



UNIVERSITI
TEKNOLOGI
MARA

Cawangan Johor
Kampus Pasir Gudang



INDUSTRIAL TRAINING FIELD REPORT (CHE353)

BERG & SCHMIDT NUTRITION

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ACKNOWLEDGEMENT

Assalamualaikum w.b.t., in the name of Allah SWT the most beneficent and the most merciful. To start, I would like to express my deepest gratitude to the almighty Allah SWT for giving me the chance to prepare this report, complete all the task given and finish my industrial training as schedule in order to end my diploma programme.

First of all, I would like to express enough thanks to my supervisor, Ng Ben Wei for having me to undergo my industrial training in Berg & Schmidt Nutrition. My completion of this training could not have been accomplished without the support from him and my mentor, Putera Amirul Haikal. Furthermore, I feel grateful to be surrounded by amazing people in the company as they showed me their kindness and willingness to share the knowledge, opinion and experiences.

Last but not least, I'm wishing Berg & Schmidt the best of luck in the future and hoping the company will continue to strive to be among the best company for the consumers worldwide.

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1. INTRODUCTION

1.1 INTRODUCTION TO INDUSTRIAL TRAINING (CHE353)

Industrial Training (CHE353) is a compulsory subject assigned for Chemical Engineering students at Universiti Teknologi MARA (UiTM) as the final course subject for the final semester (semester 6). The industrial training is an important part or component in engineering curriculum. Here, theories learnt in the previous semesters either in core or on-core courses will have to be implemented or applied into the real working environment in industries.

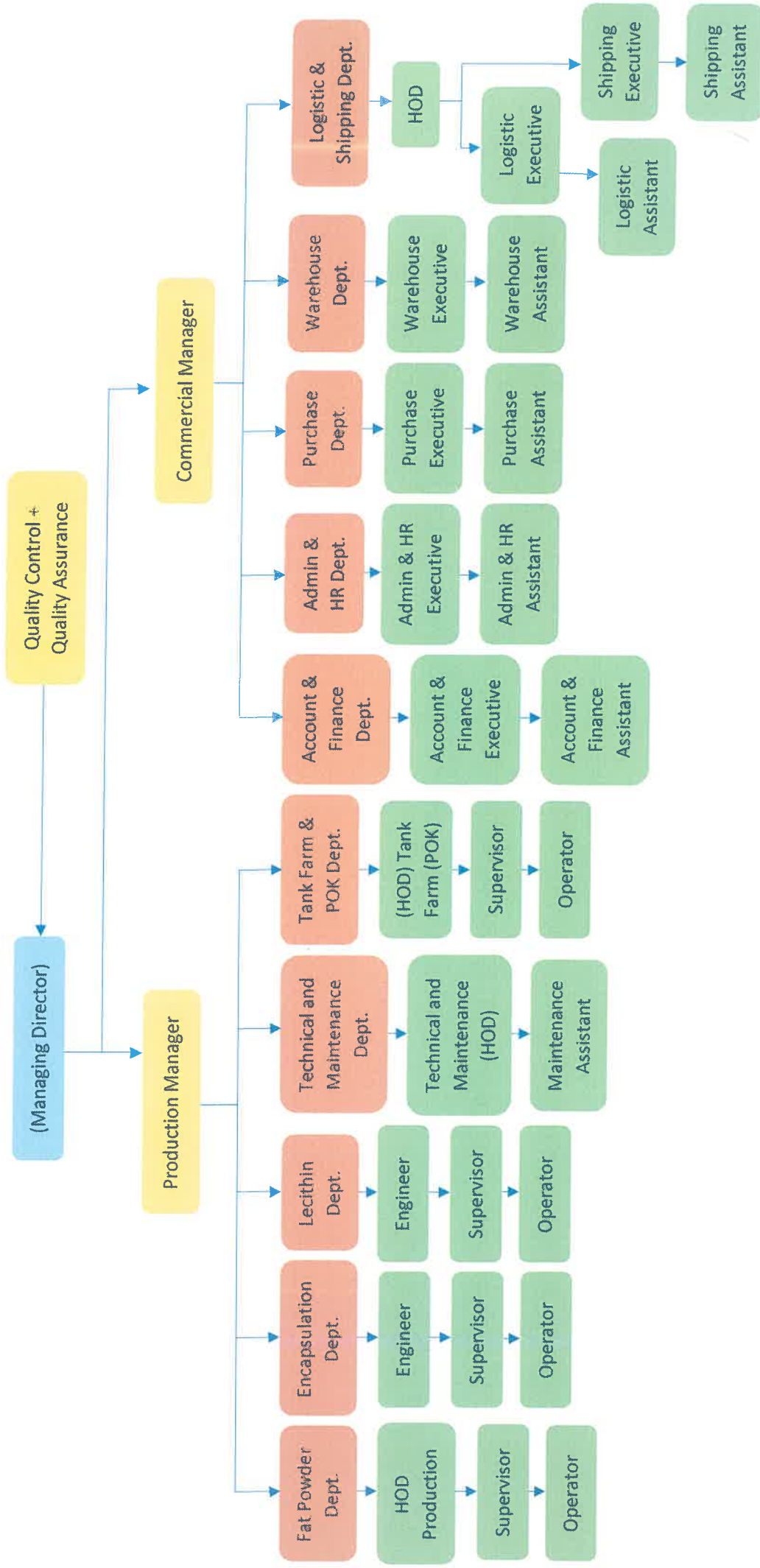
The objective of this course is to ensure that students are exposed into the real engineering world and appreciate the theoretical knowledge learnt. Then, students will be able to perform a basic engineering practices such as preparing a writing technical report, build a good communication with colleagues, handling a given task or project and sharing thoughts or opinion for betterment of the industries. Last but not last, students will have to increase the level of integrity, ethical and accountability in practicing engineering.

