

**INTERNSHIP REPORT**  
**IN PT FRISIAN FLAG INDONESIA PLANT PASAR REBO**



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## APPROVAL

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Telah melaksanakan Praktek Kerja di Perusahaan kami, dengan keterangan sebagai berikut,

Tanggal :25 Juni 2018 s/d 25 Juli 2018  
Di bagian :Powder Blending & Packing

Demikianlah surat keterangan ini dibuat, untuk digunakan sebagaimana mestinya .

Jakarta, 01 Juli 2018  
PT. FRISIAN FLAG-INDONESIA

  
**Randi Nur Indrawan**  
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## PROLOGUE

Praise and thank you to God Almighty for the completion of practical work activities at Frisian Flag Indonesia - Pasar Rebo Plant which began on July 25, 2018 until June 25, 2018. The author would like to thank you to family, friends, lecturers, to colleagues and supervisor during practical work. Therefore on this occasion the author would like to thank:

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2. Mr. Dr. Parama Kartika Dewa as a Supervisor who has helped guide the practical work process from the beginning to completion both in making reports and examinations of practical work
3. Both of my parents and younger brother who always supportive in various matters and problems.
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5. Mr. Eko as PBP Production Manager who always helped me in carrying out practical work projects.
6. Ms. Dinar as my supervisor and user supervisor who helps me in doing practical work in the company.
7. Kallista Adhysti Willentiana as my lover and always supports me all this time.

Thus the authors hope that this practical work report can be useful to the reader. The author expects constructive criticism and suggestions for practical work reports that are still lacking. thank you.

Yogyakarta, 3 November 2018

Writer

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# CHAPTER 1

## INTRODUCTION

### 1.1. Background

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

Practical work can be said to be a venue for professional simulation of Industrial Engineering students. The paradigm that must be instilled is that during practical work students work in the company they choose. Working, in this case includes the activities of planning, designing, repairing, implementing and detaining problems. Therefore, in practical work activities carried out by students are :

1. Recognize the scope of the company
2. Follow the work process in the company continuously
3. Do and do assignments given by superiors, supervisors or field supervisors
4. Observing system behavior
5. Compile reports in written form
6. Conduct practical work exams

Industrial Engineering is an offering that deals with planning, designing, repairing, and installing integrated systems of people, machines, materials, information, energy, work methods and financial resources or briefly reviewing industrial systems. From the curriculum in PSTI UAJY, the competencies possessed by students and graduates of Industrial Engineering include:

1. Production Planning and Control
2. Inventory Management
3. Quality Control System
4. Material Handling System
5. Logistics and Supply Chain Management

6. Product Design and Development
7. Occupational Safety and Health Techniques
8. Design of Manufacturing Facilities Layout
9. Organizational Management
10. Cost Analysis
11. Industrial Feasibility Analysis
12. Process Design and CAD / CAM, and others.

In carrying out this Job Training, it is expected that the company can place and assign tasks or jobs to students in accordance with Industrial Engineering competencies.

### **1.2. Problem Identification**

Identification of problems in practical work activities at PT. Frisian Flag Indonesia Plant Pasar Rebo is:

1. Review of production time in the production of powder powder and apply the Line Balancing strategy at PT. Frisian Flag Indonesia Plant Pasar Rebo.
2. Review of leisure time (Idle Time) in the process of producing milk powder at PT. Frisian Flag Indonesia Plant Pasar Rebo.

### **1.3. Scope of Problem**

Formulation of problems in practical work activities at PT. Frisian Flag Indonesia Plant Pasar Rebo is :

1. Review of production time in the production of powder powder and apply the Line Balancing strategy at PT. Frisian Flag Indonesia Plant Pasar Rebo.
2. Review of leisure time (Idle Time) in the process of producing milk powder at PT. Frisian Flag Indonesia Plant Pasar Rebo.

### **1.4. Aim**

The things that want to be achieved through the implementation of Job Training as a compulsory subject at the University of Atma Jaya Yogyakarta are among others to increase the value of students. These values are explained below :

1. Train discipline.
2. Train the ability to interact with subordinates, colleagues, and superiors in the company.

3. Train the ability to adapt to the work environment.
4. Observe directly the activities of the company in production and running a business.
5. Completing the theories obtained in lectures with existing practices in the company.
6. Add insight into production systems and business systems.

### **1.5. Work Practice Planning**

This practical work will be begin starting from 25 June 2018 to 25 July 2018 at PT. Frisian Flag Indonesia (FFI) Jl. Raya Bogor KM 5, Pasar Rebo, East Jakarta. In this practical work, the writer was placed in the PBP (Processing Department) Department. Student hours follow the standards of the company, namely Monday to Friday at 07:30 - 16:00.

### **1.6. Benefits**

Benefits in carrying out practical work activities at PT. Frisian Flag Indonesia Plant Pasar Rebo is:


1. Develop professional knowledge, attitudes, skills and abilities through the application of science, practice and direct observation in the field
2. Open students knowledge about the industrial world
3. Knowing the application of the Line Balancing strategy in real world industrial activities, PT. Frisian Flag Indonesia Plant Pasar Rebo.
4. Train students mentally in the world of work in the future.
5. Train relationships and relationships with new employees and colleagues at PT. Frisian Flag Indonesia.
6. Fulfilling the tasks of the Practical Work course in the curriculum of the Faculty of Industrial Technology, Atma Jaya University Industrial Engineering Study Program Yogyakarta.

## CHAPTER 2 COMPANY REVIEWS

### 2.1. Company Profile

PT. Frisian Flag Indonesia Plant Pasar Rebo located on Jl. Raya Bogor Km 5, Pasar Rebo, East Jakarta, is one of the largest foreign milk (PMA) production companies in Indonesia with distributed brands namely "Frisian Flag" or Susu Bendera and established according to the Deed of Establishment No. 59 dated October 18, 1968 with the business field "Milk Processing Industry". PT. Frisian Flag Indonesia is an affiliate company of the parent company Royal Friesland Campina. Milk produced by this company varies in powder form, sweetened condensed milk, liquid milk. Besides that, PT. Frisian Flag Indonesia also produces non-dairy products, such as cheese, ice cream, butter.

Company identity is explained in the PT RPL - RPL Implementation Report. Frisian Flag Indonesia Plant Pasar Rebo in 2013 is as follows:

Company Profile	PT. FRISIAN FLAG INDONESIA
Logo	
Type of Business	Entity Limited Liability Company
Company Address	Jl. Raya Bogor Km, Pasar Rebo Jakarta Timur – 13760
Telephone Number / Fax	(021) 8410945 / (021) 8416123
Industrial Type i. Section ii. Division iii. Description	<i>iv.C. Manufacturing v.11 vi.Manufacture of beverages products (milk, dairy)</i>
Manufacture Type	Capital Status of Foreign Investment (PMA)
Business Sector	Dairy Industry
Established	1968

### **2.1.1. Company History**

The beginning of PT. Frisian Flag in Indonesia began when the Friesche Vlag brand was first imported from the Netherlands by Cooperative Condensfabriek Friesland, which has now been renamed Royal FrieslandCampina in 1922. FrieslandCampina itself is the largest cattle breeder cooperative in the Netherlands with 12,707 personnel and the majority of them are dairy farmers from the Netherlands, Germany, and has 23,675 employees in 100 companies worldwide. In 1969, FrieslandCampina began building a factory in Pasar Rebo. This factory initially only produced sweetened condensed milk (SKM) after success with sweetened condensed milk, Ciracas Factory began to produce liquid milk. The Plant Pasar Rebo was founded on November 5, 1973. The product produced at the time of establishment of the factory was sweetened condensed milk with the brand "Foremost". Various innovations have been carried out including by presenting sweetened condensed milk in the form of sachets. Then in 1977 the company was taken over by Friesche Vlag Indonesia for management reasons and changed the capital status to Indonesia - Netherlands. Since that time the product produced started using "Frisian Flag". Then PT. Foremost Indonesia in 2003 merged a company with PT. Noble Testament in accordance with the Corporate Merger Approval Letter from the Investment Coordinating Board (BKPM) No. : 999 / IIIIPMA / 2003 and renamed PT. Frisian Flag Indonesia.

### **2.2. Factory and Location**

PT. Frisian Flag Indonesia is located in Jakarta and has 2 factories and offices located in different locations.

- a. The Head Office and Factory are located at Jalan Raya Bogor Km. 5, Pasar Rebo, East Jakarta with a focus on producing milk powder.
- b. Offices and factories located at Jalan Raya Bogor Km. 26, Ciracas, East Jakarta with a focus on producing sweetened condensed milk and liquid milk.

## **2.3. Corporate Awards and Management**

### **2.3.1. Company Vision and Mission**

PT. Frisian Flag Indonesia has a vision and mission that is used as a guideline for the company so that it can achieve its goals. Vision and mission of PT. Frisian Flag Indonesia as follows:

#### **a. Vision**

Become a leading dairy-based nutrition company that provides quality products that are affordable for all consumers in Indonesia.

#### **b. Mission**

Committed to improving the nutritional quality of the Indonesian people by providing the best quality milk-based products and education about healthy lifestyles for the people of Indonesia.

### **2.3.2. Company Management**

In running the company PT. Frisian flag Indonesia applies TQM (Total Quality Management), which prioritizes quality for customer satisfaction. In TQM, implementation is not only applied to products but also to people. In other words, TQM is implemented in all aspects and elements in the factory.

### **2.3.3. Company Regulations**

Every employee who works at PT. Frisian Flag Indonesia Plant Pasar Rebo has the responsibility to obey company regulations, including:

- a. Employees come and work in accordance with the rules for the distribution of the prescribed shift.
- b. Employees who arrive late with a warning from their respective heads. If the frequency of arriving late is frequent, then sanctions are imposed in accordance with the Collective Labor Agreement (Collective Labor Agreement).
- c. Attendance when entering and returning to work.
- d. Provide and report work results to superiors in accordance with the time specified.

- e. Non-smoking employees in the company area.
- f. Employees are prohibited from using accessories that can interfere production.

#### **2.3.4. Company Awards**

PT Frisian Flag Indonesia has so far received various awards such as the following.

- a. ISO 9001: 2000 Certificate of Total Quality Management.
- b. ISO 14001 certificate on Environment Management System that regulates the production process by taking into account environmental aspects.
- c. ISO 22001 certificate on Food Safety with the application of HACCP to ensure food from critical points.
- d. OHSAS 18001 certificate on Safety, Health, and Environment for workers. OHSAS is provided with the fulfillment of the criteria set by the International Labor Organization (ILO).
- e. Good Manufacturing Practices (GMP) for the application of Hazard Analysis Critical Control Points (HACCP) in Total Quality Control.
- f. The Best Investor Award 2007 is a category of large-scale companies in Indonesia.
- g. Award certificate as a company with the title "Very Good" in compliance and performance in environmental management in DKI Jakarta Province in 2009.
- h. Award certificate from the Ministry of Environment concerning the 2010-2011 company performance improvement program (Proper) with the title "Green Rating" in 2011.

#### **2.4. Company Employment**

##### **2.4.1. Employee Rights**

Every employee who works at PT. Frisian Flag Indonesia Plant Pasar Rebo has the right to be fulfilled by the company, including:

- a. Leave Rights

Each employee has leave rights 12 times a year. If within a year the employee does not take leave, leave entitlements are forfeited, there is no accumulation in

the following year. For female employees also get monthly leave every month which is regulated by the prevailing laws and regulations.

b. Dining facilities

Every employee who works on every shift, non-shift, and overtime hours gets consumption facilities from the company 2 times each working day.

c. Health benefits

The company provides First Aid for Accidents (P3K) in every part of the workplace and polyclinic with the company physician and labor social security. If employees who are sick need special help, they will be assisted with health insurance.

d. Social Benefits

The company provides milk for free every month and at THR. The company provides welfare for its employees in the form of facilities for sports, recreation, education, cooperatives and awards.

#### **2.4.2. Worker Status**

PT. Frisian Flag Indonesia Plant Pasar Rebo is divided into 2 categories, worker status category and working hours category. Number of workers at PT. Frisian Flag-Plant Pasar Rebo is 550 people.

**a. Status of Workers**

Based on the employment status, PT. Frisian Flag Indonesia-Plant Pasar Rebo is divided into 2 categories, including:

i. Permanent Worker

Permanent workers are workers who have completed the probationary period and are appointed through an assessment letter as permanent workers.

ii. Contract Worker

Contract workers are workers who work with work agreements arranged within a certain period. Contract workers can be extended contracts or the contract is not renewed based on the company's decision.

**b. Working Hours**

Based on working hours, PT. Frisian Flag Indonesia Plant Pasar Rebo is divided into 3 categories, including:

i. Shift

Shift workers in the company are divided into shift 3 teams and 4 teams.

1. Shift 3 Team. Team shift workers are workers who work in 5 working days a week, namely Monday to Friday.

- Shift 1 (morning) : 07.00 – 15.00 WIB
- Shift 2 (noon) : 15.00 – 23.00 WIB
- Shift 3 (night) : 23.00 – 07.00 WIB

Shift shifts are done once a week, where next week's shift 1 workers change to shift 3, next week's shift 2 workers change to shift 1, and shift workers 3 next week change to shift 2. Each worker can change working hours at any time adjust the situation and conditions that occur.

ii. Shift 4 Squad

Squad 4 shift workers are workers who work in 7 working days a week, namely Monday-Sunday and holidays for 2 days a week. Holidays are arranged by each department in accordance with their needs and adjust to their respective turnaround.

iii. Non Shift

Non-shift workers work for 5 working days, namely Monday-Friday with working hours for 8 hours / day (08.00-16.00 WIB). Non-shift work hours apply to workers who are not directly related to production such as office, administration, sales and marketing).

iv. Overtime

Overtime is additional work time outside working hours if in an urgent situation or product demand increases. Every overtime done will be calculated and recorded in the monthly form of the worker.

## 2.5. Organizational Structure

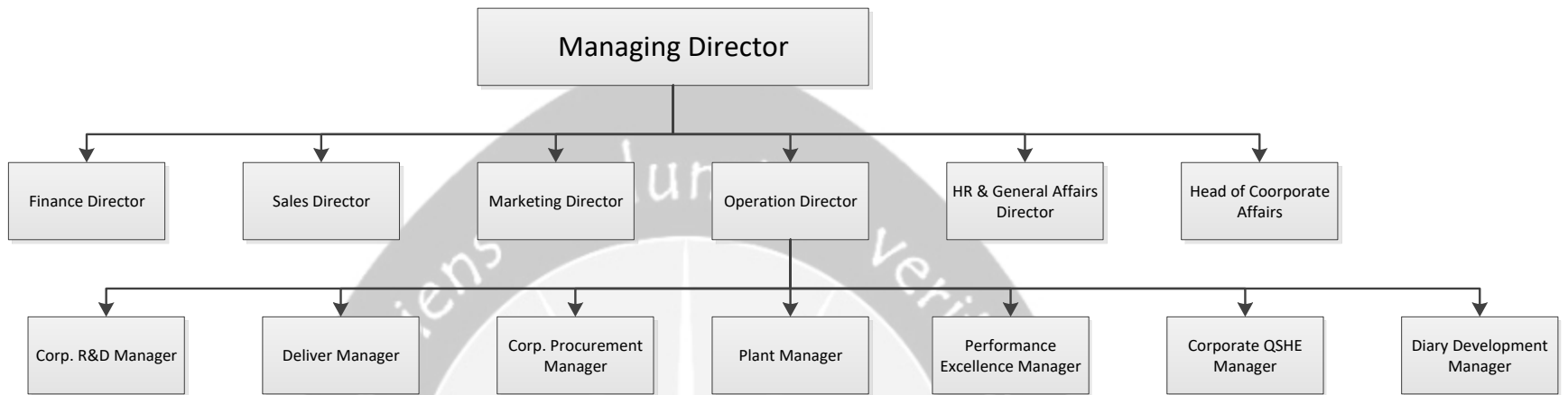
Organizational structure at PT. Frisian Flag Indonesia consists of Managing Directors, who oversee Division Directors from various divisions. Then for the level below the Division Director there are more managers who will supervise supervisors, foreman, and operators in accordance with the plant and division. While for the whole company, the division is done of course with each Job Description. Following is the division of the overall structure :

- a. Finance
- b. Sales
- c. Operation
- d. Marketing
- e. HRD
- f. Head of Corporate Affairs

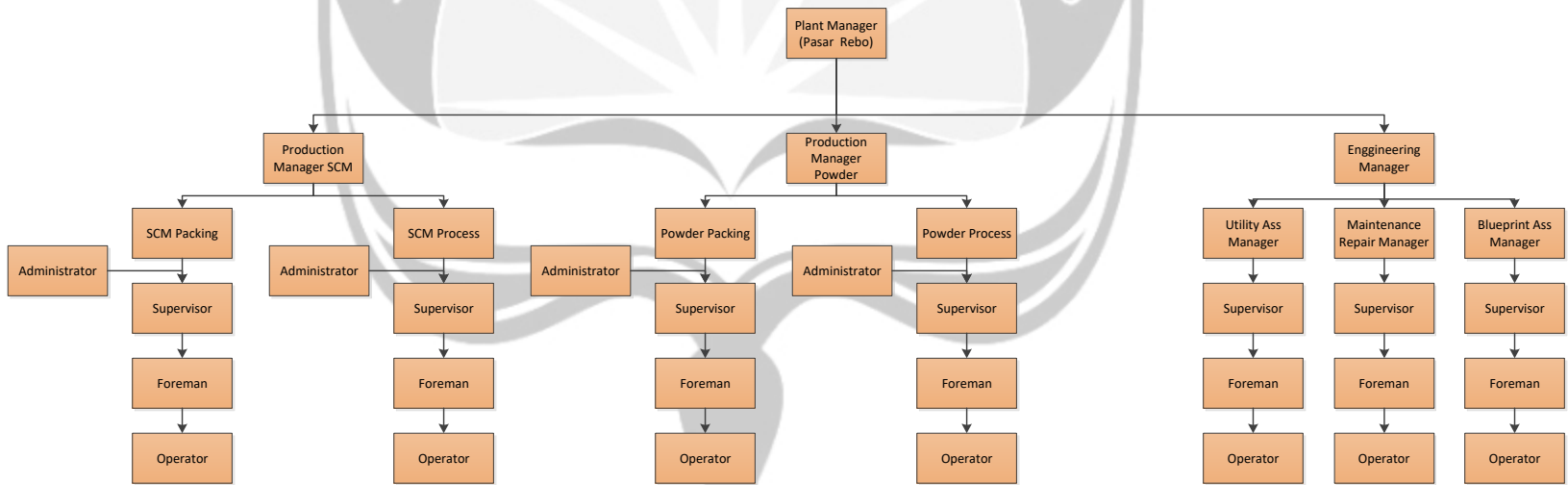
The division above is the division according to the scope of work. Finance manages finance, sales manages sales, operations manages production, marketing regulates marketing, HRD arranges recruitment and head of corporate affairs regulates calm relations out. Then for the division of positions at PT. Frisian Flag Indonesia Plant Pasar Rebo is divided into:

- a. Plant Manager
- b. Production Manager SCM
- c. Production Manager Powder





**Figure 2.1 Organizational Structure PT. Frisian Flag Indonesia**



**Figure 2. 2 Organizational Structure PT. Frisian Flag Indonesia Plant Pasar Rebo Divisi PBP**

### **2.5.1 Job Description**

Job Description is one of the important things in determining the work of various positions and divisions. Job Description plays a role to divide the workspace of each worker in one division or different divisions so as to reduce collisions in doing something. The division of work must always exist in various companies, agencies, or more precisely where there are people gathering and doing something to achieve a common goal.

