



Participant Guide

AUTOMOTIVE SERVICE TECHNICIAN

LN MAN AUT AST RW L3 ENG PG VER 1.00

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Foreword

LabourNet is a social enterprise that creates sustainable benefits for workers in the informal sector, by taking an end to end solution focused on plugging gaps in the eco-system to the market, to address all the challenges faced by the unorganized sector workforce today. This course on Automotive Service Technician is created to upgrade the skills of semi-skilled helpers in automotive industry and as well as new entrants with minimum required qualification.

This course book is designed for the training model known as work integrated learning. Trainee will be imparted with knowledge through lecture in the industry premises for fixed duration every day. For the remaining time trainee will be working in a shop floor. The trainer will be providing guidance for limited duration as and when required to ensure the trainee is acquiring the required skills to function as a independently as an automotive service technician.

The advantage of this model is that the trainee will be learning in the working environment and not many new facilities are required for training delivery, except sparing of the machinery for on-the job training under the guidance of the Trainer.

This course for automotive service technician is designed to ensure that the trainee will be able to meet all the performance, knowledge and core skills criterion specified in the draft Qualification Pack for automotive service technician vide Reference ID: ASC/Q 1401 published by NSDC

Table of Contents

Foreword.....	2
Table of Contents	3
Key Competencies	4
Module 1- Overview on automotive industry and generic skills	4
Session Plan 1- Introduction to automotive industry and automotive service technician.....	4
Relevant Knowledge	4
Session Plan 2 - Hazards, safety and health	9
Relevant Knowledge	9
Relevant Knowledge	11
Module 2- Assist in vehicle service and maintenance	13
Relevant Knowledge	14
Session Plan 2 – Major components and aggregates of a vehicle	18
Relevant Knowledge	18
Session Plan 3– Service and maintenance of automobile	23
Relevant Knowledge	23
Module 3- Plan and organize work to meet expected outcome	29
Session Plan 1 – Planning and Organizing.....	29
Relevant Knowledge	29
Module 4 -Work effectively in a team	31
Session Plan 1– Team work and communication skills	31
Relevant Knowledge	32
Module 5-Maintain a healthy, safe and secure working environment	34
Session Plan 1 – Health, safety and security requirements	34
Relevant Knowledge	34
Suggested exercises for OJT.....	36
Exercise 1: Identify measuring tools and instruments	36
Exercise 2: Checking the condition of the battery	37

Key Competencies

Key competencies are derived from the QP

Upon successful completion, the Learners will be able to:

- Assist in vehicle service and maintenance.
- Plan and organize work to meet expected outcomes
- Work effectively in a team
- Maintain a healthy, safe and secure working environment.

Module 1- Overview on automotive industry and generic skills

Module Objectives

By completing this module the trainee would have gained knowledge about:

- Automotive industry in India
- The factory/section he/she is working and his role in the section
- Hazards associated with the trade and mitigation
- SHE guidelines and legal provisions
- Basics of workplace skills
- Use and wear PPE effectively

Session Plan 1- Introduction to automotive industry and automotive service technician

Session Objectives

At the end of the session, the trainee will be able to:

- Explain the importance of automotive industry
- Describe servicing and technical repair of vehicles

Relevant Knowledge

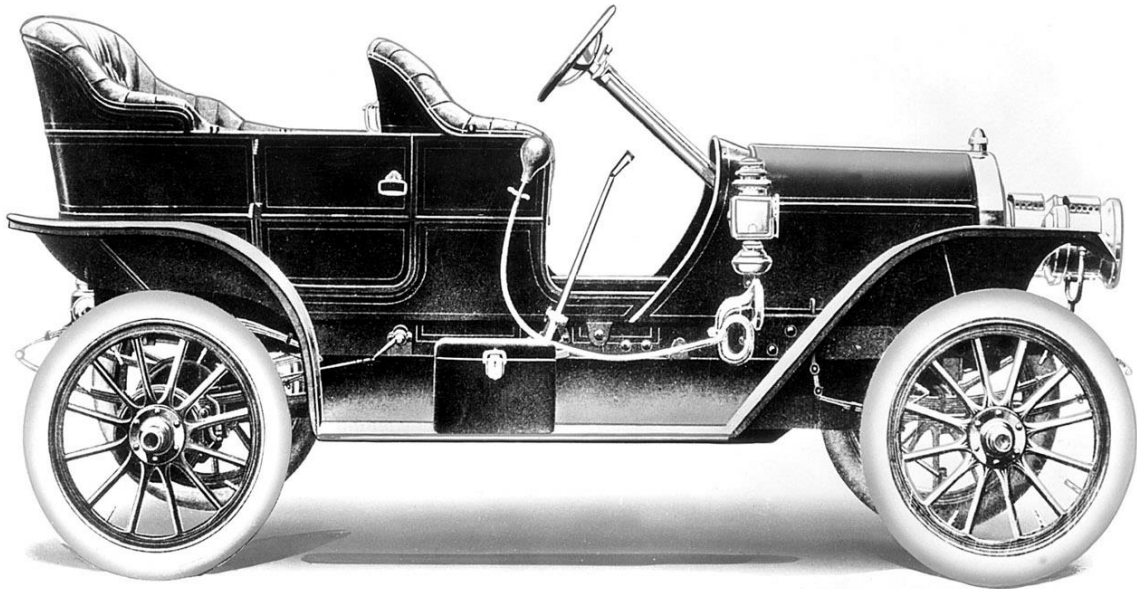
1.0 Introduction to Automobile

1.1 Introduction to Four wheeler

The era of “Automobile” starts in the mid of 17th and 18th century, strictly speaking, in 1760s. In the beginning “steam engine automobile” was created for the means of human transport.

Later on an internal combustion engine is used for a self-propelled vehicle to transport passengers and goods too.

Examples: Car, Bus, Truck, Jeep, Tractor, Van etc.,



In general, The modern automobile is essentially a transportation equipment unit consisting of a “frame” supporting the “body” and certain “power developing and transmitting units” which are further supported by “tyres and wheels” through “springs and axles”.

Engine is the chief component of an automobile. It supplies the power, which is delivered by the “transmission system” to the wheels through the clutch or fluid coupling

The different names for the automobile are:

- Auto
- Automobile
- Autocar
- Auto buggy
- Car
- Motor
- Motor car
- Motor vehicle
- Motor coach
- Motor wagon
- Horseless coach

1.2 Evolution and growth of four wheeler segment

Evolution:

AUTOMOBILE



1600 Sails on land! A chariot driven by the wind, built by Simon Stevin in Holland.



1769 The first vehicle to move under its own power (steam), by Nicolas Cugnot of France.



1827 Steam wagon of Onesiphore Pecqueur, France, allowed for difference in rear wheel speeds.



1832 Steam vehicle by W. H. James, England. It had the first three-speed transmission.



1902 The first automobile to be produced in quantity—an Oldsmobile with a curved dash.



1911 The first electric self-starter, invented by C. F. Kettering, went into production.



1928 Synchro-mesh transmission was introduced. It made gear shifting without clashing possible.



1934 Knee-action, for smoother riding, and solid steel turret tops, for safety, came in.



1940 "Sealed Beam" headlamps became standard; and automatic transmission was mass produced.