Students that has been permissioned to proceed with this course are needed to find company for the training placement. The duration of the industrial training should at least 17 weeks with 7 hour credit hours. This is a must as it will fulfil the requirements by the Board of Engineers (BEM) for the Engineering Technology Accreditation Council (ETAC) for undergraduate students.

1.2 JOB SCOPE OF INDUSTRIAL TRAINING

During the internship programme, I was assigned for two different departments which Production Department and Maintenance Department. Working in Production Department, I am responsible to ensure that the production demands are efficiently met, monitoring production and improving the production. Furthermore, assisting Production Engineer, we must support the engineering team, provide safety protocols for the plant, report issues to the manager and develop method or strategies to improve efficiency and profit. In Maintenance Department of Berg & Schmidt Nutrition, my job scope is responsible for maintenance of existing plant. This is important to ensure that the production plant can fun smoothly and all the equipment and facilities are in good condition. All the work was done with a supervision of Head of Production Department, Ng Ben Wei, Head of Technical and Maintenance Department, Mr. Geena and assisted by mentor, Putra Amirul Haikal.

2. CONTENT
2.1 ORGANIZATION CHART



2.2 COMPANY HISTORY



Figure 1: Stern-Wywiol Gruppe logo



Figure 2: Berg and Schmidt Nutrition logo

Stern-Wywiol Gruppe, an independent owner-managed group that has its headquarters in Hamburg has been among the most successful enterprises operating internationally in the field of Food and Feed Ingredients. Until now, there are 12 German specialist companies and 16 international affiliates that operates under the group producing many different functional systems for convenience foods. All this includes well-known specialist companies such as Mühlenchemie, Hydrosol, SternVitamin, DeutscheBack, SternEnzym, OlbrichtArom, HERZA Schokolade, Berg+Schmidt, SternLife and Sternchemie.

Berg & Schmidt Nutrition is a member of the Stern-Wywiol Gruppe, an internationally involved in the field of Food & Feed Ingredients. Berg & Schmidt Nutrition is an old-established Hamburg company with more than 60 years' experience in the development, production and worldwide distribution of lipids.

Berg & Schmidt nutrition has two different branches in Malaysia which is in Pasir Gudang and Shah Alam.

