A TECHNICAL REPORT

ON

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

UNDERTAKEN AT

MINISTRY OF WORK AND TRANSPORT

VIO OFFICE ALONG POST OFFICE ROAD

BY

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SUBMITTED TO THE DEPARTMENT OF MECHANICAL ENGINEERING, FACULTY OF INSTITUTE OF TECHNOLOGY, KWARA STATE POLYTECHNIC P. M.B 1375, ILORIN, KWARA STATE.

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5TH AUGUST, 2024 TO 5TH DECEMBER, 2024.

CERTIFICATION

This is to certify that I Saliman Abdulrahman Ayinla with matriculation number ND/23/MEC/FT/0011 compiled this report based on my five months Student Industrial Work Experience Scheme at MINISTRY OF WORK AND TRANSPORT from August, 2024 to December, 2024.

…….. ……
Student's Name Student's Signature

……. …….
School based supervisor Supervisor's Signature

DEDICATION

This report is dedicated to God Almighty, to my parents Mr. And Mrs Saliman, and to my lecturers for their support to the success of my industrial training program.

ACKNOWLEDGEMENTS

I extend my gratitude to God Almighty for His favour and mercies for the duration of my industrial training program.

I appreciate the workshop staff for their support during the industrial training program. I also appreciate all the knowledge imparted in me during the program.

I am thankful to all the lecturers of the faculty of Technology for all the knowledge they've imparted in me prior to the commencement of the industrial training program. I appreciate the hard work and effort you put into ensuring I get the best that engineering has to offer.

And I am extremely grateful to my parents Mr. And Mrs. Saliman, my sponsor, for their financial support and accommodation for the duration of the program.

ABSTRACT

The Student Industrial Work Experience Scheme was established by the federal government of Nigeria with the goal of exposing students in higher institutions to practical experience and industrial skill in their course of study to prepare them for the industrial work situation they're likely to encounter after graduation. This technical report is based on the experiences gained during my four months (16 weeks) of industrial training at Ministry of Work and Transport. This report encompasses all my experiences which included but not limited to identification of vehicle faults using both system diagnostics and symptomatic deduction, replacement of various vehicle parts and best vehicle practices in order to ensure a seamless usage life.

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CHAPTER ONE

1.1 About SIWES

The Student Industrial Work Experience Scheme (SIWES) was founded by the Industrial Training Fund (ITF) to combat the issue of tertiary institution graduates lack of practical experience and appropriate skills for employment in Nigerian Industries. The scheme was founded to be a skill training program to prepare students of higher institutions for the industrial work situation that they will encounter after graduation.

The program facilitates for the transfer and application of theoretical knowledge into a practical setting. It allows for students to become exposed and acquainted with experience in handling equipment and machinery that are typically unavailable in their schools/institutions of study.

Prior to its establishment, industrialists raised a concern about the lack of appropriate practical experience in graduates who are seeking employment. This showed that the theoretical education in higher institutions was unresponsive to the needs of labour employers.

The ITF Organization made the decision to aid all interested Nigerian students and enacted the SIWES program. It was officially approved by the federal government in 1974 after which it was entirely supported by the ITF until the financial burden was too much to bear and the scheme was passed on to the National Universities Commission (NUC) and the National Board for Technical Education (NBTE) in 1979. The federal government handed over the supervision and implementation of the scheme to ITF in November 1984 and it was taken over by the ITF in July 1985, with the federal government bearing all financial responsibility.

1.2 Aims and Objectives of SIWES

The objectives of the Student Industrial Work Experience Scheme (SIWES) have been outlined in the Industrial Training Fund's Policy Document No. 1 of 1973 as:

- To provide an avenue for students in institutions of higher learning to acquire industrial skills and experience in their respective courses of study.
- To prepare students for the industrial work situation they are likely to experience after graduation.
- To expose students to work methods and techniques of handling equipment and machinery that may not be available in their institutions.
- To make the transition from school to the world of work easier, and enhance students' networks for later job placements.
- To provide students with an opportunity to apply their knowledge to real work situations, thereby bridging the gap between theory and practice.
- To enlist and strengthen employers' involvement in the entire educational process, thereby preparing the students for employment in industry and commerce.

