



اَوْنِيُوْ سِيْتِي تِيْكَوْلُوْ كِيْ مِيْاَرَا  
UNIVERSITI  
TEKNOLOGI  
MARA

## INDUSTRIAL TRAINING FIELD

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Diploma Chemical Engineering

2018652762

17 weeks

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## **1) INTRODUCTION**

Industrial Training is component that important in engineering study. Knowledge learnt in all the core and non-core courses will have to be applied in real working environment in industries. One of the requirement for award of Diploma Chemical Engineering, by the Faculty of Chemical Engineering, Universiti Teknologi MARA is that students must complete at least 17 weeks of Industrial Training.

Student should note that Industrial Training is an essential thing in the development of the practical and professional skills required of an engineer and an aid to prospective employment. Because sometimes, many employers regard this period as a chance to vet new employees for future employment.

All students should make effort and give sufficient thought into obtaining the most relevant and effective Industrial Training. Whilst in difficult, it is desirable to obtain experiences in a wide range of activities, such as onsite situation, actual factory situation, quality control situation and file management. Student also should be noted about developing an awareness of general workplace behaviour and communication skills are important objectives of the Industrial Training.

Normally students shall do their Industrial Training during semester six and students shall obtain places for Industrial Training in any appropriate company of their own choices. The Faculty's coordinator of Industrial Training will assist students regarding the application process as well as responsible on the conduct of the Industrial Training. During the Industrial Training, students are required to observe the rule and regulation while attending the practical and record daily activities in the provided logbook.

End of the Industrial Training, each student will submit a full report which is contain the detail of job and activities that carried out by them. Students should be able to identify the types of work that do in real engineering world and appreciate the theoretical knowledge learnt, perform basic engineering practices, including technical writing report, communication with colleagues at the company, handle project and generate proposal for betterment of the industries. Lastly, student should be able to have higher level of integrity, ethical and accountability in practicing engineering.

Assessment for the industrial training will be based on daily logbook, report, industrial supervisor and lecturer evaluations. The students must obtain the minimum mark which is 50% on the overall assessment in order to pass industrial training