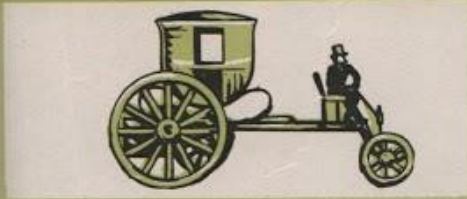


1949 New high-compression engines were introduced, and bodies acquired bigger areas of glass.

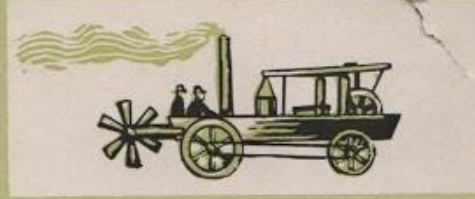
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General Motors Corp.

PROGRESS



1801 First steam carriage, for use on roads, built by Richard Trevithick, Jr., England.



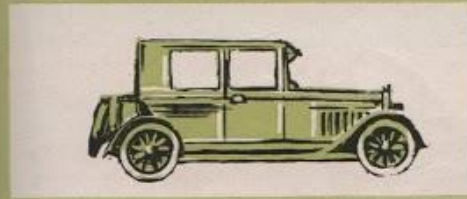
1804 Steam-driven land and water vehicle, built by Oliver Evans in the United States.



1886 One of the first automobiles with a gasoline engine, built by Gottlieb Daimler, Germany.



1893 An early American automobile—a three-wheeled phaeton built by Charles Duryea.



1923 Lacquers—highly durable colored finishes for automobile bodies—were introduced.



1924 Four-wheel brakes (used only on made-to-order cars before) went into quantity production.

driving comfort chart



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1.4 Role of automotive service technician

The automotive service technician is responsible to carry out basic services on vehicles under supervision and it is his responsibility to follow correct procedures as per the SOP of the company

Automotive service technicians perform the following duties:







1. Under supervision, assist in performing service or repair of vehicles such as:
 - Carrying out minor repair / replacement of components
 - Carrying out change of oils and lubrication
 - Washing vehicles as per prescribed standard process
 - Fetching correct materials or tools or gauges
 - Mixing cleaning solutions, abrasive compositions, or other compounds as per the directions given by senior technician.
2. Run the shops as per the directions given by the senior technician such as fetching correct tools for particular operation, fetching gauges, fixtures, taking the vehicles to dealer ship etc .
3. Raw materials, Finished products and packed items are lifted manually or by using hoists.
4. Dismantle the wheels, suspension system, steering column, braking system, engine assembly etc.
5. Assist in organizing the secure parking area and moving vehicles around as directed.
6. Follow standard operating procedures
7. Track on the records of service and repaired vehicles
8. Report any malfunctions observed in tools, equipment and repair requirements observed in vehicles to the concerned persons.
9. Plan and organize work in order to complete it to the required standards on time.
10. Work effectively in a team
11. To carry out housekeeping activities such as waste disposal, cleaning equipment, dealing with accidental damage, store housekeeping and maintaining schedules& records for housekeeping duty.
12. Identify and correct any hazards that can be dealt with safely.

Session Plan 2 - Hazards, safety and health

Session Objectives

At the end of the session, the trainee will be able to:

- Familiar with the general hazards or risk that can lead to accidents
- Understand the basic safety, health and hygiene measures
- Wear and use PPE for safety

 Hot surface	 Danger of entrapment	 Danger of death
 High temperatures	 Glass hazard	 Danger of suffocation

Outcome: Identify hazards and safety signs at work and determine the appropriate safety measures that should be followed to avoid any accidents.

Relevant Knowledge

2.0 Hazards, safety and health

2.1 Hazards

A hazard is literally measured as a circumstance that poses a threat to life, property or environment. Mostly hazards are hidden with a risk involved in it. A situation which is hazardous is literally termed as an incident.

For example, we can say water spilled in the floor, oil or grease spilled in the floor, etc. These are the hazards which may cause worker to slip and fall, leading to injuries.

To identify hazards it is important to understand the various types of hazards.

Types of Hazards:

1. Chemical hazard.
2. Physical hazard.
3. Ergonomic hazard.

1. Chemical Hazards- Chemical normally go into the workers body by the following ways:

Inhalation: Inhalation is naturally the most common way through which chemicals can enter the body at shop floor.



Ingestion: Accidentally swallowing chemicals through eating, drinking, or smoking occurs via ingestion



Absorption: It is absorption of a chemical via skin and eyes



Physical Hazards: Physical hazards are of different types and can be hazardous to workers. They include

- Noise
- Vibration
- Temperature extremes
- **Noise:** When you are exposed to too much of sound, the first level would facilitate a temporary loss in hearing. Numerous factors of too much noise that majorly affects the employees are listed below:
 - Kind of an equipment being functioned
 - If a machine is not properly maintained

- When two or more machines producing high sound are operated simultaneously
- Enclosed or partially enclosed spaces
- **Vibration:** The vibration throughout the body can arise while running large equipment, like drillers, air mallets, pile drivers, tractors, bulldozers, earth-moving equipment, and other large machinery. Hand-arm vibration majorly occurs while using power tools, like pneumatic drills, grinders, etc.
- **Temperature Extremes:**

A change in body temperature when working under risky environmental condition can cause stress/illness from heat/cold. If a proper treatment is not given on some can cause both heat and cold stress/illness. This stress/illness can change into life –threatening situations.

Heat illnesses causes and injuries: Substantial amount work in very high temperatures could lead to muscle cramps, dehydration and unconsciousness.

- Heat rash
- Fainting
- Heat cramps
- Heat exhaustion
- Heat stroke
- Wearing resistant protective clothing when doing heavy work.

Cold illnesses causes and injuries: A cold temperature majorly causes tiredness, breathing difficulties and lack of consciousness (hypothermia).

- Frost nip
- Immersion injury (trench foot)
- Frost bite
- Hypothermia

Relevant Knowledge

3.0 Workplace Skills

3.1 Oral Communication

What is communication?

Communication is exchange of information between people. It can be in the form of oral words, written words, drawings or physical actions. Communication is essential to express ideas and thoughts to friends, family, co-workers, customers. Communication also plays a major role in information exchange and decision making.