Below is the organizational structure of PT. Frisian Flag Indonesia Plant Pasar Rebo and also the entire company.

#### **a. Plant Manager**

Served to be responsible for all production that occurred at PT. Frisian Flag Indonesia Plant Pasar Rebo. Starting from the production of milk powder (Powder), sweetened condensed milk and also engineer.

#### **b. Production Manager SCM**

Served to be responsible for the entire production of sweetened condensed milk in PT. Frisian Flag Indonesia Plant Pasar Rebo. Production Manager is responsible for managing supervisors, foreman, and operators in the sweetened condensed milk division.

#### **c. Production Manager Powder**

Served to be responsible for the entire production of Powder milk in PT. Frisian Flag Indonesia Plant Pasar Rebo. Production Manager is responsible for managing supervisors, foreman, and operators in the milk powder division.

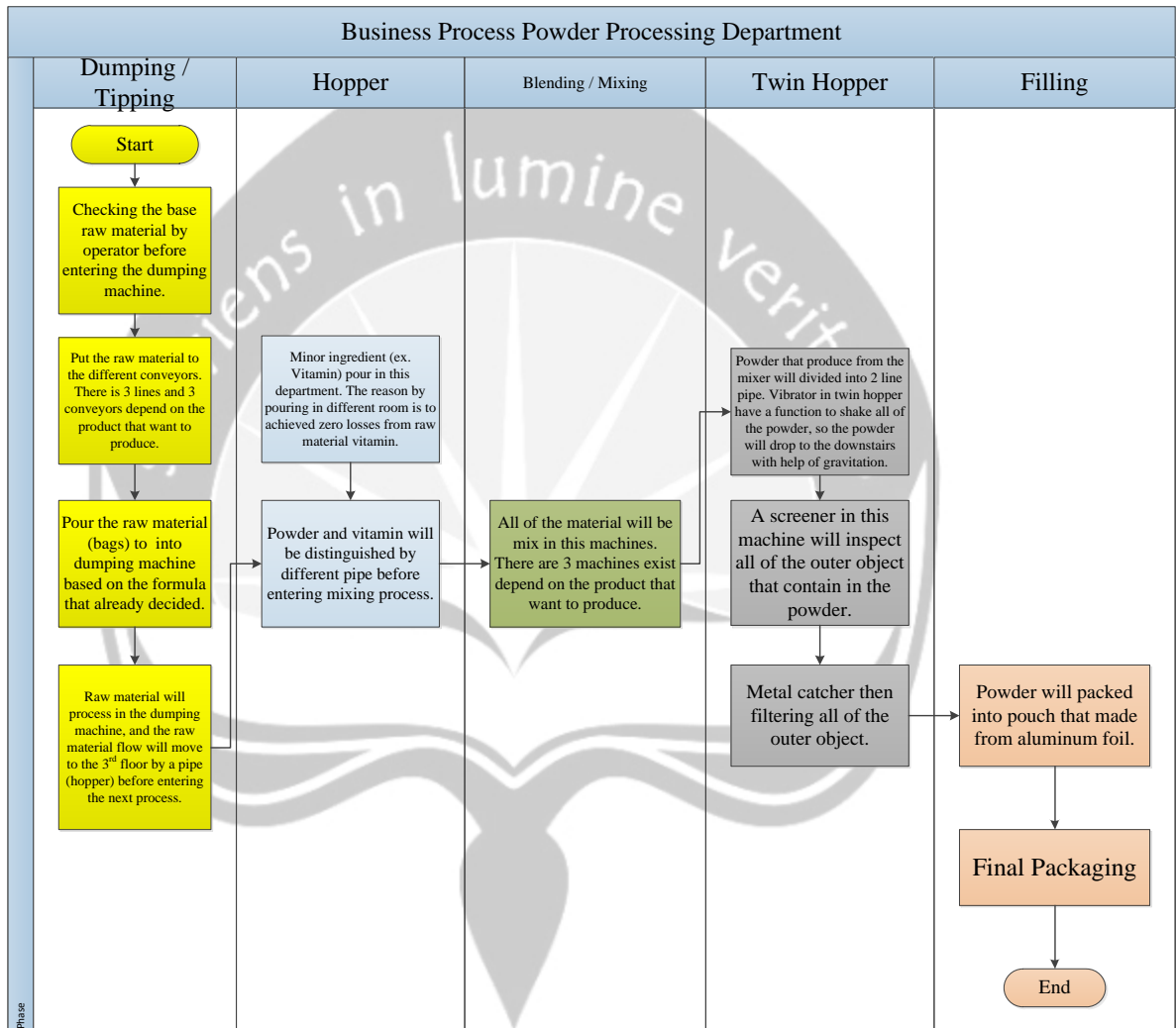
#### **d. Engineering Manager**

Served to be responsible for all machines in the production plant at PT. Frisian Flag Indonesia Plant Pasar Rebo. Engineering Manager is responsible for managing supervisors, foreman, and operators in the engineering division.

## CHAPTER 3 COMPANY OVERVIEW

### 3.1. Company Business Process

**Table 3.1 Flow Company Business Process**



The following is a business process that occurs in the Powder department at PT. Frisian Flag Indonesia Plant Pasar Rebo. The process begins with Raw Materials entering the Warehouse and being processed on a Dumping machine then after that the process starts semi-automation except in the Hopper department where there is still human power in inserting vitamins into the machine.

### 3.2. Produced Product

PT. Frisian Flag Indonesia is a company that produces milk with various variations in appearance, taste and shape. Products produced by PT. Frisian Flag Indonesia is available in the form of sweetened condensed milk, milk powder, liquid milk and milk for toddlers. The following are products produced by PT. Frisian Flag Indonesia.

**Table 3.2 PT. Frisian Flag Indonesia Product**

#### 1. Sweetened Condensed Milk

<p><b>1. <i>Frisian Flag Bendera Cocopandan Kental Manis</i></b></p> <p>Frisian Flag The Cocopandan Kental Manis flag is produced with milk-based ingredients containing macro nutrients (protein, carbohydrates and fat) and contains 6 Vitamins (Vitamins A, D3, E, B1, B3 and B6) and 4 minerals (Calcium, Phosphorus, Sodium and Potassium). Frisian Flag The Cocopandan Kental Manis flag is sweetened thick with Cocopandan flavor which can be used to add delicacy to dessert such as pudding, bread and cake topping.</p>	
<p><b>2. <i>Frisian Flag Full Cream Gold</i></b></p> <p>This product is a sweetened condensed milk product with 3 grams of protein in 1 cup of milk or equal to the protein content in half chicken eggs. This product can be consumed by all ages (except babies 0-12 months). The product is packaged in canned form weighing 370 grams, pouch weighing 220 grams, and sachets weighing 40 grams.</p>	

### **3. Frisian Flag Bendera Kental Manis**

This product is a sweetened condensed milk product containing 6 Vitamins (Vitamins A, D3, E, B1, B3 and B6) and 2 minerals (Calcium and Phosphorus), can be drunk as milk or can be combined with other foods. This product can be consumed by all ages (except babies 0-12 months). Frisian Flag Sweet Kental Flag product is packaged in cans with a weight of 370 grams, pouch weighing 560 grams, and sachets weighing 40 grams.



### **4. Frisian Flag Bendera Coklat**

This product is a sweetened condensed milk product containing 5 Vitamins (Vitamins A, D3, E, B1 and C) and 3 minerals (Calcium, Phosphorus and Manganese), can be drunk as milk or can be combined with other foods. This product can be consumed by all ages (except babies 0-12 months). Product 12 Frisian Flag Bendera Cokelat is packaged in canned form weighing 370 grams, pouch weighing 220 grams and 560 grams, and 40 grams.



### 5. *Omela Krimer Kental Manis*

This product is a sweetened thick cream that is used to add delicacy to food and drinks, such as additional coffee, tea, fruit ice and additional foods such as toast, cakes, martabak, etc. This product can be consumed by all ages (except babies 0-12 months). Products are packaged in cans weighing 370 grams.



### 6. *Frisian Flag Mut Mut*

Frisian Flag Mut Mut is a sweetened thick cream that is produced with dairy ingredients with the content of macro nutrients (protein, carbohydrates and fat) as well as a source of Vitamin A and D3 and high in Calcium and 3 other multivitamins and minerals.



## 2. Instant Milk

### 1. *Purefarm*

This product is a fresh milk product intended for consumers between adolescents and adults. The product is packed with carton pack sizes of 225 ml and 900 ml. Available in full cream flavors, Milk Flavor (Coconut Delight, Swiss Chocolate, Strawberry) and Low Fat (French Vanilla, Chocolate, Strawberry, Plain).



## 2. Kids

This product is a milk product intended for children. Products are packed with carton pack and bottles. Carton pack packaging measuring 70 ml, 115 ml, and 180 ml, while packing bottles of 120 ml and 180 ml. Available in flavors of Chocolate, Strawberry, Grape.



## 3. Family Powder Milk

### 1. Frisian Flag Purefarm Full Cream

This product is a fresh milk product intended for consumers between adolescents and adults. The product is packed with carton pack sizes of 225 ml and 900 ml. Available in full cream flavors, Milk Flavor (Coconut Delight, Swiss Chocolate, Strawberry) and Low Fat (French Vanilla, Chocolate, Strawberry, Plain).



### 2. Frisian Flag Purefarm Cokelat

Frisian Flag Purefarm Milk Powder Chocolate is produced using quality powdered milk with macro nutrients (protein, carbohydrates and fat) and high in Vitamin A, B1, B2, B3, B6 and B12, and. In 40 gr Frisian Flag Purefarm Chocolate contains 5 grams of protein.



### **3. Frisian Flag Purefarm Insta**

Frisian Flag Purefarm Instant Milk Powder is produced using quality powdered milk with the content of macro nutrients (protein, carbohydrates and fat) and high in Vitamin A, B1, B2, B6, B12, C and D. In 35 gr Frisian Flag Purefarm Instant contains 5 grams of protein.



### **4. Frisian Flag Susu Bubuk Instant Madu**

Frisian Flag Instant Milk Powder Honey is produced using quality powdered milk with macro nutrients (protein, carbohydrates and fats) and high in Vitamin A, B1, B2, C and D and high in Calcium and easily dissolved because it is in an instant form. With the taste of honey, make your child like it more. The nutritional content in Frisian Flag Instant Milk Powder Honey is formulated to support the growth of your child. In 40 gr Frisian Flag Instant Milk Powder Honey contains 5 grams of protein.



**5. Frisian Flag Susu Bubuk Instant Cokelat.**

Frisian Flag Instant Milk Powder Chocolate is produced using quality powdered milk with macro nutrients (protein, carbohydrates and fat) and high in Vitamin A, B1, B2, C and D and high in Calcium and easily dissolved because it is in an instant form.



**a. Mother Milk**

**a. Frisian Flag Mama**

Frisian Flag Mama SUPRIMA is a special drink for pregnant and lactating women with delicious chocolate flavor. Specially formulated to meet the nutritional needs of the fetus and mama. Can be consumed by pregnant and lactating mothers at once, making milk consumption more practical and economical.



**b. Frisian Flag Jelajah 1 – 3**

Frisian Flag Roaming SUPRIMA is a growth milk specially formulated for children aged 1-3 years with delicious flavors of honey, vanilla and chocolate. With the content of macro nutrients (important nutrients, protein, carbohydrates and fats), high in protein, iron, iodine, selenium, zinc, vitamin A, C & E, inulin dietary fiber and many more.



**c. Frisian Flag Karya 4 – 6**

Frisian Flag Karya SUPRIMA is a growth milk specially formulated for children aged 4-6 years with delicious honey, vanilla and chocolate flavors. Contains macro nutrients (important nutrients: protein, carbohydrates and fats), Calcium & Phosphorus, Vitamin D, Selenium & Zinc, Inulin Food Fibers, Vitamin A, C & E, and other nutrients.



**3.2.1. Bahan Baku**

The basic ingredients of milk powder production at PT. Frisian Flag Indonesia is pure milk itself, but the content - the content of various dairy products available on the market is different. The content of vitamins and other ingredient is the secret of each company and is a characteristic of available products. For the milk content contained in Frisian Flag products, it is certainly a secret and assets of the company, but the outline of the basic ingredients of making milk powder, sweetened condensed milk and liquid milk is almost the same. The following are the constituents of dairy products from PT Frisian Flag Indonesia-Plant Pasar Rebo.

**Table 3.3 Materials**

Jenis	Bentuk Fisik	Kapasitas Pertahun	Bentuk Kemasan
<b>Bahan Baku</b>			
Fresh Milk	Cair	2.854,06 ton	Tangki
Palm Oil	Cair	11.220,94 ton	Tangki
Anhydrous Milk Fat	Cair	406,56 ton	Drum 210 kg
Butter Milk <i>Powder</i>	Padat	539,14 ton	Polyline Paper Bag 25 kg
	Padat	2.072,48 ton	Polyline Paper Bag 25 kg
SMP MH (Skim Milk <i>Powder</i> Medium Heat)	Padat	15.950,91 ton	Polyline Paper Bag 25 kg
Whole Milk <i>Powder</i> Instant (for <i>Powder</i> Exports)	Padat	1.047,99 ton	Polyline Paper Bag 25 kg
Whey Permeate UACCF 352147 (for SCM Choco)	Padat	1.507,78 ton	Polyline Paper Bag 25 kg
Demin Whey <i>Powder</i> 25%	Padat	3.499,92 ton	Polyline Paper Bag 25 kg
Demin Whey <i>Powder</i> 90%	Padat	4.255,99 ton	Polyline Paper Bag 25 kg
Edible Lactose	Padat	769,09 ton	Polyline Paper Bag 25 kg
Lactose Blend (Seeding Lactose)	Padat	8,76 ton	Polyline Paper Bag 25 kg
Whey Permeate Consense 050	Padat	3.890,83 ton	Polyline Paper Bag 25 kg
Milk Protein Concentrate	Padat	219,78 ton	Polyline Paper Bag 25 kg
Sugar RS	Padat	21.250,18 ton	Polyline Paper Bag 25 kg
Sugar RE	Padat	31.609,85 ton	Polyline Paper Bag 25 kg
Frutafit HD	Padat	616,46 ton	Polyline Paper Bag 25 kg
DHA	Padat	19,51 kg	Polyline Paper Bag 25 kg
AA	Padat	19,85 kg	Polyline Paper Bag 25 kg
<b>Bahan Penolong</b>			
Vitamin	Cair/Padat	255,04 ton	Plastik 25 kg dalam Karton Box
Ingredient	Padat	1.353,63 ton	Polyline Paper Bag 25 kg
Flavour (Perisa)	Cair/Padat	447,69 ton	Polyline Carton Box 25 kg
Alumunium Foil	Padat	73.012.308	Karton Box
Duplex	Padat	50.783.582 buah	Karton Box
Paper Bag	Padat	793.680 buah	-
Weld Spout	Padat	9.011.190 buah	Karton Box
Outer Carton	Padat	23.267.424 buah	-
Lem (Glue White)	Cair/Padat	111.099 kg	Ember Plastik/Paper Bag 25 kg

Source : Departement Dairy Development Program, FFI

#### **a. Skim Milk Powder**

Skim Milk Powder is a source of animal protein where solid milk without fat is adjusted. Skim Milk Powder has characteristics that will dissolve well at a temperature of 60-70°C for ± 20 minutes..

#### **b. Butter Milk Powder**

Milk Powder or BMP is a source of animal protein and a source of fat that functions as an expression. Milk Powder Butter has characteristics that tend to dissolve more easily than SMP.

