



اَوْنِيُوْرْسِيْتِي تِيْكْنُوْلُوْجِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

Glasfil Polymer Sdn. Bhd.
the reliable polymer designer™

INDUSTRIAL TRAINING FINAL REPORT

SESSION: 2022-2

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All praises to Allah, Lord of the universe, and peace be upon His Messenger, in the name of Allah, the Most Beneficent and Merciful. Above all, I want to thank Him for blessing me with patience and mental fortitude to complete the Internship report. It is undeniably a necessary requirement for obtaining a certified diploma with flying colours, and I have received outstanding assistance from many sources, which I would like to record here with great pleasure and gratitude.

Firstly, I would like to thank myself for always keep on trying and do the best even though it is hard and stressful. I felt very grateful of myself for always stand and survive even though facing a pressured and stressful workplace. I would love to acknowledge my family for giving support and advises to keep going. I would like to thank my siblings whose always drive me to my workplace.

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ABSTRACT

The purpose of this industrial training is to assist student to gain some learning opportunities and work experiences in industry as much as possible from professional workers relevant to the workplace involved which that can improve the employability. The industrial training was held for 24 weeks started from 21st February 2022 until 4th August 2022 at Glasfil Polymer Sdn. Bhd., Balakong which is one of the companies that manufacturing plastic products. There are 2 main plants that fit 19 injection molding machine and 1 warehouse. The training undergoes in 4 different job scope which industrial management, technical task, quality control and research and development. The participation of trainee towards certain project gave better understanding and more knowledge in managing and handling manufacturing of plastic fabrications by manipulating parameter that had been learned in university which open to other knowledges despite the knowledge gained from the university. Lastly, other task and activity such as documentation and training help to improve soft skills and to practice on carry task under pressure. From this industrial training, trainee has exposed with real working environment with related field during the industrial training and able to apply all theories studied in class onto relevant industrial works.

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CHAPTER 1

INTRODUCTION

1.1. OVERVIEW OF THE TRAINING

Students in particular programs at all levels of higher education in Institutions of Higher Learning are required to complete Industrial Training (IHL). Industrial training programs were created to strengthen the necessary competencies in order to increase the number of graduates qualified for employment. Students that enroll in industrial training programs have real-world experience in the workplace, which helps to increase market trustworthiness.

Industrial training refers to exposing students to real-world engineering experiences and involving them in Chemical Engineering projects before graduate. One of the prerequisites for receiving a diploma in chemical engineering is that the student must finish at least twenty-four (24) weeks of industrial training with a total of 12 credit hours during the sixth semester. The training started on 20th February 2022 until 4th August 2022. Within this duration, as trainee from University Technology of MARA, UiTM, will be given task that related and relevant with program taken. It is necessary for students to submit their duty report on stated date to the company as proved students have started the industrial training programme. Through this training, students were required to prepare report regarding the training and logbook to jot down their daily activities during the industrial training.

Industrial training gives opportunity for student to apply all theories studied in previous semester according to the types of industry they applied. Exposing the students to the real work environment can surely preparing them to see and feel the experience of working with people in the industries. Industrial training could also trigger their unknown skills and could show them a career that required skills they might have. On top of it, the industrial training also boosts students' self-confidence and enhances their collaboration and communication abilities. In their profession of engineering, students are required to exhibit a high level of integrity, ethics, and accountability.

1.2. OBJECTIVE

The primary goal of Industrial Training (IT) is to provide students with opportunities to learn in the workplace and gain practical experience in order to improve market reliability. Industrial training helps in the preparation of students for careers as engineering technicians by producing engineering technician graduates with excellent technical skills, industrial management skills and soft skill competency. There are some other objectives of industrial training which are:

- Make a new network.
- Enhance communication skills in workplace.
- Sharpen skills as manufacturing technician.
- Develop management skills include time management and work management.

Working hours	8 and a half hour
Day of working	6 days a week
Work In	8.30 a.m.
Break	Monday-Thursday and Saturday <ul style="list-style-type: none">• 1.00 p.m. to 2.00 p.m. Friday <ul style="list-style-type: none">• 12.45 p.m. to 2.30 p.m.
Work Out	6.00 p.m.

1.3.2. COMPANY SUPERVISOR BACKGROUND

1.Name: Mr. Abdul Halim Bin Hussain

CHAPTER 2

COMPANY PROFILE

2.1. Company Background

Since 1992, Glasfil Polymer Sdn. Bhd. specializing in Plastic Injection Molding with Mold Fabrication and Plastic Production. The office with build-in factory located at Balakong, Selangor. Owned a high technology machine and experience system expert, show a big impact on production. With its 25 years experienced in the plastic industry, expert knowledge, competence and reliability continue success in producing plastic product.

As one of the leading manufacturers in Malaysia. Glasfil Polymer offer customers a one stop solution for mold fabrication and plastic injection. Glasfil's in-house design and tooling expertise provide professional part design and drawing according to the most exacting specifications. The company provide in-house trial and submit samples for customer's approval to maintain its top-quality assurance.

Glasfil promise the quality of the product will be either perfection or masterpiece for customer and meet all the requirement needed. Glasfil Polymer owned 2 manufacturing plant with 19 injection molding machines ranging up to 560 ton and 1 warehouse with wide capacity to store goods and material.

2.2. Company History

Glasfil Polymer Constantly improving and upgrading our production technology and at the same time educating our staffs to fulfill the customer's demand and becoming the trusted manufacturer. In future, Glasfil will implement integrated operation with multiple technologies and be the "one stop centre" for plastic products market to fulfill diverse customers' requirements. Thus, Glasfil Polymer will be able to offer customers with products that exceed their expectations.

This company serves original equipment manufacturers across multiple industries. Its current productions are a series of automotive, furniture accessories, telecommunication, automation, bathroom parts, electronics and electrical.

Glasfil Polymer capable to navigate aspiration to be recognized as the reliable polymer designer and supplier for plastic products in the global marketplace, the company began to export its product directly to Singapore, Germany, USA, Australia, and Sri Lanka.

2.3. Company Logo, Vision & Mission

2.3.1 Company's Logo



Glasfil Polymer Sdn. Bhd.
the reliable polymer designer™

2.3.2. Company's Vision

Glasfil group - To create value in what we do and make a difference.

2.3.3. Company's Mission

Glasfil group – To be the industry leader in what we do and drive positive changes around us.