The communication process

Communication is an activity, which has a series of steps. The components involved in the process of communication are:

1. **Context:** Communication is affected by the context in which it takes place. The context may be physical, social, chronological, or cultural. Every communication proceeds with context. The information is present in the mind of the sender (Source). The sender chooses the message to communicate within a context. This can be an idea, a concept, information or feelings.
2. **Sender/Encoder:** Sender/Encoder is the person who sends the message. The credibility of the sender is important in the message process. For example, emails from the senior management are read first. The sender initiates a message by encoding the idea or a thought in words or symbols and sends it to a receiver. The message is the actual physical product from the source encoding. The message could be a speech, a written document or a physical gesture. Sender may be an individual or a group or an organization. The views, background, approach, skills, competencies, and knowledge of the sender have a great impact on the message. The verbal and non-verbal symbols chosen are essential in ascertaining interpretation of the message by the recipient in the same terms as intended by the sender.
3. **Message:** Message is the main thought that the sender wants to communicate. Communication process begins with deciding about the message to be conveyed. It must be ensured that the main objective of the message is clear. There should be no ambiguity.
4. **Channel:** Channel is the medium in the communication process that the sender uses to transmit the message to the receiver. There are various channels available for communication –
 - **Written**
 - Email
 - Letter
 - Memo
 - Reports
 - Fax
 - Publications
 - **Verbal**
 - Face to face meetings
 - Telephone
 - Video conferencing
 - Presentations

Points to remember:

- The automotive industry is one of the key sectors of the Indian economy.
- **Personal protective equipment (PPE)** refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury.

- The process of identification of physical or health related hazards at workplace is known as Hazard Assessment.
- Communication is exchange of information between people. It can be in the form of oral words, written words, drawings or physical actions.
- There are three styles of reading which we use in different situations:
- Reading skills refer to the specific abilities that enable a person to read with independence and interact with the message.
- The purpose of effective written communication is to send a message with the intention of the recipient understanding the message and responding to it.
- Policies and Procedures are the strategic link between the Company's Vision and its day-to-day operations.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Exercise sheet

Answer the following questions.

1. List the role of the helper/automotive service technician.

2. _____ is exchange of information between people. It can be in the form of oral words, written words, drawings or physical actions
 - a. Communication
 - b. Reading

Module 2- Assist in vehicle service and maintenance

Module Objectives

By completing this module the trainee would have gained knowledge about:

- Basic functioning of various components and aggregates of a vehicle.
- Assist in performing vehicle service and maintenance

Relevant Knowledge

1.0 vehicle service and maintenance

1.1 Shop hazards and safety

Automotive jobs in the workshop involves – adjusting wheel alignment, checking engine performance, checking charging systems, adjusting engine valves and many other jobs. All of these jobs can be done easily and safely if you follow the safety rules.

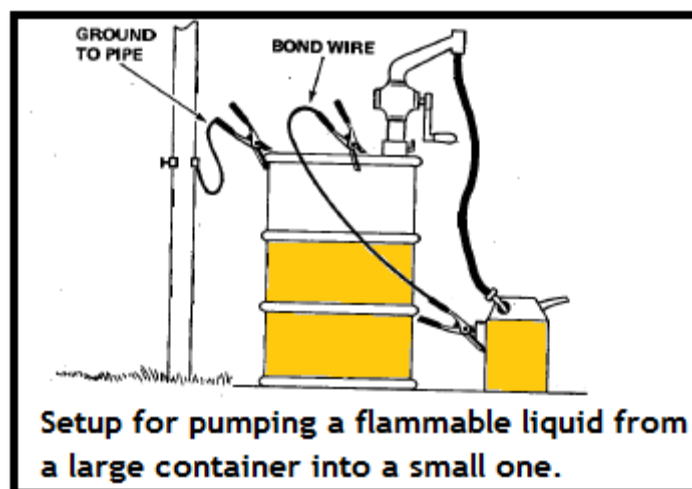
Safety means protecting yourself and others from possible danger and injury. This session describes the rules you should follow to protect yourself from harm. Follow the rules for your protection, and for the protection of others around you prescribed by the OEM (Original Equipment manufacturer).

HAZARDS

1. HAZARDS DUE TO FAULTY WORKING HABITS OR CONDITIONS

Here are some of the major hazards that might be due to working habits of the employees or to the general working conditions:

- Smoking while handling dangerous materials such as gasoline or solvents. This can result in a major fire or explosion.
- Careless or incorrect handling of paint, thinners, solvents, or other flammable fluids. Below figure shows the correct arrangement for pumping a flammable fluid from a large container into a small one. Note the bond and ground wires. Without these, a spark might jump from the nozzle to the small container. This could cause an explosion and fire.



- Blocking exists. Areas around exit doors and passageways leading to exits must be

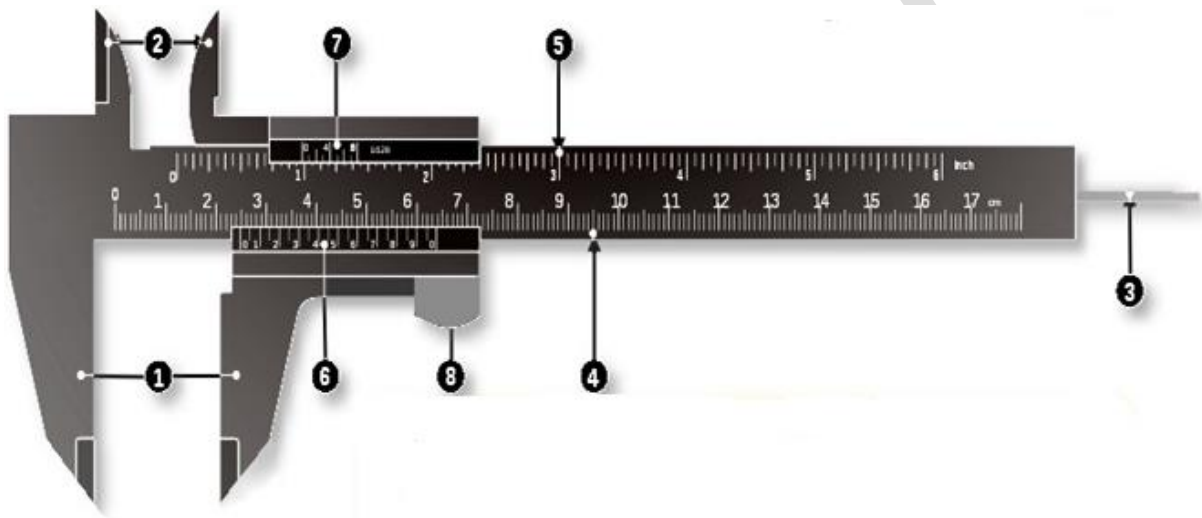
kept free of all obstructions. If you wanted to get out in an emergency – as, for example, when a fire or explosion occurred – a blocked exit could mean serious injury or even death.

