



UNIVERSITI
TEKNOLOGI
MARA



INDUSTRIAL TRAINING FIELD REPORT (CHE 353)

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Diploma in Chemical Engineering (EH110)

2018213432

22nd March 2021 – 15th July 2021

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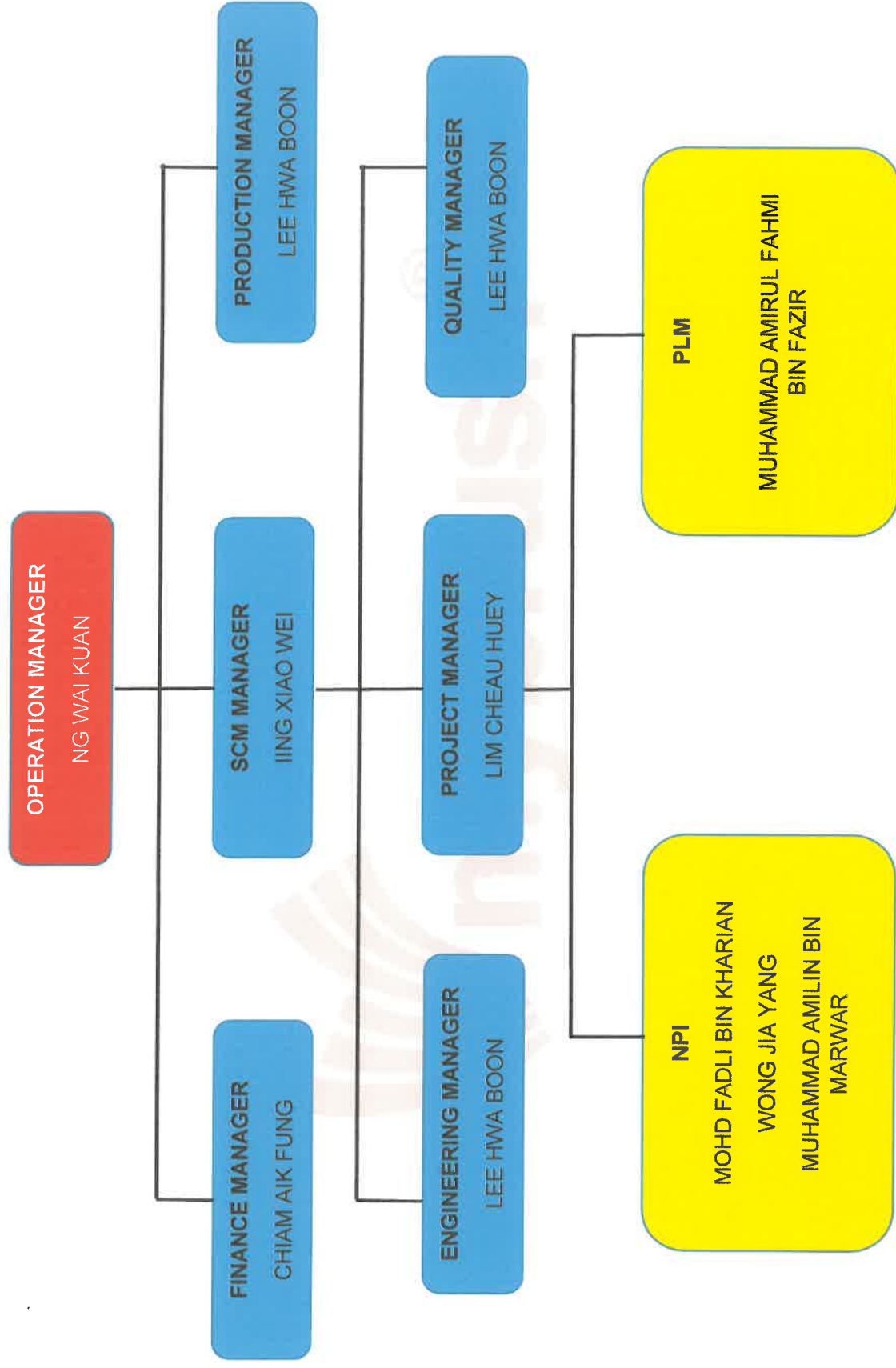
1.0 INTRODUCTION

Industrial training is an opportunity given to the Diploma of Chemical Engineering (EH110) students in exploring and experiencing the Chemical Industries through CHE 353. This course has given exposures to the students in terms of identifying the types of work that chemical engineers do in real engineering world and appreciate the theoretical knowledge learnt. It also helps student to able to perform the basic engineering practices, including technical writing report, communication with colleagues, handling project and generating proposal for betterment of the industries. Lastly, this course also helps students to have higher level of integrity, ethical and accountability in practicing engineering.

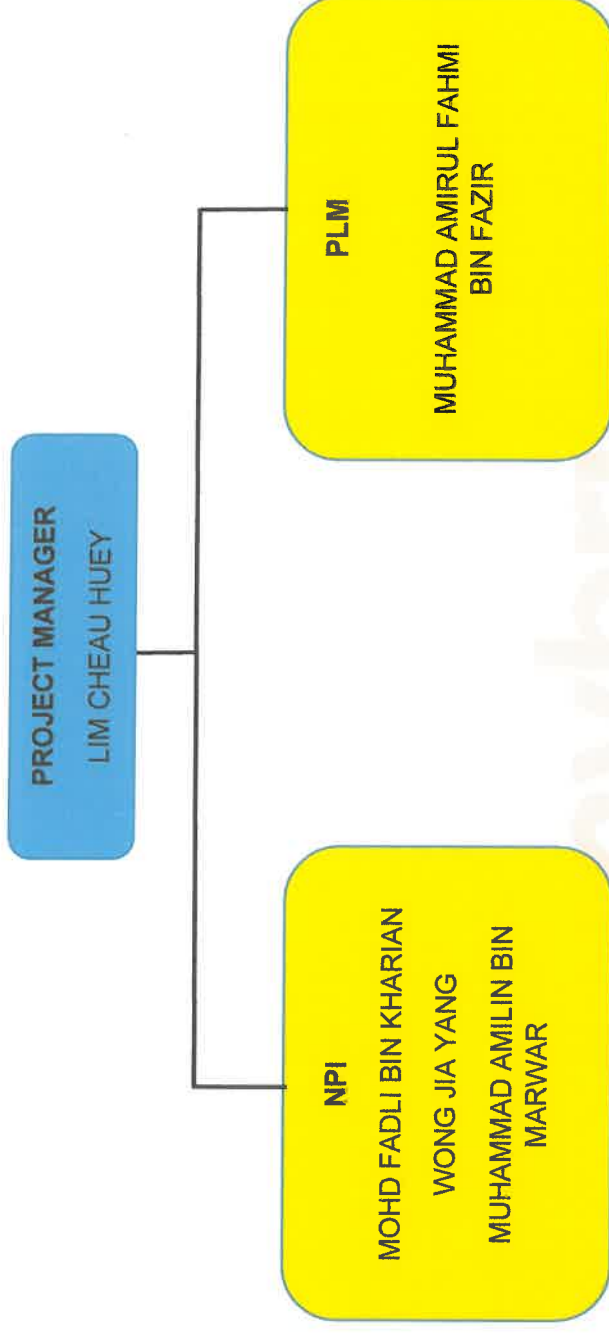
I was given a big opportunity to undergo industrial training at Mybrush Industries Sdn Bhn in Senai, Johor. My supervisor is Ms. Lim Cheau Huey who is the manager of project department. However, she assigned me under Mr. Fadli Kharian as my mentor. I was placed in the project department. This department is important in the company because all the engineers will test all the incoming products and cannot run the products until fully approved and has undergoes all the testing. I was trained there from 22nd of March 2021 – 15th July 2021.