## 2) ORGANIZATION CHART

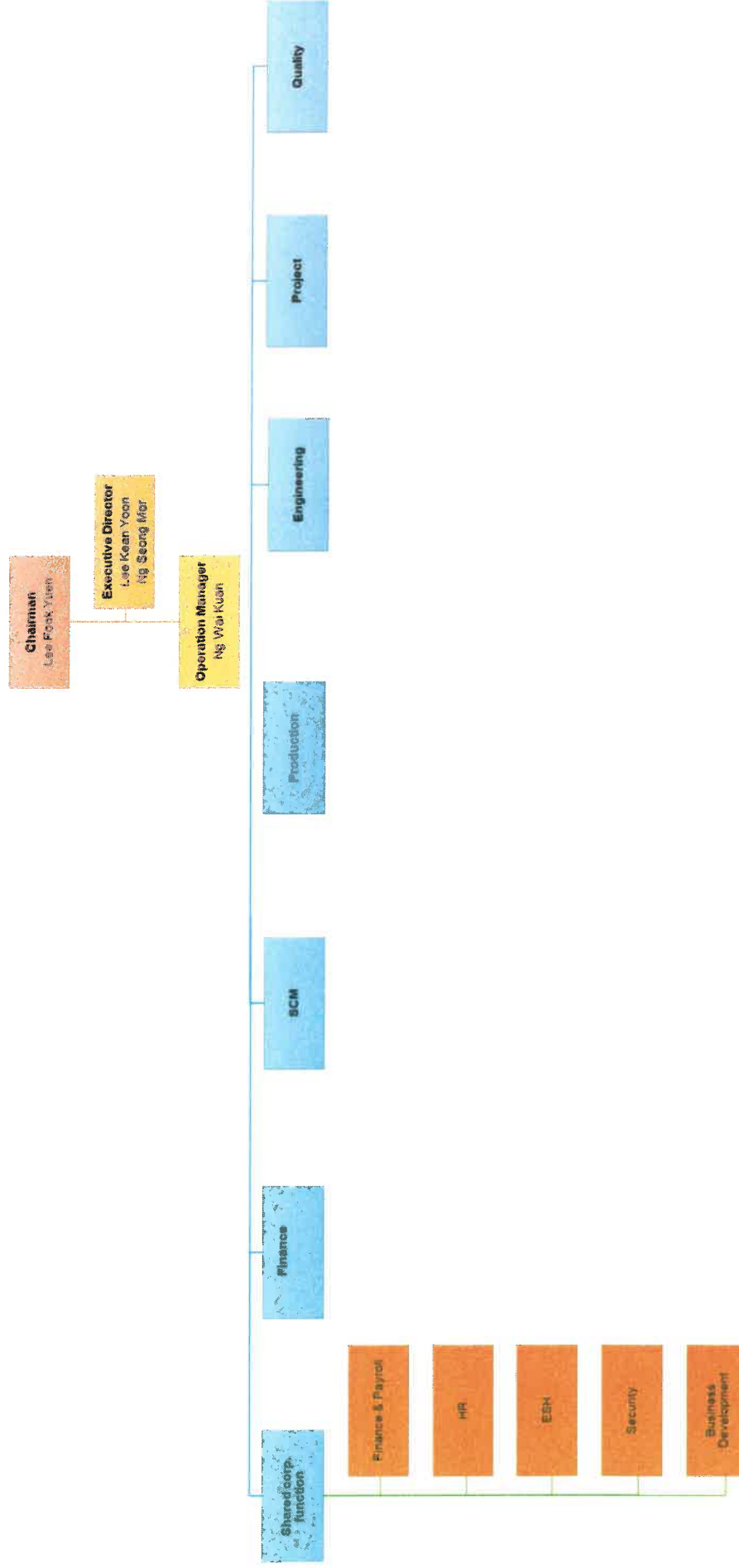


Figure 1 Overall Organization Chart

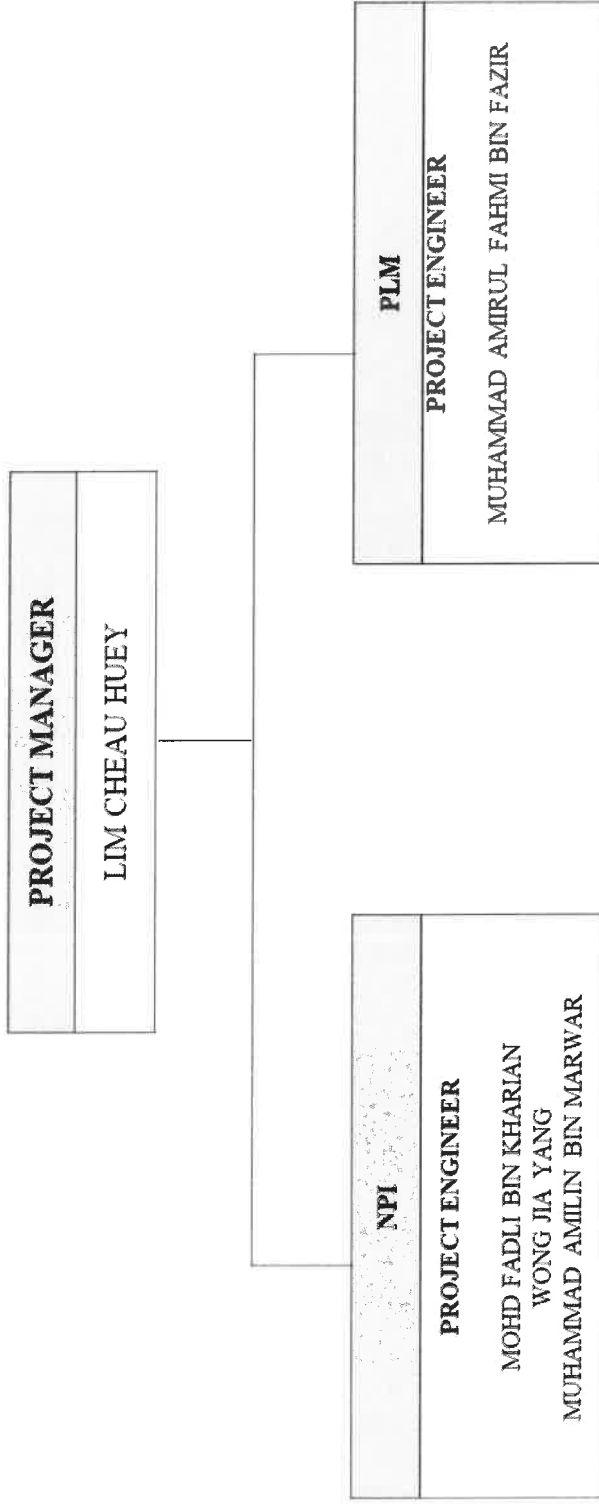


Figure 2 Project Department's Organization Chart

### **3) HISTORY OF THE COMPANY**

MyBrush Industries Sdn Bhd was established in year 2004 and the headquarterd in Johor Bahru, Malaysia. MyBrush Group is one of the fastest growing total manufacturing solutions company's in Malaysia, serving local and international needs. The company started as a local business with 1 factory and 5 employees only. But today, the company operates from 8 plants with more than 3000 employees. The group's primary manufacture activities are currently based in Malaysia and Philippines. Their products across the globe for their international partners market. Due to consistent growth, the current annual revenue is USD 120 million which is 507 million Malaysian Ringgit.

MyBrush Group has been continuously investing and improving the company and production throughout the years in order to support their customers' requirements and market demand. The company now offer a comprehensive product range and manufacturing solutions, which are includes assembly, engineering design, equipment fabrication, injection moulding, brush making, supply chain and project management. MyBrush Group always give their commitments to customers and their business philosophy states that "Customer's Problem is Our Business". With the help of their skilled and knowledgeable team, MyBrush Group continues to provide high quality and cost-efficient product and services to the customer.

Furthermore, MyBrush Group become a major engineering brush supplier in Malaysia in 2010. The next year which 2011, MyBrush provide full solution from moulding to bristling and then form a MyTech & Assembly that provide one stop solution for Assembly production. MyBrush Group also developing their one of their product which is brush to give a best condition to the customer. In 2014, they started new production which is injection moulding production with 10 machines. The company also has localization of carbon fiber brush technology in 2016.

Next, the production for MyBrush's branch that I intern is brush making. The company produce felt for vacuum's part and their major customer is Dyson. There have four process for felt making which are mixing glue process, warping process, weaving process and secondary process. In secondary process have six process such as pre-heat, gluing, trimming, slitting, sewing and packaging. Mixing glue is a process to produce glue to use at gluing process and glues have seven of material which is deformer, three types of glue, thickener and hardener. Lastly, warping process is using weft yarn as raw material and produce big bobbin and small bobbin.