1.2 Workshop tools

The common tools used during routine servicing and repairs are explained below:

MEASURING EQUIPMENT:

VERNIER CALIPER



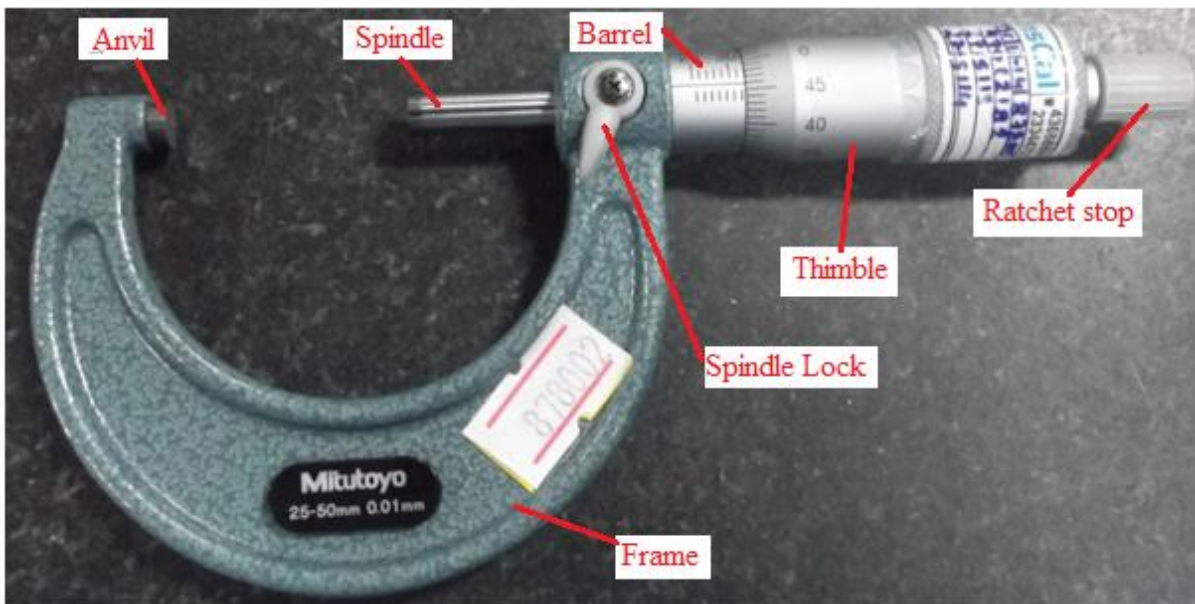
Parts of a vernier caliper:

1. **Outside jaws:** It measures external diameter or width of an object
2. **Inside jaws:** Measures internal diameter of an object
3. **Depth probe:** Measures depths of an object or a hole
4. **Main scale:** Marks for every mm of calibration
5. **Main scale:** Marks for every inches and fractions of calibration
6. **Vernier scale** interpolated measurements to 0.1 mm or better is yielded.
7. **Vernier scale:** Interpolated measurements in fractions of an inch is yielded
8. **Retainer:** used to block movable part to allow the easy transferring of a measurement

Ranging from both inside and outside measurement of instruments to within thousands of width, Vernier caliper is able to measure both. To take the required calibration, add the number of inches on the fixed scale on the frame to the number of tenths that are seen between the last inch marking and the zero on the vernier scale. Then add the number of 0.025 inch markings seen between the last tenth reading and the zero on the vernier scale,

Finally, read the number of lines from zero on the reverse scale to the point where the line on the vernier scale exactly 0.001 inch. There is also metric vernier caliper.

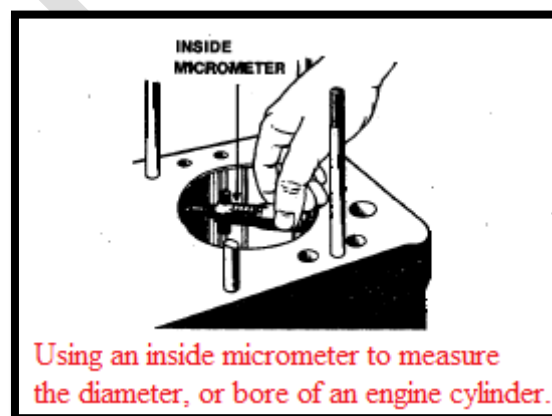
MICROMETER



Working Principle of Micrometer: The micrometer works on the principle of screw and nut. The longitudinal movement of the spindle during one revolution is equal to the pitch of the screw. The movement of the spindle to the distance of the pitch or its fractions can be accurately measured on the barrel and thimble.

Inside Micrometer

Figure shows an inside micrometer which is used to measure the diameter, or bore of an engine cylinder.



FEELER GAUGE



Feeler gauge is a device used to measure clearance or gap between two items or parts. They are used to adjust the existing gap by reducing or increasing the gap in order to come with the right fit.

SMALL HOLE GAUGE



The small hole gauge is used to measure the diameter of small holes such as the valve guide bore in a cylinder head. The gauge is adjusted until the split ball slides in the hole with a slight drag. Then the distance between the two sides of the split ball is measured with an outside micrometer.

DIAL INDICATOR



The dial indicator is a gauge that uses a dial face and a needle to register measurements. It has a movable plunger or contact arm. As the plunger or arm is moved, the needle rotates on the dial face to indicate the distance in thousandths of an inch.

The dial indicator can be used to measure taper in engine cylinders. The movement of the needle in a dial indicator when moved up and down represents the amount of taper in it.

Session Plan 2 – Major components and aggregates of a vehicle

Session Objectives

At the end of the session, the trainee will be able to:

- Understand the basic functioning of engines and fuel system, cooling system, air supply systems, emission and exhaust system, ignition systems, Clutch assembly, Clutch operating system, Gearbox, Drivelines and hubs, Drive train assembly and transmission, Steering system, suspension system, Brake system, Tyres & wheels, Radiator, batteries and power storage system, Power generating systems, Electrical wire harness, air conditioning system, Lighting, Electronic systems, Electronic control unit, Hydraulic Pneumatic system, various lubrication systems, etc.,

Relevant Knowledge

2.0 Functioning of components and aggregates of a vehicle

2.1 Functioning of components and aggregates of a vehicle

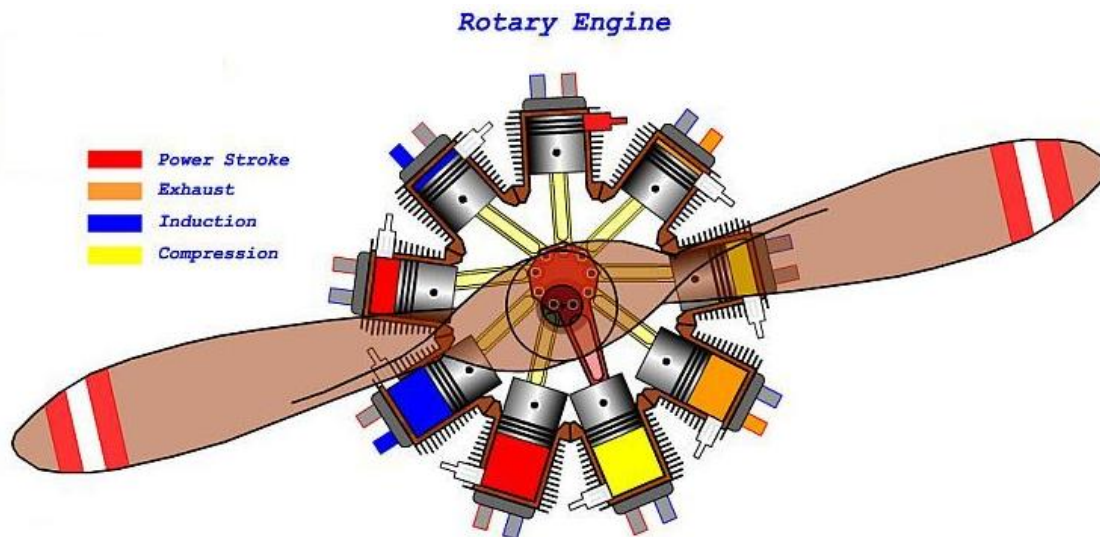
ENGINES AND FUEL SYSTEM

In an engine, the fuel is mixed with air and undergoes combustion process in combustion chamber. This combustion of mixture provides energy to drive the piston. In SI engine an appropriate amount of fuel and air mixed at some proportion prior entering into the combustion chamber.