This internship benefits all parties. Through all the industrial training program, it gives an opening for the industry to locate and identify the potential future employees and in enhancing the company's reputation among the graduates. The strength between industry-university partnerships can be stronger through this program. However, interns must make sure that all the task given throughout this program by the supervisor is completed and has to make sure in being responsible to exhibit the discipline behavior by following the rules and regulations of the company. Most notably, this program has provide the positive impact to the students as they managed to experience a real-life working culture, demonstrating constant building skill and able to expose new knowledge with the help of the professionals in the industry.

2.2 General Organization Chart



2.3 Project Department Organization Chart



Project department is the organization which is responsible in contributing to the overall project objectives and specific team deliverables by contributing towards the planning of project activities executing task within the expected quality standards required in order to ensure the project is success.

In this company, there are two parts of project which is New Product Introduction (NPI) and Product Lifecycle Management (PLM). NPI is focusing on the new product given by the customer. NPI consisting of process flow, Process Failure Mode Effect Analysis (PFMEA), internal drawing, Operation Standard (OS), Head Count Cycle Time (HCCT). Meanwhile, for PLM it is for product which is currently running in the company where it focus on managing the entire lifecycle of the product which consist of Bill of Material (BOM), Product Change Notice (PCN), Dyson Part Approval Process (DPAP).

2.3 Products of Business

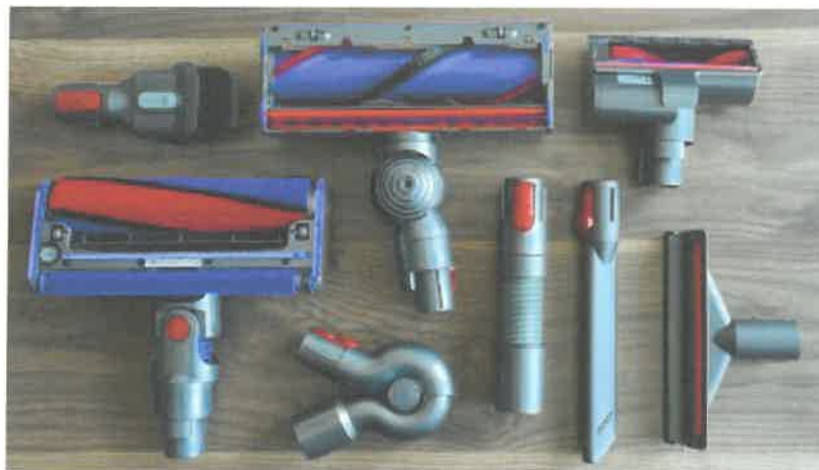


Figure 3: Example of Dyson Vacuum Part

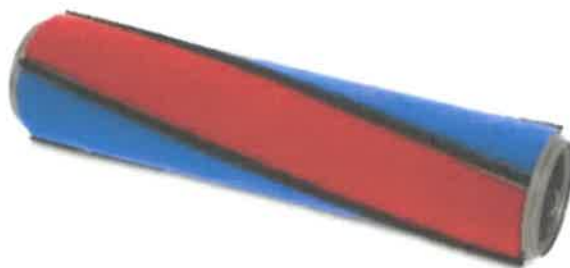


Figure 4: Example of Felt Produced used in Dyson Vacuum

As shown in figure 3, Mybrush Site 2 main customer is Dyson. Our company is basically the main supplier for the felt used in the Dyson Vacuum. Example of the felt produced can be seen in the figure 4. There are two types of designs for the Felt, which are single and combo. The single Felt uses a machine that can only produce one felt in a single color, such as red. Meanwhile, the Felt combo uses a machine that can process two colors in one time which is red and blue

3.0 Process Flow of Company

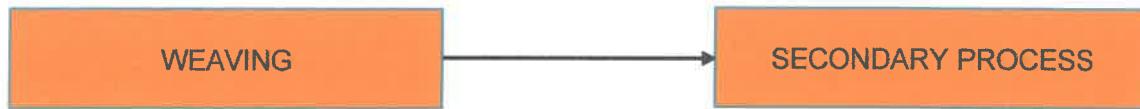


Figure 5: Process Flow of Mybrush Industries

3.1 Weaving Process

The weaving section is where the raw material is transformed into finished goods which is Felt. In this process, the operator need to arrange the arrangement of the bobbin used and the beam. There are types of beam used in this process, small and big bobbins. Small and large bobbins will be used as the yarn for the edge of the felt, and the beam in the middle will be assigned as the felt itself, with the top of the beam in charge of the color of the felt's backing. Each of the beam determines the color of the felt while the big and small bobbins will always remain as the black color on the felt's edge. The yarn will begin on the first hield wire's front roller since the front roller will help the yarn strain and get into the right path with the existing hield wire as it prevents the yarn from hitting the yarn. Next, the transmitter will pull the other yarn which is the weft yarn and then insert it into the yarn from the first hield wire as the weft yarn for the product. The transmitter is usually divided into two sets which the left side is in charge of inserting the yarn into the felt meanwhile the right side which is the receiver needle will be in charge for the yarn from the left side of the transmitter. One of the mechanisms in achieving the expected density for the Felt is the use of stainless steel between the hield wire and the transmitter.