#### **c. Milk Powder Concentrate**

Milk Powder Concentrate is a powder that is used when protein levels are less than the standard. Milk Powder Concentrate adjusts protein levels in milk formulations so that they can reach the standards set. Milk Powder Concentrate has the characteristics of difficult to dissolve.

#### **d. Edible Lactose**

Edible Lactose is an ingredient used when protein levels are more than standard. Edible Lactose will adjust the protein content in the formulation according to the standards set.

#### **e. Cocoa Powder**

Cocoa Powder is a natural powdered chocolate which contains a source of protein and vegetable fat. Cocoa Powder has the characteristics of dispersing to form a suspension and is not soluble in milk mixture

#### **f. Choco Flavour**

Choco Flavor is an ingredient that gives the aroma of chocolate for chocolate sweetened condensed milk. Choco Flavor has the characteristics of easy to dissolve.

#### **g. Sugar**

Sugar is a natural sweetener and preservative for sweetened condensed milk..

#### **h. Demineral Whey Protein**

Demineral Whey Protein is a secondary substitute for chocolate sweetened condensed milk products, OMELA, and Krimer. Demin Whey Protein has the characteristics of soluble.

#### **i. Whey Permeate**

Whey Permeate is a substitute for SMP for chocolate sweetened condensed milk products, OMELA, and Krimer. Whey Permeate has the characteristics of being soluble.

#### **j. Modified Strach**

Modified Strach is a thickener and processor for chocolate sweetened condensed milk products, OMELA, and Krimer. Modified Strach has sticky and difficult to dissolve characteristics.

#### **k. Milk Flavor**

Milk Flavor is an ingredient in the form of a liquid that gives the aroma of milk for creamer products. Milk Flavor has the characteristics of soluble.

#### **l. Water**

Water acts as a solvent for solid materials.

#### **m. Evaporated Milk dan Fresh Milk**

Evaporated Milk is the process of changing the total solid fresh milk to a certain size by evaporating the water content.

#### **n. Stabilizer**

Stabilizer is a vegetable balancer for chocolate sweetened condensed milk products, OMELA, and Krimer. The stabilizer has the characteristics of a sticky liquid and disperses to form a suspension.

#### **o. CaCO<sub>3</sub> Calcium Carbonate**

CaCO<sub>3</sub> is a source of minerals and calcium that increases product viscosity.

**p. AMF (Anhydrous Melting Fat)**

AMF is a source of milk fat that softens the texture of the product. AMF has the characteristics of not soluble.

**3.2.2. Jenis dan Kapasitas Produksi Eksisting.**

PT. Frisian Flag Indonesia The Pasar Rebo Plant was established in 1968 and commercially produced in 1970. The type / production of PT. Frisian Flag Indonesia and its capacity in accordance with the Decree of the Head of BKPM No: 33 / T / INDUSTRI PERDAGANGAN / 2004 dated February 3, 2004 concerning Industrial Business Permit and Permanent Business License for Trade in the Context of Merger, No: 149 / T / INDUSTRI / 2007 concerning Permit Expansion of February 27, 2007 and No: 197/1 / IU / II / PMA / INDUSTRI / 2011 concerning Expansion Business License dated October 19, 2011 are:

- a. Sweetened Condensed Milk (SKM): 268,751.40 tons
- b. UHT milk: 40,000,000 liters
- c. Milk Liquid: 60,193,000 liters
- d. Milk Powder, Cereal, Baby Food, Ice Cream Mixes: 67,299 tons
- e. Packaging Paper Pack 1,000 ml: 3,000,000 pieces
- f. Packaging Paper Pack 200 ml: 50,000,000 pieces
- g. Plastic Bottle Packaging measuring 100 ml-1,000 ml: 42,000,000 pieces
- h. Canned Packaging: 240,000,000 pieces

PT. Frisian Flag Indonesia Plant Pasar Rebo produces 2 types of products, namely Sweetened Condensed Milk (SKM) in sachets and Milk Powder.

### **3.3. Production Process**

#### **3.1.1. Milk Powder Production Process**

Production of milk powder at PT. Frisian Flag Indonesia-Pasar Rebo Plant must go through several stages which are sterile and complex so as to achieve quality products. The process of making milk powder that occurs at PT. Frisian Flag Indonesia is more automated and less manpower, because the process is less than the thick sweet and UHT. In the production of raw milk powder available in the form of different sacks. There is a bag containing protein for milk, wheat, milk butter etc. Production of milk powder at PT. Frisian Flag Indonesia starts with the goods in the raw material storage. Then the raw material is transferred to tipping to be checked by the operator before entering the dumping process. Inspection is needed to determine how many sacks (milk, protein, wheat) are needed in the one-time mix process. Understanding one mix here is a batch of milk powder production that will take place. For mixed sati production, it usually requires 29 sacks which are a combination of several ingredients which can produce around 700kg - 750kg of milk powder. In this report the production to be discussed focuses on milk powder production.

The process is then continued with the inspection operator moving the sack that has been determined according to the company's formula to the conveyor that goes upstairs. After the specified sack, the amount is carried by the first conveyor, then the bags will go into the dumping process where in this process there will be one or two operators to move the bags to be checked before entering the machine. The operator here is tasked with cutting the sack-wrapped sacks and looking back on whether they are in accordance with the formula. Then after the bags have been cut, the operator will pour the contents of the bags into the dumping machine. In the dumping process there are three different conveyor lines. The first is milk powder for toddlers, then lanes two and three are ordinary milk powder and milk powder for pregnant women. The procedure for entering formula for milk powder is almost the same for each pathway. After the process is then the ingredients will be sucked with a vacuum Powder pipe to the third floor (at PT. Flag France Indonesia is called the 11 meter floor.) For further processing.

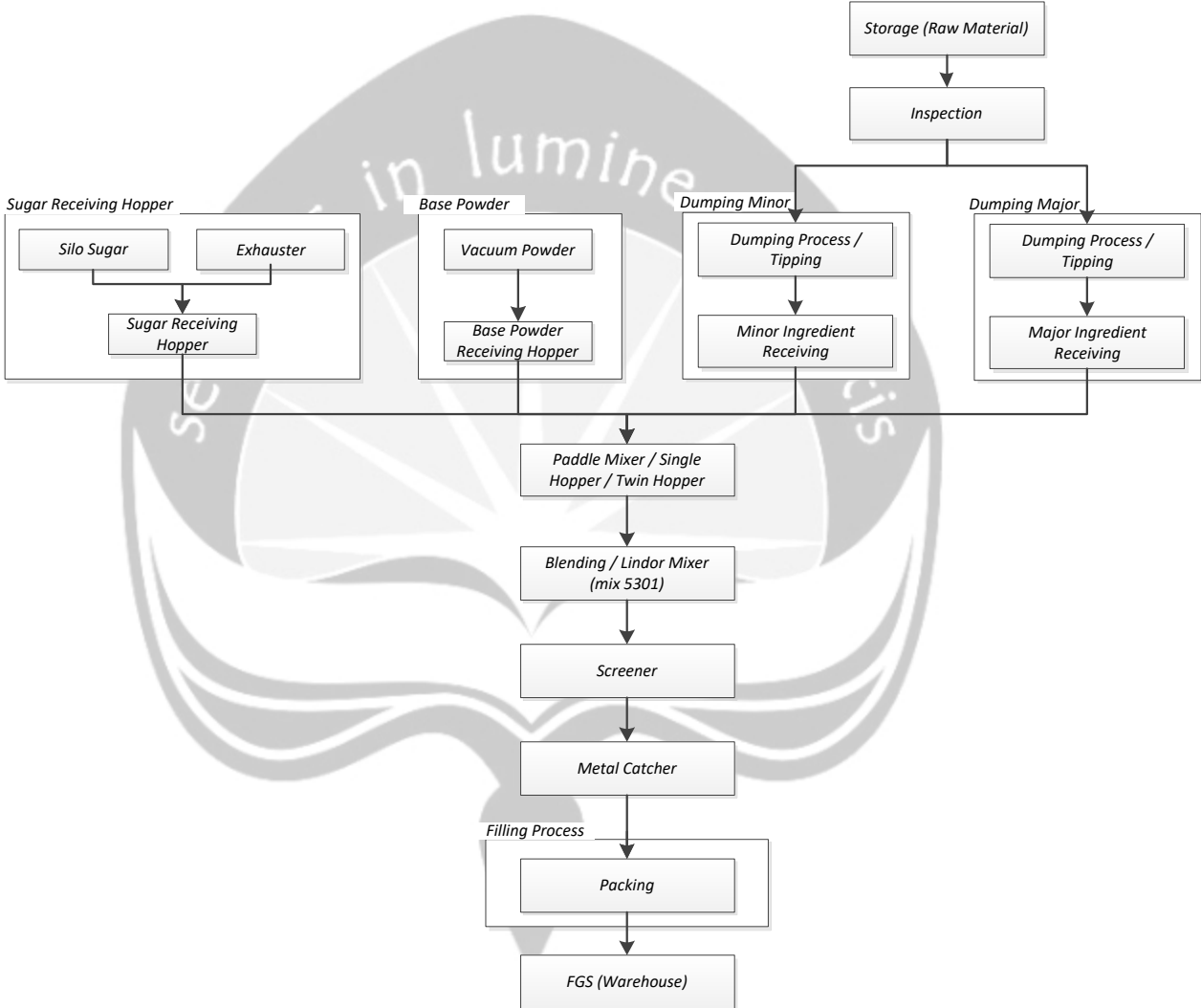
In this 3rd floor, the operator will manually put vitamin powder into the machine so that it can be mixed with the mixing process on the 1st floor. The process of inserting

vitamins is done on the 3rd floor due to reducing material losses in vitamins. If the process of inserting vitamins is done on the 1st floor of the dumping machine, the risk of vitamins will be dispersed even greater. So to minimize this process, pouring vitamins is done upstairs and has its own work station. After inserting vitamins in a vitamin storage area on the 3rd floor (Minor receiving Hopper), then the vitamins and powder that are processed in the dumping machine will go down to the 2nd floor first to be processed on the Hopper machine. Here there are 3 processing machines depending on the product. If the product for line infant (baby) then the process on the 2nd floor will be done using a mixer machine. If the ordinary product will be processed using a Hopper machine.

After being processed on the 2nd floor, the powder and vitamins will go down to the 1st floor where the two core materials will be mixed on the lindor machine. In this process the time for mixing has been determined by 4 minutes. Then if there is a foreign material contained in the powder, it will be filtered by Screener & Metal Catcher by using a sieve that has a very small filter (0.4 millimeters is the dimension that the sieve has when the powder is filtered on the machine).

After passing this stage, the powder will go down to the 0th floor (basement floor) and the filling process will be carried out where the powder will be packed according to the product requested. The powder will be packaged in a poch form or can be called a pot and coated using allumunium foil. The next process is the process of installing the outer packaging, namely the brand, image, logo and packaging..

**3.1.2. Flowchart Production Process Milk Powder**



**Figure 3.1 Flowchart Production Process Milk Powder**

## **1. Raw Material**

Raw materials are obtained from spray dryer departments in the form of sacks wrapped in plastic and brown cardboard to avoid cross contamination. Raw material will be sent to Major tipping with an intermediary vertical conveyor, where the raw material sent is only in accordance with the number of formulations needed. Before being sent, the operator must first make sure that the raw material to be used is clean and not torn.

## **2. Tipping & Dumping**

The process by which the sacks will be opened from the packaging by the operator and included in the tipping machine.

## **3. Receiving Hopper (Minor, Major, Base, Sugar)**

Receiving Hopper is a large tubular container with a capacity of up to 1.5 tons. After all the Raw Materials needed are collected, the material will be distributed to the mixer frame with a time of 120 seconds - 300 seconds. The critical point that must be considered in this process is when emptying the material, there cannot be any material left in the receiving hopper. There are four receiving hoppers used for temporary shelters of various materials used for making products.

## **4. Lindor Mixer**

The mixing process is carried out on a large frame in 90 to 240 seconds. The mixing process can only be done if all the material that is accommodated in the receiving hopper is fully in the mixer tank.

## **5. Twin Hopper**

Powder produced from the mixing process will be distributed to twin hopper. Twin Hopper is a tube with the bottom divided into 2. The vibrator contained in the twin hopper will vibrate the Powder so that the Twin Hopper Valuer is open and the powder drops.

## **6. Screener**

Screener is a filter device consisting of shifter and metal catcher. Shifter functions all the time to filter or separate powdered lumps. The powder that passes will enter the metal catcher, while those that do not pass will come out automatically and are accommodated in the side dumper for reprocess.

## **7. Metal Catcher**

Serves to capture and separate objects or granules that contain metal that is accidentally carried by powder.

## 8. Filler

A machine that functions to put Powder into aluminum foil according to the formulated dose. Set Up is done in this process if required to fill aluminum foil with a different Powder period. Aluminum is used because it has low permeability so it is difficult to penetrate light and moisture. Aluminum is given a code using ink jet print. The coding stage aims to provide an identity about the origin of the product and expire date, so that if there is a product damage, the production line can be known. Products in aluminum foil packaging are then taken using a horizontal conveyor machine for packaging.

### 3.3. Fasilitas Produksi

Facilities contained in the PBP Department include Material Handling and machines for processing raw materials into finished materials.

#### a. Forklift

Appointment of raw materials in the form of sacks in the production department using Forklifts and only a few workers who have licenses allowed to drive. The use of a Forklift in the PBP Department includes, among other things, taking materials in the form of sacks from outside into the factory, and moving the sack of raw materials to the Tipping & Dumping area before inspection by the operator.



**Figure 3.2 Forklift**

**b. Handpallet**

If the raw material to be transported is not too much, then the operator uses Handpallet to move raw materials to be more efficient and flexible. For operators from Handpallet, only a few operators have licenses that may drive the rest.



**Figure 3.3 Hand Pallet**

**c. Conveyor**

The conveyor is used in the Tipping & Dumping area to transport the finished raw material on the inspection to the Tipping & Dumping floor. Dumping & Tipping is exactly 100 meters above the inspection site, therefore it requires a conveyor as a tool.



**Figure 3.4 Conveyor**

## **CHAPTER 4**

### **STUDENT OVERVIEW**

#### **4.1. Scope of Work**

Job Training is carried out at PT. Frisian Flag Indonesia Plant Pasar Rebo on June 25, 2018 to July 26, 2018. This company is a company engaged in the production of milk. Milk produced consists of several variants such as milk powder, UHT milk, and sweetened condensed milk. Practical working hours follow office work hours (without shift), namely Monday to Friday 08.00 - 16.30 WIB. The scope of student work is in the production section. Students are placed in the Processing Department (Powder / PBP) during practical work. The task given during practical work is to analyze some of the problems contained in the Processing Department so that it can provide improvements to the course of production. During the practical work, students are guided by the Dinar MBA as Supervisor in the production process of Powder or milk powder. Students are also assisted by supervisors, foreman, and operators who work on the production floor.

#### **4.2. Responsibilities and Authorities at Work**

The responsibilities of students while doing practical work at PT Frisian Flag Indonesia Plant Pasar Rebo are as follows :

1. Carry out the tasks and jobs given by the field supervisor and complete them according to the standards set.
2. Pay attention to cleanliness and work safety when entering the production area.
3. Maintain company secrets by not taking pictures in the production area.

Student authority during the practical work at PT Frisian Flag Indonesia Plant Pasar Rebo is as follows :

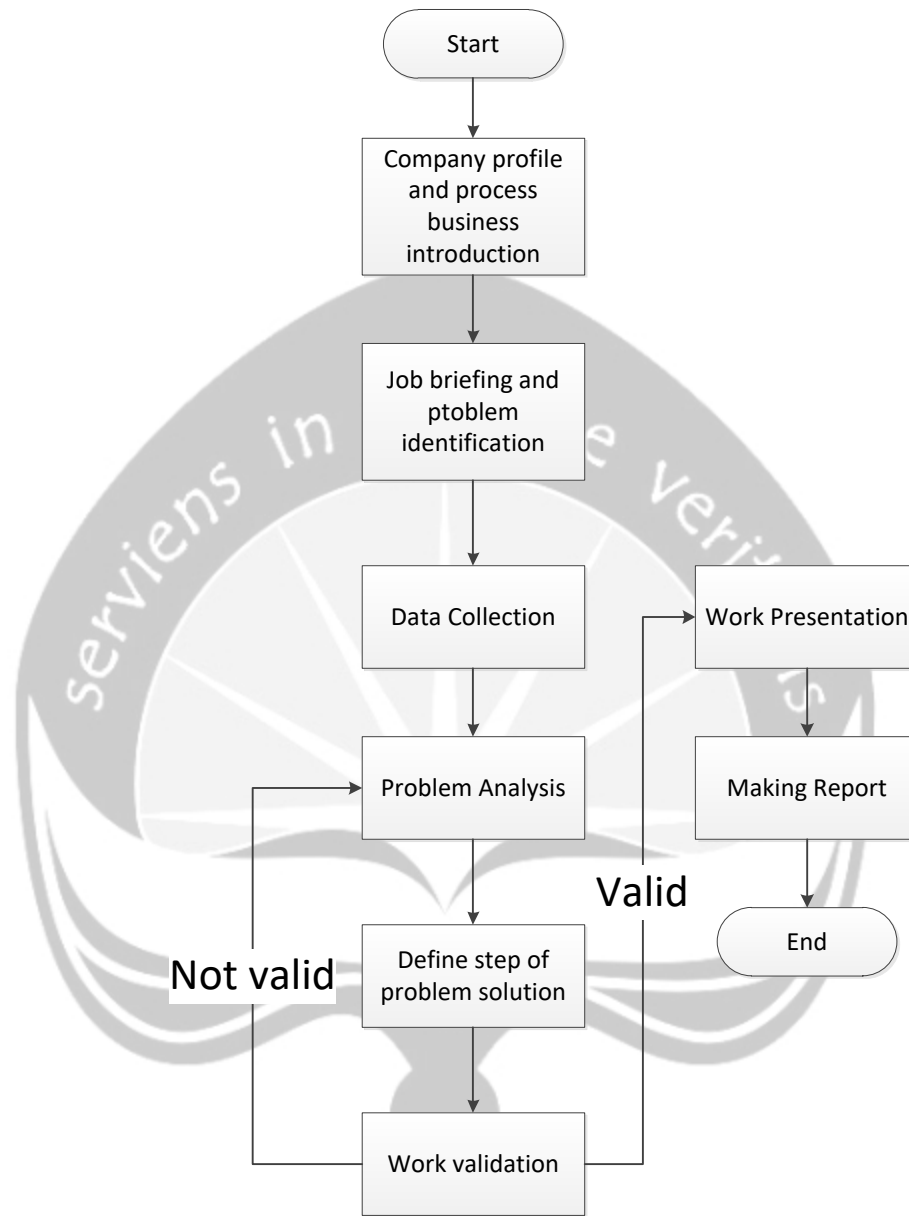
1. Students are allowed to ask questions to all staff, operators, foreman, and supervisors related to the production process..
2. Students are allowed to use any tools provided during college to solve company problems.
3. Students are allowed to request supporting files that are used as a media for problem solving and report preparation.

