UNIVERSITI TEKNOLOGI MARA

INDUSTRIAL TRAINING FIELD REPORT

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PROGRAMME : DIPLOMA OF CHEMICAL ENGINEERING

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ACKNOWLEDGEMENT

First and foremost, Alhamdulillah and praise be to Allah S.W.T for granting me this opportunity to complete my internship training for 17 weeks as well as completing this field report on time.

I would like to express my utmost gratitude to my company supervisor, Mr. Ahmad Aizat bin Johar for giving me guidance, knowledge and supervision along the way while I was there. Without his share of information, I might not have learn what I do know now especially in terms of industrial knowledge. Also, a very big thanks to Sipro Plastic Sdn. Bhd. For agreeing to become a host and accept my internship placement request.

Next, I would like to express my profound acknowledgement and deep regards to the Chemical Engineering Faculty especially to my academic supervisor, Madam Salmi for her assistance and encouragement in completing my student logbook, report as well as the industrial training itself. Without her assistance, I might not have completed my final semester on time. Last but not least, I would like to thanks my family and friends for consistently giving me moral support along the way. Alhamdulillah.

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1.0 INTRODUCTION

Industrial training is one the courses that needs to be fulfilled as a student of Chemical Engineering at Univesiti Teknologi MARA in order to finish their diploma studies. Industrial training is required as it is one of the ways to prepare and expose students to their field of work. With this, students are at least able to practice hands on and learn a lot of knowledge that they might find useful in the future. Industrial Training for Diploma of Chemical Engineering usually takes around 17 weeks and is always held at the 6^{th} or final semester of the study.

This industrial training provides benefits both to the company and the university. It gives an opportunity for the company to identify and scout employees with the expected potential as well as enhancing the company's reputation and name among students or interns. Interns need to carry out all the tasks assigned by the supervisor in order to acquire merits. Interns also need to maintain their work behavior by adhering to the company's rules and regularity. Other than that, industrial training is also about creating a social responsibility between the company and the university. Interns will be supervised and guided by supervisor appointed by the company in carrying out work related to their studies and then highlighting their weaknesses or strengths. By undergoing industrial training, students can surely improve their knowledge, skills and abilities along the way.

In my case, the industrial training was unfortunately held during the corona virus pandemic. Luckily enough, I was able to secure a placement in a company called Sipro Plastic Industries Sdn. Bhd. which was actually out of my field of studies. I was also place under the department of Research and Development with supervision from Encik Ahmad Aizat bin Johar. Nonetheless, I am still grateful for it since I can at least acquire some general knowledge regarding industry and the ways around it. I am also able to regularize myself at a situation of work almost similar to my field of studies.

2.0 CONTENTS

2.1) ORGANIZATION CHART

For this part, I did not manage to obtain the full organization chart of the company due to it being too complicated and large. Therefore, I am including the chart for Engineering and Development department which is the core sector of Research and Development I was in.

FOUNDER

DATO' NORAINI BINTI SOLTAN

GENERAL MANAGER
ENCIK DAMIRI

Engineering & Development

HEAD DEPARTMENT
ENCIK MASDAR

DEPUTY HEAD DEPARTMENT
ENCIK AZARE

Research & Development

ENGINEER 1
ENCIK AHMAD AIZAT

ENGINEER 2
ENCIK FITRI

Business & Development

ENGINEER 1
ENCIK HATTA

ENGINEER 2
ENCIK SYAWAL

2.2) BACKGROUND OF COMPANY

Shah Alam Factory

Sg Petani Factory

Bukit Beruntung Factory 1 (HQ)

FIGURE 1: 3 main factories of Sipro Plastic Sdn. Bhd.

SIPRO was founded by Dato' Noraini binti Soltan. It was established in 1992 and offers a comprehensive package encompassing product design and development, mould fabrication, injection moulding, painting and assembly for autmotive parts and household appliance.

Located in Shah Alam and Bukit Beruntung, Selangor and also Sungai Petani, Kedah, the four factories are well positioned within the industrial hub of Malaysia, serving local and multinational companies. Among SIPRO business partners are PROTON, PERODUA, TOYOTA, HICOM-HONDA, SONY and PANASONIC. The company's products are exported to Europe, South America and across Asia.

