# INDUSTRIAL PRACTICE REPORT

# IN PT. TOYOTA MOTOR MANUFACTURING INDONESIA

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16 14 09061

**INTERNATIONAL INDUSTRIAL ENGINEERING PROGRAM**

**FACULTY OF INDUSTRIAL TECHNOLOGY**

**UNIVERSITAS ATMA JAYA YOGYAKARTA**

**2019**

## INTERNSHIP CERTIFICATE OF COMPLETION

TOYOTA TMMIN

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**TO WHOM IT MAY CONCERN**
**No. 5400 /HRD/HRPTM/EX/VII/2019**

We certify that the following person:

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Has completed the Internship Program at PT. TOYOTA MOTOR MANUFACTURING INDONESIA since July 4th, 2019 until August 4th, 2019 at **PLANT ADMINISTRATION KARAWANG 1,2 DIVISION**

Please be informed accordingly.

Jakarta, July 25th, 2019

Sincerely yours,

PT TOYOTA MOTOR MANUFACTURING INDONESIA
JAKARTA INDONESIA

**Dian Cahayani**
**Department Head**

recruitment3 : 07/25/2019 : 13:09

**CONFIRMATION PAGE**

Job Training Report carried out at PT. Toyota Motor Manufacturing Indonesia starts on July 4, 2019 until August 4, 2019 compiled by:

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Karawang, 2 August 2019

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| Ketut Wismantara | Anugrah K. Pamosoaji S.T., M.T. |

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2. Ms. Yolanda and Mr. Alvin from the Logistics Division of PT. TMMIN as a User
3. Mr Rizzal Firdaus and Mr Doni Ariyonarta from PT. TMMIN as a Mentor
4. Mr. Ketut as Head Section of the PPIC Division
5. Mr Doni, Mr Pandu, Mr M. Nasrudin Latief as coworkers
6. And all parties involved in the work of Job Training that I cannot mention one by one..

The author also apologizes if there are some mistake in this Job Training Reports and hopefully this report can be useful for us all.

Karawang, 1st August 2019

Author

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# PRELIMINARY

## 1.1. Background of Industrial practice

The Industrial Engineering Study Program of Industrial Technology Faculty, Atma Jaya University Yogyakarta requires all of their students to perform the Industrial practice that correspond to the Curriculum in PSTI UAJY. The PSTI UAJY seek that the Industrial practice is a method of the students to recognize the situation in industrial cocmpany and to improve, increase and develop the profesional working ethic as the Pre-Undergraduate of Industrial Engineering Students.

Job training can be asume as the Industrial Engineering in-field job simulation. The paradigm that must be implements to the student is when the Work Practice occurs, the students works in the of his choose. The working process here includes the activity of planning, designing, improving, implementing and problem solving. From these process, the activities of Working Process activities that must be done by the students are ::

1. Recognizing the scope of the company
2. Follows all of the working process in the company continuity
3. Perform and finish the task that given by the seniors, supervisor or the field mentor
4. Observe the system behavior
5. Arrange the reports in written form
6. Perform the Job Practical Examination

## 1.2. Purpose of Industrial practiceing

Purposes that must be the goal of the Job Pactices are :

1. Training of the discipline attitude.
2. Interaction and Communication training between subordinates, working partners and supervior in the company.
3. Train the ability to adapt with the working environtment.
4. Observe directly the production process of the compaby and the business process of the company.
5. Completing the theory that has been learned in the University with the pracital in the Industry Company

6. Learn about the new insight about the production system and business process

### 1.3. Place and Time of Job Training

This Industrial practice started from 4th July 2019 until 4th August 2019 in PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) that addressed at KIIC Lot DD 1 Industrial Estate, Jl Permata Raya, Karawang Barat, Sirnabaya, kec. Telukjambe Timur, Karawang Regency, West Java 41361. The working hours for this company are Monday to Thursday, starts from 07.15 to 16.00 with the resting hour from 12.00 to 12.30. On Friday, the working hours starts from 07.15 to 16.30 with the resting hour from 12.00 to 13.00. In the end of Industrial practice, there will be Assessment and Examination from the Supervisor about what the student has been done from the Industrial practice process. In the progress of Industrial practice, the author is placed in the Procurement Departement (PPIC) to study about the Scheduling, Forecasting and Ordering Process of the e-Kanban system that implemented in PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) and also the author have the chance to study about the case of problem in the Procurement Process that will explained in this paper.

# CHAPTER 2
# GENERAL REVIEW OF THE COMPANY

## 2.1. Brief History of the Company

### 2.1.1. History of the Company

PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) is a subsidiary of Toyota Motor Corporation (TMC) which is a car factory originating from Japan with its head office in Toyota, Aichi. TMC is a member of the Toyota Group and manufactures cars with several other brands such as Lexus, Scion, Daihatsu and Hino and owns a small share of Subaru and Isuzu. Toyota Motor Corporation was founded in September 1933 as the Toyoda Factory Car division. Today, Toyota is the largest car manufacturer in the world with the highest number of unit sales and net sales. The company was growing so rapidly that in the 1940s Toyota had begun entering the company name in the stock exchanges in Tokyo, Osaka and Nagoya and listed in 1947, Toyota's domestic car sales had reached 100,000 vehicles, Toyota's name in the international automotive market increasingly famous for its best products namely Land Cruiser (1950), Corola (1996), and Toyota Camry (1990) who managed to print the best sales in America.

In the business process, Toyota has the representative company in Indonesia, PT. Toyota Astra Motor (PT. TAM) that founded in 1971 and the product assembly company in indonesia, PT. Toyota Multi Astra. In 1996, PT. Toyota Motor Manufacturing Indonesia was established and stands officialy as the production division of Toyota Brand in Indonesia, replacing the PT. Toyota Multi Astra.

In 2003, PT. TAM reorganized with PT. TMMIN by placing PT. TAM as the official distributor of PT. TMMIN products for domestic sales. For the export segment market, PT. TMMIN exports car units to Taiwan, Brunei Darrusalam, Thailand, Arabic, Philippines, Malaysia Latin America, Morocco, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates through representatives of other Toyota Motor Corporation subsidiaries.

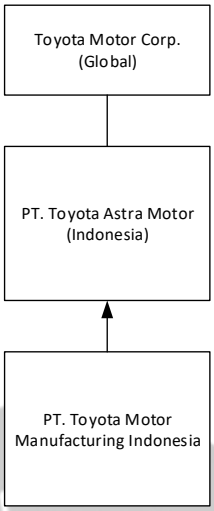



**Figure 2.1. Toyota Motor Corporation's Company Scheme.**

**Figure 2.2 Logo of PT. Toyota Motor Manufacturing Indonesia**

### 2.1.2. Product Of The Company

PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) Plant 1 Karawang located at KIIC Lot DD 1 Industrial Estate, Jl Permata Raya, Karawang Barat, Sirnabaya, kec. Telukjambe Timur, Karawang Regency, West Java 41361. Output from production process of PT. TMMIN are :

#### 2.1.2.1. Toyota Innova Reborn

The Toyota Innova Reborn is the 7th generation of the Toyota Kijang Innova, which launched on November 14, 2015 and classified as MPV (Multi Purpose Vehicle) category. This car is available in petrol and diesel engine variants. For this generation, Toyota released 3 types namely G, V and Q types.

**Figure 2.3 Toyota Innova Reborn**

#### 2.1.2.2. Toyota Fortuner

Toyota Fortuner is a product of PT. TMMIN which is a car with a medium SUV segment that has been marketed in Indonesia since 2007. After ten years, the Toyota Fortuner updated its design in 2017 with the latest design as shown in Figure 2.4. Toyota Fortuner that marketed in Indonesia are available in petrol and diesel engine variants with 2.4 liter and 2.7 liter engine capacities. This car is also available in various types, including G, VRZ and SRZ types.

**Figure 2.4. Toyota Fortuner**

### 2.1.3. Cerfitiface and Achievements Of The Company

PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) has won various national and international certificates that can be proof the quality of products and the existence of the company itself as long as the company was established. The company certificates include:

1. **ISO 9001**

   This certification is an international standard in the field of quality management systems. This standarization is occurs in the work process with certain specification that must be correspond to determined standard of product quality or service quality management.

2. **ISO 14001**

   ISO 14001 certification is an international specification regarding environmental management. One of the actions taken in this process is by managing waste, the process also supports government regulation to running environmentally friendly industries.

3. **SMK3**

   SMK3 is an environmental management system that aims to support work safety in the process. This management system can be done by control and manage the risks that related to both production and non-production activities.

In addition, PT. TMMIN has received many awards, there are:

1. Proper Award (2010)
2. Proper Award Sunter II (2011)
3. The Best Environtment Management Company by Toyota Motor Asia Pasific (2012)
4. The Best Environtment Company by Goverment of DKI Jakarta (2012)
5. Proper Award Green by Ministry of Goverment (2012)
6. The Best Environtment Management Company by Goverment of DKI Jakarta (2013)
7. Asean Best Energy Award (2014)
8. The Best Rapporteur Company Export Foreign Exchange (2015)
9. BPLHD Of West Java (2015)
10. Sustainability Reporting Award (2015)
11. 1st Platinum Award in Global Eco (2015)
12. The Best Envirotnemtn& Performance Award by Goverment of DKI (2015)
13. Archipelago CSR Award (2015)
14. Primaniyarta Award (2015)
15. The Best Indonesian Green Award (2016)
16. WIMACO Award (2016)
17. Good Factory Award (2016)

18. Social Business Innovation Award (2016)
19. Primaniyarta Award (2016)
20. The Best Environment Management & Performance Award (2016)
21. Astra Green Energy Award – The Best Program of Energy Improvement & Renewable Energy (2016)
22. CSR Appreciation 2016 – Sindo Award
23. Green Proper Award 2016 for TMMIN Karawang
24. World Custom Organization (WCO) – 2017
25. The Award for the Best Authorized Economic Operator Company
26. The Best Indonesia Green Award (2017)
27. Most Admired Company (2017)
28. Sindo Innovation Awards (2017)
29. Social Business Innovation and Green CEO Awards (2017)
30. Autocar Indonesia Reader's Choice Awards (2017)
31. Excellent Company and Warranty Reduction Content (2018)
32. German Design Award (2018)
33. Gold Medal from Asia Pasific Post Production Option (2018)
34. PMMI 2018 (QCC-SS Award) – 2018
35. 3 Gold Medals from Temu Karya Mutu dan Produktivitas (2018)
36. Primaniyarta Award (2018)
37. Nusantara CSR Award (2018)
38. Bronze Medal from TMC Skill Interchange Festival (2018)
39. Excellence from Asean Skil Competition (2018)
40. Ap 6th Environtmental Award (2018)
41. 20 Medals from Toyota AP Skill Contest (2018)
42. Innovastha 2018 (QCC and SS Awards)
43. Asia Production Quality Award (2019)
44. Anugrah Indonesia Maju (2018 – 2019)
45. Indonesia Industry 4.0 Readiness Index (2019)
46. Asia Pacific Customer Serviec Kaizen Evolution (CSKE) Cup
47. Indonesia Most Admired Company (2019)

## 2.2. Organization Structure

### 2.2.1. Organization Chart

PT. Toyota Motor Manufacturing Indonesia has very broad organizational structure. One of Departement from whole company organizational structure is the Procurement Department (PPIC) which stands as the key-management of goods ordering to suppliers in form of e-KanBan. In PT. TMMIN, there are 2 shift which are white shift and red shift. For red shift, the working hour is from 07.15 to 16.00 and for white shift, the working hour starts from 21.15 to 06.00.

In the Industrial practice activities, the writer placed in the CCR Section of Procurement Departement Red Shift that stands as the plan-master of parts ordering to supplier. The Organizational Structure of Procurement Departement CCR Section (Red Shift and White Shift) will be shown in diagram below.

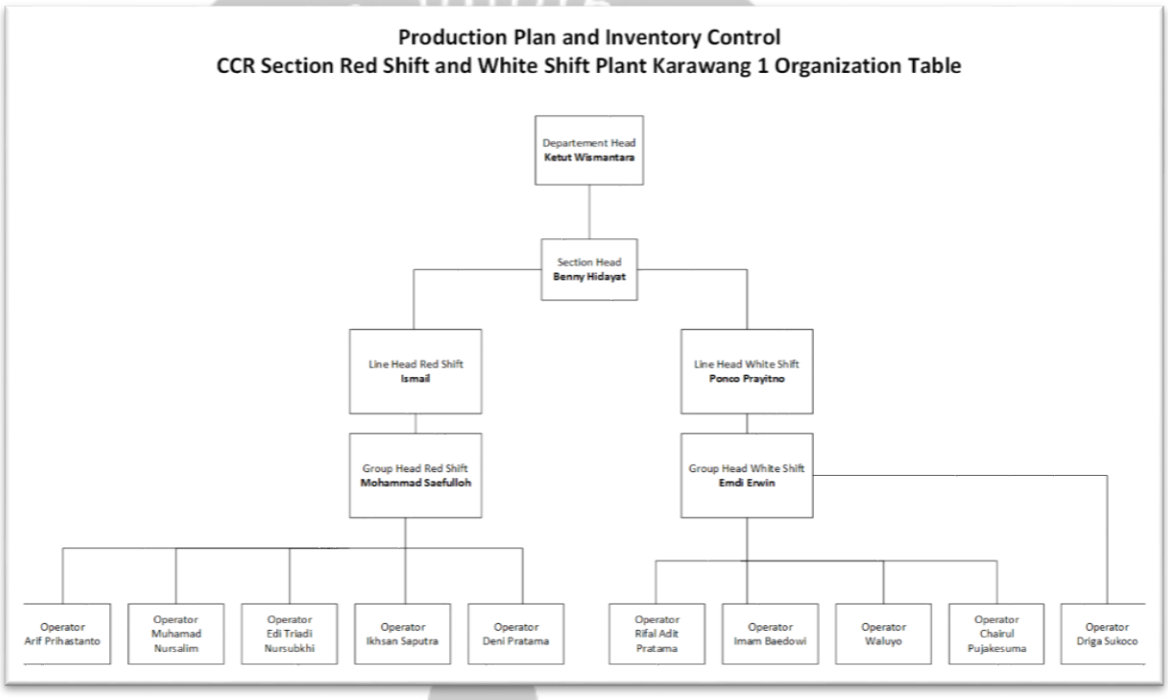



**Figure 2.5. Organizational Structure of White Shift and Red Shift of PPIC CCR Section.**

### 2.2.2. Job Description

The following are the explanation of some of the job description that carried out by workers in the PPIC CCR Section:

**a. Departement Head**

The Department Head is the worker who is fully responsible for all work in the PPIC Department. According to Organizational Structure hierarcy of

PT. TMMIN, the Department Head is responsible to the Manager and has authority over the Section Head.

**b. Section Head**

Section Head is the worker who is fully responsible for all the work in the Section CCR. According to Organizational Structure of PT. TMMIN, the Section Head is responsible for the Department Head and has Authority with the Group Head.

**c. Group Head**

Group Head is the worker who leads, monitors and control the operator. The group head is responsible to the Section Head.

**d. Operator**

Operators are workers who carry out the tasks that assigned by the Section Head through the Department Head and responsible to the Group Head and Section Head.

## 2.3. Management of The Company

To create a good, comfortable, structured and professional work environment for their employees, all the rules, regulation and function of PT. TMMIN are correpond to the company's Vision, Mission and Principles.

### 2.3.1. Vision and Mission of Company

Vision is a distant target of a company that must be achieved in the future and Mission is a statement of efforts of the company to realize the Vision that has been determined. In its business activities, PT. Toyota Motor Manufacturing Indonesia has the following Vision and Mission:

**a. Vision**

- **Best and Flexible Company**

PT. TMMIN committed to be a global manufacturing company in order to develop the best manufacturing operations to produce global quality products that can easily fullfil the market needs in each country.

- **Admired Company**

PT. TMMIN committed to make a contribution to Indononesia to growing together in order to be a better country.

**b. Mission**

Helping people and things move comfortably from one place to another through sustainable development of technology, products and services in the automotive industry.

### 2.3.2. Principle of The Company

The working activity in PT. TMMIN Follows the 7 Important Principles of the Company, which are summarized in 7 Toyota Main Principles, that consist of:

1. **Integrity**
   - Uphold the integrity and act on promises
   - Act responsibly in accordance with the promises (walk the talk)
   - Demonstrates integrity and ethics in daily work activities based on the principles of Good Corporate Governance
2. **Visionary**
   - Contributing to the development of Indonesian industry and society
   - Contributing to the nation and society of Indonesia
   - Focus on customer needs by predicting and responding to company needs and market business opportunities
3. **Respectful**
   - Respecting the team members and superiors by listening to the opinions of others with an open mind and heart
   - Respect the team members, colleagues and superiors
   - Building a conducive and harmonious working atmosphere
4. **Ownerships**
   - Works as worker with a sense of ownership, striving to achieve goals with our own efforts
   - Performing our duties with the expectation of ownership and responsibility
   - Actively stands for all concerns of the company (defend our castle)
5. **Innovative**
   - Continue to make improvements and and encourage innovation
   - Tireless and not easily satisfied in the pursuit of improvement (Kaizen)
   - Dare to change and take risks for better processes and results
6. **Cooperation**

- Build and synergize team strengths, tie harmonious relationships with Stakeholders
- Build synergy and consensus work activity through cross-functional collaboration to achieve goals
- Build a harmonious relationship based on understanding among each other.

