard, so that the guaranteed product is received on time and quality. The example product of PT. MAPI such as Blue Bowl, Bottle of 15 ml LDPE Vaccine, Bottle of 10 ml LDPE Vaccine, HDPE Bottle 500 ml 60 gr, HDPE Bottle 1 liter 80 gr, Vinegar Bottle, 5 liter white Jerigen 210 grams.

2.2. Organizational Structure

The organizational structure defines the organization's hierarchy of people and department as well as how information flow within the organization. It is also the formal arrangement of roles, responsibilities and relationship within an organization.

The existing organizational structure of PT. MAPI can be seen in the figure below.

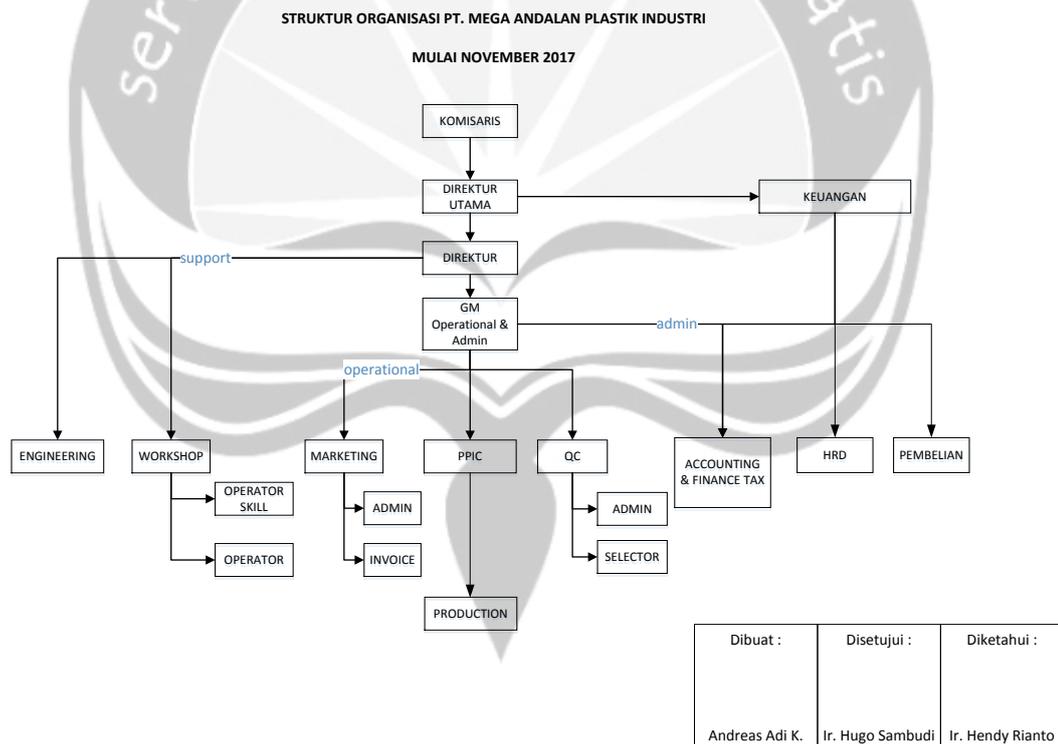


Figure 2. 1 Main Organizational Structure of PT. MAPI

2.2.1. General Manager

- a. Establish company policies by determining the company's plans and objectives both short and long term
- b. Responsible inside and outside the company.

- c. Coordinate and supervise tasks delegated to the other position and establish good working relationships.
- d. Assisting the intern regulations to companies that do not conflict with company policy.
- e. Improving and perfecting the arrangement aspects so that organizational goals can be achieved effectively and efficiently.
- f. Become an intermediary in communicating ideas, ideas and strategies between leaders and staff.
- g. Guiding subordinates and delegating tasks that can be carried out by subordinates clearly.

2.2.2. Engineering

- a. Make mold design according to market demand.
- b. Innovate and input to the customer regarding the delivery of design services that are in accordance with the wishes.
- c. Coordinate with marketing and customers related to the design results of the images that have been made before proceeding to the mold making process.
- d. Cooperating with the workshop section on the meaning of reading pictures in the mold making process.
- e. Monitoring and coordinating with the mold making process, trial and mold trial results.

2.2.3. Workshop

- a. Making and maintaining the mold that needed by the production department.
- b. Maintenance of all components related to the mold, cleaning, and replacement of mold components.
- c. Trial the new mold and make sure the molds installed on the machine can function properly.
- d. Assist other people when there is a problem installing the mold on the machine and making sure the mold can be installed safely and functioning properly.
- e. Order requests to the purchasing department regarding the need for materials needed in the workshop.
- f. Responsible for the cleanliness of the workplace of the workshop, maintenance of work tools and machines and the safety of themselves and coworkers.

2.2.4. Marketing

- a. Planning and compiling an integrated and efficient marketing strategy of production with regard to company resources.
- b. Coordinating with the PPIC and Production Department to support the smooth production of work, including planning, processes and production results in the company.
- c. Establish good relations and cooperation with consumers / customers.
- d. Analyze reports on market conditions and situations along with competitor analysis.
- e. Monitoring the smooth delivery of goods.
- f. Responsible for the smoothness and implementation of marketing objectives in accordance with the established marketing strategies and objectives.

2.2.5. PPIC

- a. Make a production planning both weekly, monthly or yearly based on data from Marketing, and coordinate with GM or Director for approval.
- b. Coordinate with the HR department regarding HR needs that are adjusted to the production plan that has been made and approved.
- c. Share work schedules with the Head of Production.
- d. Coordinate the production plan that will be carried out to all relevant parts, so that there is preparation of facilities and infrastructure needed.
- e. Collaborate with the Workshop section for needs that require Workshop section support.
- f. Coordinate to the finance and purchasing departments related to production plans, as well as production needs that require a financial budget.
- g. Cooperate with the company's engineering division if there is a plan to produce new products.
- h. Coordinate with the QC department for established quality standards, or standardize quality, there is a balance between QC and production.
- i. Evaluating the activities that have been carried out, drawing conclusions about the shortcomings that must be improved in the future and the successes that have been achieved in the production section that must be maintained.
- j. Responsible for the suitability of the schedule to GM.
- k. Responsible for work safety, both own self and coworkers.

2.2.6. QC

- a. Coordinating with the purchasing department regarding the quality of the material needed.
- b. Coordinating with the Warehouse section regarding the receipt of materials, the standard of quality checking that is set.
- c. Control the process carried out in production and coordinate about the quality standards set in the company.
- d. Supervise QC Inspector for random and periodic checks on products, visually, functionally and size.
- e. Making a QC Pass or product marker sticker that passes the selection with the standard quality means that in the future it can be held accountable in the future if an error occurs in the control / damaged product.
- f. Ensure that the products sent and received by the Buyer are products that are in accordance with the quality standards that have been set.

2.2.7. Accounting & Finance Tax

- a. Creating a financial report both daily, weekly, monthly and or annually according to the needs of the company.
- b. Make and report tax reports on income tax and value added tax.
- c. Make tax planning and strategies in the company.
- d. Provide analysis and predictions regarding the potential of corporate tax based on the applicable tax laws.
- e. Apply accounting treatment for taxation events (starting from appraisal/calculation, recording (recognition) of tax.
- f. Presenting accounting treatment in commercial reports and corporate fiscal reports.
- g. Carrying out tax filing and documentation.
- h. Looking for solutions to corporate taxation.

2.2.8. HRD

- a. Managing the employee recruitment process by reviewing the needs of new employees and evaluating the results of the selection of prospective employees according to the requirements determined by the company in order to produce employees who are in accordance with the requirements and competencies required.