### **4.3. Job Implementation Methodology**

The first line of implementation of practical work at PT. Frisian Flag Indonesia Plant Pasar Rebo is a student given an introduction and information about the company, especially regarding security in the production area. Second, students are given assignments and jobs contained in the company. Third, identification of problems and data collection needed to solve problems that arise. Based on the identification of problems and existing data, an analysis is carried out to get the right solution to the problem. The final step is to make a practical work report.



### 4.3.1. Implementation Steps



**Figure 4.1 Step For Implementation**

### 4.4. Work Result

In practical work activities this time students are given assignments by lecturers and also by mentors in the intended company. For assignments from lecturers, students are given the task of making VSM (Value Stream Mapping) for the entire production process contained in the Powder Department. Then the second task carried out by

students was to analyze the effectiveness of production trajectories for the whole area, especially in dumping machines that still use human assistance. Students then determine a suitable method to analyze the problem, and students choose to use the Line Balancing method as a project when doing practical work activities.

#### **4.4.1. Improving the Number of Workers in the Dumping / Tipping**

In the process of determining the problems in the PBP Department, the authors obtained a project to analyze the production process time of the entire production in the PBP Department. The author was also given the task of analyzing the latest implementation of the PBP Department to increase the powder output quota for one mix. The implementation that occurred in the PBP Department was where the powder output pipe was enlarged in diameter. Then the author also got a related task that is finding out whether there is an ineffective work station in milk powder production in the PBP department.

##### **i. Problems in Company**

Dumping & Tipping is a process in which various raw materials in the form of sacks will be mixed into one machine. This process begins with the sacks of raw materials that will come out of the container using a knife. Then the next process is to enter the powder into the machine manually (using humans). In the problem this time the author saw that there was a waste of time due to factors of fatigue and lack of personnel working on it. Therefore, the writer for the first time made an observation to determine the actual time of the process of cutting the bag and lifting the bag before being processed using the proposed method to determine the right solution to prevent wasted time.

##### **ii. Problem Solving**

In this problem the author uses the Time Study and Balancing Line methods. The first step is to take data directly at regular intervals. The data taken is data when the worker performs activities in the Dumping & Tipping process, the Tipper to Hopper, Blending, and Filling process times. After the observation data is taken, then the adequacy and uniformity test is conducted to find out whether the data taken is sufficiently feasible to be analyzed. Then the allowance is calculated from

the workers using the Westinghouse method, the purpose of this is to find out the elements of the operator's work during the Dumping & Tipping process. After that the writer describes the value of efficiency and smoothness index to find out whether the method that was resolved is effective or not. Time data is then processed to determine the average cycle time, normal time, standard time of production activity.

**i. Work Measurement (*Time Study*)**

Time Study is an activity to determine the time needed by an operator to complete a work activity with normal conditions and tempos. Workers with records have average and trained skills. (Wignjosoebroto, 2003). Measurement is divided into two, namely:

**1. Direct Time Measurement**

Measurement is done by observing the operator directly and when the machine is working or operating. Direct time measurement must be done randomly not only in one place, then the measurement must also see if the machine and the worker stop then the observation must stop and continue when the operation returns.

**2. Indirect Time Measurement**

Measurements are only based on data viewed from the table. The time measurement does not consist of the standard time data and the movement time data.

The time measurement used in this study is the processing time to complete one mix or can be called 1 batch. The elements of activities contained in the department can be known to be a repeat activity. Not all of the time data recorded in the PBP department can be done directly because some processes are carried out automatically and control of the machine is in the operator's room. Therefore, for some automated processes, recording is done in the operator's office.

**ii. Precedence Diagram**

In applying line balancing, there needs to be an overview of the production flow from the manufacture of a product. Precedence Diagrams play an important role in making the Balancing Line. In this diagram, symbols are

displayed to facilitate the reader how to flow from the production process in a company and can see the dependence, sequence, standard time of a process. In short, this diagram traces a graphical picture of the sequence of work operations, as well as dependence on work operations with other objectives to facilitate the control and planning of activities related to it. (Baroto, 2002) Following are the symbols used in Precedence Diagrams :

1. Circle Symbol

Symbols Circle with letters or numbers inside to facilitate the original identification of an operation process.

2. Arrow Symbol

Shows dependency and sequence of operations. In this case, the operation at the base of the arrow means preceding the work operation at the end of the arrow

3. The number above the circle symbol is the standard time needed to complete each operation process.

iii. **Line Balancing**

In an industry, production planning plays an important role in making production scheduling, especially in operating arrangements or work assignments that must be carried out. This resulted in production lines being inefficient because of the accumulation of material between work stations that were not balanced with the speed of production.

A perfect balance is achieved when there are output equations from each operation in a line sequence. If the output is not the same, the maximum output may be achieved for the slowest operating line. The slowest operation causes an imbalance in the production path. Balance on the work station functions as an efficient output system. The results that can be obtained from a balanced trajectory will lead to more serious attention to work methods and processes. Trajectory balance also requires operator skills that are properly placed on existing work stations. The advantage of track balance is the division of tasks evenly so that congestion can be avoided. (Setiawan, 2000)

**Table 4.1 Table of Activity Dumping Line Infant**

Pengamatan	Aktivitas	Average	Total
<b>I</b>	Proses Conveyor	0.00	
	Mengangkat Karung/Sak	1.12	
	Memotong Sak Dengan Pisau	3.80	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.23	
	Changeover	1.00	
<b>II</b>	Proses Conveyor	0.00	
	Mengangkat Karung/Sak	0.98	
	Memotong Sak Dengan Pisau	4.73	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.17	
	Changeover	1.00	
<b>III</b>	Proses Conveyor	0.00	
	Mengangkat Karung/Sak	1.18	
	Memotong Sak Dengan Pisau	4.92	
	Proses Penyaringan Mesin	0.13	
	Cleaning	0.23	
	Changeover	1.00	
			<b>7.883333333</b>
			<b>7.466666667</b>

**Table 4.2 Table of Activity Dumping Line Gum A (Gum A Screen Tam 1/3), (Gum A Screen Wolf 2/3)**

Pengamatan	Aktivitas	Average	Total
<b>I</b>	Proses Conveyor	0.00	
	Mengangkat Karung/Sak	0.88	
	Memotong Sak Dengan Pisau	4.78	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.28	
	Changeover	1.00	
<b>II</b>	Proses Conveyor	0.00	7.95
	Mengangkat Karung/Sak	1.13	
	Memotong Sak Dengan Pisau	4.78	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.23	
	Changeover	1.00	
<b>III</b>	Proses Conveyor	0.00	8.15
	Mengangkat Karung/Sak	1.07	
	Memotong Sak Dengan Pisau	5.20	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.18	
	Changeover	1.00	
	Proses Conveyor	0.00	8.45
	Mengangkat Karung/Sak	1.07	
	Memotong Sak Dengan Pisau	5.20	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.18	
	Changeover	1.00	

**Table 4.3 Table of Activity Dumping Line Line Gum B (Screen Tan 4 A/B), (Screen Wolf 4/5)**

Pengamatan	Aktivitas	Average	Total
<b>I</b>	Proses Conveyor	0.00	7.266666667
	Mengangkat Karung/Sak	0.98	
	Memotong Sak Dengan Pisau	4.17	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.12	
	Changeover	1.00	
<b>II</b>	Proses Conveyor	0.00	7.733333333
	Mengangkat Karung/Sak	1.07	
	Memotong Sak Dengan Pisau	4.52	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.15	
	Changeover	1.00	
<b>III</b>	Proses Conveyor	0.00	8.233333333
	Mengangkat Karung/Sak	1.22	
	Memotong Sak Dengan Pisau	4.95	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.07	
	Changeover	1.00	

**Table 4.4 Table of Activity Dumping Line MS/Mainstream (Screen Wolf 8/9), (Screen Wolf 6/7)**

Pengamatan	Aktivitas	Average	Total
<b>I</b>	Proses Conveyor	0.00	8.066666667
	Mengangkat Karung/Sak	1.10	
	Memotong Sak Dengan Pisau	4.88	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.08	
	Changeover	1.00	
<b>II</b>	Proses Conveyor	0.00	7.366666667
	Mengangkat Karung/Sak	1.05	
	Memotong Sak Dengan Pisau	4.18	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.13	
	Changeover	1.00	
<b>III</b>	Proses Conveyor	0.00	7.916666667
	Mengangkat Karung/Sak	1.30	
	Memotong Sak Dengan Pisau	4.47	
	Proses Penyaringan Mesin	1.00	
	Cleaning	0.15	
	Changeover	1.00	

**Table 4.5 Table of Activity Average Time**

<b>Total Average Time (minutes/second)</b>	7.80	468.17
<b>Total Time (minutes/second)</b>	561.80	33708

Measurements made directly are measurements of work time from workers in the Dumping & Tipping process. In this process the author must describe the activities that occur in the activity. As the example in the table above the author describes the activities that occur in the process, namely lifting the bag, cutting the bag, placing the bag into the machine. In the observation of the author, the number of conveyor is 0 because the activities of the process of raw materials are transferred to the conveyor machine, the workers always accumulate raw materials before being cut first. The number of sacks stacked is approximately 29 so the author's assumption time is 0. In data retrieval there are differences in data that are far from each other. This is because the number of operators when lifting sacks varies. In one case, there were two observations of the number of operators, and after a period of time, the number of operators was one so that the time needed to do one more mix. Then the body size of the operator also varies, which results in differences in strength and durability of the operator in lifting the sack. The speed in cutting the sack can also be observed in this process, there are operators who are smart, some are not..

Table 4.6 Table of Time Process Product Fullcream

Waktu Produksi Produk Fullcream PT. FRISIAN FLAG INDONESIA																				
Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Minute)	Total Time (Second)		
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)				
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second						
BB FC HALLO	1	8	15:56	16:02	6	360	17:27	17:33	6	360	17:33	17:37	4	240	498	737.2	16	960		
	2	9	17:33	17:40	7	420	19:05	19:09	4	240	19:09	19:13	4	240	500	737.2	15	900		
	3	10	19:09	19:17	8	480	19:46	19:50	4	240	19:50	19:54	4	240	486	737.2	16	960		
	4	11	19:50	19:59	9	540	20:33	20:38	5	300	20:38	20:42	4	240	492	737.2	18	1080		
	5	12	20:38	20:48	10	600	21:14	21:18	4	240	21:18	21:22	4	240	444	737.2	a	1080		
	6	13	21:18	21:25	7	420	22:50	22:55	5	300	22:55	22:59	4	240	456	737.2	16	960		
	7	14	23:12	23:19	7	420	23:50	23:53	3	180	23:53	23:57	4	240	396	737.2	14	840		
	8	15	23:58	0:04	6	360	0:41	0:45	4	240	0:45	0:49	4	240	399	737.2	14	840		
	9	16	0:47	0:52	5	300	1:34	1:37	3	180	1:37	1:41	4	240	397	737.2	12	720		
	10	17	1:38	1:45	7	420	3:07	3:10	3	180	3:10	3:14	4	240	378	737.2	14	840		
	11	18	3:14	3:21	7	420	4:07	4:10	3	180	4:10	4:14	4	240	393	737.2	14	840		
	12	19	4:12	4:19	7	420	4:51	4:54	3	180	4:54	4:58	4	240	390	737.2	14	840		
	13	20	4:56	5:02	6	360	5:38	5:41	3	180	5:41	5:45	4	240	351	737.2	13	780		
	14	21	5:44	5:51	7	420	5:38	5:41	3	180	5:41	5:45	4	240	396	737.2	14	840		
	15	22	7:30	7:36	6	360	7:37	7:40	3	180	7:40	7:44	4	240	389	737.2	13	780		
Total Time					105	6300											203	13260		
Average Time					7	420			3,73333333				224				4	240	13,53333333	884

Time Table The above process is the observation data conducted by the author in the operator's room. The operator's office organizes and controls all machines from PBP production and as a place to distribute information to all operators in the production room. Observations were made at the operator because it was difficult to observe when the engine stopped and the engine was alive in production. When done in the operator everything will be easy because each machine is finished processing one time the powder mix, the operator will record in an observation sheet and archived. The above observations are done in minutes and seconds. Observations for Dumping & Tipping time will be compared to the records made by the operator. So that the data to be analyzed will have elements from direct observation and from the operator..

**Table 4.7 Table Time Process Filling Product Fullcream**

Filling Calculation		
Variable	Nominal	Unit
Output	2835	Product
Durasi	128	Minutes
Output per Mix	700	Kg
Per Pack (product) Weight	0.4	Kg
Product per Second	0.36914063	Product / Sec
Amount of Pack per Mix	1750	Pack per Mix
Cycle Time per Mix	645.996094	Sec / Mix
*Filling is an fully automatic machine that only need one operator to maintane the machine. The cycle per mix in filling machine cannot be determine manually because it work continuously.		

Then for the processing time, the author analyzes using the number of outputs per minute so that it can get what data is usually used for one time mix (batch). The formula used by the author is by finding the number of products per second first.

$$\text{Produk per detik} = \text{Output} / (\text{Durasi per menit} * 60 \text{ ment}) \quad (4.1)$$

Setelah diketahui berapakah jumlah produk per detik kemudian jumlah produk per detik dibagi dengan berat kemasan *Output* untuk mengetahui jumlah produk yang dihasilkan dalam satu kali *mix*

$$N' \text{ produk per mix} = \text{Output per mix} / \text{berat per produk} \quad (4.2)$$

After knowing how many products per second, then the number of products per second is divided by the output weight of the output to find out the number of products produced in one mix dengan using formula below :

$$\text{Cycle Time} = N' \text{ Produk per detik} / N' \text{ Produk per mix} \quad (4.3)$$

The processing time of Filling per one mix cannot be determined because the machine works continuously.

iv. **Data Adequacy Test**

Data adequacy test is a test used to ensure that the data obtained is sufficiently objective. Data retrieval is ideally done in large numbers, but measurements in large numbers are difficult to do because of limitations such as time, effort, and costs. In the data adequacy test there is a level of accuracy and confidence. Where the level of accuracy is the maximum permissible level of deviation from the measurement results of the actual value. While the level of confidence is a large probability that the data obtained is located in a predetermined level of accuracy. Following is the formulation of data adequacy testing :

$$N' = \frac{k}{s} \frac{\sqrt{(N \cdot \sum X^2) - (\sum X)^2}}{\sum X}$$

(4.4)

Information:

N = The amount of data taken

N ' = The actual amount of data must be taken

X = the time needed to complete an element of work

s = level of accuracy

k = confidence level

If  $N < N'$ , then the data taken is not enough so that it is necessary to retrieve data from a number of  $N' - N$ . Whereas if

$N \geq N'$  then the data is said to be sufficient.