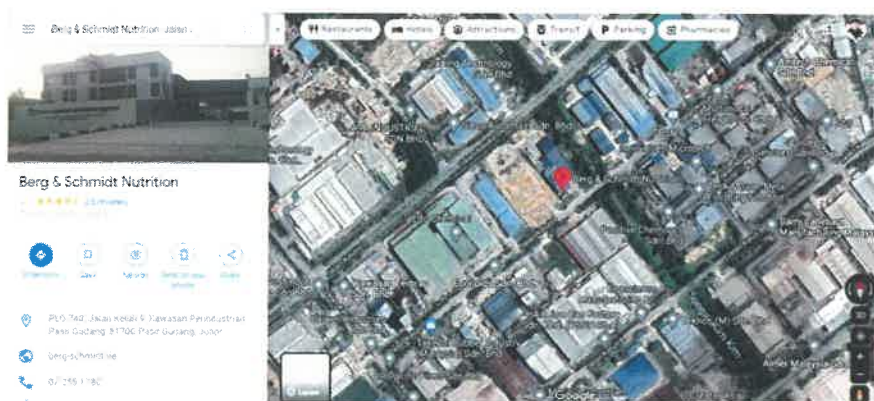


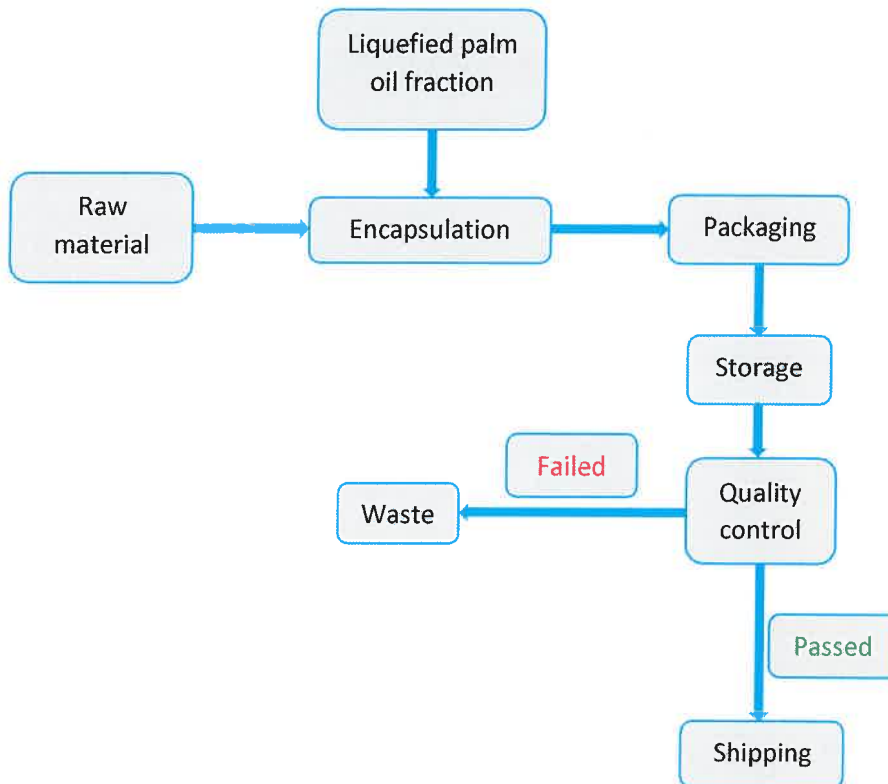
Figure 3: Location of Berg & Schmidt in Pasir Gudang

2.3 NATURE OF BUSINESS

Berg & Schmidt Nutrition involves in food and beverages industry. The company produces innovative ingredients for food and animals. They offers functional systems both for human and animal nutrition.

2.4 PROCESS FLOW

2.4.1 Process flow for 'X' (Batch Process).



Description on Process flow for 'X'.

i) Raw material

Raw material is loaded into the bind of fluidized bed reactor.



Figure 4: Bind

ii) Liquefied palm oil fraction

The oil comes in liquid form and must be melted. Melted oil should be maintained at certain temperature. If the oils has frozen, it takes hours for the oil to melt again. This usually happen when the plant has to be shut down due to problems.



Figure 5: Melting tank

iii) Encapsulation

Raw material inside the bind is fluidized while the hot oil is sprayed through the nozzles attach at the bottom of the bind. The process consumes around 2 hours and 15 minutes until all the raw material is fully coated.



Figure 6: Fluidized bed reactor

iv) Packaging

The product is packaged into boxes and stored at the ware house.