- b. Managing, evaluating, and supervising the process of cooperation contracts with companies supplying labor, cleaning service, training, and transportation in accordance with the competencies and requirements set by the Government and the Company, so that the interests of the company are protected.
- c. Supervise the personnel data administration process, by managing attendance, payroll, benefits, and employee services, so that staffing data is neat, complete, and orderly administration.
- d. Oversee the planning and implementation of employee training programs based on training needs according to the annual assessment results and job competency needs, to improve employee abilities / competencies according to needs.
- e. Supervise and control the services provided to employees in terms of staffing, health, training and general processes in accordance with company regulations, so that employee rights are fulfilled.
- f. Monitor and control the work plan and its implementation from the personnel administration process, training, clinics, and general sections, so that the interests of employees and companies can be fulfilled and smooth.
- g. Maintain and enhance good relations with the community around the factory, government, police, military, and religious leaders by communicating the conditions and activities of the company, so that the situation and condition of the company remain safe and smooth.
- h. Manage, evaluate, and supervise cooperation contracts with hospitals, clinics, health laboratories, and pharmacies in providing health services for employees and their families in accordance with company regulations, so that health services and their families are guaranteed, easy and fast, and reasonable costs .
- i. Make monthly reports on staffing, training, health and general in accordance with procedures, to ensure the availability of accurate, informative and documented reports.
- j. Motivate, develop, and evaluate the abilities and performance of subordinates, in order to be able to do work in accordance with job competencies and job descriptions

2.2.9. Purchasing

- a. Planning purchases, coordinated with the production and marketing departments related to production and shipping plans, engineering department related to future project plans and other parts that require.
- b. Make the Pre-Order to be submitted to the supervisor for review and approval about will need or no need for purchase.
- c. Conduct market survey to check available price on the market.
- d. Determine the supplier that is in accordance with the quality and price, and choose the supplier with the cheapest price and the most appropriate quality as needed.
- e. Purchase goods by coordinating part of drivers and / or direct suppliers.
- f. Carry out tracking or supervision of goods, so that will arrive at the company on time in accordance with the agreed time, to ensure a material vacuum and hamper the production process.
- g. Recap of receipt of goods coming, confirm the financial part for the next financial process.
- h. Coordinate with the warehouse section regarding the receipt report and also the report on the use of goods to adjust the amount of stock of admin records with real goods in the warehouse.
- i. Responsible for ensuring the availability of materials and other auxiliary materials in the company's area.

2.3. Management of the Company

2.3.1. Vision and Mission

The Vision of PT. MAPI is “Being the Largest and Most Trusted Plastic Company in Indonesia That Can Become the Pride of the Indonesian Nation”.

The Mission of PT. MAPI is:

- a. Always give QCD (Quality, Cost, and Delivery) which is the best quality, competitive cost and timely delivery for consumers.
- b. Applying the 5R culture (Concise, Neat, Clean, Care, and Diligent) within the Company.

2.3.2. Employment

In PT. MAPI, number of employees are approximately 100 employees which is divided into several departments such as production, maintenance and office.

- a. Recruitment

PT. MAPI employs approximately 100 workers. The employees are recruited by PT. MAPI as odd workers with contract per 3 months. PT. MAPI employees also is the residents that live on the company area. All of the employees are recruited directly but some are from the employee's acquaintances. It means that, if an employee has friends or family looking for job then they will suggest the company to recruit their friends or family.

b. Working Hours

Working hours in PT. MAPI is 24 hours starts from Monday to Saturday in a week. The employees have 1 day off in a week. The working day apply for only production employees. For the office employee's working day is only from Monday to Friday. The work shift is divided into 3 shift:

- i. Shift 1: starts from 06.00 until 14.00
- ii. Shift 2: starts from 14.00 until 22.00
- iii. Shift 3: starts from 22.00 until 06.00

Break hours are self-managed by the employees themselves with duration of 1 hour.

c. Facilities

PT. MAPI also provide some facilities for the employees such as locker, mosque, parking yard for employee's motorcycle, and also kitchen which the employees will be served a tea, coffee and etc.

2.3.3. Marketing

The products of PT. MAPI are only marketed in local area. PT. MAPI focuses their products distribute to home industry and stores. Mostly, the products is distributed to home industry. The type of home industry is plant home industry which produces plant fertilizer. In addition, PT. MAPI also has regular customers so they will routinely distribute their products.

CHAPTER 3 REVIEW OF ENTERPRISE SYSTEM

3.1. Business Process of the Company

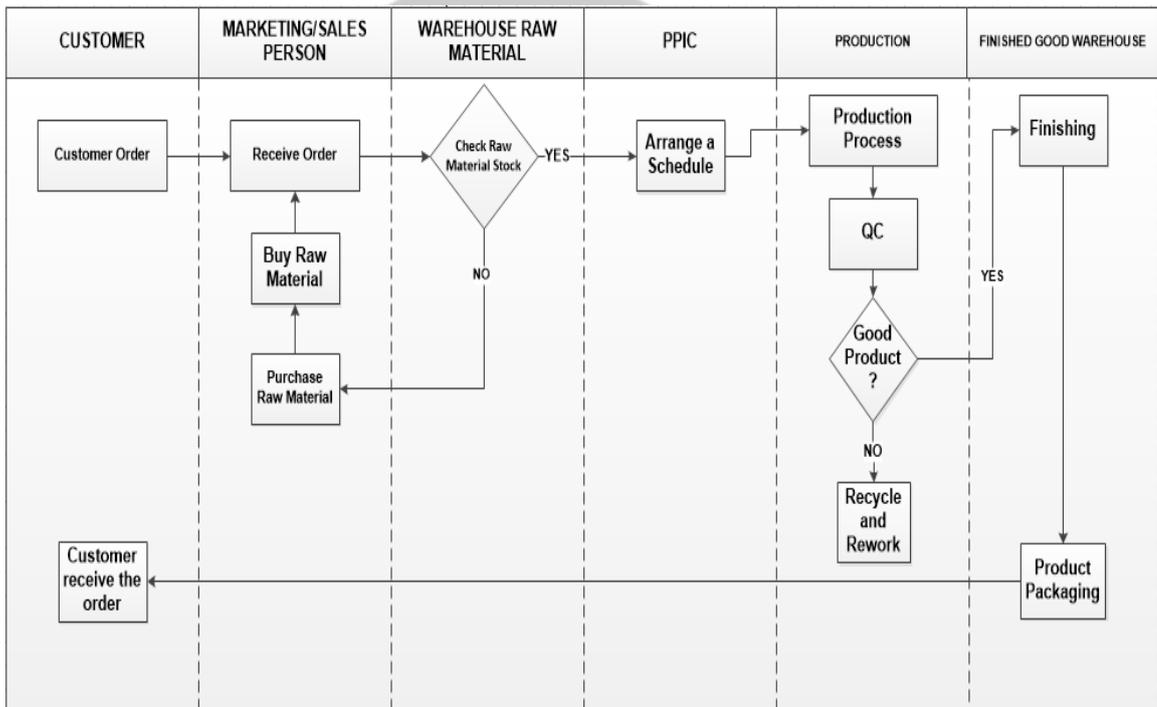


Figure 3. 1 Business Process

This is the explanation of business proses of PT. MAPI (Mega Andalan Plastik Industri) :

a. Customer

The customer will make order to the company.

b. Marketing/sales person

Marketing/sales person will receive the order from the customer and will transferred to raw material warehouse department.

c. Warehouse Raw Material

In raw material warehouse, there will be stock checking to make sure that if the raw materials can fulfill the customer order. If the raw materials are not enough, then marketing department will contact supplier to buy and supply raw materials.

If the raw materials that exist are enough to fulfill the customer order, then raw material department will transfer to PPIC department.

d. PPIC

The head of PPIC will arrange the schedule and other need regarding to the production process.

e. Production

After all has been passed in PPIC, the production process will start. When the production process is done, the final process is Quality Control to make sure the product is defect or not. If there is defect product, then it will reworked if it is possible, if it is not then it will be recycled to be a raw material again in crusher department. After all the products passed the QC, it will be sent to finishing which also the finished good warehouse.

f. Finished Good Warehouse

In finished good warehouse, the product will be packaged into a cartoon box and will be distribute to customer.

3.2. PT. MAPI Products

In PT. MAPI, the main product is from plastic and they produce many products but still has the same characteristics which are bottle, jerigen, jars, medicine spoon and many more. PT. MAPI products can be seen in Table 3.1.