**7. Bad News First**

- We report bad news immediately to ensure the best and timely problem solving.
- Report the bad news for the first time to our superiors to ensure that appropriate countermeasures are taken.
- Dare to express opinions and suggestions in a good and polite manner.

### 2.3.3. Employeement

The total employees at PT. Toyota Motor Manufacturing Indonesia is approximately 4,884 person. At the CCR Section Procurement Department (PPIC), the number of employees are 16 peoples. The working hours at PT Toyota Motor Manufacturing Indonesia has 2 parts of working hours, namely red shift and white shift. For working hours of the red shift is from 07.15 WIB to 16.00 WIB, with a break at 12.00 WIB until 12.30 WIB except on Friday, the break hour is from 12.00 to 13.00 and white shift working hours from 21.15 to 06.00. The factory workdays from PT. Toyota Motor Manufacturing Indonesia Office is from Monday to Friday and also possible for Overtime work on Saturdays at 07.15 to 16.00 WIB. The author placed in Monday to Friday and Red Shift.

### 2.3.4. Marketing

Every month, PT. Toyota Motor Manufacturing Indonesia obtain the market demand data for car production units both from domestic and export. For the domestic market, PT. Toyota Motor Manufacturing Indonesia gets demand data from PT. Toyota Astra Motor, and for the export market PT. Toyota Motor Manufacturing Indonesia gets demand data from Toyota representative companies in Asia Pacific and GCC countries. The demand data can be reflected into production schedules and supply schedules after the receiving process of demand data.

### 2.3.5. Facility

PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) provides facility services to support the comfort of workers in this company. Following below are the facilities provided by PT. TMMIN Plant 1.

**a. Employees Coorperation**

One of the facilities for PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN) is an Employee Cooperation that has a Mini Market business called Family Mart, Vending Machine in collaboration with Blue Mart which is integrated with applications on smartphones transaction process, and a Canteen that sells a variety of snacks and heavy foods for Employees who works at PT. TMMIN.

**b. Gym Center**

PT. TMMIN provides the fitness activities by establishing a Gym Center that located near the Employees Cooperative. This Gym Center can accommodate around 40 employees and contains 10 fitness equipment that can be used for employees outside of their shift time.

**c. Toyota Tennis Hall**

PT. TMMIN provides a tennis court that can be use by its employees outside their shift time.

**d. Health Center**

To support the health and safety factors of their employees, PT. TMMIN provides a Health Center that located in front of the Employees Cooperative. The Health Center is lead by a doctor and helped by 10 nurses to anticipate if there is an abnormality in the company that causes an injury. Inside the Health Center itself there is an ambulance stanby parked to guard if there are employees who are injured and needs extra treatment to the nearest hospital.

**e. Toyota Futsal Center**

PT. TMMIN facilitates employees hobbies for playing futsal by providing a futsal center located next to the Health Center. This Futsal center is used for all employees outside working hours with a capacity of 1 futsal court to accommodate 2 teams and 50 spectators.

**f. Toyota Basketball**

The employees also get a facility to develop their Basketball Hobbies in the form of the Toyota Basketball Center that located in east of the entrance.

Toyota Basketball has a capacity of 80 people including 2 basketball teams that can be used by their employees ouside their working shift.

**g. Commuter Car**

Considering that the company has several plants and company facilities that are relatively far from each other, PT. TMMIN provides Commuter Car facilities for its employees that can be used inside the company. Commuter cars are available in the form of off-road (non-street legal) production cars without a vehicle police number. The Commuter Cars that available are Toyota Innova, Toyota Fortuner, Toyota Yaris, Toyota Etios and Toyota Avanza.

**h. Canteen**

To provide the food to the employees during breaks, PT. TMMIN provides a canteen that available in offices, plants and other important facilities. The canteen is separated according to employee positions into the Operator's Canteen, Staff Canteen, and Manager's Canteen. The canteen provides food facilities in size of boxes with free of charge at 11:45 to 12:30. The food was cooked beforehand by workers in the Canteen from 8:00 to 11:15.

**i. Mushalla**

PT. TMMIN provides prayer rooms for the spiritual needs of employees that available in offices, plants and near line operators. Prayer hours are available during breaks and after breaks during business hours.

# CHAPTER 3

# SYSTEM OF THE COMPANY REVIEW

## 3.1. Business Process Of The Company

PT. TMMIN is a car manufacturing company with PT. Toyota Astra Motor as the settle partner for the domestic distribution of its products as well. Every month, the PCD Division at Sunter receives demand data from domestic customers (PT. Toyota Astra Motor) and Toyota partner companies for worldwide market. The demand data can produce GPPS output that contains production requirements for the month in form of suffix units per month. The received data is the data that used to compile e-KanBan every month and will be monitored and managed by PPIC Department, so that e-KanBan results can be published for internal company, logistic partners company and suppliers. The results of the e-KanBan are used for production scheduling processes, receiving parts and logistics needs. Parts that arrive will be used for the assembly and production process. After the final product is finished, the domestic product will be shipped to PT. Toyota Astra Motor and worldwide product will be shipped using sea transportation to Toyota worldwide customers.

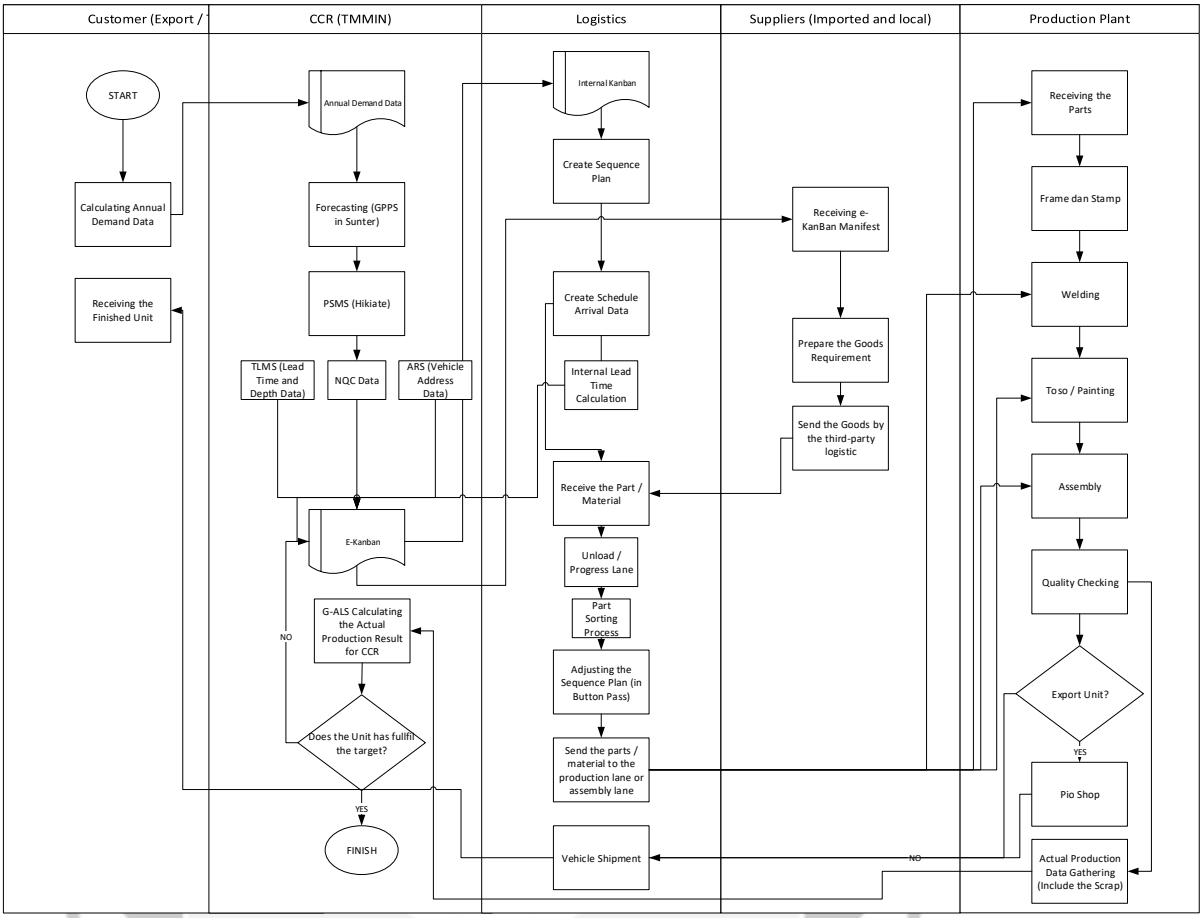



**Figure 3.1. Process Business Of The Company.**

## 3.2. Product Output

PT. Toyota Motor Manufacturing Indonesia Plant 1 is a factory that produces output of Toyota Innova and Toyota Fortuner cars with a production capacity of 195,000 units per year. Both cars are manufactured and marketed to the local segment with PT. Toyota Astra Motor and exported countries. The technical specifications of Toyota Innova and Toyota Fortuner will be explained in the following paragraph.

### 3.2.1. Toyota Innova Reborn

First produced in 2004, Toyota Innova is the product of PT. TMMIN in MPV category and has been mass produced in PT. TMMIN for domestic and international market. Toyota Innova is the next generation of the previous product, Toyota Kijang. The name "Innova" comes from English word; innovation and it has different name in many countries such as "Toyota Kijang Innova" (Indonesia), just "Innova" or "Innova Crysta".

Innova exported to many countries such as Philippines, Malaysia, Vietnam, India, Jamaica, Thailand. Brunei Darrusalam, Saudi Arabia, Kuwait, Qatar, Egypt, Oman, Argentina, and United Arab Emirates.


**Figure 3.2. Toyota Innova Reborn.**

### 3.2.2. Toyota Fortuner

Also known as Toyota SW4, Fortuner is manufactured by Toyota with base of Hilux platorm as a Middle-SUV Category. This car consist of three rows of sats and available in rear-wheel drive and four-wheel drive configuration. The Research and Development of Fortuner is done by Toyota Thailand. In today, this car is produced in Indonesia, Argentina, Egypt, India and Pakistan.

The begining of Toyota Fortuner was build in Thailand (Toyota Thailand) by Thailand aNd Japanese engineers. After done with their first generation, the design of Toyota Fortuner improved by Toyota Australia as the second generation of Toyota Fortuner. As the result, the demand of this car is high in several countries such as Philippines, Thailand, India an Pakistan. There are several countries that Toyota didnt market the Fortuner as well, because they have already the product that replace the segment of Fortuner such as 4Runner (North America), Hilux Surf

(Japan), and Land Cruiser Prado (Europe and Austrlasia) for those market.



**Figure 3.3. Toyota Fortuner**

### 3.3. Production Process

#### 3.3.1. Raw Material

Thr processes carried out in Plant 1 PT Toyota Motor Manufacturing Indonesia is the Stamping, Painting and Assembly process. Stamping process is the process of changing a copper plate material to a certain shape with a Stamping Press machine. For this process, PT. Toyota Manufacturing Motor Indonesia uses a Stamping Machine to form the basic framework of the car and car body. The raw material that used in the Stamping process is the Copper Plate. After completing the Stamping process, Welding process and Body Frame forming, the assembled car parts enters the Toso Shop for the Painting process. In the process here, the material used is Body Spray Paint.

**Figure 3.4. Copper Plate Stamping Raw Materials**

#### 3.3.2. Production Process

Production Process is a process to transform materials from raw materials to the semi-finished products or finished products. In this case, PT. TMMIN uses copper as material of body parts which combined with other car parts that came from suppliers during the assembly process in the assembly shop.

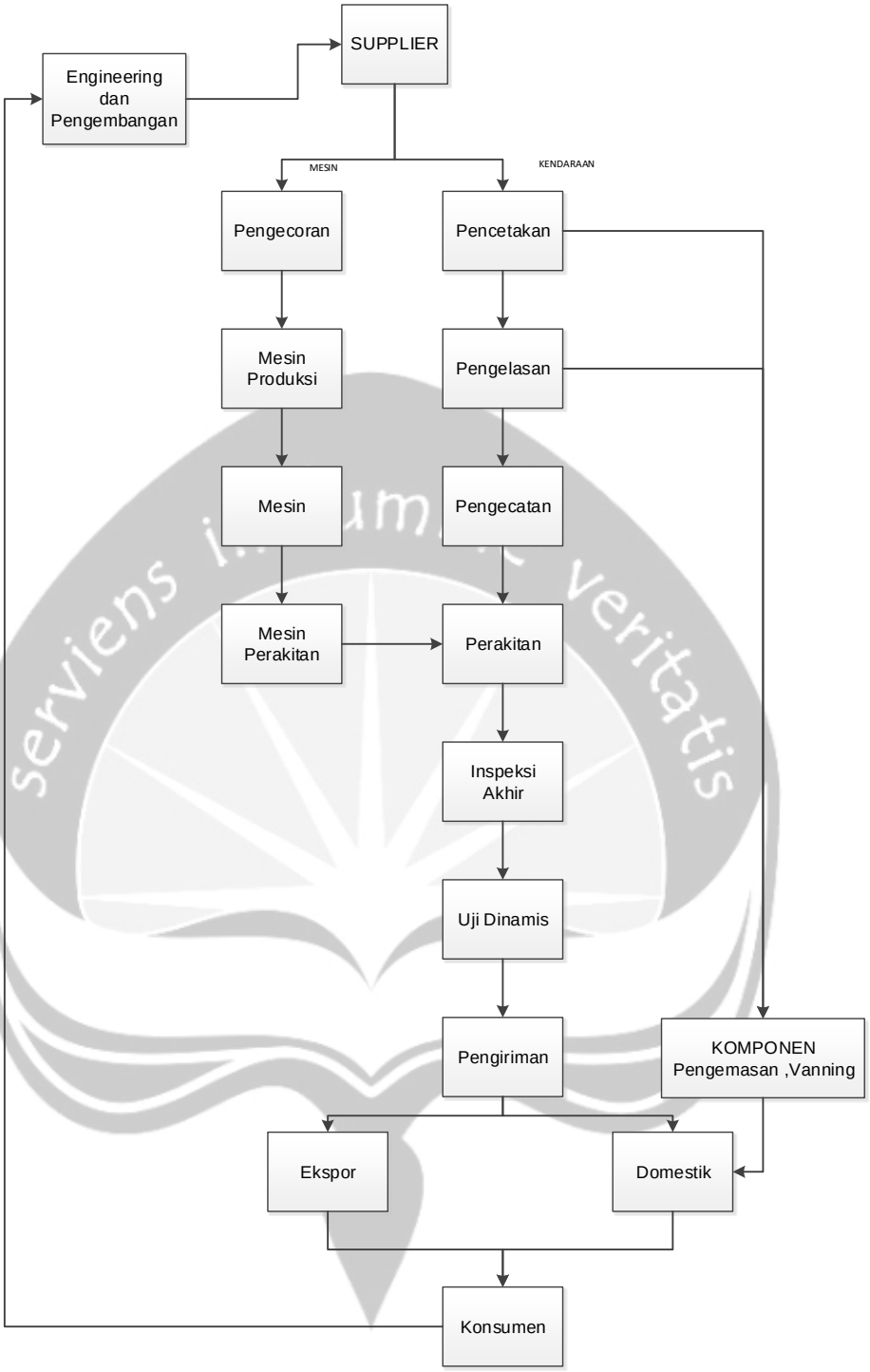



**Figure 3.5. Production Process of PT. TMMIN.**

The production process begins with the receiving of raw materials that used for the stamping process. After the product has been finished for Stamping, the product will be processed at the Welding Shop and enters the Toso Shop for painting process. Units that completed in the painting process will be handover for the Assembly process for the assembly of the parts that have been received from the

supplier. Units that have been completed in the Assembly process will be carried out to the Quality Checking division before the units are released and distributed to domestic market (PT.TAM) or overseas. For the information, the production process at Plant 1 per July 25, 2019 has a takt time of 2 minutes that means in every 2 minutes there is a unit of car produced.

### 3.3.3. Quality Control

Quality Control is a final production stage at PT. Toyota Motor Manufacturing Indonesia to ensure the best quality product to consumers. The way to ensure the good quality is by planning, designing, implementing and controlling. The QC division is divided into 6 sections including QC Engineering Project, QC Engineering Service plant 1, QC Engineering Service plant 2, Quality Planning, Quality Inspecton plant 1, and Quality Inspecton plant 2.

