UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FACULTY OF MECHANICAL ENGINEERING

INDUSTRIAL TRAINING REPORT

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YEAR: 3

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INDUSTRY NAME: ARC AUTOS (M) SDN BHD

INDUSTRIAL TRAINING REPORT
AT
ARC AUTOS (M) SDN BHD

Period of Training:
15/07/2024 - 20/09/2024
(10 WEEKS)

Submitted By:
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This Technical Report for Industrial Training is submitted to
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ii	Industrial Training Declaration form - Cop & TT	

…… ……..

Faculty Supervisor Signature & Cop Date

NON-CONFIDENTIAL DECLARATION BY INDUSTRY

Non-Confidential Declaration by Industry

"I hereby declare that this Industrial Training Technical Report was written by Muhammad Fathul Hadi Bin Mohd Nizam and all information regarding this company and the projects are NON- CONFIDENTIAL and is true to my best knowledge."

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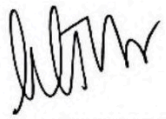

.....

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Company's Name	: AUTOS (M) SDN BHD
Department	: ENGINEERING DEPARTMENT
Date	: 12/09/2024

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INDUSTRIAL TRAINING DECLARATION FORM

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This report is a product of my own and has confirmed its contents by the industry as a complete report after the conclusion of industrial training in the stipulated time frame.

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Tarikh (*Date*) : 20/9/2024

ABSTRACT

This industrial training report presents the work and learning experience gained during a 10 week training period at Arc Autos (M) Sdn Bhd, a company specializing in automotive services, repairs, and manufacturing. The training was part of the Mechanical Engineering course requirements, and its main objectives were to provide exposure to real-world industry practices and to enhance technical skills in mechanical engineering.

Throughout my industrial training, I was engaged in various CNC machining tasks, including part production, cutting, grinding, polishing, and precision laser marking. I operated multiple CNC milling machines, such as the FANUC ROBODRILL, Mitsubishi M-V5CN, AWEA HF-1000, and TIDA MV-800, producing components like motorcycle parts and exhaust flanges, and performing finishing processes. I also gained experience with SolidWorks 2024, MasterCam X9, and EZCAD3 software to design, program, and execute CNC operations, successfully completing projects like custom hex screw nuts and panel switch brackets for automotive use. In addition to these tasks, I undertook a significant project where I reassembled a Mitsubishi Evo 5 from a car frame to a fully functional, drivable vehicle, integrating various mechanical and electrical systems, and ensuring the vehicle's operational capabilities.

Under the supervision of my industrial mentor, Mr. Larry Cheng Seng Onn, I had the opportunity to apply theoretical knowledge gained in the classroom to practical problems, such as analyzing mechanical failures and suggesting improvements in repair processes. I also learned about the importance of safety protocols and standard operating procedures to ensure efficient and safe operations within the factory.

The training not only enhanced my technical expertise in mechanical engineering but also improved my problem-solving skills, teamwork, and time management. Moreover, I gained a deeper understanding of the challenges faced by the automotive industry and the strategies to overcome them.

In conclusion, the industrial training experience at Arc Autos (M) Sdn Bhd was highly beneficial in bridging the gap between theoretical knowledge and practical application. It has prepared me for future challenges in the mechanical engineering field and provided valuable insights into industry expectations.

ACKNOWLEDGEMENT

Alhamdulillah, with the completion of my industrial training at Arc Autos (M) Sdn Bhd, I would like to take this opportunity to express my deepest gratitude to those who have contributed towards my successful journey during this training. First and foremost, I extend my utmost thanks to Allah S.W.T. for His grace and guidance that have enabled me to complete this important phase of my academic and professional development.

I would like to sincerely thank my industrial supervisor, Mr. Larry Cheng Seng Onn, whose continuous support, patience, and valuable insights have greatly enhanced my learning experience. His expert guidance and willingness to share his knowledge have significantly enriched my understanding of the automotive industry. His mentorship will always remain a source of inspiration as I pursue my future career.

I am also grateful to the entire team at Arc Autos (M) Sdn Bhd for their warm welcome and generous support throughout my training period. The collaborative working environment allowed me to gain practical experience, improve my technical skills, and understand the daily operations of the automotive industry. Their willingness to assist and involve me in various projects was invaluable to my growth as an aspiring professional.

Additionally, I would like to extend my appreciation to the academic and administrative staff of UTeM for providing me with the opportunity to undergo this industrial training and for their guidance in the overall process. Special thanks to my faculty supervisor, Dr. Mizah Binti Ramli, for her invaluable support and advice throughout this experience.

Lastly, I am deeply thankful to my family and friends for their continuous encouragement and support during my training. Their motivation has been a driving force that helped me navigate through this learning journey. I am forever grateful to everyone who contributed, directly or indirectly, to my successful completion of this industrial training.

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ABBREVIATION

Abbreviation	Meaning
SSM	Suruhanjaya Syarikat Malaysia
ROC	Registration of Company
R&D	Research and Development
CNC	Computer numerical control
CAM	Computer-Aided Manufacturing

1.0 INTRODUCTION

Industrial training is an integral part of the Mechanical Engineering course, designed to bridge the gap between theoretical knowledge and practical application in a real-world setting. It provides students with invaluable hands-on experience and exposure to the industry's professional work environment, preparing them for future careers. I had the privilege of undertaking my industrial training at Arc Autos (M) Sdn Bhd, a well-established company in the automotive sector known for its excellence in vehicle diagnostics, repair, improvement and maintenance.

The training period, which lasted for 10 weeks, offered me a comprehensive understanding of the automotive industry. I was exposed to various operational aspects, including CNC machining, precision manufacturing, automotive component production, and vehicle modification. This comprehensive experience encompassed tasks such as part production, cutting, grinding, polishing, and precision laser marking, as well as using software like SolidWorks 2024, MasterCam X9, and EZCAD3 for designing, programming, and executing machining operations. The opportunity to work alongside experienced engineers and technicians at Arc Autos enhanced my understanding of the complexities involved in automotive systems.

During the course of the training, I was able to apply the theoretical principles learned in university, such as Mechanical Design, Manufacturing Processes, and Computer-Aided Design (CAD), to practical situations in the factory. This hands-on experience allowed me to improve my technical skills and better understand industry standards and practices. Furthermore, I gained insight into the importance of safety regulations, quality control, and effective time management in the day-to-day operations of a mechanical engineering firm.

This report outlines my learning experience at Arc Autos (M) Sdn Bhd, focusing on the knowledge and skills acquired, the challenges encountered, and the problem-solving techniques applied. The report also reflects on the professional growth I achieved during this period, which has significantly enhanced my preparedness for the mechanical engineering profession. My time at Arc Autos was not only educational but also a critical step in shaping my future career in mechanical engineering.

1.1 OBJECTIVE

- To document the learning outcomes derived from hands-on experience at Arc Autos (M) Sdn Bhd.

- To analyze the integration of academic knowledge with real-world applications in the automotive industry.

- To evaluate the skills and competencies developed during the training period, such as technical proficiency, communication, and teamwork.

- To identify challenges faced during the training and propose practical solutions that were applied to overcome them.

- To reflect on personal and professional growth, preparing for a smoother transition from academic life to a professional career.

1.2 SCOPE OF TRAINING

The industrial training at Arc Autos (M) Sdn Bhd exposed me to a wide and deep understanding and providing hands-on experience in mechanical engineering processes, emphasizing the practical application of theoretical knowledge. The scope of the training included:

1. **CNC Machining.**
   Gained practical exposure to CNC machining, where precision and attention to detail were crucial in fabricating custom mechanical parts. This included setting up the CNC machine, programming the toolpath, and ensuring accurate machining of components.

2. **Laser Marking:**
   Acquired skills in operating a laser marking machine to mark a custom hex screw nut. The task involved engraving the brand name "TONNKA" and thread code on the part, requiring precision in handling the laser and ensuring the clarity of the markings.

3. **Work Project:**

   Carried out a significant project where I reassembled a Mitsubishi Evo 5 from a car frame to a fully functional, drivable car. This project involved integrating various mechanical and electrical systems, ensuring proper assembly, and validating the vehicle's operational capabilities.