Tabel 3. 1 List of Products

No.	Product	Type
1.	Vaccine Bottle	10 ml 15 ml 30 ml
2.	FMC Bottle	250 ml White 100 ml White 250 ml Brown 100 ml Brown
3.	Fertilizer Bottle	500 ml 1 liter
4.	Vinegar Bottle	80 ml 210 ml
5.	Medicine Spoon	

6.	Jerigen	2 liter 5 liter 210 gr 5 liter 185 gr
7.	Jerigen	5 liter
8.	Waste bottle	Single Type

Table 3.1. List of PT. MAPI Products (continue)

No.	Product	Type
9.	Jars	Single Type
10.	Crystal Container	Single Type
11.	Legs of bird cage	Single Type

3.3. Production Process

PT. MAPI uses a continuous production process. It means that the production process always run everyday because the type of production is mass production which produce in big amount. The production process flow can be seen in the Figure 3.1.

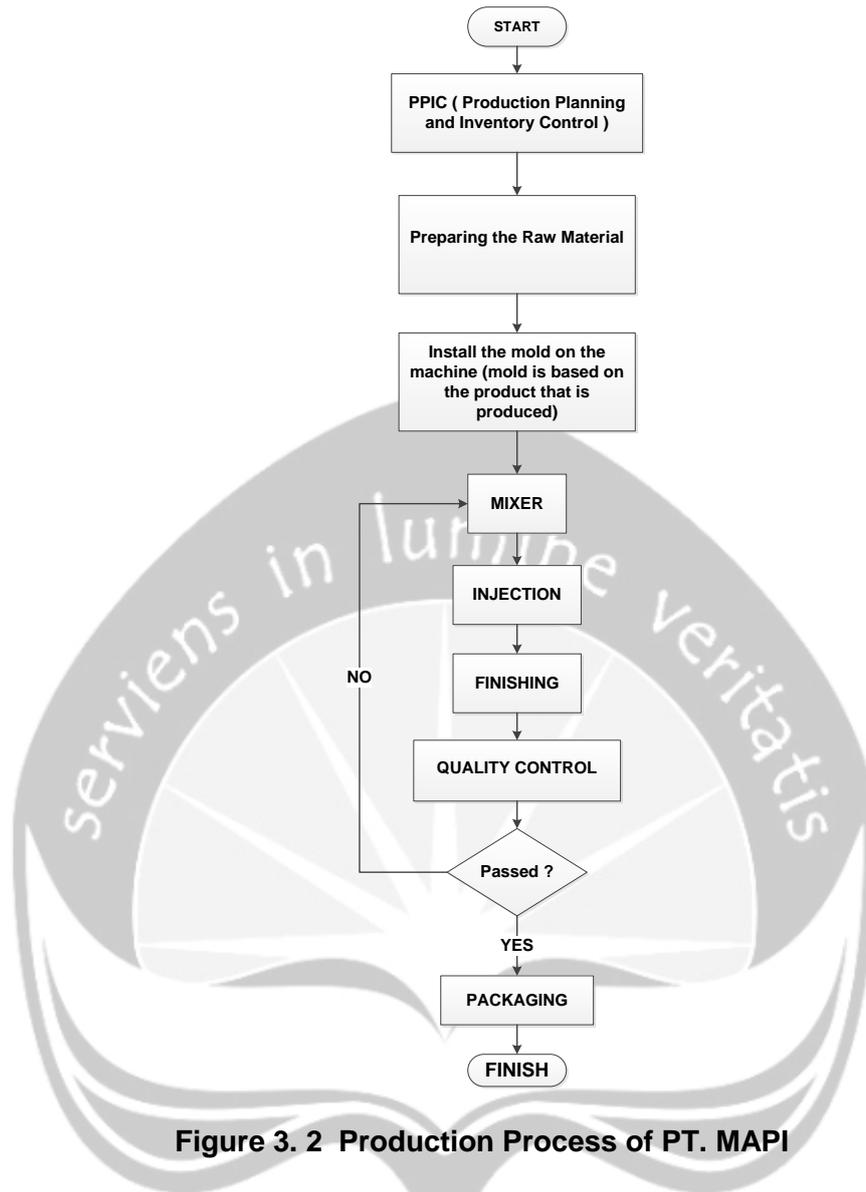


Figure 3. 2 Production Process of PT. MAPI

The description of the production process in PT. MAPI:

a. Start

b. PPIC (Production Planning and Inventory Control)

Production Planning will set up the production scheduling. First, PT. MAPI will check the raw material whether the stock is still available or not. If the raw material is ready then they will make a schedule and then prepare the raw material for production.

c. Preparing the Raw Material

The preparation of the raw material will be put in a shelf which located in the raw material warehouse. The worker will take the raw material to production floor using stacker.

d. Install the mold on the machine

The workshop worker will prepare the mold and take the mold from the workshop place to the production area and will install the mold on the machine. The mold that is used will be based on the product that is produced on that time.

e. Mixer

In mixer process, the raw material will be mixed with a coloring material. This coloring material serves to give color to the product that will be processed. The color will be decided base on the customer demand or customer requirement.

f. Injection

In the Plastic Injection Molding Process there are 2 major parts of the method and type of machine used, namely: Vertical Injection Molding Machine and Horizontal Injection Molding Machine. In PT. MAPI, the machine used is a Vertical Plastic Molding Machine. This injection process includes 5 stages :

i. Mold Case

ii. Fill Injection

iii. Holding Injection

iv. Charging and Cooling

v. Mold Open

g. Finishing

At the finishing stage, the product that has been finished injected will immediately come out of from the machine after being removed or cut from the mold. The finished product will have a lot of scrap that is still united. The worker will cut the scrap that still mold with the product. The scrap will be gather into a sack and bring to the crusher department to be recycled as raw material again.

h. Quality Control

After the product is finished, the product checking process is carried out find out whether the product is feasible or out of defect. If there is a defect product, it will be gathered and bring to crusher department to be recycled as raw material again.

i. Packaging

The packaging in PT.MAPI uses a clear plastic to package the finish products. But some products will be put into boxes.

j. End

3.4. Production Facilities

In PT. MAPI production floor, there are a lot of facilities that the company provides and the worker can use. Below is the facilities of the production floor that the company provides :

a. Pallet

In PT. MAPI there are 2 types of pallet which consist of the steel pallet and the wood pallet. The steel pallet is use for the raw material that will be put before it will be processed, and the wood pallet is for the product that already been packaged. The size of the pallet in PT. MAPI is 1m x 1m. Below is the picture of the pallet that PT. MAPI use.



Figure 3. 3 Steel Pallet



Figure 3. 4 Wood Pallet

b. Shelf

Shelve is used to keep the raw materials, cardboard, scraps, finished good, and other tools to support the production such as the molds in the workshop area. Some of the Shelves in PT. MAPI have 2 untill 3 level but some only have 1 level. Below is the picture of the Shelves in the PT. MAPI.



Figure 3. 5 1 Level Shelves

c. Box Container

Box container is a box to keep the products as soon as the injection blowing finished. So when the products is done being injected there will be a small conveyor that will lead to the box container next to the machine.



Figure 3. 6 Box Container

d. Trolley

Trolley is one of the Material Handling that PT. MAPI have in the production floor. The use of the trolley to help the worker bring Raw Materials and Finished Good.



Figure 3. 7 Trolley

e. Stacker

Stacker is used to lift / bring down items that are on the shelf that has 2 or more levels. The stackers at PT. MAPI also have a functions to bring the mold from the workshop area to the injection machine. Because the weight of the mold is a little bit heavy so, the workers at PT. MAPI uses stacker.



Figure 3. 8 Stacker

f. Crusher Machine

This crusher machine has a function to make the scraps of the finished good became a plastic seeds again. When the finished good has been finished, the scrap will put in a sack and then it will be put in the crusher departement. From the production process there are no waste, because all of the scrap will be recycled to be a raw material again.



Figure 3. 9 Crusher Machine



Figure 3. 10 Crusher Machine

g. Mixer Machine

Mixer machine is used to mix the plastic seed with colour material. The worker puts the raw material seeds and colour material into the tube, then the tube will spin.