#### 4) PROCESS FLOW

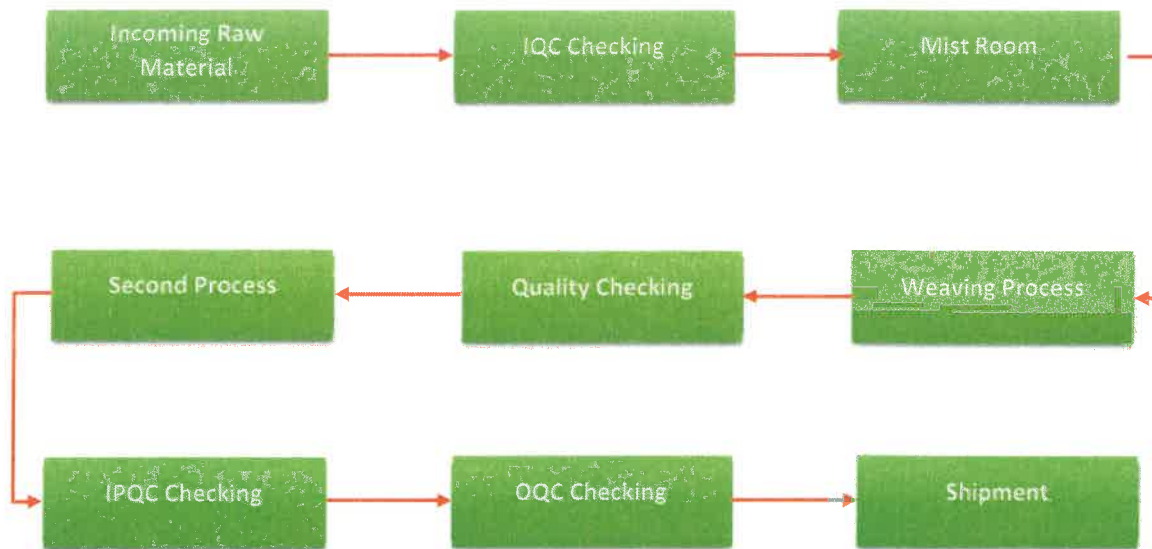


Figure 3 Overall Process Flow

The first process is incoming raw material, raw materials for this production are nylon yarn, weft yarn and glue material. For the nylon yarn, there have a lot of colour likes yellow, blue and red. Then, it will go through for Incoming Quality Control (IQC) checking to make sure all raw material do not have defect and reaches to the company with same quantity like in the quotation. Next process is the raw materials will go to the mist room, which is a place that keep the raw material. The mist room will keep the raw material in a good condition with a suitable temperature and humidity.

Furthermore, the weft yarn will go warping process to make big bobbin and small bobbin. The big bobbin is a combination of 232 of weft yarn or 132 of weft yarn in one roll. For the small bobbin is combination of 6 of weft yarn in one roll and the colour of big bobbin and small bobbin are black. Then, at the weaving process the raw material that will use are nylon yarn, big bobbin, small bobbin and weft yarn. For the nylon yarn's colour will be choose follow the model specification. All raw materials will go through the weaving machine and it will produce work in progress (WIP) called felt. The felt that be produce will be check by quality control and then felt with good condition operator will put into one bin. The rejected felt will be separate into another bin. Each machine has its own bin and one bin can collect around 200 meter to 350 meter of felt.

The next process is secondary process that have six process which are pre-heat, gluing, trimming, slitting, sewing and lastly packaging. First process is pre-heat and backing process, felt will go to oven with 60°C. The purpose of this process to heat up the nylon yarn at the felt and make the felt become fluffier. Out of the oven, the surface of felt's backing will

go through the heater rod to remove the hairy yarn at the surface of backing. Besides, felt will go to gluing machine and the glue will be put on the backing surface. Then, the felt will go through three chamber and two oven called main oven and sub-oven. In addition, the felt go to trimming process. In this process, the felt will be trim to make sure the height follow the specification. The felt will go to the slitting process and purpose of this process is to cut side of the felt to get the desired width. After the product have the height and width in specification, the product will go sewing process to joint the felt. Last process is packaging, the one roll of the product is around 35 meter. Then, it will be check by IPQC which is In-Progress Quality Control to make sure the product do not have any defect such as discolour, uneven or under width.

Lastly, the product will be shipment to customer who wanted it and before the process, it will go through Outgoing Quality Control (OQC) checking. The purpose of this OQC checking is to confirm that the label at the boxes same with model contain inside it. If the packaging in a good condition, the shipment will be proceed.