4. **Cutting and Grinding:**

   After completing the cutting process, I continued with surface grinding to ensure that each workpiece was in perfect condition. Used a grinder to achieve a smooth and precise finish, which was critical for meeting quality standards and preparing the workpieces for subsequent processes.

5. **Software Skills**:

   Gained experience with SolidWorks for 3D modelling and design, which enhanced my ability to create and analyze mechanical parts and assemblies. Additionally, acquired foundational knowledge of Mastercam for CAD/CAM programming, which supported the transition from design to manufacturing processes and EZCAD3 for laser marking and engraving applications.

6. **Maintenance Tasks**:

   Performed essential maintenance work to ensure the smooth operation of machinery. This included refilling the coolant for CNC machines, refuelling SW68 oil, changing cutting tools, replacing carbide inserts for CNC turning machines, and clearing washers produced by CNC operations.

7. **Polishing Process**:

   Practiced using a bench-mounted polishing machine to refine the surface of the custom-manufactured screw nut. The polishing stage improved the finish and aesthetics of the part, reinforcing the importance of surface treatment in manufacturing.

8. **Manual Thread and Power Tapping**

   I gained hands-on experience in both manual and power tapping processes, enhancing my skills in precision thread cutting for industrial applications.

9. **Adherence to Safety and Ethical Standards:**
   Followed safety protocols strictly, particularly when working with machinery, ensuring ethical responsibility and maintaining high standards in the workplace.

10. **Technical Communication and Collaboration:**
    Developed strong communication skills by interacting with different departments and collaborating with colleagues. Worked under the supervision of Mr. Larry Cheng Seng Onn, applying feedback and ensuring the quality of the final output..

In general, the extent of my training at Arc Autos (M) Sdn Bhd provided me with the analysis and exposure needed in mechanical engineering related to automotive engineering and the best practices that I needed to encounter in my future practice.

2.0 INDUSTRY BACKGROUND

2.1 COMPANY BACKGROUND

Arc Autos (M) Sdn. Bhd.

Arc Autos , located in Durian Tunggal, Melaka, was founded in 2010.

Company Logo

Figure 1 : Company Logo

Company Detail

Registration no.(ROC) : 899427-H/ 201001015186

Date of incorporation : 23 April 2010

Business office address :

NO 10, JALAN IAN 5, INDUSTRI ANGKASA NURI, 76100 DURIAN TUNGGAL, MELAKA

Tel : 014-2202689

Fax : 06-3323033

Email : info@tonnka.com

Website : https://www.tonnka.com/

Vision and mission

Vision : *To be a preferred integrated solution and service provider in the fully custom made manifold industry.*

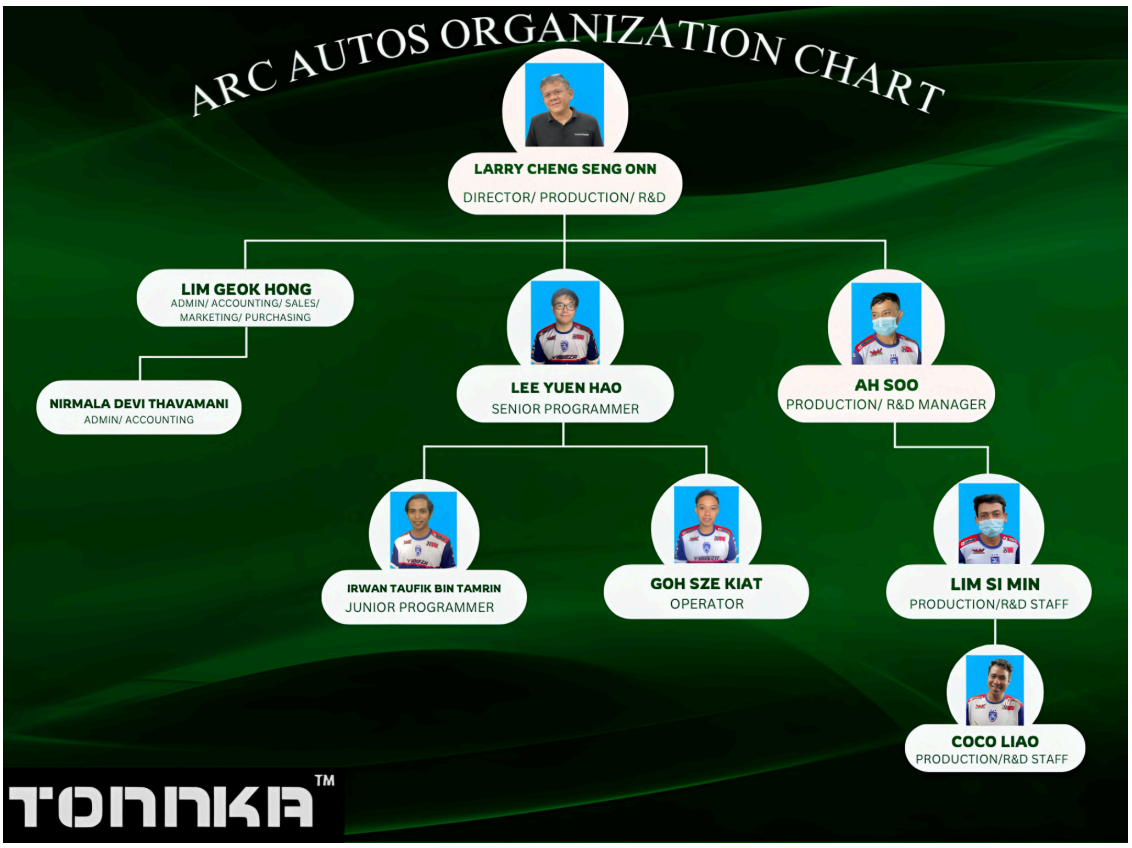
Mission : *To design and produce top-tier drift cars that meet the highest standards of performance and reliability. Through continuous research and development, we aim to innovate and refine our vehicles, offering unparalleled driving experiences. We are committed to empowering motorsport enthusiasts and professional drivers alike by delivering customizable, high-performance solutions, while prioritizing sustainability and safety in every aspect of our production.*

Company working hours

Monday	9:00 AM	6:00 PM
Tuesday	9:00 AM	6:00 PM
Wednesday	9:00 AM	6:00 PM
Thursday	9:00 AM	6:00 PM
Friday	9:00 AM	6:00 PM
Saturday	9:00 AM	6:00 PM
Sunday	Weekend holiday	

Table 1 : Company working hours

Organization Chart



Nature of business

ARC AUTOS Engineering & Trading is an engine modification company that provides premium source for true competition racing header, intake manifold, exhaust manifold & turbo manifold. Our company custom makes every kind of manifold. Our product name is TONNKA. At the moment we sponsor a number of top drifters in Malaysia, they are Tengku Djan (Head of R3), Ivan Lau & Tan Tak Wei, and other drifter and drag racers, their feedback is very positive.

Our company uses the finest materials in producing our manifolds. We are supported by our experienced employees and expertise in this industry in order to produce a second to none manifold in this competitive industry. We specialize in custom made exhaust manifolds, and we can solely tailor make them to fit your engine and help your engine reach its top efficiency.

Discover a diverse range of exceptional products offered by this company, including the following :

Table 2 : Company's product

1JZ Side Mount Turbo T3 twin scroll with wastegate pipe (S13/180sx)	
4G63-T Turbo Up (B) T3 Extended (Evo1-3)	
Race Pedal Box (Aluminium)	
Surge Tank (Billet) 1.5Litre	
2jzgte Duel Fuel Rail Intake Manifold	
Flatwell Metal Head Gasket RB26dett Combination Set	

The company offers 18 product types on the TikTok Shop platform, 86 products on the Shopee platform, and 88 product types available through its official website.

Bankers

- Malayan Banking Berhad

Company Awards

Figure 2 : Company's award trophies

- Champion 2WD Turbo Otr Cyberjaya (1/11/2009)
- 1st Runner Up Class-G MUSC Drag Challenge (16/1/2010)
- Champion 2WD Turbo Open Cyberjaya R6 (19/6/2010)
- KBS-Fx Open Asia Drift Challenge (1/10/2010)
- Federal Open Drift Championship (24/9/2011)
- Ace Drift Challenge Final Round Champion (23/10/2011)
- Champion Ace Drift Challenge R3 Expert Category (20/4/2013)
- Malaysia's Grass Root Phantom Chase 1st place (13/6/2015)
- King Of Asia Drift 2016 Round 2 Champion (12/6/2016)
- 1st Runner Up MIMC Melaka AE86 Track (4/8/2018)

2.2 HEADQUARTERS LOCATION

Our main office is on the second floor of the 1st building and is located in Durian Tunggal Melaka.

