INDUSTRIAL TRAINING FINAL REPORT

SESSION : MARCH-AUGUST 2022

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Duration (Date) : 21th February 2022 until 5th August 2022

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ACKNOWLEDGEMENT

First I would like to thank Ms Allison, HR Ms Ita, Head of Vegeta Manufacturing Mr Lee Hoy Sun for giving me the opportunity to do an internship within the organization for me it was a precious experience. This internship period was a great chance of learning and professional development.

I also would like to thank all the people that worked along with me Rafiq, Ng Zhi Ting and Khin Maung Win with their patience and openness they created an enjoyable working environment. It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

I would like to express gratitude to my supervisor, Ms Allison for giving necessary advice which was extremely valuable for my study, both theoretically and practically. My heartfelt gratitude also goes out to the staffs and employees for cooperating and guiding me throughout this six-month internship

Finally, I take this opportunity to thanks my family and friends who have been with me and offered emotional strength and moral support.

ABSTRACT/ EXECUTIVE SUMMARY

This report presents a summary of activities I was involved in during an internship at Vegeta Manufacturing from February 21 to August 5, 2022. The activities that I was involved is included but were not limited to operating the wastewater treatment plant. During my internship, I learnt how to start the treatment plant, troubleshooting problems and record daily data about the wastewater performances. In wastewater treatment plant I acquire knowledge on taking Sludge Volume Index, pH adjustment, observation of Primary clarifier tank, jar test and record performance monitoring. This internship was a perfect opportunity to apply some of the knowledge that I have learned in previous courses. In addition, I was able to develop some additional soft skills like communication, team work, and flexibility. I was taught about documentation and office work such as arranging file label hence grasp a real working environment.

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CHAPTER 1

INTRODUCTION OF INDUSTRIAL TRAINING

1.1 Overview

Industrial training provides students with significant skills and practical knowledge and motivates them to become a professional and successful engineer. The students will gain both theoretical and practical knowledge during the training period. There are different courses taught under industrial training. Once the students successfully complete the training, they should go through the training assessment. The students qualified will be given a degree according to the training they have obtained.

Industrial training offers the obligation for real-time work and job offers. The students can select their career in different work environments. It is important to update your existing skills with industrial training courses so that it helps you in landing better job opportunities. During the training period, the students get aware of latest technologies and the ways they are presently used in relevant and important industries. It is mostly open for graduates so that they can easily face the professional work scenario.

1.2 Objective of Industrial Training

The main objective of Industrial Training (IT) is to give students learning opportunities in the world of work to receive practical experience in order to improve the reliability of the market. In preparing the students as an engineering technician, the industrial training helps to produce chemical engineering technician graduates with excellent technical skill and soft skill competency. Student should be able to perform technical skill learnt in chemical engineering field. Student demonstrate a proper social skills and responsibilities during industrial training. Student are able to engage in independent and lifelong learning during industrial training.

1.3 Industrial Training Placement

1.3.1 Industrial Schedule

Table 1: Industrial schedule

Normal working hours	**8 hours**
Day of working	5 days a week
Work in	8.00 a.m.
Break hour	12 p.m. to 1 p.m. 1 p.m. to 2 p.m.
Work out	6 p.m.

1.3.2 Company Supervisor Information

1. Conduct introductory, refresher and update trainings to the relevant associates to ensure adequate waste management knowledge is present in the factory.
2. Ensure work performance meet legislative and regulation.
3. Perform inspections of wastewater facilities and prepare summary reports of findings, including cost estimates of repair and inventory control.
4. Establish setup and analyse, implement and monitor chemical, biological or other wastewater treatment methods, perform operational evaluation, perform periodic inspection and audit as appropriate.
5. Ensure all SOPs and documentation is in compliance with OSHA regulation.
6. Participate in cost reduction, cost saving, machine setup and improve efficiency of equipment.
7. Liaise and work closely with consultants, contractors and suppliers to ensure quality and timely delivery of the assigned project.
8. On call to respond to emergencies and breakdown in plant and pump stations.
9. Ensure all work in conformance to Occupational Safety and Health Act regulations.

CHAPTER 2

COMPANY PROFILE

2.1 Company Background

Vegeta Manufacturing Sdn Bhd is an enterprise based in Malaysia. Its main office is in Kg Baru Subang, Shah Alam. The company operates in the Food & Beverages Manufacturing industry. Its production including manufacturing and repackaging of fruit juices and drinks.

Table 2: Operating schedule of Vegeta

Days	Working Time	Operating Period
Monday to Saturday	8.00 a.m – 12.00 p.m 12.00 p.m – 1.00 p.m (lunch hour) 1.00 p.m – 6.00 p.m	4 hours 1 hours 5 hours (Total : 10 hours)
Sunday	Weekend holiday	-

2.2 Company History

Vegeta Groups of Companies was founded in 1997 as a juice and health food producer in Malaysia's peninsular centre. We branched into the creation of skincare and hair care products in 1999 and have continued to sell research items to multilevel companies to this day.

We specialise in can juice manufacturing in the early stages, such as orange, mango, apple, kiwi, lychee, pink guava, tamarind, sour sop, and tropical fruit punch. In addition, we made energy drinks, herbal drinks, and "Asian drinks" such as soya bean milk, chrysanthemum tea, green tea, and grass jelly.

We created a production line for carbonated sports drinks and herbal energy drinks in 2004, and we export the majority of our products to the US and European markets. We invested more than $2 million in bio-technology items such as collagen and medicated golden sea cucumber peptide" for healthy skin and noni juice in 2005.

All phases of production are strictly monitored and subjected to a HACCP food safety system implementation for the oral production lines and GMP implementation for the production's external use, such as skin care and hair care. At predetermined intervals, the in-house laboratory facility examines the microbiological and physical qualities of all incoming raw components and completed products. Today, the majority of our goods are made with the best components and natural raw materials, and we are devoted to seeking out natural ingredients in product research and development.