CHAPTER TWO

2.1 Brief History of Ministry of Work and Transport

The Ministry of Works and Transport in Nigeria has a rich history. Established in 1951, the Federal Ministry of Works is responsible for planning, developing, and maintaining federal roads, bridges, and infrastructure across the country.

The Ministry is structured into eleven professional departments and eight units, each with unique responsibilities. These departments and units work together to ensure effective planning, development, and maintenance of federal roads and infrastructure. Over the years, the Ministry has undergone several transformations, with its name changing to reflect its expanding scope of responsibilities. Today, the Ministry is responsible for overseeing the construction and rehabilitation of highways, ensuring road safety standards, and coordinating with other relevant agencies and stakeholders in the transportation sector.

At the state level, ministries of works and transport also play a crucial role in developing and maintaining infrastructure. For example, the Osun State Ministry of Works and Transport is responsible for formulating policies on management of government infrastructure and transportation issues in the state.

In recent years, the Nigerian government has placed significant emphasis on developing the country's transportation infrastructure, including roads, railways, and ports. The Ministry of Transportation, established as a separate entity, oversees the development of these transportation modes, working closely with the Ministry of Works and other stakeholders. My internship at ministry of work and transport has imparted at the very least all basic knowledge needed for automobile diagnostics and treatment. A list of some of the activities carried out are:

Changing of brake pads and brake discs

Automobile Servicing

Changing of Stabilizer Rubbers and Linkages

Changing of alternator

Changing of fuel pump

Changing of fuel filter

Changing of spark plugs and ignition coil

Dismounting of Engine Block

Changing of alternator

Topping of AC gas

Changing of shock absorber

Changing of steering rack

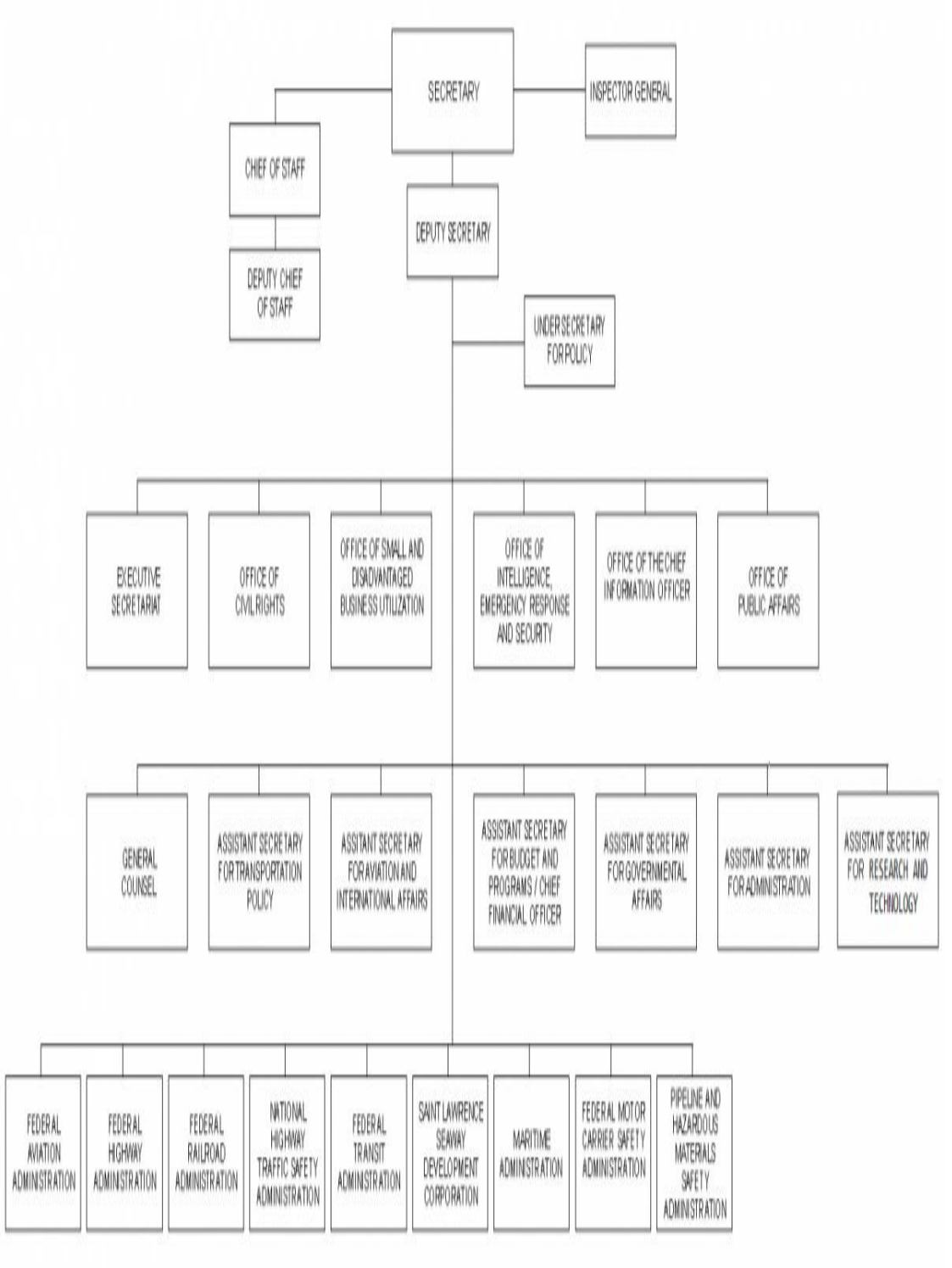
Changing of piston rings

Resetting of engine Timing

Changing of radiator

Changing of condenser

2.2 Organizational Chart for Ministry of Work and Transport



CHAPTER THREE

3.1 Toyota Corolla Automobile Systems

3.1.1 Brake System

This is responsible for slowing down and bringing the vehicle to a stop in order to avoid collisions and accidents. Toyota Corolla Automobile utilize advanced brake systems designed for safety, performance, and comfort. It involves a seamless blend of traditional and innovative systems, therefore catering to a variety of driving conditions. The brake system includes brakes on both the front and rear wheels. The front wheel brakes employ ventilated brake discs providing better heat dissipation and performance. The rear wheel brake discs on the other hand could either be solid in the older models or ventilated in the newer models.

Components of the Brake System

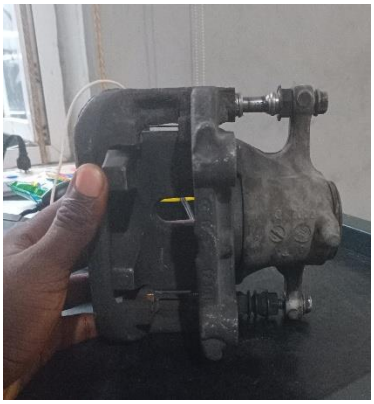
TheToyota Corolla brake system is made up of certain components in order to enable efficiency and ease of use, these components include;

Brake Pedal: This is the initiator in the brake system. The driver applies force to this pedal which initiates the braking process.

Master Cylinder: This is formed from a combination of the brake master and the brake salvo. It converts the pedal force into hydraulic pressure, which sends brake fluid to the brake callipers.

Brake Lines: These refer to the hoses which carry and distribute the brake fluid at high pressure from the master cylinder to the brake components in the wheels.

Brake Callipers: The brake callipers serve as housing to the brake pads and apply pressure to the brake discs, creating friction to slow the vehicle.



Brake Pads: These are specialized friction materials that press against the brake discs to slow down the vehicle. They also come with sensors to alert the driver when they are worn and need replacement.

Brake Discs: These are components which rotate along with the wheels. The brake pads clamp onto them and uses the friction to generate stopping power.

Aside from the above components, Mercedes-Benz has also implemented several advanced braking technologies in order to ensure stability, efficiency and safety in their brake systems.