Figure 7: Sealing Machine

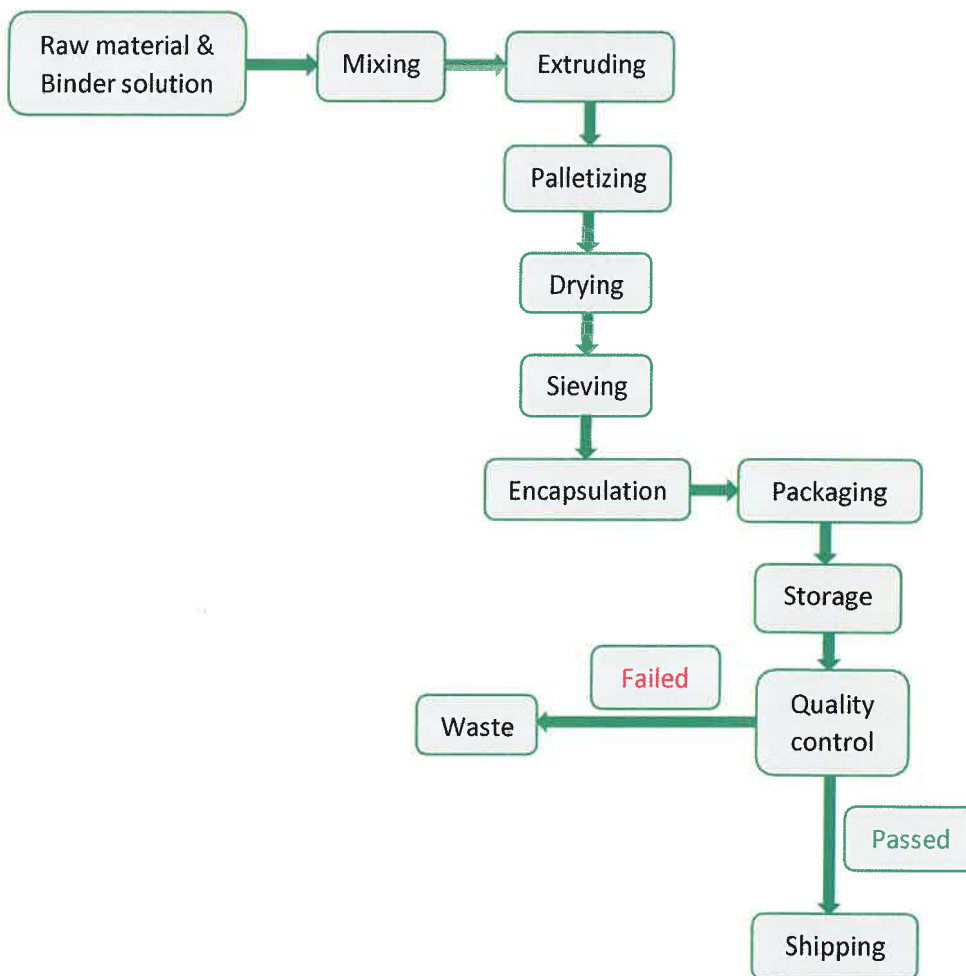
v) **Quality control**

Samples are taken from each batch of product and being checked at lab to determine whether it achieve the specifications or not.

vi) **Waste**

Failed product that is overcoat or undercoat is counted as waste as they do not pass the quality set.

2.4.2 Process flow for 'Y' (Batch Process).



Description on Process flow for 'Y'.

i) **Raw material and binder solution**

The raw material used is 'Y' powder. Binder solution is the mixture of two different powder with water. The purpose is to help the raw material powder bind together.

ii) **Mixing**

The 'Y' powder is mixed with the binder solution inside the mixer for a few minutes. The operator will check the mixture to ensure it is fully mixed. If not, they need to run the machines for another few minutes.



Figure 8: Slot Mixer

iii) **Extruding**

The operator will use scope to transfer the mixture from the slot mixer into the extruder. The mixture of 'Y' powder and binder solution is changed into granulate. It is importance to heat up the machine to ensure that the output is in a good condition. If the granulate is too long, re-extrude.



Figure 9: Extruder

iv) **Palletizing**

Granulate is going palletizing to change the shape into sphere-like.



Figure 10: Palletizer

v) **Drying**

Palletized granulate is still wet after the palletizing. Here, granulate is being dried inside the fluidized bed reactor by blowing.



Figure 11: Fluidized bed reactor

vi) **Sieving**

Dried granulate is sieved or filtered to separate between different sizes. Rejected granulate will go the process again starting from mixing.



Figure 12: Sieve

vii) **Encapsulation**

Granulate transferred into the bind is fluidized while the hot oil is sprayed through the nozzles attach at the bottom of the bind. The process consumes around 2 hours and 15 minutes until it is fully coated.

viii) **Packaging**

The product must be completely sealed, packaged into boxes and stored at the ware house.