## 5) WEEKLY ACTIVITIES

Weeks	Activities
Week 1	In the 1 <sup>st</sup> week, the supervisor was briefing about the company, working hour, production and explain more detail about the product that they produce. I also tour around the plant with the mentors. In this week also learn about the project department such as New Product Introduction (NPI), Bill Of Material (BOM) files, Product Lifecycle Management (PLM). Next activity in this week, learn to read and understand the part number, type of model and name of the product. So that it will do not have any difficulty or miscommunication if the colleagues ask for help.
Week 2	Monitor weaving machine at weaving process and understand the mechanism how the felt can be produce. Furthermore, use Smartscope to measure and collect data for the height and width of the product which is nylon bristle strip. For the measurement, it need 20 samples of the product. After that, the data will be extract to excel and submit to mentor.
Week 3	The daily activity is monitor weaving process. There are a few activities for monitor the weaving area such as check the daily output report every machine, daily maintenance report, travel card for each bin and check the yarn position for each machines. Other than that, always check and make sure that operator practice the 5S in weaving area which are sort, set in order, shine, standardise and sustain. The operators have to make sure the machine clean because dust is one of the aspect for felt have defect discolouration.
Week 4 – Week 5	Do the daily activities and check the first piece for each machines. First piece is a testing product before start the production, to make sure the felt do not have defect and in a good condition. Next, continue the mini project job which is measure the felt to compare the theoretical measurement with actual measurement.
Week 6	Check first piece at weaving machine and do the daily activities which are check daily output report and others. Other activity in week 6 is doing an operation standard (OS) for new model which is X248P LHS, yellow colour. The OS is for secondary process likes pre-heat, gluing, trimming and slitting. Next, inspect the dimension



	of nylon bristle strip using calliper to check the product in spec or reject.
Week 7	Do the daily activities at weaving process. Proceed the OS for the same model in secondary process. Furthermore, do the new task which is Bill Of Material (BOM) document for short felt model and Document Change Notice (DCN). Short felt is felt that less than five meter. Next, did a safety operating procedure (SOP) for machines at secondary process such as chamber, main oven, sub oven and trimming machine.
Week 8	In this week, monitor the machine and do daily activities at weaving process. Continue the SOP task for secondary process. Secondly, manage the OS document for secondary process for all models in the company's server. Arrange all the OS documents to make look more organized in the server. Other than that, do a stock take for workshop spare part with other project engineers. We will collect all data, how many this spare part for technicians' reference.
Week 9 – Week 10	Do the daily activities at weaving area and proceed stock take task for workshop spare part. Other activity, update and organise the BOM document for hardcopy and softcopy. Check the revision of the document, make sure there has the latest revision document for hardcopy. And also manage the OS files, the OS must tally with the OS master list.
Week 11	For week 11, do the daily activities which are check daily output report, daily maintenance report, travel card at each bin and first piece at weaving machines. Next, continue organise and manage the OS documents for all model. Update the operation standard (OS) for weaving process and secondary process for model X285K Felt. Lastly, meeting with En. Fadli about the incoming task.
Week 12	This week start work from home and the first task is update OS model X285K LHS for weaving and secondary process. Do a meeting and discuss for Operation Standard new system, Bill Of Materials and Product Document Change (PCN) master list. For the OS new system, supervisor and mentor want the OS files more organised and easier to update revision of the files. Update PCN master list to make sure it tally with BOM files. Other than that,

	update operation standard new system for weaving process model X248P, X547, X620 LHS, X674 Top and X547 RHS.
Week 13	Update OS new system model X287 Brushbar, X285K LHS for weaving process. Furthermore, update OS new system model X248P Felt, X248P LHS, X674 Bottom and X674 Top for warping and mixing glue process.
Week 14	Update OS new system model X620 Felt, X620 RHS, X547, X285K, X287 for warping process and mixing glue process. Next, re-edit BOM files for correction purpose but just a few model only. Lastly, manage BOM files, operation standard and formatting files for hardcopy.
Week 15	Proceed organised BOM, OS, and formatting files for hardcopy. Update OS new system model X547, X248P and X620 for secondary process. Create template OS new system for mixing glue process and secondary process. Lastly, up revision OS secondary process model X547 RHS, X285K and X547 for add steps at slitting OS.
Week 16 - Week 17	Work from home

