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INTERNSHIP REPORT
PT. CITRA JAYA HOSINDO



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INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM
FACULTY OF INDUSTRIAL TECHNOLOGY
UNIVERSITAS ATMA JAYA YOGYAKARTA
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2019

APPROVAL

The internship report which is written based on the internship at PT. Citra Jaya Hosindo during the period of January 3, 2019 to February 8, 2019 by:

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**LETTER STATING THE FINISH OF INDUSTRIAL PRACTICE (SURAT
KETERANGAN PELAKSANAAN KERJA PRAKTEK)**

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CHAPTER 1

INTRODUCTION

1.1. Background

Department of Industrial Engineering (PSTI), Faculty of Industrial Technology Universitas Atma Jaya Yogyakarta (PSTI UAJY), commands all students to do technical practice along with the stated curriculum in department. PSTI UAJY sees internship as a media for students to know the environment of work, industry, and also grow, elevate, and innovate the ethnic of professional working, as an Industrial Engineering graduate ahead.

Internship can be said as a professional simulation for Industrial Engineering students. The paradigm is that within technical practice working days, students work in their chosen company. Work, in this statement includes planning, designing, improvement, implementation, and solution. Therefore, in technical practice, the activities done by students are:

- a. Recognizing the scope of the company.
- b. Following the business process continuously of a company.
- c. Doing the assignments given by supervisor or field coach.
- d. Observing the system.
- e. Compiling written report.
- f. Doing technical practice's examination.

Industrial Engineering is a field of study related with planning, designing, improvement, and installation of an integrated system, consists of Man, Machine, Material, Method, Money, Energy, Environment, and Information. In addition, scopes of Industrial Engineer are integrated system between aspects mentioned above (Man, Machine, Material, Method, Money, Energy, Environment, and Information). That means that in doing the responsibilities, Industrial Engineer has to see the activities based on its integrated system's point of view.

Area of competencies for Industrial Engineer are including:

1. Work System Design and Analysis.
2. Production Planning and Controlling.
3. Inventory Management.
4. Quality Control System.
5. Material System.

6. Logistics and Supply Chain Management.
7. Product Design and Improvement.
8. Occupational Health and Safety.
9. Manufacturing Facility Planning.
10. Organizational Management.
11. Cost Analysis.
12. Industrial Feasibility Analysis.
13. CAD/CAM and Process Design, And Others.

1.2. Purpose

Things to be achieved through the implementation of internship are:

- a. Practice self-discipline.
- b. Practice the ability to interact with employees.
- c. Practice the ability to adapt with working environment.
- d. Observe directly the activity of the company in running the production and business.
- e. Complete the theories in college with the real condition in factory.
- f. Enhance the knowledge about production and business system.

1.3. Date and Place

The internship started from January 3, 2019 up to February 8, 2019 in PT. Citra Jaya Hosindo, Pergudangan Nusa Indah Blok A No. 8, 57 – 58, Jurumudi, Tangerang. The performance of this technical practice will be continued with preparation of report, assessment, and also examination of technical practice or internship. The student was placed production department.

CHAPTER 2

GERENAL REVIEW OF THE COMPANY

2.1. History of PT. Citra Jaya Hosindo



Figure 2.1 PT. Citra Jaya Hosindo's Business Card

PT. Citra Jaya Hosindo is a national level company established by Tommy Fransiscus in 2002. From 2002 until now, the company is located in Kawasan Pergudangan Nusa Indah Blok A No. 8, 57 – 58. PT. Citra Jaya Hosindo is a manufacturing company and it manufactures hydraulic fitting. Their customers are mostly from heavy equipment industry, automotive manufacturer, and plastic manufacturer all over Indonesia but they also receive orders from retailers. There are customers from Jakarta, Banten, West Java, Central Java, Sumatra, and Kalimantan.

There is only one shift in the company and the normal working time is from 8 AM to 4 PM. When there are lots of demand or work to do, the office workers will have one hour of overtime (8 AM to 5 PM) while the production plant workers will have maximum of 3 hours overtime (8 AM to 7 PM). On Saturday, the working time is from 8 AM to 2 PM. Break time is one hour from 1 PM to 2 PM. On Friday, break time is from 12.30 PM to 2 PM.

In 2002, PT. Citra Jaya Hosindo manufactured hydraulic fittings and selling imported hydraulic hoses. The company also focuses more on getting the product as fast as possible to the customer to compete with other competitors who needed a long time to fulfill an order. In the beginning of 2018, PT. Citra Jaya Hosindo made their own hose brand named Fransis Hose and the founder designed the hoses characteristics and specifications himself.

2.2. Organizational Structure in PT. Citra Jaya Hosindo

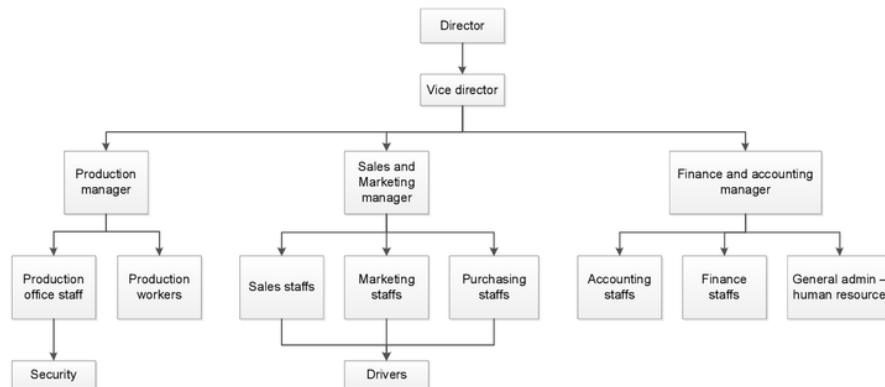


Figure 2.2 Organizational Structure Hierarchy

2.2.1. Director

The Director is the founder (Mr. Fransiscus). The Director is responsible for does overall supervision especially in production plant, supplier sourcing especially for global sourcing, purchase imported products or materials, do forecast demand, and change production schedule depending on urgency from customers.

2.2.2. Vice Director

The Vice Director is responsible for administration tasks. The Vice Director supervises Accounting and Finance Department and is also responsible for imported materials, makes reports on asset value own by the company, and calculate the wages of all employees.

2.2.3. Production Department

In Production Department, there are production manager, production office staff, production workers, product consultant, and security. Production Manager is responsible for making production schedule based on the orders received from the office, in charge of fixing and doing maintenance of the machines, and is responsible for all production process and quality of product, make sure no process goes wrong, and report production condition to the office. Production Manager is responsible for all production workers, product consultant, and security.

Production office staff is responsible for taking orders from the office, compile the daily production data, receive ordered materials, and manage the solid waste (call the buyer who would process the wastes).

Production workers have responsibilities to check the quantity of materials left in stock and they always report the condition of the materials received from supplier to the purchasing staff. In production department, every worker performs quality checking because quality checking is done every time a process is done to the material. Production department also do regular daily checkup of machines before production process starts.

Product consultant knows product specifications than anyone else. The product consultant will visit customers if the customer call and does not know what they need for their machines or if the customer is doing a project and want PT. Citra Jaya Hosindo to be part of the project.

The security's job is to guard the entrance so unauthorized personnel cannot come in. The security reports to the production manager.

2.2.4. Sales and Marketing Department

In Sales and Marketing Department, there are sales and marketing manager, sales staffs, marketing staffs, purchasing staffs, and drivers. The Sales and Marketing Manager supervises sales staffs, marketing staffs, purchasing staffs, and make schedule to where and when the sales staff should go.

The sales and marketing staffs are mostly the ones who receive orders from customer, visit customers to check what the customers need, and check if the customer have any complain. The staffs also keep up to date data on competitors including new competitors, check if there's any price increase or decrease in the market.

Purchasing staffs are the one who orders materials, tools, parts, and other necessary things. Purchasing staffs are also responsible for updating material prices from different suppliers and compare the prices. The purchasing staff will always find the most suitable supplier to match with what the production department needs and do sourcing when needed.

The drivers' job is to take materials from suppliers, deliver finished products to customers, deliver finished products to freight forwarding services, drive the employees when they need to go somewhere (like sales or marketing staffs visiting customer), and drive the director or vice director when they need to go somewhere for business purposes.

2.2.5. Finance and Accounting Department

In Finance and Accounting Department, there are finance and accounting manager, accounting staffs, finance staffs, and general admin. The Finance and Accounting Manager supervises accounting staffs, finance staffs, and general admin, and also manages internal financial circulation.

Finance and accounting staffs have the tasks to handle taxes calculation, make report of income and outcome, do extension of vehicle registration, take care of domicile permission, and pay for BPJS.

General admin is responsible for finance and accounting tasks but also responsible for new employee recruitment when needed.

2.3. Management in PT. Citra Jaya Hosindo

When the production floor is running, several types of products would be made and the manufactured products could change up to five times a day. The quantity of the manufactured product is also not targeted but the workers keep notes on the type of product and the quantity they made in a day.

KERTAS KERJA HARIAN					
Nama Mesin		Tanggal			
No.		Keterangan	Jumlah	Keterangan	Jumlah
1	AS 38	P. 265	32	PA	08:00
2	Bagi 28	P. 158	100	PA	15
3	AS 68	P. 163	10	PA	24

Figure 2.3 Daily Production Report

2.3.1. Motto

PT. Citra Jaya Hosindo has a motto of not being idle when it is working time. PT. Citra Jaya Hosindo prioritizes speed and efficiency more than quality of the product. The workers in the production plant would always have things to work on, there would be no one who is idle (continuous flow). some workers can operate several machines so they can move between machines, depending on the

situation. The cutting tools for each machine (including CNC) are also fixed to reduce setup time.