Anti-lock Braking System (ABS):

This is a system which prevents wheel lock during hard braking, enhancing vehicle control.

Electronic Stability Program (ESP):

The ESP works in tandem with the ABS in order to maintain vehicle stability during slippery conditions.

Brake Assist: This helps to automatically apply maximum braking force in emergency situations.

Adaptive Brake Lights: Increases the brightness of the brake lights during hard braking to alert drivers behind.

Regenerative Braking

In hybrid and electric models, this system recovers energy during braking to recharge the battery. Some issues encountered on the brake system include;

- Worn out brake pads and brake sensors which warranted a replacement.
- Worn out brake discs which warranted a replacement.
- Leaking brake lines which lead to low brake oil levels causing faulty braking.
- Faulty brake master and brake salvo which caused inefficient distribution of brake fluid to brake components.

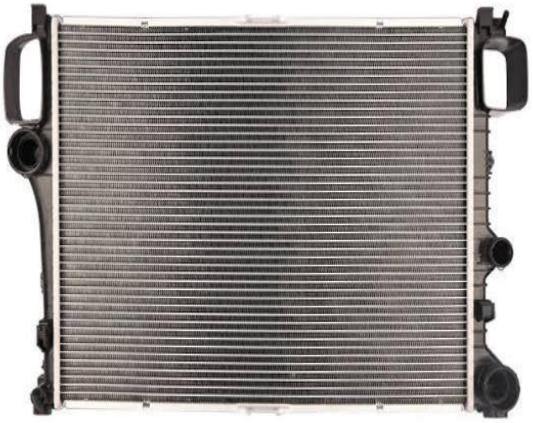
The Toyota Corolla brake system uses cutting-edge technology to provide safety, reliability, and enhanced performance. Regular maintenance and understanding of the system's features are essential for optimal vehicle operation.

3.1.2 Cooling System

The cooling system in Toyota Corolla vehicles is prided on maintaining optimal engine temperatures, ensuring efficient performance, longevity, and reliability. It prevents overheating, which can cause significant engine damage, and supports the operation of various components.

Components of the Cooling System

Radiator: This is the core component that dissipates heat from the coolant. It is composed of a series of tubes and fins that increase surface area for heat exchange. It may include a transmission cooler in some models.



Water Pump: The water pump circulates coolant throughout the engine and cooling system. It is driven by a belt connected to the engine's crankshaft. It ensures consistent flow of coolant to maintain temperature.

Thermostat: This regulates coolant flow based on engine temperature. Opens and closes based on feedback from a sensor to maintain the optimal operating temperature, preventing the engine from overheating or running too cold.

Cooling Fans: The cooling fans draw air through the radiator. It is activated based on coolant temperature or vehicle speed to enhance cooling efficiency.

Coolant Reservoir: The reservoir holds excess coolant and allows for expansion and contraction of the coolant as it heats and cools. It provides a means to check coolant levels and add fluid when necessary.

Hoses: This refers to flexible tubes that transport coolant between components. They include upper and lower hoses connecting the radiator to the engine, as well as bypass hoses.

Engine Block and Cylinder Head: The engine itself contains passages through which coolant flows. It absorbs heat from the engine and transports it to the radiator.

Heater Core: A small radiator used to provide cabin heat. It is located inside the vehicle's dashboard and uses engine coolant to warm the air that enters the cabin.

Cooling Process

The cooling process of the engine occurs in four parts;

Heat Absorption: As the engine operates, it generates heat. Coolant flows through the engine block, absorbing this heat.

Circulation: The water pump circulates the heated coolant to the radiator.

Heat Dissipation: In the radiator, air flows over the tubes, cooling the coolant as it passes through.

Return Flow: The cooled coolant returns to the engine, completing the cycle.

Thermostat Regulation: The thermostat opens or closes to control coolant flow based on the engine's temperature, ensuring it remains within the optimal range.

Some issues encountered on the cooling system include;

- Overheating due to low oil or coolant levels, faulty thermostat or faulty water pump.
- Corrosion i.e., Rusting of metal components in the engine due to use of improper coolant.
- Coolant leakages due to leaking hoses, radiator or water pump.