2.4. Organization Chart



2.5. Main Product/Service Provided to the Client

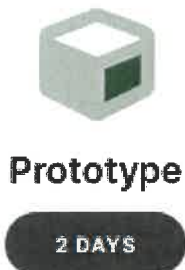
- ISO 9001 : 2015 manufacturing
- Mold fabrication/tooling c/w design and analysis
- Plastic injection molding with Video Non-Contact Measuring Device (Accuracy \pm 3 micron)
- Expertise in plastic material recommendation / consultation
- Material design with 2D and 3D SOLIDWORKS in plastic which includes Strength Analysis, Production Stimulation, Structural Strength and Pressure Resistance
- Provide secondary process such as Ultrasonic Welding, Pad Printing, Silk Screen and Assembly Jobs
- Manufacturing company which comply to Green Environmental System

2.6. Business Flow



Provide free consultation for customer and research to understand customers' requirements better

Whole idea of product sketching R&D team will be focused on the material via production processes and component properties up to assessment of procedures and products in the light of economical and ecological aspects.



Glasfil provide a 3D prototype for customers to “look, touch & feel” the product or part before committing to more time and costly aspects of production by using SolidWorks and Moldex 3D software.

Glasfil's mould department will proceed to tool and drawing after getting approval from the customer. It will take 7 days to proceed from tool discussion to tool approval.



Tool Drawing

5 DAYS



Tool Fabrication

28 DAYS

Technicians will start using the High Precision steel cutting technology to fabricate the tool. Tool fabrication could help customer save time and cost

Technicians will run tool testing to assure mold performance, quality and track the test outcomes to assure the is perfect



Product Approval

2 DAYS



Tool Testing

3 DAYS

Product approval will be sent to customer before starting sunning mass production.

Product will be test with in house testing facilities to achieve the test specifications that are required by customers.



Quality Assurance and Quality Control

2 DAYS



In-house Assembly

2 DAYS

In house assembly service will be provide to customers as it could reduce cost and achieve quality consistency.



Packing & Packaging

2 DAYS

Glasfil offered packing and packaging services that are customizable to customer's need. The packing of all products will be ensured in meeting customers' standards and quality.



Shipping

2 DAYS

Goods will be shipped either by sea or air.

Figure 2.6. Glasfil polymer's business flow

CHAPTER 3

OVERVIEW OF THE TRAINING

3.1. INTRODUCTION

During the period of the industrial training, Glasfil Polymer assigned many types of tasks and most of them are on hands with minimal supervise. Mostly tasks given related with management, technical, quality control and research and development. All of the tasks given guided by senior staffs and monitored by supervisor who also a production engineer.

3.2. Summary Of the Training and Experience Gained

Task 1: Record production output and problem encountered during production

Production output comes from the number of products produced from the injection molding machine. The outputs were recorded by operator during the production of certain products on a prepared form called target sheet. Then, the forms for every machine operated will be collected at the end of the shift by trainee. Before shifts started, all outputs for every machine will be keyed in into a google sheet's file called Production Daily Output.

To identify the problem, trainee will take notes and jot down problem encountered during the production. The problems will be written on the operator's record (production target sheet) by referring to technician and production engineer. The duration in solving the problems will be also recorded to calculate estimation in production output.

Task 2: Calculate the target to achieve for each operator.

There are two types of operators, secondary operator, and machine operator. Secondary operator will be given secondary tasks such as trimming, assembling, packing, and weighing. For each operator, they will be given target according to the duration of processes for a single product. As for machine operator, the target will be calculated according to machine cycle time.

Task 3: Check the quantity of the production for every product produced

This task was assigned to identify the quantity produced has achieved the desired quantity by customers. Firstly, the quantity will be calculated referring to the machine counter displayed in machine screen monitor. To confirm it, previous quantity record was calculated to identify whether it has reached its target or not. Plus, quantity of products achieved by the warehouse department from production will be confirmed by the head of warehouse department.

Task 4: Material availability and estimate production operation hour.

The first thing to do when shift started is to check the material availability in each machine. The material will be checked by open the hopper, machine instrument where material will be loaded before being charged and inject into mold. Then, the availability of a material will be checked by referring to the person in charge of loading material into the hopper whether the material still available at the warehouse or not.

Task 5: Purchase request

In production, there are some equipment that require for machine service, mold install and other services. There are also items used by the operator to operate machine such as gloves, cutter, scissor, carton, plastic bag and sellotape. Sometimes the items are not enough, so purchase requests were done as request to admin purchaser regarding the insufficient items.

Task 6: Technician's task

As trainee in production department, technician's tasks were given. Technician's tasks includes start and stop a machine, fix machine error, entering parameter, fills in parameter in the parameter forms and adjustment settings.

Task 6: Check product's defect/reject

During production, trainee was assigned to check the product produced whether the production of the product acceptable or not. This task was guided by the senior staff from Quantity Control department who show all the types of reject for certain products. Knowing the rejects, trainee was assigned to indicate the cause of the reject produce.

Task 7: 3D drawing using SolidWork

Trainee was told to draw certain products produced by the company using the SolidWork software. At first, supervisor gave few weeks to be familiar with the software by try to draw any products produced by the company. Then, trainee was given 2 hours to draw a product chose by the supervisor and will be evaluate based on the drawing.

Task 8: Material test

The test was done to investigate the outcome of product with recycle material as its resin. The experiment was done using 2 types of material which is PP COPO RECYCLE 50% and PP COPO RECYCLE 100%. This experiment's outcome will decide the types of material that will be used for the upcoming production of the products.

3.2.1. Weekly Activity (Summary of each week)

Week 1: Introducing to production flow and production staffs

Week 2: Briefing with production manager and production engineer

Week 3: Cleaning and greasing mold on machine

Week 4: Operate machine and study the defects of the product

Week 5: Learn to start and stop a machine

Week 6: Updating production output from home (quarantine)

Week 7-8: Learn to start and stop a machine

Week 9: Learn to fix machine error.

Week 10: Learn to eliminate part that stuck on mold.

Week 11: 3 days public holidays and 2 days emergency leaves

Week 12: Mold minor service

Week 13: Training operator to operate machine in a right manner

Week 14: Working on SolidWorks and material testing

Week 15: Learn how to operate robot arms

Week 16: Preparing machine capacity report

Week 17: Managing products' quantity

Week 18: Being in charge in KRAIBURG project

Week 19: Preparing standard inspection procedure for KRAIBURG project

Week 20: Preparing reject rate report regarding the KRAIBURG project

Week 21: Work on countermeasures to reduce number of rejects for KRAIBURG project

Week 22-24: Filing Job sheet and other documents

CHAPTER 4

DETAILS OF EXPERIENCES

4.1. INTRODCUTON

Throughout the industrial training, experiences were gained from difference aspect which is industrial management, technician’s tasks, quality control and research and development. As for industrial management, experiences gained were managing the machine should be run, estimating machine operation and preparing certain reports. Other than that, experience in solving machine error, minor servicing mold, setting up robot arm and preheating material in hopper were obtained guided by supervisor the production engineer. Next, as being test on using SolidWork software, trainee was given task to draw some of the product produced by Glasfil Polymer. The company also assigned to join in testing material and experimenting on recycle material in production.