Not only in the production floor, drivers that do not have any delivery schedule would go to the production floor and help around. Some financial and accounting staffs will go and help sales and marketing staffs when they have finished their works or when the sales and marketing department is really busy with orders.

2.3.2. Product Marketing

For the company's products to reach the customers, the company have 11 vehicles. Five cars including pickup trucks and box trucks and seven and six motors. For customers in Tangerang and Jakarta region, the company deliver the products on their own directly to the customer. For customers outside those regions mentioned before, the company uses ground, water, or air freight forwarding service.

To promote the company itself, the company sometimes participate in industrial exhibitions. Other times, PT. Citra Jaya Hosindo would do a customer visit to customer outside of Java Island.

CHAPTER 3

SYSTEM REVIEW OF PT. CITRA JAYA HOSINDO

3.1. Business Process

PT. Citra Jaya Hosindo has a made-to-order system. The company planned the production schedule based on the orders they get.

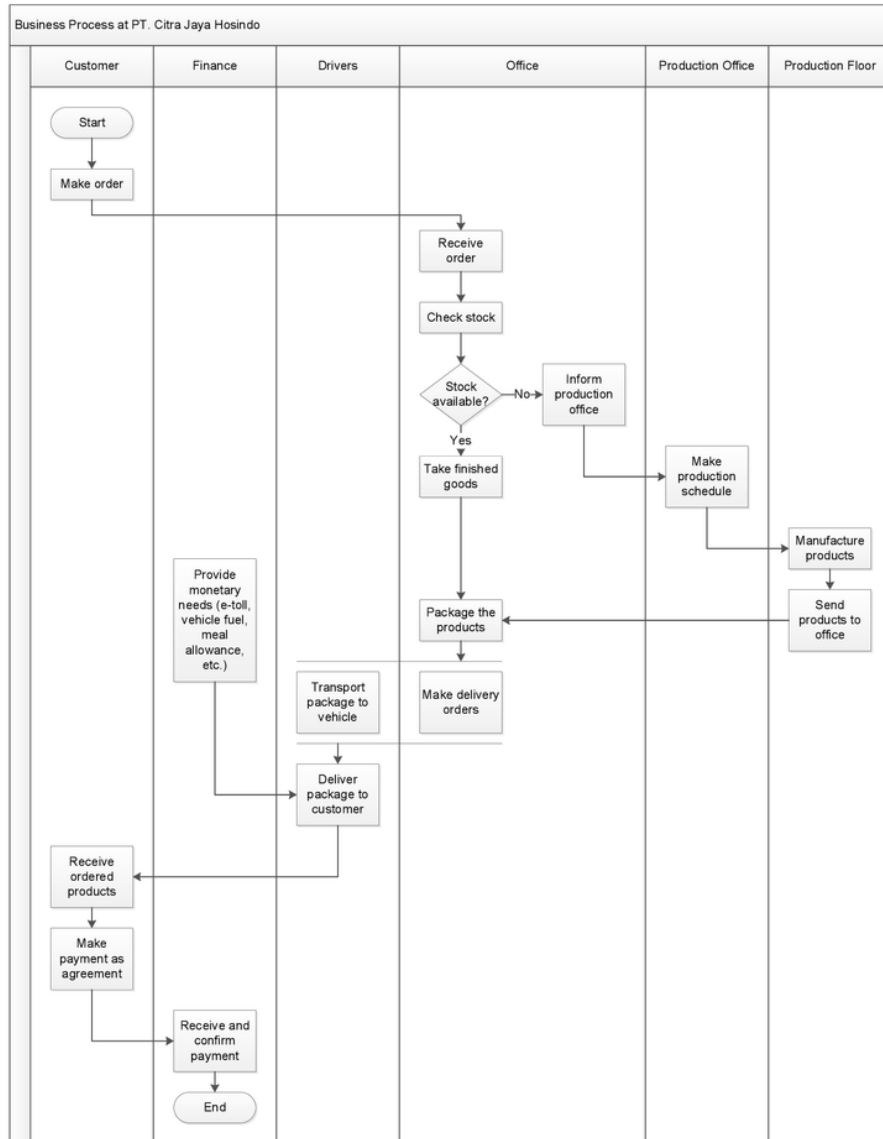


Figure 3.1 Business Process Flowchart

The production schedule is decided by the production manager. The production workers all work based on what the production manager told them to make. The finished product would be sent to the office and the sales and marketing staffs would pack and sometimes assemble the products and gave the packages to the drivers. Sales and marketing staffs would report to the director on what finished products arrived and the quantity. They would make delivery orders too for the drivers to take with them when delivering.

Payment from customers are received several months after orders are fulfilled, depending on the agreement with each customer. The financial and accounting department would check the payment on due time. Payment from the company to suppliers are also done in several months based on agreements with each supplier. Payment is done by the financial and accounting department and vice director.

For purchasing activity, the staff would only purchase when there is a report from the production manager about the need for material replenishments. Sometimes the director would also check the materials and told the purchasing staff to order when necessary. Whenever there is an increase in price of materials, the purchasing staff would report to the director and discuss the quantity that would be ordered. Purchasing staff is also the one who makes complaints if the materials received from suppliers are in bad conditions.

3.2. Finished Goods

PT. Citra Jaya Hosindo manufactures thousands of types of hydraulic fitting but they do not need a book catalogue for the products because hydraulic fittings are specific items with many different sizes and specifications depending on the hose's type, machine type, and how the customer wants to connect the hose to the machine. So, the customers do not need book catalogue from the company, they already know what hydraulic fittings they need to order. Generally, there are two types of hydraulic fittings, common hydraulic fittings and uncommon hydraulic fittings. Common hydraulic fittings are fittings that almost every hydraulic machine need while uncommon hydraulic fittings can include special order, like custom specification, from the customer. Here are some of the product the company manufactured and displayed as samples in the office.



Figure 3.2 Some Samples of PT. Citra Jaya Hosindo's Finished Goods

For their own brand of hydraulic hose, the company made their own book catalogue. The catalogue also has a list of pricing based on the specifications of the hose.

3.3. Production Process

Below is the production process flowchart.

