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TEKNOLOGI
MARA

Cawangan Johor
Kampus Pasir Gudang

CHE 353
INDUSTRIAL TRAINING FIELD REPORT
VANCE BIOENERGY SDN BHD

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1.0 INTRODUCTION

1.1 Introduction to Industrial Training Che 353

Industrial training is a compulsory course for all diploma students of Universiti Teknologi Mara (UiTM). It acts as a requirement need to be fulfilled by the students in order to complete the programme and also act as a token to graduate from the university. For Chemical Engineering students, a 17-weeks period with 7 credit hours is allocated as the duration for the training at any company chosen by the students themselves. The duration can be longer but cannot be less depends on the chosen company. The rule and regulation also do not impose any restriction on choosing whether to gain the training experience either in government or private company. However, the training should be in line with work experience that is relevant to professional development prior to programme taken.

Industrial training plays a major role in engineering curriculum. All the practices and theories learnt in both core and additional courses require to be applied into the real working environment in any industries that are related to chemical engineering. Other than the actual training in respective industries, the students are also trained to make a resume or job applications through various way such as LinkedIn and Jobstreet before actually experiencing the real working environment. The main aims or objectives in conducting an industrial training for the students would be as following:

- i) Student should be able to differentiate and identify the types of actual work conduct by chemical engineers in the real world of engineering and be grateful to each the theoretical knowledge and practices learnt.
- ii) Student should be able to utilize various simple engineering practices which includes project handling, technical writing report, communication among coworkers and creating proposal that lead to betterment of industries.
- iii) Student should be able to demonstrate high level of integrity, ethical and accountability in engineering practice.

1.2 Job Scope of Industrial Training

An opportunity was given as an intern in the Department of Production in Vance Bioenergy Sdn. Bhd. The job scope throughout the internship include various aspects such as monitor and analyze data, calculating production, and inspecting product and equipment. Despite the crisis of pandemic Covid-19, the internship was successfully conducted and completed for 17 weeks that includes both worked from office and home. Each day during the internship was a learning process and many new things had been gained along the way as new experiences.

2.1 ORGANIZATIONAL CHART AND HISTORY OF THE COMPANY

2.1 Organizational Chart

Currently, the company is under Mr. Hatta's management and assisted by various departments per shown in Figure 2. In production department, Mr. Faizal act as Head of Department, follow with the production engineers that include Mr. Syamim, Zulkifli, Farid and Ms. Siti. And both production interns, are under supervision of Mr. Faizal and be guided and mentored by all production engineers per shown in Figure 1.

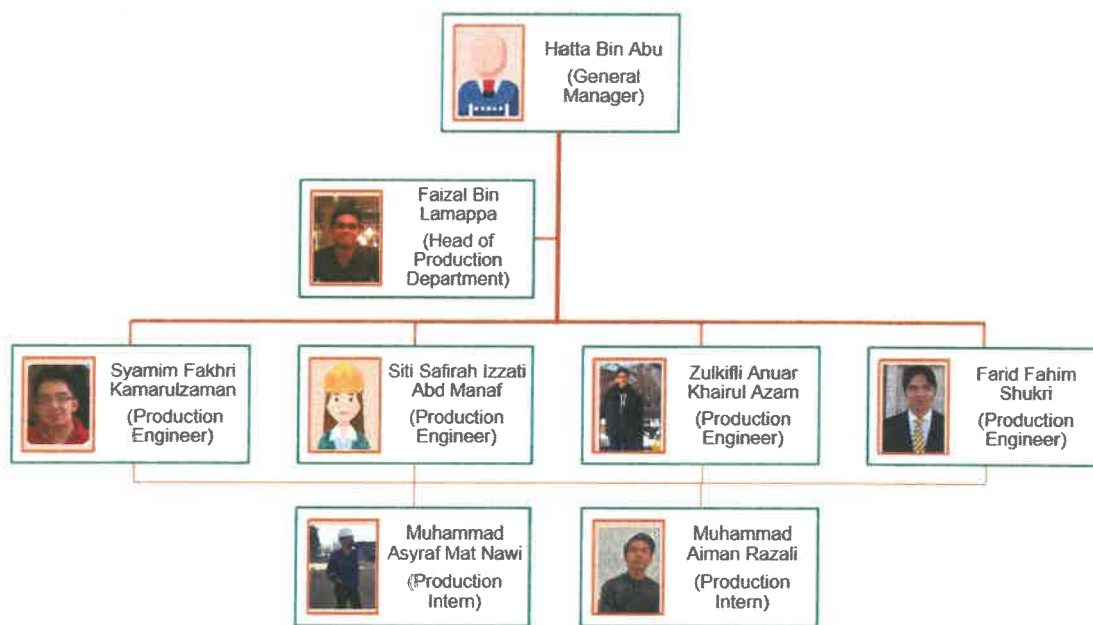


Figure 1. Organizational chart at Vance Bioenergy Sdn. Bhd.

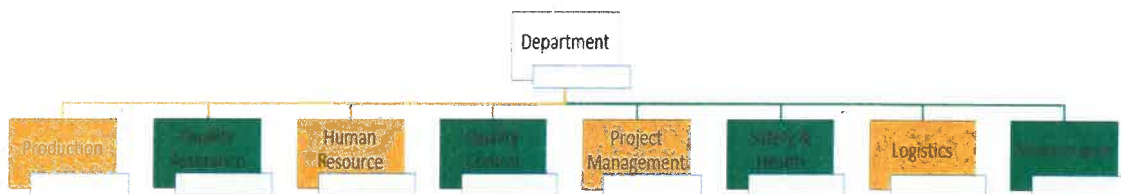


Figure 2. List of departments in Vance Bioenergy Sdn. Bhd.

2.2 Company Profile

Vance Bioenergy Sdn. Bhd. is well known as the leading ISO 9001 certified producer of biodiesel which also known as fatty acid methyl ester, certified high grade surfactants, pharmaceutical-grade of refined glycerine which in it official name as Vance Refined Glycerine and other oleochemicals products which not only focused on chemical industry but various other industries. The headquarter is located in Singapore while both of its production plant are located in Tanjung Langsat and Keluli which are in the Industrial Estate of Pasir Gudang in Johor, Malaysia.

Due to its strategic location with the approximation of 7 million metric tons of palm oil refining capacity in Pasir Gudang, Vance Bioenergy have gained numerous benefits from both its access to fresh palm oil from the oil palm refineries. Not only that, Vance Bioenergy also relatively close to the Johor Port that consists of major storage and berthing facilities which allowed the products to be ship smoothly throughout the world at a very competitive price.



Figure 3. Photo Session of Workers in Vance Bioenergy Sdn. Bhd

In addition, Vance Bioenergy also in possession beyond just two biodiesel plants with the total annual production of 150,000 metric capacity, but also hold the title of two of the largest single standing glycerine refineries in Asia with the total annual production of 40,000 metric tons of pharmaceutical-grade refined glycerine. Moreover, with the total capacity of 25,000 metric

tons that equipped with nitrogen blanketing, its own storage tanks also come with fully integrated clean room class drumming line and warehouse ensure adherence to the highest quality and hygiene standards.