2.3 Vision and Mission

TOTAL COMMITMENT TOWARDS CUSTOMER SATISFACTION, FOOD SAFETY & QUALITY

KOMITMEN SEPENUHNYA KEARAH KEPUASAN PELANGGAN, KESELAMATAN MAKANAN & KUALITI

2.4 Organization Chart

VEGETA MANUFACTURING SDN BHD

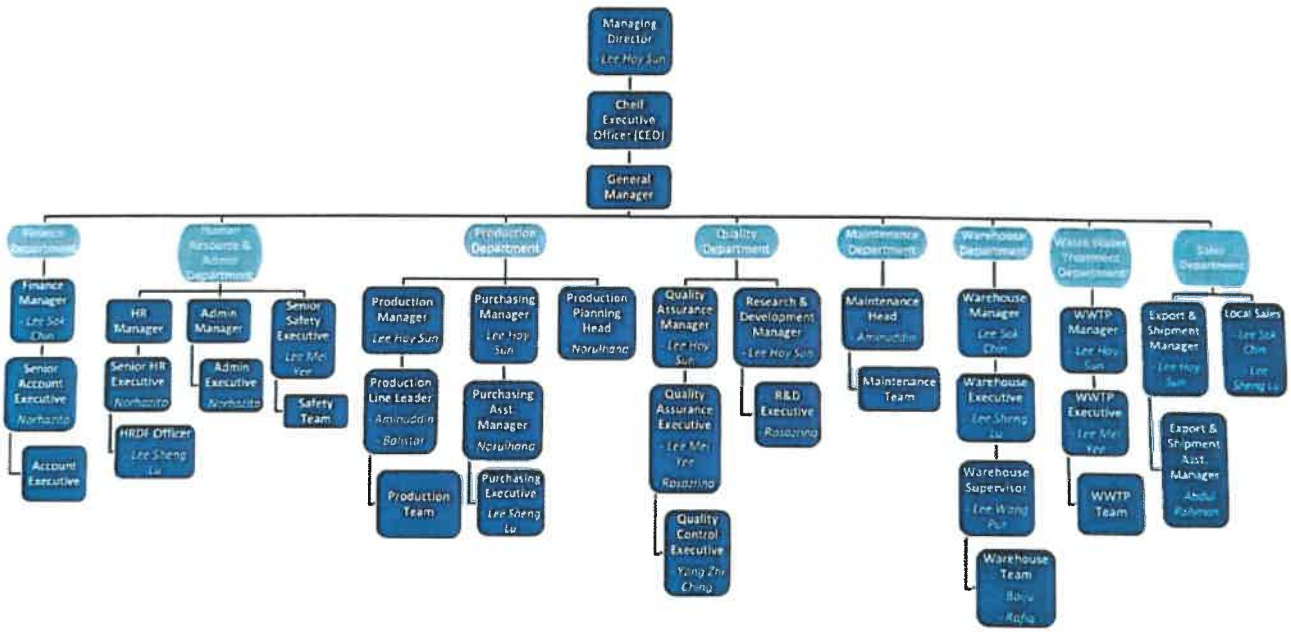


Figure 1: Organization Chart

2.5 Main Product / Service to Client

Manufacturing and repackaging of Fruit juices and drinks :

1. Camelli UHT Apple 250ml
2. Camelli UHT Orange 250ml
3. Camelli UHT Mango 250ml
4. Camelli UHT Grape 250ml
5. Camelli UHT Lychee 250ml
6. Camelli UHT Soursop 250ml
7. Camelli UHT Pink Guava 250ml
8. Camelli UHT Young Coconut 250ml
9. Camelli UHT blackcurrant 250ml
10. Camelli UHT Ice Lemon Tea 250ml
11. Camelli UHT Chrysanthemum Tea 250ml
12. Camelli UHT Jasmine Green Tea 250ml
13. Camelli UHT Wintermelon Tea 250ml
14. Camelli UHT Cranberry Apple 250ml
15. Camelli UHT Soy Milk 250ml
16. Camelli UHT Sourplum Calamansi 250ml
17. Camelli UHT Sourplum Lychee 250ml
18. Camelli UHT Cocobox Chocolate Milk 250ml
19. Camelli UHT Bubblebox Milk Tea 250ml
20. Vegeta UHT Bandungbox Rose Milk Tea 250ml
21. Vege Young Coconut Juice Drink With Pulp 300ml
22. Rubaaaly Asam Jawa Drink (Can) 300ml
23. Rubaaaly Pink Guava Drink 300ml
24. Rubaaaly Soursop Drink 300ml
25. Rubaaaly Asam Jawa Drink (bottle) 300ml
26. B2 Power Mixed Fruit Flavoured Drink 250ml
27. Extra Tongkat Ali with Honey Botanical Beverage 250ml

CHAPTER 3

OVERVIEW OF THE TRAINING

3.1 Introduction

During my internship period, I was trained to start and operate the wastewater treatment plant which includes taking the Sludge Volume Index, pH adjustment in coagulation tank, observation of primary clarifier tank, the jar test and recording all the data in the performance monitoring form. All this tasks have to be done daily and reported to the supervisor.

3.2 Summary of the Training and Experience gained

Task 1: Sludge Volume Index / Sludge Settle ability

I was exposed to aerobic wastewater treatment plant and how to operate it along with my colleague and learn more about the sludge bacteria through the training given by my supervisor Ms Allison and the notes she have given to me. I gained experience about the sludge characteristics and major/minor upset condition as well as how to handle it. This is very important for me as a student to acquire skills to troubleshoot problems that happened in aerations tank. I also studied more about the terms related to the wastewater sludge bacteria such as Biological Oxygen Demand (BOD), Mixed Liquor Suspended Solid (MLSS), Mixed liquor Volatile Suspended Solid (MLVSS) and Total Suspended Solid (TSS).

Task 2: pH Adjustment

I manage to understand when was the time I need to add acid/ alkaline dosing and adjust the meter settings to get the required pH range for coagulation to occur. Acid dosing need to be increased if the pH is above 7.5 and alkaline dosing need to be increased if the pH is below 6.5. in our plant the optimum pH for coagulant to occur is pH7 which is neutral. pH value from influent or raw wastewater need to be considered as well before adjusting the pH.

Task 3: Observation of Primary Clarifier Tank

Primary clarifier tank is place right after the chemical treatment tank process. Before starting the Wastewater Treatment system, one of the action need to be done is pushing all the sludge floating on the surface of the Primary Clarifier Tank with metal pole or scoop out the

sludge and deposit them into the Sludge Holding Tank. I experienced many situation on how to handle major/minor upset condition.

Task 4: Jar Test

Jar Test enables the correct choice and dosage of chemical coagulants aimed at removing suspended matter and pollutants in water treated in wastewater treatment plants. I gain an understanding on how to ensure jar test occur and separation between the sludge and clear supernatant in 1 minute. Moreover, comprehend on the factor that related to the effectiveness of jar test under different condition. Coagulant agent used is Poly Aluminium Chloride (PAC) and flocculant agent used is polymer.

Task 5: Record performance monitoring form

Monitoring performance is important because it can maintained acceptable range of the plant process. I understand on how to monitor the performance of physical chemical treatment processes widely used for treating industrial effluents such as: neutralization and pH adjustments, coagulation, flocculation, acid dosing, alkaline dosing, sludge volume index, jar test, MLSS and MLVSS.

CHAPTER 4

DETAILS OF EXPERIENCE

4.1 Introduction

During my internship period, I was trained to start and operate the wastewater treatment plant which includes taking the Sludge Volume Index, pH adjustment in coagulation tank, observation of primary clarifier tank, the jar test and recording all the data in the performance monitoring form. All this tasks have to be done daily and reported to the supervisor.

4.2 Details of the training and experience gained

4.2.1 Sludge Volume Index / Sludge Settle ability

Aerobic wastewater treatment systems purify water by utilising oxygen-feeding bacteria, protozoa, and other specialist microorganisms (as opposed to anaerobic systems that do not need oxygen). These systems enhance the naturally occurring process of microbial decomposition in order to break down industrial wastewater toxins and remove them. The organic pollutants decomposed by these bacteria are frequently assessed in terms of biological oxygen demand, or BOD, which is the quantity of dissolved oxygen required by aerobic organisms to break down organic waste into smaller molecules. High levels of BOD indicate an elevated concentration of biodegradable material in the wastewater, which can be generated by contaminants such as industrial discharges, residential faecal waste, or fertiliser runoff. Because these organisms require oxygen, aerobic systems must incorporate some method of introducing oxygen into the biomass, such as adding wastewater treatment ponds (which work by creating a large surface area for introducing air to the wastewater) and/or incorporating some type of mechanical aeration device.

Figure 2: Aeration tank 1 (left), Aeration tank 2 (right)

The settle ability test examines the settling properties of the suspended particles in activated sludge mixed liquor (MLSS). The purpose of the test is to offer a location for the MLSS to gradually separate from the liquid water. The bacteria clump together and form huge clumps within the first five minutes of the settle ability test (floc). Because these floc particles are somewhat denser than water, they assist in settling and compaction. The floc begins to settle toward the bottom of the container after first clumping together, squeezing the clear liquid out and up toward the surface. To begin, it should generate a large floc particle that settles well and retains tiny particles that contribute to the turbidity around the floc. Second, the biomass should generate a clear liquid above the settling solids, which will become the plant effluent.