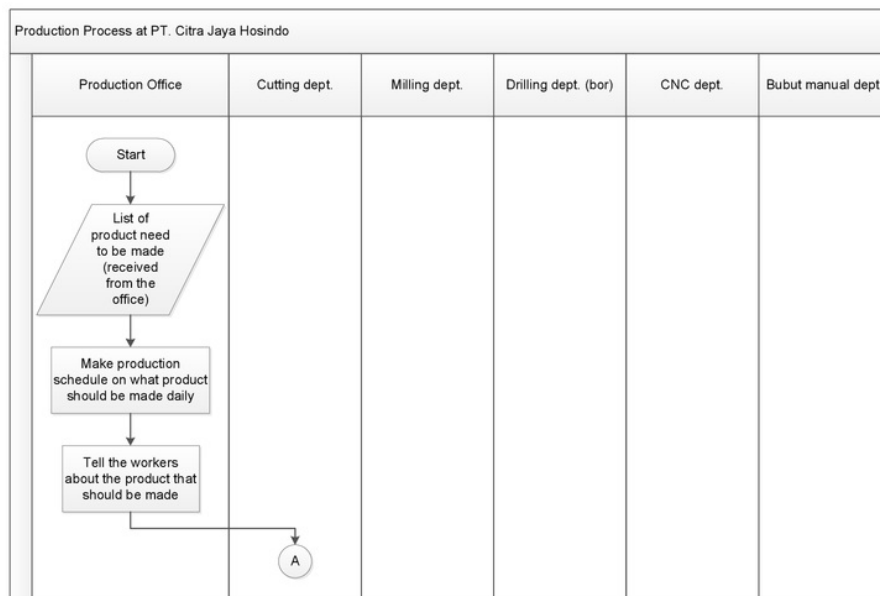


Figure 3.3 Production Flowchart

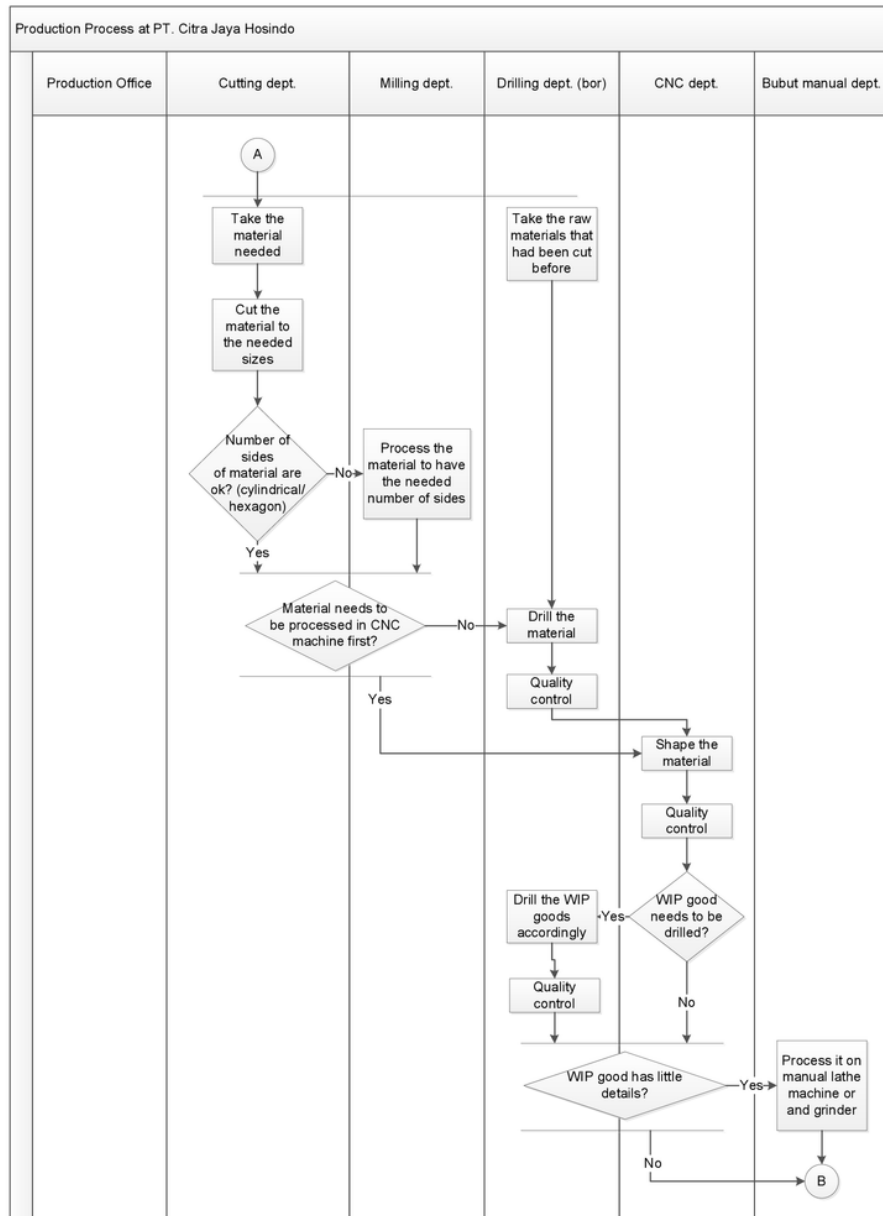


Figure 3.4 Production Flowchart (2)

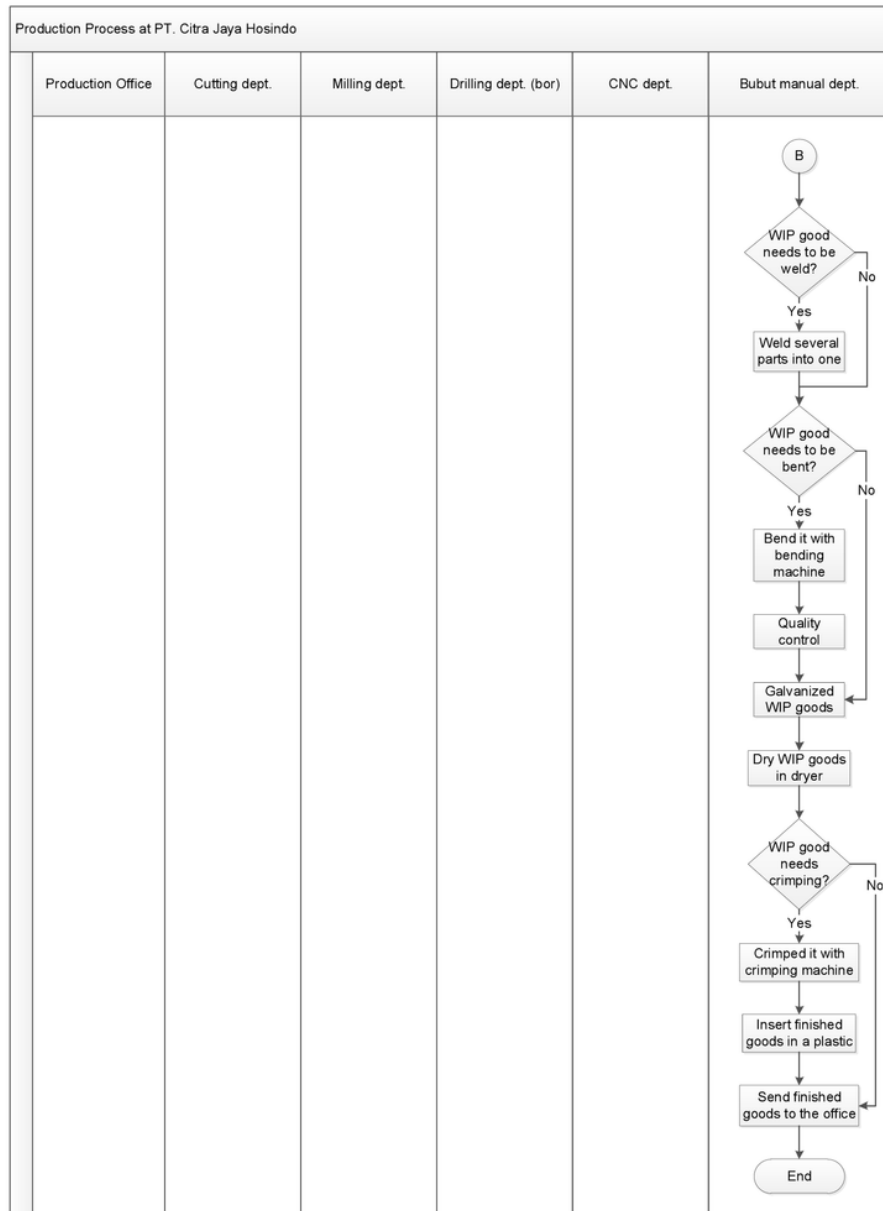


Figure 3.5 Production Flowchart (3)

The flow of production process depends on the type of product made. Products that use materials with big diameter would be processed in vertical drill machines first before processed in CNC machines. Products that use materials with small

diameter would be processed in the CNC machine first before being processed in vertical drill machines to reduce defect from errors done by workers.

The decision to process the WIP (work in progress) goods using manual lathe machine after being processed in the CNC depends on the design of the product being made. Some products need small draft at its tip. The draft is made using manual lathe machine to reduce setup time of changing the cutting tools in CNC machines.

Grinding tool is used when the product has rough surface either because the raw material had a rough surface, a little rust, or because the surface became rough after being processed by machines. Welding tool is used when making products that have several branches (T-shapes, XYZ axis-shape, 90°-shape, and others). Depending on the design, products with angles are bent with a bending machine.

Assembly is done when a hydraulic fitting is completed with a nut (metric hydraulic fitting). Metric hydraulic fittings need to be crimped with a crimping machine when the customer asked for it.

3.4. Production Facility

In the production floor there are rooms for CNC machines, bending machines, crimping machines, and coating machines. The rest of the machines are put in an open space. The most important tools in production tools in production floor are rulers, tape measure, vernier caliper, and arc ruler because almost all quality control involves the checking of dimensions.

There are storages for hydraulic hose and semi-finished goods for crimping (stocked in the same room as the crimping machines). Raw materials are put in an open space in the production floor. Finished goods are put in an open space near the office and shipping area.

The company uses bought and self-made hand trollies for material handling. Self-made hand trollies are used to move WIP goods and finished goods. Bought hand trollies are used to move heavy things other than materials (oil drums, gas).



Figure 3.6 Cutting Machines



Figure 3.7 Vertical Drilling Machines



Figure 3.8 CNC Room



Figure 3.9 CNC Room (2)



Figure 3.10 Manual Lathe Machines



Figure 3.11 Grinder



Figure 3.12 Welding Tool



Figure 3.13 Bending Machines



Figure 3.14 Manual Bending Tool



Figure 3.15 Nut Crimping Machine



Figure 3.16 Hose Crimping Machine



Figure 3.17 Coating Machine



Figure 3.18 Drying Oven



Figure 3.19 Roll Spring Machine



Figure 3.20 Raw materials



Figure 3.21 Semi-Finished Goods Stock



Figure 3.22 Finished Goods



Figure 3.23 Self-Made Hand Trolley



Figure 3.24 Bought Hand Trolley

Facilities that the company provides are rooms (mess) for workers that live far away, toilets in office and production floor, and dining room where office workers would eat (production workers usually buy food and eat outside since there are many food sellers around the factory). The office and CNC room are provided with air conditioners. Throughout the production floor there are exhaust fans and circular ceiling ventilators. The company also provides the workers with masks, boots, safety shoes, safety glasses, gloves, and first aid kits.