4.2. DETAILS OF EXPERIENCE

4.2.1. INDUSTRIAL MANAGEMENT

Task 1: Record production output and problem encountered during production

Production output comes from the number of products produced from the injection molding machine. The outputs were recorded by operator during the production on a prepared form called target sheet and will be collected at the end of shift. All outputs for every machine will be keyed in into a google sheet called Production Daily Output.

Production Daily Output 2022 -XLSX ☆ 📄

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DATE	MACHINE	1	2	3	4	5	6	7	8	9	10	11	12
	PRODUCT	GK000	KW 008TB			TK 010-R			KW003	GK 009	GK 004	LTC 112	GK005
	Part N.Weight	180.0	24.0			18.0			3.0	116.0		7.0	
	Cycle Time (Actual)	101	70			57			24	69	45	39	30
	Plan	737	525			1,527			6,300	548	3,380	3,600	3,332
	Hours running (Plan)	21.5	5.0			8.5			10.3	10.8	10.5	10.5	8.0
	Hours running (Actual)	21.5	5.0			8.5			10.5	10.5	10.5	10.5	8.0
	Machine Count	852	533			1,828			927	3,608			3,987
4.1.2022	Adjustment Reject (short)												
	Quality Reject (short)	85	45			6				4			
	Actual Reject	85	45			6				4			
	ACTUAL	767	485	0	0	1,822	0	0	0	925	1,008	0	3,992
	Material use in production	100KG	25KG			25KG				125KG	50KG		25KG
	Purging Material (kg)												
	Purging Material Name												
	% REJECT	#REF!	0.0	#DIV/0!	#DIV/0!	0.0	#DIV/0!	#DIV/0!	0.0	0.0	0.0	0.0	0.0
	REMARKS	0	0			0			0	0	0	0	0
	Performance (%)	#REF!	103.06%	#DIV/0!	#DIV/0!	100.86%	#DIV/0!	#DIV/0!	0.00%	168.21%	107.38%	0.00%	100.00%

Figure 4.2.1. Production daily output

The elements in the production daily output records are machine number, types of product (products code number), part weight, cycle time, plan quantity, planned hour, actual hours, machine count, rejects, actual quantity, machine performance and remarks. All of this elements can be obtained from operator's target sheet. Plan quantity can be calculated as:

$$\text{quantity} = \frac{3600}{\text{cycle time}} \times \text{planning hours} \times \text{number of cavity}$$

Actual quantity obtained after machine count minus the reject's quantity. For machine performance, the numbers gained from the formula below:

$$\text{Performance}(\%) = \frac{\text{Actual quantity}}{\text{Planning quantity}} \times 100\%$$

Lastly, remarks row was provided to state if there is any problems occurred during production which also rows to write the reasons of low machine performances. This was done for further improvement in operating machine for certain products.

To identify the problem, trainee will take notes and jot down problem encountered during production in the operator's target sheet at the remarks part. The problems will be written on the operator's record (production target sheet) by referring to technician and production engineer. The duration in solving the problems will be also recorded to calculate estimation in production output.

GLASSY POLYMER SOFT BHD			
24, R. 22			
720	8025741	18 A	6100 21016
466	527	725	037
7	7	0	12
23	14	18	12
1200 m	1200 m	1200 m	1200 m
17	238	239	202
977	548		
21	1216		
180	18		
1200 m	1200 m		
106	697		
MOL. PLASTIK DARI NY. STROK DIPERIKSA DAN DITANDAHI			

Figure 4.2.2. Operator's target sheet

Task 2: Calculate the target to achieve for each operator.

There are two types of operators, secondary operator, and machine operator. Secondary operator will be given secondary tasks such as trimming, assembling, packing, and weighing. For each operator, they will be given target according to the duration of processes for a single product. Then, the performance will be record in google sheet where the percents will be graded.

Secondary Process Daily Target 2022 .XLSX

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SHIFT PRODUCTIVITY RECORDS

MONTH : JUNE 2022

DATE	VANTI						
	PART NO.	TASK	DURT HRS	TARGET QTY	ACTUAL QTY	%	GRADE
1	AF001	WEIGHING	1.5	1500	1950	130	A+
	AF002	WEIGHING	0.5	1500	1300	87	B
	CE194	PRINTING	4	160	157	98	A
2	AE002	WEIGHING	1	1200	1100	92	A
	AF001	WEIGHING	1	1300	1350	104	A
	AE002	TRIMMING	1	400	400	100	A
	CE194	SORTING	1	50	49	98	A

Figure 4.2.3. Secondary process daily target record

As for machine operator, the target will be calculated according to machine cycle time. The targets given will be in an hour target which means the quantity of finished goods achieved in an hour. The number of finished goods influence the performance of the operator. If operator the operator run machine but did not finish the trimming and eliminating runner from part, the grade will be low as finished goods quantity did not achieve the target.

Shift Performance Operator 2022 .XLSX

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SHIFT PRODUCTIVITY RECORDS

MONTH : JANUARY 2022

DATE	ASNAH						AISYAH					
	M/C NO.	DURT HRS	PART NO.	QTY TARGET	QTY PCS	GRADE	M/C NO.	DURT HRS	PART NO.	QTY TARGET	QTY PCS	GRADE
1												
2												
3	10	10.5	GK004	3360	4472	A+	12	6	GK003	2880	3192	A+
4	10	10.5	GK004	3360	4088	A+	2	5	KW008	530	530	A
							12	8	GK003	3992	3992	A
5	10	10.5	GK004	3360	4408	A+	12	10.5	GK003	5040	5372	A+
6	15	10.5	CPK001	713	896	A+	10	10.5	GK003	3360	4036	A+
7	15	10.5	CPK001	713	827	A+	2	10.5	KW008	1080	1080	A

Figure 4.2.4. Shift performance operator record

The performance for each operator will be calculated based on the cycle time which is the duration of operator finishing certain process. The evaluation was made based on the quantity of finished goods for 1hour.

$$\text{Quantity target} = \frac{3600s}{1hr} \times \frac{1}{\text{cycle time } s} \times 1 \text{ hr process}$$

$$\text{Performance (\%)} = \frac{\text{Quantity target}}{\text{Quantity achieved}} \times 100\%$$

For each achieved target, operator will be rewarded with incentives given by the company. This google sheet can be seen by production manager, human resource executive, operation manager and managing director as they will evaluate the operators whether they deserve the incentive or not. Plus, this records were intended to decide whether the operator is suitable for certain tasks so that all production process run in smooth according to what has been planned.