Figure 3. 11 Mixer Machine

h. Injection Machine

In PT. MAPI, there are fifteen injection machines. All of the machines are injection machines but the machines produce different shape or form of product. The machine usually is managed by maintenance team which the maintenance worker will make the molding form or shape base on what will be produced. So, every machines produce different product. Injection machine that is used in PT. MAPI is Haitian Injection Molding Machine MA2500/1000G type. The machine specification can be seen in the figure below.

Specification		MA 2500/1000G		
INJECTION UNIT				
Screw Diameter	mm	A	B	C
Screw L/D Ratio	LD	50	55	60
Shot Size (Theoretical)	cm ³	22	20	18.3
Injection Weight (PS)	g	497	601	715
Injection Rate	g/s	452	547	651
Injection Pressure	Mpa	173	210	250
Plasticizing Capacity(ps)	g/s	205	169	142
Screw Speed	rpm	21.6	26.6	30.3
CLAMPING UNIT				
Clamp Tonnage	KN		2500	
Toggle Stroke	mm		540	
Space Between Tie Bars	mm		570X570	
Max.Mold Height	mm		570	
Min. Mold Height	mm		220	
Ejector Stroke	mm		140	
Ejector Tonnage	KN		62	
OTHERS				
Max. Pump Pressure	Mpa		16	
Pump Motor Power	Kw		22	
Heater Power	Kw		16.65	
Machine Dimension(LxWxH)	m		5.86X1.52X2.2	
Machine Weight	t		7.5	
Hopper Capacity	Kg		50	
Oil Tank Capacity	L		355	

Figure 3. 12 Injection Machine Specification



Figure 3.13.

Figure 3. 13 Injection Machine



Figure 3. 14 Injection Machine



Figure 3. 15 Injection Machine

i. Raw Material

Raw Materials that used in PT. MAPI consists of two kinds of raw materials which are the plastic seeds HDPE type and coloring material. Coloring material is a kind material that give colour to the plastic seeds. This coloring process will be processed in the mixer machine. The color that will be used will depends on the customer requirement.

j. Steel stairs

PT. MAPI have 2 procedures to put the Raw Material into the injection machine. The first is the worker uses a small steel stairs to go up and pour the raw material to the machine. The second way is PT. MAPI use a kind of pipe that sucks the raw material from it's sacks and then directly enter the machine to been process.



Figure 3. 16 Steel Stair



Figure 3.17.

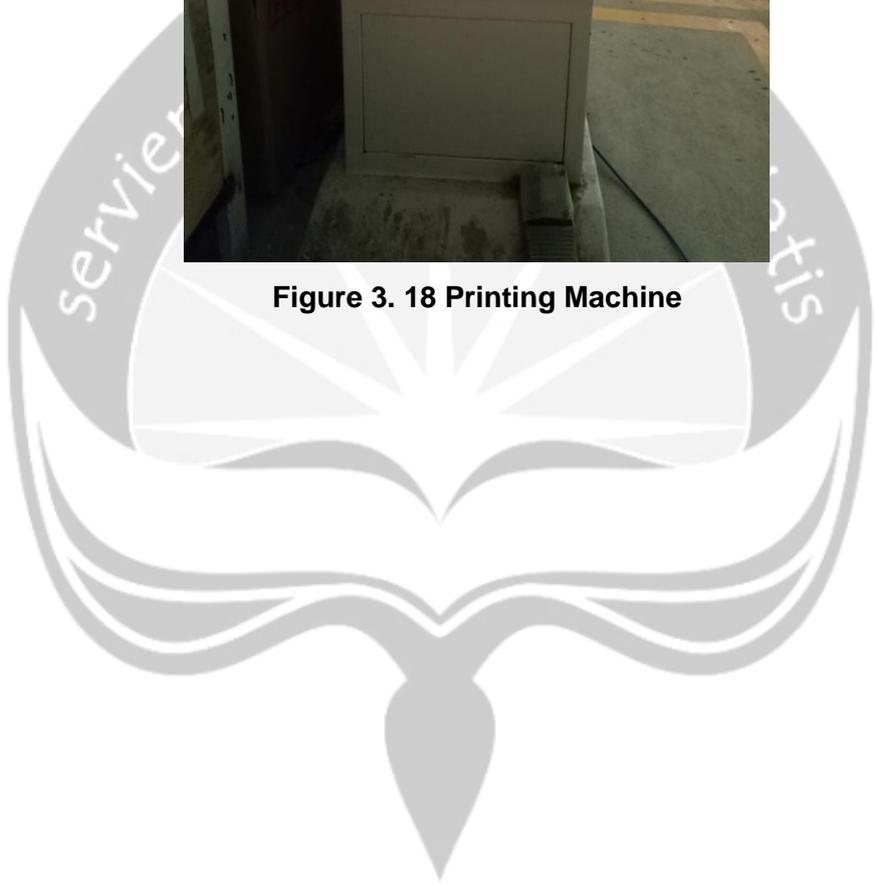
Figure 3. 17 Steel Stair

k. Printing

Printing process is used to print a stamp or writing on the product such as bottle and jars. This process is not main process in the production because it will be used when there is a request from the customer.



Figure 3. 18 Printing Machine



CHAPTER 4

REVIEW OF STUDENT WORK

4.1. Scope of Work

In PT. MAPI (Mega Andalan Plastik Indonesia), there is only one main building. This building consist of many departement such as the production area, the workshop area, and the office. Mr. Andreas is the manager of PT. MAPI (Mega Andalan Plastik Indonesia) and also the field supervisor for the student.

The scope of work that given by the field supervisor was about the layout of PT. MAPI. So based on the task that given by the field supervisor, the student must fix or re-layout the previous layout of PT. MAPI. The purpose of this project is to make the workplace of PT. MAPI more better.

On the implementation of the Internship, there are two kind of activity that the student did during the Internship in PT. MAPI, the first activity is observation and the second activity is consultation. There was a reason why the student didn't fully finished the project in the office of PT. MAPI. This was because the field supervisor don't provide table for the student to do the project and also because the space of the office is also limited. During the Internship, if the student is done doing the observation the student was allowed to go home and continue the progress at home by the field supervisor. The observation of the project was started from the production floor. The observation was finished by using a measurement equipement and a blank paper to make some notes. After the student make some progress then the student met the field supervisor to do some consultation about the progress and the consultation can be held almost 3 days a time and the presentation to the director of PT. MAPI is 2 week a time.

In the final, the student suggest some alternative layouts that will be discussed together with the director and the manager. The choosen layout will be directly being implemented because the condition of PT. MAPI is condition that really need some improvements.

4.2. Job Responsibilities and Authority

The Job responsibilities and Authority of the student is the student have to suggest some alternative layouts that soon will be implemented for PT. MAPI. The layout that the student design can be for long term and short term.

During the Internship, the manager give the student fully authority to enter all of the work area without a permission. The benefits of the full authority that the manager gave is so the student to design the new loayout of PT. MAPI for long and short term are :

- a. To measure the dimension of the machine
- b. To measure the size of the shelf
- c. To measure the distance of each machine
- d. To measure the distance of each shelf
- e. To take some photo for the documentation
- f. To measure the size of each area of the production floor. The production area consist of:
 - i. Raw Material warehouse
 - ii. Crusher departement
 - iii. Workshop departement
 - iv. Workstation departement
 - v. Finishing departement
 - vi. Office
 - g. Finished good departement
 - h. Rest area

The manager of PT. MAPI (Mega Andalan Plastik Industri) also provides some supporting data to the student to help the project. The supporting data is main size of the whole building.