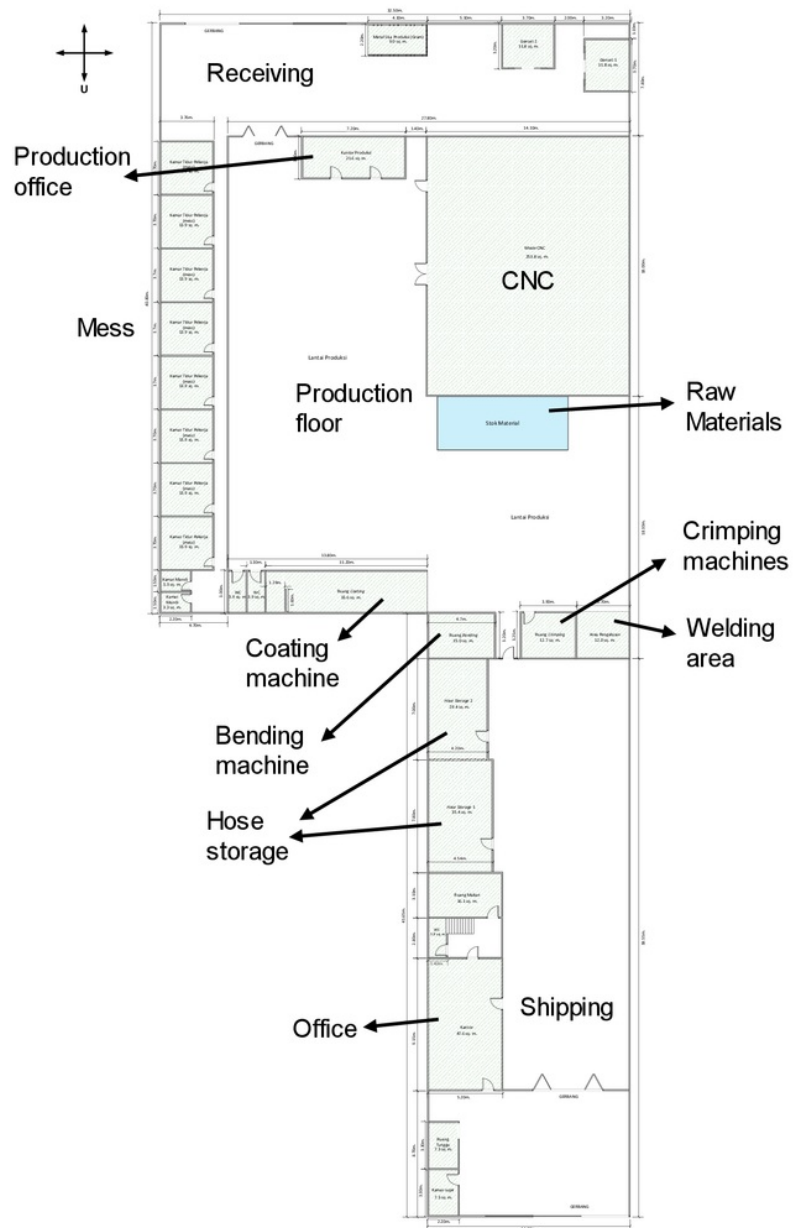


Figure 3.25 Factory Layout

CHAPTER 4

REVIEW OF STUDENT'S WORKS

4.1. Working Scope

The supervisor gave several tasks to be done. The scope was almost all about the activities in production floor but some activities in the office were included too. The student mostly worked alone unless the supervisor told the student to work with another employee.

4.2. Responsibility and Authority

Several tasks that were given by the supervisor were to:

- a. Make the factory layout (including the office)
Making the layout of the whole place and the whole building with measurements and areas.
- b. Make machine layout
Identify where the machines are in the company and give information such as brand and models of the machines.
- c. Make production flowchart (simple and engineering flowchart)
Simple production flowchart is the production process only. Engineering production flowchart is from when the production office received orders from the office until the product was sent to customer.
- d. Take data of valuable inventories
Inventories that were needed to be counted were valuables like air conditioners, tables, chairs, CCTV cameras, computers, telephones, cupboards, and others of sorts. The student decided what inventory should be included but the student also confirmed the type of inventory to the supervisor.
- e. Help with collecting data of machines owned by the company
Data of serial numbers and the year the company bought the machines. To collect the data, the student was paired with one of the financial staffs.
- f. Observe, analyze, and suggest improvement on the production floor
Safety and Health improvement suggestion in production floor.
- g. Visit PT. Citra Jaya Hosindo's customer
Visitation to a customer to do some measurement and control on hydraulic hose and fittings.

For doing these tasks, several permissions were given to student. Those permissions were to be able to observe production floor, to take pictures, to interrupt the workers or other employees briefly when the student had something to ask, and to look at any documents on paper, except for financial and accounting documents. The student was not allowed to open the documents in any of the company's computers.

4.3. Methodology Used

Methods used in doing the given tasks were mostly observation on the spot. The students would also ask questions to the supervisor or employees and workers. After every task, the end result would always be given to the supervisor for revisions or confirmation that it was already okay.

4.3.1. Making of Factory Layout

First, a rough drawing was made by walking around the whole factory and building. Then measurements of all rooms and spaces in the building were taken with a laser distance meter. To make the layout digitally, Microsoft Visio was used. The scale of the drawing was one-centimeter equals to one meter in real life. Information available in the layout were room names, room dimensions, room area, total land area, and total building area. Finally, the pdf-file of the layout was sent to the supervisor's email and revisions or confirmation would be given by the supervisor. After every revision, the tasks would be sent again to the supervisor until it was approved.

4.3.2. Making of Machine Layout

First, a draft drawing was made. It contained the position of the machines, the quantity of every type of machine, model and brand of the machines, including genset. It was made by walking around and observing the production floor. The machine layout was made digitally using Microsoft Visio, using the factory layout file as base. Different symbols were used for different machines. The information available in the machine layout was the type, brand and model of the machines, and their locations. After it was finished, the pdf-file of the layout was sent to the supervisor and revisions or confirmation would be given.

4.3.3. Making of Production Flowchart

To make the production flowchart, the student used the information explained by the supervisor, observation in production floor, and information from the production manager and or production workers. The production flowcharts were made digitally using Microsoft Visio. The engineering production flowchart had detailed production processes. The simple production flowchart was not detailed but it mentioned the wastes of the process done. The simple production process was drawn first on a piece of paper. After some revisions and the supervisor confirmed it, the student made the flowcharts. The simple flowchart was sent to the supervisor in jpg-form and the engineering flowchart was sent in pdf-file. The supervisor then gave revisions and confirmation.

4.3.4. Taking Valuable Inventory Data

The task given was to make a simple inventory data. To make it, every room and area were visited in order to count the number of inventories the company had at the time. After counting and taking notes, the data was made into a Microsoft Excel file and was sent to the supervisor.

4.3.5. Collecting Machine Data

Every machine's serial number were looked at and the numbers were noted down. For every machine, the year of purchased was checked with the company's purchasing documents. The machines' information was checked with the information in the company's yearly asset tax. The machines' information was to be put in the machine layout so the machine layout was revised and sent to the supervisor for revisions and confirmation.

4.3.6. Safety and Health Improvement Suggestion in Production Floor

For safety and health improvement, there were many aspects that could be considered. International Labour Organization (2013) categorized safety and health hazard into four categories based on its effect on the victim.

Kategori A	Kategori B	Kategori C	Kategori D
Potensi bahaya yang menimbulkan risiko dampak jangka panjang pada kesehatan	Potensi bahaya yang menimbulkan risiko langsung pada keselamatan	Risiko terhadap kesejahteraan atau kesehatan sehari-hari	Potensi bahaya yang menimbulkan risiko pribadi dan psikologis
Bahaya factor kimia (debu, uap logam, uap) Bahaya faktor biologi (penyakit dan gangguan oleh virus, bakteri, binatang dsb.) Bahaya faktor fisik (bising, penerangan, getaran, iklim kerja, jatuh) Cara bekerja dan bahaya factor ergonomis (posisi bangku kerja, pekerjaan berulang-ulang, jam kerja yang lama) Potensi bahaya lingkungan yang disebabkan oleh polusi pada perusahaan di masyarakat	Kebakaran Listrik Potensi bahaya Mekanikal (tidak adanya pelindung mesin) House keeping (perawatan buruk pada peralatan)	Air Minum Toilet dan fasilitas mencuci Ruang makan atau Kantin P3K di tempat kerja Transportasi	Pelecehan, termasuk intimidasi dan pelecehan seksual Terinfeksi HIV/AIDS Kekerasan di tempat kerja Stress Narkoba di tempat kerja

Figure 4.1 Four Categories of Occupational Safety and Health Hazard

Safety and health aspects that were considered were all categories, except for category D. Category A, B, and C were based on observation and interview. Category D was not considered because of the evaluator's lack of authority and knowledge on how to improve psychological condition in the company.

First, the factors that might cause injury were identified. In category A, there are hazards that affect health:

a. Chemical hazard

Chemicals used in PT. Citra Jaya Hosindo are hydraulic oil, cutting oil, Helios A, Helios B, Nitric acid, and HCl (Hydrochloric acid). Hydraulic oil is not exposed to workers. Cutting oil is exposed to workers because almost every machine uses cutting oil. The cutting oil is soluble cutting oil and it is safe for human. There had never been complaints from workers about skin irritation and breathing problems. Helios A, Helios B, Nitric acid, and HCl were used in coating process and were exposed to the workers operating the coating machine. The concentration of Nitric acid is 68% and the concentration of HCl is 32%. All chemicals for coating process are not good when exposed directly to the skin. Workers operating the coating machine have masks, boots, and gloves. There is a little bit of dust when grinder is used. There are solid wastes from processing the material from almost every machine.



Figure 4.2 Hydraulic Oil and Cutting Oil Drums

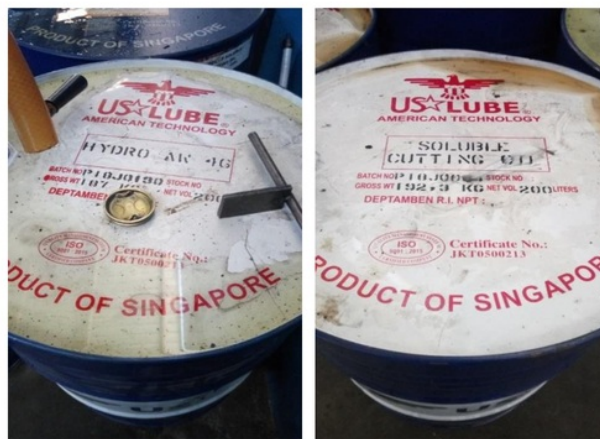


Figure 4.3 Hydraulic Oil and Cutting Oil Drums (2)

b. Biological hazard

Biological hazard from bacteria and virus from animals are not present since there are no animals in and nearby the facility. There are few mosquitoes but there had never been a report about employees getting dengue fever from PT. Citra Jaya Hosindo facilities. Virus and bacteria could be transmitted from human interaction, for example sickness like flu and cold. Employees who are sick badly would take day offs and employees who can still work would use masks so they would not transmit their illness (virus or bacteria) to the other employees.

c. Physical hazard

There are loud noises from machinery and hand trolleys. There was no proper tool to measure the decibel of the noise but the rule of thumb is that the noise might be more than 85 dB if people had communication difficulties when in the

noisy area (International Labour Organization, 2013). Limit of noise exposure is 85 dB for 8 hours. If workers hear 85 dB of noise for more than 8 hours, it could damage their hearing ability in the long run. In PT. Citra Jaya Hosindo, the workers needed to talk rather loudly so they could hear one another but talking to one another was not difficult despite the loud noise so it is possible that the noise exposure in the production floor was below 85 dB.