2.2.1) VISION

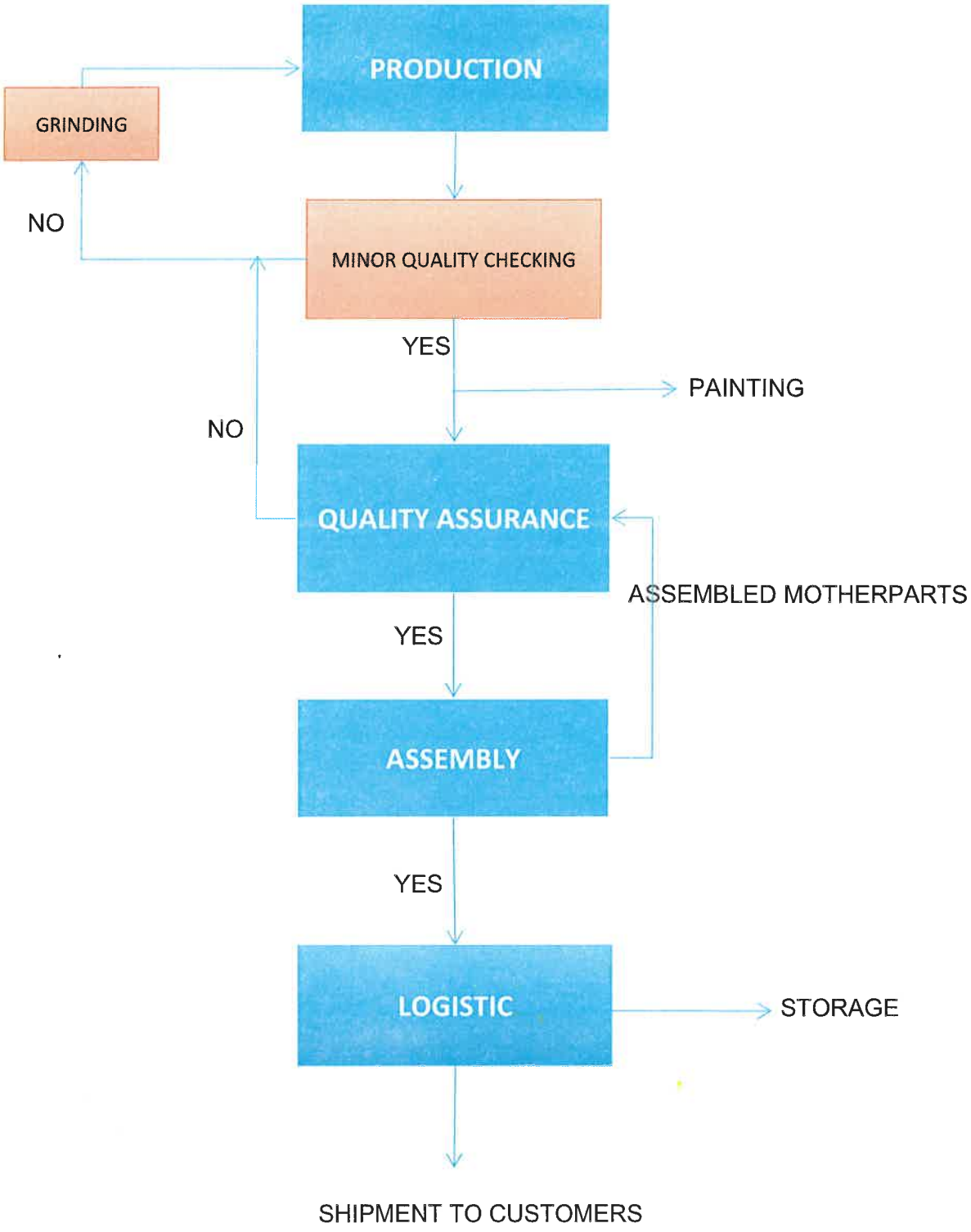
SIPRO has only one vision yet it is very idealistic which is to be a world class integrated plastic manufacturer.

2.2.2) MISSION

Their mission is to be committed towards producing the highest quality products and services that exceeds customers' expectation through innovation and human capital development for healthy returns to all stakeholders by adhering to their core values.