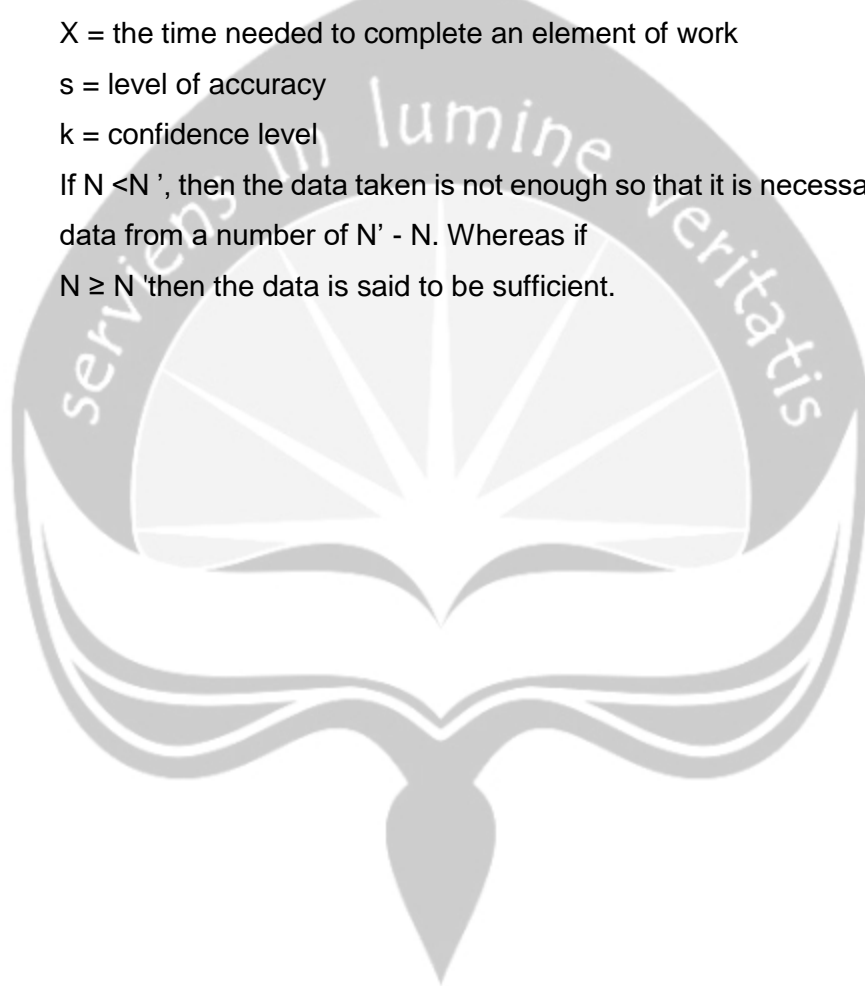


Table 4.8 Table of Dumping & Tipping Data Adequacy Test

<p style="text-align: center;"><b>Uji Kecukupan Data</b>  <b>Setiap Line Proses <i>Dumping &amp; Tipping</i></b>  <b>PT. FRISIAN FLAG INDONESIA</b>  <b>POWDER DEPARTMENT</b></p>								
No	Line Infant (Screen W 1/W10)		Line Gum A (Gum A Screen Tam 1/3)		Line Gum B (Screen Tan 4 A/B)		Line MS/Mainstream (Screen Wolf 8/9)	
	Bag Picking	Bag Cutting	Bag Picking	Bag Cutting	Bag Picking	Bag Cutting	Bag Picking	Bag Cutting
1	2	6	3	14	2	6	2	14
2	2	6	1	11	2	6	2	13
3	4	8	1	12	1	7	1	12
4	3	10	2	12	2	5	1	12
5	2	8	1	13	1	6	2	11
6	1	9	3	11	1	8	1	11
7	3	11	4	10	2	9	2	12
8	2	10	3	8	3	7	2	13
9	1	9	2	11	4	10	3	9
10	3	10	3	8	1	9	3	7
11	2	8	2	9	1	9	1	11
12	2	10	3	8	2	11	2	13
13	3	7	3	7	3	10	2	12
14	3	8	1	8	3	12	1	12
15	3	8	2	7	3	13	5	9
16	1	10	2	10	2	12	1	7
17	2	8	4	7	1	12	3	8
18	1	8	2	9	2	9	4	13
19	2	8	3	7	2	7	4	9
20	3	7	4	10	1	8	5	8
21	1	6	1	9	2	8	3	10
22	2	7	3	11	3	7	2	8
23	3	7	2	7	1	6	1	7
24	4	6	2	10	2	7	1	9
25	2	8	3	12	4	6	2	8
26	4	7	3	13	2	8	3	10
27	1	5	3	12	2	11	2	8
28	2	6	1	10	1	12	2	8
29	3	7	1	11	3	9	3	9
N	29	29	29	29	29	29	29	29
$\bar{x}$	67	228	68	287	59	250	66	293
$\Sigma^2$	4489	51984	4624	82369	3481	62500	4356	85849
k	2	2	2	2	2	2	2	2
s	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
N'	9.979950991	0.861803632	9.688581315	0.543893941	12.86986498	0.7168	10.28466483	0.521846498
Notes : If Value N > N' the data is sufficient enough to analysis								
Conclusion	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient

**Table 4.9 Table of Dumping & Tipping Data Adequacy Test**

Uji Kecukupan Data Setiap Line Proses Tipping, Tipper to Hopper, Blending PT. FRISIAN FLAG INDONESIA POWDER DEPARTMENT				
No	Tipping	Tipper to Hopper	Blending	Total Time
	Minutes	Minutes	Minutes	Minutes
1	7	7	4	18
2	12	5	4	21
3	14	6	4	24
4	6	7	4	17
5	12	7	4	a
6	9	7	4	20
7	8	7	4	19
8	9	6	4	19
9	9	8	4	21
10	5	7	4	16
11	6	7	4	17
12	6	5	4	15
13	13	5	4	22
14	9	6	4	19
15	8	6	4	18
<b>N</b>	15	15	15	15
<b>Σ</b>	133	96	60	266
<b>Σ<sup>2</sup></b>	17689	9216	3600	70756
<b>k</b>	2	2	2	2
<b>s</b>	0.05	0.05	0.05	0.05
<b>N'</b>	1.2663237	2.430555556	6.22222222	0.31658093
<b>Notes : If Value N &gt; N' the data is sufficient enough to analysis</b>				
<b>Conclusion</b>	Sufficient	Sufficient	Sufficient	Sufficient

**v. Westinghouse Adjustment Factor**

According to Sतालaksana (2006), Westinghouse is a method used to determine the adjustment factor in work time measurement where the assessment is divided into 4 factors:

**i. Skills**

Is the ability of the operator to follow the work method in accordance with the rules set.

**ii. Business**

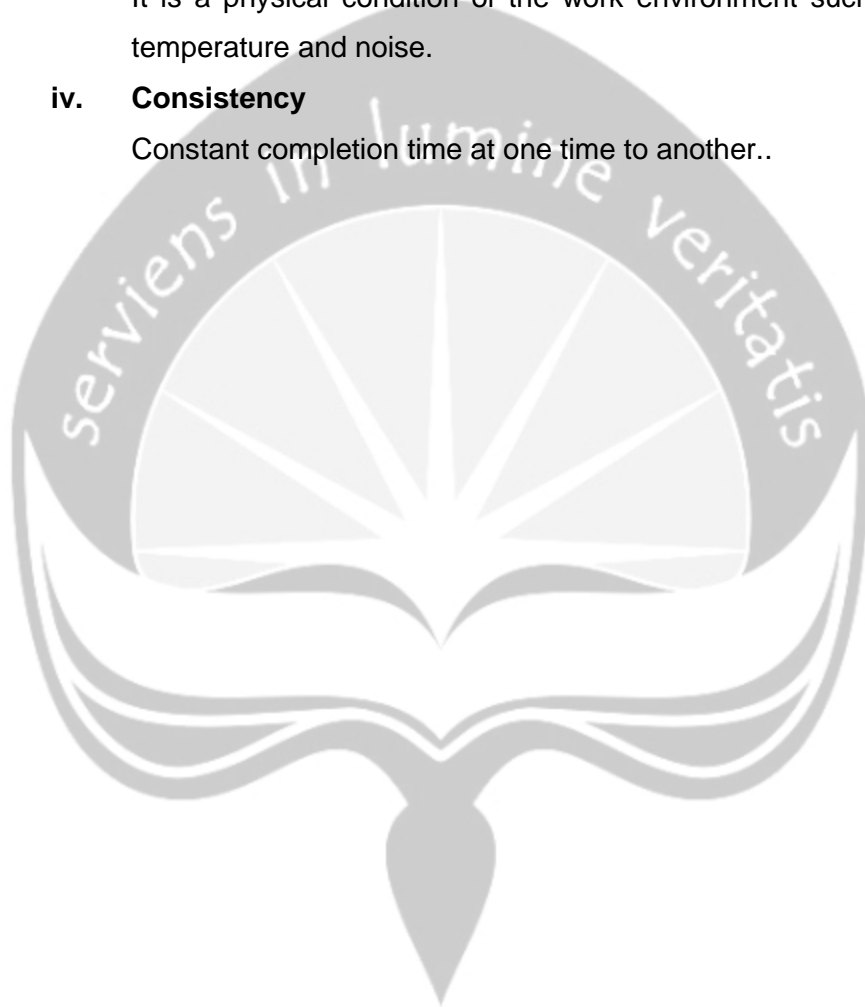
Is the operator's sincerity when doing his work.

**iii. Working Conditions**

It is a physical condition of the work environment such as lighting, temperature and noise.

**iv. Consistency**

Constant completion time at one time to another..



**Table 4.10 Adjustment Factor Table**

<b>Factor</b>	<b>Kelas</b>	<b>Lambang</b>		<b>Penyesuaian</b>
Keterampilan	Superskill	A1	+	0.15
		A2	+	0.13
	Excellent	B1	+	0.11
		B2	+	0.08
	Good	C1	+	0.06
		C2	+	0.03
	Average	D		0
	Fair	E1	-	0.05
		E2	-	0.1
	Poor	F1	-	0.16
F2		-	0.22	
Usaha	Excessive	A1	+	0.13
		A2	+	0.12
	Excellent	B1	+	0.1
		B2	+	0.08
	Good	C1	+	0.05
		C2	+	0.02
	Average	D		0
	Fair	E1	-	0.04
		E2	-	0.08
	Poor	F1	-	0.12
F2		-	0.17	
Kondisi Kerja	Ideal	A	+	0.06
	Excellent	B	+	0.04
	Good	C	+	0.02
	Average	D		0
	Fair	E	-	0.03
	Poor	F	-	0.07
Konsistensi	Perfect	A	+	0.04
	Excellent	B	+	0.03
	Good	C	+	0.01
	Average	D		0
	Fair	E	-	0.02
	Poor	F	-	0.04

**Table 4.11 Table Allowance Factor Table**

Tabel Besarnya Kelonggaran Berdasarkan Faktor-Faktor yang Berpengaruh				
Faktor	Contoh Pekerjaan	Ekuivalen Beban	Kelonggaran (%)	
<b>A. Tenaga yang dikeluarkan</b>				
1. Dapat diabaikan	Bekerja di meja, duduk	tanpa beban	Pria 0,00-6,0	Wanita 0,00-6,0
2. Sangat ringan	Bekerja di meja, berdiri	0,00-2,25 kg	6,0-7,5	6,0-7,5
3. Ringan	Menyepak, ringan	2,25-9,00	7,5-12,0	7,5-16,0
4. Sedang	Mencangkul	9,00-18,00	12,0-19,0	16,0-30,0
5. Berat	Mengayun palu yang berat	18,00-27,00	19,0-30,0	
6. Sangat berat	Memanggul beban	27,00-50,00	30,0-50,0	
7. 1 star biasa berat	Memanggul karung berat	didas 50 kg		
<b>B. Sikap kerja</b>				
1. Duduk	Bekerja duduk, ringan			0,00-1,0
2. Berdiri diatas dua kaki	Badan tegak, ditumpu dua kaki			1,0-2,5
3. Berdiri diatas satu kaki	Satu kaki mengerjakan alat control			2,5-4,0
4. Berbaring	Pada bagian sisi, belakang atau depan badan			2,5-4,0
5. Membungkuk	Badan dibungkukkan bertumpu pada kedua kaki			4,0-10,0
<b>C. Gerakan kerja</b>				
1. Normal	Ayaman bebas dari palu			0
2. Agak terbatas	Ayaman terbatas dari palu			0,5
3. Sulu	Membawa beban berat dengan satu tangan			0,5
4. Pada anggota-anggota badan terbatas	Bekerja dengan tangan diatas kepala			5-10
5. Seluruh anggota badan terbatas	Bekerja di lorong pertambangan yang sempit			10-15
<b>D. Kelelahan mata **)</b>				
1. Pandangan yang terputus-putus	Membawa alat ukur		Pencabutan baik 0,0-6,0	Buruk 0,0-6,0
2. Pandangan yang hamper terus-menerus	Pekerjaan-pekerjaan yang teliti		6,0-7,5	6,0-7,5
3. Pandangan yang terus menerus dengan fokus tetap	Pemeriksaan yang sangat teliti		7,5-12,0	7,5-16,0
4. Pandangan terus menerus dengan fokus berubah-ubah	Memeriksa cacat-cacat pada kain		12,0-19,0	16,0-30,0
5. Pandangan terus-menerus dengan konsentrasi tinggi dan fokus tetap			19,0-30,0	
6. Pandangan terus menerus dengan konsentrasi tinggi dan fokus berubah-ubah			30,0-50,0	
<b>E. Keadaan suhu tempat kerja **)</b>				
1. Tinggi	Suhu (<math>^{\circ}</math>C)	dibawah 0	Kelalahan normal didas 10	Berlelahan didas 12
2. Rendah	0-13			12-5
3. Sedang	13-22			8-0
4. Normal	22-28			0-8

Tabel Besarnya Kelonggaran Berdasarkan Faktor-Faktor yang Berpengaruh (Lanjutan)				
Faktor	Contoh Pekerjaan	Ekuivalen Beban	Kelonggaran (%)	
5. Tinggi		didas 38		8-100
6. Sangat tinggi		didas 38		didas 40 didas 100
<b>F. Keadaan atmosfer ***)</b>				
1. Baik	Ruang yang berventilasi baik, udara segar			0
2. Cukup	Ventilasi kurang baik, ada bau-bauan (tidak berbahaya)			0,5
3. Kurang baik	Adanya debu-debuun beracun atau tidak beracun tetapi banyak			5-10
4. Buruk	Adanya bau-bauan berbahaya yang mengharuskan menggunakan alat pernapasan			10-20
<b>G. Keadaan lingkungan yang baik</b>				
1. Bersih, sehat, cerah dengan kebisingan rendah				0
2. Sirkus kerja berulang-ulang antara 5-10 detik				0,1
3. Sirkus kerja berulang-ulang antara 0,5 detik				1-3
4. Sangat bising				0,5
5. Jika faktor-faktor yang berpengaruh dapat menurunkan kualitas				0,5
6. Terasa adanya getaran lantai				5-10
7. Keadaan-keadaan yang luar biasa (bunyi, kebersihan, dll)				5-15

\*\*\*) Kontras antara warna hendaknya diperhatikan

\*\*\*) Terpenting juga pada keadaan ventilasi

\*\*\*) Dipengaruhi juga oleh ketinggian tempat kerja dari permukaan laut dan keadaan iklim

Catatan pelengkap: Kelonggaran untuk kebutuhan pribadi bagi: Pria = 0,2-5%

Wanita = 2-5%

**Table 4.12 Table Process Adjustment Factors**

No.	PERFORMANCE RATING	MEASUREMENT	
		MARK	VALUE
<b>Dumping Process</b>			
Mengangkat Karung/Sak			
1	Keterampilan	Good - C2	0.03
2	Usaha	Good - C1	0.05
3	Kondisi kerja	Excellent - B	0.04
4	Konsistensi	Excellent - B	0.03
Jumlah			0.15
			1.15
-----			
No.	PERFORMANCE RATING	MEASUREMENT	
		MARK	VALUE
Memotong Sak Dengan Pisau			
5	Keterampilan	Excellent - B2	0.08
6	Usaha	Good - C2	0.02
7	Kondisi kerja	Excellent - B	0.04
8	Konsistensi	Excellent - B	0.03
Jumlah			0.17
			1.17
Jumlah Total			1.16

**Table 4.13 Table Factor Allowance**

No.	FACTOR (OPERATOR : PRIA)	ALLOWENCE %
		MARK
<b>Dumping Process</b>		
Mengangkat Karung/Sak		
1	Tenaga yang dikeluarkan	25
2	Sikap Kerja	1.5
3	Gerakan Kerja	0
4	Kelelahan mata	0.4
5	Keadaan suhu tempat kerja	0.5
6	Keadaan atmosfer	0
7	Keadaan lingkungan yang baik	0.5
Jumlah		27.9
Jumlah %		0.279
-----		
Memotong Sak Dengan Pisau		
1	Tenaga yang dikeluarkan	6
2	Sikap Kerja	1.5
3	Gerakan Kerja	0
4	Kelelahan mata	0.4
5	Keadaan suhu tempat kerja	0.5
6	Keadaan atmosfer	0
7	Keadaan lingkungan yang baik	0.5
Jumlah		8.9
Jumlah %		0.089
Jumlah Total		0.184

ii. Time Calculate and Analyze

Table 4.14 Table of Cycle Time

Average Time		Time (in Second)
Dumping / Tipping (machine observation)	468.17	444.08
Dumping / Tipping (operator observation)	420	
Hopper to Mixer		224
Waktu Blending		240
Filling Time		645.996

Table 4.15 Tabel of Normal Time, Standard Time, and Method Proposed

Station	Average Cycle Time (Sec)	Normal Time	Standard Time	Current Method	# Workers Machine(Proposed Method)			Current Method	Cycle time per worker machine (sec) (Proposed Method)		
					1	2	3		1	2	3
1	444.083	515.137	609.92	1	2	3	4	609.92	304.96	203.31	152.4804533
2	224	224	224	1	1	1	1	224	224	224	224
3	240	240	240	1	1	1	1	240	240	240	240
4	645.996	645.996	645.996	1	1	1	1	645.996	645.996	645.996	645.996

**Table 4.16 Table of Normal Time, Standard Time, and Method Proposed**

Station	Method							
	Current		1		2		3	
Formula	WsMAX - Wsi	(WsMAX - Wsi)^2	WsMAX - Wsi	(WsMAX - Wsi)^2	WsMAX - Wsi	(WsMAX - Wsi)^2	WsMAX - Wsi	(WsMAX - Wsi)^2
1	36	1301	341	116304.999	443	195973.394	494	243557.687
2	421.996	178080.703	422	178080.703	422	178080.703	422	178080.703
3	405.996	164832.828	406	164832.828	406	164832.828	406	164832.828
4	0.000	0.000	0	0	0	0	0	0
<b>Total</b>		<b>344215</b>		<b>459219</b>		<b>538887</b>		<b>586471</b>

iii. **Proposed Method and Solution**

Here is the propose method in determining the number of operators for Dumping & Tipping process.