SOP for Sludge Volume Index test:

1. Ensure the blower in Aeration tank 1 and Aeration Tank 2 is running for at least 10 minutes before doing this test.
2. Prepare a scoop, a 1 Litre measuring cylinder and a timer.
3. Scoop up a generous amount of sample from aeration tank.

Figure 3

4. Immediately transfer the sample into the 1 Litre measuring cylinder.

Figure 4

5. Make sure sample level is at 1 Litre and read at eye level.
6. Set timer to 30 minutes. Do not move the sample after setting the timer.
7. Read the level after 30 minutes of settling and record in the performance monitoring form.

Sludge Volume Index (SVI) average readings should be in the 600ml to 700ml range. Average SVI can be obtained from addition value of Aeration Tank 1 and Aeration Tank 2 divide by 2. The average of SVI number more than 700ml may result from disposing too much juice into the pump sump, causing the bacteria to consume more than adequate food for development. If this occurs, the sole solution is to wash the filter press once every two days to free up room in the Sludge Holding Tank. Once the Sludge Holding Tank has been emptied to half capacity, there will be more space to desludge from the Aeration Tank for at least 10 minutes per day. Rafiq suggested that the valve be opened 40% to desludge, and in 10 minutes, roughly 680L of sludge was desludged without considering the clogged pipe. Increased SVI values make discharge more difficult since it takes longer for sludge to settle, especially if the Aeration Tanks were already full when the air valve was switched off but the sludge had not sunk below the pipe, causing the water to overflow.

Figure 5: Photo taken from 19th May 2022 with average SVI value 650ml (Left: from aeration tank 2, Right: from aeration tank 1)

Figure 6: Photo taken from 26th June 2022 with average SVI value 865ml (Left: from aeration tank 2, Right: from aeration tank 1)

4.2.2 pH Adjustment

Coagulation is the process by which colloids are destabilised by neutralising the repulsive forces that keep them apart. The use of coagulant, which is normally positively charged, will neutralise the colloids' negative charge. As a result, the particles collide and join together to produce bigger particles that settle more easily. Rapid mixing is essential during coagulant addition to disperse the coagulant throughout the whole liquid. Coagulant overdose should be avoided since it can result in total charge reversal and colloid complex stability. Coagulant agent used is Poly Aluminium Chloride (PAC). Polymers are added into the coagulated effluent to promote the aggregation of the suspended solids into particles large enough to settle by forming bridges between the flocs. Flocculating agent must be added by slow and gentle mixing to allow for contact between the small flocs and to agglomerate them into larger particles.

Jar testing is a pilot-scale test of the treatment chemicals used in a particular water plant. It stimulates the coagulation/flocculation process in a water treatment plant and helps operators determine if they are using the right amount of treatment chemicals, and thus improve the plant performances. Perform jar test taken from chemical treatment Coagulation Tank and observe the separation and clarity of supernatant after 1 minute. Evaluate if it is Turbid/ Milky/ Clear Supernatant according to observation.

pH value:

1. pH 4.0 to pH 6.2 – pH is too low, coagulation and flocculation process unable to occur
2. pH 6.3 to pH 6.4 – separation between supernatant and the sludge occurred. However it is not stable as pH might go lower than 6.3 at any time as the water is flowing.
3. pH 6.5 to pH 7.0 – the pH value should achieve which is stable and guarantees good separation between supernatant and sludge.
4. pH 7.5 – the maximum allowable pH in our plant as there will not be any separation between supernatant and sludge beyond pH 7.5

If the pH of influent (raw wastewater) at Equalizing Tank is lower than 6.0, ensure no acid is dosing and alkaline is dosing. If the pH of influent is higher than 10.0, ensure no alkaline is dosing and acid is dosing. Use the pH strip to measure the pH value.

Figure 7

Reading at the control panel indicates pH in Coagulation Tank normally ranged from 6.5 to 7.5. Adjust alkaline pump settings if the pH is below than 6.0, alkaline used in this process is caustic soda flakes mixed with water in 500L tank capacity. Adjust acid pump settings of the pH is above 7.5, acid used in this process is 30kg Sulphuric Acid 98% mixed with water in 500L tank capacity.

Figure 8: pH < than 6.5, alkaline is dosing

Figure 9: pH > than 7.5, acid is dosing

4.2.3 Observation of Primary Clarifier Tank

Before starting the Wastewater Treatment system, one of the action need to be done is pushing all the sludge floating on the surface of the Primary Clarifier Tank with metal pole or scoop out the sludge and deposit them into the Sludge Holding Tank. This sludge happened after shut down the treatment overnight. This situation depends on the effectiveness of coagulant dosing and flocculant dosing in the chemical treatment tanks. Thus, after started the treatment system we need to switch on the pump and turn the dial for Primary Clarifier Tank, pump until no more sludge floating and adjust the cycle timer if necessary.

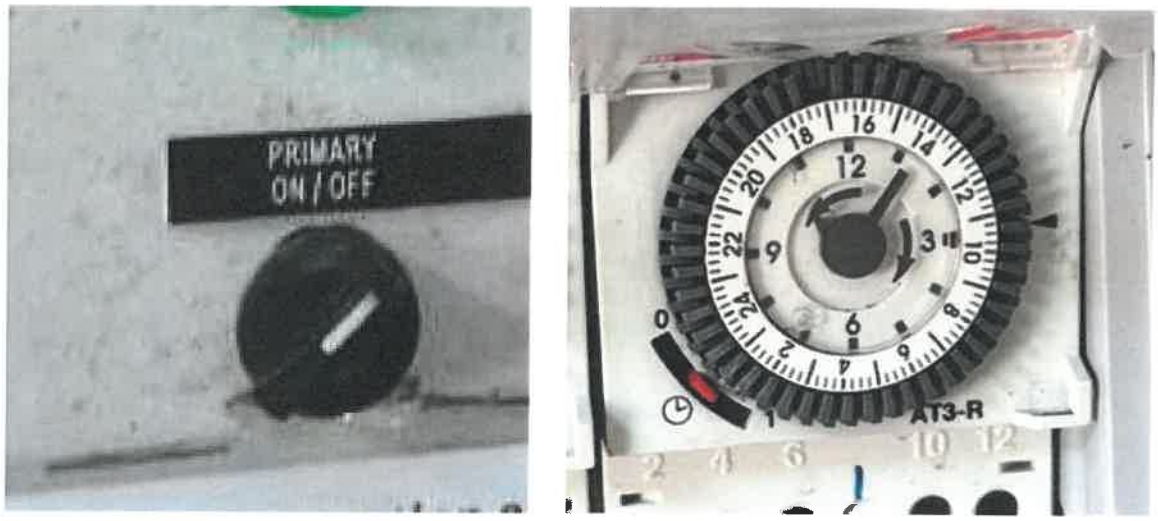


Figure 10: switch and dial for primary clarifier tank

There are three condition of Primary Clarifier Tank that we had encountered during my internship which when the water is cloudy, fairly clear and clear. We identified the situation and troubleshoot the problems as required.