2.3) PROCESS FLOW

The process flow will be as the following:



2.3.1) Production

FIGURE 2: Injection moulding machines at Production

FIGURE 3: Resins from BASF Chemicals

Production department is the starting point of products. Both product that has been developed or still under development are produced in this department. There are currently a total of 10 injection moulding machines, 4 of them are automated which will drop the output from the cavity into a container below the machine, while the rest of them are manually operated which means that the output would need to be 'hand-picked' from the cavity itself. Products produced from SIPRO are mostly plastic components but the resin they utilize were ordered from various chemical companies such as BASF chemicals. The type of plastic material they usually use are either polyethylene, ABS or others. The production session will always begin at 8 in the morning (unless there are any casualties) and will continue to run until 12 in the afternoon or until they reach the production quota.

For the startup, the workers will load the resin mixture and will run the machine for 10 minutes in order to get the perfect 'first piece'. This is to make sure there is no excess resin left from the previous production and to get the designated shape. There will be also 30

minute gap in between production for maintenance. After a batch of product output is obtained, it will undergo a minor quality checking by the workers in the department to determine whether each individual piece is 'OK' or 'NG' (not good). For the 'OK' parts, it will either be transfered to the QA department for further quality checking or to painting while the 'NG' parts are sent to the grinding machine to be recycled back into resins.

2.3.2) Quality Assurance

FIGURE 4: A scratch defect on Door Handle

As the name suggest, QA department is where they monitor and maintain the quality of the product output. QA department is responsible for carrying out quality checking for all the products in the plant. Sometimes QA department is also involved in product mock-up test if there are complains as well as running the 'First-piece' process in production. For quality checking, there are currently 4 QC inspector. 2 of them cover for chrome-painted parts, 1 for color-painted parts and 1 for mother parts. The checking will be by observation and also scrubbing using oiled solution. For paintings, the inspector will check for visible defects such as pinhole, scratches, runner-up, dust or colour-out and also shape defects such as warping, sinkhole and breaks. For mother parts, the inspector will check the mechanism and structure of the assembled parts such as spring-backs, abnormal noises, lubricated area and missing child parts.

The check painted parts will be transferred to the assembly department for assembling while the checked mother parts will be passed to logistic department for storing.

2.3.3) Assembly

FIGURE 5: Assembling process by the workers.

FIGURE 6: Drawer storage for child parts.

The checked parts from QA will be transferred to Assembly department for assembling. The workers will follow the individual instructions of each part stated on their work stations. To assemble the part, they will also need some child parts such as screws, nuts, springs, plates, frame and protectors. All of these parts can be obtained from the child part drawer as shown in Figure 6. As mentioned before, the mother-parts will be once again passed to QA for checking of mechanism and structure while the assembled painted parts will be passed to logistic for storage.

Other than that workers in the Assembly department is responsible for meeting the required daily quota and also reserved stock. Because of this, there are 2 shifts which are morning and night shift and assembly department is the busiest of all. Usually, SIPRO will keep 5 days worth of stock in case of any emergency or sudden orders.

2.3.4) Logistic

FIGURE 7: 'Shooters' or storage area of logistic department.

Logistic department is the last step in product flow. Logistic department are responsible for the product storage area or 'shooters'. Product quantity needs to be maintained daily to fulfill the minimum quota. In case of shortage, logistic department needs to inform and push assembly department in order to fulfill it. Other than that, logistic department are also responsible in delivering customers' orders using lorry. Most of the time, their delivery time will be at 10 in the morning and 4 in the evening. Invoices and Purchase Orders are also managed by their workers.

2.4) BRIEF DAILY/WEEKLY ACTIVITY

During my industrial training period at SIPRO, I received a lot of knowledge and training. Most of it are not related to my field of studies but it sure is useful as a general knowledge. In the first 2 weeks of my training, I was placed in the Quality Assurance Department under the supervision of Cik Nor Hanani. I was tasked to do quality checking daily and support the QC team. Other than that, I also did some self studies about the material, processes and parts by asking around the people working in the plant.