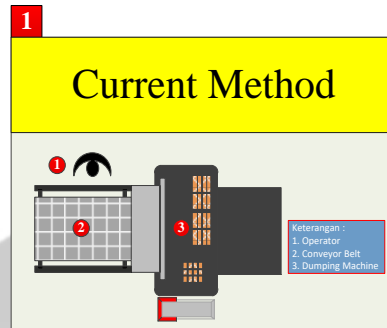


Figure 4.2 First Method

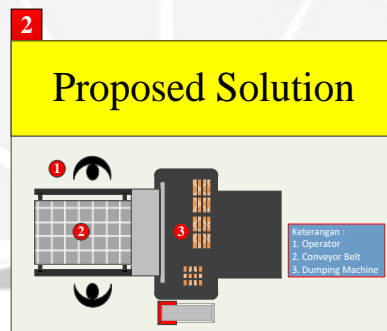


Figure 4.3 Second Method

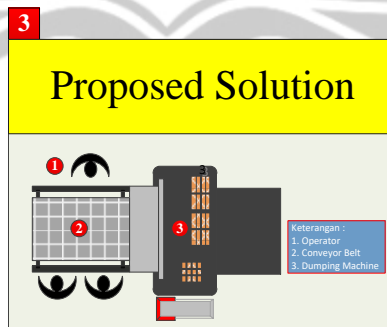
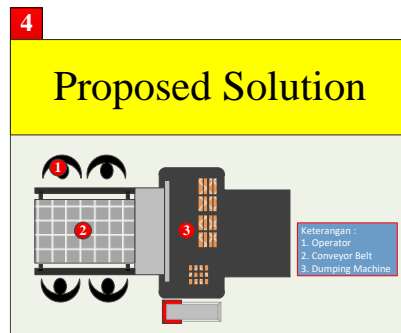


Figure 4.4 Third Method



**Figure 4.5 Fourth Method**

The propose method is to add the number of workers on Dumping & Tipping work station. The number of workers submitted in this report is 2, 3, 4. This is because in this process there are a number of non-permanent workers. Workers who work in this station can sometimes be two people, sometimes one person can. So from that the writer calculates the impact of the number of workers who lift and cut the sacks of raw materials whether it is efficient or not with the method proposed by the author and compared.

iv. Calculation of Efficiency Analysis and Best Steps

Table 4.17 Calculation

Performance Indicator	Current Method	Proposed Method		
		1	2	3
# of Workers	4	5	6	7
# of Increased Workers	-	1	2	3
Highest Cycle Time / Bottleneck Cycle Time	646.00	646.00	646.00	646.00
Total Cycle Time per Worker/Machine	1719.92	1414.957	1313.303365	1262.476547
Line Efficiency (%)	66.56	54.76	50.82	48.86
Smoothness Index	586.698291278	677.6566462	734.0891805	765.8140888

The table above is a calculation to determine the efficiency of the method proposed and the Smoothness Index of the proposed track. In this table the reader can find out the number of workers in each method and also the number of additional workers that occur. For Highest Cycle Time contained in the table is taken from the previous normal time table. Where the largest amount of time in the work station is taken from the table. For the total cycle time obtained by adding up the entire production process time contained in one method. From there Line Efficiency and Smoothness Index can be obtained.

In determining which method is best to be applied in production, the author must consider several aspects above. To determine the best trajectory in addition to finding the highest Line Efficiency and Smoothness Index which is the closest to 0. For Line Efficiency, if the number obtained is close to 100% then it can be said that the production trajectory is smooth and there are no problems. With the high value, it shows that all work stations have the same time as the specified cycle time. While the Smoothness Index shows the level of smoothness of the cross-production balance formed.

## TOTAL CYCLE TIME PER WORKER/MACHINE

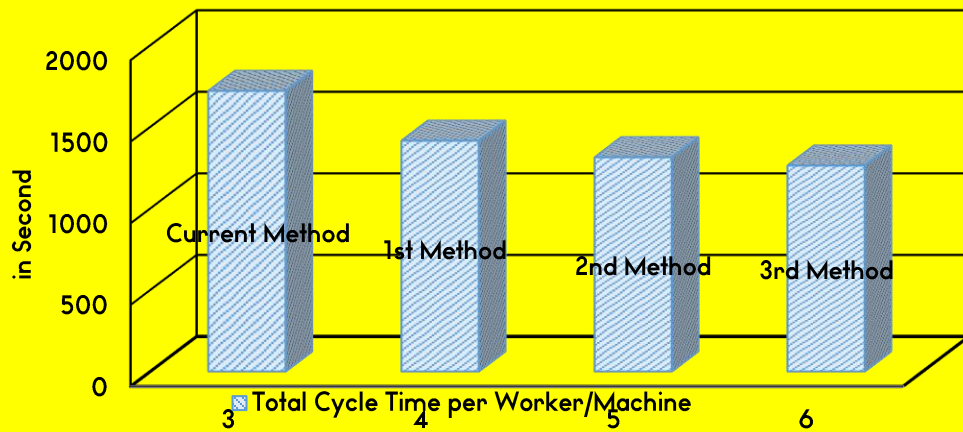


Figure 4.6 Comparison Chart of Cycle Time

## LINE EFFICIENCY (%)

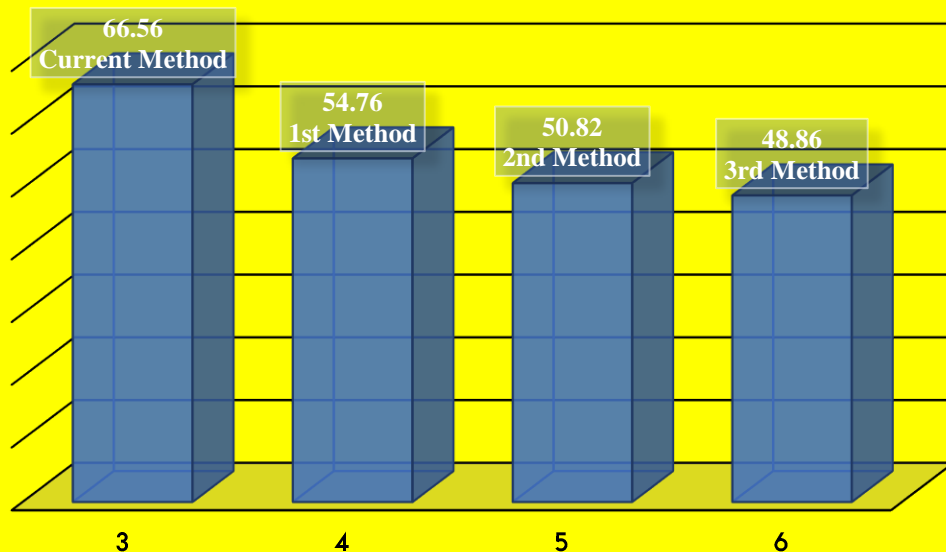


Figure 4.7 Comparison Chart of Line Efficiency

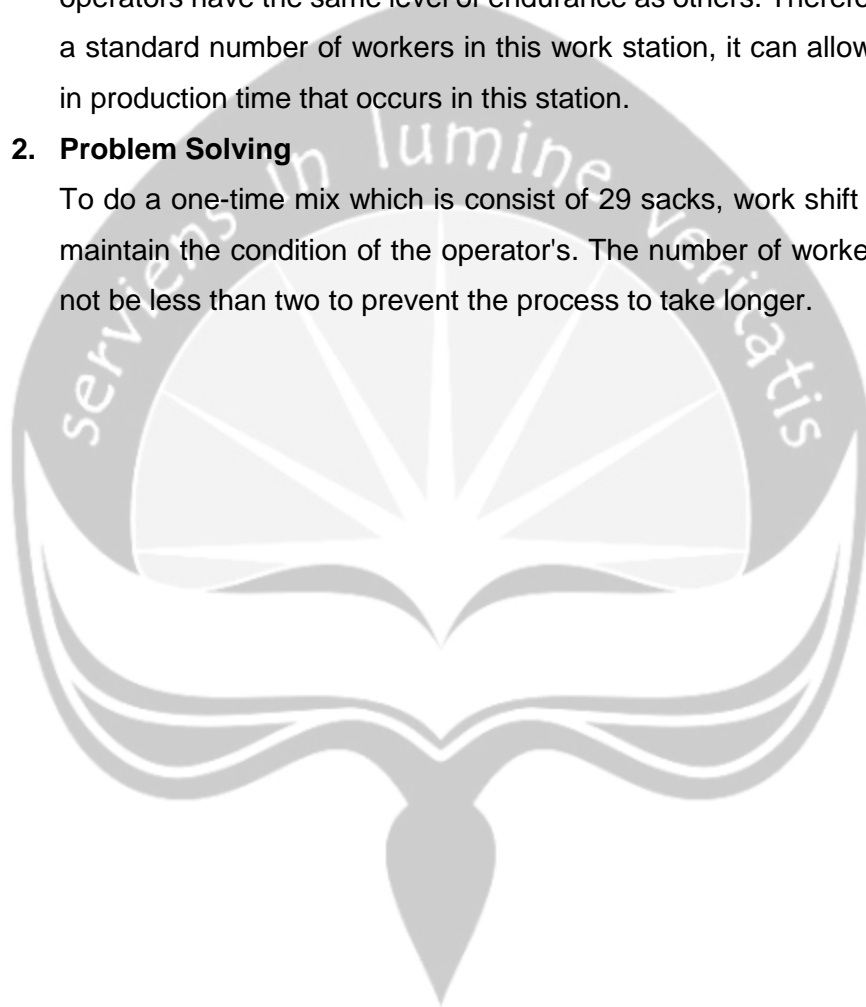
v. **Maximizing Processing time in *Dumping & Tipping***

1. **Problem in Company**

Dumping & Tipping process in the PBP department there is no standard number of workers and procedures needed in cutting sacks and sacks. If there is standardization in carrying out these procedures, maybe the process time that occurs in this department can be less than usual. Not all operators have the same level of endurance as others. Therefore, if there is a standard number of workers in this work station, it can allow a decrease in production time that occurs in this station.

2. **Problem Solving**

To do a one-time mix which is consist of 29 sacks, work shift is needed to maintain the condition of the operator's. The number of workers must also not be less than two to prevent the process to take longer.



#### 4.4.2. Value Stream Mapping

### VALUE STREAM MAPPING PT. FRISIAN FLAG INDONESIA PLANT PASAR REBO PBP DEPARTMENT

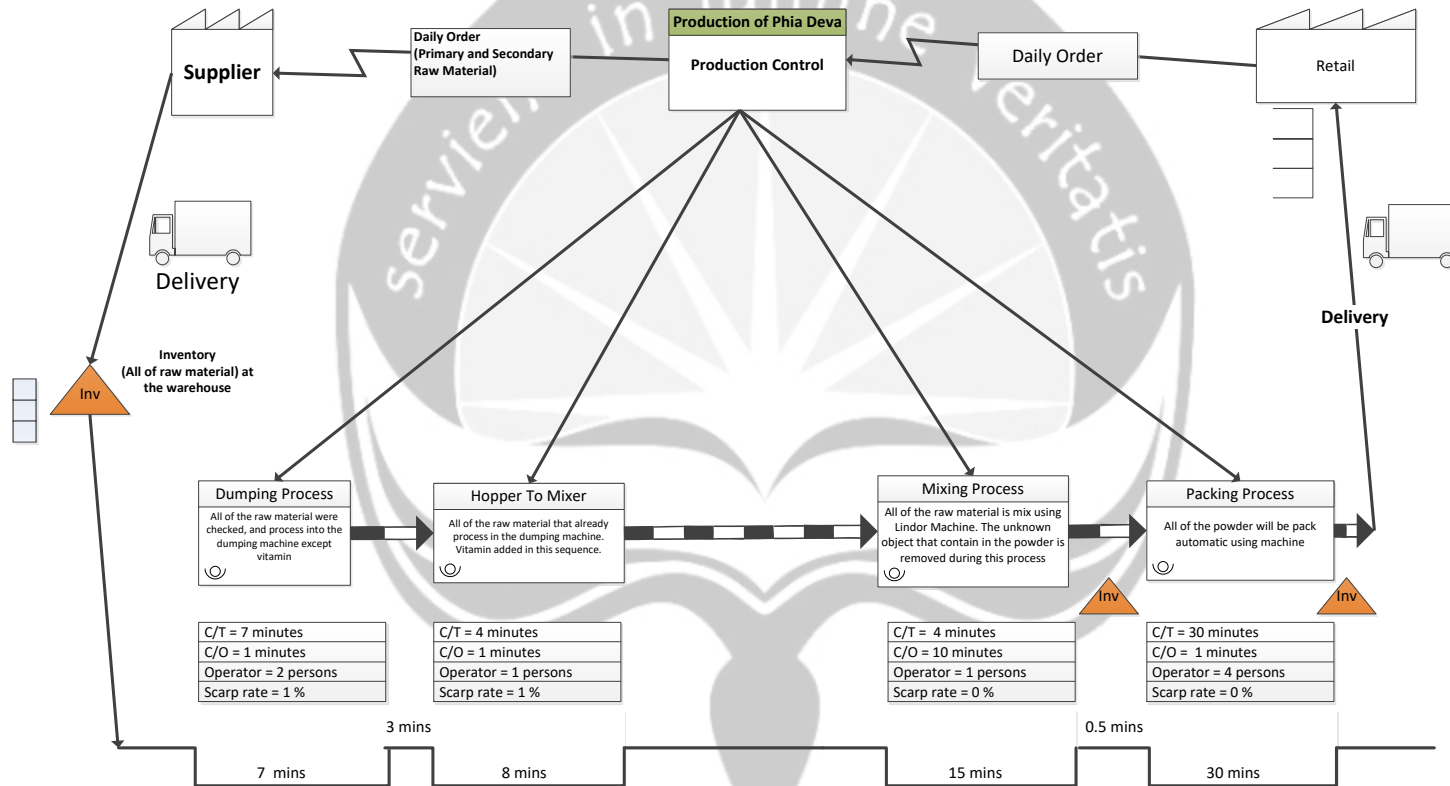


Figure 4.8 Value Stream Mapping of PT. Frisian Flag Indonesia

#### **4.4.2.1. Definition**

Values Stream Mapping (VSM), is one of the tools from Lean Manufacturing that is useful for clearly seeing the production flow of a product. Starting from the supplier to the customer. VSM is made in the form of flow maps and is used to analyze the flow of material and information needed by customers. This tool was first used by Toyota and until now it has turned into an important tool in the industrial world. The benefits of VSM in general are to help improve business processes and evaluate if there is inefficiency from the product trajectory. Advantages of VSM :

#### **4.4.2.2. Element on VSM**

##### **a. Supplier**

Raw material contained in PT. Frisian Flag Indonesia Plant consists of ingredient powder used to make milk powder. Materials that supply PT. Frisian Flag Indonesia includes wheat flour, vitamins, flavor, etc. To extract from pure milk, PT. Frisian Flag Indonesia also takes from dairy farms in West Java. The location and location of the Milk is the secret of the factory. The raw material is lifted using a truck and placed in a warehouse after arriving at the factory.

##### **b. Storage**

Powder storage of raw materials is placed in a warehouse and sorted by type. For example, vitamin powder will be separated with wheat powder, as well as other powders. For pure milk originating from livestock, it has its own storage area. A place that is used to store pure milk before being processed into milk powder, namely SILO.

##### **c. Manufacture**

PT. Frisian Flag Indonesia Pasar Rebo Plant is a central factory that produces all powder products and most sweet thick products. In this report the authors observe the production of powdered milk only. The manufacturing or manufacturing process of milk powder itself starts from the main raw material and vitamins are mixed in the tipping machine, then processed using a linder machine to mix. And the final stage is packing milk powder and the inclusion of brands in milk powder.

##### **d. Retailers**

Finished products from PT. Frisian Flag Indonesia can be obtained at stores and markets widely in Indonesia. Frisian Flag is also one of the largest dairy products

in Indonesia. Therefore, it is not wrong if this product can be obtained easily because the products from Frisian Flag are one of the daily needs of the majority of people in Indonesia. The level of needs of consumers greatly affects the distribution of products. The high level of demand from consumers must be directly proportional to the availability of the product, so that the goals and profits can be achieved.

#### **4.4.2.3. Problem in VSM**

##### **a. Manufacture**

In the process of producing milk powder at PT. Frisian Flag Indonesia Plant Pasar Rebo supervisors and managers are always looking for search so that production in the department can run as effectively as possible. When the writer did the Job Training, the author got the task to analyze the dampat before and after the innovation of the milk powder production department. PBP Department innovates by enlarging the dimensions of the production pipeline in the lindor machine (mixing process). The results of the data obtained are, with the innovation in production pipelines, the operating time for 1 time mix of milk powder can be reduced. By reducing operating time faster, the 1-week target which usually reaches 100-110 mix can be exceeded. This can affect the overtime of workers as well, the greater the demand from the community, the greater the target mix per week. This affects the duration of overtime of workers and also the cost of overtime workers. The following below is a table of time before and after implementation along with the differences.