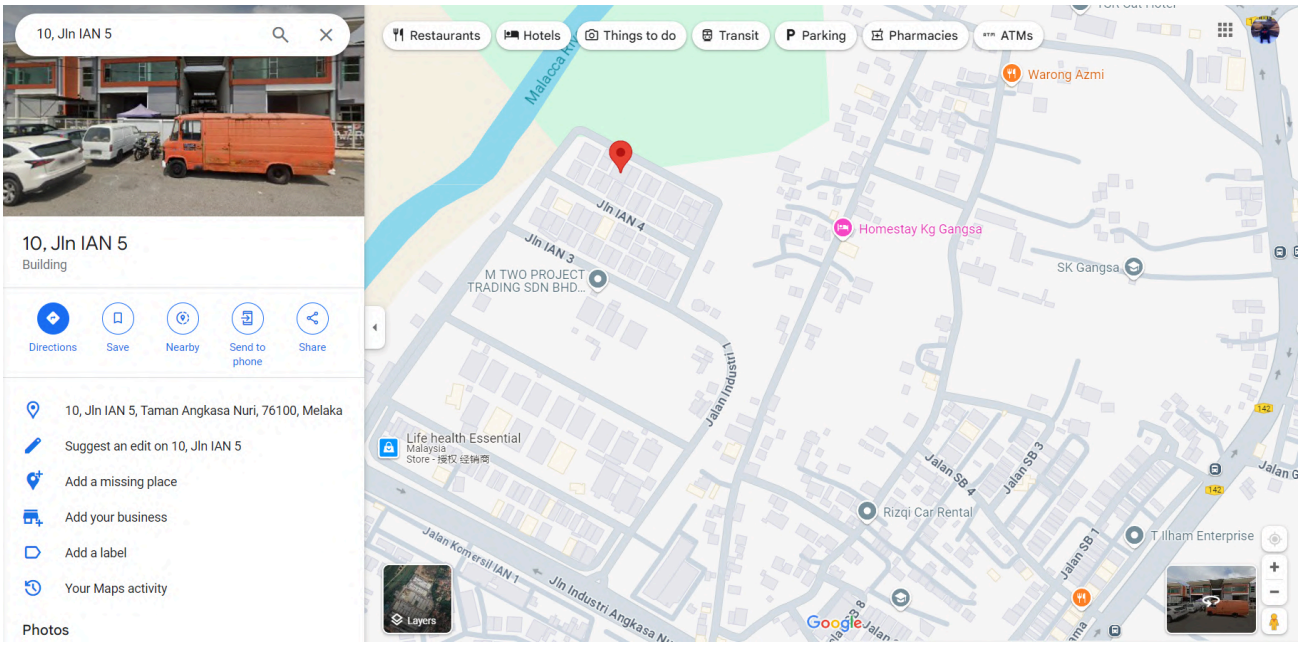


Figure 3: Location of Arc Autos (M) Sdn. Bhd. headquarters based on maps

Figure 4: Arc Autos (M) Sdn. Bhd building

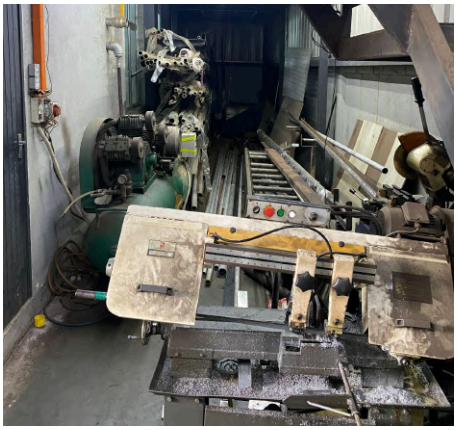
Figure 5: Main office

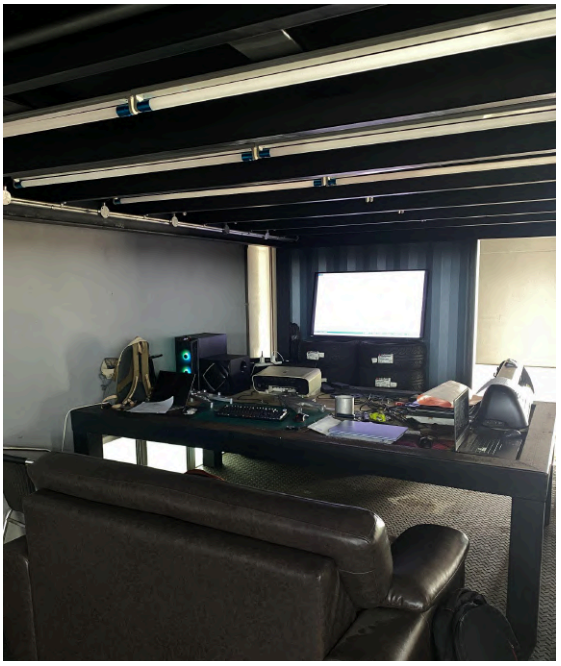
2.3 TRAINING LOCATION

The training and R&D locations are also in the same location but in the 2nd building.

Figure 6: Location of industrial training

Table 3: Industrial Training Department

Department	Figure
CNC Machining	
Conventional machining	
Polishing	
Cutting	

Welding	
R&D and Assembly	
Design and CAD/CAM	

3.0 TRAINING ACTIVITIES

3.1 CNC Milling Machine Operation and Maintenance

During my industrial training, I was granted the opportunity to operate four out of the six CNC milling machines available: the FANUC ROBODRILL Series 1i-Model A, Mitsubishi M-V5CN, AWEA HF-1000, and TIDA MV-800. These experiences provided me with practical hands-on knowledge of different CNC technologies, significantly enhancing my technical skill set and understanding of precision machining. Throughout the process of learning how to operate this CNC machine, I worked with two types of materials: iron and aluminium. This exposure allowed me to understand the distinct machining properties and handling requirements of both materials.

3.1.1 FANUC ROBODRILL Series 1i-Model A

I had the opportunity to learn and operate this CNC model as early as the first week of my training. During that time, the machine was utilized to produce mounting brackets for motorcycle monoshock, providing me with early exposure to practical applications of CNC machining.

Figure 7: **FANUC ROBODRILL Series 1i-Model A CNC Machine**

Figure 8: Securing material process

Figure 9: Mounting brackets

3.1.2 Mitsubishi M-V5CN

I had the opportunity to operate this CNC model for the first time in the production of a motorcycle arm, as well as during the finishing process. This experience provided me with a comprehensive understanding of both the initial manufacturing and final finishing stages involved in precision component production. The primary challenge I encountered was that, although the mechanical skills required to operate this machine were quite similar to those needed for the FANUC ROBODRILL CNC machine, there were notable differences. Since the material size was larger in this case, the method of securing the material was more stringent. This time, the procedure involved using two plates, compared to just one plate during the previous production week. Additionally, in the finishing stage, the Standard Operating Procedure (SOP) varied slightly. Six M6 allen key screws were required, each accompanied by a relatively thick 10mm washer. The process of securing the motorcycle arm using an M6 allen key was performed after the arm had been placed on the prepared plate.

Figure 10: Mitsubishi M-V5CN CNC Milling Machine

Figure 11: Raw material

Figure 12: Arm

Figure 13: Arm condition before finishing stage

Figure 14: Securing the motorcycle arm process

Figure 15: Arm condition after finishing stage

3.1.3 TIDA MV-800

This particular CNC model was the one I operated most frequently, handling a variety of production tasks. These included the manufacturing of motorcycle adjustable rear rack support components, the finishing stage of intake manifold chamber inlets, monoshock brackets, finishing stage for T10 turbo flanges , and the finishing stage of adjustable motorcycle rear rack plates. There are two primary techniques for securing materials to this CNC machine: using a vise handle or employing Allen key screws. The choice of method depends on the type of material, the stage of the process, and the programming settings established by the programmer.