By the third week, I was transferred to Research and Development department due to some management changes. This time, I was supervised by Encik Ahmad Aizat. At first, I was tasked to regularly monitor the stock of Radiator Air Guide which is still under development. From time to time, I was involved in R&D works such as mock-up test for products due to customer complains, meet-up with jig-maker and more. My task as a Sipro intern are different day by day. I will usually check in with Encik Aizat in the morning and ask whether he has a task for me.

On some cases that I have no task assigned, I would usually go around and offer support and help to the other colleagues. I was also requested to help other department if they need any assistance, For example, I was requested by Encik Farid, which is the head department of logistic to study Supply Chain Risk Management and assist him in completing an SCRM table requested by TOYOTA.

Other than that, as an intern of R&D department I occasionally helped in their documentation such as reviewing and simplifying the Engineering State of Work from GEELY (PROTON), reorganizing engineering drawing and data, reprinting and filing of documents for IATS Audit and making a report to mould maker.

On my 7th week of training, I was involved in running trials for a part that SIPRO supplied to PROTON. The part that was mentioned was Garnish Front Deck for car model EXORA and the trial was held at PROTON itself in Shah Alam. During my time there, I assist in tagging the car and recording any data that is needed such as car number, color and car code. The trial should last for a week but I only managed to went there for 2 days due to PROTON shutting down for Eid-Fitri Holiday.

Unfortunately, due to Corona Outbreak and total lockdown, I did not manage to get back to work after the holidays since the Human Resource decide to put me in work from home state. And because of that I also cannot get any task from my supervisor because most of R&D department job and duty are hands-on. From my 9th to the 17th week, I received task provided by Madam Salmi.

2.5) DESCRIPTION OF TASK ASSIGNED

As I mentioned, during my internship period I had various and different type of task assigned from different people. These are some of the task I would like to highlight:

2.5.1) Mock-up test (spring)

FIGURE 8: Spring tail is on the edge of plate bulge

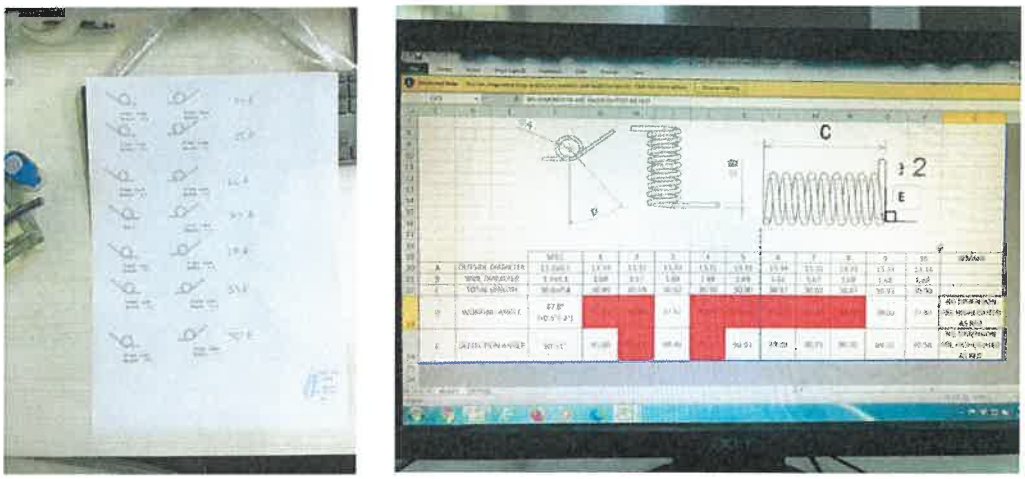


FIGURE 9: List of possible working angle (left), data from test (right)

This is one of the mock-up test that I was involved in R&D department. TOYOTA complained that some of the door handle made an abnormal noise and some snapped. This is due to the tail of spring being on the edge of the plate bulge (refer figure 8). Over the time, the plastic material of the plate will scrape off due to the contact and friction of the spring resulting the spring to be put out of its position. To correct this, a mock-up test for spring by sample is made to determine the minimum and maximum suitable working angle for the spring.

The test is carried out by preparing 16 sample of spring and re-crank and reshape them according to the list of working angle in figure 9. Then the customized spring is assembled into its mother part and the data is observed and recorded. The data is then discussed with spring supplier for future order.