4.3. Work Implementation Methodology

The work implementation methodology of the student during the Internship in PT. MAPI (Mega Andalan Plastik Indonesia) can be seen at figure 4.2.:

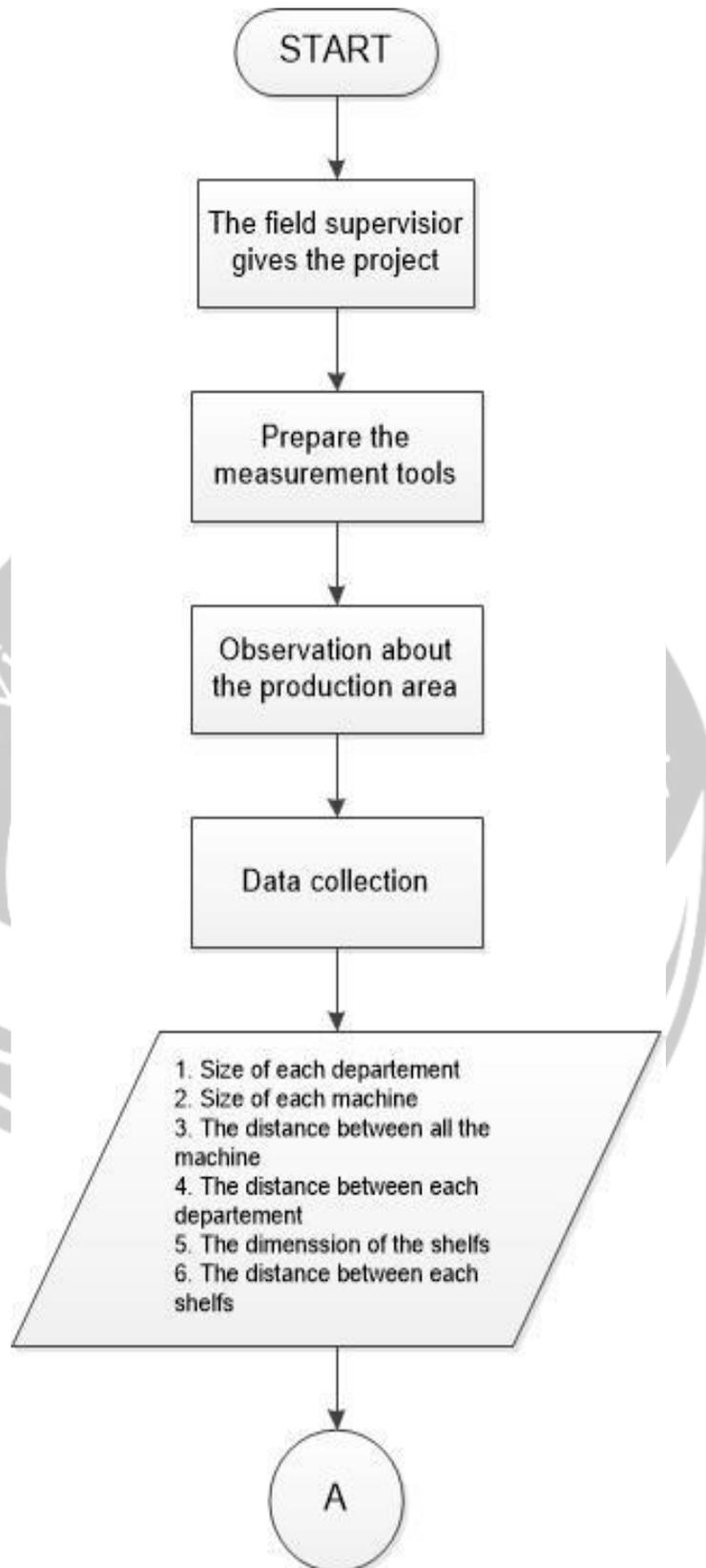


Figure 4. 1 Work Implementation Methodology

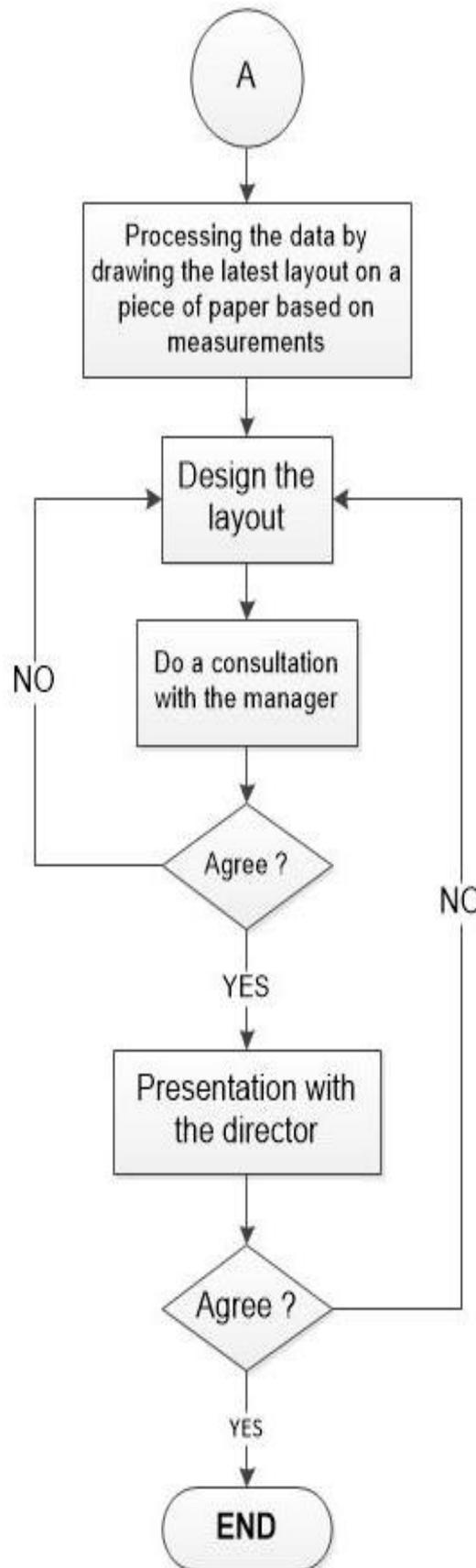


Figure 4. 2 Work Implementation Methodology (Continue)

This is the explanation of Work Implementation methodology of the student during the Internship:

a. Start

b. The field supervisor gives the project

The field supervisor give the project to the student on the first day work. The project that given by the field supervisor is about Layout of PT. MAPI.

c. Observation about the production area

Before the student start to design the layout, the student must do the observation. The student walk around the production floor and make some discussion related to the needs of student to design a new layout of PT. MAPI. The student decide to start from the Raw Material Warehouse, Crusher departement, Workshop area, finsihing departement, finish good departement, Office, rest area. The observation is done by using a measurement tool called meteran.



Figure 4. 3 Measurement tools

d. Data, data collection, and Data processing

The data that student need is based on the observation and the supporting data from the manager. The supporting data consist of the main size of the building. During the data collection, student make some notes and draw a temporary layout in a blank paper. The function of this temporary layout is to remind the student which position from each departement.

e. Design the layout

After do the observation, the student are allowed to go home and do the progress at home. This is the reason why the student have to make some notes and a

temporary layout. The student didn't have the facilities to work in PT. MAPI because of the limited space of the office and the student must do the project at home. The design layout of the progress is done by using Microsoft Visio.

f. Do a consultation

The consultation with the manager is held at least 3 days a time. If the student want to do some consultation with the manager, the student bring laptop and show the progress. In the consultation, the manager and the student can discuss together about the progress of design layout wether it still need some improvement or not. If the manager suggest something that the student haven't get the data, then the student will continue to do the observation that day or on the next day. But, if the manager suggest the student to some revision about the progress, then the student is allowed to go home and revise it at home.

g. Presentation

After the project is already accepted by the manager, then the student will present the final design project to PT. MAPI.

h. End

Then the project of Internship will be soon been implemented by PT. MAPI.

4.4. Work result

Work result is a result from each progress starting from the beginning untill the end of the project. The student make 3 main steps to finish the project which is previous layout data, basic theoritical and new design layout.

4.4.1. The current layout data

To make the current layout of PT. MAPI, the student need to gather all the data to design the current layout. To design the current layout, the student some supporting data from the manager such as the main size of the building. After the student have the supporting data, then the student can manually measure all the departement size in the production area. The following table is the data that the student get during the observation in the production floor.