After that, the product need to go through shearing blade and shearing plate to be fully considered as done with the process. The shearing plate is the main component in making sure that the height of the Felt is on specs. As the shearing plate is important in considering the height of the Felt, this is also important in ensuring the installment of it since if it is too tight or loose will play big role in resulting the Felt to have flaws since it was cut roughly by the shearing blade. Undersize or oversize defect also have the potential to arise.

Before the felt can be produced, the engineer in charge is responsible in determining the height and density required for the Felt product which has been decided by the customer, Dyson. The technician who is responsible will configure the necessary equipment or monitor in order to achieve the desired height and density. Each of the height and densities desired required a unique

3.2 Secondary Process

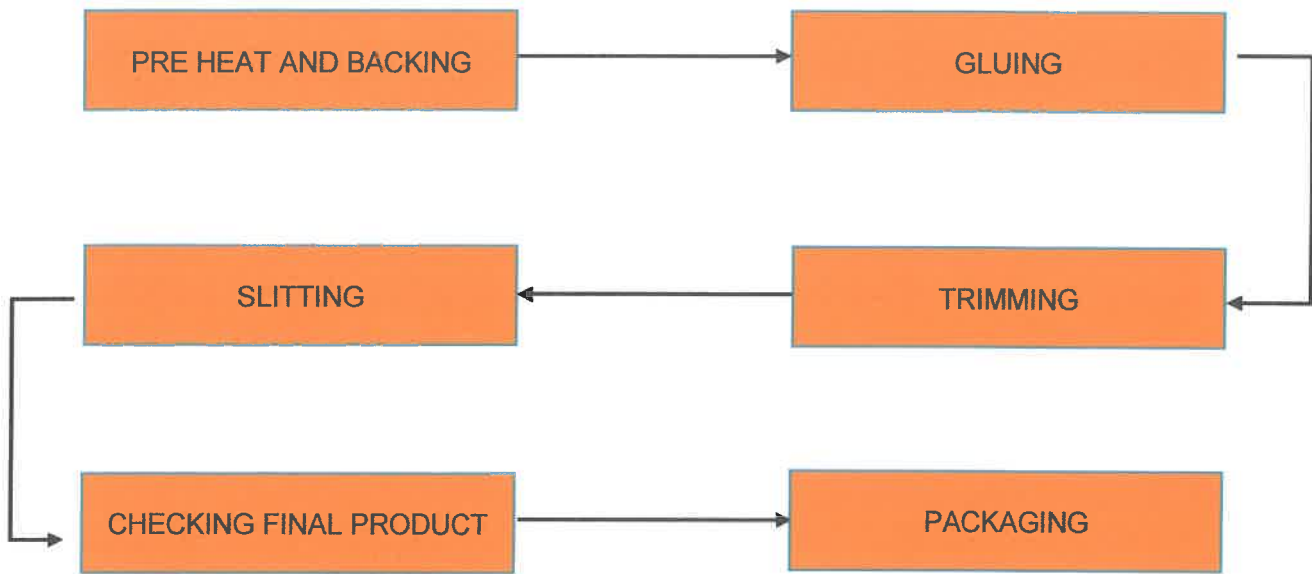


Figure 8: The Process Flow for the Secondary Process

After the logistic department's staff performs inspection on the Felt in the Mist Room, all of the produced Felts will be transferred to the secondary process section. Before the Felt begins the first process of the secondary section, the product must go through another inspection for defects. Once the operator analyze the Felt and discover defect on the product, such as for the height or the roughness, the product will be send to the sorting area where the leader of the quality inspector will do the second inspection to determine either the defects will be considered as critical or not. If the defects are acceptable, the product can proceed to undergo the second process while the product that has the critical defect will be classified as scrap which could not be used in the further processes.

The secondary process consist of six stages that the Felt must go through, as shown in Figure 8. For the first process, pre-heat and backing, this process help the Felt in burning the hair and making the backing of the felt harder in order to prevent glue from penetrating the Felt. Next. For the gluing process, the back of the Felt will be glued to make it stronger while still making it flexible. This process is focusing on preventing the yarn from falling off the Felt. In this process, the felt will undergoes curing process in the chamber. This is related to the gluing phase since it hardens and sharpens the felt which will result in the Felt being harder and tougher to make it more stable.

Next, the Felt will go through two ovens. The first oven helps the glue to cure after the curing process while oven 2 is crucial in providing heat to the oven in order to make the Felt harder.

After the Felt has undergoes all the gluing process, it will be proceed to the trimming process. In this section the Felt will go through trimming machine where the machine will cut the excess yarn on the Felt which prevent it from achieving the desired height. After that, it will go through slitting process, where in this process the Felt's edges will be cut according to the desired width.

After the Felt has go through all the process from pre-heat and backing to the slitting, they will be checked by the operator who leads the section. In this part, the leader will check all the remaining defect from the secondary process such as broken yarn where the operator will cut the damage part and will connect the Felt by sewing. Lastly, the quality inspector will check the Felt to ensure the Felt has passed all the defect inspection and will then proceed to packaging steps. In this step, the Felt will be packed into specific box following the type of products where one box could hold up to four rolls.