Quality Inspection plant 1 has 3 parts namely Vehicle Inspection Support, Vehicle Inspection 1, and Vehicle Inspection 2. The Vehicle Inspection Support section is responsible for 100% checking, sampling parts, developing supplier quality, leading investigation, repetition of problem and investigate the vehicle problems.

The Vehicle Inspection 1 section is responsible for inspecting vehicle specifications, vehicle engines, functions, exterior and interior body fittings. Vehicle Inspection 2 has the task of checking the function of the vehicle, checking front wheel alignment, drum test, brake test, body, rope test, shower test.

CVE (Complete Vehicle Evaluation) is a small part of the QC department that inspects vehicles by sampling includes static and dynamic checks. Static checks include FWA (Front Wheel Alignment), Headlamp Aiming, Pedal Spec, Handle Force and Vehicle Spec. Dynamic checks include drive screening and shower tests.

The figure below is the following business process that occur in the CVE section:

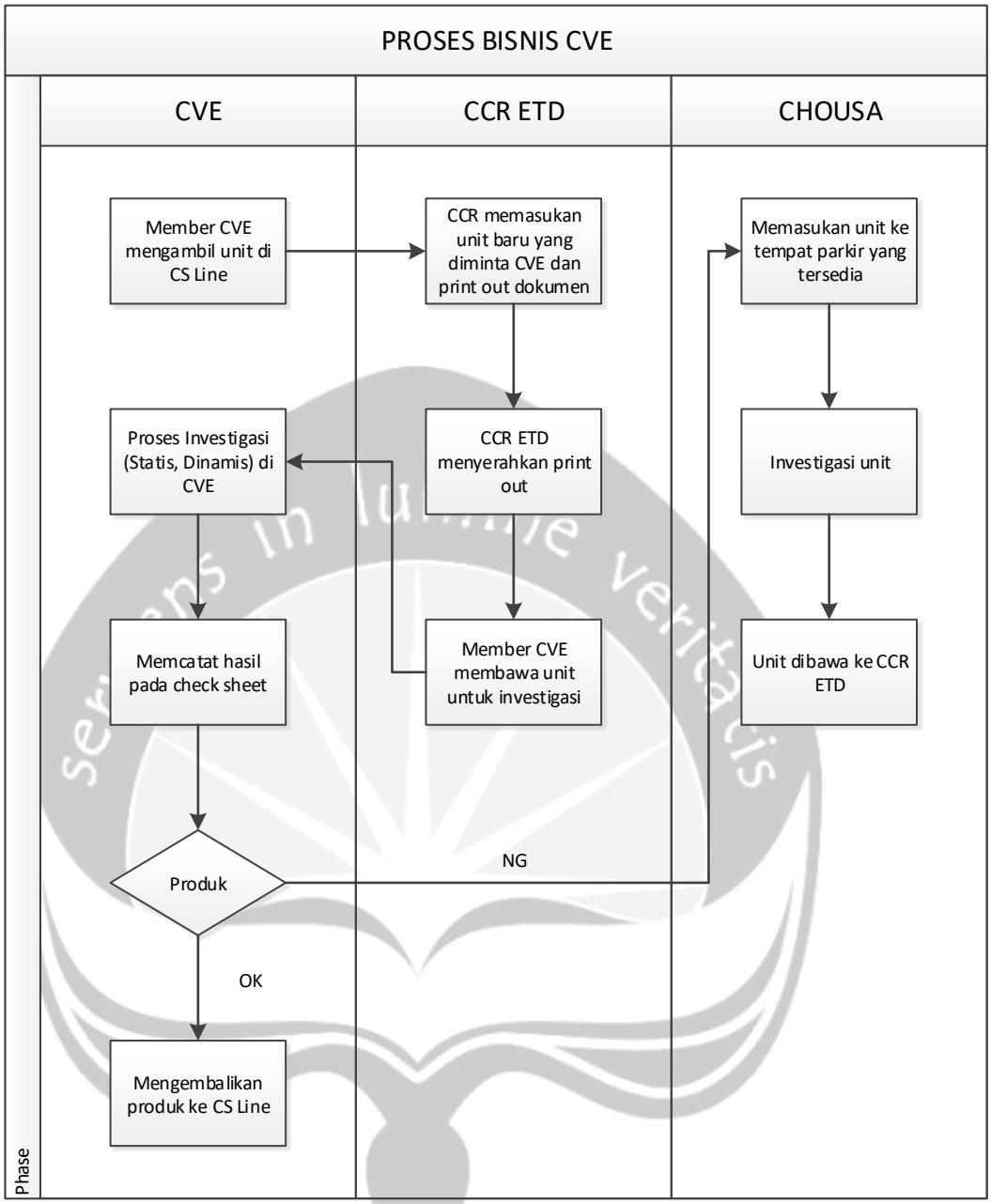



**Figure 3.6. CVE Process.**

The quality improvement methodology consists of 5 main values. The five main values are Define, Measure, Analyze, Improve, Control (DMAIC). These five values are used to increase the quality of the product or service, improve cycle time, and reduce costs.

This stage consists of 3 parts, namely Project Chapter, Process Map, and Voice of Customer. Project Chapter is the process of identifying problems that occurs in a

company. Problem identification can use past data that describes a problem and then discussed in a team or commonly called brainstroming.

Voice of Customer is information from consumers that leads to problems that are happening at the company. Voice of customer can be obtained in several ways. One of them is Brainstroming.

**a. Measure**

The purpose of this stage is to understand the process sequence, validate data, and determine process capabilities. Understanding the sequence of processes can be done by creating a value stream map. Value stream maps can provide a picture of the waste that occurs during the process of value added.

This stage can also be done using 7 Quality Control Tools data consisting of Process Flow Diagrams, Check Sheets, Histograms, Pareto, Cause and Effect Diagrams, Scatter, and Control Charts. The tool will be used to analyze problems that occur in the company..

**b. Analayze**

At this stage the problems faced by the company are analyzed using existing tools. 7 Quality Control Tools consisting of Process Flow Diagrams, Check Sheets, Histograms, Pareto, Cause and Effect Diagrams, Scatter, and Control Charts..

**c. Improve**

At this stage the most optimal solution is chosen in order to produce the most appropriate solution. Solutions can include creating new processes, combining processes, and modifying existing processes.

**d. Control**

CVIS (Complete Vehicle Inspection Standard Vis is an examination of the appearance and function of a vehicle. The appearance of the vehicle covers the body, accessories, parts, machine, and all of overall car components.

### 3.4. Operational Facility

Operation Facilities are devices or tools that used in the production process to produce good quality output. Production process facilities are grouped into Production Process Machines, Material Handling Tools and Quality Control Facilities.

### 3.4.1. Production Machine

The following below are the machines that used during the car production process, including:

**a. Stamp Machine**

Stamp machine is used to form a flat material into a form that desired by the user. At PT. TMMIN, the stamp machine is used to form a body that has Copper raw material in the Frame Shop.

**b. Welding Machine**

Welding machine is used to combine a material with another material by burn it in small point of area with certain of temparature. At PT. TMMIN, the Welding Machine is used to combine the frame to the body before the processed product carried out to the painting process.

**c. Painting Machine**

At PT. TMMIN, Painting Machine is used to paint a body as desired according to request order.

**d. Assembly Machine**

Assembly machine is used to combine, merge or unite parts both small and big parts into a car.

### 3.4.2. Material Handling Tools

To move a material and parts from the certain place into desired place, there are some material handling tools that will make the work of operator become easier. Those tools are:

**a. Screw Reclaimer**

Screw Reclaimer is a device used to lift parts that are relatively heavy but still below the operator's height. This tool is shaped like a hand grip that used with a remote control connected to the cable.

**b. Towing**

Towing is a motorized train that used to pull the dolly loaded by parts in the form of a skid. One skid can contain a 1m3 high container box that from various parts.

**c. Forklift**

Forklift is a vehicle that contains hooks to move the skid from the truck to the progress lane and from the progress lane to the dolly.

### 3.4.3. Worker K3 Supporting Facilities

To support the workers job and protect themself from some dangerous material or dangerous activities, PT. TMMIN provide the K3 Supporting Facilities such as:

**a. Safety Shoes**

Safety shoes used to protect the workers foot from heavy materials that possible to hit their feet. Safety shoes used at PT. TMMIN can resist a weight up to 200 kg.

**b. Ear plug or Ear Muff**

Earplug or Ear Muff is tools to protect the ear from the danger of sound that is too loud, caused by engine noise or others in PT. TMMIN. Earp Plug or Ear Muff is only used for the department of Toso (Painting).

**c. Helmet**

The helmet that used in PT. TMMIN can hold a weight of up to 200kg to protect the head from unwanted things.

**d. Gloves**

Gloves used by the operator to protect the hand palm from sharp objects or dirt which possbily cause injured or infected.

**e. Apron**

The apron is used by the Plant's Operator to protect them from chemicals or hazardous substances that are likely to be sprayed towards the Operator's body with high risk of body injury.

**f. Sleeve Sheats**

In PT. TMMIN, Sleeve sheats used by operators to protect hands from the dangers of sparks and chemicals that can be harmful to the body.

**g. Eye Glasses**

In PT. TMMIN, The glasses are used by the operator to protect the eyes from splinters that can harm the eyes in the Welding Shop and Stamp Shop sections.

# CHAPTER 4

# REVIEW OF THE JOB OF THE STUDENT

## 4.1. Scope Of Work

In the PT. Toyota Motor Manufacturing Indonesia (PT. TMMIN), the implementation of Industrial Job were done at Production Planning and Inventory Control CCR Section which is responsible to manage the material procurement scheduling. The author guided by Mr. Rizzal Firdaus as the Staff in the Procurement Departement who direct and plan the schedule of industrial practice program activities. In addition, the author is assisted by several colleagues in the department at PT. Toyota Motor Manufacutring Indonesia (PT. TMMIN) include:

a. Mr Ketut as the Member of Department Section that provides an explanation of the Kanban System
b. Pak Rizal Firdaus as the Staff of Procurement Departement provides an explanation of the Purchasing Process
c. Mrs. Yolanda as the Logistics Staff section which explain the part purchasing
d. Mr. Doni Ariyanarta as the operator of the PPIC section who explained the Component Ordering section
e. Mr. Pandu as the operator of the PPIC section who provide Supplier Content data
f. Mr. Lukman as PPIC Staff Member who provide company technical data.
g. Mr. Andi, as the Logistics Staff, who gave permission for the production Genba Plan
h. Mr. Ridho as staff of the Dojo Logistics that guides the Genba Plant production processing

## 4.2. Job Responsibilities and Authority

During the industrial practice at PT Toyota Motor Manufacturing Indonesia, the author was given the task to learn the concepts of logistics, procurement, and e-KanBan logic. In addition, the author is also given the task of case studies to repair the overflow incident. The author is given the authority to Genba (Plant visit), ask colleagues and operators at the Logistics Department and the Procurement Department about the Toyota Logistic System, Toyota Prodution System, e-

KanBan system and discuss with mentors about specific tasks and developments during industrial practice at the company.

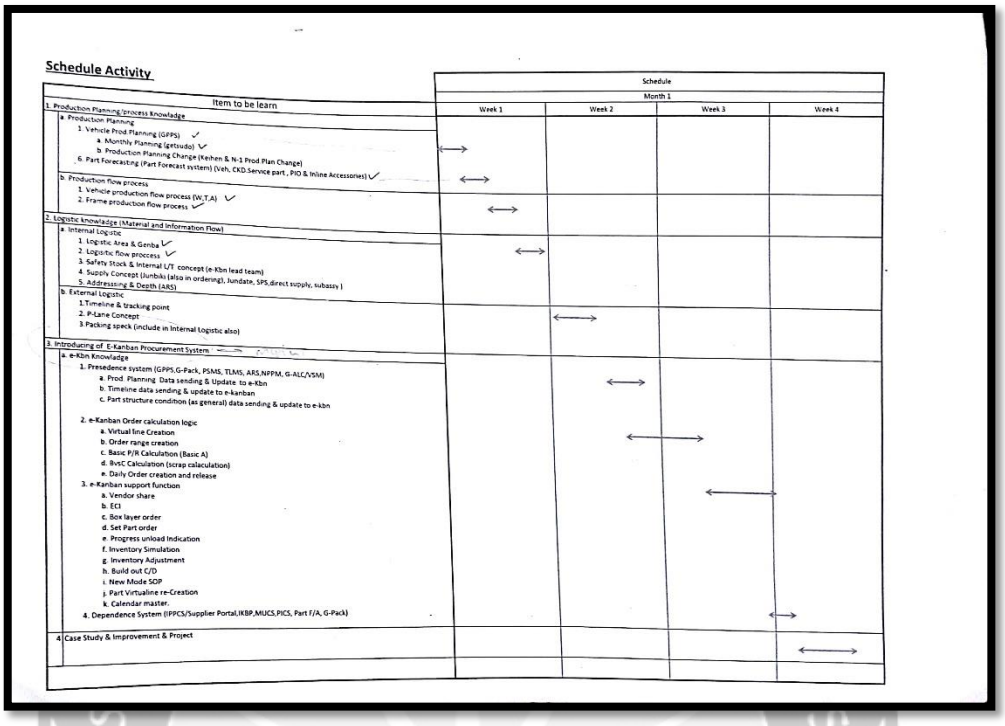



**Figure 4.1. The Study Schedule Activity on PPIC CCR Section.**

### 4.3. Work Implementation Methodology

When doing the industrial practice, students are given the task to understanding the cases of overflow incident that occur in some automotive parts. The implementation of the work begins with study the concept of eKanban, then taking data of overflow parts from the Procurement Department. After that, continue to searching for information about the criteria of overflow part with the Logistics Department and Procurement Department and look for parts that feasible to examine whether the overflow incidents is worth to investigate. After the criteria are obtained, continued to look up the schedule information of when the part will enters the progress line, so that the author can calculate the time when the observation was begin to the end of observation.

After understanding the observation schedule, the writer begin to Genba and perform internal lead time calculations, then checking the suitability of the internal lead time from the data and look for factors that cause the overflow incident. In the end, the writer made a report written on A3 paper according to the procedure at PT. TMMIN which will be presented to Mr. Ketut as the Line Head in the PPIC Division.

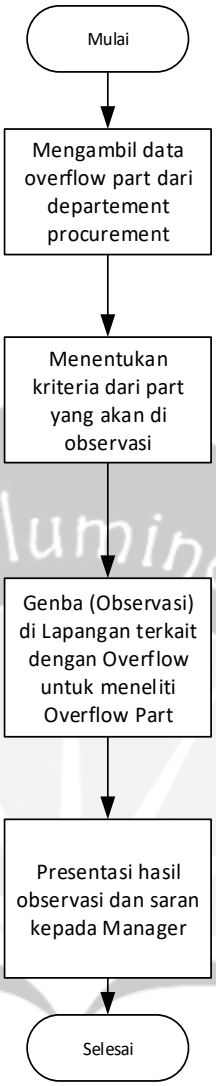



**Figure 4.2. Work Implementation Flowchart.**

### 4.3.1. Obtaining A Specific Task

The task given to the author is research on Overflow Part. Overflow itself is a condition where parts that have been scheduled and arrived at the progress line cannot enter the production line for some reason and then the part will be taken to the overflow area by using a dolly pulled by towing. Overflow itself must be minimized because it is not relevant to the Just In Time (JIT) concept that established by Toyota Motor Corporation as the company standard. Therefore, a part that has overflow will be investigated to find the causes and solutions with the Logistics Department and the Procurement Department to solve the problem.

**a. Problem Limitation**

I. This research only discusses Overflow Part

II. Data are taken from 18th July to 1st August

III. This work only provides recommendations for companies to improve company performance to reduce overflow related parts.

**b. Assumption**

I. Data represents the actual situation in Plant 1 of PT. Toyota Motor Manufacturing Indonesia from Progress Line, Store, Button Pass, Jundate Area to Line Side.

### 4.3.2. Problem Identification

Problem identification is done by checking the overflow part by took the data of overflow part from the PPIC Division. The data will be verified with parts in the overflow area that contained in Plant 1 of PT. TMMIN in the Progreess Line, Button Pass to Lineside. Then from the whole part, it will be determined which part has the most influence on the continuity of the production process in the Plant for further investigation and observation.