Figure 13: Sealing machine

ix) **Quality control**

Samples are taken from each batch of product and being checked at lab to determine whether it achieve the specifications or not.

x) **Waste**

Failed product that is overcoat or undercoat is counted as waste as they do not pass the quality set.

2.5 DAILY ACTIVITIES

As an intern, besides learning about things related to the industrial work, there are a few things that I did practically during my internship. Some of the activities are, monitoring the production plant, recording the amount of raw materials and products, improving the production, helping with the research and development and helping with the maintenance. I worked starting from 8 a.m. until 6 p.m. and from Monday to Friday.

2.5.1 Monitoring the production plant.

During the internship, I was scheduled to assist the engineer on day shift. We need to ensure that there is enough number of operator on the shift. This will help the production to achieve the number of targeted batch produced per shift as there is enough manpower. It is crucial to arrange their schedule to avoid any miscommunication. Then we always need to communicate with the operator and project manager to counter any problem together. Furthermore, we are responsible to ensure the quality of work is done in safe and efficient manner. Next, we need to identify, documenting and reporting about the production plant to the production manager.

2.5.2 Recorded amount of raw material and product.

The plant involves no active reaction. Then, the amount of product produced should be the same as the total amount of raw materials used. However, due to some circumstances, there will be losses almost to 20kg per batch. Some of the reasons are parts of the raw materials are too powdery and has be blown into the cyclone and some may fall onto the floor as the production is a batch process and involves a lot of human intervention.

2.5.3 Improving the production.

Observing the production plant will give the ideas on how we can improve either to increase the production plant, provide better protocols for operators' safety, reduces the cost of production, provide method to manage and reduce waste, find an updated method or technology that can be applied and other. All this aspects will provide to the plant betterment.

2.5.4 Helping with research and development.

Most of the companies nowadays do not allow their intern to involve in the research and development as it is confidential. Fortunately, I was given the trust and chance to involve in the process. However all the research was done

by the Research and Development's engineer. By helping the engineer, I have learnt about the protocols and methods to do the trial such as to check the moisture content, heat up the materials and use the equipment. Here, the amount of raw materials used and product produced are scaled down and being process in a smaller machine and equipment compared to the production plant. There are a few things that being tested which are the best method or raw materials that should be used. We need to record all the parameters involve such as temperature and flowrate.

2.5.5 Helping with maintenance.

As part of Technical and Maintenance Department, I need to assist activities regarding maintenance to ensure that the production plants work just fine. There are a few things that I have done such as, assist engineer to check the condition of bag filter, change the bag filter and clean the encapsulation bind nozzles. However, most of the time I spent on Production Department and only help if being called.

2.5.6 Prepare report about Project Management (working from home)

During the internship, there are times where all the intern are not allowed to enter the company as our country is having pandemic. Due to this situation, my mentor as came out with an idea or alternative ways on how we can keep learning something even from home. I was provided with materials such as video and web pages to produce report. The main topic is about Project Management where it include, time management, work management, quality management, cost management and others.

2.6 MINI PROJECT

2.6.1 Mini Project 1: Designing Plant Layout

Currently, the company consists of three different production plant that produce different types of products. I was assigned for Project 3 (Plant 3) where we produce nutritious food for cow and chicken. The process of its production is batch process. Firstly, I need to identify the arrangement of the equipment at the plant and measure its distance from each other by using measuring tape. Then, all the information will be implemented into AutoCAD. Only block diagram was requested by the supervisor so it is only a simple layout without any instrumentation or piping system as the process involves is a batch process. This task was important for the plant as its useful for anyone that is not familiar for the plant will easier to recognize any equipment and where it is located. Furthermore, this plant layout helps any people that enter the plant to be aware about their safety. For example, by looking at the plant layout, they will alert about any location that should be avoided to prevent any bad incident. The task was given and finished by a day.