Task 3: Check the quantity of the production for every product produced

This task was assigned to identify the quantity produced has achieved the desired quantity by customers. Firstly, the quantity will be calculated referring to the operator's target sheet obtained from the machine counter displayed in machine screen monitor. Sometimes the product produced was more than 1 cavity, but the counter only counts the number of shots produced. So, to calculate the actual quantity, machine count will be multiplied with the number of cavities per shot. This was done because customers' desired quantity is in a piece and not in shot.



Figure 4.2.5. Machine screen monitor (HAITIAN MODEL)



Figure 4.2.6. Operator's target sheet (production output record)

To confirm the actual quantity of products, production daily output will be observed to calculate previous production and check the quantity of defect products during the production. If there is reject produced, products will be produced more than the desired quantity according to the quantity of reject produced.

Lastly, to avoid any miscount, quantity of products achieved by the warehouse department from production will be confirmed by the head of warehouse department. These steps could ensure the quantity produced is comply with customer's desired quantity.



Diagram 4.2.1. Quantity check flow process

Task 4: Material availability and estimate production operation hour.

The first thing to do when shift started is to check the material availability in each machine. The material will be checked by open the hopper, machine instrument where material will be loaded before being charged and inject into mold. The amount of material in the hopper will be observes and read the scales at the hopper.



Figure 4.2.7. Hopper scales and material checking

Then, the availability of a material will be checked by referring to the person in charge of loading material into the hopper whether the material still available at the warehouse or not. If the material is not sufficient, estimation was made and record using calculation below:

$$Quantity (pcs) = \frac{Number\ of\ cavity\ (pcs)}{shot\ weight\ (g)} \times \frac{1000g}{1kg} \times material\ available(kg)$$

This formula was used to identify the quantity that could be produced with current material. Next, lifetime of the material will be calculated to know at what time the machine will stop. Besides that, the estimation were made to decide whether run other product or stop after finished the material in the hopper. All the calculation will be recorded to identify the amount of material needed to reach desired quantity. The estimation can be done by using the formula below:

$$\text{Estimation time} = \text{Quantity}(\text{pcs}) \times \frac{\text{cycle time (s)}}{3600 \text{ s}} \times \frac{1 \text{ shot}}{\text{number f cavity (pcs)}} \times 1 \text{ hr}$$

TIME	DATE	MACHINE NO	14
10.30am	01-07-22	PRODUCT	AF001
		NUMBER OF CAVITY	1
		SHOT WEIGHT	35
		MATERIAL (KG)	75
		QUANTITY	2143
		CYCLE TIME	45
		ESTIMATE TIME (hr)	27

Table 4.2. Material availability and time estimation record

4.2.2. TECHNICAL/TECHNICIAN OPERATION

Task 5: Technician's task

In production department, technician's skills are very crucial to make sure all productions run in smooth, and problems can be solved quickly. Technician's tasks include start and stop a machine, fix machine error, entering parameter, fills in parameter in the parameter forms and adjustment settings. Before operating a machine, enter the parameter required in the machine settings. The parameter was obtained from previous operation for mold that have been operate before. For new mold, parameter will be obtained from mold test that has been done before. The parameter was record in a parameter form.