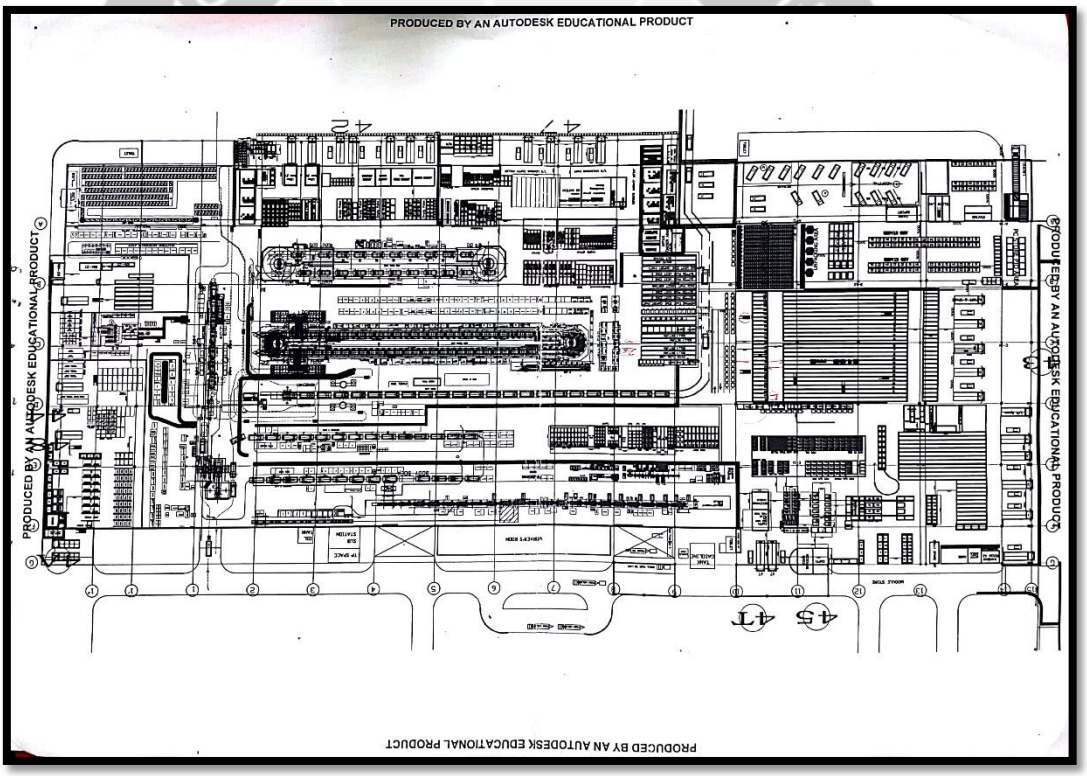



**Figure 4.3. Location Layout (Include the Lineside).**

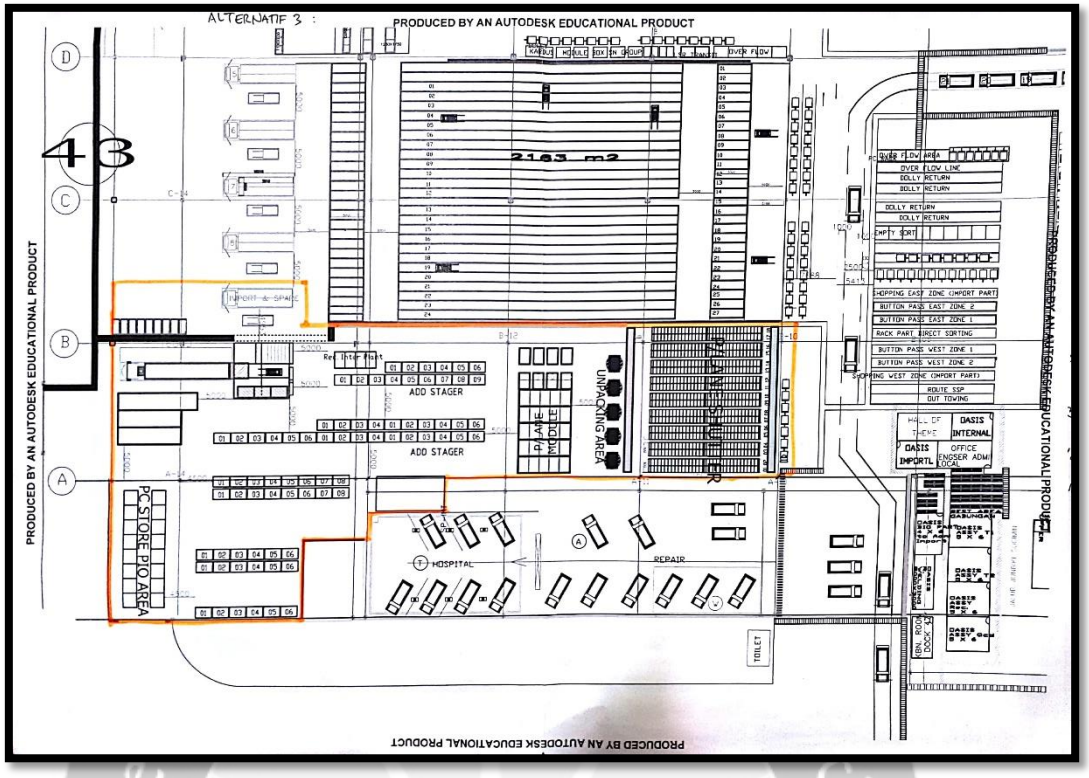



**Figure 4.4. Location Layout (Only from Unloading Dock until Button Pass).**

### 4.3.3. Literature Study

Literature Study is a study about the material or theory that related to the problem and job description that given in order to make a exact solution to decide what to do to solve the problem.

#### A. Toyota Logistic Concept

In concept, the Toyota Production System (TPS) has a goal of minimizing cost and waste. In value chain, TPS considers that Logistic activities have non-value added to the continuity of production itself. Therefore the learning objective of the Toyota Logistics Concept is to minimize the cost and waste generated from the Logistics activities themselves. The two pillars supporting this goal are the application of the principles of JIT and Jidoka. JIT is a condition where a production system only produces products with the right amount, time, and output as needed. Whereas Jidoka is a condition when abnormalities occur (abnormal conditions in the production machine), the production will stop for the safety of its workers. In principle, JIT itself can be done by reducing the lead time and reducing the stagnation of the production process itself so that it can produce as little output as

possible. The Toyota Production System itself categorizes waste into 7 types, including:

1. **Waste of overproduction**

   Waste of produce that exceeds a predetermined target.

2. **Waste of waiting (time on hand)**

   Waste of time from waiting in production lane or logistic.

3. **Waste in Conveyance**

   Waste that occurs because a part or a material experiences too much material handling process.

4. **Waste of Processing**

   Waste that occurs when a part has too long process that requires time or processes that have excess stagnation.

5. **Waste of inventory**

   Waste of inventory occurs when there is an inventory process for storing a part.

6. **Waste of motion**

   Waste of motion occurs when there is too much inefficient movement or excessive movement in the production process.

7. **Waste of making defect**

   Waste occurs when the material or product output of a process has a defects so it cannot continue to the next process.

**Just In Time (JIT)**

Just in Time is a concept of producing what is needed, when it is needed and in the amount needed. JIT has three main principles:

a. **Continous flow in process**

   Continuous flow in process means one by one production by minimizing the stagnation of a part in a process or between processes.

b. **Pull system**

   Pull system is a system to inform the needs of a material or part in real time by observing the processes that have occurred before.

c. **Production based on Takt Time**

   Takt time is time required for a production system to produce one product. It can be calculated from the total operating time divided by the total production needs per day.

**Heijunka**

Heijunka is a process for leveling of variations and volumes of material or parts. The aim of Heijunka is to minimize or reduce waste and reduce stock.

**Logistic Classification**

In Toyota, the logistic itself can be classified depends on purpose and the contents as the object of the logistic activity, such as :

a. **Procurement Logistic**

   Procurement Logistics is all logistics activities that occur in procurement good issuing from supplier and cross docs activity to the plant. In concept, Toyota Logistics will minimize Transportation Costs as much as possible by choosing transportation modes and proper handling tools that can accommodate high quantities.

b. **Internal Logistic**

   Internal Logistics is all logistics activities that occur within the Plant including moving goods between buildings until moving parts into a production process.

c. **Vehicle Logistic**

   Vehicle logistics is the logistics process of sending a vehicle that has been produced from the Plant to the dealer.

**eKanban System**

Historically, e-Kanban system is a development of KanBan system that has been implemented in the Toyota Production System by providing online integration on the system so that the data needs can be displayed in real time, following the actual production needs to create a more accurate and efficient system. There are some fuction or benefits of using eKanban system :

**a. Make an Order Based on What Is Needed.**

Make a forecast of vehicle needs in the form of monthly to weekly followed by calculating the needs of parts for the vehicle to determine the order quantity and order time with consideration of internal lead time, external lead time, depth and address of the part.

**b. Accurate of Internal Lead Time Calculation**

Internal Lead Time can be obtained accurately by observe the assembly point on the production line and calculate the time of parts delivering.

**c. Accurate of Order Lead Time Calculation**

Accurate Lead Time Orders can be generated with time management from ordering, part preparation, and part loading time from suppliers to delivery to the plant.

**d. Scrap Reflection for comparing Plans and Actual Conditions**

The production process has possibility to defects in production output (vehicles) or parts that are attached to the vehicle. Therefore, scrap from the production process might affect the needs of parts that will be displayed from KanBan Manifest which will be updated every day. Here kanban users can intervene in the system to input daily scrap data to produce a more accurate daily kanban part requirement.

**How eKanban Works**

e-KanBan is a system to represent the needs of parts per unit by combining several data. These include GPPS, G-ALC, Supplier Data Master, Scrap Data, Lead Time, Part NQC. Like the diagram below.

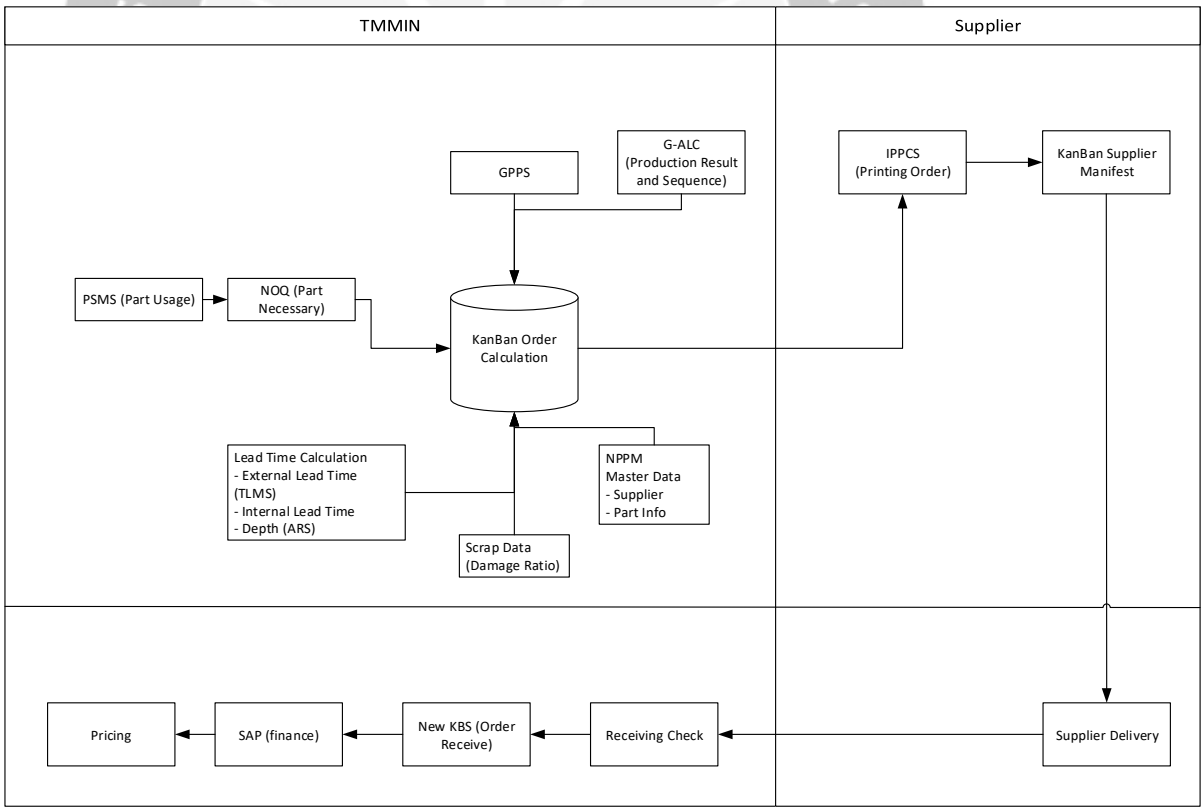



**Figure 4.5. eKanban Data Flow.**

Every month, the PCD Division at Sunter receives unit needs data from PT. Toyota Astra Motor and Toyota partner companies from abroad. The data can produce GPPS output containing production requirements for the month in suffix units per month. GPPS data will be combined with PSMS (Hikiate), which is the description of the name of the part needed for each suffix. Data from PSMS will be combined to NQC which can already represent supplier code data, part name, kanban number and total part needs. NQC Part data will be combined with ARS (Addressing), NPPM (Hikiate), Scrap Data and TLMS (Lead Time Data) so that e-KanBan results can be published for internal, logistical and vendor purposes. The published e-KanBan will be updated every day with the actual situation at the factory and delivered to suppliers and vendors every day so that the results of the e-KanBan calculation can be more accurate.

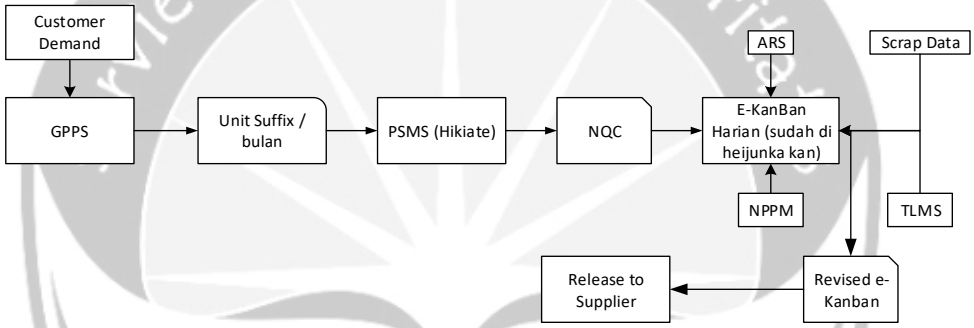



**Figure 4.6. eKanban Process Flow.**

### B. Overflow

Overflow is a phenomenon where a part that must be assembled cannot enter the progress line which is will sent back to the overflow area. Parts returned to the overflow area will be reprocessed or may be stored for too long which is contrary to the JIT principle applied by Toyota Motor Corp.

The bad impact of overflow is when there are some part that contains outside the lineside, it will distract the flow of forklift / dolly and made the transportation of logistic become not smooth.

**Example**, there are 2 steering wheel part that got overflow in every cycle, that made the transport will late 10 second per cycle. In the total, there are 360 second of lateness (from 36 cycle per day) which is equals to 6 minutes. If the takt time was set at 2 minutes, the production process will lack 3 vehicle. (illustrated in Figure 4.6. below)

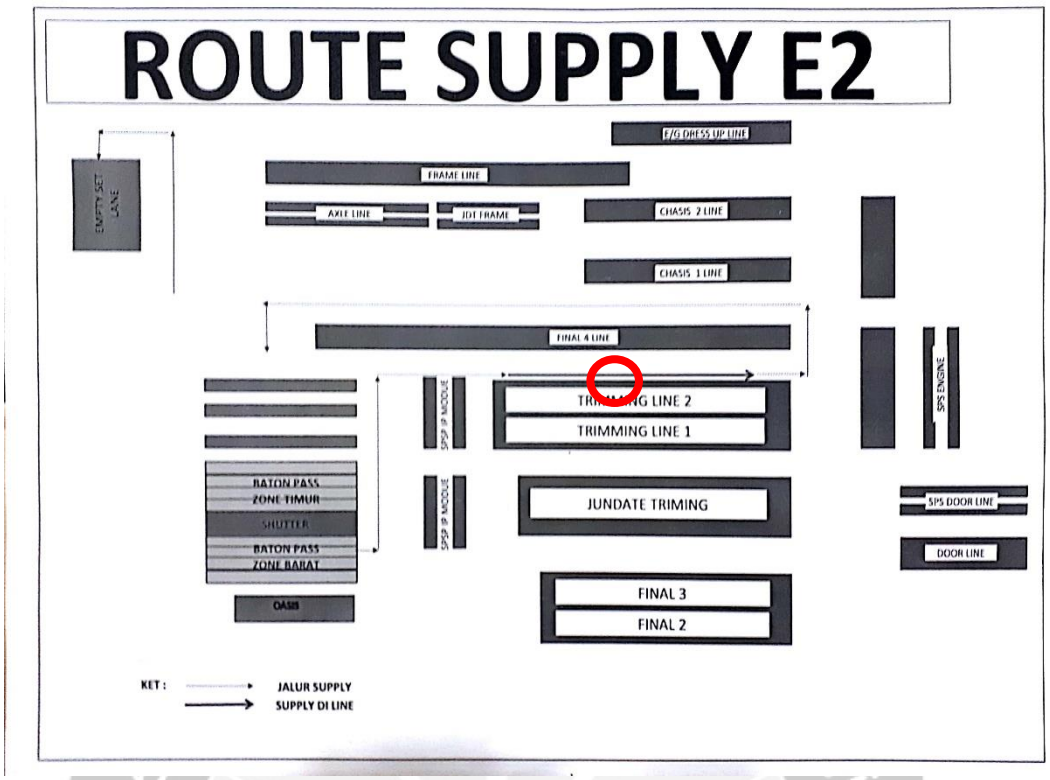



**Figure 4.7. The Steering Wheel Part will distract the towing flow.**

### C. Internal Logistic Concept

In the internal logistics process, there are 36 supply cycles, which means there will be a process of supply of goods to the production line 36 times which is carried out in 2 shifts per day. Part supply flow received by Line Side will run according to the route that has been divided from A1 to H3.