For lighting in the company, there are many lamps and natural light from the sun could come through from the ceiling. The workers see normally without having to squint their eyes or bowing down to see an object. There are no vibration and falling hazard. Workers are not exposed to vibrations and high places. For heat and temperature hazard, the company has many air ventilations and good air circulation. The temperature in production floor is not hot. It is also not too moist and not too dry. There are no signs off mold growing on the walls and there is no problem with dry skin or breathing problem (when it is dry). There is heat from welding machine but there is no vapor or metal vapor. When using welding tool, the workers has eye protection mask or glasses.



Figure 4.4 Lighting in Production Floor

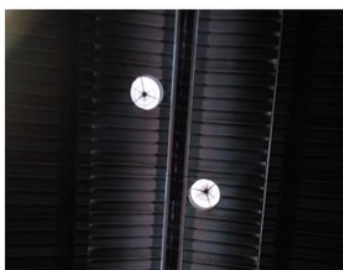


Figure 4.5 Ceiling Exhaust Fan

d. Ergonomics hazard

Almost all workers stand up for a long time. Most tools needed as a helping tool are near the workers and can be reached without walking. Workers would sit on a small chair when doing welding or grinding. Workers doing nut crimping process would sit. Workers doing hose crimping process would stand and bow while crimping the hoses. Some workers can operate more than one machine and can do more than one process and some workers would do repetitive tasks. The works are repetitive but there are several activities in one cycle of repetition and the order of activities in once cycle is not always the same. Most tasks do not have heavy load but the activity that has heavy load is the coating activity where the workers in charge need to lift the products in a basket to galvanize it and lift it in and out of the dryer. The weight can be more than five kilograms depending on the quantity of products galvanized. Activity that had awkward position was when worker need to use hose crimping machine. The workers do his task by bowing down and leaning to the wall.



Figure 4.6 Operators Postures: Cutting Machine



Figure 4.7 Operators Postures: Drilling Machine



Figure 4.8 Operators Postures: CNC Lathe Machine



Figure 4.9 Operators Postures: Milling Machine



Figure 4.10 Operators Postures: Manual Lathe Machine



Figure 4.11 Operators Postures: Welding



Figure 4.12 Operators Postures: Grinding Machine

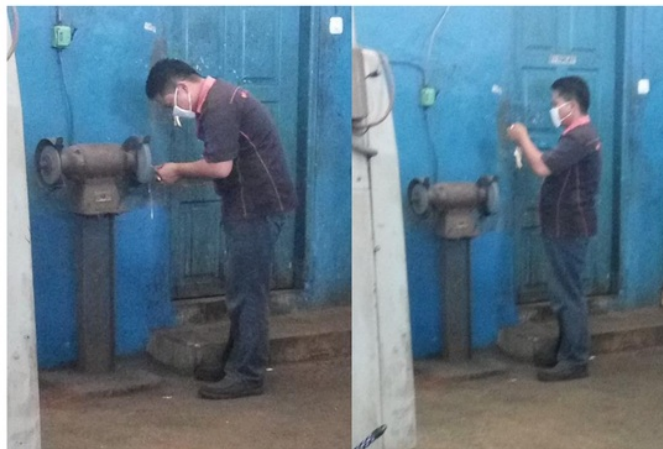


Figure 4.13 Operators Postures: Grinding Machine (2)



Figure 4.14 Operators Postures: Heating Before Bending



Figure 4.15 Operators Postures: Bending Machine



Figure 4.16 Operators Postures: Manual Bending



Figure 4.17 Operators Postures: Hose Crimping Machine



Figure 4.18 Operators Postures: Nut Crimping Machine



Figure 4.19 Operators Postures: Coating Machine



Figure 4.20 Operators Postures: Galvanization



Figure 4.21 Operators Postures: Dryer



Figure 4.22 Operators Postures: Roll Spring Machine

e. Pollution hazard to the society

PT. Citra Jaya Hosindo is located in a warehousing and industrial area. There is no pollution hazard to the society. The metal solid wastes from the company are sold to another company that processes metal scraps. Chemical waste is stored and sent to company that processes toxic and hazardous materials.



Figure 4.23 Solid Waste



Figure 4.24 Chemical Waste

In category B, there are hazards that affect safety:

a. Fire hazard

Flammable things in the production plant are the chemical liquid (hydraulic oil and cutting oil), gas for welding, and papers. Hydraulic oil and cutting oil are flammable but their burning point are really high so it is unlikely for them to catch on fire and there is no flammable warning in the oil containers. As for HCl, the solution itself is not combustible but when it interacts with metal, hydrogen gas would be produced and it is combustible (Japan Soda Industry Association, 2006). Nitric acid is also not combustible (Dulux Safety Data

Sheet, 2015). There are two big size exhaust fans on the wall in the coating room.

Fire source in production plant is welding tools. There are four fire extinguishers in production plant. One fire extinguisher was near cutting and welding area. One fire extinguisher was near the production office, electrical circuit, and CNC room. Another one was near the back (south) gate and near the genset. The fire extinguisher near production office, electrical circuit, and CNC room needs to be replaced because its gauge was on the red color (instead of green).



Figure 4.25 Fire Extinguishers



Figure 4.26 Exhaust Fan in Coating Room

b. Electrical hazard

Main electrical switches are placed in a corner where not many activities are present. Cables for machinery and tools are in good condition and are organized so that the cables stick to the walls, reducing risk of tripping.



Figure 4.27 Electrical Circuits

c. Mechanical hazard

Tools used in the production floor are not dangerous and they are common tools so the possibility of using the tools incorrectly is low. The tools are Vernier caliper, arc ruler, ruler, tape measure, and various sizes of steel stick. The tools condition is still good and the workers had no problem in using them.

d. Housekeeping hazard

All machines in production plant have enough room and spaces for workers to move freely. Machines are checked every day before starting production and maintained every week or every time the worker suspects there is something wrong with the machine. The floor is swept every day and every time the solid waste began to pile up. Tools to help process the material in every machine are not that many and it can be put around the machine. The tools placement is not messy and it will not be lost because each worker is responsible for their own tools. There are designated places for production wastes. Doors are free from obstacle. Storages is sorted nicely, there are labels and colors to distinguish different products. Chemicals have labels and are put far away from fire source.

In category C, there are hazards that affect the fulfilment of basic needs :

a. Availability of drinking water

There is one dispenser in the middle of production floor. When the water runs empty, the workers will take water galloon which is stored near the parking lot. The workers bring their water bottle to the production floor, the workers can drink and refill anytime they want.



Figure 4.28 Drinking Water in Production Floor

b. Availability of toilet and washing station

There are two toilets in the production floor. The toilets can also be a washing station. Another washing station is for coating process.

c. Availability of dining room or canteen

Dining room is only available for office workers. There is no dining room or canteen for production floor workers. Workers usually buy and eat food in food stores near the facility.

d. Availability of first aid

There are one set of first aid box located in the office. The medications are always filled again or changed to new ones when it is about to run out or already expired.

e. Availability of transportation

PT. Citra Jaya Hosindo does not have company transportation for employees. All their workers live around the area and the company provide a mess for workers who live faraway.

4.3.7. Visitation to One of PT. Citra Jaya Hosindo's Customer

There were two visitations, on January 30, 2019 and January 31, 2019. The visitations were to the same customer but different factory locations. Before entering the factory, the product consultant needed to report to the receptionist to call for the PIC (person in charge). The product consultant and the student then needed to leave their phones behind in the receptionist and the receptionist gave safety hats. Bags were allowed to be brought. The PIC then took the product consultant and the student to the factory.

On January 30, 2019, a customer located in an industrial area in Cikarang was visited. In the past, the product consultant of PT. Citra Jaya Hosindo participated in the project and designed what hydraulic hoses to use and how long it was needed, along with the hydraulic fittings. The visitation was to see the condition of the hydraulic hoses and fittings the customer ordered. On the visitation, field observation was done on the location of the new machine. The hydraulic hoses conditions were observed along with the environment around the machine and the hydraulic hoses conditions concerning with the movement of the machines. The personnel in charge of the project from the customer side was also there to explain how the machine was doing and what can be improved from the hydraulic hose and fitting aspect. After discussing about the project, the head of production plant also consulted about hydraulic hose change for another machine.

On January 31, 2019, the product consultant had an appointment to do some measurements on hydraulic hose and fitting for a customer in an industrial area in Karawang. The customer had a new project to change some hydraulic hose on machines of the same type into hydraulic pipe. There was already a sample of hydraulic pipe used on one machine. The customer wanted PT. Citra Jaya Hosindo to provide hydraulic pipes and fittings. The student helped the product consultant to measure the pipes samples. The product consultant also discussed the hydraulic fittings for the pipes. Tools for measuring that were used were vernier caliper and tape measure.