The cooling system in Toyota Corolla vehicles is a critical component that ensures optimal engine performance and longevity. With advanced technologies and regular maintenance, the cooling system effectively manages engine temperatures, supporting overall vehicle reliability. Understanding its components and functions can help in recognizing potential issues and maintaining the system effectively.

3.1.3 Suspension System

Suspension systems are designed to maintain vehicle stability for the driver and passenger's comfort. Mercedes-Benz automobiles possess advanced suspension systems that enhance vehicle performance, comfort, and safety. The suspension system can either be an independent suspension, multi-link suspension or an air suspension system.

Independent Suspension: Commonly used in the front and rear, allowing each wheel to move independently, improving ride quality and handling.

Multi-link Suspension: Utilized in many models, this system provides better handling and comfort by allowing more precise wheel movement.

Air Suspension: Offers adjustable ride height and improved comfort by using air springs instead of traditional coil springs.

Several key components and technologies involved in the suspension system include;

Key Technologies

Airmatic: An air suspension system that automatically adjusts the ride height and damping based on driving conditions and load.

ABC (Active Body Control): A hydraulic suspension system that actively manages body movements during cornering, braking, and acceleration, enhancing stability and comfort.

Dynamic Select: Allows drivers to choose different driving modes, which adjust the suspension settings for comfort, sportiness, or efficiency.

Components of the Suspension System

Shock Absorbers: Control the impact and rebound of the vehicle's springs, maintaining tire contact with the road.

Coil Springs and Air Springs: Support the vehicle's weight and absorb shocks from the road.

Stabilizer Bars: Reduce body roll during cornering by linking the left and right sides of the suspension system.

Control Arms: Connect the wheel hubs to the vehicle's frame, allowing for controlled wheel movement. Consists of both the upper and lower arm.

Performance Features

Adaptive Damping: Adjusts the shock absorber settings in real-time based on road conditions and driving style.

Lower Ride Height: Many models feature a lower ride height for improved aerodynamics and handling, especially in sportier variants.

Enhanced Traction Control: Integrates suspension with traction control systems to improve grip on different surfaces.

Some issues encountered on the suspension system include;

- Faulty shock absorber
- Worn bushing for the stabilizer bars
- Worn bushing for lower and upper arms

The suspension systems in Mercedes-Benz vehicles features a blend of advanced engineering and technology aimed at providing a superior driving experience. With ongoing innovations, these systems will continue to evolve, enhancing comfort, safety, and performance in future models.

3.1.4 Transmission System

This system allows for smooth and seamless switch between different gears and speed levels for an optimized driving experience. Mercedes-Benz is renowned for its cutting-edge transmission systems that enhance vehicle performance, efficiency, and driving experience. Below is a comprehensive overview of their transmission technologies and features.

Types of Transmission Systems

Automatic Transmission: Most common in Mercedes-Benz vehicles, providing seamless gear shifts without driver intervention.

Manual Transmission: Available in select models, allowing drivers full control over gear selection.

Dual-Clutch Transmission (DCT): Combines the benefits of manual and automatic transmissions for faster and smoother gear changes.

Key Technologies

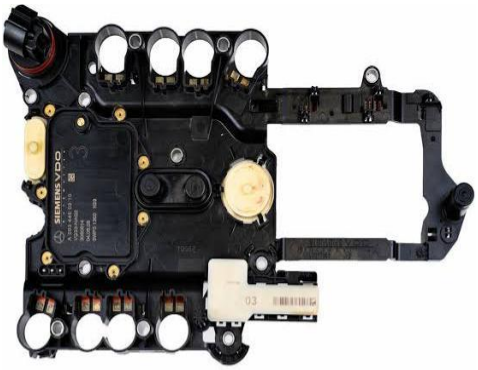
7G-Tronic: A 7-speed automatic transmission that optimizes gear shifts for improved fuel efficiency and performance. It adapts to driving styles and conditions.