When I operate the monoshock bracket during manufacturing stage , this is the step that must be followed in tying the material before running the machine ;

1. When the material has been placed in the correct position (close to the stopper), the vise handle is used to tighten the position of the material.
2. Then when the stopper is raised. The next step is to tap the surface of the material using a rubber mallet so that the bottom surface of the material is even with the plate that has been prepared.
3. Check whether the plate on the left and right of the material can move or not. If the plate can move then step 2 must be repeated until the plate cannot move.
4. Run the machine by pressing the green button on the CNC machine control panel.

Next, to secure the material using the second technique, which involves the use of an Allen key screw. I did it when i used to operate the T10 turbo flanges during finishing stage;

1. Place the turbo flange on the prepared plate
2. Next, the Allen key screws are carefully inserted into the designated holes and tightened to ensure a secure fit.I used an allen key m8 size to tighten the four allen key screws placed on each corner of the turbo flange.
3. Run the machine by pressing the green button on the CNC machine control panel.

Neglect in performing these steps perfectly will cause the cutting tools to break or the material not to be formed correctly.

Figure 16: TIDA MV-800 Milling Machine

Figure 17: Securing process

Figure 18: Rubber mallet

Figure 19: Vise handle

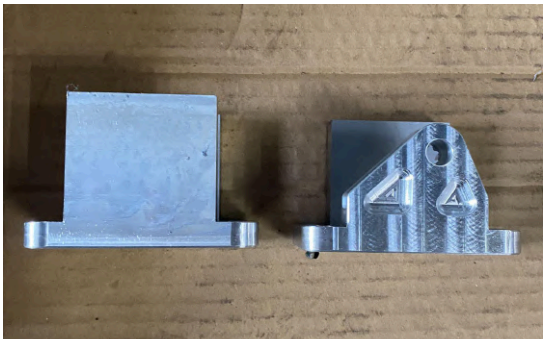


Figure 20: Condition of monoshock bracket before and after process

Figure 21: T10 turbo flanges condition before finishing stage

Figure 22: Securing Process

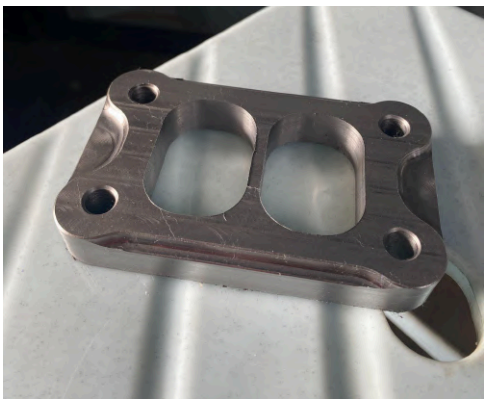


Figure 23: T10 turbo flanges condition after finishing stage

3.1.4 AWEA HF-1000

Lastly, I had the opportunity to operate the AWEA HF-1000 CNC milling machine, which I used primarily for the manufacture of exhaust flanges and intake manifold chamber inlets. This machine is predominantly utilized during the manufacturing stage and is less frequently employed in the finishing stage. The material most commonly processed on this machine is iron. Since the AWEA HF-1000 is predominantly used in the manufacturing stage, the materials, such as exhaust flanges and intake manifold chamber inlets, are secured using a vise handle and a rubber mallet. The process of securing these components is similar to that used with the TIDA MV-800 machine. However, due to the nature of iron, which is more challenging to secure compared to aluminium, each step must be executed with greater force and precision. Iron requires more energy and a stricter approach to ensure proper fastening and stability during the machining process. The iron dimensions used for manufacturing the exhaust flanges were $70 \times 50 \times 15\ mm$, while the intake manifold chamber inlets were significantly larger, measuring $295 \times 75 \times 15\ mm$. This size difference further necessitated more rigorous securing methods and adjustments in the machining process.

Figure 24: AWEA HF-1000 CNC milling machine

Figure 25: Securing process Figure 26: Raw material

Figure 27 :Exhaust flanges

Figure 28 :Rawr material Figure 29 :Intake manifold chamber

3.1.5 CNC Machine Maintenance

Regular maintenance of CNC milling machines is essential to ensure optimal performance and extend the machine's lifespan. Proper upkeep not only enhances operational efficiency but also contributes to the longevity and reliability of the

equipment. So during the maintenance process, I undertook several tasks to ensure the CNC milling machine remained in optimal working condition. These tasks included:

1. **Starting the Machine:** I followed the prescribed procedures to initiate the CNC milling machine, ensuring all preliminary checks were completed before powering it on.

2. **Mixing Coolant:** I mixed CM2000 oil with water to prepare the appropriate coolant solution for use in the CNC machine. This involved ensuring the correct ratio of coolant to water for optimal performance.

3. **Filling the Coolant:** I learned the proper method for filling the coolant reservoir, a critical step for maintaining optimal machine temperature and performance during operation.

4. **Identifying a Good Coolant Level:** I became proficient in assessing the coolant level, ensuring it was maintained within the recommended range for effective machine cooling and lubrication.

5. **Using the Button Program on the CNC Machine (Manual Operation):** I gained experience in utilizing the button program for manual operation, which allowed for precise control and adjustment of the machine's functions.

6. **Cleaning the Machine Before It Stops Operating:** I performed routine cleaning of the machine to remove debris and residues, ensuring it remained in good condition and ready for the next operation.

7. **Shutting Down the CNC Machine:** I followed the correct shutdown procedures to safely power down the CNC machine, ensuring that all systems were properly deactivated and secured.

8. **Refuelling SW-68 Oil:** I refuelled the machine with SW-68 oil when alerted by the machine’s alarm system, following proper procedures to ensure the correct oil levels were maintained.

9. **Opening the Spindle for Changing CNC Cutting Tools:** I accessed and opened the spindle to replace CNC cutting tools, following safety protocols and ensuring the new tools were correctly installed and secured

10. **Replacing Carbide Inserts for CNC Turning Machine**s: I performed the replacement of carbide inserts in CNC turning machines, including the removal of old inserts, cleaning of the tool holder, installation of new inserts, and ensuring proper alignment and security.

Figure 30: Cleaning alloy washers

Figure 31: Mixing coolant

Figure 32: CNC machine control panel

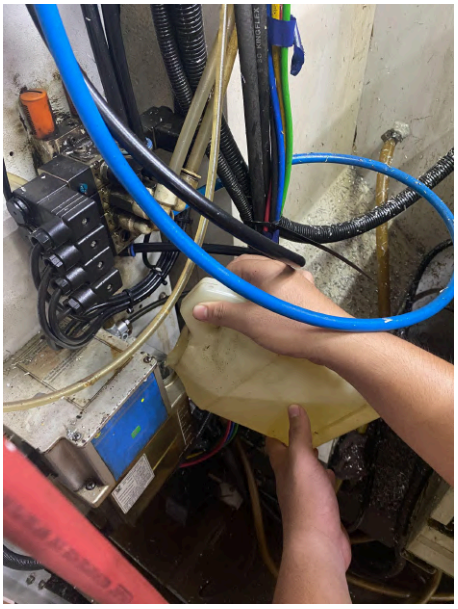


Figure 33: Refuelling SW-68 Oil

Figure 34: Opening the Spindle

Figure 35: Replacing Carbide Inserts for CNC Turning Machines

3.2 DESIGN AND SOFTWARE

During my industrial training, I specifically learned and utilized three types of software: SolidWorks 2024 for creating detailed designs and sketches, MasterCam X9 for generating toolpaths and machining instructions, and EZCAD3 for laser marking and engraving applications. This hands-on experience with these programs provided a comprehensive understanding of the entire workflow from design to production.

3.2.1 SolidWorks 2024 program

During the second week of training, our supervisor Mr. Larry taught us how to draw and sketch the products produced at the factory using the SolidWorks 3D program. We also learned how to integrate SolidWorks with the MasterCam program, which allowed for a seamless transition from design to machining. In week 4 , I was assigned the task of sketching a panel switch bracket designed for installation in a Toyota GR 86 car. This involved creating precise and detailed designs to ensure the bracket would fit and function effectively within the vehicle.