2.6.2 Mini Project 2: Produce a HIRARC for production plant

HIRARC is a word that made up from three different activities that related and consecutively running after the other. The activities consist of Hazard Identification, Risk Assessment and Risk Control. Through Hazard Identification, a person will be able to recognize or evaluate any situation, item, thing or others that has the potential to cause harm. Few types of hazard are chemical, biological and physical. When the hazard is identified, the risk assessment will be followed up. During risk assessment, we will able to evaluate the level of hazard either its major or minor, the frequency or likelihood of the hazard causing harm and all the consequences. The last step is the risk control. There are a few types of risk control that can be applied regarding its hierarchy starting from elimination, followed by substitution, engineering controls, administrative controls and personal protective equipment (PPE). In order to do this task, I have used Microsoft Excel as it is very functional to do the task. Figure 14 is the example of the HIRACR.

2.6.3 Mini Project 3: Suggestion for plant betterment

The production plant uses almost 80% of human intervention instead of machinery. The minimum number of worker or operator should be 3 persons per shift. As an intern for production engineer, I was assigned to think for solution that can help to improve the plant in any ways such as to increase its production rate, to reduce work load of operator and to prevent any bad possibilities at the plant. Here are a few suggestions that I has voiced out to the company:

- a) Use a portable stairs inside the plant.



Figure 15: Portable Stair

Currently, the operators have to climb the bind (Figure 16) without any safety equipment in order to transfer the raw materials into the encapsulation bind. The raw materials consists of powder or dust that causes the bind surface to become slippery. This is very unsafe to the operator that they may fall down during the activity. The use of this portable stairs helps to prevent any bad incident to occur.



Figure 16: Encapsulation Bind

- b) Build drain inside the plant.



Figure 17: Drain

The production plant currently runs two different product. When the plant is about to change the product, they need to do cleaning process before proceed to the next product. There are a few heavy machine such as the slot mixer that need to be lifted up using forklift and move to the other place for washing process as there is no drainage inside the plant. This consumes a lot of time and sometimes take the whole day. By building this drain, it will be easier for the cleaning process as the can just wash the equipment at its own place so, it can reduce the time consumption during product exchange and avoid production delay.

2.6.4 Mini Project 4: Design melting tank

During encapsulation process, the hot oil is sprayed towards the raw material. However, the oil comes in solid form where it is palm oil fraction known as stearin. Here is where the melting tank play its role to melt the oil fraction at certain temperature. There are several types of melting tank that has been used in the industry. To design the melting tank, there are a few factors that need to be considered. Some of the factor are the ability of the melting tank to supply high rate of heat at certain period and the materials that suits its temperature. Figure 18 until Figure 21 are the sketch of melting tank that I has assisted in designing with the help of the other engineer. This melting tank uses hot water to supply heat towards the oil. Through heat transfer calculation, we can determine the temperature of hot water and amount of heat needed to melt certain amount of solid oil at certain time.