The 24/7/365 on-site laboratory houses the latest testing equipment and is staffed by a full team of chemists, laboratory managers and technicians to maintain the stringent quality assurance standards. The team also engages in R&D and ongoing efforts to improve the products, expand the product lines, and optimize production processes. The logistics team at Vance Bioenergy is also key to ensuring accurate and timely delivery of products to customers worldwide and is experienced in managing the entire spectrum of packaging and shipping solutions.

Coupled with the immense experience of the Vance production specialists who collectively have more than a century worth of work experience in the oleochemical and vegetable oil industry, Vance Bioenergy has both the technology and expertise to deliver high quality products that meet or exceed customers' expectations. Vance Bioenergy is a socially and environmentally responsible company and has been an active member of the Roundtable on Sustainable Palm Oil (RSPO) since 2006.



Figure 4. Various Departments in Vance Bioenergy Sdn. Bhd.

2.3 Official Logo

The logo of the company which officially being used by Vance Bioenergy mainly for any business activities. The logo used green and yellow theme. The yellow represents the oil while the green represent that the company is environmental-friendly. With the flower shape icon that construct by several drop of oils that justify that the oils produced environmentally friendly.



Figure 5. Logo of Vance Bioenergy Sdn. Bhd.

2.4 Vision and Mission

The company comes up with the vision to do the best to fulfill the customers' requirement and constantly improve capabilities, goods, and services. Vance Bioenergy Sdn. Bhd. holds a mission to be a successful and sustainable organization which does it best for its stakeholders which produce highest product quality, with on time logistics, also providing excellent service attention, solution focused and long-term relationships.

2.5 Certifications

Vance Bioenergy has excellent quality management systems and constantly strive to deliver products that exceed internationally recognized standards and provide dedicated services that cater to the customers' requirements.

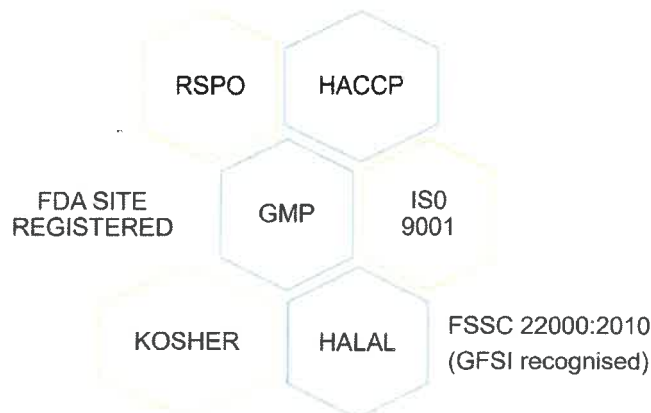


Figure 6. List of Certifications Owned by Vance Bioenergy Sdn. Bhd.

2.6 Company Branches

Currently, Vance Bioenergy have two branches which are located at Jln Nibong 5, Kawasan Perindustrian Tanjung Langsat, 81700, Johor (Nibong Branch) and PLO 668 & PLO 669, Jalan Keluli 5, Kawasan Perindustrian Pasir Gudang, Johor, Pasir Gudang, 81700 Pasir Gudang, Johor (Keluli Branch).



Figure 7. Vance Bioenergy Sdn. Bhd. (Nibong Branch)



Figure 8. Vance Bioenergy Sdn. Bhd. (Keluli Branch)

2.7 Scope and Product of The Business

Vance Bioenergy major business mainly cover 3 products which are refined glycerine, biodiesel and surfactants.

Firstly, is the refined glycerine. Vance Bioenergy is one of the largest producers of refined glycerine in Asia. With a production capacity of 40,000 metric tons of refined glycerine per annum, Vance Bioenergy offer a large volume commitment to the customers based on long term contracts. Vance Refined Glycerine is shipped to more than 80 countries worldwide. Vance Bioenergy is also a buyer and trader of refined glycerine and crude glycerine. With a strong balance sheet, Vance Bioenergy are the ideal counterparty for glycerine trading requirements. Refined Glycerine is a colorless, viscous and sweet tasting liquid. It is natural and derived purely from vegetable oils. Vance's pharmaceutical and food grade Refined Glycerine is ideal for use in high-end applications where uncompromised quality is needed, such as applications in food, beverages, pharmaceuticals, and cosmetics.



Figure 9. Refined Glycerine sample

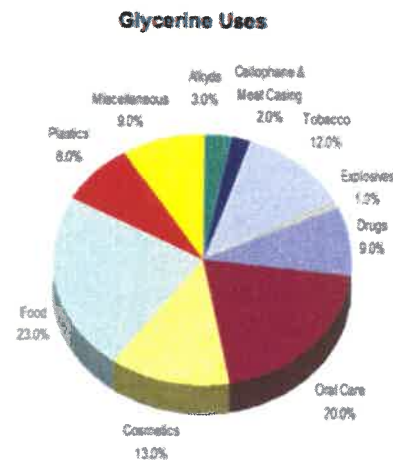


Figure 10. Refined Glycerine applications

Next, is the biodiesel. Vance Bioenergy is the leading biodiesel exporter from Malaysia since 2006. Being a pioneer in the industry, it has the most substantive track record of producing and delivering biodiesel on time and well within specifications. With two state-of-the-art plants and a combined production capacity of 150,000 metric tons of biodiesel per annum, Vance Bioenergy are a trusted supplier to the oil majors and international oil trading companies. Vance Biodiesel meets and exceeds the international biodiesel standards such as MS

2008:2014, EN 14214, ASTM D-6751 and the Australian Biodiesel Standard. ISO 9001 certification forms the backbone of our Quality Assurance System. Vance Bioenergy also have one of the most advanced and fully equipped biodiesel analytical laboratories in the industry. Being a Full Member of the Roundtable on Sustainable Palm Oil (RSPO), Vance Bioenergy supply environmentally friendly and sustainable biodiesel.



Figure 11. Biodiesel samples

Vance Bioenergy has 25,000 metric tons of on-site storage tank capacity. Using dedicated road tankers, Vance Bioenergy have well established logistics arrangements to transport and deliver the biodiesel efficiently and on-time throughout Peninsular Malaysia. The production facility is located within minutes of Johor Port where it has onshore tanks to facilitate bulking and loading for large shipments of biodiesel by sea. Having a deep draft and the world's single largest palm oil storage facility, Johor Port is the ideal port from which to ship biodiesel. Vance Bioenergy is also a buyer and trader of all forms of biodiesel. Backed by a strong balance sheet, Vance Bioenergy is able to enter into large contracts with customers who may demand customized solutions that require fixed prices or indexation of prices, and as such require significant hedging in the paper and physical markets. Vance Bioenergy is the ideal counterparty for the biodiesel trading requirements.