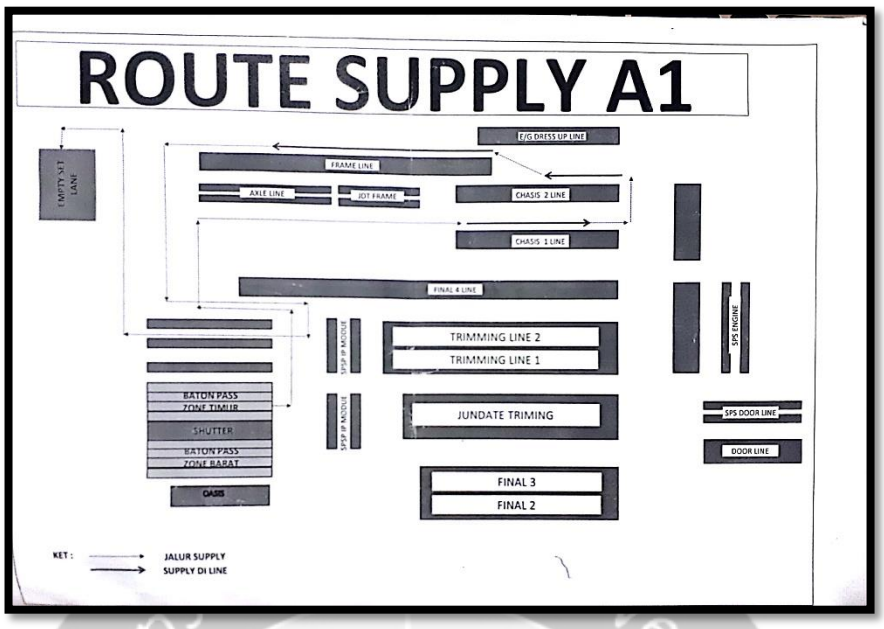



**Figure 4.8. Route A1.**

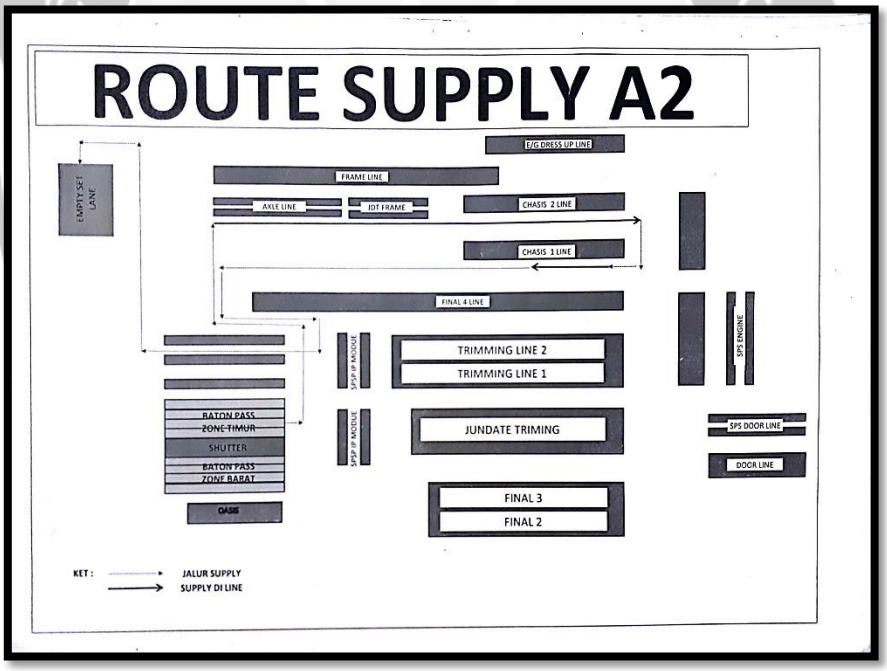



**Figure 4.9. Route A2.**

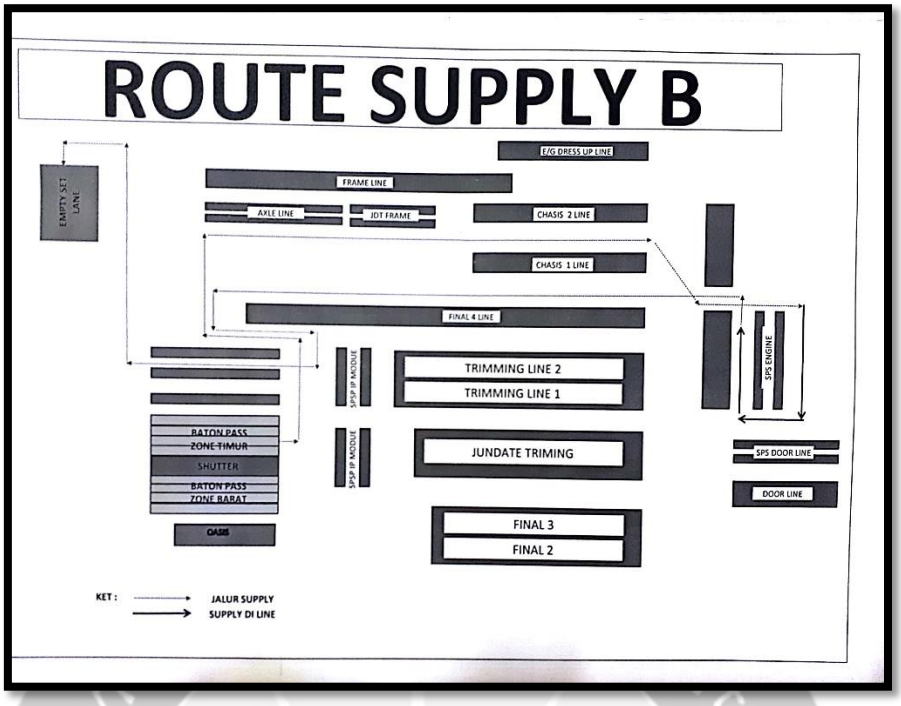



**Figure 4.10. Route B.**

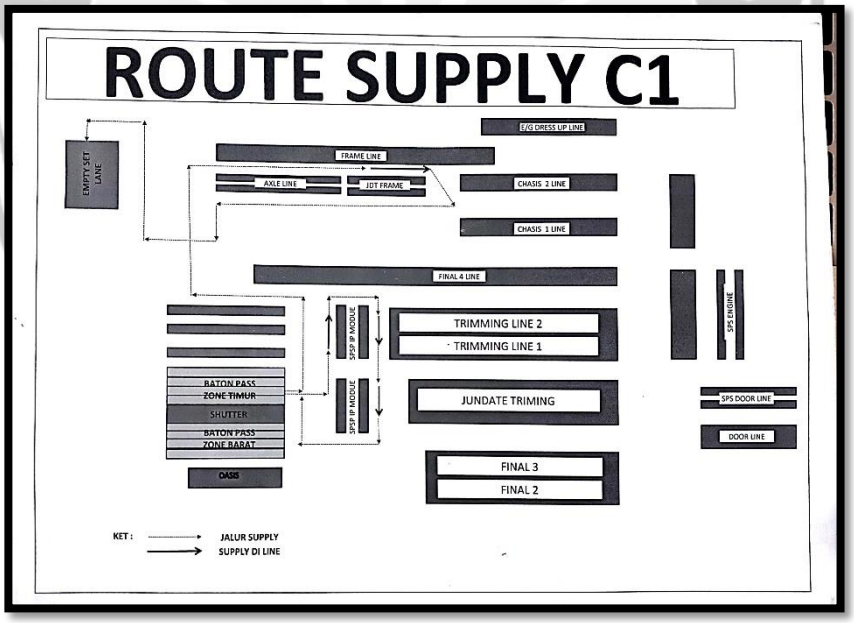



**Figure 4.11. Route C1.**

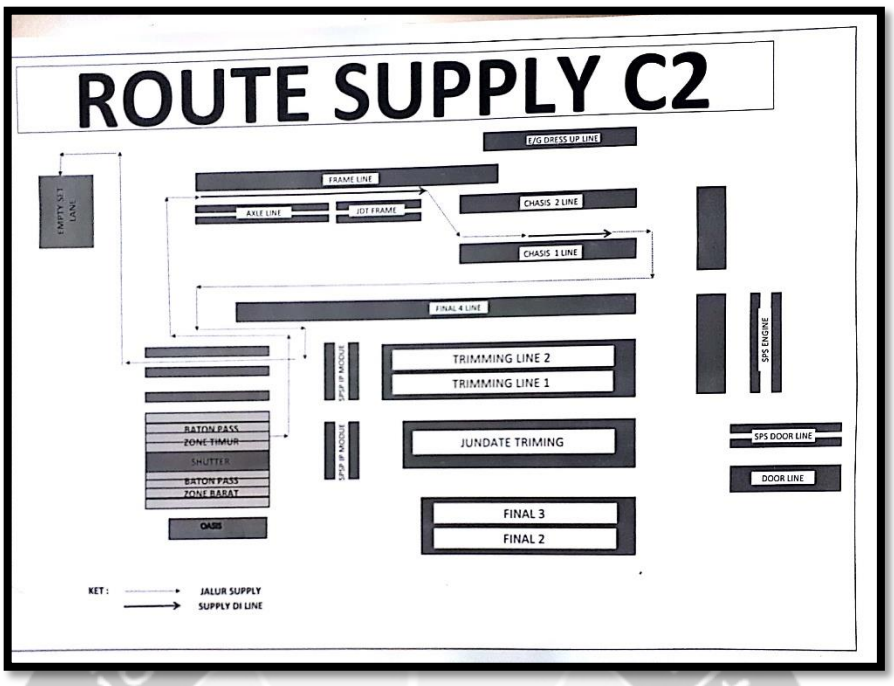



**Figure 4.12. Route C2.**

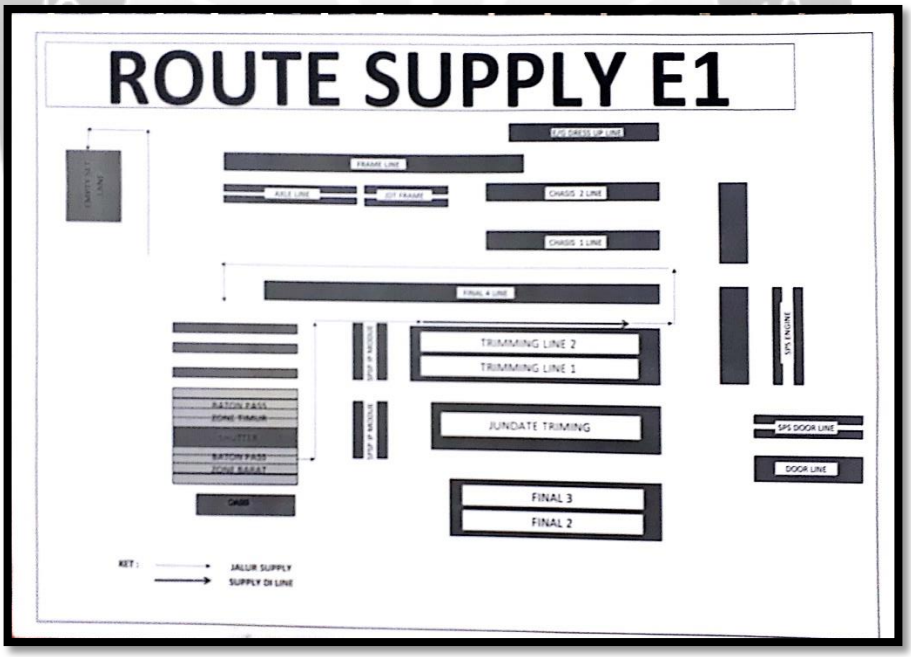



**Figure 4.13. Route E1.**

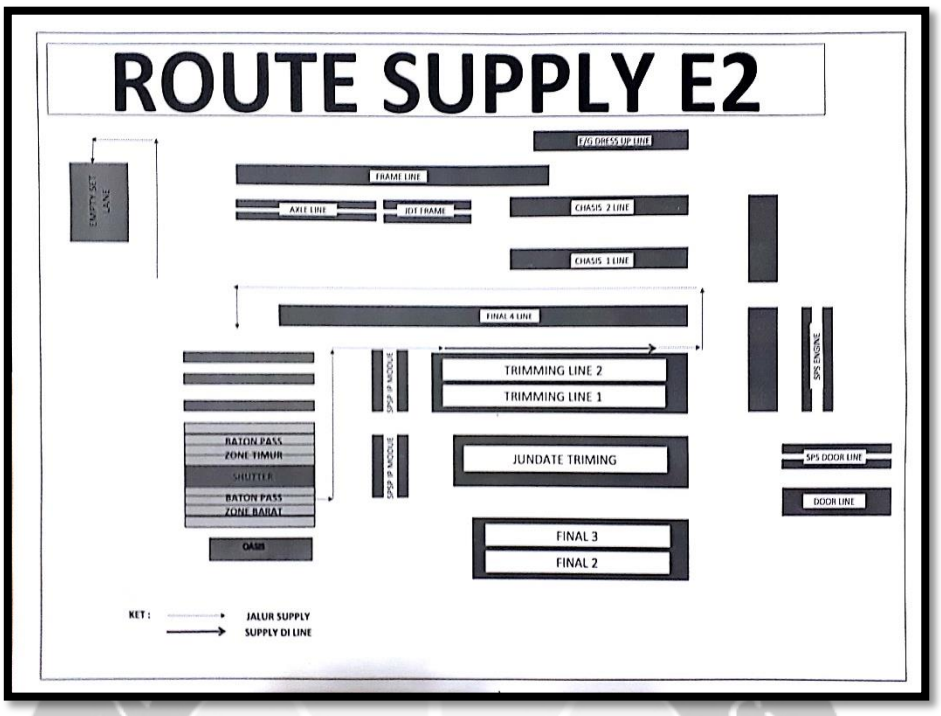



**Figure 4.14. Route E2.**

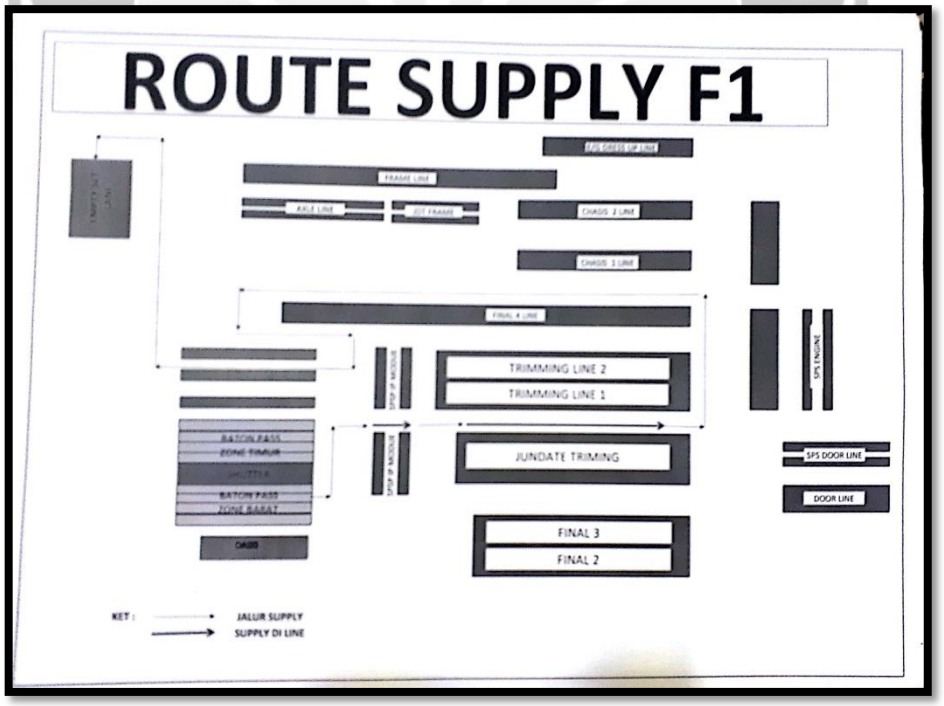



**Figure 4.15. Route F1.**

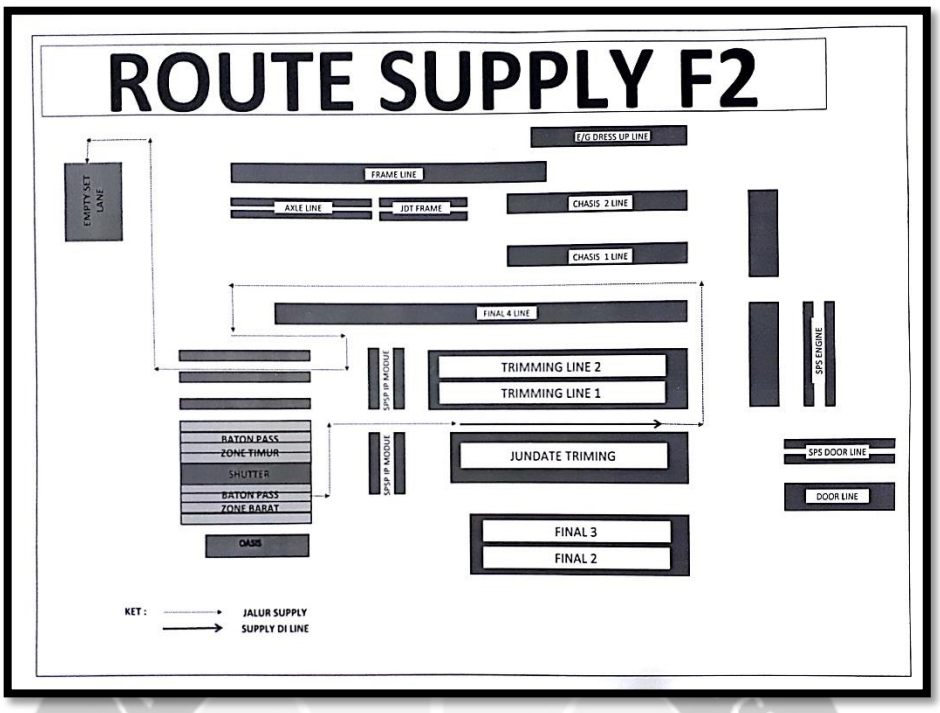



**Figure 4.16. Route F2.**

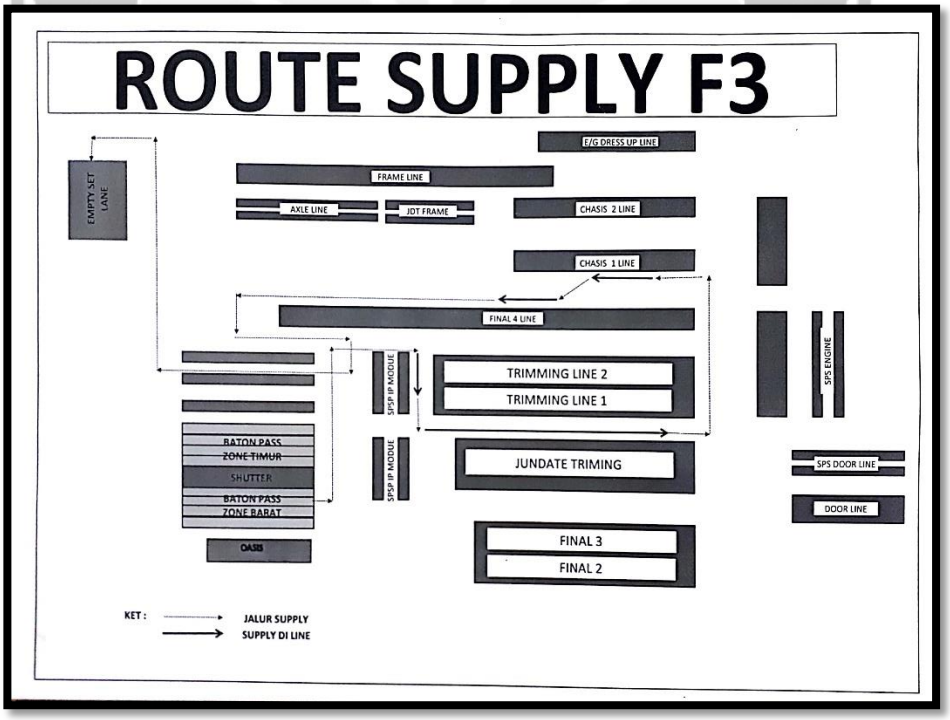