**Table 4.18 Time Before Implementation**

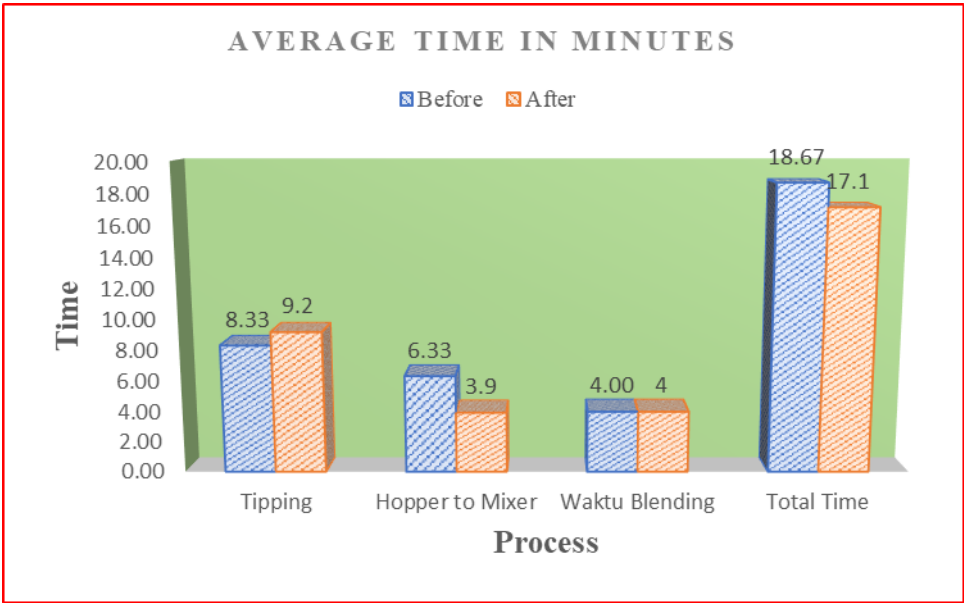
Perbandingan Waktu Produksi Produk 4,5,6 Honey 15 MIX, LINDOR 2 PT. FRISIAN FLAG INDONESIA																						
Before																						
Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Minute)	Total Time (Second)				
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)						
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second								
4.5,6 Honey	1	36	15:10	15:22	12	720	15:24	15:29	5	300	15:29	15:33	4	240	0	737.2	21	1260				
	2	37	15:29	15:37	8	480	15:39	15:44	5	300	15:44	15:48	4	240	0	737.2	17	1020				
	3	38	15:44	15:53	9	540	15:56	16:02	6	360	16:02	16:06	4	240	23	737.2	19	1140				
	4	39	16:02	16:10	8	480	16:12	16:18	6	360	16:18	16:22	4	240	13	737.2	18	1080				
	5	40	16:18	16:24	6	360	16:26	16:32	6	360	16:32	16:36	4	240	53	737.2	16	960				
	6	41	16:32	16:39	7	420	16:41	16:47	6	360	16:47	16:51	4	240	46	737.2	17	1020				
	7	42	16:47	16:54	7	420	16:56	17:02	6	360	17:02	17:06	4	240	128	737.2	17	1020				
	8	43	17:02	17:10	8	480	17:12	17:18	6	360	17:18	17:22	4	240	228	737.2	18	1080				
	9	44	17:18	17:25	7	420	17:27	17:32	5	300	17:32	17:36	4	240	200	737.2	16	960				
	10	45	17:32	17:46	14	840	17:48	17:54	6	360	17:54	17:58	4	240	0	737.2	24	1440				
	11	46	17:59	18:02	3	180	18:25	18:31	6	360	18:31	18:35	4	240	-4.5	737.2	13	780				
	12	47	19:13	19:25	12	720	19:27	19:42	15	900	19:42	19:46	4	240	-0.9	737.2	21	1260				
	13	48	19:42	19:51	9	540	19:51	19:56	5	300	19:56	20:00	4	240	7	737.2	18	1080				
	14	49	19:56	20:04	8	480	20:04	20:10	6	360	20:10	20:14	4	240	5	737.2	18	1080				
	15	50	20:10	20:17	7	420	20:19	20:25	6	360	20:25	20:29	4	240	90	737.2	17	1020				
Total Time			125				7500				95				60		3600		280			
Average Time			8.33				500				6.33				380		4.00		240		18.6666667	

**Table 4.19 Time After Implementation**

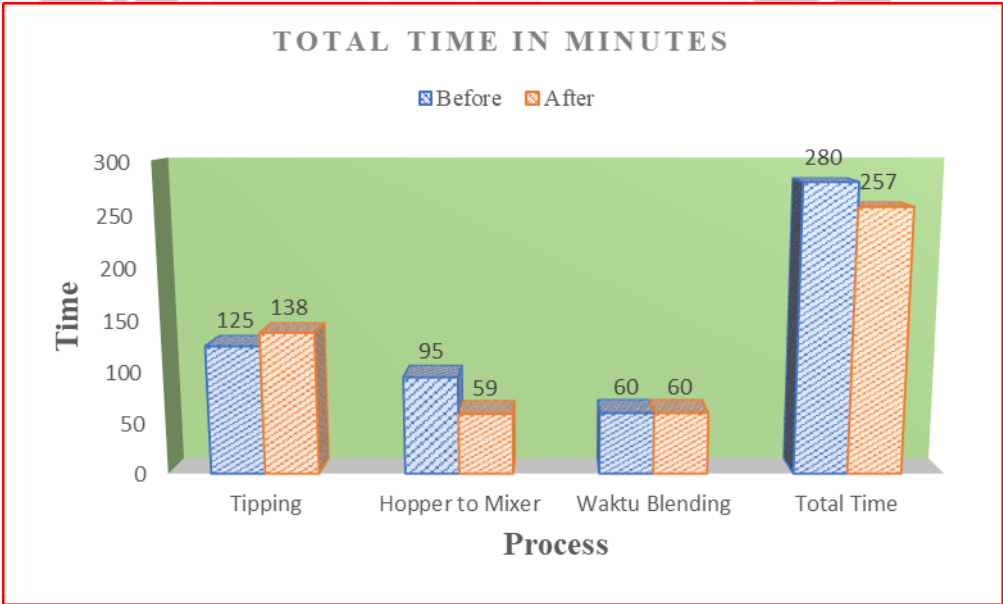
Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Minute)	Total Time (Second)				
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)						
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second								
4.5,6 Honey	1	30	23:12	23:19	7	420	23:34	23:38	4	240	23:38	23:42	4	240	316	775.5	15	900				
	2	31	23:38	23:53	15	900	23:58	04:02	4	240	04:02	04:06	4	240	342	775.5	23	1380				
	3	32	04:03	04:12	9	540	04:20	04:24	4	240	04:24	04:28	4	240	233	775.5	17	1020				
	4	33	04:25	04:35	10	600	04:40	04:44	4	240	04:44	04:48	4	240	243	775.5	18	1080				
	5	34	04:45	04:54	9	540	14:06	14:09	3	180	14:09	14:13	4	240	218	775.5	16	960				
	6	35	14:09	14:17	8	480	14:24	14:28	4	240	14:28	14:32	4	240	224	775.5	16	960				
	7	36	14:28	14:36	8	480	14:50	14:54	4	240	14:54	14:58	4	240	148	775.5	16	960				
	8	37	14:54	15:03	9	540	15:14	15:18	4	240	15:18	15:22	4	240	146	775.5	17	1020				
	9	38	15:18	15:29	11	660	15:34	15:38	4	240	15:38	15:42	4	240	189	775.5	19	1140				
	10	39	15:29	15:47	18	1080	15:57	16:01	4	240	16:01	16:05	4	240	203	775.5	16	960				
	11	40	16:01	16:08	7	420	16:22	16:26	4	240	16:26	16:30	4	240	355	775.5	15	900				
	12	41	16:27	16:37	10	600	16:45	16:49	4	240	16:49	16:53	4	240	272	775.5	18	1080				
	13	42	16:52	17:01	9	540	17:12	17:16	4	240	17:16	17:20	4	240	247	775.5	17	1020				
	14	43	17:17	17:27	10	600	17:34	17:38	4	240	17:38	17:42	4	240	311	775.5	18	1080				
	15	44	17:29	17:47	18	1080	17:55	18:03	8	480	18:03	18:11	8	480	309	775.5	16	960				
Total Time			138				8280				59				3540		257		15420			
Average Time			9.2				552				3.93				236		4		240		17.1333333	

**Table 4.20 Time Implementation Analysis**

Analisis Pengamatan									
Average Time (in Minutes)	Before	After	Total Time (in Minutes)	Before	After	Process	Percentase	Kesimpulan	
Tipping	8.33	9.2	Tipping	125	138	Tipping	-10.40%	Increase	
Hopper to Mixer	6.33	3.9	Hopper to Mixer	95	59	Hopper To mixer	37.89%	Decrease	
Waktu Blending	4.00	4	Waktu Blending	60	60	Waktu Blending	0.00%	-	
Total Time	18.67	17.1	Total Time	280	257	Total Time	8.21%	Decrease	



**Figure 4.9 Comparison Chart of Average Time Before and After**



**Figure 4. 10 Comparison Chart of Total Time Before and After**

## CHAPTER 5

### CLOSING

#### 5.1. Conclusion

Conclusions obtained through practical work at PT. Frisian Flag Indonesia Plant Pasar Rebo is a company that will always make improvements to optimize its production. Improvement carried out can be seen in optimizing the time of the dumping and mixing process and adding batch capacity for dumping by adjusting the amount of output and production pipelines.

#### 5.1.2. Line Balancing

For research and analysis of the Balancing Line from the author, it is translated into the following points. :

1. Productivity of powder production is directly proportional to the speed of production.
2. The speed of production is caused by the number of workers in the dumping division when entering ingredients from milk powder.
3. The strength of each worker is different, which causes different processing times in the dumping machine.

#### 5.1.3. Value Stream Mapping

1. Implementation of the new pipe reduce the production time very significant.
2. Widening the diameter of the new pipe on the lindor machine makes the production process time decrease dramatically.

#### 5.2. Solution

After analyzing and calculating the data taken at the company, there is suggestions to solve the problems at PT. Frisian Flag Indonesia. The following suggestions can be applied in the company in accordance with the two methods proposed :

#### 5.2.1 Line Balancing

Standardization of the number of workers in the Dumping & Tipping process expected to prevent fatigue from operators and workers. Then also to achieve a high level of productivity to reduce waste.

### 5.2.2. Value Stream Mapping

The application of the widening of the pipe diameter on the lindor machine proved effective. Therefore the company must implement this solution in other places but still must consider if there is a machine breakdown and bottleneck..



## REFERENCES

- Bedworth, David D. & Bailey, James A. 1987. *Integrated Production Control System*. Canada: John Wiley & Sons
- Groover, Mikell P. 2001. *Automation, Production System, and Computer – integrated Manufacturing 2<sup>nd</sup> edition*. New Jersey: Prentice-Hall
- Sutalaksana, I.Z. et, al. 2006. *Teknik Perancangan Sistem Kerja*. Bandung: Penerbit ITB.



## APPENDIX

### 1<sup>st</sup> Appendix Comparison Table Production Table

*Production Time Table 4,5,6 Honey 15 MIX, LINDOR 2 (Before)*

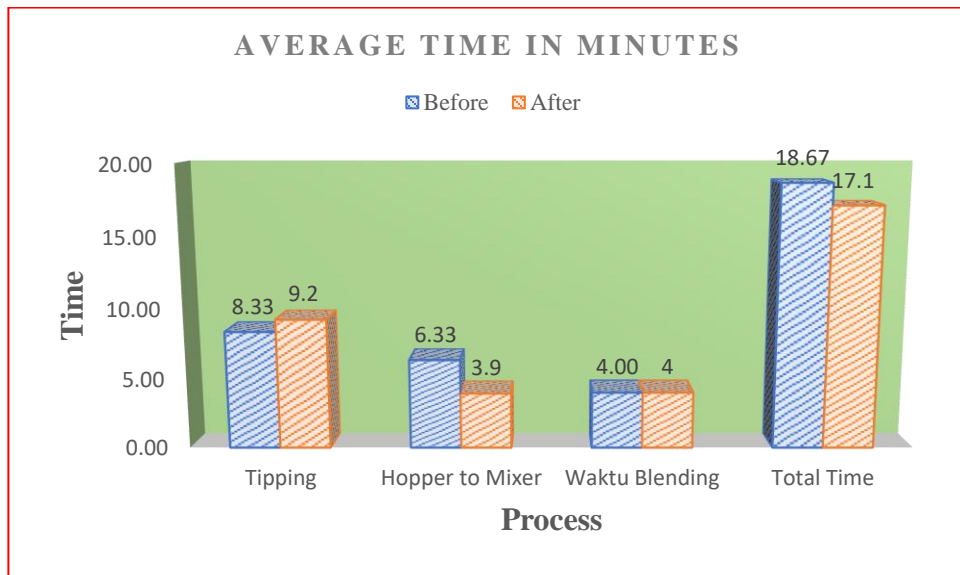
Before																				
Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Minute)	Total Time (Second)		
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)				
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second						
4.5,6 Honey	1	36	15:10	15:22	12	720	15:24	15:29	5	300	15:29	15:33	4	240	0	737.2	21	1260		
	2	37	15:29	15:37	8	480	15:39	15:44	5	300	15:44	15:48	4	240	0	737.2	17	1020		
	3	38	15:44	15:53	9	540	15:56	16:02	6	360	16:02	16:06	4	240	23	737.2	19	1140		
	4	39	16:02	16:10	8	480	16:12	16:18	6	360	16:18	16:22	4	240	13	737.2	18	1080		
	5	40	16:18	16:24	6	360	16:26	16:32	6	360	16:32	16:36	4	240	53	737.2	16	960		
	6	41	16:32	16:39	7	420	16:41	16:47	6	360	16:47	16:51	4	240	46	737.2	17	1020		
	7	42	16:47	16:54	7	420	16:56	17:02	6	360	17:02	17:06	4	240	128	737.2	17	1020		
	8	43	17:02	17:10	8	480	17:12	17:18	6	360	17:18	17:22	4	240	228	737.2	18	1080		
	9	44	17:18	17:25	7	420	17:27	17:32	5	300	17:32	17:36	4	240	200	737.2	16	960		
	10	45	17:32	17:46	14	840	17:48	17:54	6	360	17:54	17:58	4	240	0	737.2	24	1440		
	11	46	17:59	18:02	3	180	18:25	18:31	6	360	18:31	18:35	4	240	-0.5	737.2	13	780		
	12	47	19:13	19:25	12	720	19:27	19:42	15	900	19:42	19:46	4	240	-0.9	737.2	31	1860		
	13	48	19:42	19:51	9	540	19:51	19:56	5	300	19:56	20:00	4	240	7	737.2	18	1080		
	14	49	19:56	20:04	8	480	20:04	20:10	6	360	20:10	20:14	4	240	5	737.2	18	1080		
	15	50	20:10	20:17	7	420	20:19	20:25	6	360	20:25	20:29	4	240	90	737.2	17	1020		
<b>Total Time</b>																	<b>280</b>		<b>16800</b>	
<b>Average Time</b>																	<b>18.6666667</b>		<b>1120</b>	

*Production Time Table 4,5,6 Honey 15 MIX, LINDOR 2 (After)*

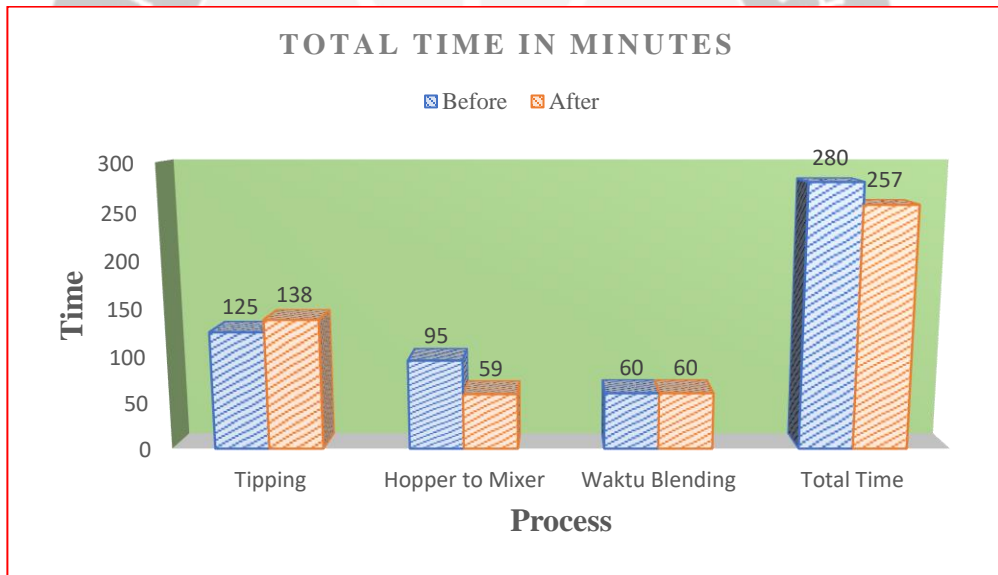
After																				
Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Minute)	Total Time (Second)		
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)				
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second						
4.5,6 Honey	1	30	23:12	23:19	7	420	23:34	23:38	4	240	23:38	23:42	4	240	316	775.5	15	900		
	2	31	23:38	23:53	15	900	23:58	0:02	4	240	0:02	0:06	4	240	342	775.5	23	1380		
	3	32	0:03	0:12	9	540	0:20	0:24	4	240	0:24	0:28	4	240	233	775.5	17	1020		
	4	33	0:25	0:35	10	600	0:40	0:44	4	240	0:44	0:48	4	240	243	775.5	18	1080		
	5	34	0:45	0:54	9	540	1:06	1:09	3	180	1:09	1:13	4	240	218	775.5	16	960		
	6	35	1:09	1:17	8	480	1:24	1:28	4	240	1:28	1:32	4	240	224	775.5	16	960		
	7	36	1:28	1:36	8	480	1:50	1:54	4	240	1:54	1:58	4	240	148	775.5	16	960		
	8	37	1:54	2:03	9	540	2:14	2:18	4	240	2:18	2:22	4	240	146	775.5	17	1020		
	9	38	2:08	2:29	11	660	2:34	2:38	4	240	2:38	2:42	4	240	189	775.5	19	1140		
	10	39	2:39	2:47	8	480	2:57	3:01	4	240	3:01	3:05	4	240	203	775.5	16	960		
	11	40	3:01	3:08	7	420	3:22	3:26	4	240	3:26	3:30	4	240	355	775.5	15	900		
	12	41	3:27	3:37	10	600	3:45	3:49	4	240	3:49	3:53	4	240	272	775.5	18	1080		
	13	42	3:52	4:01	9	540	4:12	4:16	4	240	4:16	4:20	4	240	247	775.5	17	1020		
	14	43	4:17	4:27	10	600	4:34	4:38	4	240	4:38	4:42	4	240	311	775.5	18	1080		
	15	44	4:39	4:47	8	480	4:55	4:59	4	240	4:59	5:03	4	240	309	775.5	16	960		
<b>Total Time</b>																	<b>257</b>		<b>15420</b>	
<b>Average Time</b>																	<b>17.1333333</b>		<b>1028</b>	