## 6) MINI PROJECT

Mini project that I assign is raw material usage for new model. The model for this project are X248P RHS (Right Hand Side), yellow colour and X248P Felt, yellow and blue colour. The tasks are monitoring one weaving machine that produce this model. I have to weight the raw materials such as yellow nylon yarn, big bobbin, small bobbin, protective yarn and weft yarn. For model X248P RHS to produce, it need 17 yellow nylon yarn, two big bobbin 132 weft yarn's type, two small bobbin, two weft yarn and two protective yarn. For X248P Felt, it need 16 yellow nylon yarn, 16 blue nylon yarn, four protective yarn, two big bobbin 232 weft yarn's type, two small bobbin and two weft yarn.

In the morning, I will weight the nylon yarn, weft yarn and protective yarn to get the initial weight and also record the counter at the weaving machine. For every 20 minutes, I will check the machine and raw materials to know if any change. Then, I will weight the new material and record the counter. For big bobbin and small bobbin, it can be use for five or six days and average of the weight is around 27 kg include the roller (10 kg). For new nylon yarn, can last for 3 or 4 days and weft yarn and protective yarn are frequently change. The end of the shift, I also will weight the materials for final weight on that day. So for every changes, I need to record the counter of the machine. The purpose is to use for theoretical formula to get the length of felt that produce.

Furthermore, other task for this mini project is I have to compare the actual length of the felt with the theoretical measurement. I have to measure the felt for this model manually using measurement tape. The felt that produce from weaving machine will be put in bin. So, one bin can collect around 200 meter to 350 meter. I will measure manually for two or three bins which is around 600 meter to 1050 meter in one day and the data measurement will be record.

Next, the data that I record from the physical tasks which are weight big bobbin, small bobbin, weft yarn, protective yarn, nylon yarn and measure the length of felt manually will be extract to Microsoft excel. The theoretical measurement have its own formula refer the counter at weaving machine. The theoretical measurement create by engineer of MyBrush using density of the felt, weight of the raw material and counter. The actual measurement will be compare with theoretical measurement for study purpose. This task is to make sure the comparison logic and acceptable. For raw material data will be used to compare with the Bill of Material (BOM). In the excel for raw material, there have column for date and time for the material, position, weight, counter and output which is the theoretical measurement in meter.

Microsoft Excel interface showing the 'Weft Yarn' data table. The table has columns for Material, No., Start (Date, Time), End (Date, Time), Position (L/R, T/B), Initial Weight (kg) Gross, Final Weight (kg) Gross, Counter (Initial, Final), and Output (m).

Material	No.	Start		End		Position		Initial Weight (kg)		Final Weight (kg)		Counter		Output (m)
		Date	Time	Date	Time	L/R	T/B	Gross	Gross	Initial	Final			
Weft Yarn	R4	1/4/2021	8:46 am	1/4/2021	4:40 pm	R	B	0.649	0.022	4383	51449	99.0863158		
	R11	1/4/2021	4:40 pm	1/4/2021	5:48 pm	R	B	1.286	1.195	51449	57904	13.5894737		
	R3	2/4/2021	9:35 am	2/4/2021	10:37 am	R	B	0.132	0.024	242	7936	16.1978947		
	R9	2/4/2021	10:37 am	2/4/2021	6:04 pm	R	B	1.263	0.767	7936	45764	79.6378347		
	R11	3/4/2021	8:24 am	3/4/2021	1:03 pm	R	B	1.083	0.891	368	13948	28.5894737		
	R17	5/4/2021	8:30 am	5/4/2021	5:47 pm	R	B	1.204	1.102	0	42070	88.5684211		
	R18	6/4/2021	9:30 am	6/4/2021	5:43 pm	R	B	0.723	0.057	2640	49660	98.994737		
	R20	7/4/2021	10:27 am	7/4/2021	4:02 pm	R	B	0.494	0.022	4757	40360	74.9536842		
	R21	7/4/2021	4:02 pm	7/4/2021	6:01 pm	R	B	1.254	1.11	40360	50078	20.4589474		
	R15	8/4/2021	8:30 am	8/4/2021	5:33 pm	R	B	1.153	1.153	1005	30696	62.5073684		
R24	9/4/2021	8:30 am	9/4/2021	5:35 pm	R	B	1.145	0.463	2229	47886	96.12			
R27	12/4/2021	8:34 am	12/4/2021	3:26 pm	R	B	0.381	0.022	3064	27357	51.1431579			
R29	12/4/2021	3:26 pm	12/4/2021	6:05 pm	R	B	1.3	1.069	27357	42476	31.8294737			