Figure 12. Biodiesel Dispatch

Lastly, is the surfactants. Vance Bioenergy is an emerging producer of natural oleochemical surfactants. Currently focused on producing Cocamide DEA (CDEA) and Cocamidopropyl Betaine (CAPB) and always looking to expand its portfolio of products. Vance Bioenergy have a combined production capacity of 24,000 metric tons for oleochemical surfactants. With rich experience in the oleochemical raw materials, Vance Bioenergy are able to produce high quality surfactants economically and efficiently. Vance Bioenergy believe in the continuous improvement of current products and Research & Development of new products to meet customers' existing and future formulation needs. Vance Bioenergy aspire to provide ideal solutions for any formulation requirements. Vance CAPB is a mild amphoteric secondary surfactant. It is used as a foam booster, viscosity builder, thickening agent, humectant and antistatic agent in surfactant formulations especially in Personal Care and Cosmetic products, Household, Industrial and Institutional cleaners. Vance CDEA is a readily biodegradable, non-ionic surfactant that has good wetting, decontamination and dispersing properties. It has good tolerance to hard water and has antistatic performance. When used together with primary surfactants, foaming ability improves significantly and the foam produced is much more stable.



Figure 13. Surfactant sampling

3.0 PROCESS FLOW

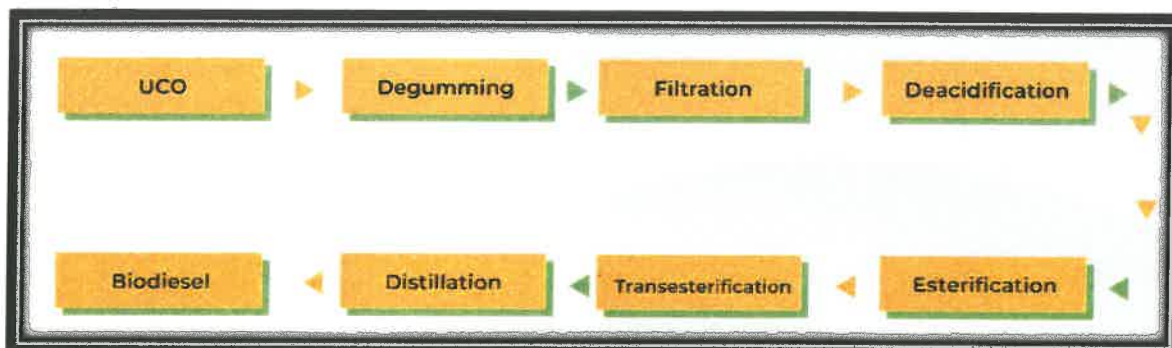


Figure 14. Biodiesel Process Flow in Vance Bioenergy Sdn. Bhd.

The process started with the used cooking oil (UCO) dispatched by the supplier to the storage tank. UCO are oils and fats that have been used for cooking or frying in the food processing industry, restaurants, fast foods and at consumer level, in households. It is estimated that currently around 90% of cooking oils and fat used are produced from vegetable oils. From the storage tank, it will undergo the first process which is degumming.

Degumming is the process for removal of phosphatides from the UCO. The phosphatides are also called gums and lecithin. The latter term is also the common name for phosphatidyl choline, but common usage refers to the array of phosphatides present in all vegetable oils. The process uses acid degumming instead of water degumming. The acid degumming process can be considered as an alternative to the water degumming process in that it uses a degumming acid combined with water. Used cooking oil, either water degummed or not, is treated by an acid, usually phosphoric acid or citric acid depends on the phosphatides level in the presence of water. The acid degummed oil is then dry degummed and physically refined. The process is usually carried out at elevated temperature around 90°C.

Filtration, the process in which solid particles in the oil are removed by the use of a filter medium that permits the fluid to pass through but retains the solid particles. It is done through Niagara Filter also known as Pressure leaf filter. Pressure leaf filters, or pressure vessels consist of 10 to 60 leaves, stacked inside a vertical vessel. The leaves are drainage systems that support a wire or textile cloth cover. Since the filtration process is contained within a pressure resistant vessel, it is an ideal solution for hazardous processes. A filter cycle begins with the vessel sealing in the shaft and its filter leaves. Then, precoat is introduced. A precoat tank containing filtrate and diatomaceous earth type filter aid is agitated for around 10 minutes.

Then, the mix fills the vessel, vents all the air, and pressurizes. The precoat runs for 15 minutes at a fluid rate around 30-60 gallons per square foot per hour. After precoat, slurry is forced through the vessel under pressure. Solid particles are trapped in the precoat, or filter media while clarified liquid passes through and into a filter leaf. The liquids pass from leaf to the shaft's interior, then out of the filter into a holding tank. Between batches, liquid cake or sludge is drained from a valve. Dry cakes require a much larger opening, sometimes the entire vessel slides back for access to the leaves for discharge and cleaning.

The deacidification process involves the removal of FFAs from crude oil to provide more stability and to make it more acceptable for consumers. This stage is the most delicate and difficult one in the refining process, since it determines final product quality. The process started with a steam distillation at elevated temperature under vacuum pressure to remove Free Fatty Acid, volatile compounds like oxidative compounds such as aldehydes and ketones and other contaminants based on their vapor pressure and volatility. Deacidification improves the flavor and oxidative stability of the refined oil by nearly a complete removal of FFA and other volatile odor and flavor compounds by thermal destruction of hydroperoxides. The deodorization conducted at high temperature with a shorter period that yield oil with improved stability.

Esterification reaction is mostly used for reducing the excess FFA level of oil for complete cleaning and then followed transesterification reaction for converting fatty acid into fatty acid methyl esters. The transesterification process is a reversible reaction and carried out by mixing the reactants, such as fatty acids, alcohol and catalyst. A strong acid is used as a catalyst which is either sodium or potassium methanolate depends on the oil conditions. The end products of the transesterification process are raw biodiesel and raw glycerol. In a further process these raw products undergo a cleaning step using methanol as alcohol where FAME (fatty acid methyl ester) biodiesel is produced.

Lastly, is the distillation or separation process aims to separate or allocate the product of the transesterification into their respective group. Distillation is a purification process where the components of a liquid mixture are vaporized and then condensed and isolated. The mixture from transesterification process is heated and the most volatile component vaporizes at the lowest temperature. The vapor passes through condenser, where it condenses back into its liquid state. The condensate that is collected is called distillate. The products gained from the distillation process is methyl ester with the byproduct of methanol, crude glycerine and fatty matter. The methyl ester also known as biodiesel is then being supplied to the storage tank readied to be dispatch.