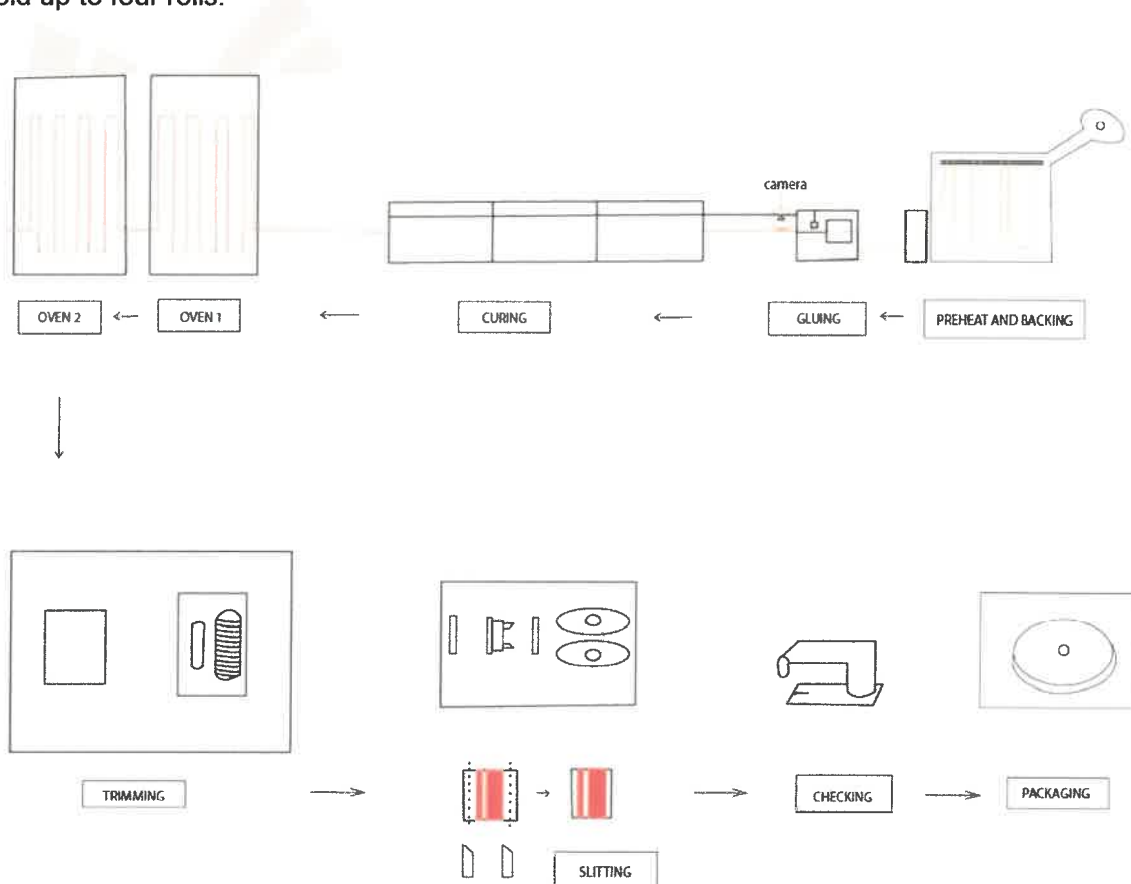


Figure 9: Processes in Gluing Section with Product

4.0 Brief Daily / Weekly Activities

4.1 Brief Daily Activities

I was assigned to assist the engineer in charge to monitor the secondary process. In this task, I have to ensure to check the assembly process verification (APV). This APV will be filled up by the operator who leads the process which will be verified the quality inspector in charge. This APV is really important in order to inform what kind of product is running on that time. This is because, few of the products has the similar looks with others but in fact they are two different model. In the APV it will stated the name of product running. This also help when customer or visitors come visit the site and ask anyone, we could straight away go to the APV and looked at the type of product running.

Next, I was also assigned to check the initial machine checklist and daily maintenance. This is done by the technician in charge and I only have to verified either they already completed the task yet or not. This is really crucial in determining when the machine is in faulty. If the machine breaks down suddenly, and to know either it comes from human fault or machine, this document may come in handy. If the technician really checks the machine then the machine is really in fault. This is also important to ensure the lie spent of the machine is still ongoing and still can be used.

Lastly, I have to check the travel card. All of the product process in the secondary section generally comes from the weaving section. So, the Felt will be placed in a bin before going to the secondary section. In the travel card, it will be stated the quantity which has minus the defect amount from the weaving section. This travel card is really important since all of the quantity information is stated in the report. This is really crucial in the output report as this would effect and help in determining the daily output report. In the daily output report will stated the total number of defects for each machine, the total outcome of each machine and the type of machine used for both. This report also concluded that if the day's goal is can be achieved or losses. If there are too many losses, all the person in charge will track down the causes of the losses.

4.2 Brief Weekly Activities

Week 1 – 4 (22nd March 2021 – 16th April 2021)

On the first week of my internship, I undergoes training with the other intern there. We were trained by the project engineer, Wong Jia Yang. In this meeting, we were exposed on all the items used under the project department. We also gained knowledge regarding the company organization and what the company actually do. During this meeting, my supervisor also has assigned a mentor to me and the other intern. Other than that, we knew there are two types of department under the project department which are New Product Introduction (NPI) and Product Lifecycle Management (PLM). The engineer also explained to us regarding what do these two departments do and what they do in contributing to the company. I also was assigned by my mentor to collect the cycle time of how long does the process of changing the bobbin is being replaced. This data is very crucial in every replacement, and I was glad for being exposed to this. In this week we also learned on how to identify the part number and the model of the product by seeing it on the Operation Standard (OS) on the machine. I was also being asked to check the fiber height of the finished goods to ensure they align with the specs as this is very critical dimension for the customer. In the second week, I was assigned to assist the engineer in charge in the secondary process. This is the week which I was assigned my Daily Task as well. The project engineer also assigned me to take the data for the weight of the glue being used for gluing process. I was asked to do a study for few of the products which is running during that time. I took reading for each 5 meter for 30 reading. By this, I could take the average reading of how much glue usage for each meter. This is really crucial in the Bill of Material (BOM) as this would tell all the information for that certain product. In the BOM it would tell all the list of the raw materials, intermediate assemblies, sub-components, parts, quantities of each needed to manufacture and end product. BOM can be used for communication between manufacturing partners or confined to a single manufacturing plant. In this week, I also was assigned my mini project which is measured the fiber width of the Felt before and after gluing process. Lastly, in the fourth week, I was exposed on how to prepare the Operation Standard (OS).

This software is quite similar with Autocad which our faculty uses in the Engineering Drawing subject. As far as my concern, the major difference between these two software is that Autocad support the 3D drawing while, Draftsight only supports 2D.