The customer also had a problem with several machines of the same type. The customer noticed that the usage of oil for the machine had been higher and profligate recently and there was a possibility of oil leakage from the hydraulic hose or fitting and since it had been a long time since they changed the hydraulic hose and some of the hydraulic hoses looked worn out, the customer decided to change

the hydraulic hoses of the machines. The product consultant then measured the diameter and length of the hydraulic hose, as well as, the suited hydraulic fittings if the customer wanted to change it. The student helped in taking notes of the product codes needed.

4.4. Working Results

The following results are the approved results that were sent to the supervisor at the time and were already approved.

4.4.1. Result of Factory Layout

The factory layout was made into four parts. The first layout was basic factory layout which stated the room or area names with their area in meter squares. The second factory layout had the info of the total land area of the factory. The land area was divided into three parts, following the division in PBB (Pajak Bumi dan Bangunan). The third part was the total of building area. The last part was the building area that were divided into several categories like offices, parking lot, storage, and others. The basic factory layout was then used to make machine layout.



Figure 4.30 Factory Layout: Total Land Area

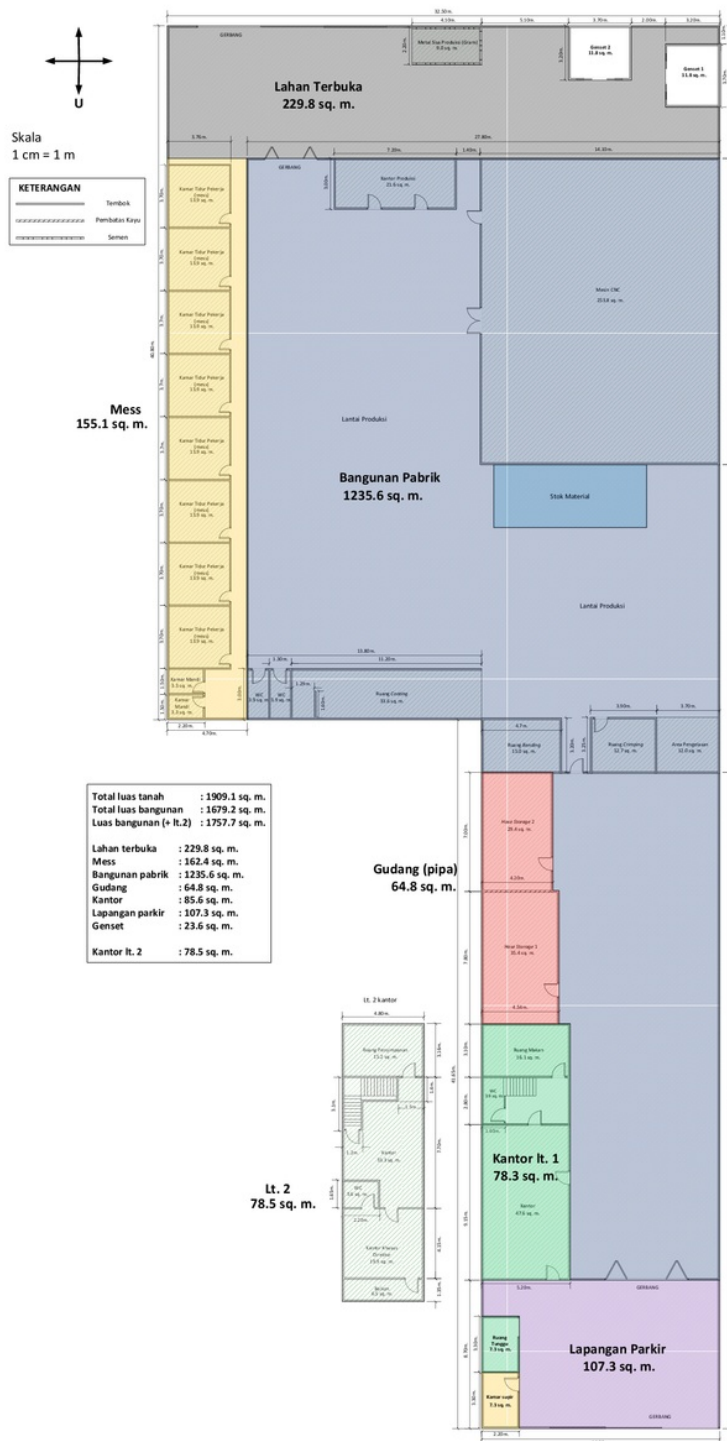


Figure 4.32 Factory Layout: Area Classifications

4.4.2. Result of Machine Layout

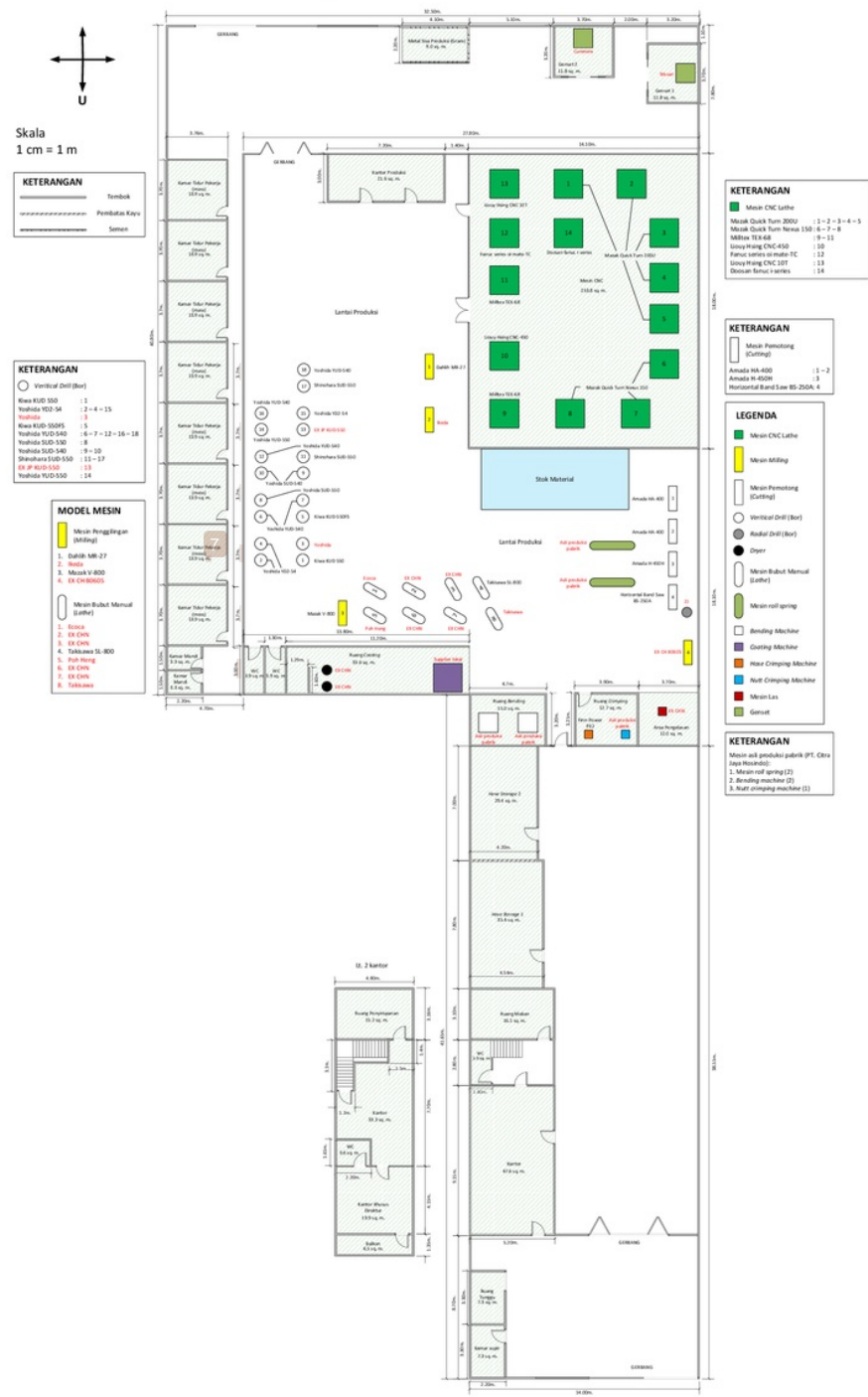


Figure 4.33 Machine Layout

4.4.3. Result of Production Flowchart

Below is engineering production flowchart, starting from receiving order to delivery.