**Figure 4.17. Route F3.**

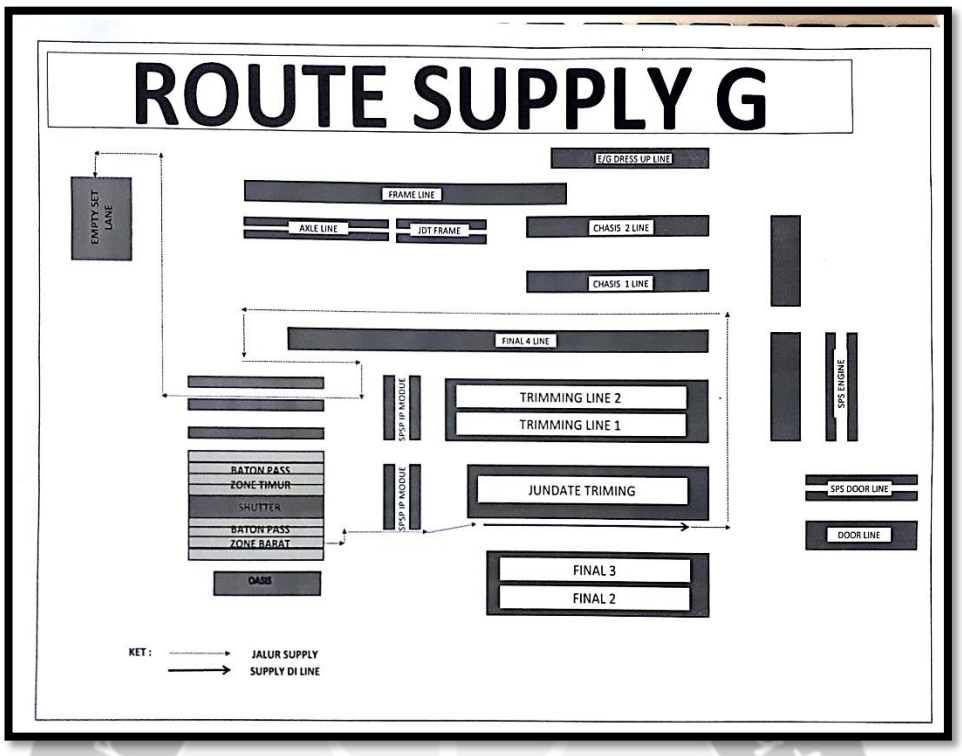



**Figure 4.18. Route G.**

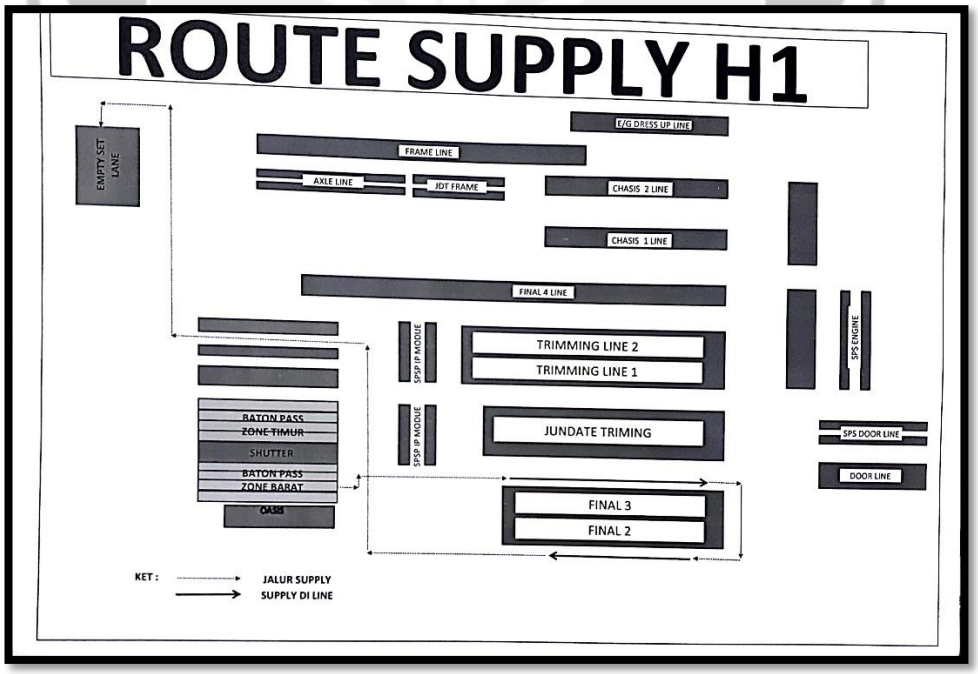



**Figure 4.19. Route H1.**

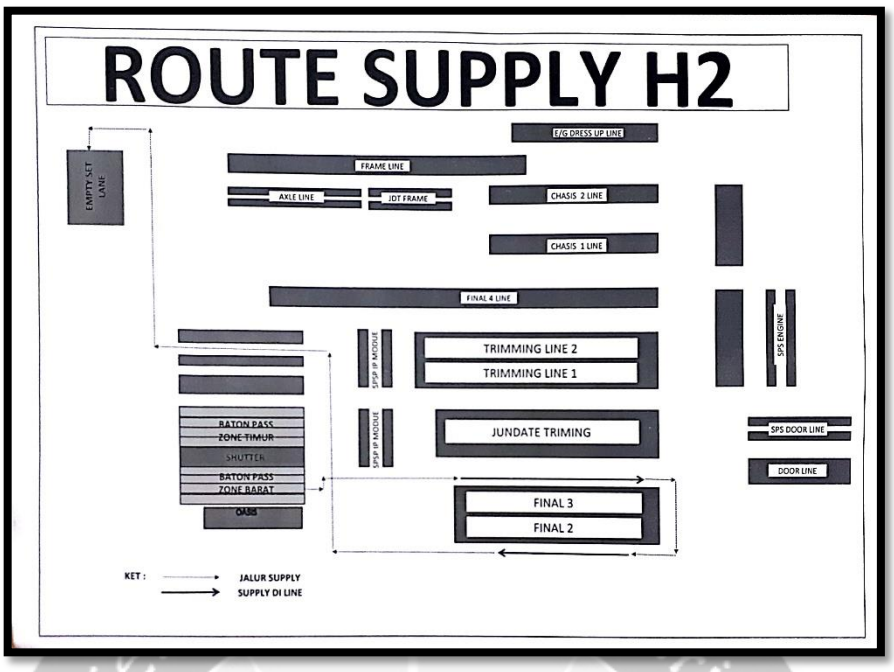



**Figure 4.20. Route H2.**

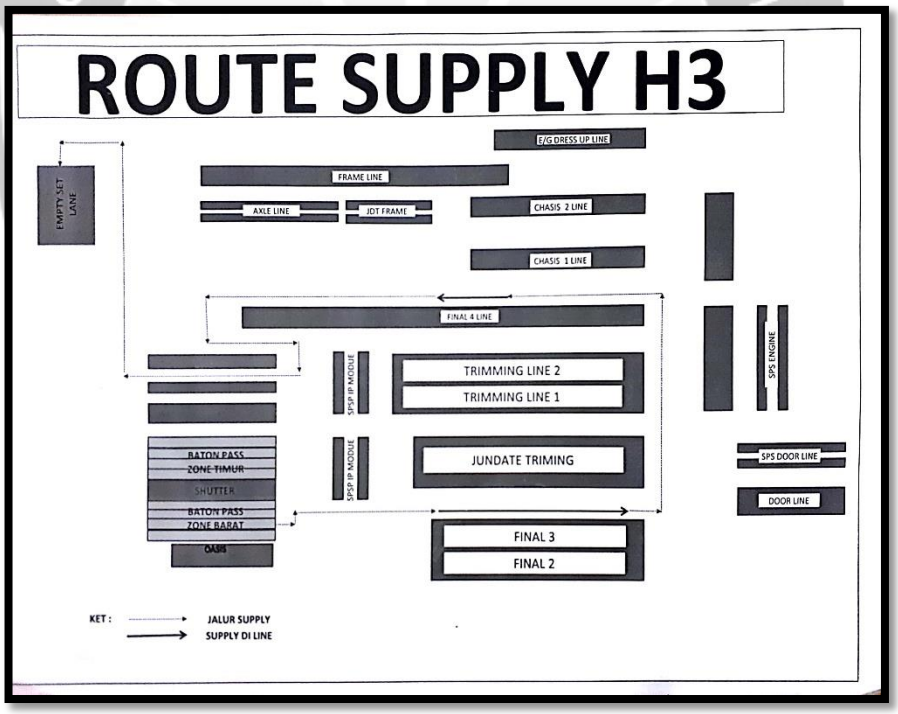
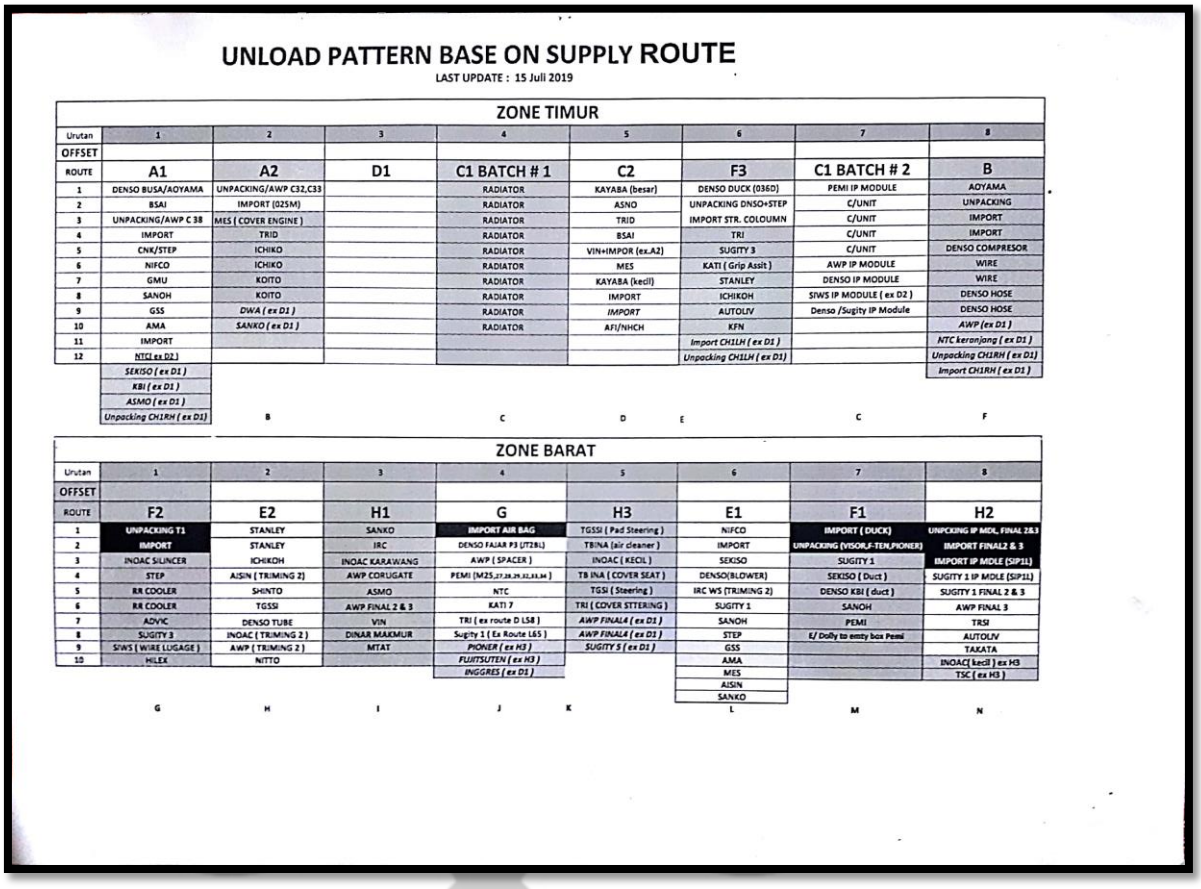



**Figure 4.21. Route H3.**

The Part supply are passed by from Unloading into the Lineside through the following stages:

***Unloading -> Sorting -> Progress Line-> Button pass -> Lineside***

In the actual situation, the supply process can be seen the route layout below which represents the supply flow in the plant. The contents of each route is different as shows in Figure 4.21. below