Long term statistics		X547				
Std dev	0.0323		376217-01/03	Total Height	4.93 ± 0.30	1.94
PpU	2.54	Total Width		29.23 ± 0.30	1.92	100.00%
PpL	1.52	Small Side Edge		0.45 ± 0.20	1.68	100.00%
Ppk	1.52	376227-01/03A	Total Height	4.93 ± 0.30	1.77	100.00%
			Total Width	28.03 ± 0.30	1.42	100.00%
			Small Side Edge	0.45 ± 0.20	1.42	100.00%
Ppk	1.52	376220-01/03A	Total Height	4.93 ± 0.30	2.62	100.00%
			Total Width	57.26 ± 0.30	1.34	100.00%

Figure 13 Example of PPK Achieved and the KPI

Week 9 – 11 (17th May 2021 – 4th June 2021)

During week nine, there are some problem with the Felt. We discovered new defect. The defect that we found out was too much excess glue on top of the Felt. As this occur, I assist the quality inspector in running few test. The test that we did was water test. In this test we pour few drops of water on the Felt's backing and left it for 15 minutes to see how much the water penetrates through the Felt. Most of the testing, the water penetrates the Felt before 15 minutes and this considered as defect which would turn as scrap. I also did a stock take in the workshop with the other intern and engineers. This is to check the remaining of the spare part and to ensure the availability of the spare part. I also was assigned to update the process potential capability (PPK) of the product and update the performance indicator (KPI) of the month.



Figure 14: Water Test on the Felt

Week 12 – 17 (8th of June 2021 – 15th July 2021)

On 8th June, we were officially work from home (WFH). During this WFH I was assigned my mini project which is creating a new system integrated for Operation Standard (OS). I learned on how to lock and cells and hidden the formula during this time. I also did a few trial and error on this project and had few meetings with my mentor regarding this project. After I was given the approval by both mentor and supervisor, I proceed in edited all of the operation standard. I edited all of the operation standard up until 2nd of July 2021. During the last two weeks, I updated the BOM, Product Change Notice (PCN), Internal Drawing, and Operation Standard (OS) and also I updated the OS for the product running since there are new revisions updated.



5.0 Mini Project

Mini Project helps the students in exploring and to have a better understanding of the fundamentals throughout the practical application. It also helps in boosting the students' skills and sharpen the students' critical thinking.

5.1 Measure the Fiber Width before and after Gluing.

I was assigned to do a study on the measurement of the fiber width of the Felt before and after the gluing process. This project was done in the secondary process which the measurement was taken before it enters the pre-heat and backing. I would take the reading for 1 meter for 30 samples for each of the product which was done for each 5 runs for every product. For the after gluing process, I will have to take the measurement of the same Felt after it undergoes gluing, curing and heating process.



Figure 15: Chamber for Heating Process



Figure 16: After the Gluing Process

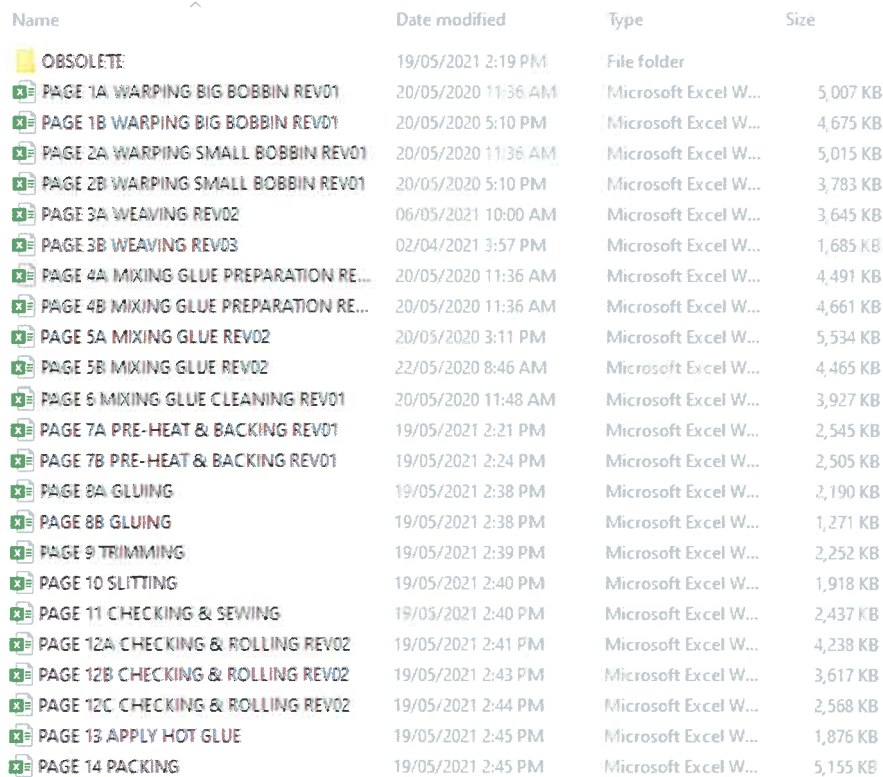
As shown in figure 9, the Felt will go through chamber and oven after the gluing process which is crucial in ensuring the glue on the Felt's backing is completely dried. The measurement of the after gluing process that was supposed to be taken was done after the Felt exits the oven as shown in figure 16. This study is really important as the heating process required heat where different product required different temperature. In this study I have to measure the shrinkage differences for before and after the gluing process. Generally, heating will always turned any products to shrink as the heat exposed was quite high which for instance the range are between 140°C - 160°C. The objective of this study is generally to obtain the shrinkage measurement for every heat applied as this would really effect the measurement of fiber width for the finished goods. All of the products in the secondary process were all from the weaving section. So in the weaving section, the fiber width are already controlled. However, during this study I have gained few reading where the shrinkage are too big and too small. So, I could concluded that this issue was being controlled by the temperature used as all the before measurement was already being controlled in the weaving section.

By doing this study, the engineer in charge can check and inspect the temperature which is suitable for the felt to get the exact shrinkage value they are targeting. Right after few study were done for numbers of runs, the shrinkage value was obtained between the ranges targeted as they have changed the temperature following the studies that was done. This is really crucial and important steps as in the slitting process, there would not be too many defects that will be turned into scrap as studies were being done to avoid losses.

In this project, I gained knowledge where all of the production runs in a certain company needed to undergo few studies and test. This is because, we need to ensure the quality and the reliability of the product. Throughout studies and testing, the manufacturers and production are able to set the technical standards for example in my study, the temperature used. It is really important to have guidelines to ensure our products meet the customer expectations. It is really important to be aware of the products' durability before they reach the customer in order to avoid any issues with the customer.