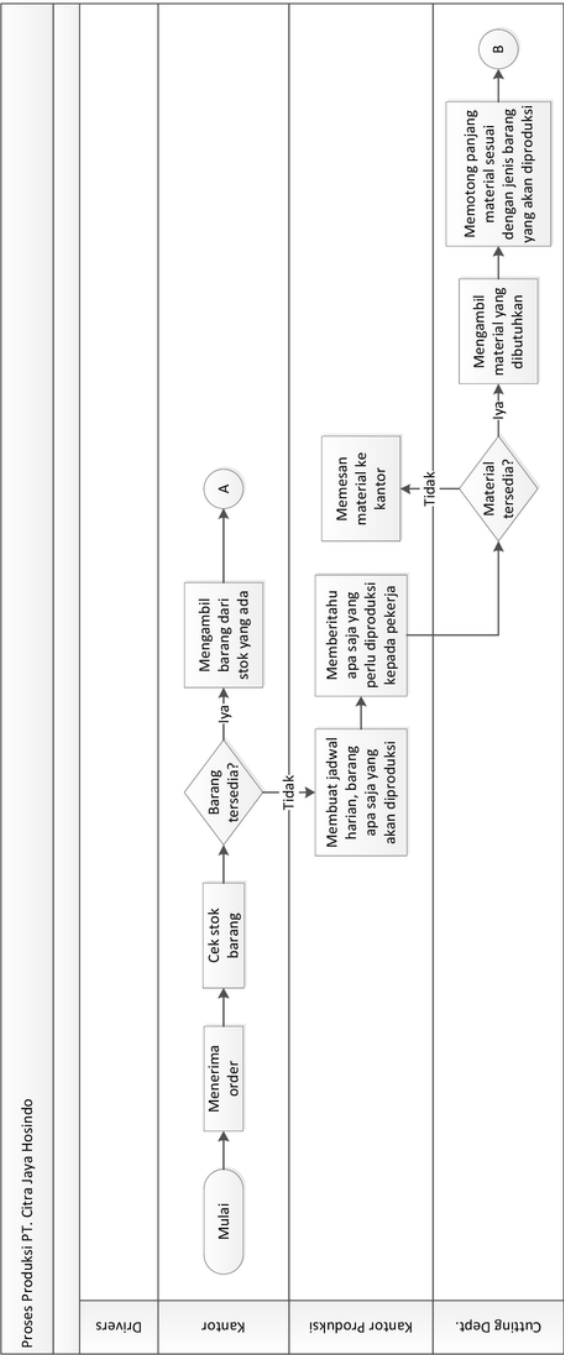


Figure 4.34 Engineering Production Flowchart

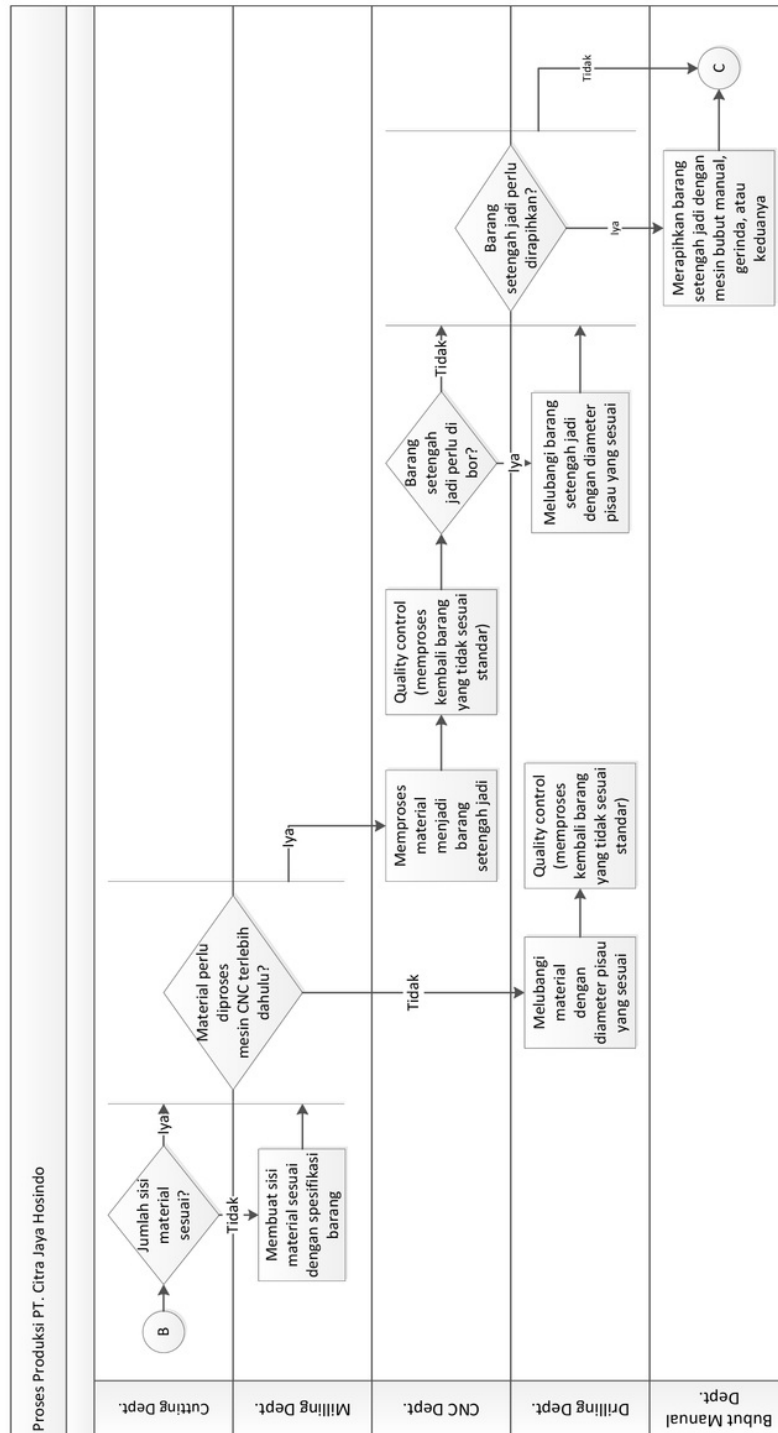


Figure 4.35 Engineering Production Flowchart (2)

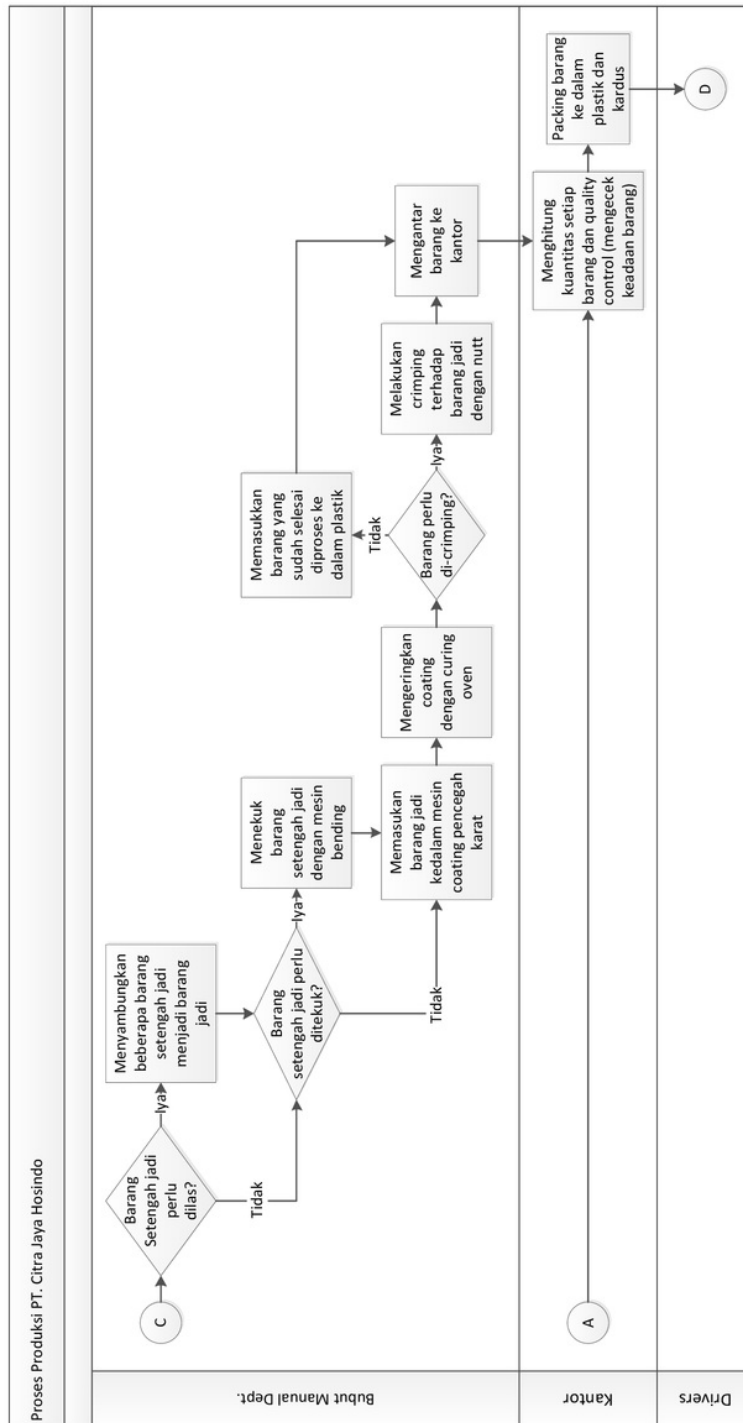


Figure 4.36 Engineering Production Flowchart (3)



Figure 4.37 Engineering Production Flowchart (4)

For the simple production flowchart, there is only one flow. It starts from the raw material until packaging. Beside the flow of production, there are information about the wastes produced in every process.



Figure 4.38 Simple Production Flowchart

4.4.4. Result of Valuable Inventory Data

There are 18 inventories and their quantities are mentioned.