Tabel 4. 1 Data of the current layout

No.	Department	Dimension (m)
1.	Office	9,9 x 2,9
2.	Front Warehouse	9,9 x 4,8
3.	Mushola	2,5 x 2,5

Table 4.1 Data of the current layout (continue)

No.	Department	Dimension (m)
4.	Kitchen	2,3 x 1,8
5	Old Raw Material Warehouse	9,9 x 6,5
6.	New Raw Material Warehouse	6 x 6
7.	Scrap	6,5 x 5,16
8.	Crusher	5,16 x 4
9.	Workshop	17,7 x 15,6
10.	Generator	3,3 x 1,6
11.	Rest Area	16 x 13,5
12.	Office Toilet	1,9 x 1,8
13.	Public Toilet	3,3 x 1,1
14.	Rest Area Toilet	3,8 x 1,8
15.	Finishing Area	22,8 x 7,3
16.	Total Company Area	78,8 x 33,7

From the data the student get during the observation, then the student can design the current layout. the result of the current is shown in figure 4.4.:

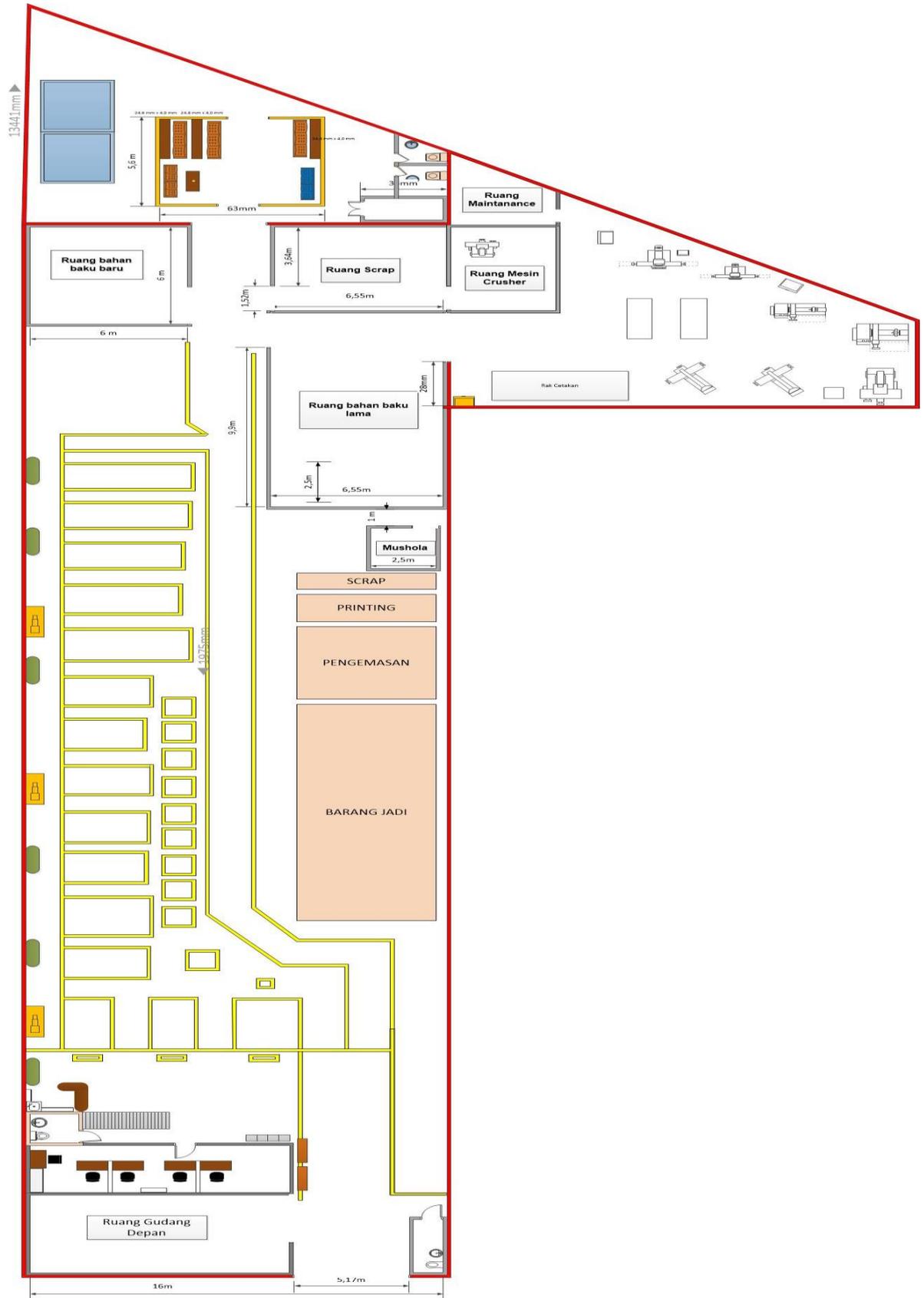


Figure 4. 4 Current layout of PT. MAPI

The current layout of PT. MAPI was finished by using Microsoft Visio. After the student done finishing the current layout, then the student did some conculation with the manager. If the manager agreed with the current layout then the student can continue to make a new design of layout based on the method that the student want to use. The method that the student want to use is manufacturing facility planning about material flow pattern.

4.4.2. Limitation of designing the layout proposal

During the progress of making the layout proposal, there are some limitation on finishing the layout. The limitation is a order from the manager to the student. The limitation of doing the layout is the scope that the student were allowed to design is only at the production floor. To determine the distance in each departement, the supervisor suggest the student to use the middle point of the departements area or the middle point of the incoming and outcoming door. The departement that can allowed to move from thier previous place is only the departement that related to the production floor such as Raw Material Departement, Workstation Departement, Finishing departement, Finish Good departement, Crusher departement.

4.4.3. Design Layout Proposal

Based on the method that the student use to design the new layout, the student can make a layout that the material movement is more effective. The figure 4.5. is the design layout proposal.