5.2 Creating New System for Operation Standard (OS)

Operation Standard (OS) is a set of step-by-step instructions compiled and prepared by the engineers in order to help the operator carry out their daily routine operations. OS were done to achieve efficiency, quality output and uniformity of the performance while reducing any miscommunications and failure in complying with the industry regulations.



Name	Date modified	Type	Size
OBSOLETE	19/05/2021 2:19 PM	File folder	
PAGE 1A WARPING BIG BOBBIN REV01	20/05/2020 11:36 AM	Microsoft Excel W...	5,007 KB
PAGE 1B WARPING BIG BOBBIN REV01	20/05/2020 5:10 PM	Microsoft Excel W...	4,675 KB
PAGE 2A WARPING SMALL BOBBIN REV01	20/05/2020 11:36 AM	Microsoft Excel W...	5,015 KB
PAGE 2B WARPING SMALL BOBBIN REV01	20/05/2020 5:10 PM	Microsoft Excel W...	3,783 KB
PAGE 3A WEAVING REV02	06/05/2021 10:00 AM	Microsoft Excel W...	3,645 KB
PAGE 3B WEAVING REV03	02/04/2021 3:57 PM	Microsoft Excel W...	1,685 KB
PAGE 4A MIXING GLUE PREPARATION RE...	20/05/2020 11:36 AM	Microsoft Excel W...	4,491 KB
PAGE 4B MIXING GLUE PREPARATION RE...	20/05/2020 11:36 AM	Microsoft Excel W...	4,661 KB
PAGE 5A MIXING GLUE REV02	20/05/2020 3:11 PM	Microsoft Excel W...	5,534 KB
PAGE 5B MIXING GLUE REV02	22/05/2020 8:46 AM	Microsoft Excel W...	4,465 KB
PAGE 6 MIXING GLUE CLEANING REV01	20/05/2020 11:48 AM	Microsoft Excel W...	3,927 KB
PAGE 7A PRE-HEAT & BACKING REV01	19/05/2021 2:21 PM	Microsoft Excel W...	2,545 KB
PAGE 7B PRE-HEAT & BACKING REV01	19/05/2021 2:24 PM	Microsoft Excel W...	2,505 KB
PAGE 8A GLUING	19/05/2021 2:38 PM	Microsoft Excel W...	2,190 KB
PAGE 8B GLUING	19/05/2021 2:38 PM	Microsoft Excel W...	1,271 KB
PAGE 9 TRIMMING	19/05/2021 2:39 PM	Microsoft Excel W...	2,252 KB
PAGE 10 SLITTING	19/05/2021 2:40 PM	Microsoft Excel W...	1,918 KB
PAGE 11 CHECKING & SEWING	19/05/2021 2:40 PM	Microsoft Excel W...	2,437 KB
PAGE 12A CHECKING & ROLLING REV02	19/05/2021 2:41 PM	Microsoft Excel W...	4,238 KB
PAGE 12B CHECKING & ROLLING REV02	19/05/2021 2:43 PM	Microsoft Excel W...	3,617 KB
PAGE 12C CHECKING & ROLLING REV02	19/05/2021 2:44 PM	Microsoft Excel W...	2,568 KB
PAGE 13 APPLY HOT GLUE	19/05/2021 2:45 PM	Microsoft Excel W...	1,876 KB
PAGE 14 PACKING	19/05/2021 2:45 PM	Microsoft Excel W...	5,155 KB

Figure 17: Arrangement of Operation Standard of Our Company

As shown in the Figure 17, that is the arrangement of OS used in our company, where all processes were in different excel. In fact the one from the same process but has 2 different pages were also separated into different excel. I was assigned to combine all of these excel into one specific excel following the model. This project was given to me once we started our Work from Home (WFH) on 4th June 2021. I did my research first and do some study regarding this project. My supervisor also requested to have few of the selected cells locked and also hidden the formulas used for the cells. After studies and few trial and error using the existing OS and I managed to create the new template for my department to use after having the approval from my

supervisor.

	PAGE 1-2_TEMPLATE_WARPING (updated)	8/3/2021 11:50 PM	Microsoft Excel W...	14,973 KB
	PAGE 3_TEMPLATE_WEAVING (1)	8/3/2021 11:50 PM	Microsoft Excel W...	6,679 KB
	PAGE 4-6_TEMPLATE_MIXING GLUE	8/3/2021 11:50 PM	Microsoft Excel W...	9,644 KB
	PAGE 7-14_X547 FELT_SECONDARY	7/24/2021 3:13 PM	Microsoft Excel W...	20,176 KB

Figure 18: Arrangement of Operation Standard following the New System

As can be seen from figure 18, that is the arrangement after I created the new system where I have combined few processes into certain excel and could be seen it is more organize and simple. For the locked and hidden formula, I applied these formulas on certain cells only. This is because, different people will handled this OS so the probability for it to be change without proper documentation is really high.

Part Information	
Model	-
Part Name	-
Part No.	-
Mould No.	NA
Ref. No.	DY-OS-FELT-XXXX
Supplier	MYBRUSH INDUSTRIES SDN BHD
FG Part No.	-
COLOUR	-
BASE CLOTH COLOUR	-

Figure 19: Example of Cover Page

	OPERATION STANDARD		REF. NO.:	DY-OS-FELT-XXXX	PREPARED BY:	-	
	PROCESS :	PACKING	PAGE:	1 of 1	VERIFIED BY:	-	
MODEL	-	PART NAME	-	DATE:	-	REV:	-
MOULD NO.	NA	PART NUMBER	-	SUPPLIER:-	MYBRUSH INDUSTRIES SDN. BHD	APPROVED BY:	CH LIM

Figure 20: Operation Standard

As shown in figure 20, this is the example of the cover page that I has created which would link with the actual OS in the figure 19 where all of the important information such as model, part name, part no and etc. would be on formula would be hidden.