**UNLOAD PATTERN BASE ON SUPPLY ROUTE**

LAST UPDATE : 15 Juli 2019

**ZONE TIMUR**

| Urutan | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| OFFSET | | | | | | | | |
| ROUTE | A1 | A2 | D1 | C1 BATCH # 1 | C2 | F3 | C1 BATCH # 2 | B |
| 1 | DENSO BUSA/AOYAMA | UNPACKING/AWP C32,C33 | | RADIATOR | KAYABA (besar) | DENSO DUCK (036D) | PEMI IP MODULE | AOYAMA |
| 2 | BSAI | IMPORT (025M) | | RADIATOR | ASNO | UNPACKING DNSO+STEP | C/UNIT | UNPACKING |
| 3 | UNPACKING/AWP C 38 | MES ( COVER ENGINE ) | | RADIATOR | TRID | IMPORT STR. COLOUMN | C/UNIT | IMPORT |
| 4 | IMPORT | TRID | | RADIATOR | BSAI | TRI | C/UNIT | IMPORT |
| 5 | CNK/STEP | ICHIKO | | RADIATOR | VIN+IMPOR (ex.A2) | SUGITY 3 | C/UNIT | DENSO COMPRESOR |
| 6 | NIFCO | ICHIKO | | RADIATOR | MES | KATI ( Grip Assit ) | AWP IP MODULE | WIRE |
| 7 | GMU | KOITO | | RADIATOR | KAYABA (kecil) | STANLEY | DENSO IP MODULE | WIRE |
| 8 | SANOH | KOITO | | RADIATOR | IMPORT | ICHIKOH | SIWS IP MODULE ( ex D2 ) | DENSO HOSE |
| 9 | GSS | *DWA ( ex D1 )* | | RADIATOR | *IMPORT* | AUTOLIV | Denso /Sugity IP Module | DENSO HOSE |
| 10 | AMA | *SANKO ( ex D1 )* | | RADIATOR | AFI/NHCH | KFN | | *AWP (ex D1 )* |
| 11 | IMPORT | | | | | *Import CH1LH ( ex D1 )* | | *NTC keranjang ( ex D1 )* |
| 12 | NTCI ex D2 ) | | | | | *Unpacking CH1LH ( ex D1)* | | *Unpacking CH1RH ( ex D1)* |
| | *SEKISO ( ex D1 )* | | | | | | | *Import CH1RH ( ex D1 )* |
| | *KBI ( ex D1 )* | | | | | | | |
| | *ASMO ( ex D1 )* | | | | | | | |
| | *Unpacking CH1RH ( ex D1)* | B | | C | D | E | C | F |

**ZONE BARAT**

| Urutan | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| OFFSET | | | | | | | | |
| ROUTE | F2 | E2 | H1 | G | H3 | E1 | F1 | H2 |
| 1 | UNPACKING T1 | STANLEY | SANKO | IMPORT AIR BAG | TGSSI ( Pad Steering ) | NIFCO | IMPORT ( DUCK) | UNPCKING IP MDL, FINAL 2&3 |
| 2 | IMPORT | STANLEY | IRC | DENSO FAJAR P3 (JT28L) | TBINA (air cleaner ) | IMPORT | UNPACKING (VISOR,F-TEN,PIONER) | IMPORT FINAL2 & 3 |
| 3 | INOAC SILINCER | ICHIKOH | INOAC KARAWANG | AWP ( SPACER ) | INOAC ( KECIL ) | SEKISO | SUGITY 1 | IMPORT IP MDLE (SIP1L) |
| 4 | STEP | AISIN ( TRIMING 2) | AWP CORUGATE | PEMI (M25,27,28,29,32,33,34 ) | TB INA ( COVER SEAT ) | DENSO(BLOWER) | SEKISO ( Duct ) | SUGITY 1 IP MDLE (SIP1L) |
| 5 | RR COOLER | SHINTO | ASMO | NTC | TGSI ( Steering ) | IRC WS (TRIMING 2) | DENSO KBI ( duct ) | SUGITY 1 FINAL 2 & 3 |
| 6 | RR COOLER | TGSSI | AWP FINAL 2 & 3 | KATI 7 | TRI ( COVER STTERING ) | SUGITY 1 | SANOH | AWP FINAL 3 |
| 7 | ADVIC | DENSO TUBE | VIN | TRI ( ex route D LS8 ) | *AWP FINAL4 ( ex D1 )* | SANOH | PEMI | TRSI |
| 8 | SUGITY 3 | INOAC ( TRIMING 2 ) | DINAR MAKMUR | Sugity 1 ( Ex Route LS5 ) | *AWP FINAL4 ( ex D1 )* | STEP | E/ Dolly to emty box Pemi | AUTOLIV |
| 9 | SIWS ( WIRE LUGAGE ) | AWP ( TRIMING 2 ) | MTAT | *PIONER ( ex H3 )* | *SUGITY 3 ( ex D1 )* | GSS | | TAKATA |
| 10 | MILEX | NITTO | | *FUJITSUTEN ( ex H3 )* | | AMA | | INOAC( kecil ) ex H3 |
| | | | | *INGGRES ( ex D1 )* | | MES | | TSC ( ex H3 ) |
| | | | | | | AISIN | | |
| | | | | | | SANKO | | |
| | G | H | I | J | K | L | M | N |

**Figure 4.22. Part Supplier Content Each Route.**

## D. Internal Lead Time

Internal Lead Time is the calculation of the process time of the supply part of the process in the progress line until it reaches the progress line. Internal Lead Time itself can be calculated using the following formula::

***Internal Lead Time (min) = PC Delivery + PC Safety + LS Delivery + LS Safety***

**a. PC Delivery**

PC Delivery is the process of sending part / supply from the progress line when the cycle of the part starts running until the part reaches the button pass.

**b. PC Safety**

PC Safety is a backup time that is used to avoid things that are not desired like Supplier Capability Vehicle Sequence Compliane (Wrong Sequence of The Part) and Out of Kanban

**c. LS Delivery**

LS Delivery is a calculation of the time a part is moved from the Button Pass Area to the Side Line.

**d. LS Delivery**

LS Safety is a backup time that is used to avoid things that are not desirable when implementing LS Delivery, such as Part Defect, Overflow, Hotcall, etc.

## E. Process Reducing in Toyota

The overflow incident that occur on some parts could be the cause of the process improvement that occurs in Logistic Departement in PT. TMMIN. In recent time, the Logistic Departement did the improvement to reduce 9 process of internal logistic into 7 proecss of internal logistic, as seen in the figure below

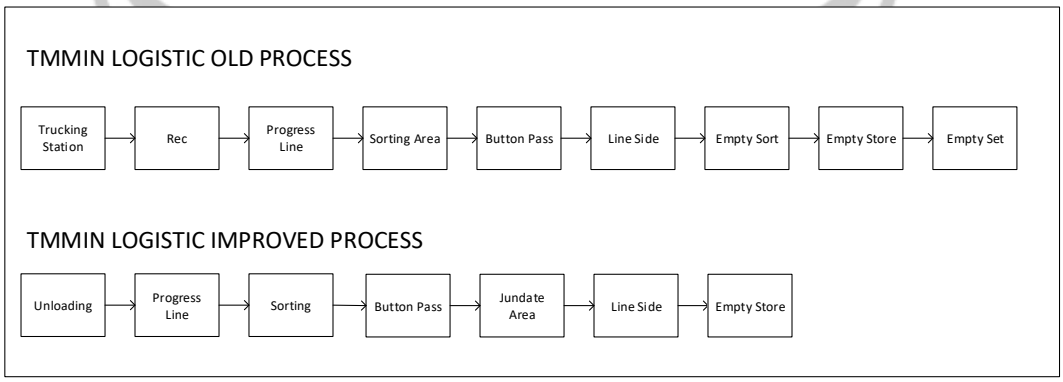



**Figure 4.23. Logistic Dept. Old Process vs Improved Process.**

## F. Toyota PDCA Report

PDCA is short for Plan-Do-Check-Action which is a standard procedure of the Toyota Motor Corporation that is implemented throughout the company and is carried out by all employees to overcome problems and improve an output system.

## 4.4. Work Result

After began to study and analysis the problem of the overflow part from theories and Genba (Study into the plan) the author began to dig the data and conclude some analysis.

### 4.4.1. Data Analysis

#### 1. Daily Overflow Data

The author granted an access by the Kanban Operatorm Mr. Pandu to see the annually overflow parts that recorded in the Button Pass area and send to eKanban system as follows :

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | AREA | CODE INPUT | KBN_NO | PART_NO | SUPPLIER NAME | PART NAME | LINE ADDRES | STOCK |
| 2 | FOLLOW UP TO ANALISA | 3 | 031J | 896660KU6000 | | | SIP1R- I6 | 1 |
| 3 | FOLLOW UP TO ANALISA | 3 | 086E | 768010K290D0 | SUGITY CREATIVES | GARNISH SUB-ASSY BACK DOOR OUTSIDE | SPT1 - M38 | 3 |
| 4 | BLOK A | 1 | 136E | 82111KK08300 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M25 | 1 |
| 5 | SAMPING EMPTY BOX | 7 | 141K | 811500KB8100 | INDONESIA KOITO | HEADLAMP ASSY LH | CH2RH- C26 | 2 |
| 6 | SAMPING EMPTY BOX | 7 | 145C | 167110L15000 | DENSO INDONESIA CORPORATION (CIBITUNG) | SHROUD FAN | JF1RH- Z9 | 1 |
| 7 | SAMPING EMPTY BOX | 7 | 147K | 811500KF1100 | INDONESIA KOITO | HEADLAMP ASSY LH | CH2RH- C27 | 1 |
| 8 | SAMPING P/LANE | 8 | 152C | 175650L07000 | TOKAI RUBBER INDONESIA | SUPPORT EXHAUST PIPE NO.4 | FRAMR- F66 | 1 |
| 9 | BLOK A | 1 | 156C | 177000L36000 | DENSO INDONESIA CORPORATION (CIBITUNG) | CLEANER ASSY AIR W/ELEMENT | FNL3 - K29 | 2 |
| 10 | BLOK A | 1 | 163D | 90119T019100 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | BOLT W/WASHER | CH2LH- C36 | 1 |
| 11 | SAMPING EMPTY BOX | 7 | 163D | 90119T019100 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | BOLT W/WASHER | CH2LH- C36 | 1 |
| 12 | PROBLEM HIKIATE | 5 | 166D | 90119T025000 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | BOLT W/WASHER | ERDL - D52 | 1 |
| 13 | SAMPING EMPTY BOX | 7 | 166D | 90119T025000 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | BOLT W/WASHER | ERDL - D52 | 8 |
| 14 | BLOK A | 1 | 169H | 359700K14000 | MTAT INDONESIA | HOUSING ASSY POSITION INDICATOR | SF2L - K55 | 2 |
| 15 | BLOK A | 1 | 1732 | 777540K01000 | SANOH INDONESIA | HOSE CHARCOAL CANISTER OUTLET | TRIM2- T76 | 1 |
| 16 | SAMPING EMPTY BOX | 7 | 1732 | 777540K01000 | SANOH INDONESIA | HOSE CHARCOAL CANISTER OUTLET | TRIM2- T76 | 1 |
| 17 | SAMPING P/LANE | 8 | 188C | 31485KK01000 | SETIA GUNA SEJATI | BRACKET FLEXIBLE HOSE NO.2 | CH1LH- C15 | 1 |
| 18 | SAMPING EMPTY BOX | 7 | 190D | 90167T001200 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | SCREW PAN TAPPING | FNL3 -K126 | 1 |
| 19 | SAMPING P/LANE | 8 | 193D | 90178T005600 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | NUT FLANGE | SF3L - K8 | 9 |
| 20 | PROBLEM HIKIATE | 5 | 196B | 90105T005900 | AUTOMOTIVE FASTENERS AOYAMA INDONESIA | BOLT FLANGE | T2LH - X19 | 2 |
| 21 | BLOK A | 1 | 199K | 82116KK32200 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M29 | 1 |
| 22 | BLOK A | 1 | 203K | 82116KK50100 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M25 | 1 |
| 23 | BLOK B | 2 | 210K | 82116KK75200 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M29 | 1 |
| 24 | BLOK B | 2 | 212K | 82116KKA0200 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M25 | 1 |
| 25 | FOLLOW UP TO ANALISA | 3 | 212K | 82116KKA0200 | AUTOCOMP SYSTEMS INDONESIA | WIRE ENGINE ROOM MAIN | SPT1 - M25 | 4 |
| 26 | SAMPING EMPTY BOX | 7 | 220K | 82117KK24200 | AUTOCOMP SYSTEMS INDONESIA | WIRE INSTRUMENT PANEL | SIP2R- I53 | 4 |
| 27 | SAMPING P/LANE | 8 | 222C | 445900K13000 | SARI TAKAGI ELOK PRODUK | BRACKET ASSY BRAKE ACTUATOR | JDT1 - T58 | 1 |
| 28 | SAMPING P/LANE | 8 | 226K | 82117KK43200 | AUTOCOMP SYSTEMS INDONESIA | WIRE INSTRUMENT PANEL | SIP2R- I51 | 1 |
| 29 | FOLLOW UP TO ANALISA | 3 | 255H | 485300K06000 | KAYABA INDONESIA | ABSORBER ASSY SHOCK RR | FRAMR- F55 | 3 |
| 30 | FOLLOW UP TO ANALISA | 3 | 257C | 452860K070C0 | SUGITY CREATIVES | COVER STEERING COLUMN UPR | TRIM2- T81 | 1 |
| 31 | SAMPING P/LANE | 8 | 265H | 48824KK01000 | SARI TAKAGI ELOK PRODUK | BRACKET STABILIZER | FRAMR- F68 | 1 |
| 32 | SAMPING EMPTY BOX | 7 | 266H | 51410KK01000 | NUSA TOYOTETSU CORP. | COVER ASSY ENGINE UNDER NO.1 | CH2RH- C32 | 2 |
| 33 | BLOK A | 1 | 268C | 47110KK11000 | NUSA TOYOTETSU CORP. | SUPPORT ASSY BRAKE PEDAL | SPT1 - M30 | 1 |

**Figure 4.24. Annual Overflow Data.**

#### 2. Overall Overflow Data

Overflow data was taken from Mr. Pandu who obtained the data from the Logistics division located in the Plant. The data represents the actual condition of the number of overflow parts that are updated every day.

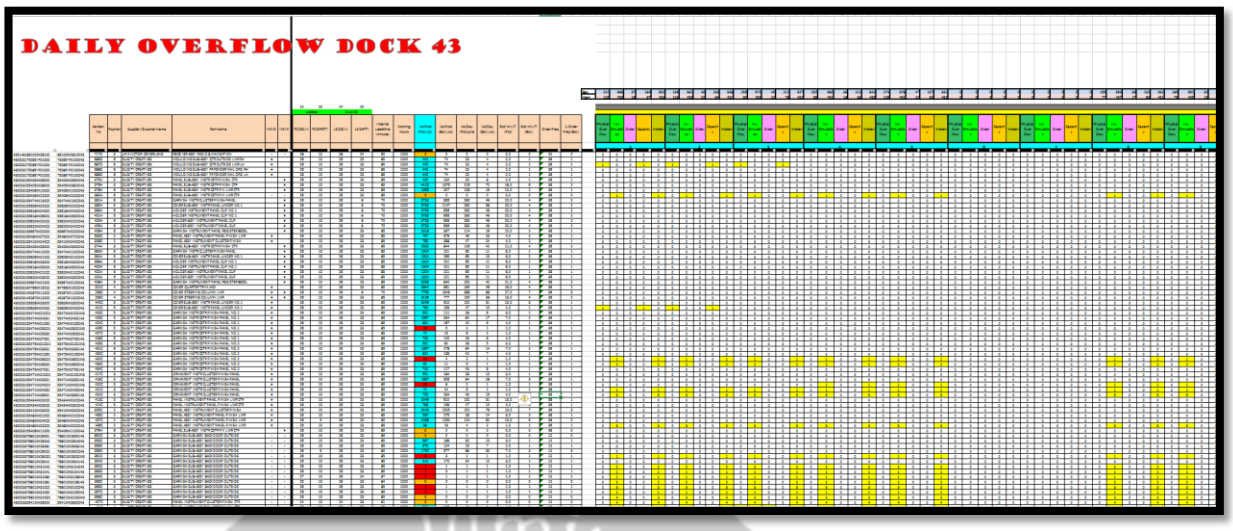



**Figure 4.25. Overall Overflow Stock on Dock 43.**

### 3. Determination of Criteria for Part

After having a discussion with Mr. Rizzal from the Procurement Division, criteria obtained to determine whether the part is suitable for observation include:

- Is a Common Part (Used for the type of Fortuner and Innova), Part Innova and Part Fortuner
- Part with high production volume
- Part with the number of pieces per kanban and hikiate (use of parts per unit) is small
- Part with a high number of frequency occurrences and overflow quantities

### 4. Causes Formulation

There are common reason why the part become overflow, those reason are:

- **Capacity Problem**

  Where the capacity on the side or production line is lack.

- **Internal Lead Time Problem**

  Where there are differences in Internal Lead Time between Actual and Data in eKanban.

- **Depth**

  Where there is a difference in depth between planning and actual.

- **Emergency Order**

  Cases where hotcalls (lack of parts on the line side) result in Emergency Orders which cause a buildup of stock in the future.

- **Heijunka**

  Cases where the planned Heijunka is different from the actual situation.