9G-Tronic: An advanced 9-speed automatic transmission that enhances both acceleration and fuel economy with smooth, rapid gear changes. It also includes features like the torque converter to ensure smooth engagement and enhance efficiency and also different modes that adapt shifting patterns based on driving preferences.

AMG Speedshift: A performance-oriented version of their automatic transmissions, designed for quicker shifts and enhanced driver engagement in AMG models.

Components of the Transmission System

Transmission Control Unit (TCU): The electronic brain that controls the operation of the transmission, optimizing shift points and performance.



Gear Sets: Various gear ratios that determine the relationship between engine speed and wheel speed, influencing acceleration and top speed.

Some issues encountered on the transmission system include;

- Faulty gearbox auxiliary
- Faulty Transmission Control Unit
- Faulty Intelligent Servo Module

The transmission systems in Mercedes-Benz vehicles exemplify a commitment to performance, efficiency, and driver comfort. With ongoing advancements and a focus on future technologies, Mercedes-Benz continues to lead in the development of sophisticated transmission solutions that enhance the driving experience.

3.1.6 Ignition System

The ignition system starts and maintains engine function in the vehicle. Mercedes-Benz vehicles are equipped with sophisticated ignition systems designed to enhance engine performance, efficiency, and reliability. Below is an exhaustive overview of the key components, technologies, and features associated with their ignition systems. The models worked on utilized the coil-on-plug (COP) system where each spark plug has its own ignition coil mounted directly on it, providing more precise ignition timing and improving efficiency.

Key Components

Ignition Coil: Converts low battery voltage into the high voltage needed to create a spark at the spark plug.

Spark Plug: Delivers the electrical spark to ignite the air-fuel mixture in the combustion chamber

Ignition Control Module: Manages the timing of the spark and controls the ignition coils based on engine conditions.

Crankshaft and Camshaft Sensors: Monitor the position of the engine components to provide real-time data to the ICM for accurate ignition timing.

Advanced Technologies

Multi-Spark Ignition: Some Mercedes models feature multi-spark ignition systems that fire multiple sparks during a combustion cycle, improving combustion efficiency and reducing emissions.

Adaptive Ignition Control: This system adjusts ignition timing dynamically based on various factors like engine load, temperature, and speed, optimizing performance and fuel efficiency.

Smart Start/Stop Technology: Integrates with the ignition system to automatically shut off the engine when the vehicle is idle and restart it when the driver accelerates, enhancing fuel efficiency.

Performance Features

Improved Combustion Efficiency: Advanced ignition systems ensure optimal timing and spark intensity, leading to better combustion and higher power output.

Reduced Emissions: Precise ignition control helps in achieving complete combustion, which minimizes unburned fuel and harmful emission.

Enhanced Reliability: Modern ignition systems are designed to be more durable and resistant to environmental factors, reducing maintenance needs.

Some issues encountered on the ignition system include;

- Faulty ignition coils
- Carbon deposited spark plugs

- Dirty air filter affecting air-fuel ratio
- Faulty inlet manifold seal

The ignition systems in Mercedes-Benz vehicles are engineered for optimal performance, efficiency, and reliability. With advancements in technology and a focus on future innovations, these systems play a crucial role in the overall driving experience, ensuring that the engine runs smoothly and efficiently under a wide range of conditions.

3.1.7 Exhaust System

The exhaust system in Mercedes-Benz vehicles is critical for managing engine emissions, optimizing performance, and enhancing sound characteristics. This summary provides an exhaustive overview of its components, technologies, and features.

Components of the Exhaust System

Exhaust Manifold: Collects exhaust gases from the engine's cylinders and directs them into the exhaust system.

Catalytic Converter: Referred to as the catalyst on-field converts harmful pollutants in exhaust gases (such as carbon monoxide, hydrocarbons, and nitrogen oxides) into less harmful emissions. Mercedes-Benz often uses advanced three-way catalytic converters for improved efficiency.

Oxygen Sensors: Monitor the level of oxygen in the exhaust gases, providing feedback to the engine control unit (ECU) for optimal fuel-air mixture adjustments.

Muffler: Reduces engine noise produced during combustion and exhaust gas flow. Mercedes-Benz employs various muffler designs to fine-tune sound characteristics.