Part Information	
Model	XXX
Part Name	-
Part No.	-
Mould No.	NA
Ref. No.	DY-OS-FELT-XXXX
Supplier	MYBRUSH INDUSTRIES SDN. BHD
FG Part No.	-
COLOUR	-
BASE CLOTH COLOUR	-

Figure 21: Amendment was done on the Cover Page

mybrush™		OPERATION STANDARD		REF. NO. :	DY-OS-FELT-XXXX		PREPARED BY:	-
PROCESS :		PACKING		PAGE:	1 of 1		VERIFIED BY:	-
MODEL:	XXX	PART NAME	-	DATE:	-	REV:	-	APPROVED BY:
MOULD NO.:	NA	PART NUMBER	-	SUPPLIER:	MYBRUSH INDUSTRIES SDN. BHD			CH LIM

Figure 22: Operation Standard after amendment

As shown in figure 22, I edited the model name with XXX on the cover peger and the OS would follow the changes as illustrates in figure 21. This action could not be done by directly change the information on the OS itself as I have set the cells as locked and could only be done if password was entered. By this way, only selected people can update this OS where any random changes can be avoid.

I managed to gain few knowledge and experience in carrying this project which the first one is that I obtain new skills in mastering the Microsoft Excel which could help me in future purpose. Even though I learned this through self-learning and have tons of errors being done but I managed to come up and created a new system for my company. This is a really great opportunity given by my department and I really appreciate to have the chance in contributing few things to my company. Other than that, I also gained the experience in teaching the engineers and someone who has the title regarding this new system. This is something that I treasure the most as I have never had this experienced before.

6.0 Conclusion and Recommendations

In the nutshell, industrial training really a beneficial especially towards the student and also the company. It helps the student in having the better picture in the real-life working environment. Other than that, industrial training also helped the student to be more independent and have a good critical thinking in solving any problems. There are various knowledge and experience I have gained throughout this training. I managed to sharpen my communication skills especially in communicating with the foreign workers. I am glad in being exposed to various country and racial.

I was also am very glad to have the chance in experiencing the production line in a company. I have done quite numbers of test and studies towards the company's product. This really helps in exposing me to hands on of all the common equipment used in a production company. I am also delightful to have such helpful and cooperative colleague who would always offered me help whenever I am in need. In addition, to obtain the trust of my supervisor in creating a new system for them is also a huge achievement for me as that is quite a big things to be done by a trainee.

For recommendation, I am really hoping that this company would have a proper timetable for the internship students as this would be beneficial for both party. This is because, there would be few times where I have to go seek for works or else I would not have anything to do for that day. Throughout my internship there, I could see that the company is really trying their best in improving themselves despite the COVID-19 being around us. To sum up, this training gave me quite numbers of skills in preparing for the future.

7.0 Appendices



Figure 23 & 24: Base Cloth vs. Substrate

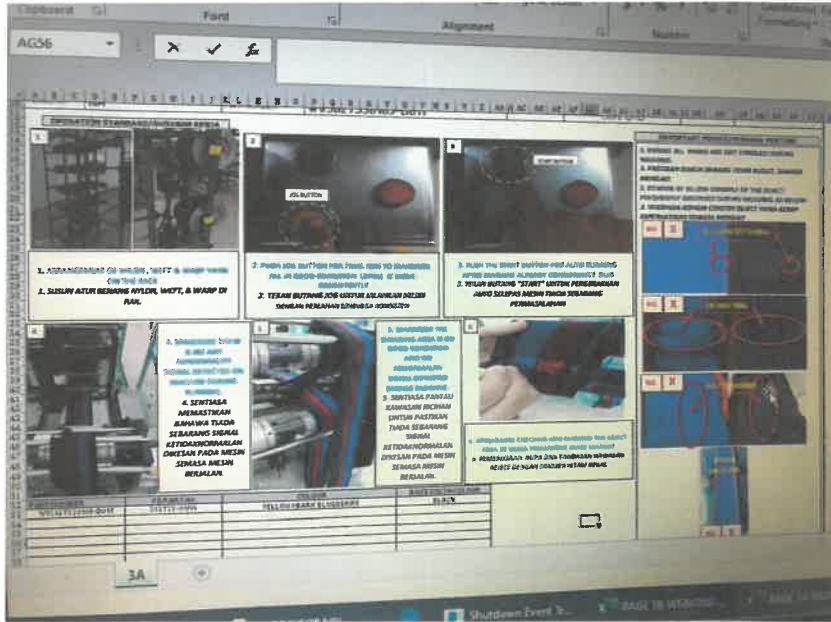


Figure 25 & 26: Example OS that I Edited with One of the Picture Taken to be used in the OS

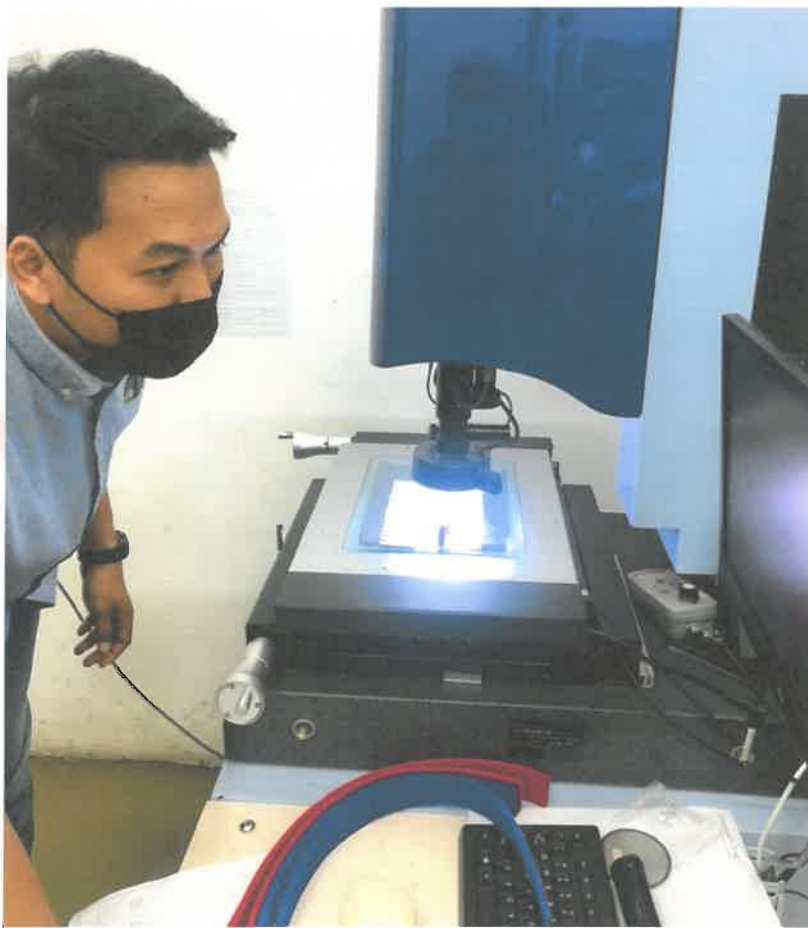


Figure 27, 28 & 29: Example of the Reading taken from the Smartscope and A picture of Engineer in Charge operating the Smartscope