The function of the fuel system is to store and supply fuel to the cylinder chamber where it can be mixed with air, vaporized, and burned to produce energy. In Fuel system, fuel pump draws the fuel from tank and then it is delivered to carburetor. From the carburetor the fuel is delivered to the combustion chamber for process of combustion.

Internal combustion (IC) engines are engines in which the combustion of fuel takes place inside the cylinder. The heat energy generated after combustion is converted into mechanical energy.

There are two types of IC engines: Rotary and reciprocating engines.



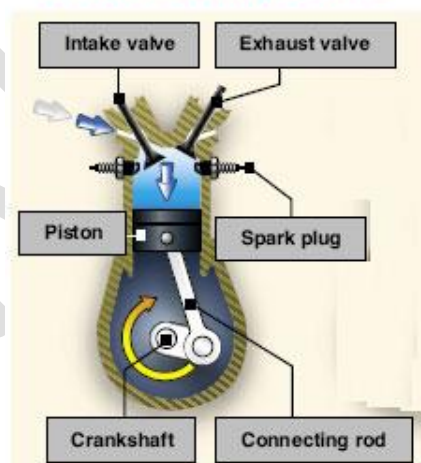
In rotary engines, a rotor rotates inside the engine to produce power.

In reciprocating engines, a piston reciprocates within a cylinder.

Among rotary and reciprocating engines, reciprocating engines are widely used. Reciprocating engines are classified into 2 types

- spark ignition (SI) engines and
- Compression ignition (CI) engines.

Reciprocating Engine



SI engines are called as spark ignition engine because the fuel and air mixture is burnt due to spark ignition ignited by the spark plug.

In CI engines, owing to high pressure exerted on the fuel, it results into ignition.

SI and CI Engines are specifically classified as

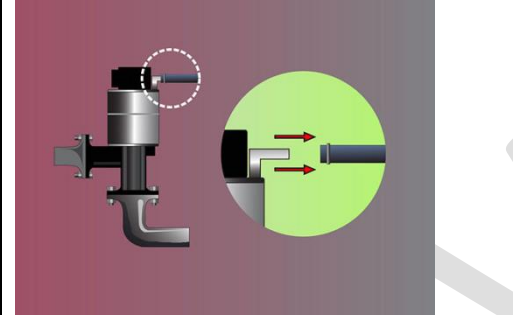
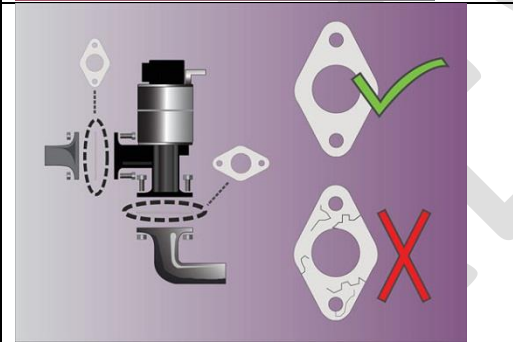
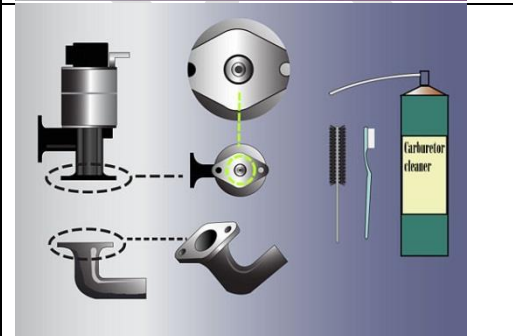
- 2-stroke engine

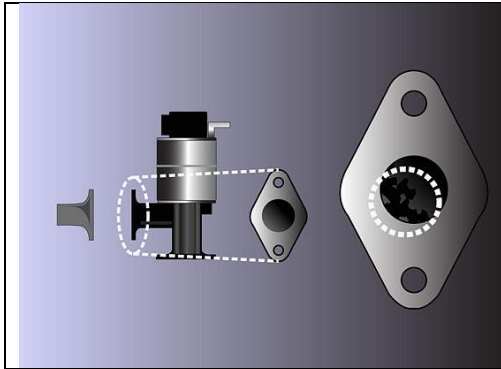
- 4-stroke engine

S.NO	2-stroke engine	4-stroke engine
1.	For every two strokes of the piston, fuel is burnt inside the combustion chamber.	For every one stroke of the piston, fuel is burnt inside the combustion chamber
2.	Two revolution of crank shaft makes up for one power stroke.	One revolution of crank shaft makes for one power stroke
3.	Less efficient than 4-stroke engines	More efficient than 2-Stroke engines

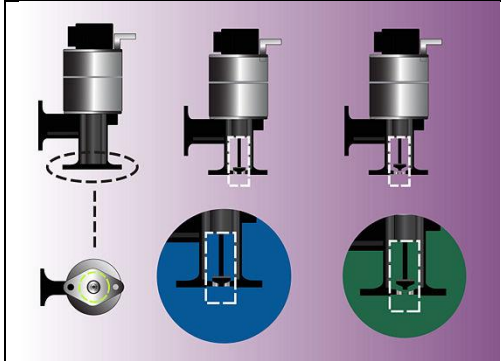
Stroke is the distance travelled by the piston inside the cylinder, which is usually equal to the length of the cylinder.

To Clean a Mechanical EGR Valve

	<p>1. Remove the vacuum hose and inspect closely for wear (cracks or weak spots), then clean out the carbon deposits either with a spray can of carburetor cleaner or with a pipe cleaner if the deposits are hardened or compacted.</p>
	<p>2. Loosen any bolts fastening the EGR valve to the engine. Inspect the gasket lining the bottom plate of the valve. If it's not frayed or cracked, you can reuse it.</p>
	<p>3. Use carburetor cleaner and a small-bristled brush like a wire brush, toothbrush or pipe cleaner to clean off the carbon from the metal exhaust gas return tube and the gas entry port on the valve (usually the smaller hole with a spring-loaded pin, or “pintle”).</p>

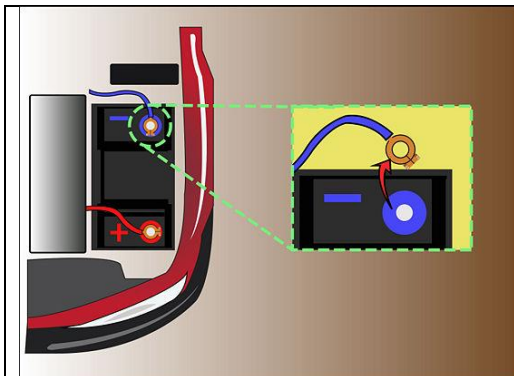


4. Clean out the entry port where the valve tubes connect to the engine (usually the intake manifold) while the EGR valve is off.