Exhaust Pipes: Carry exhaust gases from the engine to the rear of the vehicle, responsible for directing emissions away from the vehicle.

Exhaust Technologies

Dual Exhaust Systems: Many performance models feature dual exhaust systems, which enhance exhaust flow, improve engine performance, and create a more aggressive sound profile.

Active Exhaust Systems: These systems allow for dynamic control of exhaust flow and sound. By using electronically controlled valves, drivers can switch between quiet and sporty exhaust modes depending on driving conditions or preferences.

Exhaust Gas Recirculation (EGR): Some models incorporate EGR to recirculate a portion of exhaust gases back into the intake, reducing nitrogen oxide emissions and improving efficiency.

Performance Features

Optimized Flow Design: The exhaust system is engineered to minimize back pressure, allowing for improved engine output and responsiveness.

Sound Engineering: Mercedes-Benz conducts extensive sound tuning to achieve a desirable exhaust note that enhances the driving experience, especially in performance models.

Weight Reduction: Use of lightweight materials such as stainless steel and aluminium in exhaust components helps improve overall vehicle efficiency and performance.

The exhaust systems in Mercedes-Benz automobiles play a crucial role in managing emissions, enhancing performance, and improving the overall driving experience. With advanced technologies and a commitment to sustainability, Mercedes-Benz continues to innovate in exhaust system design, ensuring compliance with environmental standards while delivering exceptional performance and sound.

3.2 Activities Carried Out

3.2.1 Changing of Brake Pads and Brake Discs

Due to wear of the brake pads and brake discs due to friction, it requires regular replacement. The Instrument cluster displays a brake light when the pads have worn down to the level of the brake sensor indicating that they need replacement. The replacement of brake pads and brake discs follows specific procedure in order to ensure proper working condition.

Changing of Brake Pad

Procedure

After securing and lifting the vehicle, remove the wheels after which you will find the wheel hub with the brake calliper located on it.

After locating the brake calliper, you will loosen the bolts on the backside. Remove the calliper bolts using the appropriate socket.

Carefully slide the calliper off the brake disc and support it to avoid straining the brake line.

Remove the old brake pads from the calliper bracket. Note their orientation for installing the new pads.

Compress the piston back into the calliper housing. This is necessary to accommodate the new, thicker brake pads. Deactivation of the brake system is also necessary before this step in order to not damage the return mechanism on the piston.

Place the new brake pads into the calliper bracket, ensuring they are oriented correctly.

Carefully slide the calliper back over the new brake pads and reinstall the calliper bolts and tighten them to the manufacturer's specifications using a torque wrench. After which you reinstall the tires and drop the vehicle.

Before driving, pump the brake pedal a few times to ensure the brake pads are seated properly and to pump the brake fluid into the brake system. Check for any unusual noises or issues during a short test drive.

Changing of Brake Discs

The replacement of brake discs follows similar procedure to the replacement of brake pads with the addition of the removal of the brake disc after taking out the brake calliper and the brake pads. The new brake disc will also be installed before reinstalling the brake pads and the brake calliper.

3.2.2 Automobile Servicing

This is also known as “Getting an oil change”. This involves the removal of old oil and oil filter in order to maintain a clean and perfectly functioning engine.

Procedure

Loosen the oil filter and prepare the replacement. Remove the oil bolt from the oil sump to drain the old oil. After the old oil has been fully drained, retie the oil bolt to the sump and replace the old oil filter with the new one after which you can put in the new oil.

3.2.3 Changing of Spark Plugs and Ignition Coil

Faulty spark plugs or ignition coils can lead to misfiring which may damage the engine block and may lead to smoking. Therefore, timely replacement is necessary.

Procedure

Ensure the engine is cool before starting the procedure in order to avoid accidents. Disconnect the battery to prevent any electrical issues.

Depending on the engine model, you may need to remove covers or components to access the spark plugs and ignition coils.

Locate the ignition coils on the engine. They are typically mounted on top of the engine and connected to the spark plugs. Disconnect the electrical connector from each ignition coil.