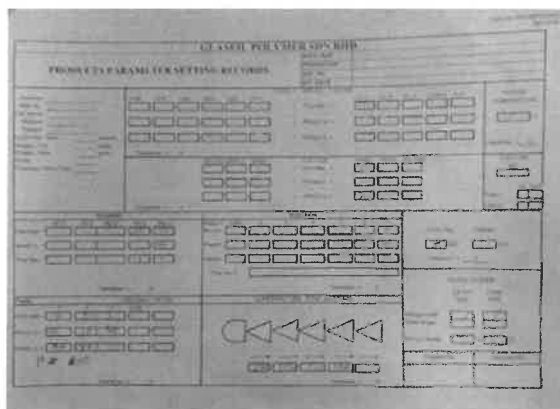


Figure 4.2.8. Parameter record form

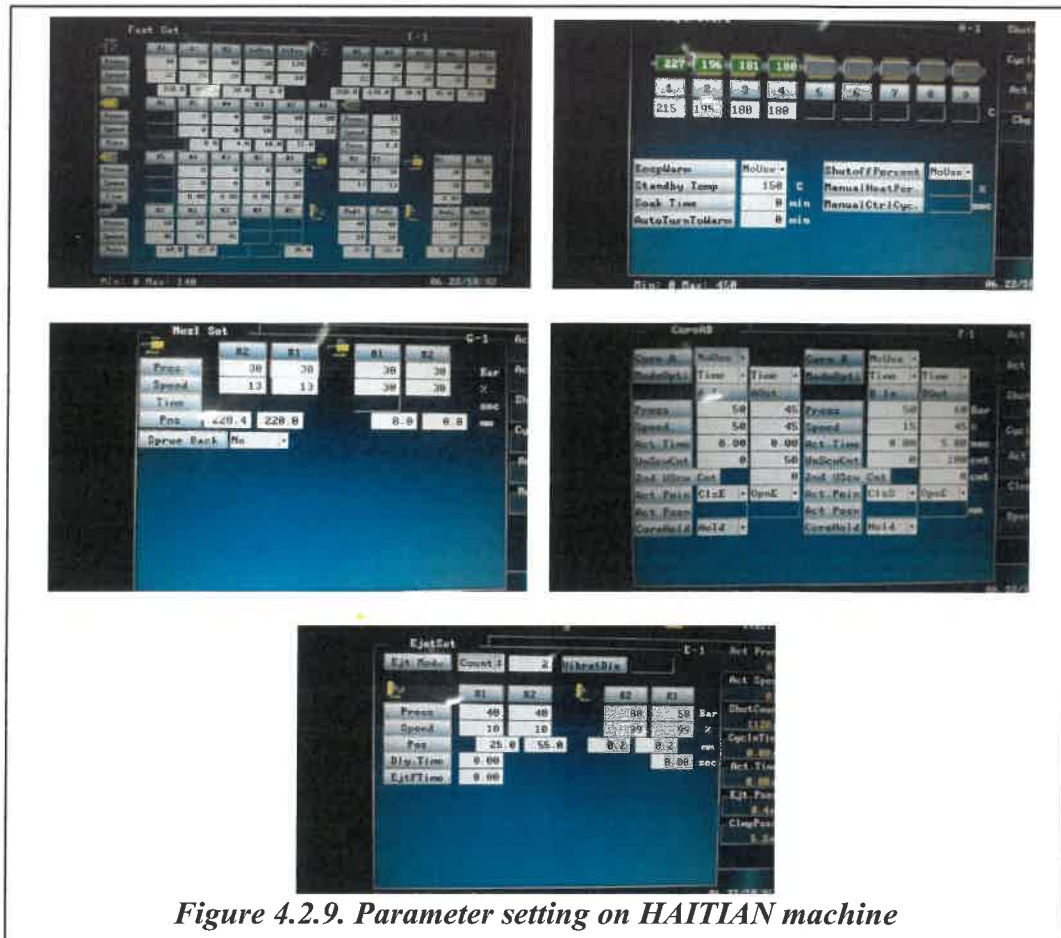


Figure 4.2.9. Parameter setting on HAITIAN machine

Start and stop machines is the first thing technician should know. There are few steps in start and stop the machine. Before starting a machine, ensuring the material is available and has been heated is important so that product produce is not defects. Next, press motor and heater button and let the machine reach the set temperature. Then, ensure mold in positive clamping position and nozzle in retract mode. After that, press auto or semi auto button to run the machine. Auto button for machine that when part fall from mold when eject while semi auto button is for part that still stuck on mold after ejecting and require operator to take the part from mold. To stop a machine, firstly make sure the machine completes its cycle. Then, press manual button to stop a new cycle. Then, press ejector retract and nozzle retract button

4.2.3. QUALITY CONTROL

Task 6: Check product's defect/reject

During production, trainee was assigned to check the product produced whether the production of the product acceptable or not. There are many types of defects that will reject if the machine produces one such as short shot, dented, white or black mark and burn mark. There are also defect cause by the operator like over cut part, oily and broken parts.

Sometimes, there are rejects that cannot be noticed by mere eye such as bent parts, sinking parts and many more. There are few methods to find the defects and sometimes it is different for different products.

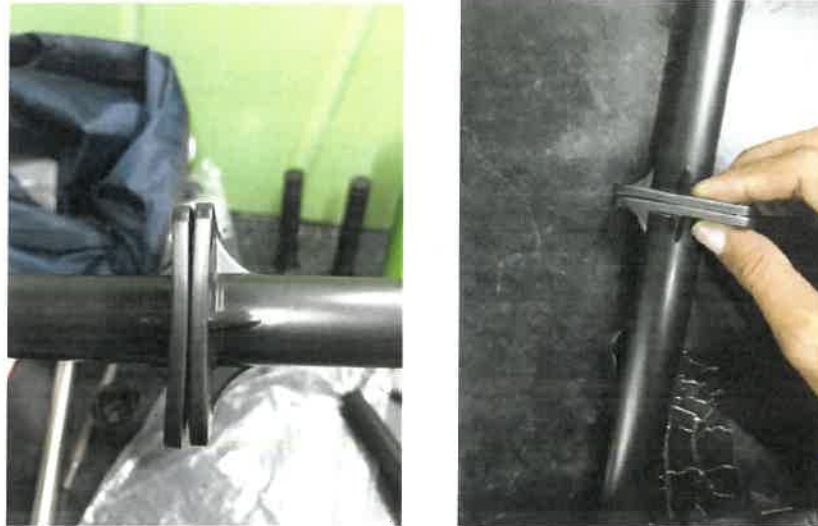


Figure 4.2.10. Checking a bent products

By knowing the rejects, trainee was assigned to indicate the cause of the reject produce. There are possible causes when the machine produces defect product which is parameter settings is not suitable, material is not well-heated, overheat material and insufficient material. As for operator's mistake, the improper handle and process was the main cause of the defects. The quantity of defects product will be record and sometimes it will be crush and became recycle material that will be used in next process.

4.2.4. RESEARCH AND DEVELOPMENT

Task 7: 3D drawing using SolidWork

Trainee was told to draw certain products produced by the company using the SolidWork software. At first, supervisor gave few weeks to be familiar with the software by try to draw any products produced by the company. There are many functions in SolidWork which includes sketching and simulation. To make a 3D drawing, skills in extruding the drawing is very important and accurate dimensions is very crucial. Trainee was given 2 hours to draw a product chose by the supervisor and will be evaluate based on the drawing.

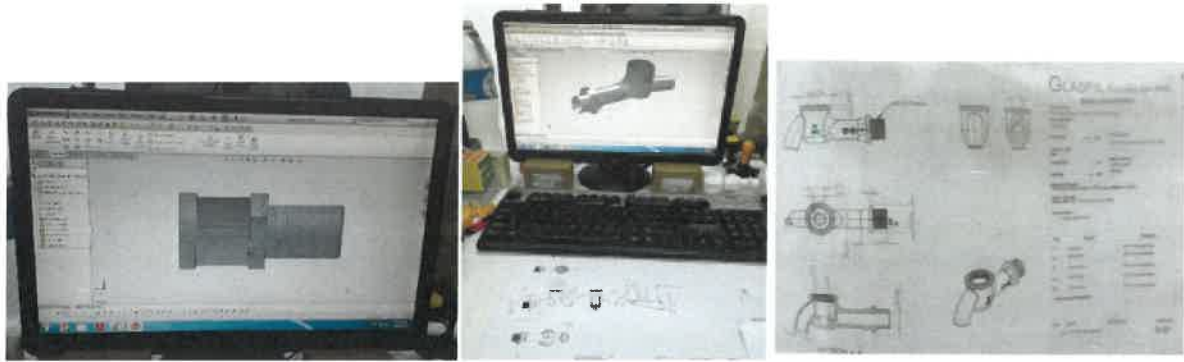


Figure 4.2.11. Drawing using SolidWork software

Task 8: Material test

The test was done to investigate the outcome of product with recycle material as its resin. The experiment was done using 2 types of material which is PP COPO RECYCLE 50% and PP COPO RECYCLE 100%. This experiment main purpose to use recycled material because it will be reduced cost in buying material for next production. However, sometimes using a hundred percent recycled material produces undesired products and the quality a little bit low. So, this experiment will determine the amount of recycled material in a production. After the material were test by run a production using both materials, the products produced were test which is water test, endurance test and function test.