4.0 BRIEF DAILY / WEEKLY ACTIVITY

4.1 Daily Activity

Throughout the internship, only 3 tasks are required to be done daily which includes naming declaration proposal (NDP), production report and production yield. NDP can be considered as separate report however the production report and production yield are interrelated since production yield report need the data from production report to proceed. The details of the tasks will be as follow:

i) Naming Declaration Proposal Nibong (NDP)

NDP is a spreadsheet consists of simple commands and formulation that enables the user to calculate the total amount of MEF A oils received per day and the level of used cooking oils (UCO) contains without the MEF A oils within the low IV oils that are carried by either lorry container or tanker each day. MEF A oils can be in several types which are either crude palm oil (CPO), palm oil mill effluent (POME) and Empty Fruit Bunch oil (EFB). The user required to key in data on the amount of the level UCO received, received MEF A in tanker and received MEF A in container. The data are collected through various daily documents such as Nibong reading tank, checklist flow meter and daily movement planning for Nibong. After that, the equipped formulation will automatically calculate the total MEF A in the opening and the level of UCO without MEF A oils. Then, the user needs to declare whether the MEF A oil or UCO are higher in term of volume. Lastly, the proposal will be sent to headquarters in Singapore to finalize the data and clarify whether the data are correct as it should be.

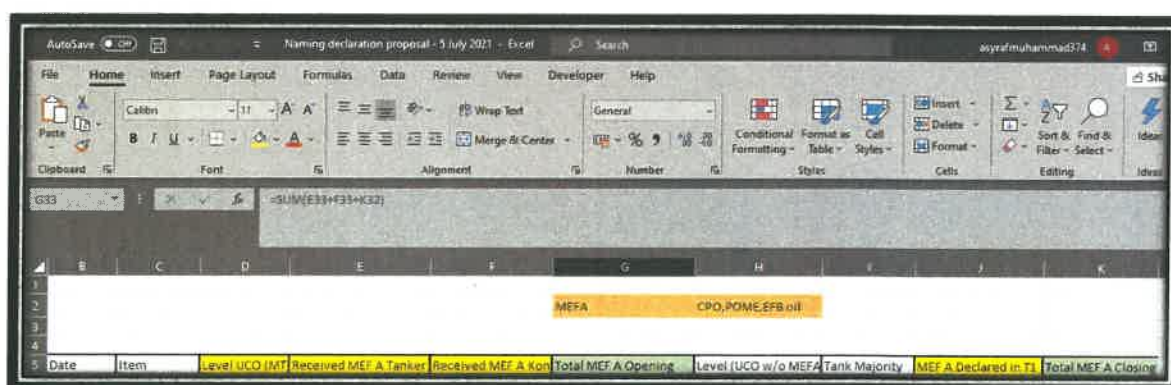


Figure 15. Naming Declaration Proposal spreadsheet with sample of formula

ii) Production Report

Per its name, the report also constructed through several commands and formulations to record the total production that occurred in the plant for each day. The user required to key in many different data that includes the data on the consumption of used cooking oil methyl ester (UCOME) for both low or high iv, the amount of steam, natural gas consumed in the plant as well as the amount of the distilled methyl ester for both high IV or low IV and ester mixture produce daily. After that, the user required to clarify in which tank the process of the production occurred and the exact supplier of the steam and natural gas during the production as well. The data, however, need to be calculated first by the supervisor in charge in a daily consumption logbook and be confirmed by the engineer. Only then, the data can be key in. It requires safety thorough hierarchy checking to ensure no error exist in the report. The report is quite important as it keep updating the major production occurred in the plant for each day.

Figure 16. Production Report Template

iii) Production Yield

The production yield is rather a complicated and yet compact spreadsheet. It requires a lot of data to be keyed in and it also contains many commands and formulations built in together within it unlike the other reports. Per its name, it mainly used to calculate the total amount yield

of palm methyl ester and refine glycerine produced per day throughout the whole plant. The user required key in the data through several steps. To begin with, the user need to key in data on the sum amount of the closing balance of refine glycerine, yellow glycerine, crude glycerine, palm methyl ester or palm oil mill effluent and refined bleached deodorized palm oil in which can be obtained from supervisor storage tank reading report. Follow with the data on the discharge refine glycerine, feed crude glycerine, dish yellow, yellow glycerine consumed by plants, export yellow glycerine, crude glycerine from methyl ester, total feed and discharge which only can be obtain through production report. After that, the user requires to key in data on the drumming refine glycerine that only can be obtain through calculation of the genetic and non-genetic modification shipment tender linked spreadsheet. The user then requires to key in data on the amount of received refined bleached deodorized palm oil and dispatch palm methyl ester which need to be extract from the daily movement planning report which hold the data on the amount of product, byproduct that are either received or dispatch. Last but not least, the user needs to sum all the amount of the amount of received crude glycerine from the crude glycerine discharge information report. This report is also quite important as it can justified whether the amount of yield produced is par or above the standard thus can prevent any losses.

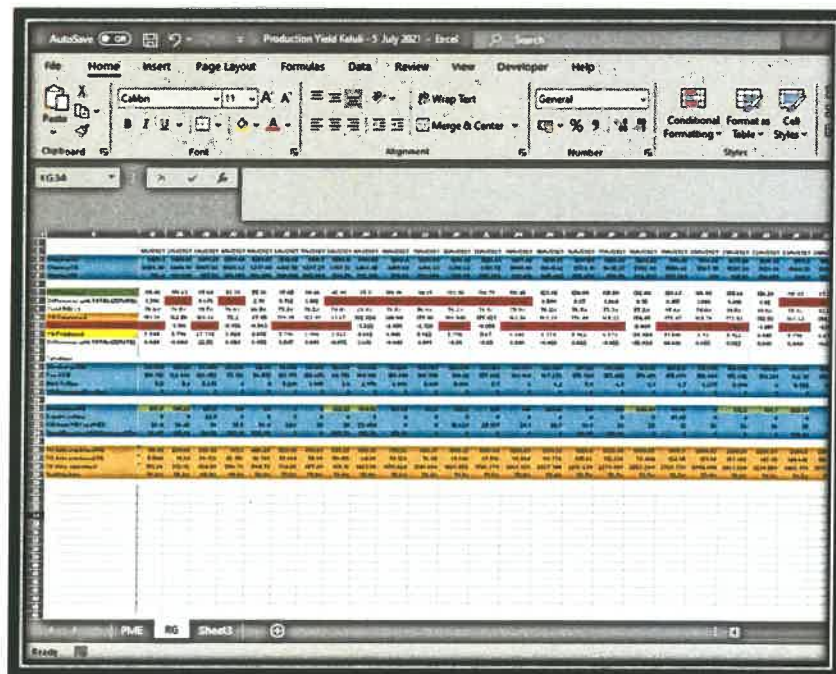


Figure 17. Production Yield Template

IV) Checking Oil Losses

The used cooking oils act as main raw material for the plant are obtained and received through various supplier. Thus, to prevent any losses or misconduct by the supplier, the company decide to check the exact amount of the oils gained via several steps. Firstly, it needs to compare the amount of oil that being bought with the amount of oil received through the flowmeter where the oils are being pumped into the tank. Then, it needs to undergo another checking which is through programmable logic controller (PLC). A programmable logic controller or programmable controller is an industrial computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, machines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis. So, through PLC, the user can identify the exact amount of oils entered the tank. Lastly, all three steps need to be compared to each other and if there are major losses occurred which usually involve more than 1 tan, it needs to be reported to the higher up for further investigation.