*Analysis Production Time Table 4,5,6 Honey 15 MIX, LINDOR 2*

Analisis Pengamatan									
Average Time (in Minutes)	Before	After	Total Time (in Minutes)	Before	After	Process	Persentase	Kesimpulan	
Tipping	8.33	9.2	Tipping	125	138	Tipping	-10.40%	Increase	
Hopper to Mixer	6.33	3.9	Hopper to Mixer	95	59	Hopper To mixer	37.89%	Decrease	
Waktu Blending	4.00	4	Waktu Blending	60	60	Waktu Blending	0.00%	-	
Total Time	18.67	17.1	Total Time	280	257	Total Time	8.21%	Decrease	



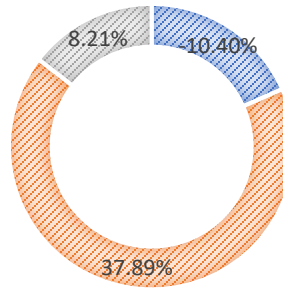
*Average Time Comparison Table Product 4,5,6 Honey 15 MIX, LINDOR 2*



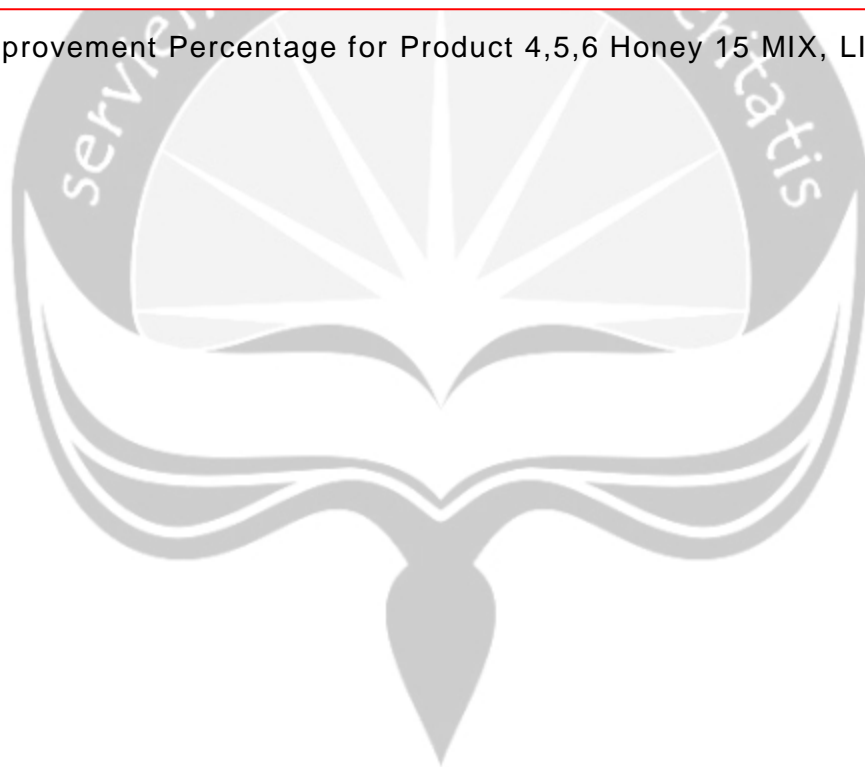
*Total Time Comparison Table Product 4,5,6 Honey 15 MIX, LINDOR 2*

## PERSENTASE PENURUNAN WAKTU PROSES MESIN

■ Tipping ■ Hopper To mixer ■ Total Time



Improvement Percentage for Product 4,5,6 Honey 15 MIX, LINDOR 2



## 2<sup>nd</sup> Appendix Production Time Compilation

### Production Time for 4,5,6 Honey

Product	NO	Batch (per Mix)	Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Second)	
			Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)		
			Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second				
BB 4,5,6 HONEY	1	36	15:10	15:22	12	720	15:24	15:29	5	300	15:29	15:33	4	240	0	737.2	21	1260
	2	37	15:29	15:37	8	480	15:39	15:44	5	300	15:44	15:46	2	120	0	737.2	15	900
	3	38	15:44	15:53	9	540	15:56	16:02	6	360	16:02	16:06	4	240	23	737.2	19	1140
	4	39	16:02	16:10	8	480	16:12	16:18	6	360	16:18	16:22	4	240	13	737.2	18	1080
	5	40	16:18	16:24	6	360	16:26	16:32	6	360	16:32	16:36	4	240	53	737.2	16	960
	6	41	16:32	16:39	7	420	16:41	16:47	6	360	16:47	16:51	4	240	46	737.2	17	1020
	7	42	16:47	16:54	7	420	16:56	17:02	6	360	17:02	17:06	4	240	128	737.2	17	1020
	8	43	17:02	17:10	8	480	17:12	17:18	6	360	17:18	17:22	4	240	228	737.2	18	1080
	9	44	17:18	17:25	7	420	17:27	17:32	5	300	17:32	17:36	4	240	200	737.2	16	960
	10	45	17:32	17:46	14	840	17:48	17:54	6	360	17:54	17:58	4	240	0	737.2	24	1440
	11	46	17:59	18:02	3	180	18:25	18:31	6	360	18:31	18:35	4	240	-0.5	737.2	13	780
	12	47	19:13	19:25	12	720	19:27	19:42	15	900	19:42	19:46	4	240	-0.9	737.2	31	1860
	13	48	19:42	19:51	9	540	19:51	19:56	5	300	19:56	20:00	4	240	7	737.2	18	1080
	14	49	19:56	20:04	8	480	20:04	20:10	6	360	20:10	20:14	4	240	5	737.2	18	1080
	15	50	20:10	20:17	7	420	20:19	20:25	6	360	20:25	20:29	4	240	90	737.2	17	1020
Total Time					125	7500			95	4500			58	3480			278	16680
Average Time					8.33	500			6.33	380			3.87	232			18.53	1112

### Production Time for 1,2,3 Choco 2 Juli 2018 Lindor 2, Mix 11

Product	NO	PO Number	Sequence	Batch (per Mix)	SILO (1/2)	Spray Drier				Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Second)
						Powder Base		Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)			
						Batch	Actual Cosume (KG)	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second					
I,2,3 CHOCO ALG	1	397826	1	1	102W11	275.8	23:40	23:44	11	660	23:46	23:53	7	420	23:53	23:57	4	240	360	887.42	22	1320		
	2	397826	2	1	102W11	274.7	23:23	23:32	9	540	23:34	23:41	7	420	23:41	23:46	4	240	482	887.42	20	1200		
	3	397826	3	1	102W11	276.9	23:40	23:50	10	600	23:52	23:59	7	420	23:59	0:03	4	240	582	887.42	21	1260		
	4	397826	4	1	102W11	273.8	23:20	23:28	8	480	23:29	23:38	9	540	23:38	0:03	4	240	459	887.42	20	1200		
	5	397826	5	1	102W11	273.4	23:24	23:32	11	660	23:34	23:41	7	420	23:41	0:03	4	240	487	887.42	21	1260		
	6	397826	6	1	102W11	275.7	23:40	23:44	13	780	23:46	23:53	7	420	23:53	0:03	4	240	523	887.42	24	1440		
	7	397826	7	1	102W11	273.5	23:24	23:31	11	660	23:33	23:40	7	420	23:40	0:03	4	240	531	887.42	23	1380		
	8	397826	8	2	102W10	274.6	2:40	2:52	12	720	2:51	2:58	7	420	2:58	2:52	4	240	522	887.42	23	1380		
	9	397826	9	2	102W10	274.3	2:41	2:52	11	660	2:54	2:58	4	240	2:58	2:55	4	240	489	887.42	22	1320		
	10	397826	10	2	102W10	278	2:40	2:51	10	600	2:52	2:58	8	480	2:58	2:59	4	240	466	887.42	22	1320		
	Total Time					197	6420			107	6420			70	4200			40	2400			217	13020	
	Average Time					13.13	428			7.6	462			5	280			2.5	150			15.27	936.36	

### Production Time for 4,5,6 Honey 1 Juli 2018

Product	NO	PO Number	Sequence	Batch (per Mix)	SILO (1/2)	Spray Drier				Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Second)
						Powder Base		Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)			
						Batch	Actual Cosume (KG)	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second					
4,5,6 Honey	1	393494	1	1		2226	22:38	22:48	10	600	22:48	22:48	8	480	22:48	22:52	4	240	428	775.56	24	1440		
	2	393494	2	1		2220	22:04	22:14	10	600	22:16	22:23	7	420	22:23	22:27	4	240	427	775.56	25	1500		
	3	393494	3	1		2224	22:28	22:38	10	600	22:36	22:43	7	420	22:43	22:47	4	240	424	775.56	15	900		
	4	393494	4	1		2244	22:54	23:04	10	600	23:02	23:09	7	420	23:09	23:13	4	240	427	775.56	21	1260		
	5	393494	5	1		2223	22:14	22:24	10	600	22:22	22:29	7	420	22:29	22:33	4	240	417	775.56	22	1320		
	6	393494	6	1		2225	22:28	22:38	10	600	22:36	22:43	7	420	22:43	22:47	4	240	425	775.56	21	1260		
	7	393494	7	1		2243	22:54	23:04	10	600	23:02	23:09	7	420	23:09	23:13	4	240	427	775.56	23	1380		
	8	393494	8	1		2221	22:11	22:21	10	600	22:19	22:26	7	420	22:26	22:30	4	240	425	775.56	22	1320		
	9	393494	9	1		2225	22:28	22:38	10	600	22:36	22:43	7	420	22:43	22:47	4	240	428	775.56	19	1140		
	10	393494	10	1		2242	22:52	23:02	10	600	23:00	23:07	7	420	23:07	23:11	4	240	429	775.56	20	1200		
Total Time					186	6360			106	6360			71	4260			40	2400			217	13020		
Average Time					18.6	636			10.6	636			7.1	426			4	240			21.7	1302		

### Production Time for 4,5,6 Vanilla 1 Juni 2018

Product	NO	PO Number	Sequence	Batch (per Mix)	SILO (1/2)	Spray Drier				Tipping				Hopper to Mixer				Waktu Blending				Twin Hopper		Total Time (Second)
						Powder Base		Time		Duration		Time		Duration		Time		Duration		Sisa (Kg)	Weight Gr (Kg)			
						Batch	Actual Cosume (KG)	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second	Start	Stop	Per Minutes	Per Second					
4,5,6 VANILLA	1	389289	1	2	102RFBK	326.7	21:45	21:53	8	480	21:55	21:59	5	300	21:59	22:05	5	300	7	775.43	18	1080		
	2	389289	2	2	102RFBK	322	21:20	21:28	8	480	21:31	21:37	6	360	21:37	21:42	5	300	120	775.43	19	1140		
	3	389289	3	2	102RFBK	326	21:37	21:45	8	480	21:48	21:53	5	300	21:53	21:58	5	300	571	775.43	18	1080		
	4	389289	4	2	102RFBK	323.3	21:53	21:59	6	360	22:02	22:08	6	360	22:08	22:13	5	300	400	775.43	17	1020		
	5	389289	5	2	102RFBK	323.5	22:08	22:15	7	420	22:20	22:26	6	360	22:26	22:31	5	300	420	775.43	18	1080		
	6	389289	6	2	102RFBK	323.7	22:26	22:34	8	480	22:47	22:53	6	360	22:53	22:58	5	300	419	775.43	19	1140		
	7	389289	7	2	102RFBK	325.7	22:01	22:08	10	600	22:05	22:10	5	300	22:10	22:15	5	300	388	775.43	20	1200		
	8	389289	8	2	102RFBK	324.2	22:32	22:40	8	480	22:44	22:50	4	240	22:50	22:55	5	300	392	775.43	17	1020		
	9	389289	9	2	102RFBK	322.6	21:42	21:49	7	420	21:51	21:55	5	300	21:55	22:00	5	300	385	775.43	17	1020		
	10	389289	10	2	102RFBK	323.1	21:20	21:28	8	480	21:36	21:40	4	240	21:40	21:45	5	300	380	775.43	14	840		
Total Time					35	4500			7.5	450			5.2	312			5	300			17.7	10620		
Average Time					3.5	450			7.5	450			5.2	312			5	300			17.7	1062		



Packaging Machine TAM 4A

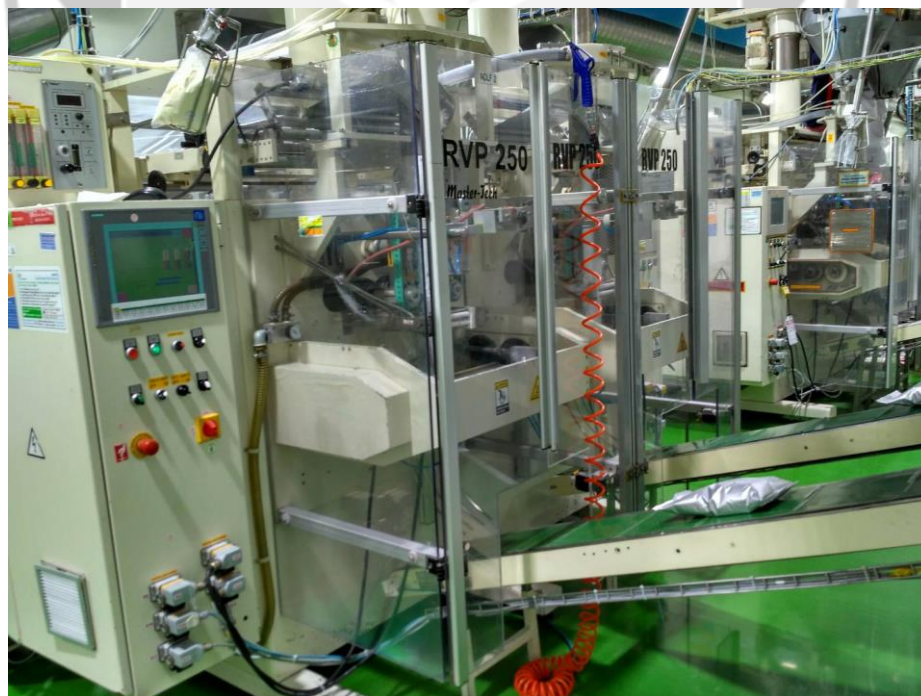
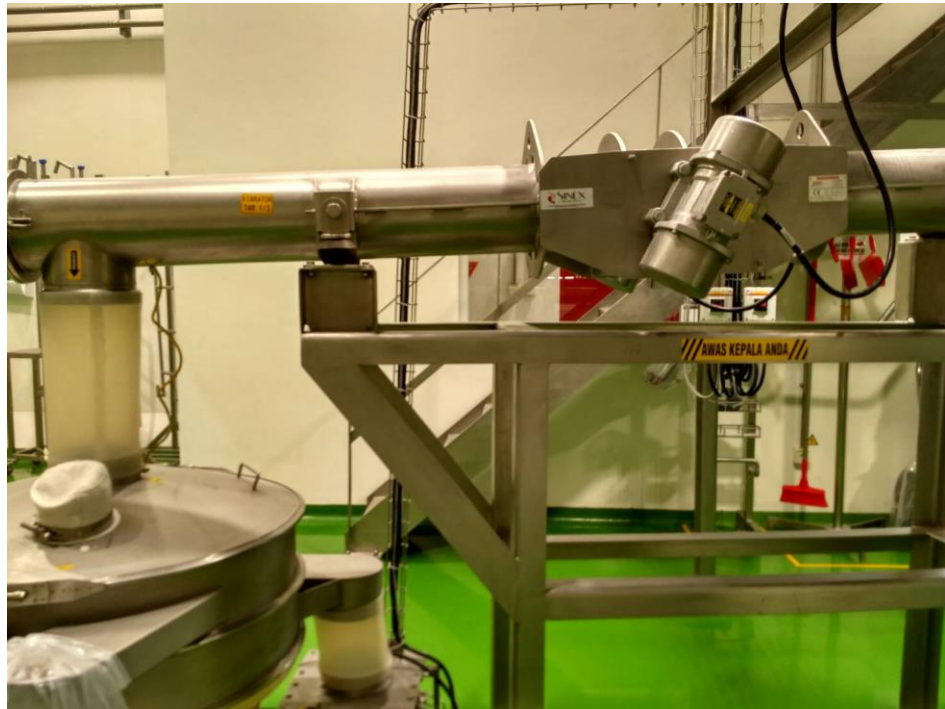


Figure of Packaging Machine TAM 4A (conveyor)



*Figure of Lindor Machine (Pipa Hopper)*



*Figure of Twin Hopper Machine*



*Figure of Dumping Machine*



*Documentation With HRD and Other Intern*



*Documentation With Supervisor*