Table 3

Effluent clarity	Solid carryover	Cause	Corrective action	Follow up
Cloudy	Medium	• Insufficient coagulant • pH <	• Increase coagulant dosing if insufficient • Increase caustic soda dosing if insufficient	Ensure sufficient coagulant and caustic soda, make sure effluent clarity improves to fairly clear state and low solid carryover

Figure 11: Primary clarifier tank on 14th July 2022 (left) and 24th May 2022 (right)

On 14th July 2022, we increased the coagulant dosing from 19% to 40% by increasing every 5% and test results after 15 minutes adjustment to ensure the appropriate coagulant dosing used and report to supervisor, Ms Allison. The condition of the primary is also closely related to the jar test, if the primary tank is not in good condition then the jar test is also ineffective. Action must be taken to prevent sludge from flowing into Aeration tank.

Table 4

Effluent clarity	Solid carryover	Cause	Corrective action	Follow up
Fairly clear	Low	All chemicals are sufficient. No adjustments needed.	No corrective action needed	-

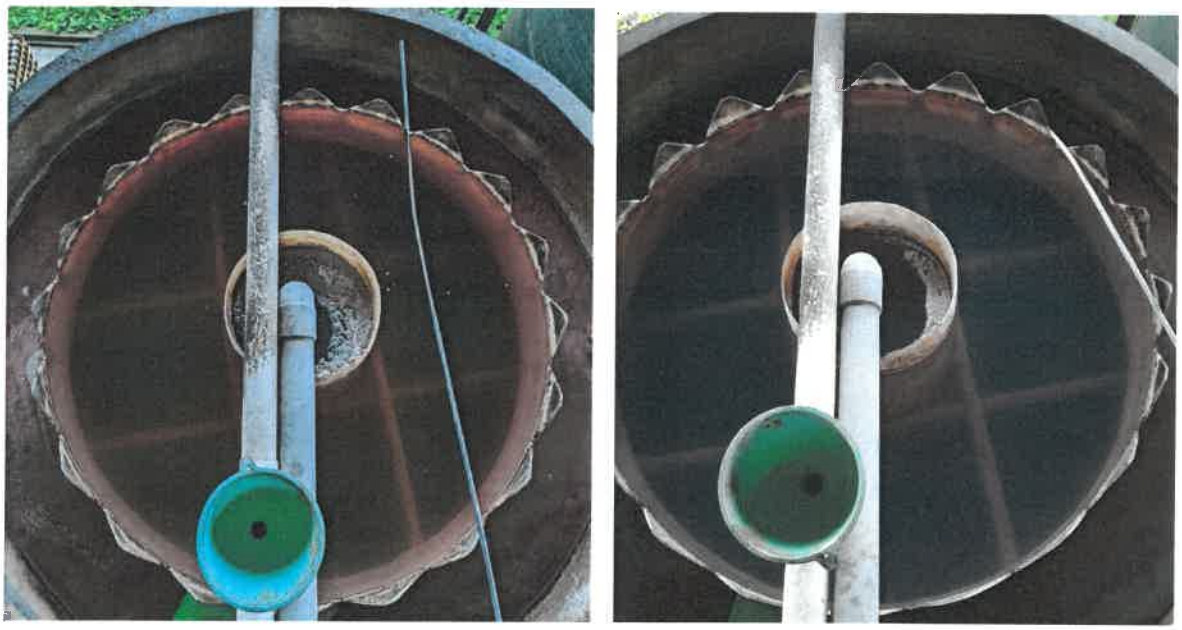


Figure 12: Primary clarifier tank on 24th June 2022 (left) and 15th April 2022 (right)

No corrective action needed to prevent the condition become worse due to overdose of coagulant after increasing the dosing or adjustment of acid dosing or alkaline dosing to match the range of pH 6.5 – pH7.5.

Table 5

Effluent clarity	Solid carryover	Cause	Corrective action	Follow up
Clear	None	All chemicals are sufficient. No adjustments needed.	No corrective action needed	-

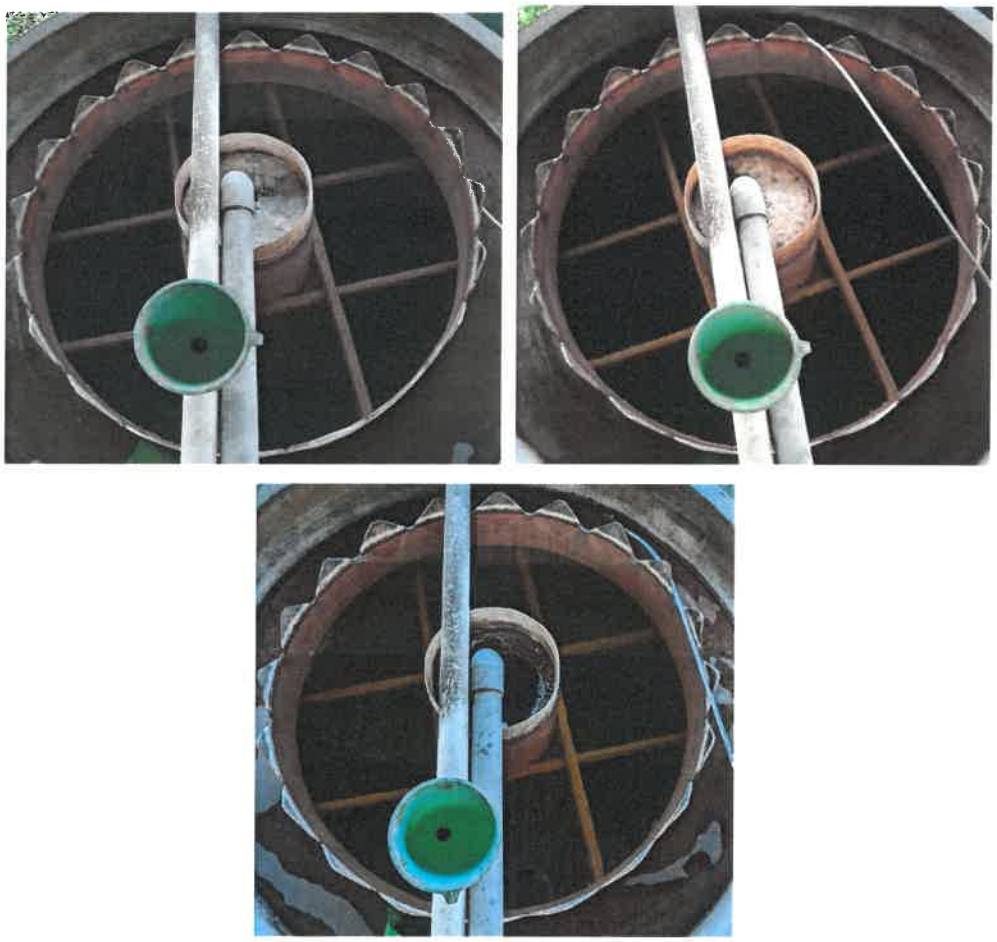


Figure 13: Primary clarifier tank on 26th May 2022 (upper left), 28th May 2022 (upper right), 23th July 2022 (bottom)

From a clear condition of Primary clarifier tank we can see the rod inside the tank which indicate the low/ none solid carryover on the surface of the tank. This shows that coagulant dosing, flocculant dosing, acid/alkaline dosing sufficient with the solid carryover or sludge produce when the water were treated.

4.2.4 Jar Test

Jar testing is a pilot-scale test of the treatment chemicals used in a particular water plant. It stimulates the coagulation/flocculation process in a water treatment plant and helps operators determine if they are using the right amount of treatment chemicals, and thus improve the plant performances. Perform jar test taken from chemical treatment Coagulation Tank and observe the separation and clarity of supernatant after 1 minute with 297rpm mixing speed. Evaluate if it is Turbid/ Milky/ Clear Supernatant according to observation. Jar test where coagulation and flocculation not able to occur if the pH is not within the range pH6.5 to pH7.5.