Figure 18. Checking data through Programmable Logic Controller

4.2 Weekly Activity

i) Plant Visit

Currently, Nibong Branch Vance Bioenergy have 4 plants. During the early week of intern, the engineers, Mr. Farid and Mr. Zulkifli lead and brief the interns on the process and equipment in all plants.



Figure 19. Worker driving forklift

Rarely, the interns are required to go to the plant in order to conduct various tasks. These are several tasks out of many tasks that were given. To start with is line tracing. The interns are required to understand the process in the plant. Thus, the engineer ordered the trainee to understand the process through the piping and instrumentation diagram by trace the exact equipment and piping per the given P&ID. There were three P&ID given to be understood by the interns before proceeding to next task.



Figure 20. View of piping and instrumentation in the plant

In the plant, the interns also being asked to watch on how the contract worker clean the Niagara Filter where the process required the worker to enter the large vertical filter and spray the cake formed at the outer of the filter using high pressure air spray to ensure the cake fall from the filter so that it can be used again as usual.



Figure 21. Vertical Niagara Filter

The interns also ordered by the head of the production department, Mr. Faizal to open and explore the crate to find and identify the spare part for the boilers. The interns required to wear personal protective equipment consists of glove, safety helmet, safety shoot, goggle and suitable equipment such as hammer to open the crate.



Figure 22. Boiler Spare Part Crate

The interns also being given task to watch the process of filling and storing product drum in the warehouse. The drum are arranged according to their types and specification and it being carried by the forklift drive by the licensed worker. The drum firstly filled by the filler that is connected directly from the output of storage tank. Then, being sort and stored and lastly being transported to buyer by container. There is also some leaking occurred near one of main tank, thus the intern required to test via the litmus paper of the stagnant liquid to check the level of acidity of the liquid in terms of pH. These are the example of many tasks that are being given to the interns during plant visit.



Figure 23. Drum in Warehouse

ii) Learn, Discuss and Apply Session

There were many things that had being learnt throughout the whole internship both new and already learnt in theory during diploma.

To begin with, is regarding steam. The interns watched the process of equipping steam tracing that composed of three main steps which are fitting, cutting and welding. Basically, steam tracing is a form of heat tracing that circulates steam around process pipes to maintain or adjust the process media at specific range of temperature. The process of equipping requires a lot of manpower where each of the manpower consists of expert in various specialized working scope. The engineer also taught on the operating principle of thermo compressor and

its advantages towards the steam system in which how it helps in reducing the steam required for the process to operate hence, lowering the production cost. The interns are also ordered to identify the actual thermocompressor used in the plant and being explained on the function of thermowell that protect temperature indicator during high steam release which help in reducing equipment cost and easy to undergoes maintenance.



Figure 24. One of piping with steam tracing

Next is watching the process of interacting with supplier. The production engineer, Mr. Zulkifli showed the ethic and attitude when interacting with supplier on resolving a crisis at a mixing vessel which occurred due to the high volume rate of condensation that leads the vessel to create many stagnant liquid outside of the vessel. While wearing proper attire including personal protective equipment, Mr. Zulkifli professionally settle the problems with the supplier with the idea of coating it with special material to control the air from going inside or outside of the vessel thus, preventing condensation. The whole process gave new work experience to the trainee.



Figure 25. Discussion between engineer and supplier

Besides that, the interns learnt more on the equipment in the plant which mainly involves two main types of pump that most commonly used in every industry which include centrifuge and positive displacement pump with various term correspond to the pump such as self-priming that can be justify as a specific type of liquid pump designed to have the required liquid inside the cavity or pump body necessary to start the pumping process which offers the potential for increased operating efficiencies in process plants where pumps are used for a variety of repeated yet intermittent operations, mechanic seal, dead-headed, cavitation, Newtonian, non-Newtonian fluid and shear force function. With correspond to the pump, the engineer also showed some actual sample of damaged pump pipe that may occurred due to cavitation or due to steam hammering per shown in the diagram below. To put it simply, steam hammering is steam charging in the pipeline while there is a presence of condensate in the line. This is because of sudden drop in pressure of steam as it comes in contact of condensate. Steam hammers can blow flange joints and can damage piping supports and even piping itself. While for the cavitation occur due to bubble forming and popping because the pressure open by valve does not as high or low as the pressure inside the pump.



Figure 26. Steam hammering effect on pipe

After that, the interns are also required to calculate the material balance for repurpose used cooking oils (RUCO) in a distillation column which required to differentiate the RUCO with the fatty acid percentage. The stream of material balance only consists free fatty acid (FFA) and triglyceride. The calculation is done to check whether the amount of FFA is below the standard set to ensure that the oil achieved the wanted specifications.

Other than that, the trainee also being taught on The Lower Explosive Limit (LEL) which can be justified as lowest concentration of a gas or vapor that will burn in air which usually varies

from gas to gas, but for most typical flammable gases usually around 5% or lesser by volume in which require the usage of liquid nitrogen (N₂) to cool down the LEL. The engineer also taught on the flash vaporization topic in which the partial vapor occurs when a saturated liquid stream undergoes a reduction in pressure by passing through a throttling valve or other throttling device. To put it simply, the high pressure liquid being passed through an open space which lead the liquid particle to turn into vapor in which can be considered as one of the simplest unit operations throughout the plant which being applied at wastewater plant.



Figure 27. One of the equipment that undergoes flash vaporization

Furthermore, the trainee also learnt on the production of cocamidopropyl and cocamidoamide with its benefit and uses in which cover many areas especially toiletries and cosmetic. Not only that, the trainee also able to watch the process of cleaning the floor of the plant due to cocamidopropyl leakage from the storage tank that only requires plain water as the leakage itself is a type of soaps which produce bubbles thus make it easier to clean it.



Figure 28. Samples of Cocamidopropyl

The interns are also being taught on the most common Excel command and function that frequently bring used in most industry which are VLOOKUP, What-If-Analysis and Pivot Table. VLOOKUP stands for Vertical Lookup. Per it name, its function is to makes Excel search for a certain value in a column of table array in order to return a value from a different column in the same row. It mostly used to group data. While What-If Analysis is the process of changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet. It comes with three types of tools which are scenarios, goal seek and data tables which commonly used by taking sets of input values to gain possible results. This function is mostly used to calculate the material balance, but it requires skill in order to perform that. A pivot table is used to customize the group data the way the user wanted. It have tools come with it which are sums, averages and statistics that can be used to aggregates the individual items of a more extensive table within one or more discrete categories.

