

Automotive Body Repair and Paint Work

Level-II

Based on August 2022, Curriculum Version 1



Module Title: - Carrying out Vehicle Cleaning

Module code: EIS BRP2 M11 0322

Nominal duration: 30Hour

Prepared by: Ministry of Labor and Skill

September, 2022

Addis Ababa Ethiopia



ACKNOWLEDGMENT

Ministry of Labor and Skills wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

Page 1 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1 September, 2022
--------------	--	-------------------------------	-------------------------------

TABLE OF CONTENT

Contents

ACKNOWLEDGMENT	1
TABLE OF CONTENT	2
Introduction to the Module	3
Unit One: Prepare To Clean Vehicle.....	4
1.1 Sourcing and interpreting safety and environmental requirements	4
1.2. Identifying tools and equipment.....	7
Self-Check -1.....	10
Written Test.....	10
Unit two: Clean Vehicle Interior and Fittings.....	11
2.1 Preparing vehicle to clean	11
2.2. Cleaning and vacuuming interior surfaces	15
Self-Check -2.....	18
Written Test.....	18
LAP Test	20
Unit Three: Clean Vehicle Exterior and Fittings.....	21
3.1 Preparing vehicle to clean.....	21
3.2. Cleaning vehicle exterior and fittings.....	23
Self-Check -3.....	25
Written Test.....	25
Unit four: Clean Engine Bay	26
4.1 Preparing vehicle to clean.....	26
4.2. Protecting electronic components and electrical connections	27
4.3 Cleaning engine bay	28
Self-Check -4.....	30
OPERATION SHIT 4	31
LAP Test -4.....	32
Unit five: Complete Work Processes	33
5.1 Making final inspection	33
5.2 Managing wastes.....	34
5.3 Checking and storing tools and equipment	35
5.4 Processing workplace documentation.....	35
Self-Check -5.....	36
OPERATION SHEET.....	37
LAP Test -5.....	38
Reference.....	39

Introduction to the Module

In automotive body work field ; the measurement and quantity estimation of body work project helps to know the quantity of work; to estimate the quantity of material required; to determine the cost of the work; to estimate the expect project completion time and to know the amount of material supplied for body work.

This module covers the skills and knowledge required for car detailing to prepare the vehicle external and internal part includes cleaning. It describes the performance outcomes required to clean a vehicle. It requires the learner to plan and prepare the task; clean the vehicle interior, exterior and engine bay; and maintains the work area, tools and equipment. This module covers the units:

- Prepare to clean vehicle
- Clean vehicle interior and fittings
- Clean vehicle exterior and fittings
- Clean engine bay
- Complete work processes

Learning Objective of the Module

- Prepare to clean vehicle
- Clean vehicle interior and fittings
- Clean vehicle exterior and fittings
- Clean engine bay
- Complete work processes

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” giver at the end of each unit and
5. Read the identify reference book for Examples and exercise

Unit One: Prepare To Clean Vehicle

This unit of competency covers the skills and knowledge required for car detailing to prepare the vehicle external and internal part includes cleaning. It describes the performance outcomes required to clean a vehicle. It requires the learner to plan and prepare the task; clean the vehicle interior, exterior and engine bay; and maintains the work area, tools and equipment.

This unit is developed to provide you the necessary information regarding the following content coverage and topics –

- Sourcing and interpreting safety and environmental requirements
- Identifying tools and equipment

This unit will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Interpret Safety and environmental requirements
- Identify tools and equipment

1.1 Sourcing and interpreting safety and environmental requirements

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP).

These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary.. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The General EHS Guidelines are organized as follows:

1. Environmental

- Air Emissions and Ambient Air Quality
- Energy Conservation
- Wastewater and Ambient Water Quality
- Water Conservation
- Hazardous Materials Management
- Waste Management
- Noise
- Contaminated Land

2. Occupational Health and Safety

- General Facility Design and Operation
- Communication and Training
- Physical Hazards
- Chemical Hazards
- Biological Hazards
- Radiological Hazards
- Personal Protective Equipment (PPE)
- Special Hazard Environments
- Monitoring



3. Community Health and Safety

- Water Quality and Availability
- Structural Safety of Project Infrastructure
- Life and Fire Safety (L&FS)
- Traffic Safety
- Transport of Hazardous Materials
- Disease Prevention
- Emergency Preparedness and Response

Use of personal protective equipment, including safety glasses, ear protection, gloves and safety footwear these are;

1. **Goggles:** Safety goggles must be worn at all times in areas where work is being Performed using chisels, grinders and polishers.
2. **Respirators:** Respirators must be worn when a student is painting using a spray gun or when a student is in an area where considerable painting is being done (such as a paint booth where another student or instructor is painting using a spray gun.)
3. **Welding:** Special welding goggles must be worn when a student is doing oxyacetylene welding. A standard welding helmet must be worn when a student is performing tasks requiring Arc or MIG welding.
4. **Power Tools:** Power tools should be disconnected from their power supply when discs, drills, sandpaper or other components are being changed or the tool is not being used. When not in use, the tools should be place in a safe area to prevent Being damaged from a fall and to protect the students’ feet and legs.
5. **Compressed air:** Air hoses are to be hung up when not in use to prevent tripping and to protect the hoses. Compressed air should not be used for cleaning hair or Clothing. Four psi of air pressure will rupture and eardrum and higher pressures may be harmful to face and eyes. Horseplay in the shop area at any time is not permitted.
6. **Rags:** To prevent wiping hands, face, or eyes with contaminated rags; rags used with thinner, reducer, paint, or other volatile products are to be placed in a covered container. This practice also helps prevent fire.