Figure 4 Example Weft Yarn Data

Microsoft Excel interface showing the 'Protective Yarn' data table. The table has columns for Material, No., Start (Date, Time), End (Date, Time), Position (L/R, T/B), Initial Weight (kg) Gross, Final Weight (kg) Gross, Counter (Initial, Final), and Output (m). A yellow highlight is present on row 16, column 15.

Material	No.	Start		End		Position		Initial Weight (kg)		Final Weight (kg)		Counter		Output (m)
		Date	Time	Date	Time	L/R	T/B	Gross	Gross	Initial	Final			
Protective Yarn	Blue 1	31/3/2021	8:00 am	1/4/2021	2:40 pm	R	B	0.271	0.101	0	38290	80.61052632		
	Red 1	31/3/2021	8:00 am	1/4/2021	5:48 pm	R	B	0.637	0.119	0	5790	12.18947368		
	Red 5	1/4/2021	2:40 pm	1/4/2021	5:48 pm	R	B	0.216	0.186	38290	57904	41.29263158		
	Blue 5	2/4/2021	8:15 am	2/4/2021	10:30 am	R	B	0.126	0.108	242	7891	16.10315789		
	Blue 7	2/4/2021	8:15 am	2/4/2021	6:04 pm	R	B	0.475	0.353	242	45764	95.83578947		
	Blue 9	2/4/2021	10:30 am	2/4/2021	6:04 pm	R	B	0.175	0.138	7891	45764	79.73263158		
	Red 7	3/4/2021	8:24 am	3/4/2021	1:03 pm	R	B	0.24	0.193	368	13948	28.58947368		
	Red 9	3/4/2021	8:24 am	3/4/2021	1:03 pm	R	B	0.186	0.142	368	13948	28.58947368		
	Red 11	5/4/2021	8:30 am	5/4/2021	5:47 pm	R	B	0.42	0.341	0	42070	88.56842105		
	Red 12	5/4/2021	8:30 am	5/4/2021	5:47 pm	R	B	0.752	0.697	0	42070	88.56842105		
	Red 11	6/4/2021	8:30 am	6/4/2021	10:00 am	R	B	0.14	0.101	2640	10600	16.75789474		
	Red 12	6/4/2021	8:30 am	6/4/2021	10:00 am	R	B	0.552	0.2640	2640	49660	-5.557894737		
	Red 18	6/4/2021	10:00 am	6/4/2021	5:43 pm	R	B	0.762	0.692	10600	49660	82.23157895		
	Yellow 1				6/4/2021	5:43 pm	R	B	0.123	0.123	49660	104.5473684		
	Red 18	7/4/2021	10:27 am	7/4/2021	4:02 pm	R	B	0.579	0.485	4757	40360	74.95368421		
	Yellow 4	7/4/2021	10:27 am	7/4/2021	11:31 am	R	B	0.171	0.102	4757	14360	20.21684211		
	Red 17	7/4/2021	11:31 am	7/4/2021	4:02 pm	R	B	0.436	0.14360	40360	54.73684211			
	Yellow 5	7/4/2021	4:02 pm	7/4/2021	6:01 pm	R	B	0.149	0.128	40360	50078	20.45894737		
	Yellow 6	7/4/2021	4:02 pm	7/4/2021	4:50 pm	R	B	0.123	0.101	40360	45528	10.88		
	Yellow 9	7/4/2021	4:50 pm	7/4/2021	6:01 pm	R	B	0.127	0.119	45528	50078	9.578947368		
	Red 17	8/4/2021	8:30 am	8/4/2021	5:33 pm	R	B	0.333	0.272	1005	30696	62.50736842		
	Red 22	8/4/2021	8:30 am	8/4/2021	1:30 pm	R	B	0.191	0.103	1005	15430	30.36842105		
	Red 24	8/4/2021	1:30 pm	8/4/2021	5:33 pm	R	B	0.134	0.114	15430	30696	32.13894737		
	Red 26	9/4/2021	8:30 am	9/4/2021	8:54 am	R	B	0.113	0.102	2229	3899	3.515789474		
	Red 27	9/4/2021	8:30 am	9/4/2021	2:38 pm	R	B	0.165	0.101	2229	33281	65.37263158		
	Red 30	9/4/2021	8:54 am	9/4/2021	2:28 pm	R	B	0.137	0.102	3899	32790	60.82315789		
	Blue 17	9/4/2021	2:38 pm	9/4/2021	5:20 pm	R	B	0.118	0.101	33281	47600	30.14526316		
	Red 31	9/4/2021	2:28 pm	9/4/2021	5:35 pm	R	B	0.137	0.112	32790	47886	31.78105263		
	Blue 26	9/4/2021	5:20 pm	9/4/2021	5:35 pm	R	B	0.117	0.114	47600	47886	0.602105263		
	Red 33	12/4/2021	8:34 am	12/4/2021	6:05 pm	R	B	0.65	0.531	3064	42476	82.97263158		
	Red 34	12/4/2021	8:34 am	12/4/2021	6:05 pm	R	B	0.465	0.326	3064	42476	82.97263158		