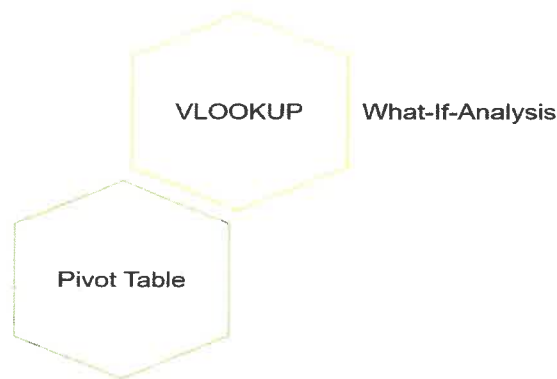


Figure 29. Function and Commands in Excel

Moreover, the intern also tasked to discuss on the simpler design of Fat Trap due to clogging problem occurred with solid waste residue which consists of fats, oil, solid and water which being complaint by one of the contract workers. Basically, fat trap with the theory of density in which fat is less than water and the oil will not mixed up with water. Hence, both fat and oils will float on the top of water. The inlet flowrate also being controlled so that the solid waste residue being able to cool down and separate into different layers. The fat trap also comes with the strainer to collect any big solid. However, the fat trap need to be cleaned or pumped out on regular basis since the solids, fats and oils will build-up over time and if it left to accumulate for enough time, the fat trap may malfunction and start to clog and the residue will flow out of the fat trap through the outlet.



Figure 30. Fat Trap

Lastly, the trainee watched, learnt and practiced the Engineering Drawing of the bubble cap trays that are required to be equipped in the storage vessel by the engineer using SOLIDWORK. The design is created to overcome a problem of pressure drop occurred in the vessel. While learning on the drawing, the trainee also able to apply theory learnt during diploma on the correlation of pressure drop with the amount of flooding point through the calculation of loading liquid gas and Ergun Equation. However, due to less effectiveness of bubble cap trays since the pressure drop remain high, the trainee discusses with the engineer on the other solution which was via pall ring packing which lessen the pressure drop in the vessel. In addition, the intern tasked to draw process flow diagram using VISIO for the future development new plant in the Nibong Branch.



Figure 31. Pall ring packing



Figure 32. Inside of the vessel

iii) Received Dispatched Weekly Summary

Due to many types of raw material and product are dispatch, the data are all record to ensure no losses occurred in the daily movement planning report. Thus, a weekly summary needs to be done to trace the materials that are lesser than the amount that had being bought in which will be compared with the weekly movement summary report. Firstly, it needs to be jot down and organized according to their category to prevent any error. After that, each material needs to be calculated as a sum per its' type. Lastly, it needs to be compared with the weekly movement summary report and identify where and from which supplier the losses occurred. Generally, it requires skills to classify identify and trace where losses occurred.

iv) Steam and Gas Consumption Report

This report holds the information on the amount of steam and gas consume weekly for the whole Nibong Branch plant. The report is also a spreadsheet consists of various formulation and commands as the other reports mentioned previously. Currently, at Nibong Branch has four plant. The user required to sum up and key in data on the amount of natural gas and steam for each plant. However, the data need to be taken from the Nibong Utilities Logbook from the monitor room in which being updated everyday by the supervisor in charge. The report is also important as it show the amount of utilities that need to be paid by the company and whether the amount of steam and gas consumed are being used efficiently.

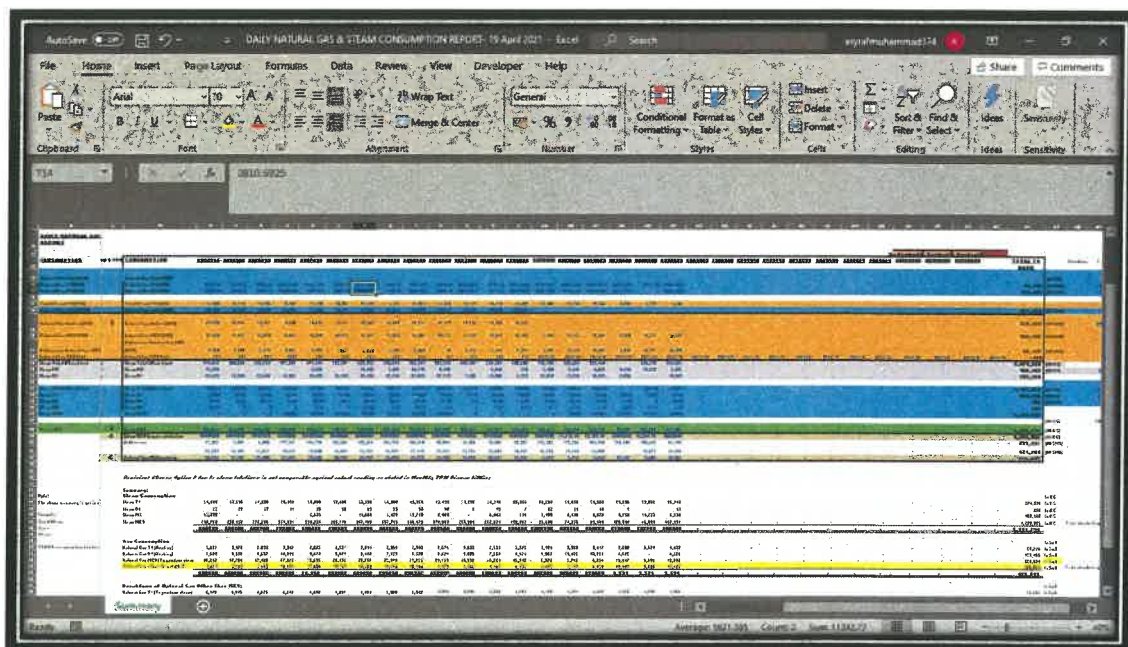


Figure 33. Natural Gas and Steam Consumption Report Spreadsheet

5.0 DESCRIPTION OF TASK ASSIGNED (MINI PROJECT)

5.1 Filter Aid Module

Currently, the Nibong branch has 4 main plants which are distillation, mixing, wastewater and surfactants. Due to new development idea, planned by the general manager, Mr. Hatta, the company decide to improve the current branch for betterment so that the yield of products can be increase significantly. However, the new development idea needs to be test first so that it will not affect the main process flow which require the usage of filter aid. And from here, a module had been created in order to give more exposure to the engineers on the filter aids since filter aid only be used in one out of four plants in the branch previously which is in the distillation plant. This exposure is a must because the new development idea required the usage of filter aid in the wastewater plant. Thus, this module is compulsory so that the wastewater engineers have better knowledge on the filter aids.