Table 4.1 Valuable Inventory Data

No.	Nama Barang	Jumlah	Keterangan
1	Mesin absen	2	
2	Komputer	8	
3	Telepon	13	
4	Kursi beroda	18	
5	Meja kantor	11	
6	Lemari besar	4	
7	Lemari kecil	7	
8	Rak display	2	
9	Printer	5	
10	Mesin fax	2	
11	AC	16	
12	Meja kecil berlaci	1	
13	Sofa	2	
14	Kursi tidak beroda	4	
15	Meja makan	1	
16	Dispenser	3	
17	Microwave	1	
18	CCTV	13	

4.4.5. Result of Collected Machine Data

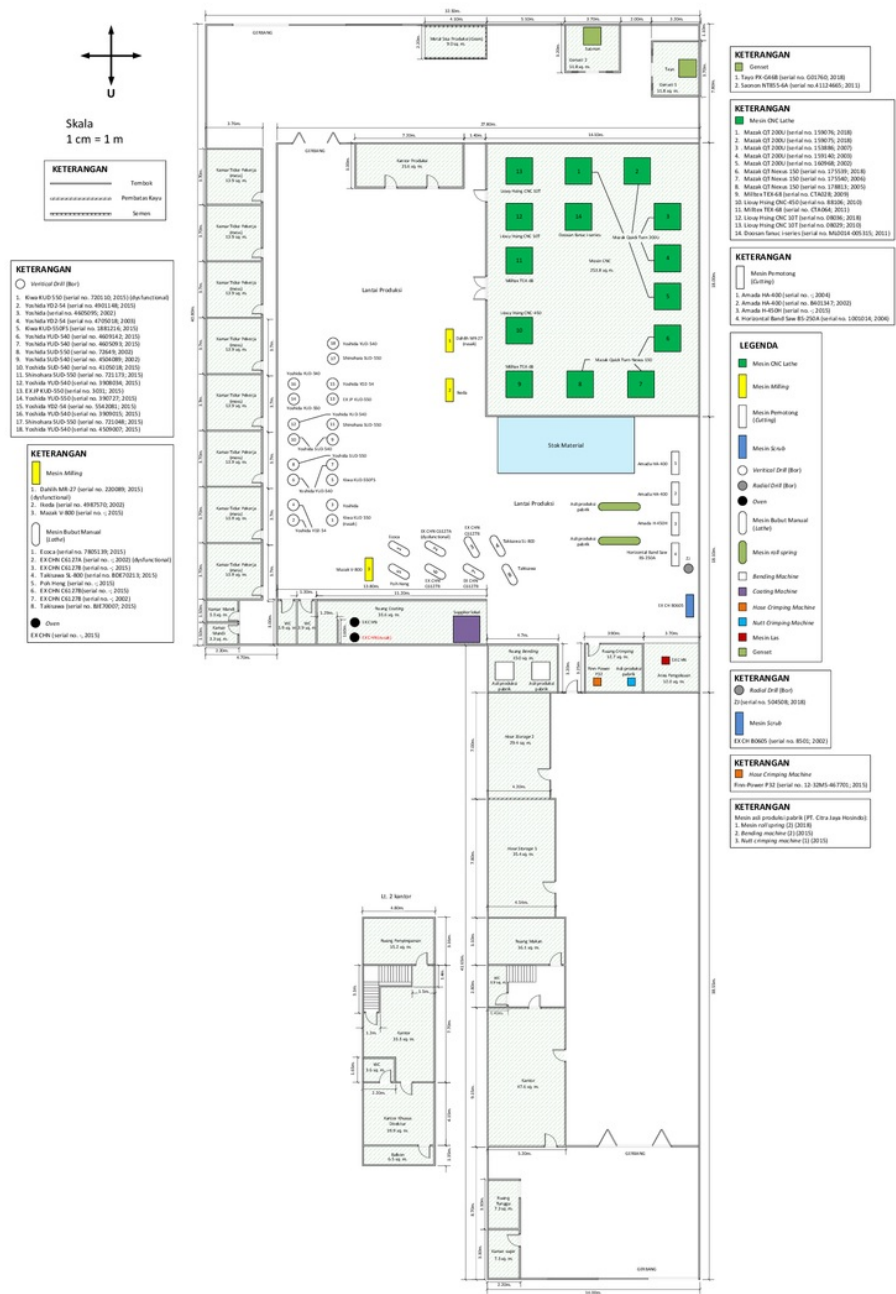


Figure 4.39 Improved Machine Layout (with Machine Information)

4.4.6. Suggested Improvement in Production Floor

In category A of occupational health and safety hazard, there needs to be improvement on physical and ergonomics hazard. In physical hazard, here are some improvements suggestions to reduce the noise or the effect of the noise to the workers. The noise became really loud when the hand trolley was used. It produced loud noises because the wheels were already shaved off and needed to be replaced so changing the wheels regularly was suggested. Also, because the hand trolley would carry materials like carbon steel, brass, stainless steel, and others, it would still produce noise, it is suggested to use a rubber mat at the base of the hand trolley or put the usual basket for material handling on top of the trolley (this had been done but only on one hand trolley) to reduce the noise by reducing the vibrations.



Figure 4.40 Baskets to be Put on Hand Trolley

For ergonomics hazard, the workers in charge of galvanizing the product needs to do galvanization many times in a day. Usually the workers fill the basket full, finish galvanizing and dry the products in one cycle of process. In these processes the workers strain their musculoskeletal system. To lighten the load on their muscles, bones or nerves, it is suggested that the workers would only fill the products until it is heavy enough for the workers and the workers would not need to carry more than they are capable of and not strain their musculoskeletal system and do galvanization process several times more than usual.

For workers using hose crimping machine, it would be better to put a chair so the worker could sit while doing the task and reduce load on the upper body part, like the chair used when using nut crimping machine.

In category B of occupational health and safety hazard, there needs to be improvement on fire hazard. Suggested improvement was to check expiry date (if the info is present) of fire extinguishers and note them down in the whiteboard of the office, to know when replacements need to be done. If there is no expiry date, the fire extinguishers gauge needs to be checked monthly. A sign that points out the location of a fire extinguisher is also needed so anyone can know where to take a fire extinguisher when needed.

Vendor/Brand	NO. PART	STNK	KIR
1. CARRY BOX	B 0084 CL		
2. HINDO BAK	B 9983 VC	03 Apr 2019	20 Mar 2019
3. HINDO BOX	B 9985 CCQ	31 Jan 2020	9 Feb 2019
4. XE MIA	B 1766 CVI	31 Mei 2018	✓
5. INDOGA	B 1776 CKH	28 Feb 2019	
6.			
7. LEXUS	B 1011 TR	9 Juli 2018	✓
8. DEVO 100	B 6711 P32	10 Mar 2019	
9. DEVO 110	B 6602 CPD	1 Okt 2019	✓
10. DEVO 110	B 3981 B1B	14 Okt 2019	✓
11. DUPSA FIT	B 6485 BCB	13 Mei 2019	
12. SUPRA X	B 3809 BUA	5 Juli 2019	✓
13. MINIBUG	B 3846 BMD	14 Mei 2019	

Handwritten notes on the right:

- X SERVICE
- PROSEDUR
- Terdaftar di
- Service Station
- Kontak:
- Terdaftar di
- Service Station
- * DUA KIR X-BUS X 10.80
- CR 101
- * 20.100
- * NO. HOT LINE TRANSAKSI 24 JAM
- 021 - 5411 5318

Figure 4.41 Information Whiteboard in the Office

In category C of occupational health and safety hazard, there needs to be first aid in production office or in production floor. So, whenever something unexpected happens and for example one of the workers got injured, it is faster to take the first aid kit from the production office or production floor than the office. In production floor, the first aid kit needs to be put in a box with medical sign (plus red sign) and sign that shows where the first aid kit is.

4.4.7. Result of Customer Visitation

The product consultant took notes of the products, its measurements, and everything related for specifications. After the visitation, the product consultant needed to check products prices from suppliers and from PT. Citra Jaya Hosindo

itself. Then, the product consultant made quotation letters to be sent to the customers' purchasing department.

For the continuation, if the quotation letters are accepted and processed during its valid period of three months, the purchasing department from the customer would make a purchase order to PT. Citra Jaya Hosindo. PT. Citra Jaya Hosindo then would provide the products and send them to the customer. If the quotation letters are already expired, the customer can request for a new one.

For the hydraulic pipes order, if the customer decides to make a purchase order, the hydraulic pipe samples would be sent to PT. Citra Jaya Hosindo. PT. Citra Jaya Hosindo would make also a sample based on the existing sample, to be tested on the machine. If the hydraulic pipes work just fine then it would later be produced as many as the customer needs. This decision was made because the customer wanted PT. Citra Jaya Hosindo to make the hydraulics pipes that are already bent like the samples they had so the customer would not have to bend the pipes and would not have trouble assembling the pipes with the machines.

From this visitation, the student learned that as a product consultant, one needs to understand completely about the products, its properties and specifications used in the industry. Different environments and conditions the machines are in might result in different product life time. For this type of job, one needs to be able to work and think quickly. The PIC in charge of the machine was busy so taking measurements, having discussions, and asking questions were done enough as necessary. Product consultant also needs to maintain a good relationship with the customer's representatives because it reflects on the capability of PT. Citra Jaya Hosido as the customer's supplier.

CHAPTER 5

CLOSING

5.1. Summary

- a. PT. Citra Jaya Hosindo is a national level manufacture company, manufacturing hydraulic fitting and selling their own brand of hydraulic hose.
- b. PT. Citra Jaya Hosindo has customers from Jakarta, Banten, West Java, Central Java, Sumatra, and Kalimantan.
- c. PT. Citra Jaya Hosindo cares much about efficiency, no workers should be idle when it is working time.
- d. Some employees in PT. Citra Jaya Hosindo have flexible position. They can move between departments when needed.
- e. The company needed factory layout, machine layout, and valuable inventories with all its information for archive purposes and as helping files when making yearly taxes and for insurance purposes.
- f. Safety and health in production floor needed to be improved.

5.2. Recommendation

- a. Changing the wheel of hand trolley regularly.
- b. Putting noise absorber material on top of hand trolley, like a rubber mat or the baskets the company uses.
- c. Provide a chair for workers operating hose crimping machine.
- d. Workers in charge of coating do not need to fill the basket full since it will make it really heavy. The workers need to do coating several times by not lifting more than they can handle.
- e. There needs to be regular checkup on the fire extinguishers in the facility. Fire extinguishers needs to be replaced once the gauge points to the red region.

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