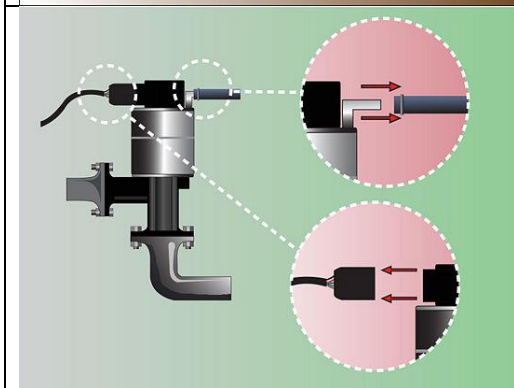


5. Check to ensure the vacuum diaphragm moves freely, reinstall the EGR valve and reattach the exhaust return and vacuum hoses.

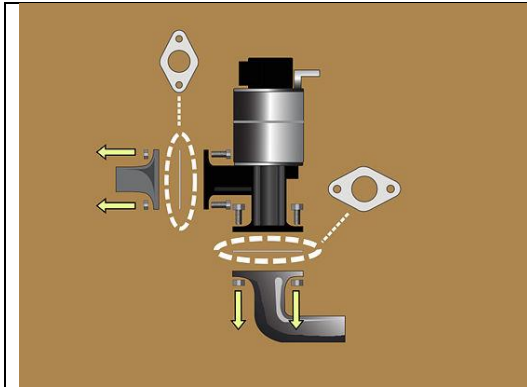
To Clean an Electronic EGR Valve



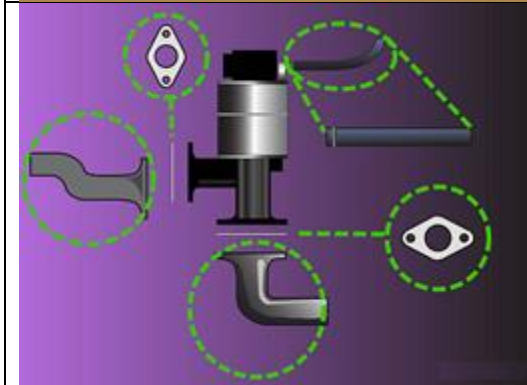
Disconnect the negative battery cable from the battery to ensure no current is flowing through the system to avoid short-circuiting the electronic component that controls the valve.



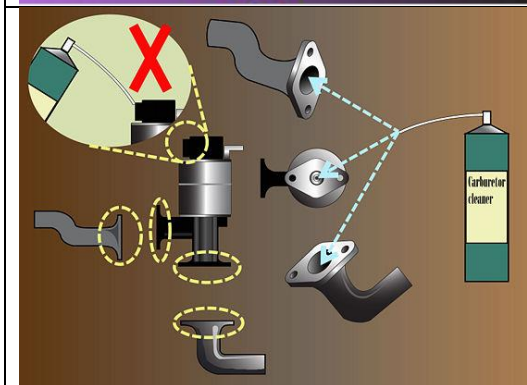
Disengage and remove any sensors and electrical connections along with any hoses.



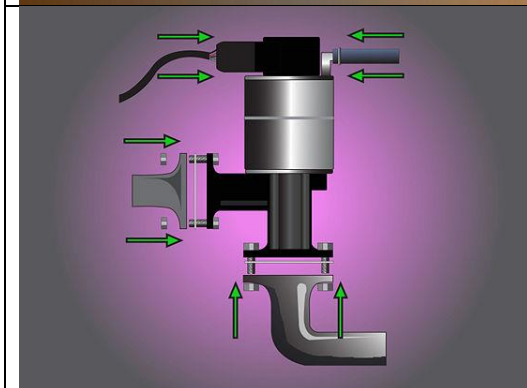
Loosen the bolts to remove the EGR valve and gasket.



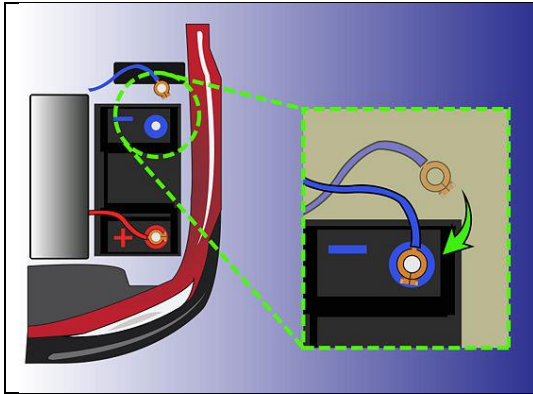
Check the hoses and gasket for wear, to replace or reuse.



Spray the valve and hoses with carburetor cleaner, using a brush to clean off the carbon buildup out of any hoses and small hole with the pintle. Do NOT spray the electrical connections or sensors with the cleaner.



Reinstall the EGR valve using the gasket and bolts, and reconnect the electrical connections and sensors with any hoses.



Reconnect the negative battery terminal.

Session Plan 3– Service and maintenance of automobile

Session Objectives

At the end of the session, the trainee will be able to:

- Describe vehicle service and repair
- Follow standard operating procedures
- Describe service manuals of vehicles

Relevant Knowledge

3.0 service and Maintenance

3.1 Vehicle service

This session will tell you, step-by-step, how to do each service job you are assigned by the senior technician. You are also required to follow direction of the senior technician such as getting fetching parts, tools, gauges, instruments, fixtures, workshop supplies, taking vehicles to dealerships, count and report serviced or repaired vehicles, etc.,

CHANGING OIL IN AUTOMOBILES

Starting of the process following are the things which is needed for changing the oil in automobiles

- Jack & axle stands (a set of car ramps may also be suitable)
- Suitable socket or spanner for sump plug
- Drain pan
- Engine oil
- Oil filter
- Oil filter wrench
- Funnel
- Container for old oil

Tools used for changing engine oil	Images
<p>Jack & axle stands</p>	
<p>Suitable socket or spanner for sump plug</p>	
<p>Drain pan</p>	
<p>Engine oil</p>	
<p>Oil filter</p>	

<p>Oil filter wrench</p>	
<p>Funnel</p>	
<p>Filter Pliers</p>	
<p>Container for old oil</p>	

STEPS INVOLVED IN CHANGING ENGINE OIL

1. Warm Up the Engine

Run the engine till normal operating temperature is reached and switch off .The oil inside the engine gets warm. The warmed oil drains out easily in comparison to cold oil and this in turn helps in draining out any built up sludge.