The results of the Jar Test can be evaluated based on different criteria:

- Optimization of coagulant dosing
- Optimization of pH
- Optimization of mixing speed time

The insoluble particles that are often created when a precipitating agent is added to a wastewater solution are very tiny and suspended in the solution (colloidal). Such particles' capacity to remain suspended is caused by both their tiny size and an electrical charge (often negative) on their surface that causes them to reject other particles. Chemical coagulation and/or flocculation are needed to encourage the clearance of these suspended particles. When coagulants are added to wastewater, a chemical reaction occurs that neutralises the repelling electrical charges around the colloidal particles, allowing the particles to adhere to one another and form clumps or flocs. These particles can be separated from the solution by sedimentation, flotation, filtration, or straining because they have been combined into bigger flocs. Anionic flocculants are frequently employed to aid in the aggregation of the flocs and their settling when necessary.

It is typically necessary to pre-treat surface waters with caustic soda in low pH and alkalinity (usually coloured) cases in order to ensure that the ideal coagulation pH is attained. For high alkalinity or pH waters, on the other hand, acid is dosed to bring the pH or alkalinity down to a lower value before dosing the coagulant. The alkalinity of model water, which is often based on deionized or distilled water, should be modified to match that of natural waters when it is used in research on improving coagulation. Controlling the pH greatly improves the coagulation process, as the pH level affects the surface charge and shape of the coagulants and contaminants to be

removed. Therefore, not only the coagulant dosing but also the pH should be optimized to maximize the removal of contaminants present in the raw water.

Jar Test procedure:

1. Use a clean beaker
2. Scoop sample from Flocculation tank
3. Set timer for 1 minute
4. Observe flocculation to occur, where sludge sink within 1min or 1.5 min
5. Record result by taking the photo for jar test and report to supervisor

Jar test when separation occurred

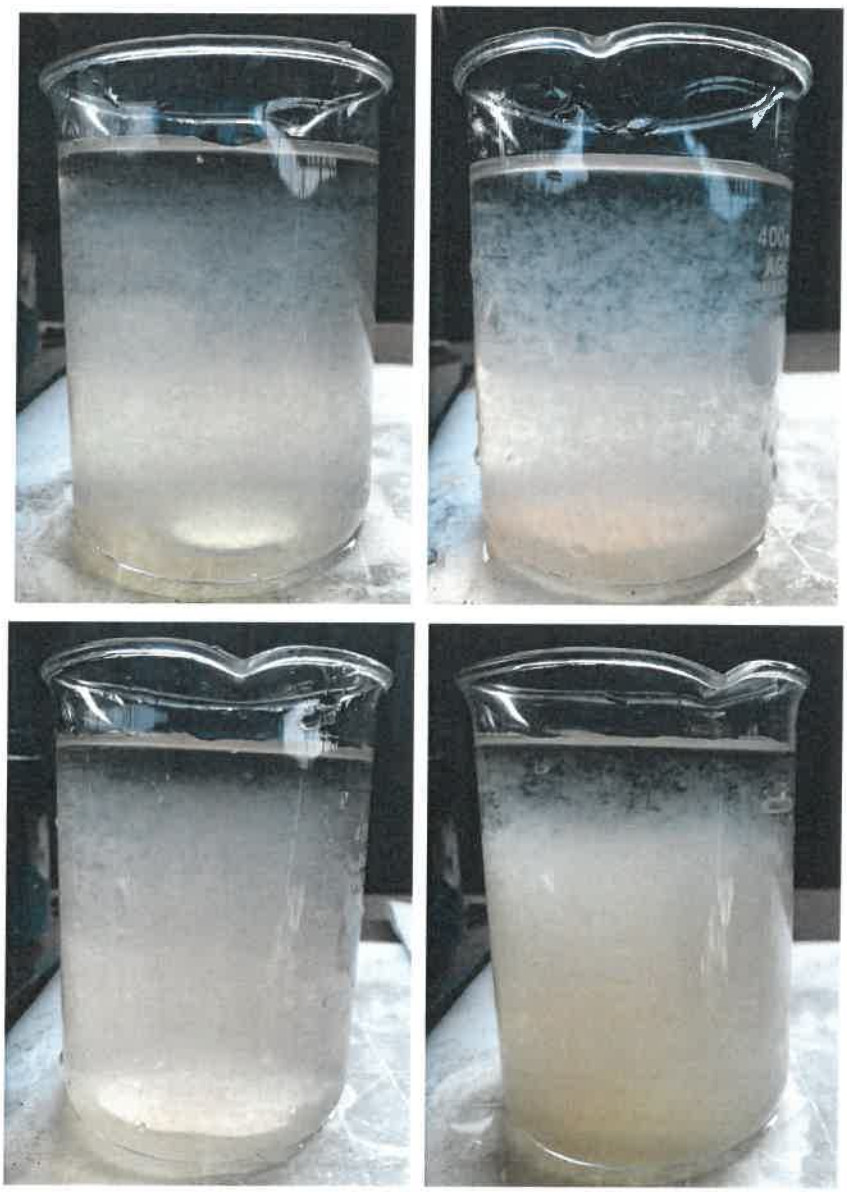
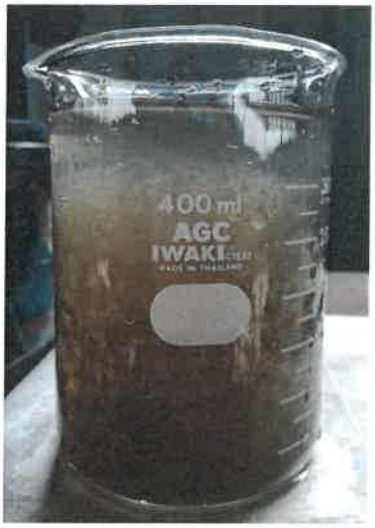


Figure 14: (from upper left) 26th May 2022, 2nd June 2022, 21th July 2022, 28th July 2022

Jar test when separation did not occurred



14th July 2022
Separation occurred but not clear supernatant showed total suspended solid above the sedimentation, coagulant dosing was increased

24th June 2022
Separation occurred but takes longer than 1 minute because disposing too much juice and bacteria consumed too much foods

18th May 2022
pH > 7.5 and not stable where coagulation did not occur, coagulant dosing was increased, acid dosing was increased

Figure 15

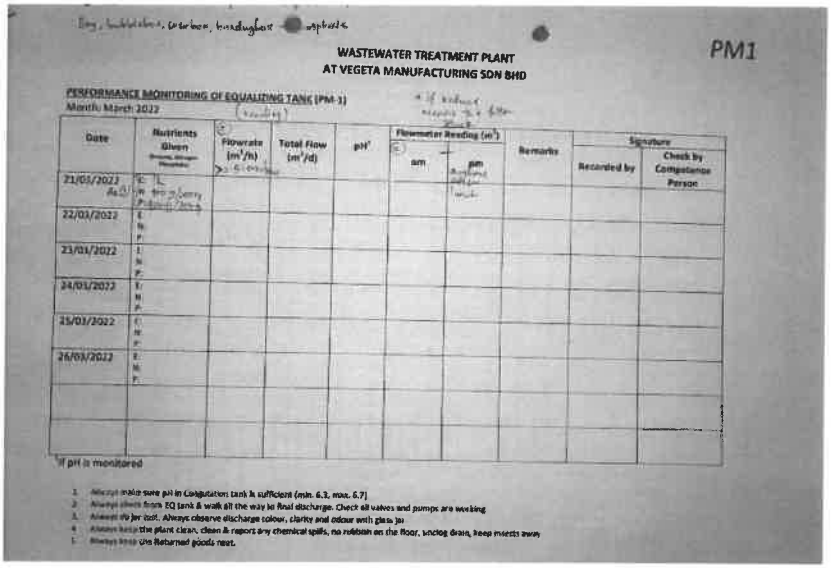
4.2.5 Record Performance Monitoring Form Daily