Figure 36: Learning session

Figure 37: Sketching panel switch bracket

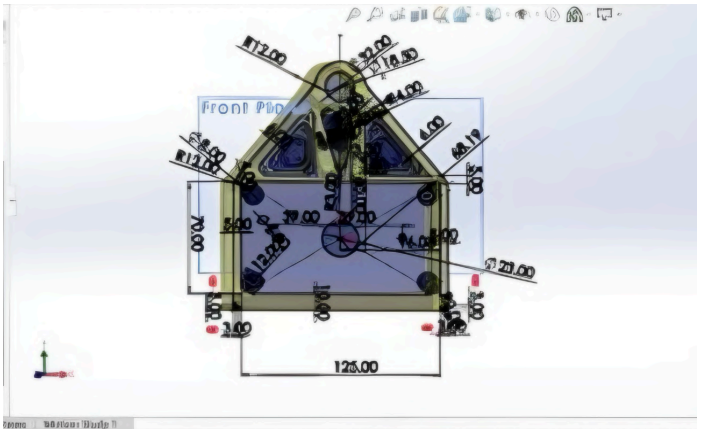


Figure 38: Panel switch bracket dimension

3.2.2 MasterCam X9 program

On the second day of the fifth week, I received an explanation and hands-on training on the MasterCam X9 program. Mr. Irwan Taufik, a staff member and programmer at our factory, provided the instruction. He demonstrated that in the industry, CNC machines are not directly used for producing items still in the R&D process due to the high costs involved.

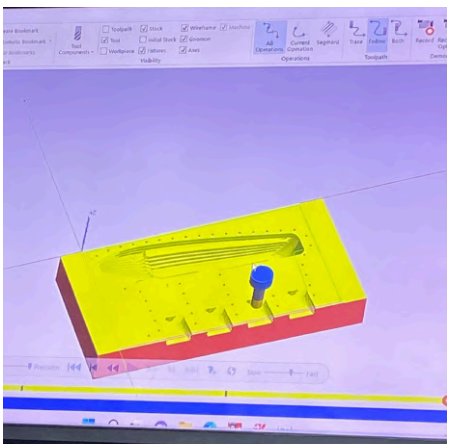


Figure 39: Toolpath animation

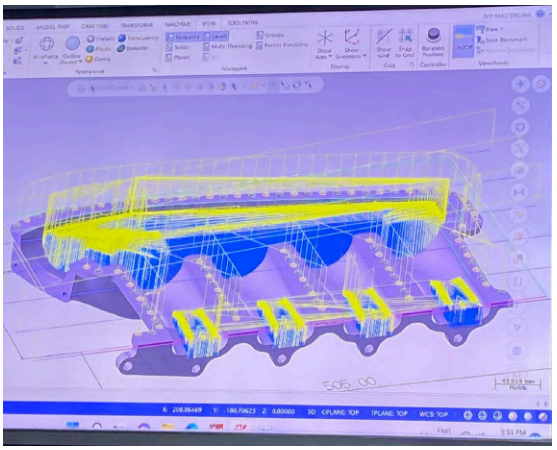


Figure 40: Backplot

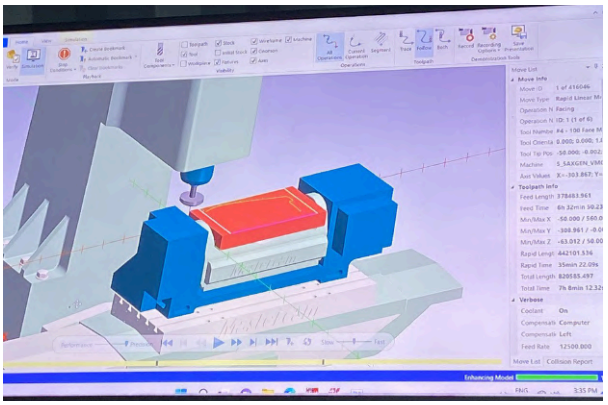


Figure 41: Cutting simulation

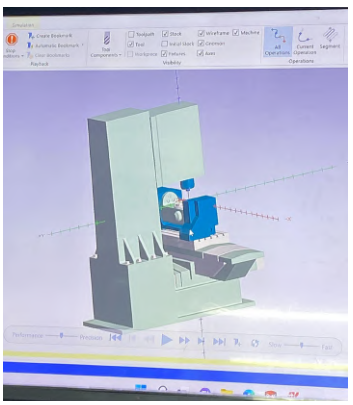


Figure 42: Milling simulation

3.2.3 EZCAD3 program

I began learning to use EZCAD3 software for laser marking on the last day of the second week of my industrial training. By the seventh week, I was assigned the task of engraving the brand name "TONNKA" and the thread code onto custom hex screw nuts using the software. I successfully completed the engraving process for a total of 110 screw nuts.