2. Raise & Secure Vehicle

Park the vehicles are parked on a flat surface and ensured that the hand brake is applied and wheels are chocked. If necessary, the jack to uplift the car from the ground and support with axel stands should be used. Alternatively, car ramps can be used.



3. Drain Old Oil

The drain pan is to be placed underneath the sump ready to catch the flow. (HOT OIL CAN BURN!)

Once all the oil has completely drained the sump plug is refitted (preferably with a new gasket) and tighten firmly tightened .



4. Remove Oil Filter

Using an oil filter removal tool, the oil filter is removed .



5. Install New Oil Filter

The new oil filter is ready to be installed. Rub some fresh engine oil is rubbed over the oil filter gasket and then screwed into the location. It is important that always components specified by the OEM must be used as replacement parts.



6. Refill Oil

Before adding oil, ensure the quantity of oil that engine can withstand. Never fill the oil exactly to its specified capacity. Practice initially to fill oil to 80% of its specified capacity.



Remove the oil filler cap, which is located on top of the engine. Place a small sized funnel in the aperture and pour the oil slowly to the engine through small funnel. The funnel is surrounded by the rags to catch any spills. When the oil is poured to the engine, there is more chances of developing the air locks .As a result of air lock, the oil spilling out of filler hole.

While pouring oil into the engine, stop pouring oil periodically and allow the oil to settle down into the engine sump. The dipsticks are used to ensure the correct, an overfill quantity of oil. The level of the oil is dropped once the oil has circulated to new filter. Start the engine and make sure the dashboard oil light goes out or the gauge indicates pressure. If not, stop the engine immediately.

Ensure the oils, lubricants and greases used are as specified by the OEM for use.

7. Check Oil Level

Once you are satisfied with the oil level, the engine is run around for minute and then shut off. The engine must be checked for oil leaks- particularly around the oil filter and sump plug..



8. Dispose Of Old Oil Correctly

check with many communities and local authorizes to dispose the used (old) oil safely.the dump of used oil on the ground, into drains or in the rubbish bin must be avoided .

9. Re-Check Oil Level

After few trips, check the oil levels using dipstick and for any leaks as a good sign of practices

Points to remember:

- Automotive jobs in the workshop involves – **adjusting wheel alignment, checking engine performance, checking charging systems, adjusting engine valves** and many other jobs.
- Hand tools should be kept clean and in good condition.
- Vernier caliper can take both inside and outside measurement
- The micrometer works on the principle of screw and nut.
- The Function of a Car Engine is to set the fuel and air into rotary motion so that it can drive the wheels of the car.
- A spark plug is an electrical device that fits into the cylinder head of an internal combustion engine and ignites compressed fuels such as aerosol, gasoline, ethanol, and liquefied petroleum gas by means of an electric spark.

- A fuel filter is a filter in the fuel line that screens out dirt particles from the fuel, normally made into cartridges containing a filter paper.
- An injector is a component used in an internal combustion engine that enables it to inject fuel inside the combustion chamber in accordance with the firing order and the quantity.
- The air conditioner cools and dries the air in the passenger compartment. It uses a refrigerator which works in the same way as refrigerators in homes.
- There are basically two types of cooling systems used in internal combustion engines. They are air-cooled and fluid-cooled systems.
- Clutch is a mechanism which enables the rotary motion of one shaft to be transmitted, when desired.
- Lubrication is required for maintenance of engine.
- Automotive engines are called internal-combustion (IC) engines

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Exercise sheet

Answer the following

a) Short answer question:

1. List the important function of lubrication.

2. Explain briefly cooling system and its importance

Module 3- Plan and organize work to meet expected outcome

Module Objectives

By completing this module the trainee would have gained knowledge about:

- Importance of planning and organizing work at workplace
- Managing time, materials and cost effectively

Session Plan 1 – Planning and Organizing

Session Objectives

At the end of the session, the trainee will be able to:

- Establish and agreeing work requirements with appropriate people
- Managing time, material and cost effectively
- Work in line with the organization's policies and guidelines
- Work within the limits of his job role
- Keep the work area clean, safe and secure

Relevant Knowledge

1.0 Planning and Organizing

1.1 Planning

Planning is the process/an act to achieve a desired goals of an organization. It is a process of achieving the optimum balance of needs with the available resources. The planning process involves:

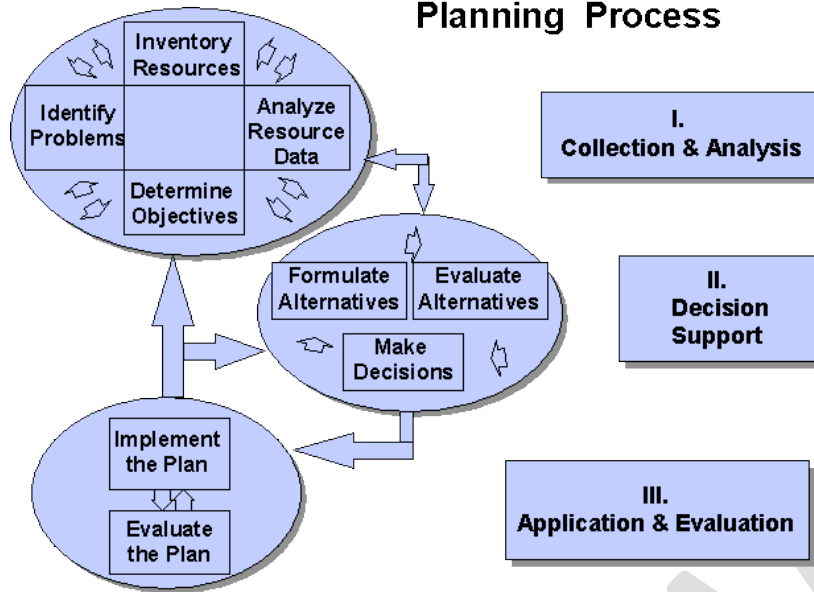
- Identifying the goals/objectives to be achieved
- To frame the strategies to achieve the goals of the organization.
- It creates the means required

Planning combines with forecasting of developments with the preparation of scenarios of how to react to them.

Planning Process

We can outline a three-step result-oriented process for planning:

Planning Process



In organizations, planning is a management process, but it can be practiced using simple tools and methods at all the levels in the organization as well as in places like garages and service centres.