Requirement for sources to conduct performance monitoring of their Industrial Effluent Treatment Systems (IETS) is provided for in **regulation 9** which is reproduced below:

Regulation 9 on **Performance monitoring of effluent treatment system** reads:

> (1) An owner or occupier of a premises shall-
> *a)* Conduct performance monitoring of the components of the effluent treatment system in the manner a s specified in the **Guidance Document on Performance Monitoring of Industrial Effluent Treatment Systems** issued by Department of Environment; and
> *b)* Equip himself or itself with facilities, **relevant equipment** or instruments for the purpose of conducting performance monitoring referred to in paragraph *(a)*.
> (2) In this regulation, performance monitoring means the routine monitoring of certain characteristics to provide an indication that a treatment process is functional and capable of treating the industrial effluent or mixed effluent.

Performance monitoring is **proactive and preventive approach** to the operation of IETS where key parameters are monitored and maintained within acceptable ranges. It needs to be performed in accordance with the procedure specified in the **Guidance Document on Performance Monitoring of IETS**. The industries need to acquire the **relevant equipment** to enable their IETS team to perform performance activities as specified in the Guidance Document. Wherever relevant, the industries are encouraged to do more than the minimum requirements specified in the Guidance Document.



PM1

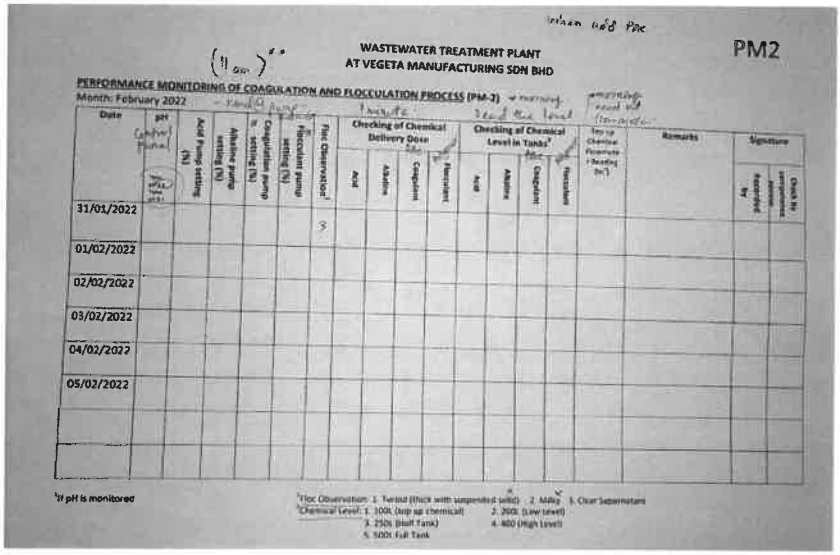
WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF EQUALIZING TANK (PM-1)
Month: March 2022

Date	Nutrients Given	Flowrate (m^3/h)	Total Flow (m^3/d)	pH*	Flowmeter Reading (m^3) am	Flowmeter Reading (m^3) pm	Remarks	Signature: Recorded by	Signature: Check by Competence Person
21/03/2022									
22/03/2022									
23/03/2022									
24/03/2022									
25/03/2022									
26/03/2022									

*If pH is monitored

1. Always make sure pH in Coagulation tank is sufficient (min. 6.3, max. 6.7)
2. Always check from EQ tank & walk all the way to final discharge. Check all valves and pumps are working
3. Always do jar test. Always observe discharge colour, clarity and odour with glass jar
4. Always keep the plant clean, clean & report any chemical spills, no rubbish on the floor, unclog drain, keep insects away
5. Always keep the Returned goods neat.



PM2

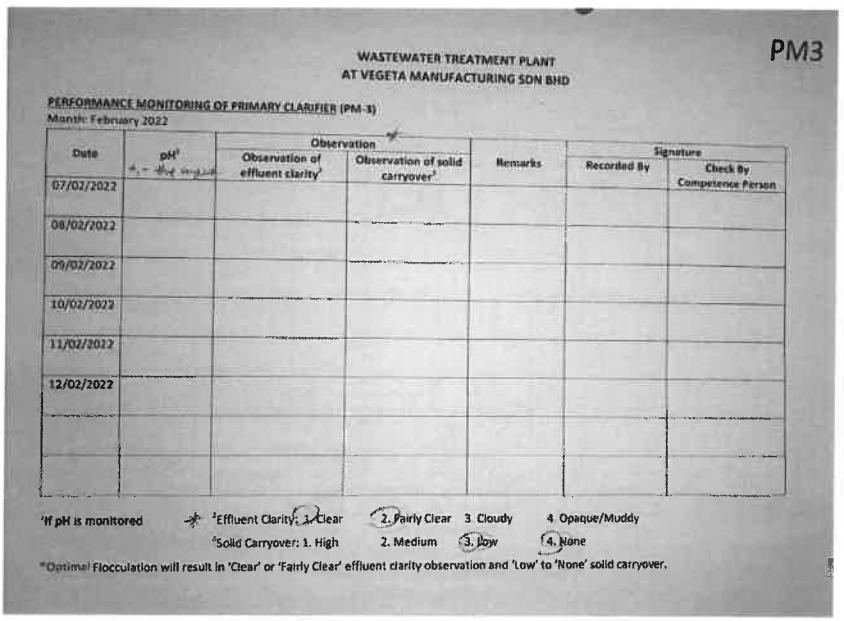
WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF COAGULATION AND FLOCCULATION PROCESS (PM-2)
Month: February 2022

Date	pH*	Acid Pump setting (%)	Alkaline pump setting (%)	Coagulation pump setting (%)	Flocculant pump setting (%)	Floc Observation[1]	Checking of Chemical Delivery Dose: Acid	Alkaline	Coagulant	Flocculant	Checking of Chemical Level in Tanks[2]: Acid	Alkaline	Coagulant	Flocculant	Top up Chemical Flowmeter Reading (m^3)	Remarks	Signature: Recorded by	Signature: Check by Competence Person
31/01/2022																		
01/02/2022																		
02/02/2022																		
03/02/2022																		
04/02/2022																		
05/02/2022																		

*If pH is monitored

[1]Floc Observation: 1. Turbid (thick with suspended solid) 2. Milky 3. Clear Supernatant
[2]Chemical Level: 1. 100L (top up chemical) 2. 200L (Low level) 3. 250L (Half Tank) 4. 400 (High Level) 5. 500L Full Tank



PM3

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF PRIMARY CLARIFIER (PM-3)
Month: February 2022

Date	pH*	Observation: Observation of effluent clarity[1]	Observation: Observation of solid carryover[2]	Remarks	Signature: Recorded By	Signature: Check By Competence Person
07/02/2022						
08/02/2022						
09/02/2022						
10/02/2022						
11/02/2022						
12/02/2022						

*If pH is monitored
[1]Effluent Clarity: 1. Clear 2. Fairly Clear 3. Cloudy 4. Opaque/Muddy
[2]Solid Carryover: 1. High 2. Medium 3. Low 4. None

*Optimal Flocculation will result in 'Clear' or 'Fairly Clear' effluent clarity observation and 'Low' to 'None' solid carryover.