2.5.2) Mock-up test (bell crank)

FIGURE 10: Bell crank samples

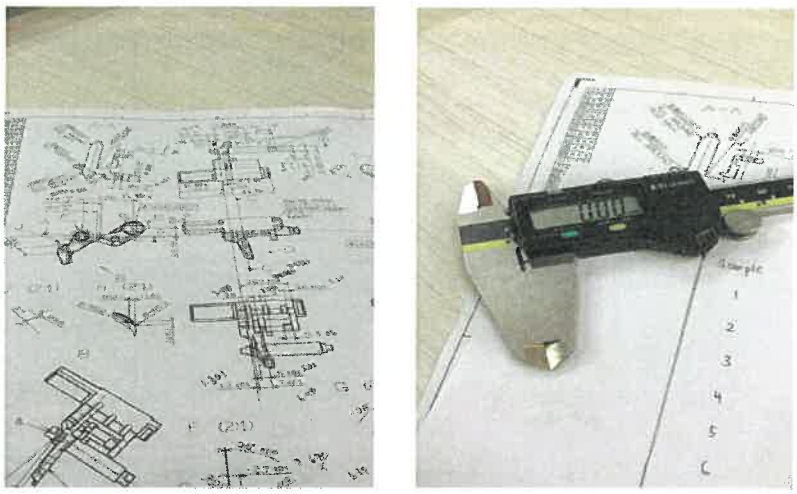


FIGURE 11: Original drawing (left), vernier calliper (right)

This mock-up test was made for bell crank, one of the child part in Door Handle. Bell crank acts as housing for the plates and springs and it produces spring back that we experience when pulling a car door. The issue with this is some batch of bell crank was either to loose or too tight. This causes it to snap from the main frame during the assembly at TOYOTA. The root cause of this is there were a few changes made to the bell crank such as widening of the hole by drilling. Since the drilling was done manually, the outcome was not consistent and some batches were different from the others.

To correct this, a few sample of bell crank from different production time was taken and labeled. Then, the inner diameter of its hole was measured using vernier calliper. The data

was compared with its minimum maximum measurement in the original drawing. The sample that was 'NG' was tracked and its batch was discarded to the grinder.

2.5.3) Stock Monitoring

FIGURE 12: Radiator Air Guide

This was the first task that I was assigned during my transfer to R&D department. I was requested to monitor the stock of these Radiator Air Guide. These parts are actually a new project proposed by PROTON to SIPRO. These radiator air guides are for cars that will be exported to middle-eastern countries. Middle-eastern countries are known for their hot surrounding temperature and according to Encik Aizat, these air guide will serve as a cooling mechanism for the car engine. Since its a new project, it is considered as 'under development' and cannot be mass produced just yet, Therefore, R&D department is responsible for monitoring the development stages.

I was tasked to record in Microsoft Excel every time the Production department produces a batch of these parts and also every time the logistic department delivers the samples of these products to PROTON.

2.5.4) Mould Report

In injection moulding, there 2 main components which are the injector and the mould. The mould is a crucial component in determining the shape and final product of the injected part. I was involved in inspecting new and old mould. This is done by observing the product outcome from their respective mould. Based on figure 13 below, I assisted Encik Aizat in locating defects from the part and marking them with marker.

Since there was a lot of visible defects on the part, it means that the mould that was used is not in a tip top condition and needs to be repaired. I helped in writing a report to the mould maker as a feedback so they could take action such as re-calibrating and re-fitting the mould.

FIGURE 13: Defects (left to right) sinkhole, scratches, runner-up

Sinkhole is a defect when the surface of plastic part seems to collapse and form a 'hole' like surface. It is caused by either lack of resin or too much pressure on that particular surface. Scratches are caused by friction between mould and surface after hardening or just common mistake of dropping parts on the floor. And last but not least, runner up is caused by the mould itself. It simply means that the mould is not tight enough that the resin leaks out during the injection process.