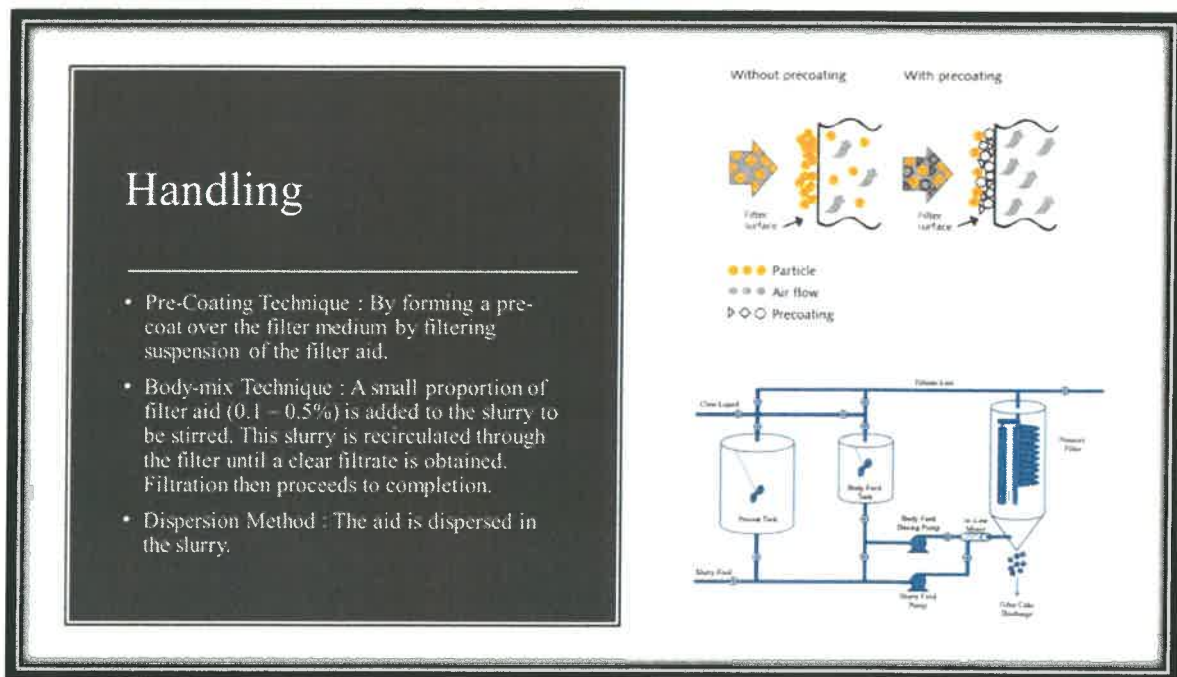


Figure 34. Sample of Filter Aid Module on Handling the Filter Aid

The modus operandi of the module is done by presentation, discussion and note. The trainee prepared a presentation to explain the filter air in the simplest way possible so that the person without prior knowledge to it can have a great understanding after the presentation is done. The presentation mostly consists of important aspect regarding the filter aids which includes

the definition, objectives, mechanism the way of handling, types and many others. After the presentation is done, a discussion session is done to share information and to ask question regarding any possible lack or unclear information delivered. Mostly, the discussion covered the problems that may arise when using filter aid instead of other media filter such as bleaching earth, the compatibility of filter aid to be used in wastewater plant due to some unwanted color exited at wastewater plant and many others.

After the discussion and presentation is done, a note has been given to each engineer as a further guidance on the filter aid. The module received quite exceptional feedback from the engineers since not only it gave the engineers clear understanding on the filter aid, plus it also helps the engineers to find the source of problems during the testing of filter aids on wastewater. By that, the module is done successfully.

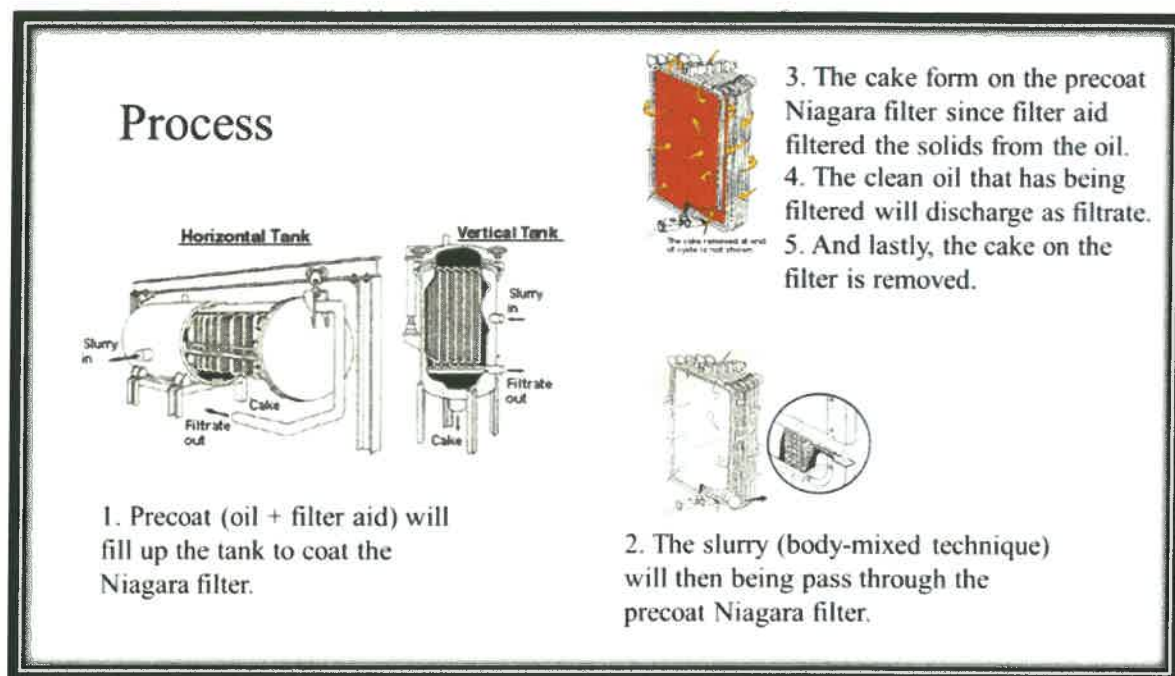


Figure 35. Sample of Filter Aid Module on the Process Flow of the Filter Aid

5.2 MCA Master Checklist Template

Due to the production of Monochloroamide (MCA) in Nibong Branch is quite new, the system that comes with it also lacking. Because of this, the logistic department make a request to the production team due to received complaint from the supplier. The complaint received was regarding the supplier need to meet several different peoples in order to give data on the raw material provided. Thus, the trainee created a new template which allowed the supplier to write all necessary data. It is created using Microsoft word and being convert to portable document format to ensure that the quality of the template remain high and unchanged.

The template is quite simple since it only consists of the date, opening and closing stock per bag, the amount of materials received and consumed, which container the supplier in charge of and the person-in-charge. By this new template, not only it solves the complaint which help the supplier record all data in one place which lessen the burden of the worker that requires to find responsible person, plus it helps the logistic team to make a report out of it since before the template exist, the logistic team need to compile data from each other which is quite troublesome. By this template, many positive feedbacks had being gained.