PM4

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF AERATION TANK 1 (PM-4)
Month: March 2022

Date	pH[1]	Dissolved Oxygen (mg/L)	MLSS (mg/L)	SVI (mL/g)	Suspended Solids of Return Activated Sludge (mg/L)	Remarks	Signature: Recorded By	Signature: Check By Competent Person
21/03/2022								
22/03/2022								
23/03/2022								
24/03/2022								
25/03/2022								
26/03/2022								

[1] pH is monitored

PM5

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF AERATION TANK 2/BIOCLARIFIER (PM-5)
Month: March 2022

Date	pH[1]	MLSS (mg/L)	SVI AE2 (mL/g)	SVI Bioclarifier (mL/mg)	Suspended Solids of Waste Activated Sludge (mg/L)	Q_{WAS} (m^3/d)		BOD (mg/L)	COD (mg/L)	Remarks	Signature: Recorded By	Signature: Check By Competent Person
21/03/2022												
22/03/2022												
23/03/2022												
24/03/2022												
25/03/2022												
26/03/2022												

[1] pH is monitored

PM6

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF MEDIA FILTRATION SYSTEM (SAND FILTER) (PM-6)
Month: March 2022

Date	Inlet Pressure (MPa)	Outlet Pressure (MPa)	Backwash carried out? (Yes or No)	Remarks	Signature: Recorded by	Signature: Check by Competence Person
21/03/2022	0	0	No			
22/03/2022	0	0	NO			
23/03/2022						
24/03/2022						
25/03/2022						
26/03/2022						

PM7

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF MEDIA FILTRATION SYSTEM (CARBON FILTER) (PM-7)

Month: March 2022

Date	Inlet Pressure (MPa)	Outlet Pressure (MPa)	Backwash carried out? (Yes or No)	Remarks	Signature	
					Recorded by	Check by Competence Person
21/03/2022	0	0	NO			
22/03/2022						
23/03/2022						
24/03/2022						
25/03/2022						
26/03/2022						

PM8

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF FINAL pH ADJUSTMENT TANK (PM-8)

Month: January 2022

Date	Final Discharge Flowmeter Reading (m^3)		Total Volume Discharge (m^3)	NaOH pump setting (%)[1]	H_2SO_4 pump setting (%)[1]	Checking of Chemical Delivery Dose		Checking of Chemical Level in Tanks		pH (5.5-9.0)	Remarks	Signature	
	(a.m)	(p.m)				NaOH	H_2SO_4	NaOH	H_2SO_4			Recorded By	Check By Competence Person
17/01/2022													
18/01/2022													
19/01/2022													
20/01/2022													
21/01/2022													
22/01/2022													

[1]If pH is monitored

PM9

WASTEWATER TREATMENT PLANT
AT VEGETA MANUFACTURING SDN BHD

PERFORMANCE MONITORING OF FILTER PRESS (PM-9)

Month: March 2022

Date	Sludge Generated (kg)		Observation	Remarks	Signature	
	a.m	p.m			Recorded By	Check By Competence Person
07/02/2022						
07/02/2022						
07/02/2022						
07/02/2022						
25/03/2022						
26/03/2022						

Figure 16: Example of performance monitoring form

4.3 Problems Encountered and Approach Adopted for Solving Problem

Black sludge from Aeration Tank 2

On 25th May 2022, when Ms Ng (internship student) and I want to start the plant we saw a floating black sludge in Aeration tank 2, the size is around 2-3cm and it is only be seen when the aeration is open but sink when the aeration close. The black sludge have a squishy texture but not slimy, clumped together in small size and breakable when squeeze between finger. They looked same like the normal sludge except that they are black in colour. We concerned if it can be found in Aeration Tank 1 because the sludge is return activated sludge but fortunately Aeration tank 1 was not affected. We scoop out all the black sludge floating on the surface of Aeration tank 2 and put in the pail as well as reported the situation right away to our supervisor Ms Allison. Ms Allison suggested to put Sodium hypochlorite to eliminate the black sludge.

Figure 17: The clack sludge found in aeration tank 2

On 26th May 2022, the sludge in Aeration tank 2 look a bit darker than before, instead of orange colour they looked more in dark brown and the black sludge is getting bigger as they clumped in larger size which is around 10-20cm. They have the same characteristics like yesterday except that it is increase in diameter and heavier than before. We scoop out all the black sludge floating on the surface of Aeration tank 2 and put in the pail. Fortunately it was found only in Aeration tank 2 and Aeration tank 1 was not affected. The situation was reported immediately to Ms Allison and she suggested another method which is increase aeration for both aeration tanks. She

inspected that the black sludge was an anaerobic sludge. As from the photo we took daily from Aeration tank it can be seen that the aeration from Aeration tank1 is very strong by the presence of bubbles on the surface of the tank as if its boiling hence absence of black sludge. Furthermore, in Aeration tank 2 was only mild aeration as there are only small bubbles presence which conclude few factors where the air diffuser in the aeration tank 2 is clogged and since the blower need to distribute air to both aeration tanks the effectiveness of the blower decreased causing some of the sludge turn into anaerobic sludge. Ms Allison suggested to alternately turn off the aeration from Aeration tank 1 for 10minutes and let aeration from Aeration tank 2 open, and then turn on aeration from Aeration tank 1 for 10minutes and let aeration from Aeration tank 2 close, this cycle was repeated around 6 times. Then the bubbles in Aeration tank 2 improved as there are more bubbles presence on the surface of the water. On the next day, the black sludge no longer detected on the surface of Aeration tank 2 since the aeration was increase overnight.

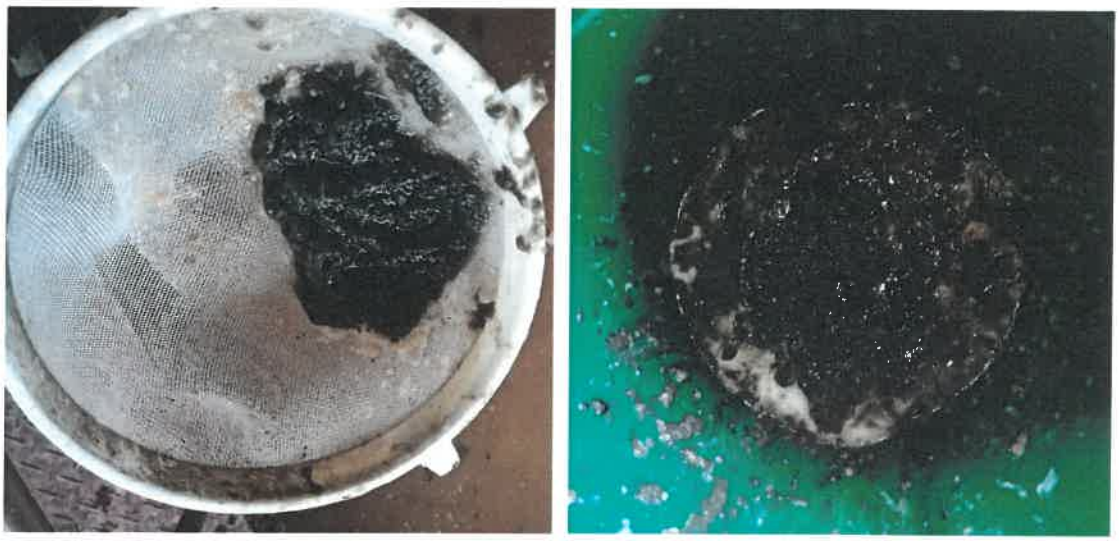


Figure 18: The bigger black sludge found in aeration tank 2

Pump from production

On the 21st week of internship we noticed that the water from Equalizing tank is always below the second level and the water in pump sump also at low level implies that small amount of water coming from production to wastewater treatment plant. It was inspected that the one way valve is already broken as the rubber inside was loose and lose its shape maybe due to hot water from production, as the valve need to suck in the water through the pipe the rubber involved leak out all the water in the pipe which creates vacuum condition in the valve. This problem makes no

water or only small amount of water from production flow to wastewater to be treated also the water will overflow into the drain nearby. A new valve was changed to prevent this situation from happening again and after the valve was fixed the next day water from production filled into the pump sump and the raw wastewater in Equalizing tank read at the third level.