MODEL TEST REPORT KIR 002					
FORMULA	MEASUREMENT	VIDEO ASSEMBLY	WATER TEST	COLOR	DEFECT TEST
PP COPO RECYCLE (CRF) 50%	✓	✓	✓	DIFFERENT COLOR	
PP HDMD 6331 50%					
PP COPO RECYCLE 100%	✓	✓	✓	DIFFERENT COLOR	

CONCLUSION: 1. PP COPO RECYCLE (CRF) 100% can be use for production compared to PP COPO RECYCLE (CRF) 50% + PP HDMD 6331 50%.
 2. Only color is not the same.

Figure 4.2.12. Report and results to identify the percentage of recycled material that can be used in production.

The result of the test is the 100% recycled material is much better than 50% recycled material. However, the product's colour is bit different and a little bit lower than a product produced from 100% virgin material.

4.3. KRAIBURG PROJECT

The first project is KRAIBURG project which is a project in producing material plate sample called plate plaque for thermal plastic and elastomer material. For this project, there are 27 different materials used but required different quantity of plate plaque. The materials were divided in three types which is transparent, translucent and silky surface.

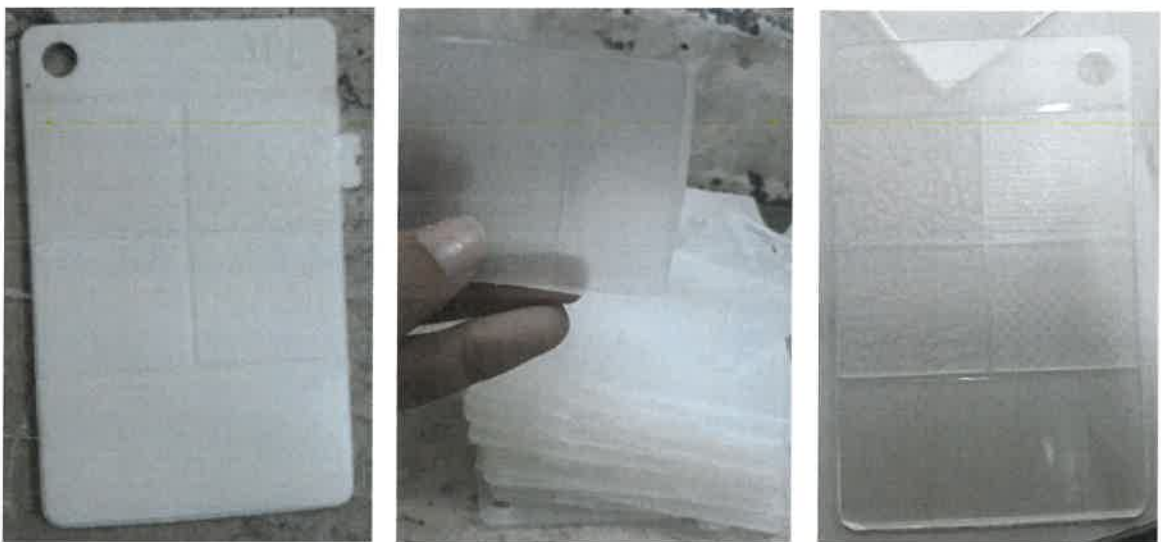


Figure 4.3. Plate plaque (from left) silky surface, translucent, transparent

Tasks as trainee production and in charge in the project is to ensure the desired quantity is reached and ensuring the products fulfill customer's specification. Before the project start, mold tests were done for every material and parameter was recorded and placed in one file. Operator, supervisor and person in charge for the project has meeting with the customers to clear things out regarding the quality specification. Every day, the quantity will be updated in different google sheet called KRAIBURG project as the project is different with the other products. This project will be run using 27 materials and the desired quantity is less than 500 pcs. Due to that, there will be different products produced in the same machine and mold. Plus, the difference in types and quantity could be quiet confusing.

SILKY SURFACE			
NO	MATERIAL	REQUIRED	PRODUCTION
1	TC6CEN	400	331
2	TC7CEN	400	352
3	CC60CN	400	324
4	CC70CN	400	275
5	CC60AN	400	
6	TF4OQD LCNT	400	849
7	TF6OQD LCNT	400	1127
8	TC4SCE	400	646
9	TC6SCE	400	770
10	TC8SCE	400	391

Table 4.3. (a) Quantity records for silky surface material

TRANSPARENT			
NO	MATERIAL	REQUIRED	PROD
1	TF3FHT	250	439
2	TF4FHT	250	440
3	TF5FHT	250	78
4	TF6FHT	250	465
5	TF6TAA	400	369
6	TF7THT	250	252
7	TF7TAA	400	473
8	TF8THT	250	408
9	TF8TAA	400	440

Table 4.3. (b) Quantity records for transparent material

TRANSLUCENT			
NO	MATERIAL	REQUIRED	PROD
1	TF2CGT	250	651
2	TF3CGT	250	296
3	TF4CGT	250	
4	TF5CGT	250	83
5	TF6CGT	250	
6	TF7CGT	250	
7	TF8CGT	250	
8	TF9CGT	250	

Table 4.3. © Quantity records for translucent material

4.3.1. PROBLEM ENCOUNTERED DURING PROJECT

At first the problem as caused by operator's mishandle that cause the product to be overcut during trimming process. The defect was notice by the customer and was sent back to Glasfil to be reworked to sort overcut product in a packaging as there is also acceptable product. Next problem in this project is machine keeps on produce many products that have black dots on the plate.

The quality specification given by the customers was that the plate should not have any insignificant marks that can be seen clearly. The number of rejects keep on increasing from days to days.



Figure 4.3.1. Black dot appeared on product

4.3.2. COUNTERMEASURES

Countermeasure 1: Operator's mishandle problem

To handle this problem, trainee was assigned to train operator in correct ways to avoid overcut and act that can lead to produce defects product. Besides that, trying to use different tools to trim the flashing of the product is also done. At first, operator used a dull and big scissors in trimming process which might be the main cause of overcut. So, supervisor ask to try using sharp blades and cut it on a board to make sure the trimming is straight and there is no overcut. However, this method has led to slow trimming process. At last, the operator used small and sharp scissors to trim the plate. To achieve customer's specification, representative from customer's side came to guide for handling and trimming the plate.

Countermeasure 2: Black dots appeared on plate

To counter the problem, supervisor identifying the cause of black dot appearance whether it comes from the machine or the material. Firstly, supervisors and trainee try to change the adjustment settings in case the black dots appeared due to inaccurate temperature because based on the research black dots comes from overheat material. At first, no black dot appeared but after few shots, black dots still appeared and keep on increasing. If there is no problem in settings, the problem might come from the machine which is in screw barrel. The previous material that sticks on the screw barrel may cause the black dot appearance.