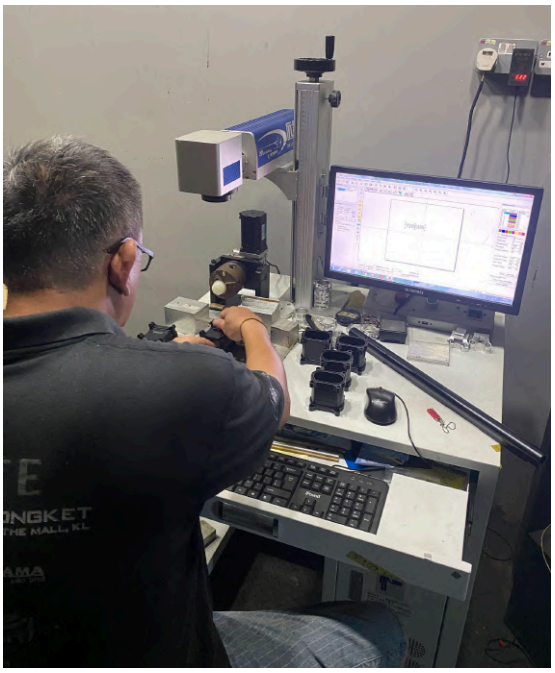


Figure 43: Learning session

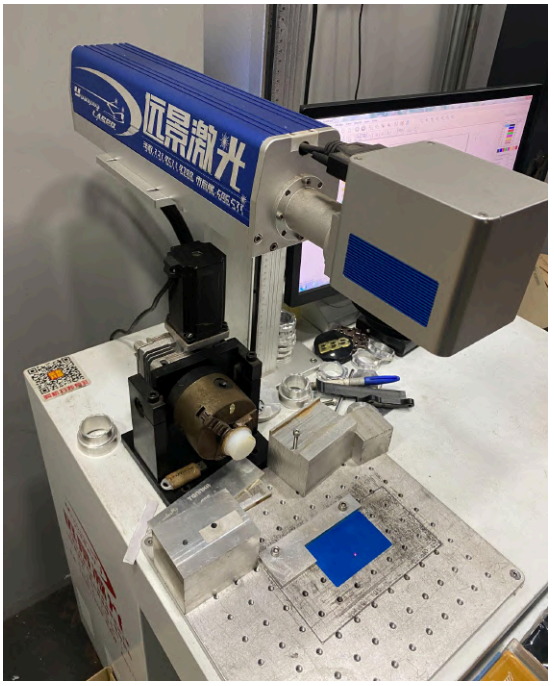


Figure 44: Laser marking machine

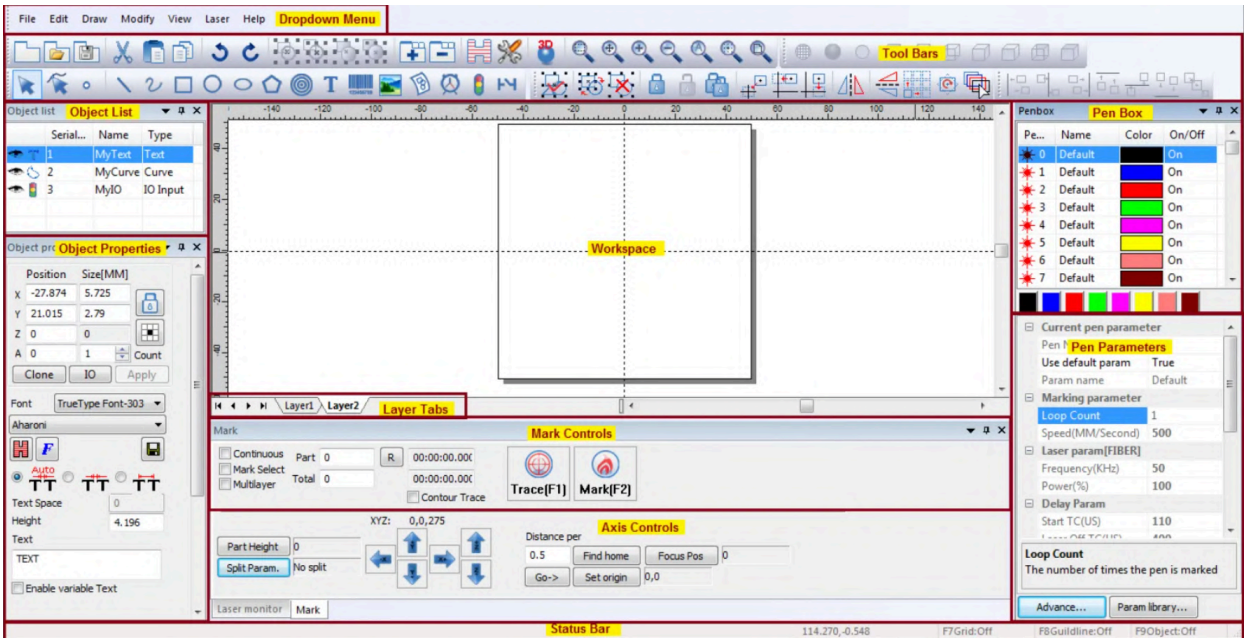


Figure 45: EZCAD3 software interface

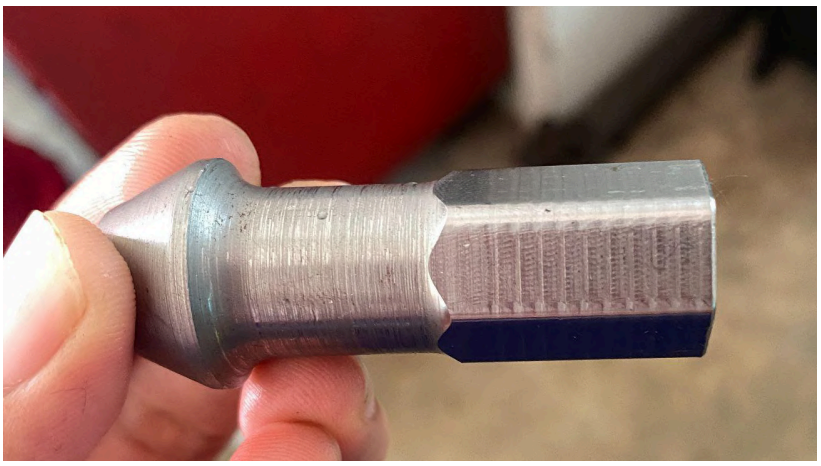


Figure 46: Nut condition before engraving process

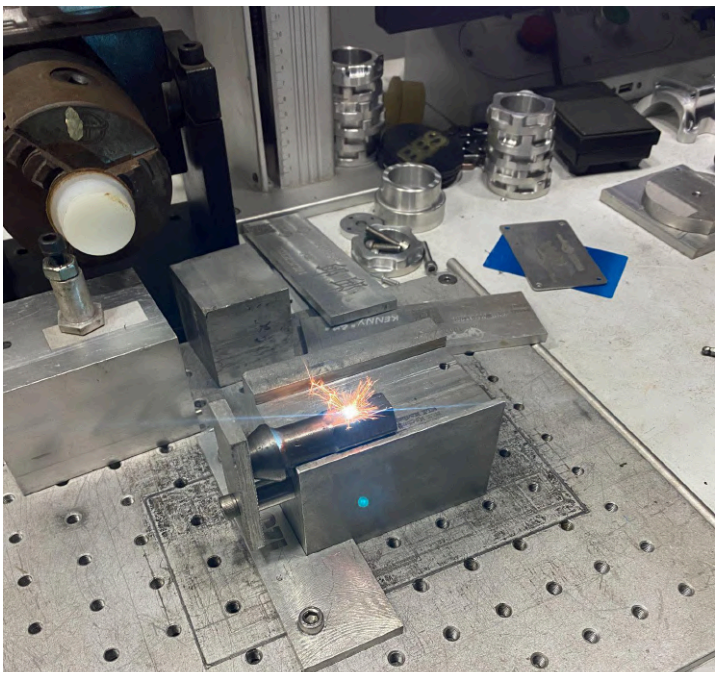


Figure 47: Engraving process

Figure 48: Nut condition after engraving process

3.3 Cutting, grinding and polishing

3.3.1 Cutting

In the second week of my internship, I was assigned to perform the cutting process utilising a circular saw. This task involved precision cutting of seven aluminium rods, each measuring 5 metres in length, into segments of 20 centimetres each. In the seventh week of my internship, I was tasked with performing the cutting process once again, this time using a metal-cutting bandsaw. The assignment involved cutting a total of 20 pieces, which were prepared for the manufacture of exhaust flanges.

Figure 49: Cutting using circular saw

Figure 50: Metal-cutting bandsaw

3.3.2 Grinding

During the second week of my internship, after completing the cutting process, I was assigned to handle the grinding process using a circular grinding machine. This task involved removing the marks left from the previous cutting operations to achieve a smooth and finished surface on the workpiece.

Figure 51: Condition workpiece before and after grinding process

Figure 52: Circular grinding machine

3.3.3 Polishing

I managed the polishing process using a bench-mounted polishing machine. The objective of this task was to smooth the surface of our hex screw nuts, ensuring that the engraving of the brand name "TONNKA" and the thread code was clearer and more distinct.

Figure 53: Condition before and after polishing process

Figure 54: Polishing process using bench-mounted polishing machine

3.4 Conventional lathe and vertical milling machine

I was instructed by the staff and provided the opportunity to operate a conventional lathe machine for the manufacturing of bonnet pins. Additionally, I gained experience operating a vertical milling machine, which was utilized for manually drilling holes in our monoshock bracket products.

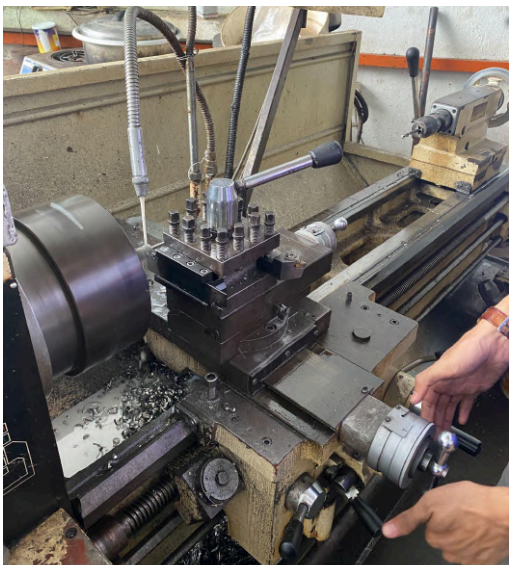


Figure 55: Conventional lathe machine

Figure 56: Hood pin

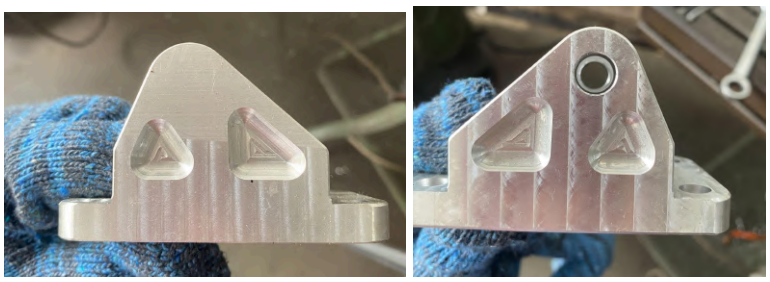


Figure 57: Monoshock bracket condition before and after drilling process

Figure 58: Conventional vertical milling machine

3.5 Manual Thread and Power Tapping

Initially, I was instructed to use the Pneumatic Tapping Machine to perform the thread-cutting process on the support component of the adjustable motorcycle rear rack. This method was employed to improve efficiency and precision during production. However, upon delivery to the customer, we received feedback indicating that the thread depth produced on the support components did not correspond with the length of the provided screws. Consequently, 600 support components were returned.