2.5.5) SCRM Table

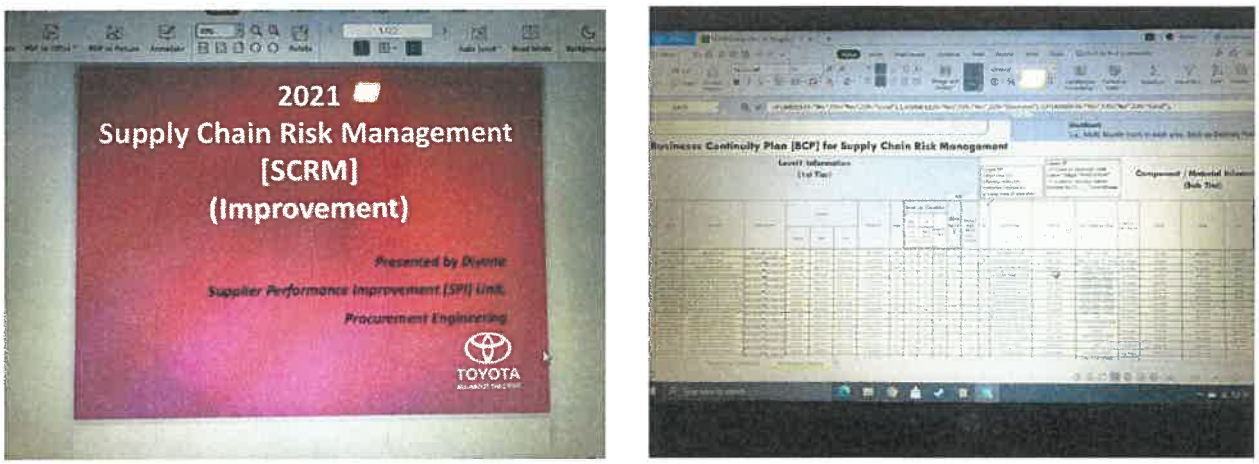


FIGURE 14: SCRM requested by TOYOTA

As I mentioned, I was involved in assisting Encik Farid with Supply Chain Risk Management that was requested by SPI Unit of TOYOTA. SCRM is an analysis done by the company to its supplier. It is carried out to determine how each of the supplier will be taking action in case of any disaster or unforeseen circumstances and calculate its risk. During this, I helped out by gathering the data of each every part that SIPRO is supplying to TOYOTA. I gathered

its name, part number, and its place of production (Shah Alam or Bukit Beruntung Plant). Other than that, I also managed to ask around about the reserved stock of each part. I filled in table and forward it back to Encik Farid for checking.

2.5.6) Quality Checking

FIGURE 15: Quality Checking

From time to time, I also did quality checking to provide support for Assembly department due to their lack of manpower. Sometimes, I also did the quality checking to obtain data for R&D when requested by my supervisor. Based on figure 15, the left picture is a defect of pinhole. Pinhole is a visible defect when and according to a worker, it is rejected if the hole exceeds 10mm or if there is more than 1 pinhole with distance of less than 1 cm apart. There was also defects such as scratches, dust/seed and warping that I find along the way. On the right side of figure 15 is a defect where the pillar that holds the screw is bend and may cause the screw to slip out of its placement.

3.0 CONCLUSION

To recall, the industrial training that was commenced during this 17 weeks at Sipro Plastic Industries has exceptionally taught me a new, better and improved soft and technical skills that are beneficial in all aspects of working life. With consistent engagement in numerous hands-on activities, I was provided with multiple teamwork skills and was able to posses learning capacity by acquiring share of information from individual of different area of expertise. Sipro Plastic has been equipping me well with exposure of industrial knowledge and I highly appreciate it.

Even though SIPRO's nature of business is mostly automotive and production technology, I managed to snatch a few basic engineering skills from the engineers that works in SIPRO. Some of the knowledge that I managed to acquire are in terms of engineering drawing, SOP of development stages, process flows, mechanical theories, logical thinking, calculations and many more. All of these bits of information are useful and I might find myself applying it in my future career as a Chemical Engineer.

During this 17 weeks of hardships, I also manage to learn my strength and weaknesses while I was there. Honestly, I find myself lacking in some area such as computer-based skills (MS Excel, Catia), communication skills, and management skills. But it is all good because I managed to improve in those area of weakness. For example, I succeed in improving my skill at using Microsoft Excel by learning from my supervisor. I also succeed in improving my communication skills by learning from the administrator, Puan Rozi by asking for guidance in how to communicate with people from different department in order to execute the task given to me. In my opinion, this Industrial Training is a success.