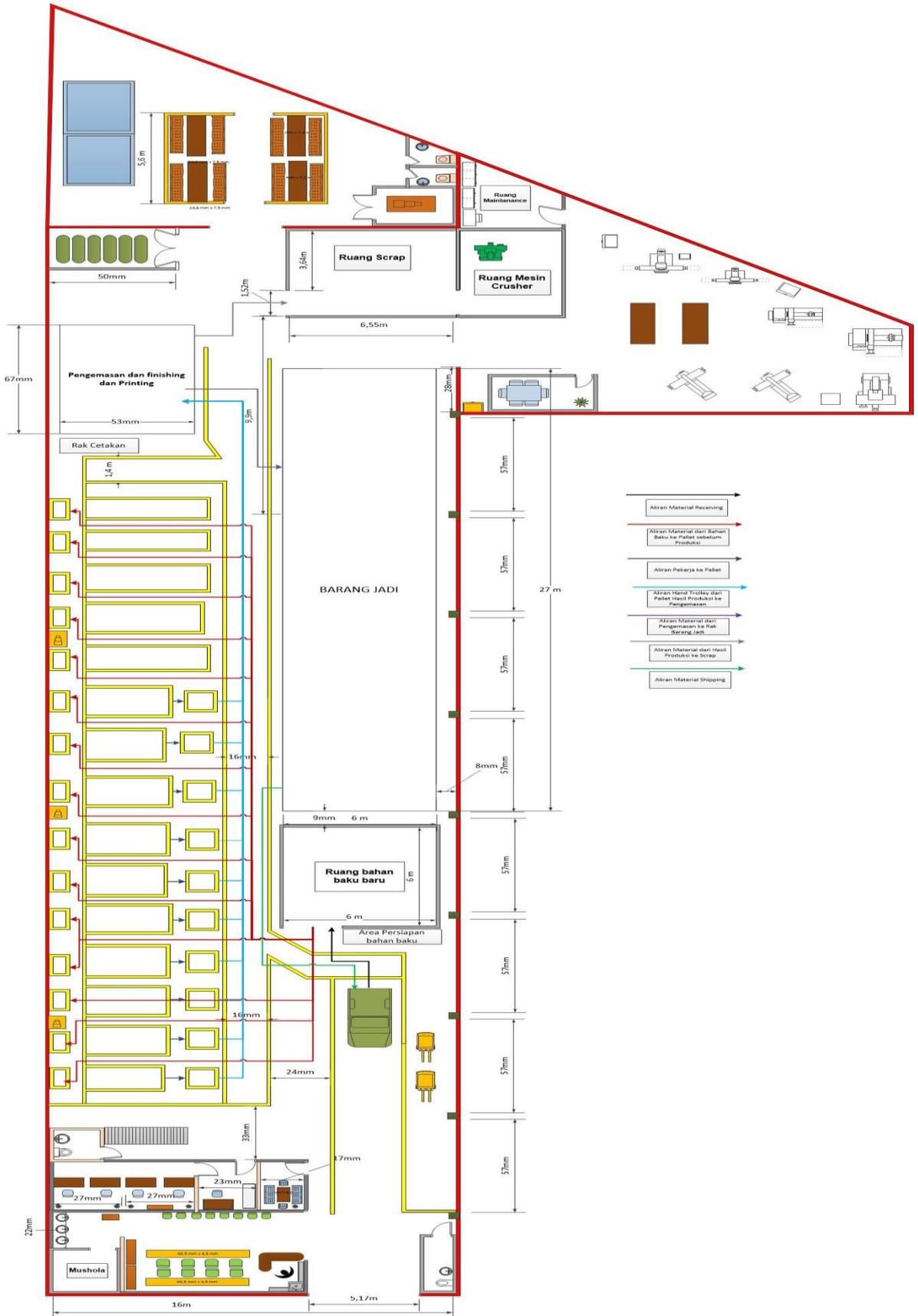


Figure 4. 5 Design layout Proposal

From the layout above, these are the following explanation of the material flow pattern design and the quantitative data on each department:

a. Replacement of the Raw Material Warehouse

In the design layout proposal, the raw material warehouse move from the previous place. The benefits of this replacement was to reduce the high opportunity of the raw material been damaged during the shipping process from the truck to the raw material warehouse. The previous distance between the raw material and the shipping department is 47,8 meter. After the replacement, then the distance between the raw material and the shipping department is 5 meter.

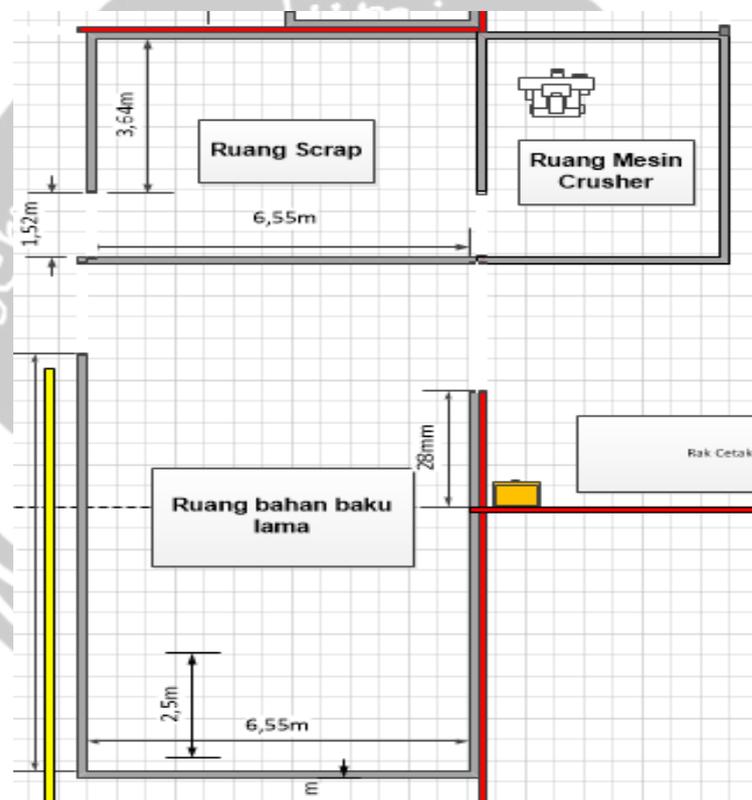


Figure 4. 6 Current layout of the Raw Material Warehouse

The current position of the Raw Material warehouse is in front of the crusher department. This condition will make the distance between the shipping department and the raw material warehouse is far.

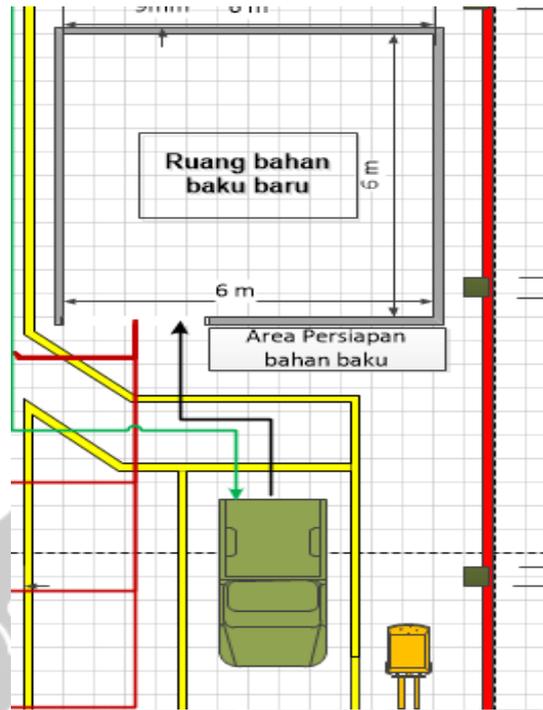


Figure 4.7 Design layout proposal of raw material warehouse

In the figure 4.7, the raw material warehouse is more near to the shipping department than the current position. This will make the process of shipping process more effective.

b. From Raw Material Warehouse to Workstation department

Based on the current layout of PT. MAPI, the previous distance between the raw material warehouse and the workstation department is far. The previous distance from raw material warehouse to the workstation department is 29,1 meter. The material flow pattern that used to fix the the layout from the Raw Material warehouse to workstation department is S-flow and I-flow. (Tompkins, 2010)

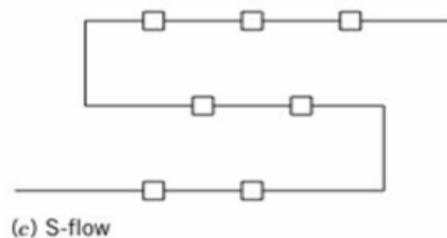
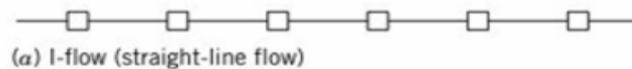


Figure 4. 8 S-Flow and I-Flow

The reason why the student design to make it S-flow and I-Flow is the conversion is dictated by the length of the production line. The distance after using the S-flow and I-flow is 12,7 meter. The distance is also related to the transportation time. The more near the distance between those two departement the more it can save time and don't consume more energy of worker on the material handling.

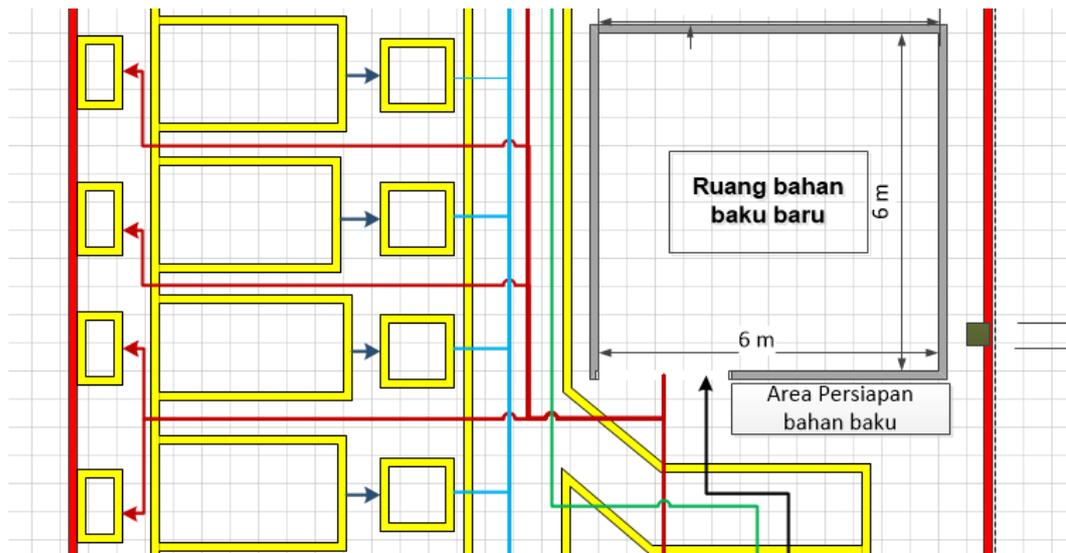


Figure 4. 9 S-Flow and I-Flow of the flow pattern

c. Replacement of the finishing departement

Based on the current layout, the finishing departement consist of printing part and packaging part. This two part have a different area of work but still in 1 departement.