Solution taken ;

To address this issue, a corrective measure was implemented. We reverted to manual thread tapping, utilizing a Tap Wrench (T-handle wrench) to manually cut the threads and ensure the required depth was achieved. This approach allowed us to rectify the issue and meet the customer's specifications.

Figure 59: Power tapping Figure 60: Manual thread tapping

Figure 61 : 600 units of the support components were returned

3.6 Work Project

During my industrial training at ARC AUTOS, several significant projects were undertaken, including the Proton R3, Yamaha Y1000ZR, Honda C70, Mitsubishi Lancer Evolution 5, and others. These projects were highly complex, requiring renovation and improvement processes that involved skills such as welding, grinding, cutting, fitting, painting, tapping, wiring, cleaning, and polishing.

However, the project in which I was directly involved was the reassembly of the Mitsubishi Lancer Evolution 5, which took approximately two weeks to complete. This hands-on experience provided me with valuable technical and practical skills in vehicle restoration and assembly.

Project Timeline: Mitsubishi Lancer Evolution 5 Reassembly

1. **Surface Preparation: Sanding and polishing the surface to ensure a smooth base for the coating process.**

   I prepared the workspace by setting up a clean, well-lit area and gathering the necessary tools, including sandpapers of 150, 240, 600, and 800 grit, sanding blocks, and water for wet sanding. I began with 150-grit sandpaper to remove paint, rust, and surface imperfections, followed by 240-grit sandpaper to smooth the surface further. Wet sanding with 600-grit sandpaper refined the surface and reduced scratches, while the final step with 800-grit sandpaper provided an ultra-smooth finish, ensuring optimal preparation for priming and paint adhesion.

Figure 62 : Polishing process

2. **Primer Coating: Applying primer to protect the surface and enhance paint adhesion.**

   The priming process involved using a spray gun to apply an even coat of primer to the prepared surfaces. Masking techniques were used to prevent overspray. Multiple thin coats were applied, with adequate drying time between each to ensure good adhesion and coverage. After priming, the surfaces were checked for imperfections, and touch-ups were made to ensure a smooth finish. This step was essential for preparing the components for the final paint application.

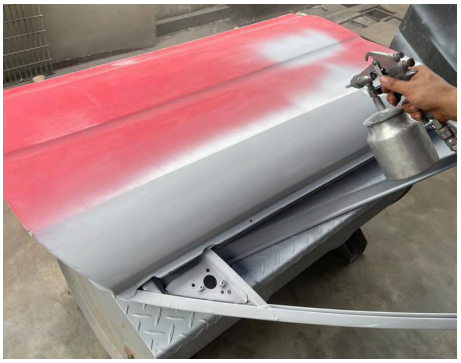


Figure 63 : Priming process

3. **Frame Work: Applying simen to the frame for reinforcement and restoration.**

   I was introduced to the cement technique, which involves applying filler to address deeper imperfections such as dents and uneven surfaces. I learned to mix and apply the filler evenly, then smooth it before sanding**.**

Figure 64 : Applying the filler.

4. **Painting: Full-body painting to restore the vehicle's exterior.**

   For the painting process, lime green paint was selected. The paint was thoroughly mixed to ensure consistent pigmentation and prevent uneven application, avoiding patches or streaks. I then applied the first coat, ensuring an even and smooth application. Proper spraying techniques were used to cover all areas without dripping. Paint thickness and coverage were monitored, with adequate drying time allowed between coats to achieve a professional finish.

Figure 65: Painting process

5. **Engine Component Cleaning:**

   Cleaning and inspecting key engine components, including the drive shaft, gearbox transfer case, and radiator. The liquid used for cleaning the engine components is petrol.

Figure 66: Cleaning process

Figure 67: Engine components

6. **Assembly: Reassembling various car components.**

   Installation :

- Door
- Front hood
- Front and rear bumpers
- Spoiler and side skirt
- Air scoop
- Door rubber seals
- Bonnet spring
- Seat
- Tyre and Rims

Lighting and Electrical Components:

- Rear and front lamps
- Brake lamps
- Signal lights
- Power window system
- Internal car lamp

7. **Fitment and Interior Work:**

- Fit alignment for proper door, hood, and bumper positioning
- Dashboard installation
- Armrest and gear cover fitting
- Installing the car ceiling and handle

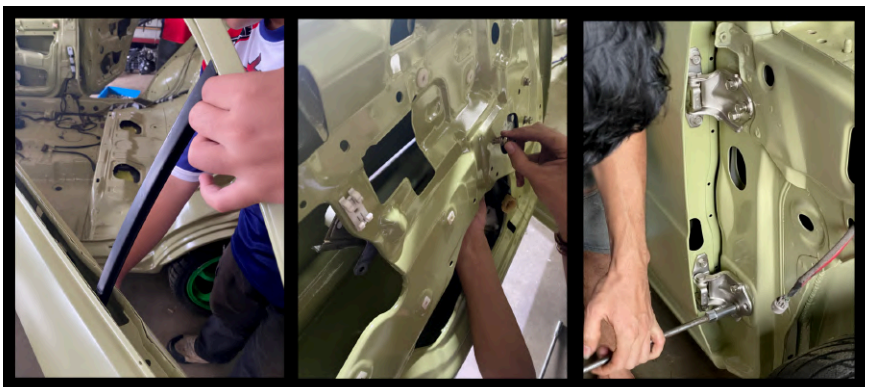


Figure 68 : Installation of door rubber seals, power window and car door

Figure 69 : Installation of air scoop, rear lamp and front bumper

Figure 70 : Installation of dashboard, brake lamp and internal car lamp

Figure 71 : The difference between the car's condition at the start of the project and after its completion.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

In summary, my internship at ARC AUTOS (M) SDN BHD has provided me with invaluable experience within a corporate environment. This hands-on training has not only enriched my understanding of industrial practices but also enhanced my technical skills. As an undergraduate, I am confident that this experience will significantly benefit my remaining Bachelor's studies and effectively prepare me for a successful career as an engineer. I have acquired a diverse range of engineering processes and techniques during my internship, alongside practical experience in manufacturing and assembling parts. Additionally, I have gained valuable insights into management structures, work codes, and organizational culture.

My capacity for logical reasoning and critical thinking has significantly improved through the resolution of various industrial challenges, as well as dealing with the repercussions of incorrect decisions. Additionally, experiences such as collaborative problem-solving and knowledge-sharing sessions have enhanced my interpersonal skills within a professional environment. The past ten weeks have been exceptionally rewarding, both in terms of what I have observed, learned, and accomplished. I would like to extend my gratitude to ARC AUTOS (M) SDN BHD for providing me with this invaluable opportunity.

4.2 RECOMMENDATIONS

Before commencing industrial training, students should ensure they are mentally and physically prepared, as the experience presents a distinct departure from campus life. Students must ensure proper physical preparation by providing course-specific equipment. For mechanical engineering, this includes safety boots and jackets, though some companies may offer these items. Responsibility for meeting safety standards ultimately lies with the student. The internship environment introduces numerous new challenges, underscoring the value of an extended internship program for gaining comprehensive benefits for future careers. Additionally, it is important to recognize that this internship experience significantly enhances and broadens one's understanding of the industry.

BORANG PENGESAHAN LAPOR DIRI
REGISTRATION CONFIRMATION

FORM A

UTeM (ISO)/PP/PK04/F9

MAKLUMAT PELAJAR *(STUDENT INFORMATION)*

Nama *(Name)*: Muhammad Fathul Hadi Bin Mohd Nizam

No. Matrik *(Matrix No.)*: B042110138

No. Kad Pengenalan: 010415021081
(IC / Passport No.)