Points to remember:

- Planning is the process of thinking about and organizing the activities required to achieve a desired goal
- Planning increases the efficiency of an organization
- Manpower planning, material planning, maintenance planning, enterprise resource planning are few types of planning
- Organizing involves the assignment of tasks, the grouping of tasks into departments and the assignment of authority and allocation of resources
- Make sure there is a place for everything and everything is its place
- List the tasks to complete, prioritize and finish it on time
- Policies are a statement of purpose.
- Procedures explain how to perform tasks and duties.
- The technician must treat confidential information as per the organization’s guidelines.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Exercise sheet

Answer the following

1. What is planning? List its advantages.

2. List the different type of planning you come across in automotive service facility.

Module 4 -Work effectively in a team

Module Objectives

By completing this module the trainee would have gained knowledge about:

- Team work and collaboration at workplace
- Maintaining clear communication with everyone

Session Plan 1– Team work and communication skills

Session Objectives

At the end of the session, the trainee will be able to:

- Work in a team effectively
- Pass on information to colleagues in line with organizational requirements
- Respect and carry out commitments made to colleagues
- Inform in time to colleagues if not able to fulfill the commitments made
- Identify and resolve if any problems in working with colleagues
- Follow organization's policies and procedures
- Share resources with team members as per priority of tasks

Relevant Knowledge

1.0 Work Effectively in a Team

1.1 Working with Colleagues.

An employee needs to be a team player while working in a team in an organization. The employee has to work with his colleagues. Colleagues refer to superiors, team members and members of other teams. Relationship of an employee with colleagues is important. Good workplace relationships help to build a healthy working environment and also help you do your job better. Good work place relationship improves the productivity of an employee and also makes the work pleasurable.

Bad relationship with colleagues spoils the working environment which diverts the concentration of an employee. Therefore, try to maintain a clear communication with your colleagues. Share your thoughts and information only related to work. Seek help from them and take guidance whenever required. It is not necessary that guidance will always be available from a superior. At times we can take suggestion from a team member or co-worker who is less experienced. Information should be shared as per the organizational requirement and regulations. Do not let personal relationships get into blocking your information flow. You may have personal differences with a team member, but this has to be completely set aside while working professionally or while exchanging information related to work.

You should ensure the following points to be an outstanding team player:

- Present the information clearly, concisely, and accurately so that it is easily understood by others.
- You should be able to seek and understand people's needs and motivations.
- Take out extra time to support and help others.
- Understand other's expectation and act accordingly.
- Work on to create a professional atmosphere.

Be polite and cooperative with others

When working as a team, it's very necessary to be polite and co-operative with the others. The employee should understand the organization objective. Being a part of a team doesn't mean you need to spend time with others ignoring work. Instead you must ensure the following points:

- Support each other
- Communicate effectively
- Achieve results or goals
- Be able to resolve conflict

Points to remember:

- Colleagues refer to superiors, team members and also members of other teams and departments.
- Maintain clear communication with colleagues.
- Pass on relevant information to colleagues.
- Respect colleagues.
- Meet commitments made to colleagues and inform them in case commitments are not being met.

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Exercise sheet

Answer the following

1. Write short note on working with colleagues.

1 -----with colleagues spoils the working environment which diverts the concentration of an employee.

- a) Good relationship b) Bad relationship C)None of the above

3. Write a note on respect with colleagues.

Module 5-Maintain a healthy, safe and secure working environment

Module Objectives

By completing this module the trainee would have gained knowledge about:

- Maintaining a healthy, safe and secure environment at workplace
- Identifying and correcting hazards at workplace in accordance with organizational procedures
- Maintaining health and safety records as required by regulatory and company standards and procedures

Session Plan 1 – Health, safety and security requirements

Session Objectives

At the end of the session, the trainee will be able to:

- Comply with organisation's current health, safety, security and environmental policies and procedures
- Report identified any health, safety, security and environmental policies and procedures
- Identify and report hazards at workplace in accordance with organizational procedures
- Follow organisation's emergency procedures
- Identify and recommend opportunities for improving health, safety and security at workplace
- Maintain health and safety records as required by company and regulatory standards and procedures

Relevant Knowledge

1.0 Health, Safety and Security requirements

1.1 Health and safety

What is Hazard?

A **hazard** is a situation that poses a level of threat to life, health, property, or environment.

Automotive jobs in the workshop involves – adjusting wheel alignment, checking engine performance, checking charging systems, adjusting engine valves and many other jobs. These jobs do include variety of hazards each day, from contact with hazardous chemicals to the possibility of amputating limbs or digits with mechanical equipment. All of these jobs can be done easily and safely if you follow the safety rules.

Different types of health and safety hazards found in the workplace are discussed below:

1. Materials Handling Hazards
2. Mechanical Hazards
3. Electrical Hazards
4. Chemical Hazards
5. Radiation Hazards
6. Physical & Environmental Hazards
7. Pressurized Hazards
8. Confined Space Hazards

Material handling hazard	
Hazard	Precaution
<ul style="list-style-type: none"> ✓ Manual handling (Lifting, pushing, pulling, carrying, cutting, etc – wrong posture & techniques, over exert, heavy load, odd shape or large item resulting in poor grip) ✓ Usage of material handling equipment Hand tools ✓ Packing or de-packing of materials 	<p>Manual handling – Use proper lifting technique, move or carry items within personal ability, seek help, use material handling equipment.</p> <p>Usage of material handling equipment – trained on safe use of equipment, not to overload, secured items and not to block sight of view.</p> <p>Hand tools - Use suitable & hand tools free of defects, correct handling technique</p> <p>Packing or de-packing of materials – Beware of nipping hazard, sharp edges or objects such as nails, wear protective gears.</p>

Points to remember:

- Repetitive motion disorders develop when workers continually place physical stress on one or more parts of the body.
- Heavy lifting puts automotive service technicians at risk for muscle strains, sprains and back injuries
- Repeated use of tools that generate noise puts at risk for hearing loss
- Wearing footwear with non-slip soles is a way to prevent slips and falls
- Always follow safety rules

- Emergency plans are the guidelines decided by the organization and which should be followed during emergencies
- In case of an accident immediately report it to the supervisor

NOTES

Use the blank space provided below to make important notes based on your understanding of the topics or anything which is important for you to remember.

Exercise sheet

Answer the following

1. Write short note on health hazards at workplace.

2. Write a note Evacuation plan.

3. List safe working practices at workplace.

Suggested exercises for OJT

Exercise 1: Identify measuring tools and instruments

Duration: 12 hours

- a) Materials: PPE such gloves, protective shoes
- b) Tools: verniers, micrometer, feeler gauge, dial indicators, different pressure gauges,

hammers, screwdrivers, wrenches and other tools used for automotive servicing

Description:

1. Read and follow the company SOP for operation
2. Collect and read the job card to understand the requirement.
3. Collect the required tools.
4. Identify the tools, understand the use of each tool and practice using the tools

Instructions to trainee:

- Follow trainer's instructions.
- Read job card, company SOP before beginning the task.
- Ensure that you follow company safety procedures and standards.
- Ask questions whenever in doubts.

Exercise 2: Checking the condition of the battery

Duration: 8 hours

- a) Materials: Battery, PPE like hand gloves
b) Equipment: Hydrometer

Description:

1. Read and follow the company SOP for operation
2. Check the tools and equipment to be used is free from faults/defects.
3. Ensure the materials used meet the specification in terms of color matching within a product / between a pair of products, where applicable.
4. Report any faults in the materials to the supervisor.
5. Housekeeping.
6. Collect the battery to be checked
7. Check the hydrometer is calibrated
8. Role play on filling documents and reporting to supervisor on defects or any issues.

Instructions to trainee:

- Follow trainer's instructions.
- Read company SOP before beginning the task.
- Ensure that you follow company safety procedures and standards.
- Ask questions whenever in doubts.