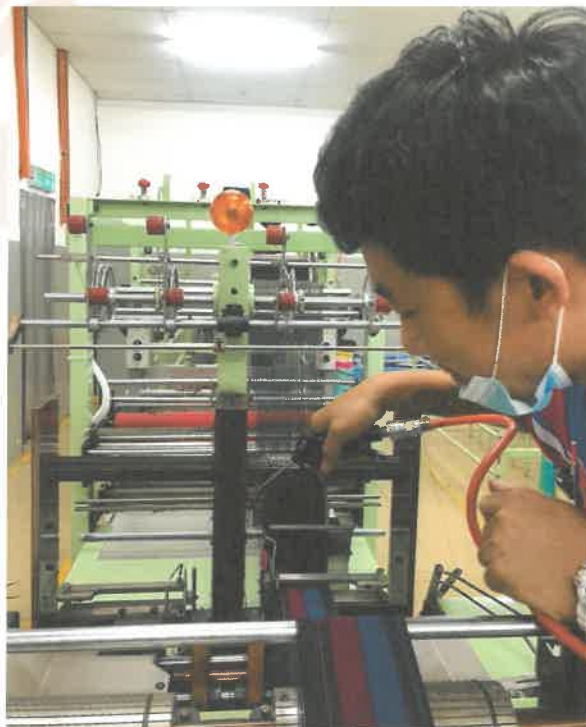


Figure 30 & 31: A picture of Operator Cleaning the Weaving Machine



Figure 32: A picture of an Intern Measuring the Jig that just Arrived for the use of Felt Measurement



Figure 33: Application of Jig on the Felt in the Production

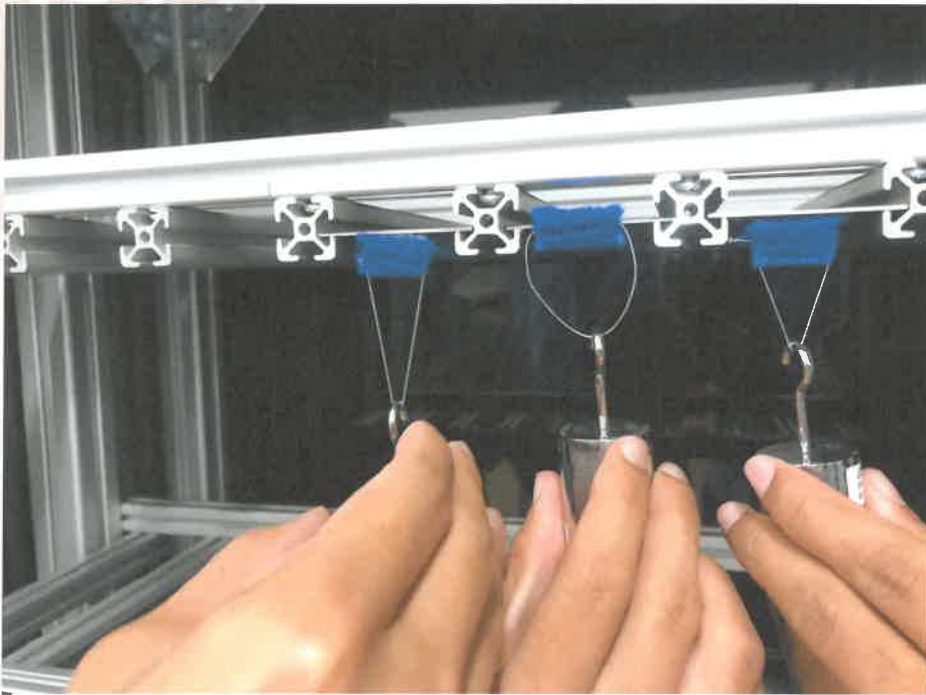
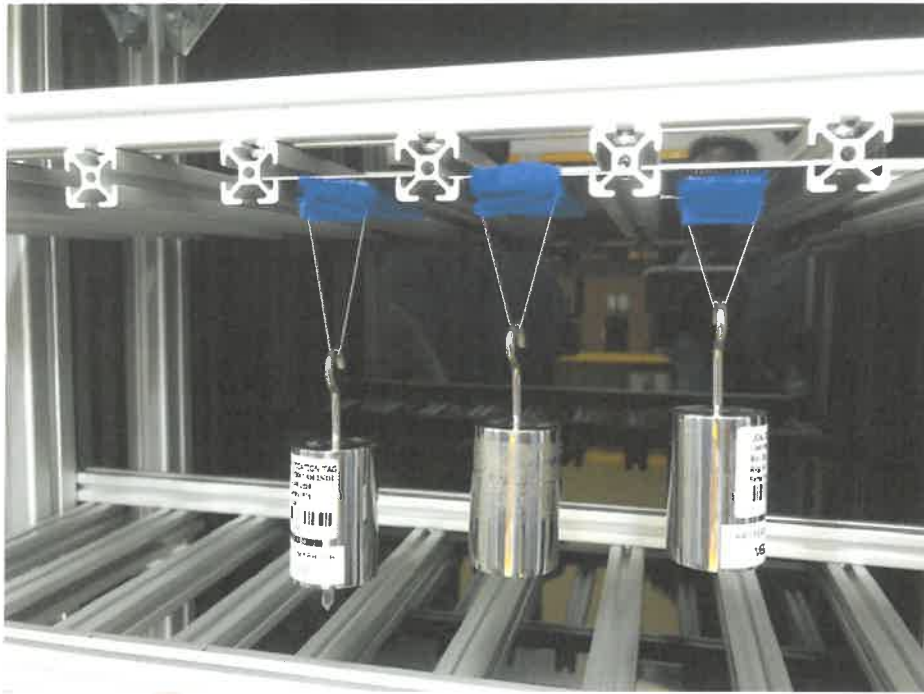


Figure 34: Static Load Test