Alamat E-mel: hadinizamutem02@gmail.com
(Email Address)

Alamat rumah (semasa latihan): B156, Taman Permai Bistari, Sungai Lalang 08100, Kedah
(Address-during training)

Poskod *(Postcode)*: 08100

Negeri *(State)*: Kedah

No. Telefon Pejabat *(Office Tel No.)*: -

No. Tel Bimbit *(H/p No.)*: 019-8803354

Tarikh Mula Latihan: 15/7/2024
(Training Start Date)

Tarikh Tamat Latihan: 20/9/2024
(Training End Date)

Elaun diterima: RM 400 sebulan *(per month)*
(Allowance received)

Biasiswa *(scholarship)*: -

**Borang ini hendaklah dihantar ke Penyelaras Latihan Industri Fakulti (PLIF), UTeM dalam seminggu selepas melapor diri*
(This form should be sent to Faculty Industrial Training Coordinator within one week after reporting for training)

MAKLUMAT INDUSTRI *(INDUSTRY INFORMATION)*

Nama Pegawai Dihubungi *(Name of Liaison Officer)*: MS LIM GEOK HONG

Jawatan *(Designation)*: ADMIN EXECUTIVES

Alamat Emel: info@tonnka.com
(Email Address)

Alamat *(Address)*: NO.10, JALAN IAN5, INDUSTRI ANGKASA NURI, DURIAN TUNGGAL

Poskod *(Postcode)*: 76100

Negeri *(State)*: MELAKA

No. Pendaftaran Syarikat (ROC): 899427-H

No. Telefon *(Tel No.)*: 06-3323033 / 014-2202689

No. Faks *(Fax No.)*: 06-332 3033

***Sektor Industri:** 32
(Industry Sector)

***Kategori Industri:** 4
(Industry Category)

(*Sila rujuk senarai kod *Please refer to the code listing***)**

Nama Penyelia Industri: MR LARRY CHENG SENG ONN
(Name of Industry Supervisor)

Jawatan *(Designation)*: DIRECTOR

Alamat Emel: info@tonnka.com
(Email Address)

Tandatangan Pelajar
(Student's Signature)

Tandatangan Penyelia Industri
(Industry Supervisor's Signature)

Cop Industri:
(Industry Stamp)

ARC AUTOS (M) SDN BHD
(899427-H) (GST No: 001447837696)
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76100 Durian Tunggal, Melaka.
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

INDUSTRIAL SUPERVISOR EVALUATION FORM
FACULTY OF MECHANICAL TECHNOLOGY AND ENGINEERING

03B	Course:
	BMKC3915
	LI-FTKM/03B/2024

STUDENT DETAIL

Student Name:

Matric No.: Session/Seksyen: Program :

Company Name:

Company Category/Status:

☐ Government ☐ GLC Company ☐ Multi-National Company ☐ SME ☐ Private Sector ☐ Statutory Body

EVALUATION (50%)

** To be filled by Industrial Supervisor based on observation of the student capabilities, etiquettes, disciplines and logbook :-*
** Circle (O) only one option for each question :-*

Q.1 Does the student capable to demonstrate his technical knowledge at the training site and capable to adapt and learn new knowledge from the industrial training? (LO1, PO1) - 14 Marks

Very excellent in demonstrating technical skills and knowledge with additional / detail information. Could adapt and learn very fast new knowledge from the industrial training. *Sangat cemerlang dalam memperlihatkan kemahiran teknikal dan pengetahuan dengan maklumat tambahan dan terperinci. Mampu menyesuaikan diri dan mempelajari pengetahuan baru dengan cepat melalui latihan industri.*	14
Excellent in demonstrating technical skills and knowledge with additional / detail information but could not adapt and learn very fast new knowledge from the industrial training. *Cemerlang dalam memperlihatkan kemahiran teknikal dan pengetahuan dengan maklumat tambahan dan terperinci, tetapi kurang berupaya menyesuaikan diri dan mempelajari pengetahuan baru dengan cepat melalui latihan industri.*	12
Good in demonstrating technical skills and knowledge and capable to learn a few new knowledge with supports. *Baik dalam memperlihatkan kemahiran teknikal dan pengetahuan serta berupaya untuk mempelajari beberapa pengetahuan baru dengan sokongan.*	10
Good in demonstrating technical skills and knowledge but could only adapt and learn a few knowledge from the training. *Baik dalam memperlihatkan kemahiran teknikal dan pengetahuan, tetapi hanya berupaya menyesuaikan diri dan mempelajari beberapa pengetahuan daripada latihan industri.*	8
Could demonstrate technical knowledge and skill but could not adapt or learn new knowledge from the training. *Boleh memperlihatkan pengetahuan dan kemahiran teknikal, tetapi tidak dapat menyesuaikan diri atau mempelajari pengetahuan baru daripada latihan industri.*	6
Could demonstrate technical knowledge but lack of technical skilled being applied. It is hard to adapt and learn new knowledge from the training. *Boleh menunjukkan pengetahuan teknikal tetapi kurang mengaplikasikan kemahiran teknikal. Ia sukar untuk menyesuaikan diri dan mempelajari pengetahuan baru daripada latihan industri.*	4
Capable to demonstrate technical knowledge but no technical skill being applied. No new knowledge gained from the training. *Boleh menunjukkan pengetahuan teknikal tetapi kurang mengaplikasikan kemahiran teknikal. Tiada pengetahuan baru yang diperoleh daripada latihan industri.*	2
Not capable to demonstrate technical knowledge and skill at the training site. No new knowledge gained from the training. *Tidak mampu untuk menunjukkan pengetahuan teknikal dan kemahiran di tempat latihan. Tiada pengetahuan baru yang diperoleh daripada latihan industri.*	0

Q.2 Does the student show awareness and follow the Company rules and etiquettes? (LO2, PO8) - 6 marks

The student fully understands and follows the company rules and etiquette *Pelajar memahami sepenuhnya dan mengikut peraturan dan etika syarikat.*	6
The student understands the Company rules but has not followed a few work etiquettes. *Pelajar memahami peraturan syarikat tetapi tidak mengikuti beberapa etika kerja.*	4
The student understands Company rules and etiquettes but has not followed a few rules. *Pelajar memahami peraturan syarikat dan etika, tetapi tidak mengikutinya dengan teliti dalam beberapa perkara.*	2
The student has not followed Company rules and etiquettes. *Pelajar tidak mengetahui dan mengikuti peraturan dan etika syarikat.*	0

Q.3 Does the student demonstrate good communication skills? (LO3, PO9) - 15 Marks

The student has delivered ideas that are clear and focused; relevant, well-organized / and well-structured with details. *Mampu menyampaikan idea dengan ayat yang jelas, berkaitan, tersusun, dan terperinci dengan butiran.*	15
The sudent has deliver ideas that are good in term of contents, method and quality but lack of details. *Penyampaian idea yang baik berkaitan kandungan, cara dan kualiti tetapi kurang terperinci.*	10
The student has deliver ideas that are weak in term of contents, method and quality. *Penyampaian idea yang lemah berkaitan kandungan, cara dan kualiti.*	5
The student was not capable of delivering any ideas. *Tidak berupaya menyampaikan sebarang idea.*	0

Q.4 Does the student demonstrate good team spirit at the training site? (LO4, PO10) - 10 Marks

The student consistently listens to, shares with, and supports the efforts of others. They also strive to maintain effective teamwork. *Selalu mendengar, berkongsi dan menyokong usaha ahli kumpulan. Sentiasa menggalakkan kerja berkumpulan.*	10
The student listen to, share with, and support the efforts of others. *Selalu mendengar, berkongsi dan menyokong usaha ahli kumpulan.*	5
The student frequently listens to, shares with, and supports the efforts of others, but occasionally falls short of being an effective team member. *Boleh mendengar, berkongsi dan menyokong ahli kumpulan. Kadangkala kurang menjadi ahli kumpulan yang efektif.*	2
The student rarely listens to, shares with, and supports the efforts of others. Often, they are not a good team member. *Jarang menunjukkan minat kerja berkumpulan. Bukan ahli kumpulan yang baik.*	0

Q.5 Does the student demonstrate lifelong learning activities? (LO5, PO11) - 5 Marks

The student is capable of searching information, managing and formulating the information. *Berkemampuan mencari, mengurus dan mengelola maklumat.*	5
The student is only capable of managing information and formulating it. *Berkemampuan mengurus dan mengelola maklumat.*	2
The student is not capable of searching and managing information properly. *Tidak tahu mencari dan menguruskan maklumat dengan betul.*	0

03B (/ 50)

Comment/Suggestion:

_____

_____

_____

Evaluated by: **Date:**

Name:_____

Position: _____

Signature:_____

Company Stamp:

Proposed Result: **Pass / Fail**