Figure 19: The broken valve

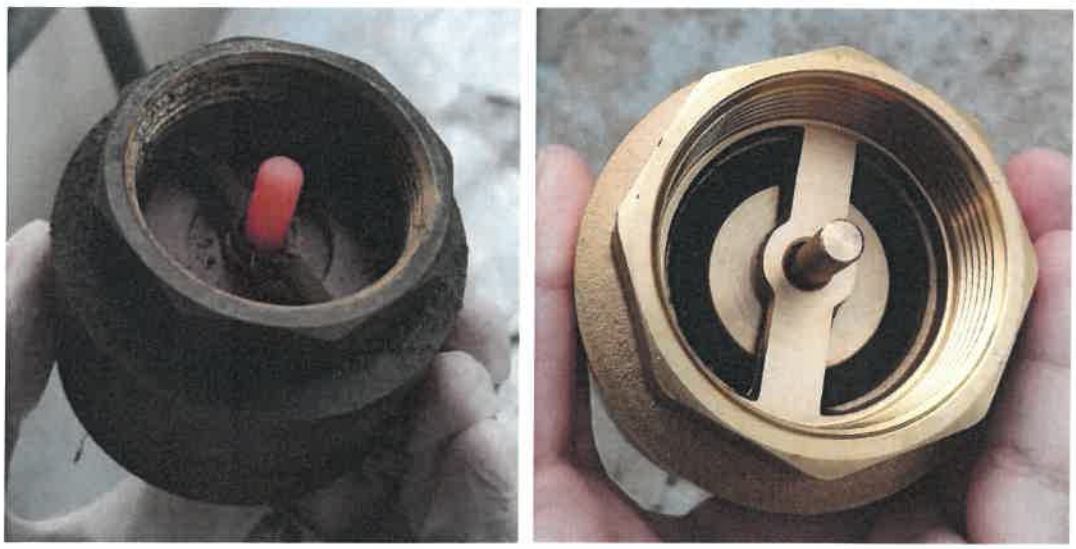


Figure 20: Old valve (left) and new valve (right)

4.4 Professional and Ethical Issues

Strong employee connections are created via teamwork since the more closely co-workers are together, the more they get to know one another and grow to like one another. As they collaborate more, they get more used to one other's preferences, dislikes, strengths, and shortcomings. A team that has been working together for a while will inevitably grow more collaborative, which will improve everyone's experience at work. During my internships I met with Ng Zhi Ting and Khin Maung Win whom doing their internship at wastewater plant, we learned how to manage all the work together as the quote plastered on the wall in the office, *"Coming together is a beginning. Keeping together is progress. Working together is success. " by Henry Ford.* We know as students we need to help each other to ease the work especially when it involves physical work as my physical is small Ng always help me when I could not reach things and Maung Win always help me with the load.

Good communication can boost teamwork and lead to better project collaboration. It applies to practically every industry. Workplace communication is important for streamlining internal communication. Maintaining effective communication ensures that management and the team below them are on the same page. Communication can be viewed both internally and externally. Any growth project relies on strong communication and on all stakeholders, whether internal or external, being on the same wavelength. During my internship I learned to polish my communication skills as I need to always report daily data to my supervisor Ms Allison as well as communicating with other staff especially the foreign worker. I need to answer and deliver the instruction in appropriate manner to improve working performances including communication by face to face or texting messages on the phone.

Managing time entails controlling both your own and other people's schedules. Time management refers to working effectively, and businesses across all industries seek employees who can utilise their time on the workplace to the fullest. The organisation makes more money and spends less time. When assigning priority, consider such factors as when each task needs to be done, how long it might take, like when I do documentation and office work I will prioritize they need in urgent. Also creates a to-do list on a piece of paper or just on the palm of my hand to make sure I tick all the checklist need to be done on that day.

4.5 Health, Environment and Sustainable Aspect

When I was assigned in wastewater treatment plant I noticed that the organization prepare the full protective personal equipment (PPE) as required especially when we need to be in contact with chemicals such Caustic Soda, Sulphuric Acid, Sodium Hypochlorite and Acid Nitric. The PPE involved is the gloves, the elbow-length gloves, the apron, the safety glasses, the face shield and the boots. All personal protective equipment must be designed and built safely, and it must be kept in a hygienic and dependable manner. It should be comfortable enough to encourage worker usage. Fit issues with personal protective equipment might be the difference between being securely covered and being dangerously exposed. Employers are required to provide personal protective equipment to their employees and oversee its appropriate usage when engineering, work practise, and administrative controls are not practical or do not offer enough protection. Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards.

As for sustainability aspect, the company contact with supplier to reuse chemical containers and they may be able to refill containers with the same chemical. If not properly disposed of, the residue within empty chemical containers might be hazardous trash. If containers are disposed of without being treated beforehand, chemical discharge may combine with groundwater, permeate the soil, and eventually be ingested, endangering both people and wildlife. Thus, give back chemical containers to supplier could prevent hazard expose to the environment.

CHAPTER 5

CONCLUSIONS

5.1 Conclusions

In conclusions, this internship has been a very useful experience for me. I can safely say that my understanding of the job environment has increased greatly. Along my training period, I realize that observation is a main element to find out the root cause of a problem. Not only for my project but daily activities too. During my project, I cooperate with my colleagues and operators to determine the problems. Moreover, the job indirectly helps me to learn independently, discipline myself, be patient, self-trust, take initiative and the ability to solve problems. Besides, my communication skills is strengthen as well when communicating with others. During my training period, I have received advice from supervisor and other staff when mistakes were made. However, those advices are useful guidance for me to change myself and avoid myself making the same mistakes again. Apart from that, I had also developed my knowledge in wastewater treatment plant theoretically and practically but I realized there is more for me to learn and I will never stop learning new things to give depth to my understandings either about wastewater or other field in the future.

5.2 Suggestions and Recommendations

When conducting Industrial Training (LI) sessions, the company or firm should concentrate on student concerns. Since students are still getting used to the pre-employment environment, instruction and direction from a firm's observation are essential. The students believe that the company's management is uninterested in the work they have done if this move is not doable. The supervisor is in charge of assisting students with their six-month industrial training by serving as a guide and providing direction herself.

Students should be more competent and timely in doing the task given so the company gives the trust to do something. Students should also be sensitive to situations that happen during industrial training such as trainees should not be too depend on the supervisors for the guidance but students should be self-knowledge in knowledge and experience as well as creative in carrying out their duties in order to strengthen themselves self. Students should be prepared to handle various situations that often occur in the management of an organization such as criticism, objection or reprimand from the supervisor.

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