- **Ratio**

  Cases where overflow occurs and there are differences in ratios later on that cause parts that were overflow the day before are not use.

## 5. Planned vs Actual Conditions

From combining the Daily Overflow data, Overall overflow data and Field Study inside the plan, the author began to select the components are parts with Unique Numbers **533C, 269C,** and **220K**

| Kanban No | Pcs/kbn | Supplier / Exporter Name | Part Name | IMV 5 | IMV 4 | PC DELIV | PC SAFETY | LS DELIV | LS SAFTY | Internal Leadtime (minute) |
|---|---|---|---|---|---|---|---|---|---|---|
| 269C | 2 | NUSA TOYOTETSU CORP. | SUPPORT ASSY BRAKE PEDAL | • | • | 26 | 10 | 11 | 8 | 55 |
| 553C | 4 | AUTOPLASTIK INDONESIA | PLATE DOOR SCUFF LH | • | • | 26 | 10 | 13 | 8 | 57 |
| 220K | 1 | AUTOCOMP SYSTEMS INDONES | WIRE, INSTRUMENT PANEL | | • | 26 | 10 | 8 | 23 | 67 |

**Figure 4.26. Part That Will Be Analyzed.**

The selection of the Part considers the number of pcs per kanban that is small, the number of high frequency overflows (> 70%) and the phenomenon occurred in the past week so that it can be analyzed.

From the data and determination of the criteria above, we get the parts that will be observed as follows:

| Unique Code | Suplier | Nama Part | Frequency (for 16 days) | PC DELIV | PC SAFETY | LS DELIV | LS SAFTY |
|---|---|---|---|---|---|---|---|
| 533C | AUTOPLASTIK INDONESIA | PLATE DOOR SCUFF LH | 16 | 26 | 10 | 26 | 8 |
| 269C | USA TOYOTETSU CORP. | SUPPORT ASSY BAKE PEDAL | 15 | 26 | 10 | 26 | 8 |
| 220K | AUTOCOMP SYSTEMS INDONESIA | WIRE, INSTRUMENT PANEL | 17 | 26 | 10 | 25 | 23 |

**Table 4.1. Part data to be observed for Overflow calculations.**

## 6. Presumed Cause of Overflow

After getting the Part to be analyzed, the writer conducted a field study (Genba) to determine the cause of Overflow. The results of the Genba include the calculation of the Internal Lead Time component including the time from the Progress Line to

the Button Pass, the time the unit is at the Button Pass and the time from the Button Pass to the Side Line.

**P-Line to Button Pass Data**

| No | Lane | Cycle | Time in | Time out | |
|---|---|---|---|---|---|
| 1 | H | 8 | 10.32.33 | 10.50.15 | 00.17.42 |
| 2 | H | 9 | 10.53.30 | 11.20.46 | 00.27.16 |
| 3 | H | 13 | 13.55.38 | 14.17.28 | 00.21.50 |
| 4 | H | 16 | 15.29.22 | 15.45.20 | 00.15.58 |
| 5 | H | 14 | 13.06.21 | 14.21.40 | 01.15.19 |
| 6 | H | 17 | 15.37.16 | 15.57.00 | 00.19.44 |
| 7 | H | 6 | 13.48.54 | 14.07.48 | 00.18.54 |
| 8 | H | 9 | 14.48.42 | 15.08.04 | 00.19.22 |
| 9 | H | 10 | 15.15.48 | 15.31.24 | 00.15.36 |
| 10 | F | | 16.21.58 | 16.35.54 | 00.13.56 |
| | | | | Average | 0.24.34 |

**Table 4.2. P-Line to Button Pass Actual Data.**

From thr results of these observations, can be seen that the results of calculations from the P-Line to the Button Pass are still in accordance with the e-kanban data listed in the Summary Overflow.

**Button Pass Data**

| No | Lane | Cycle | Time in | Time out | |
|---|---|---|---|---|---|
| 1 | A | 2 | 07.45.04 | 07.49.40 | 00.04.36 |
| 2 | G | 2 | 07.45.21 | 07.54.38 | 00.09.17 |
| 3 | D | 2 | 07.49.05 | 07.51.51 | 00.02.46 |
| 4 | C | 2 | 07.51.53 | 07.52.30 | 00.00.37 |
| 5 | E | 2 | 07.52.42 | 08.01.51 | 00.09.09 |
| 6 | H | 2 | 07.56.42 | 08.00.22 | 00.03.40 |
| 7 | C | 2 | 08.01.01 | 08.01.53 | 00.00.52 |
| 8 | F | 3 | 08.02.20 | 08.08.16 | 00.05.56 |
| 9 | E | 3 | 08.06.26 | 08.11.15 | 00.04.49 |
| 10 | D | 3 | 08.10.19 | 08.19.17 | 00.08.58 |
| | H | 3 | 08.11.13 | 08.15.33 | 00.04.20 |
| | | | | Average | 0.05.00 |

**Table 4.3. Button Pass Actual Data**

From the results of these observations, can be seen that the results of Button Pass Time calculations are still in accordance with the e-kanban data listed in Summary Overflow.

**Button Pass to Line**

| Unique Code | 533C | |
|---|---|---|
| BPass Depature | Lineside Receiving | Time Elapsed |
| 13.31.25 | 13.42.41 | 00.11.16 |
| 13.56.06 | 14.06.57 | 00.10.51 |
| 14.23.08 | 14.51.20 | 00.28.12 |
| 09.29.56 | 09.56.43 | 00.13.47 |
| 10.07.56 | 10.19.25 | 00.11.29 |
| 10.36.11 | 10.53.10 | 00.16.59 |
| 11.03.16 | 11.12.35 | 00.09.19 |
| 11.25.53 | 11.35.23 | 00.09.30 |
| 12.54.20 | 13.06.35 | 00.12.15 |
| 13.47.57 | 14.00.19 | 00.12.22 |
| | Time Average | 13.36.00 |

| Unique Code | 269C | |
|---|---|---|
| BPass Depature | Lineside Receiving | Time Elapsed |
| 15.09.40 | 15.20.35 | 00.10.55 |
| 15.35.45 | 15.43.30 | 00.07.45 |
| 16.22.19 | 16.34.50 | 00.12.31 |
| 09.11.28 | 09.22.40 | 00.11.12 |
| 10.16.03 | 10.26.32 | 00.10.29 |
| 11.07.30 | 11.21.03 | 00.13.33 |
| 12.49.03 | 13.02.35 | 00.13.32 |
| 13.16.19 | 13.25.20 | 00.09.01 |
| 13.45.40 | 13.52.54 | 00.07.14 |
| 14.11.17 | 14.25.32 | 00.14.15 |
| | Time Average | 00.11.03 |

| Unique Code | 220K | |
|---|---|---|
| BPass Depature | Lineside Receiving | Time Elapsed |
| 09.14.50 | 09.20.58 | 00.06.08 |
| 10.36.40 | 10.45.35 | 00.08.55 |
| 10.57.35 | 11.06.00 | 00.08.25 |
| 13.34.17 | 13.41.40 | 00.07.23 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Time Average | |

**Table 4.4. Button Pass to Lineside Actual Data**

After observing in the field, it can be seen that the internal lead time calculated from the Button Pass to the Line Side does not match what is stated in the data in E-KanBan Time in Overflow Summary. Part 533C has a difference of 13 minutes, Part 220K has a difference of 10 minutes and Part 269C has a difference of 11 minutes. The time difference can affect the arrival of parts that can take place more quickly as can be illustrated in the picture below:

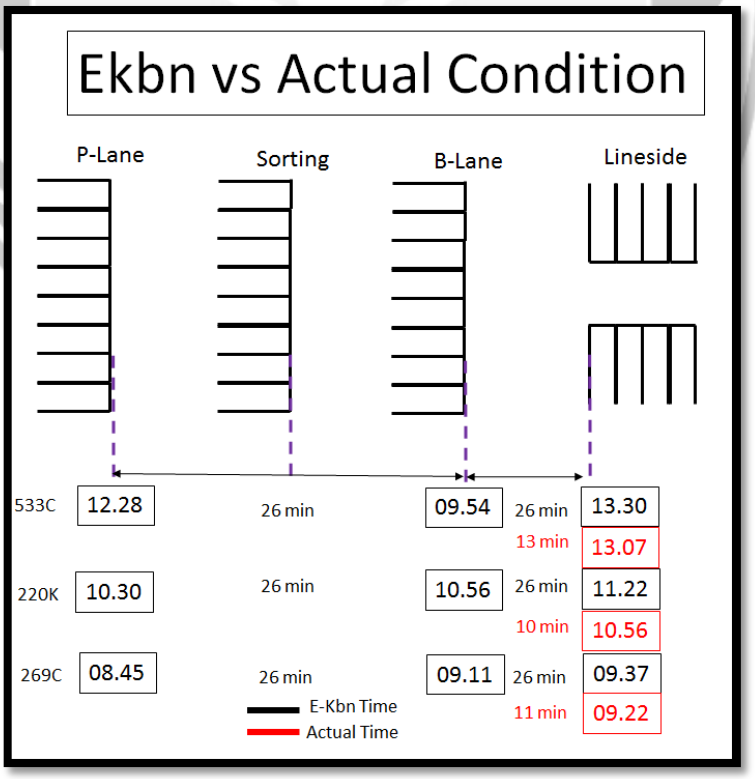



**Figure 4.27. Difference between Actual Time and eKanban Time.**

The time difference can cause inventory overflow caused by the arrival of parts faster than expected. This phenomenon can be illustrated in the Lineside Inventory chart as follows:

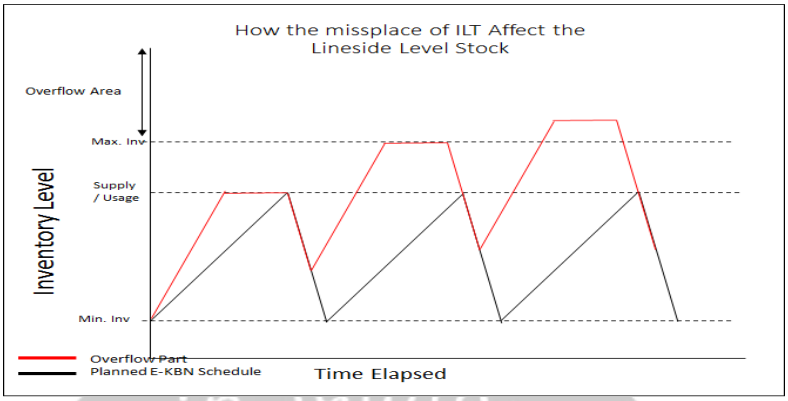



**Figure 4.27. Effect of Part Arrival on Inventory Level.**

This phenomena happens because the eKanban System still use the old process data rather than use current actual data that reduce 2 processes that can make the time required to a part flew from unloading into the lineside become faster.

**7. A3 PDCA Report**

After determining Countermeasures, the authors make A3 PDCA Reports that will be presented to the Manager as follows:

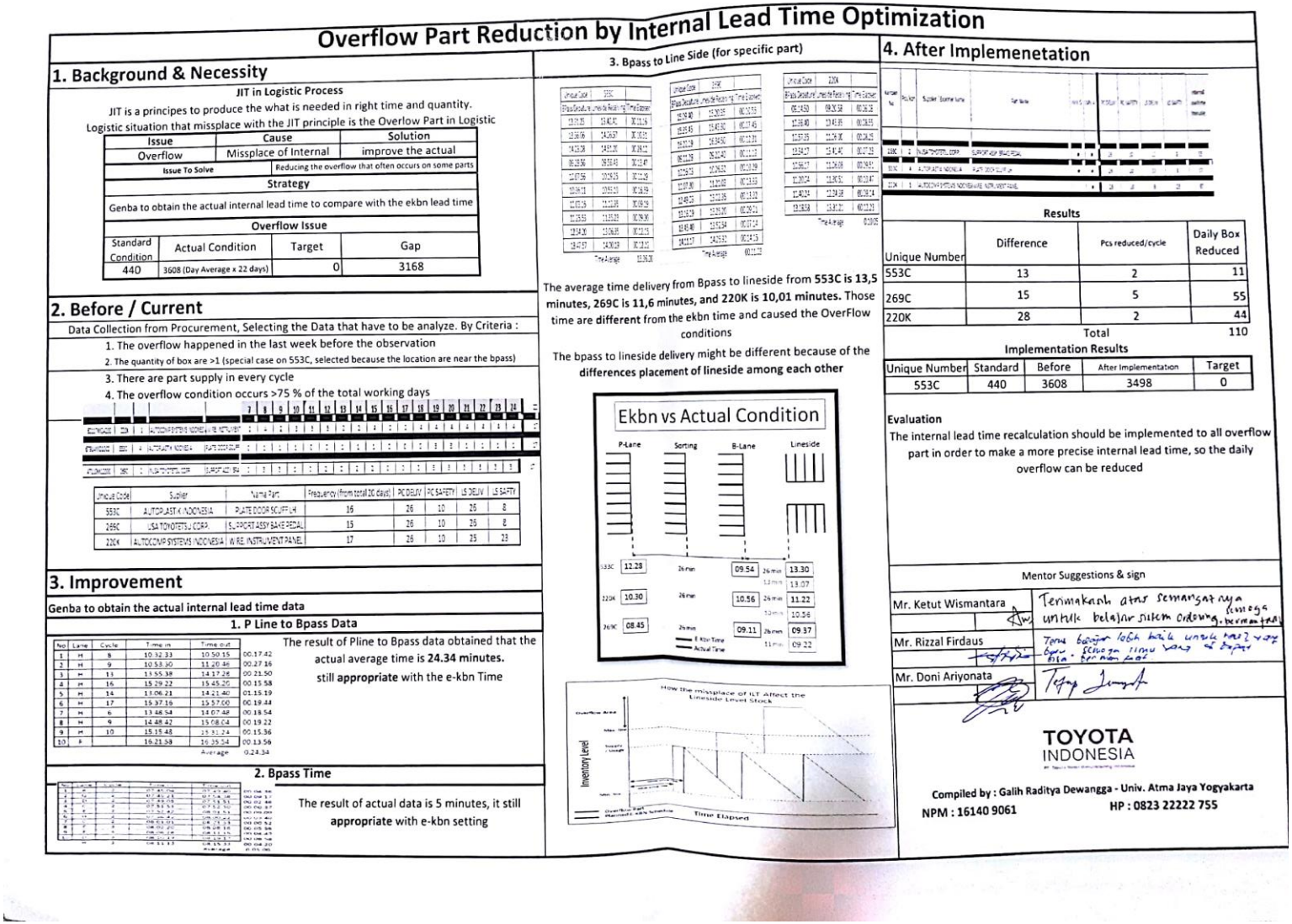



**Figure 4.29. A3 Report That Submitted to Departement Head as Proposed Improvement.**

### 4.4.2. Suggested Recommendations

In order to avoid the overflow incident, the internal components of the lead time on the Button Pass to Lineside need to be changed according to the actual situation with the following quantities.

| The result by applying the current internal lead time : | | | | | |
|---|---|---|---|---|---|
| Unique Number | Before | After | Difference | Pcs reduced | Kbn |
| 553C | 70 | 57 | 13 | 6 | 2 |
| 269C | 70 | 55 | 15 | 7 | 3 |
| 220K | 84 | 56 | 28 | 14 | 14 |

**Table 4.5. Comparison of Internal Lead Time with the number of pcs reduced.**

The time adjustment can reduce the amount of overflow by 2 kbn at 553C, 3 kbn at 269C and 14 kbn at 220K. If the amount of the previous overflow is smaller or equal to the size of the kbn, the Overflow condition in that part can be removed.

# CHAPTER 5

# CLOSING STATEMENTS

## 5.1. Conclusion

From the analysis, author conclued:

A. Case Study of PT Toyota Motor Manufacturing Indonesia's observations is the overflow incident that occurs in the Logistics section.
B. Overflow occurs due to mismatch between internal e-kanban lead time with actual conditions in the plant, because of the reducing of process in logistic.
C. Overflow will cause a high inventory level on the lineside section and cause the part cannot enter the lineside inventory area and the part will be taken to an overflow area that is not in accordance with the JIT principles applied by Toyota Motor Corporation and will distract the flow of material.
D. To fix Part Overflow problem, the company needs to make an Internal Lead Time adjustment between e-kanban data and actual data to find out more accurate internal lead time which is possible to reduce inventory level at lineside after implementing appropriate internal lead time settings.

## 5.2. Suggestion

Based on the analysis, the author conclude some suggestion:

A. Recommendations for Internal Lead Time change on Unique Parts 553C, 269C, and 220K are 57 minutes, 55 minutes and 56 minutes which will reduce the number of kanban by 2, 3 and 14.
B. Engineering Service in the Logistics Departement is expected to update the calculation of Internal Lead Time on some Parts that have close proximity to the Button Pass so that results are more accurate and Inventory Stock Levels on Lineside can be reduced and Overflow Part will be reduced also.

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