Due to that, the screw barrel was cleaned chemically which is using chemicals to eliminate any material left on the screw barrel. Chemical used in cleaning the barrel is called PURGEX 3057 PLUS which is polyethylene. First, resins from previous production were eliminated by purge all the resins out. The fill the hopper with the PURGEX and charge the resins into barrel. Purge the barrel until PURGEX exit the nozzle and let the material soaked in the barrel for 5 minutes. Purge barrel to empty and follow with next production resins, rinsing the PURGEX from machine and start the operation. After the cleaning, observation was done by calculate the reject rate before and after the cleaning. Below is the table of the observation.

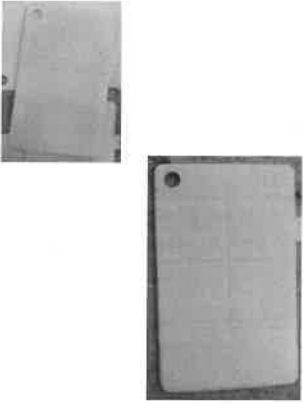
MATERIAL	QUANTITY USED	BEFORE		AFTER
		DATE	03-06-22	04-06-22
PURGEX 3057	0.5KG	MATERIAL	TC3CGT (translucent)	OC6OAN (silky surface)
		NO. OF SHOTS	100	108
		NO. OF REJECT	100	90
		PERCENT (%)	100	83
		REMARK	black dots white mark	black dots
				

Table 4.3.2. (a) Reject rate record before and after first cleaning

The number of rejects decrease but still produced and production is not consistence. So, supervisor try to adjust the setting. Then, chemical cleaning was run again after black dot still appeared on the plate. The number of rejects is not consistence. Every reject is due to black dot appeared even after the second cleaning. Then, material used to clean change from PURGEX to ASACLEAN.

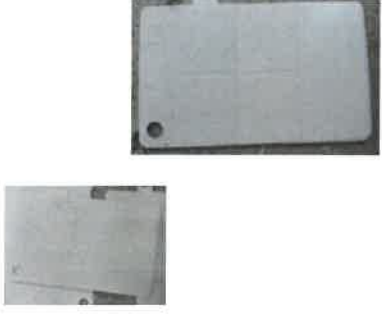


MATERIAL	QUANTITY USED	BEFORE		AFTER	
		DATE	04-06-22	04-06-22	07-06-22
		MATERIAL	TPE-OC6OAN (silky surface)	TPE-TF4OQD-LCNT (silky surface)	TPETF6OQD-LCNT (silky surface)
		NO. OF SHOTS	108	268	357
		NO. OF REJECT	90	104	57
		PERCENT (%)	83	39	16
PURGEX 3057	0.5KG	REMARK	black dots	64-black dots 26-sink mark 13-white mark/spots 5-bubble	51-black dots 2-bubble 2-white mark 1-short shot
					

Table 4.3.2. (b) Reject rate record before and after second cleaning with PURGEX








MATERIAL	QUANTITY USED	BEFORE		AFTER
		DATE	08-06-22	09-06-22
ASACLEAN	4.5KG	MATERIAL	TC6SCE	TC4SCE
		NO. OF SHOTS	109	111
		NO. OF REJECT	63	111
		PERCENT (%)	58	100
		REMARK	BLACK DOTS	BLACK DOTS
				

Table 4.3.2. (b) Reject rate record before and after third cleaning with ASACLEAN

Then, the screw barrel was cleaned physically which was done by the technician. Firstly, the screw barrel was taken out from the barrel. Then, let it cool down in front of the fan for about 1-2 hours until the material can be peeled and cleaned up. After the screw has been cooled down and the material has hardened, peel it with copper rod that has been grinded like screwdriver head or use cooper brush. Use diamond file or pen grinder to grind at the circular part that has burr and for deflashing, surface preparation, cleaning, and polishing.

Use cloth and add some kerosene to clean up and wipe the screw before installing it back into the barrel. Take some sandpaper and wrap it around iron rods, then polish it inside the nozzle adapter surface. For nozzle, the method is the same as the nozzle adapter. Take cloth and add some kerosene. Put it inside the barrel. Take a stick and push it all the way through the back side of the barrel. Do it several times to make sure that it is clean. Take multiple cloth and add some kerosene. Tie it up together and make sure it's longer than the barrel. Then, push it inside with a stick until the cloth can reach the back side. After that, push and pull many times to clean up the barrel.

STEP	PIC/ DISCRPTION	TOOLS
1	 <p data-bbox="651 969 718 1691">➤ Let it cool down in front of the fan for about 1-2 hours until the material can be peeled and cleaned up.</p>	 <p data-bbox="590 459 694 672">Fan</p>
2	 <p data-bbox="1145 969 1252 1691">➤ After the screw has been cooled down and the material has hardened, peel it with copper rod that has been grinded like screwdriver head or use copper brush.</p>	 <p data-bbox="1136 633 1241 846">Copper rod</p>  <p data-bbox="1136 275 1241 488">Copper brush</p>

STEP	PIC/ DESCRIPTION	TOOLS
3	 <ul style="list-style-type: none"> ➤ When the material has been peeled, polish the screw using sandpaper. ➤ Add some kerosene to the sandpaper to make the polishing cleaner and shining. 	 <p style="text-align: center;">Sandpaper Cloth roll (P80 grit)</p>  <p style="text-align: center;">Kerosene</p>
4	 <ul style="list-style-type: none"> ➤ Use a bunsen burner and burn it in the check ring because in that area the material is stuck and clogged. ➤ After that, use air gun to clean up and blow the material away. 	 <p style="text-align: center;">Air gun</p>  <p style="text-align: center;">Bunsen burner</p>

STEP	PIC/ DISCRPTION	TOOLS
5	 <p data-bbox="624 1021 724 1715">➤ Use diamond file or pen grinder to grind at the circular part that has burr and for deflashing, surface preparation, cleaning, and polishing.</p>	 <div data-bbox="624 707 719 909" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">Diamond file</div> <div data-bbox="624 237 719 439" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block; margin-left: 100px;">Pen grinder</div>
6	 <p data-bbox="1142 1021 1206 1715">➤ Use cloth and add some kerosene to clean up and wipe the screw before installing it back into the barrel.</p>	 <div data-bbox="1142 678 1238 880" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">Cloth</div> <div data-bbox="1142 230 1238 432" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block; margin-left: 100px;">Kerosene</div>









STEP	PIC/ DISCRPTION	TOOLS
7	  <p>➤ Take some sandpaper and wrap it around iron rods, then polish it inside the nozzle adapter surface.</p>	 <p>Hand drill</p>  <p>Sandpaper Cloth roll (P80 grit)</p>
8	  <p>➤ For nozzle, the method is the same as nozzle adapter.</p>	 <p>Hand drill</p>  <p>Sandpaper Cloth roll (P80 grit)</p>

Figure 4.3.2. Standard Operation Procedure for cleaning and reciprocating screw barrel.