However, there were several deficit that I find during this industrial training period. One of it is the company was not prepared for internship students task during the corona virus pandemic. Because of this I had to discuss with my academic advisor on what activities to do in order to fulfill my remaining weeks of internship. I hope that this issue can be taken more seriously for the next batch of intern in the future.

4.0 APPENDICES

FIGURE 16: Car tagging at PROTON

FIGURE 17: Proton Saga 35th anniversary special model

FIGURE 18: Completely assembled Door Outside Handle (Painted)

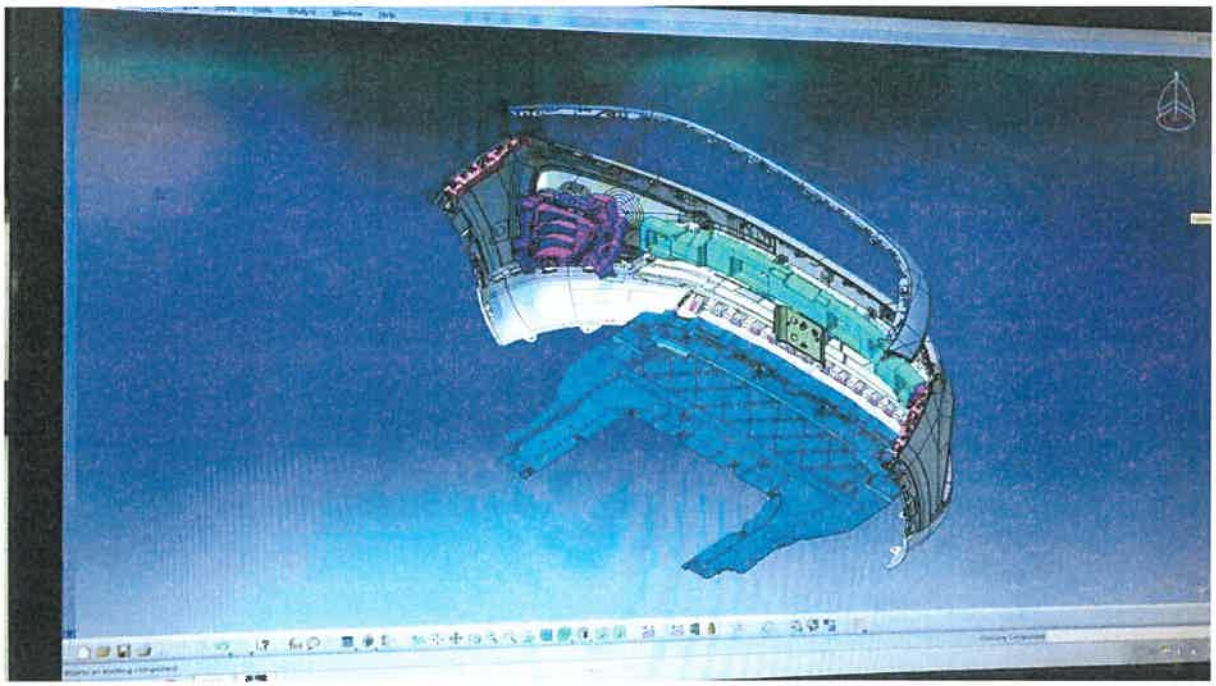


FIGURE 19: 3D model of part in CATIA

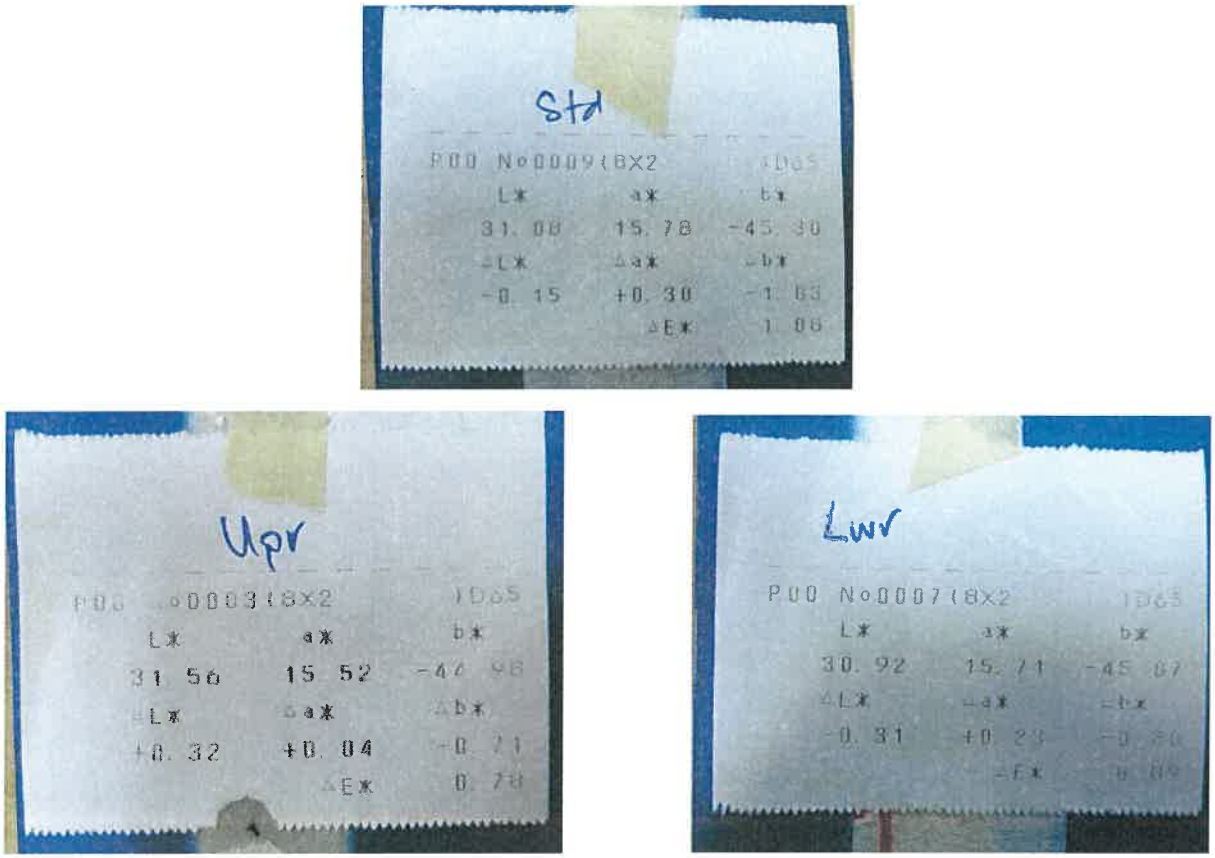


FIGURE 20: Data for color matching (Tanabata) for painting department in Bukit Beruntung Plant.

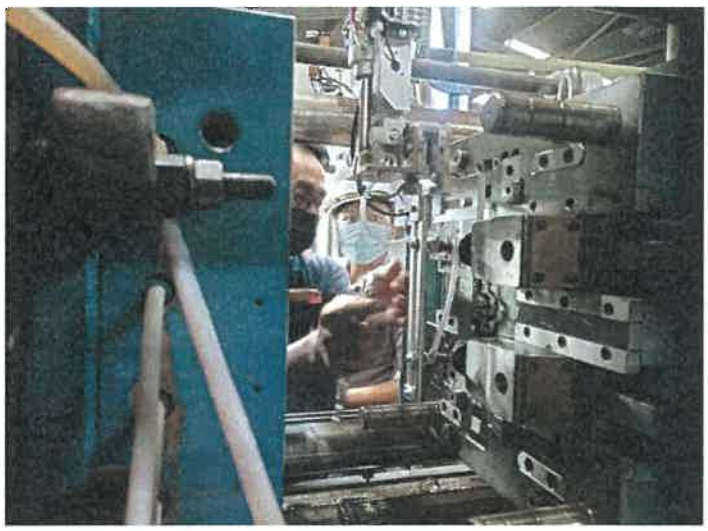


FIGURE 21: Setting up of Robotic arm for machine 1 in Production Department