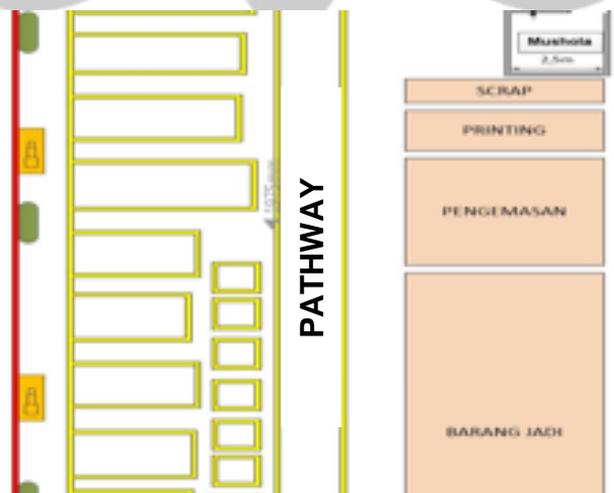


Figure 4. 10 Current layout of finishing departement

After the design layout proposal, the student design to make the printing part and packaging part combine. After combining the two part of finishing, then the student move the finishing departement near to the workstation departement. The reason why the student move the finishing departement is because the finish product that already located in the pallet don't need to cross the main pathway of the production because it can disturb the pathway of the worker.

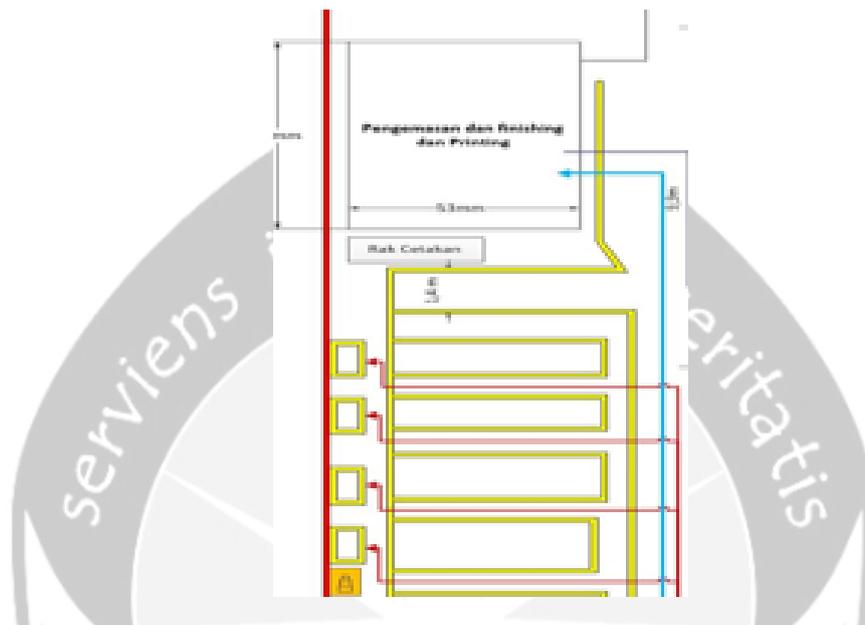


Figure 4. 11 design proposal layout of finishing departement

d. From Workstation departement to finishing departement

The material flow pattern that used from the workstation departement to finishing departement is U-flow (Tompkins, 2010).

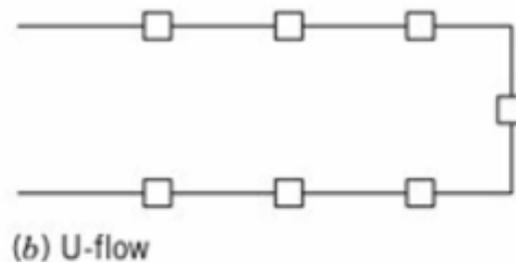


Figure 4. 12 U-flow

The reason why the student use U-flow is because the U-flow is the most effective flow and not wasting the workers movements for the workstation departement to finishing departement.

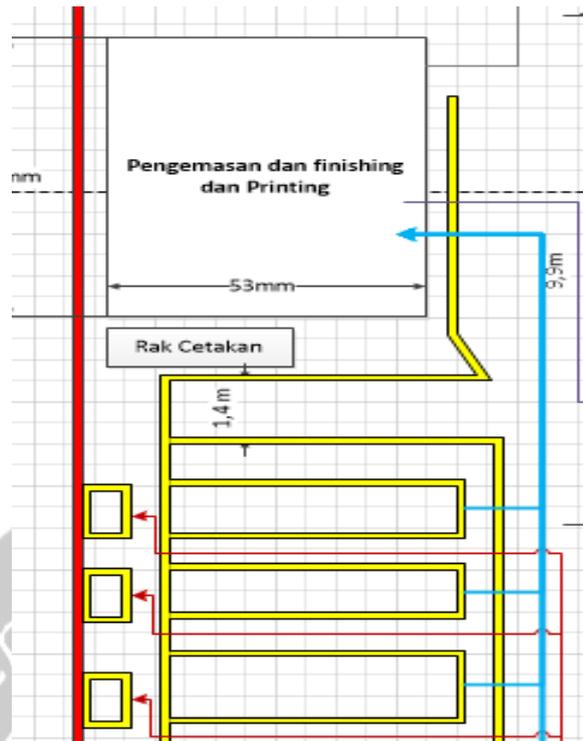
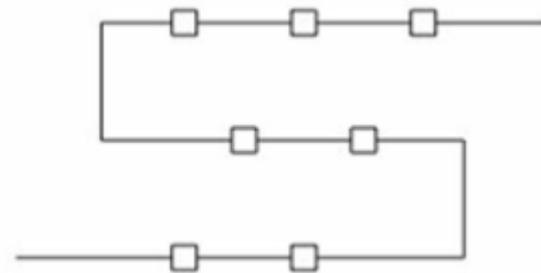


Figure 4. 13 U-Flow of the flow pattern

- e. From workstation departement to crusher departement
 The material flow pattern that used from the workstation departement to crusher departement is S-flow (Tompkins, 2010).



(c) S-flow

Figure 4. 14 S-Flow

The reason why the student design to make it S-flow is because the pattern of those two departement is from left side of the building to the right side of the building. The distance between the departements are 25,3 meter.

CHAPTER 5

CLOSING

Based on the project that finished by the student during the Internship, the observation and measuring is the most important activity during the Internship to finish the project. The first step the student to is designing the current layout of PT. MAPI because it is really helpfully for the student to design the new design layout proposal. Using the material flow pattern method is the best method to design the layout proposal and to decrease the waste of transportation time and energy of the worker. There are some condition during the designing the layout proposal, if it hasn't being accepted by the manager and the director then the student must do the observation and designing again. During the designing there some departement have the same material flow pattern. The student hope that using the material flow pattern, it can be a long term layout. There are some condition during the designing the layout proposal, if it hasn't being accepted by the manager and the director then the student must do the observation and designing again.

After 1 month doing the internship by doing the observation, interview, and designing, the student give some suggestions which is PT. Mega Andalan Plastik Industri (MAPI) need to provide some workplace for the student do the work in the office and to avoid some unwanted mistaken in the new layout proposal, the layout of PT. MAPI need to be publish in a wall so the people can remember the new material flow pattern.

REFERENCES

Tomkins., James A. (2010). Facilities Planning. *John Wiley & Sons, Inc*, 84-96.
<https://bookshelf.vitalsource.com/#/books/9780470574157/cfi/4!/4/2@100:0.00>



APPENDIX