4.4. PROBLEM ENCOUNTERED AND APPROACH ADOPTED FOR SOLVING PROBLEM.

As an intern, doing tasks and works are very challenging as it is a new exposure to work environment. However, challenges doing industrial training in Glasfil Polymer Sdn. Bhd. was very unexpected. Usually, from the perspective of staffs will expect less from interns. However, in Glasfil, they expect interns to know most thing regarding the tasks given. This should be a chance for interns to fulfill the expectation, but it might be trouble if they expect too much from intern.

Firstly, when given task, there will be less guidance as they expect interns can handle the tasks successfully. This might not be a problem if interns have experience in doing the tasks given but when there is no experience, the duration to complete the tasks will be long. Plus, the deadline to complete the tasks is very short. So, to counter the problem, it is necessary to immediately ask supervisor regarding the task. Next, if the task related with documentation tasks like doing report, preparing drafts can be very helpful. With this method, interns could know what should and should not be include in report or other documentation.

Next, the amount of works given are too many and it became a lot harder when there is minimal guidance in completing the works. Plus, the works given use a lot of energy both physical and mental. All the workloads make intern felt very stressful and emotional. However, the problems have been settled after discussing with the supervisor. Supervisor started to distribute the work evenly among other interns regardless skills and experiences.

4.4. ETHICAL AND PROFESSIONAL

Both at work and in personal life, ethical manners are always crucial. Specific standards that represent the professional community's consensus on what is and is not expected of its members are established by a code of professional ethics. An engineer may find themselves in a situation where the appropriate course of action is unclear due to unique circumstances; in these situations, the code offers standards for what constitutes moral and responsible conduct.

Professionalism is very important in work environment especially when working with other peoples. In workplace, everyone should have the sense of responsibility in doing works or handling tasks. For example, at workplace it is very unpleasant for someone to mix work with personal life. So, ones should not be very emotional especially when doing works with the others.

Besides behaviour and act, workers should also concern with the dress code which has been set in company's policy. Interns who also a worker in the company should follow the dress code and agree with it if the standards do not involve any religious issues. With this ethical and professional act, interns can easily cope with the work environment and get used to formality.

4.5. HEALTH, ENVIRONMENT AND SUSTAINABLE ASPECT.

Workplace health is all about managing hazards intelligently for the sake of the organization and its employees. Strong leadership that includes managers, staff members, suppliers, contractors, and customers is essential for efficient health and safety management. The trend toward sustainable development places a strong emphasis on the value of health and safety throughout the world. The organization gives its employees' health and safety a top priority.

As part of its commitment to a safe and healthy workplace, Glasfil Polymer Sdn. Bhd. will seek to limit and manage any environmental effects that may come from its operations. It is necessary to devote to upholding and abiding by environmental laws and continuing the best environmental protection practices. Safety measures such as applying personal protective equipment in manufacturing plant is heavily emphasized in handling or servicing machines or mold.



Figure 4.5.1. PPE during checking material in a hopper



Figure 4.5.2. PPE during lifting and install/uninstall mold using crane



Figure 4.5.3. PPE during applying external heating on nozzle.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1. CONCLUSION

In conclusion, the 24 weeks of industrial training gave the Trainee exposure to actual, practical work experience. The Trainee has acquired significant knowledge and experience across BASF (M) Sdn Bhd, including injection molding, industrial management, technical practices in the manufacturing industry, designing, and a wide range of technologies. The trainee will keep in mind using a CNC machine and maintaining a mold for the entire training week. Trainee can also share his or her knowledge and skills from their academic careers.

Throughout the internship, the student can put his or her Hands-On learning to use. Technical practices like modifying parameters correspond to what trainee has studied in university as engineering student. This is especially true of managing parameters on the CNC machine. In addition to develop professionalism and self-confidence during the internship, the trainee assisted with various projects and daily task in the production department.

Over the course of the 24 weeks of industrial training, the trainee had to execute several challenging tasks with little supervision. Trainees might learn about communications and relationships among employees. Plus, trainee's interpersonal communication skills and work ethics have improved as a result of engaging with numerous people. In addition to learn on how to design a system that are pertinent for controlling production flow operations, Trainee has received expertise with real documentation that is essential for the business. Plus, trainee has also taken part in a number of training sessions to obtain a deeper grasp of the fabrication and molding of plastics. As they will be extremely helpful in controlling and managing the production process in the same business, these trainings will be beneficial to the trainee in the future.

5.2. RECOMMENDATIONS

As have been stated before, undergo an industrial training in an injection molding manufacturer company has built up a lot of skills that can be very useful in seeking for job. Plus, trainee has given the opportunity to gain as much as possible knowledge that can be obtained here. However, under several circumstances, this company needs more improvement in handling internships in the future. The recommendations include:

- Company should distribute tasks evenly among internships regardless the industrial training period whether it is long or short period.
- Guidance should be given after assigning trainee in a certain task so that the tasks can be completed in short time.
- The tasks given should be worth with the amount of allowance given as working in a production is very risky and exhausting.

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APPENDICES



Technician activities



Sorting rejects



Cleaning and reciprocating screw barrel activities



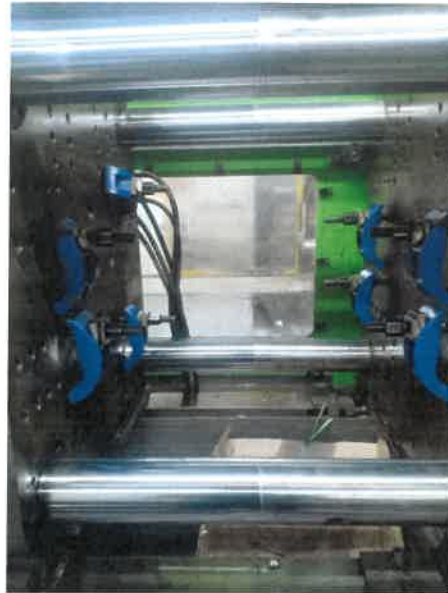
Machine in positive clamping position



Crane used to lift mold



Mold store



Machine after mold be uninstalled



Ejecting position