MASTER CHECKLIST MCA 2021						
		Kontena : _____			Month : _____	
DATE	OPENING STOCK (Bags)	RECEIVED	CONSUMED	CLOSING STOCK (Bags)	PERSON IN CHARGE	REMARKS

Figure 36. MCA Master Checklist Template

5.3 Methanol Process Flow Guide

Per its name, Vance Bioenergy refers to production that is environment friendly. Not only it means the production is safe for the environment, but it also refers to how the company reuses raw materials and products efficiently and without letting any waste. The company will use and reuse again until the materials are unusable. Methanol is one of the raw materials needed in order for the main process in the plant, which is the biodiesel production, to proceed and give the wanted specification.

Due to a sudden request from the Headquarter in Singapore, the trainee is tasked to draw a process flow chart of the methanol. The request demands a simple flow chart with an explanation that enables the reader to understand the chart easily on how the methanol is collected. Currently, there are only two ways to collect methanol, which are via the supplier or the byproduct from the process. This methanol guide explains how the methanol is collected through byproduct from the process.

The guide starts with methanol being used as a material in the enzymatic esterification process, which produces three products: Heavy Phase I, II, and III. In Heavy Phase II, no methanol is collected. For Heavy Phase I, it undergoes heating, which results in methanol vapor released, which is then condensed in the condenser and collected in a storage tank. After heating, Heavy Phase I is mixed with hydrochloric acid and then undergoes glycerine purification while Heavy Phase III is mixed with citric acid and undergoes a flash section. After that, both phases will undergo transesterification and further separation, which produce pure methanol vapor. It is then condensed in the condenser and collected in the storage tank.

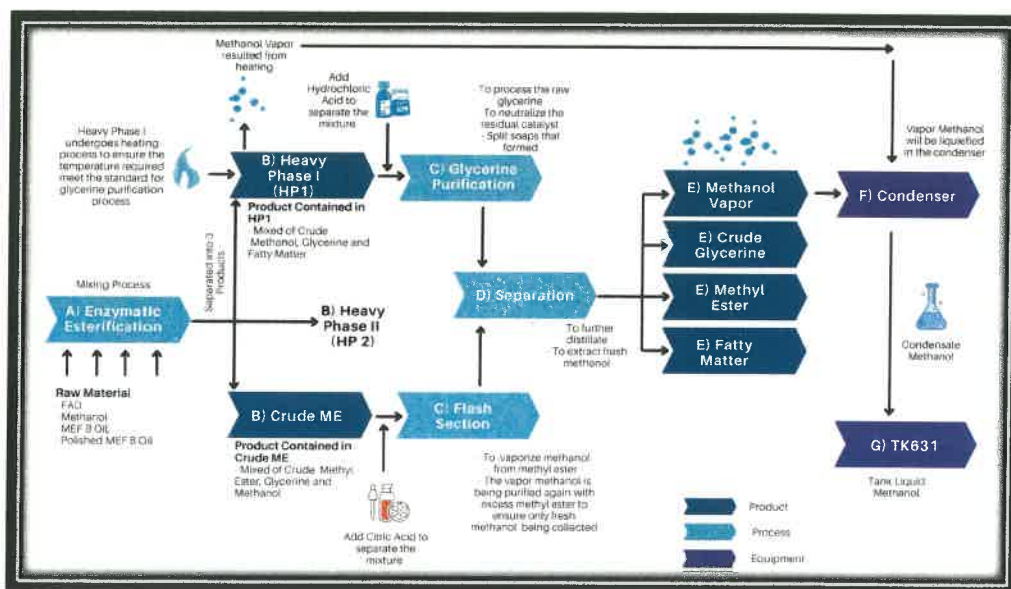


Figure 37. Methanol Process Flow Guide

The process flow is drawn using Microsoft PowerPoint and Canva, one of the designing websites. The project is done successfully and receive a great compliment from the headquarter since it simple and easy to understand even though the plant is not visible to them.

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

In conclusion, the internship with the duration of 17 weeks is done successfully despite the sudden increment of pandemic Covid019 cases. The company, Vance Bioenergy Sdn. Bhd, not only give a great working experience, but also give a warmth welcome and a good working environment. The engineers in the plant teach many new things and give exposure of a whole new engineering world to the trainee. The deepest gratitude would like to be express to the greatest production department, starting with the Head of Department, also the trainee's supervisor, Mr. Faizal Lammappa, follow with production engineers, the trainee's mentor, Mr. Syamim, Mr. Farid, Mr. Zulkifli and Ms. Siti for their unwavering dedication in sharing their knowledge and experiences despite their busy schedules, giving an endless support, guidance and lastly providing great hospitality along the way. Through the production department, the trainee able to exercise all the theories and practices that being taught during the diploma. The sincerest gratitude also being express to the industrial training coordinators, Mr. Mohd Haikal Mustafa and Ms. Noor Hidayu Abdul Rani, for their infinite effort in ensuring the internship is done perfectly and commitment in guiding the students from zero knowledge prior to industrial training until the students gain great working experiences. The trainee also earnestly happy to be able to contribute to the company with the given tasks and mini project even though it only a miniscule accomplishment. Universiti Teknologi Mara, UiTM also able to achieve its goal in producing a well-rounded students which not only have great leadership skill, grandiloquent in communicating with excellent academic performance, but also has an experience of working in the respective industry which can help students to get the upper hand for the future endeavors in overcoming their hardship when starting to work in engineering world. Many benefits and knowledge gain prior to this industrial training and give the students the better understanding on respective course industry.

6.2 Recommendation

Throughout this whole internship, there are some recommendations that would like to be suggested based on experience and third-party opinions.

To start with, is the university; Universiti Teknologi Mara (UiTM) should make a survey for every batch that undergo industrial training on their own respective company. From the survey, the UiTM can make a list of good company that provide students with good working experience. This is very important since there are exist certain companies that used and abused student as a contract worker. By this, the students can get a head up on which company the students should choose or not and have a gist on which types of company are suitable for the students based on past review. Plus, it also will lessen the burden on the final year students that are going through the final semester exam as the students do not have to push themselves on finding appropriate company which will allowed the students to focus only on their examination.

Next, is UiTM should provide a “switch company” letter. This is also important since it can remind the student that changing company is allowable but only if the company break the rules and regulation. For instance, the company abused the students to do work harsher than the contract worker such as working for 20 hours per day with no rest. Since, the students their selves sometime tend to endure the hardship and abuse during the internship due to scare of being graded as “fail” and need to repeat the industrial training for the next semester if the students decided to change their respective company. By providing the letter beforehand, not only it will help the students to have a good working experience, plus it can help the internship coordinators received less complaint.

Last but not least, a guideline on practices that compulsory to be execute by the students should be create. An example of the guideline that already exist is the mini project. This is actually optional since there are some companies only allow and limit the students on the same task for 17 weeks which give the students a tiny amount of experience only. By doing this, the students can have more exposure since the company need to follow the guideline by the UiTM. Moreover, it also can give some ideas on what the students should be doing during the internship.