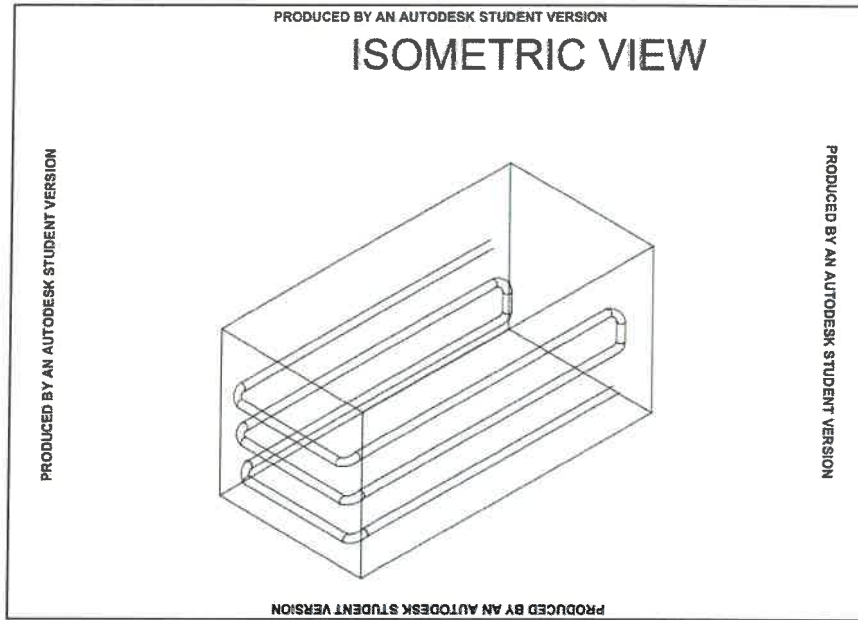


Figure 18: Isometric view

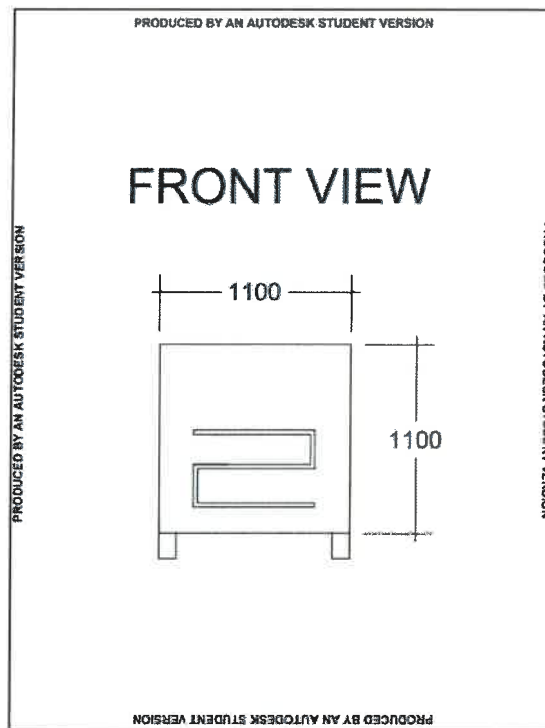


Figure 19: Front view

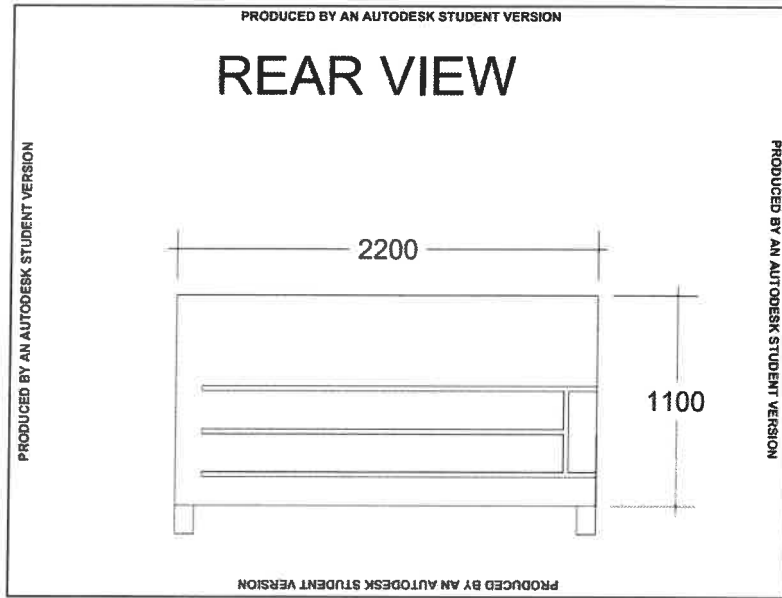


Figure 20: Rear view

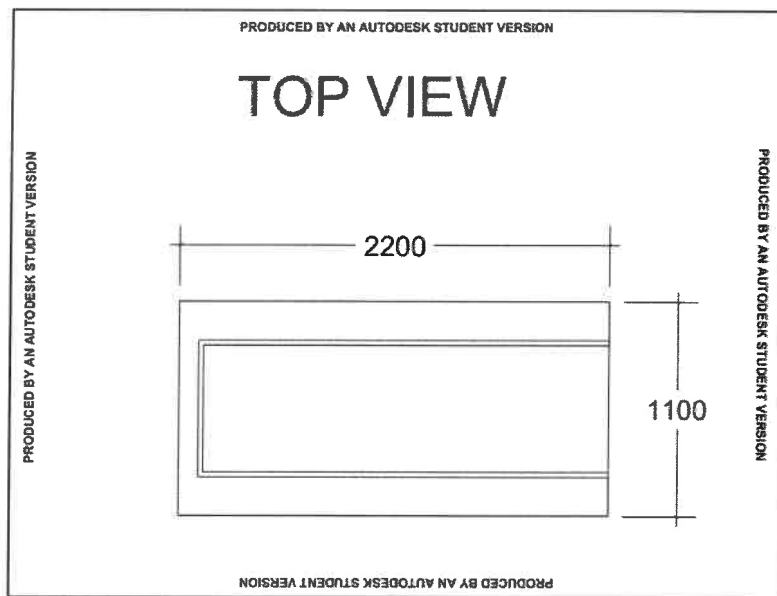


Figure 21: Top view

2.6.5 Mini Project 5: Produce a Visual Work Instructions

Visual Work Instructions, VWIs provides the important or relevant information for the point of action where it can be easily understand, visual format and simple words. VWIs can assist to work on any task that requires certain steps or procedures such as operation a machine. During my internship, the production plant has often accepted new operator or contact worker. Sometimes, the senior operator need to guide them to do tasks. By providing this VWIs, it can be easier for them to understand themselves. In order to finish the task, I need to understand all the process involves in the plant. I need about a week to finish the task as I have learnt about the process earlier in the first few weeks. Below is part of the VWIs.

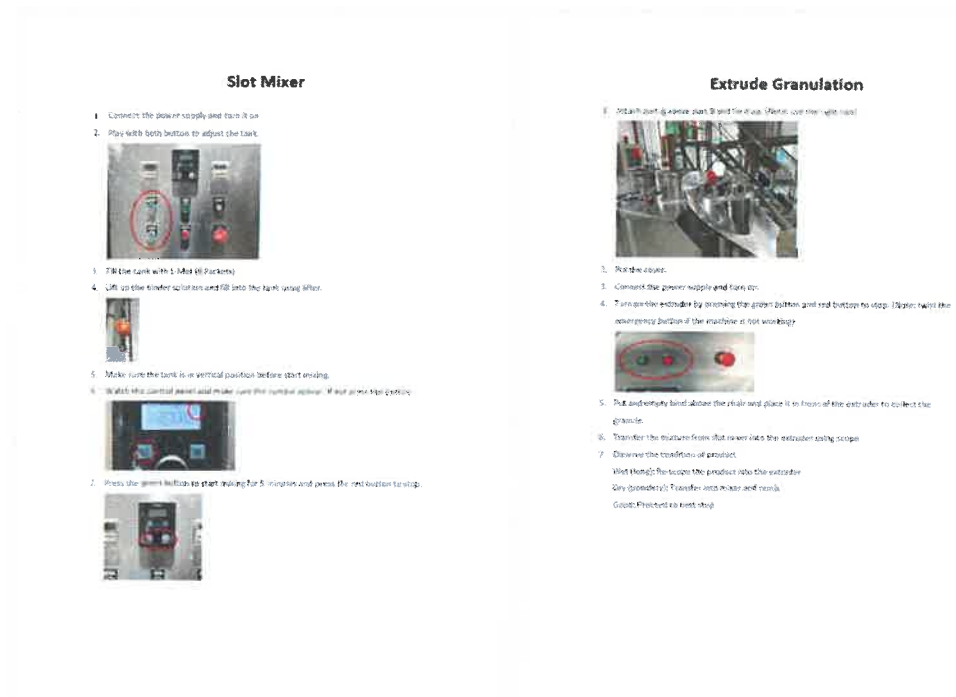


Figure 22: Visual Work Instructions.

3. CONCLUSION

In conclusion, being a part of the company during my internship has benefited me a lot. I have learnt those skills related to industrial in the real environment. Having two different roles which are in Production Department and Maintenance Department has helped me gain wider knowledge of the industry. In Production Department, I learnt about process flow, safety, plant design and other. While being in Maintenance Department has polished my skills in doing a few physical works such as changing the filter bag. Furthermore, I am able to build a good relationship with all the workers including the operators. Listening to their thoughts, opinions and all the experiences shared has opened my mind about how the industrial works. I am really grateful and thank the supervisor and mentor as they are able to give me all the knowledge and skills that I needed as I did my internship in the company although during this pandemic. All the tasks given have benefited me in many ways. In a real environment, sometimes we face problems, unfairness, mistreatment and other, but all these matters should not be the reason to stop doing but keep on going.

Having Berg & Schmidt Nutrition as my first job company was great. As a small branch in Pasir Gudang, day by day I observe the improvements done by the workers and it gives me good experiences on how we can start from below to the top. Special thanks to the company for everything and I hope they will have a better future.

Although most of the time was a great moment, I still have a suggestion or recommendation. First of all, the company should have a proper guideline for the internship. This will benefit both sides as the company can provide all the things needed by the trainee and the trainee can contribute to the company.