Figure 5 Example Protective Yarn Data

Material Usage - X248P Felt Combo -

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

Cut Copy Paste Format Painter Clipboard Font Alignment Number

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H40

	A	B	C	D	E	Output (m)	
						Theory	Actual
1							
2							
3							
4		13/4/2021	108720	0.000	221.878	221.425	
5		14/4/2021	132400	0.000	270.204	270.858	
6		15/4/2021	113100	8.000	222.816	223.03	
7		16/4/2021	110950	2.000	224.429	230.533	
8		17/4/2021	135900	0.000	277.347	274.4	
31							
32							
33							
34							
35							
36							
37							

Figure 6 Example Theoretical Measurement Vs Actual Measurement Data

## **7) CONCLUSION**

Overall internship is a really good subject and recommended to all course. It also help to enhance and develop my skills. During my internship at MyBrush Industries Sdn Bhd, I learn a lot from my supervisor, mentors from project department and workers in the plant. I learn to manage the project files such as OS files, SOP files, BOM files, PCN, formatting files and other. Other than that, I also improve my communication skill with other colleagues. For the project task, I have experience to learn and create SOP for a few machine which are chamber, oven and trimming machine. I also get advice from my mentors to be more confident to do any task and follow the instruction given. But if have any problem, ask the question because maybe it will affect the task. In conclusion, I get a lot of experiences from this internship, new people and new skills that I cannot get from my study. I wish the internship subject will be stay as a subject for the student of Chemical Engineering to grab the opportunity to gain knowledge, skills and experiences. It will help to identify strength, abilities and weakness of ourselves.

8) **APPENDICES**



Figure 7 Weaving Process



Figure 8 WIP Felt (X248P Felt)



Figure 9 Slitting Process



Figure 10 Inspection using Jig





Figure 11 Trimming Process



Figure 12 Final Product (X248P Felt)