Remove the bolts or screws securing the ignition coils and carefully pull the ignition coil out of the spark plug well.

Use a spark plug socket and ratchet to carefully loosen and remove each spark plug. Install the new spark plugs and tighten them.

Place the new ignition coils into the spark plug wells, ensuring they seat properly.

Secure each ignition coil with bolts or screws, tightening them sufficiently. Reconnect the electrical connectors to each ignition coil, ensuring they click into place.

Afterwards, you can reinstall all the previously removed components and test the engine for any irregularities.

3.2.4 Changing of Shock Absorber

Procedure

After securing and lifting the vehicle, remove the wheels after which you'll find the shock absorber. It is typically mounted between the vehicle's chassis and the wheel hub.

Depending on the model, you may need to remove components like the sway bar links or other components that obstruct access to the shock.

Remove the upper mounting bolts of the shock absorber. Next, remove the lower mounting bolts. Carefully pull the old shock absorber out afterwards.

Position the new shock absorber in place, ensuring it aligns with both the upper and lower mountings.

Secure the lower bolts first. Insert the bolt and lock it in. Secure the upper mount with its bolts and lock it in. Thereafter, use a spanner to tighten all mounting bolts.

Afterwards, reinstall the components and wheels then go for a test drive to ensure proper working condition.

Fig. 3.2: Image of an Airmatic (Balloon) shock absorber

3.2.5 Changing of Radiator

Procedure

Ensure the engine is cool before starting the procedure in order to avoid accidents. Disconnect the battery to prevent any electrical issues.

Place a drain pan under the radiator and open the drain valve at the bottom of the radiator to allow the coolant to drain completely. Close the valve once all the coolant is drained.

Depending on the model, you may need to remove the electric cooling fans. Disconnect the electrical connectors and remove the mounting bolts. Carefully lift the fan assembly out of the way.

Use pliers to loosen and remove the hose clamps and pull the hoses off the radiator allowing any fluid to drain into the pan.

Remove any bolts securing the radiator to the vehicle. Then carefully lift the radiator out of its mounting position.

Position the new radiator in place, ensuring it aligns with the mounting points and secure it in place. Reattach the hoses to the new radiator, tightening them securely with a spanner and securing them with hose clamps.

If you removed the cooling fans, reinstall them by securing the mounting bolts and reconnecting the electrical connectors.

Refill the cooling system with the appropriate type of coolant. To remove any air pockets, start the engine and let it reach operating temperature with the radiator cap off. This will allow trapped air to escape.

Afterward you can reconnect the battery and leave the engine running in order to test whether it is running at optimal temperatures.

CHAPTER FOUR

4.1 Summary of Attachment Activities

For the duration of the SIWES program, I was exposed to the industrial and practical applications of theoretical principles which were taught to me over the course of my study. I was privileged to participate in several repair jobs which enabled me to identify several sources of faults and how to carry out diagnosis by a computer system or through symptomatic deduction.

4.2 Challenges Encountered

There were several challenges which were encountered during the program which include;

- Unavailability of proper facilities for employee comfort and shelter during work hours
- Unavailability of tools and equipment for certain operations, requiring the employment of outside help or improvisation which delays work delivery.

4.3 Recommendations

I recommend the under-listed points for implementation in order to improve the quality of the SIWES program.

- The provision for monthly allowances for interns will help alleviate the financial burden created by the transportation to and from the workplace.
- Provision of knowledge pertaining to the program prior to the deployment of the students will be of great benefit.
- Experienced staff should be assigned to students on attachment for training.
- Companies should accept students for the SIWES program and ensure that they are assigned to the relevant department.
- Companies should have in place facilities to facilitate the learning experience of the student on industrial attachment.

4.4 Conclusion

The SIWES program has been able to ensure the impartation of practical knowledge to students to increase employability and experience in the of industrial application of theoretical knowledge. My experience at Ministry of Works and Transport was insightful and exposed me to group executed projects which fostered greater efficiency through teamwork and team management which will enhance my work output when working with fellow mechanical engineers on future projects.

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