Page 6 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1 September, 2022
--------------	--	-------------------------------	-------------------------------

7. Clothing: Shoes and suitable clothing must be worn at all times. To prevent Entanglement, shirttails must be tucked in; long sleeve shirtsleeves must be buttoned the wrist when operating tools.

1.2. Identifying tools and equipment

- Chemical Cleaning of the Outer Part of an Engine

Cleaning with Alkaline

Alkaline materials are good cleaning materials for greasy surfaces and they work best when heated up. It should be noted that most automobile soaps are alkaline based and using soap and hot water effectively cleans greasy surfaces.

Cleaning with bases: used on greasy parts

Cleaning with Acid

Acid materials are good for only cleaning rusts and scales. It does not clean grease; therefore, if rust is to be removed from a greasy surface, an alkaline agent is first used for the cleaning to remove the grease before acid is applied. It is to be noted that alkaline materials do not remove rust and scale. Scales are removed from the cooling system of an automotive using acid.

Cleaning with solvents

Solvents employed in engine cleaning come in three different types: (i) Water Based (ii) Mineral Spirits and (iii) Chlorinated Hydrocarbon

- Cleaning of the Inside Part of an Engine

Some of the cleaning methods employed in washing off unwanted materials inside an engine are: (i) Chemical Cleaning (ii) Abrasive Cleaning and (iii) Thermal Cleaning

- Chemical Cleaning: they involve the following:-

- | | |
|-----------------------|--------------------------------------|
| ✓ Solvent cleaning | ✓ Hot Soak Tanks |
| ✓ Alkaline cleaning:- | ✓ Spray Washer: the use of hot spray |
| ✓ Cleaning aluminum | jet |

- Abrasive blast cleaning

For engine parts to be cleaned with this method, they must be grease free. Two types of abrasive blasting are employed for cleaning various engine parts. They are:-

- ✓ Shot: Which is round in shape and
- ✓ Grit: Which is sharp and angular

Polishing equipment

- Preparation

On completion of the repair paint process, correct defects (such as spots, dust, boiling, running, orange peel, etc.) by using sandpaper from P1500 to P3000, water or dry sanding.

- **Application with Polisher**

First, clean the surface thoroughly and then apply a small amount of the polishing compound directly to the pad (or the surface). Place the polisher on the surface so that the pad has a slight angle.

- An important parameter for the perfect result is the change in the speed polisher according to the need of repair. As a rule, never exceed 2000 rpm.

Once process is complete, use a clean soft microfiber cloth to remove all residues.

- **Application by Hand:**

First, clean the surface thoroughly and then apply a small amount of the polishing compound directly to a clean soft microfiber cloth (or surface).

Rub with the cloth concentrating on the spot you want to repair.

Once process is complete, use a clean soft microfiber cloth

- Top polishing – Protection

For the perfect result, it is recommended to use the 807 Seal Polish polishing compound. To achieve better results with deeper gloss.

The 807 Seal Polish polishing compound is designed to quickly and effectively remove the circular lines and holograms that can appear during the polishing process. A key feature of the 807 Seal Polish is the creation of a protective waterproofing film. For this process, it is recommended to use the yellow pad or the waffle.

- For high performance gloss with depth and quick removal of lines from P2500, use as a second step the



806 Power Polish polishing compound. It is suitable for all kinds of repair and correction or aftermarket finish. For this procedure, it is recommended to use the HB BODY yellow pad.

Page 9 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022



Self-Check -1	Written Test
----------------------	---------------------

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the General EHS Guidelines
2. Explain about personal protective equipment,
- 3, list the requirement of tools
- 4, Explain about washing machine
5. Discuss about polisher equipment

Unit two: Clean Vehicle Interior and Fittings

This unit of competency covers the skills and knowledge required for car detailing to prepare the vehicle external and internal part includes cleaning. It describes the performance outcomes required to clean a vehicle. It requires the learner to plan and prepare the task; clean the vehicle interior, exterior and engine bay; and maintains the work area, tools and equipment.

This unit is developed to provide you the necessary information regarding the following content coverage and topics

- Preparing vehicle to clean
- Cleaning and vacuuming interior surfaces

This unit will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Prepare vehicle to clean
- Clean interior surfaces

2.1 Preparing vehicle to clean

Cleaning Guidelines

- Use products and procedures for cleaning the vehicle as found in the vehicle manuals.
- Follow the instructions on those products for use including any instructions to wear gloves and other personal protective equipment;

- | | |
|--|--|
| • Interior Door Levers/Window & Door Lock Controls | • Multifunction Levers |
| • Upper Door Trims /Armrest | • Radio Various Buttons |
| • Power Seat Switches | • Center Console & Glove Box Button/Handle |
| • HVAC Vents/Controls | • Cup Holders |
| • Steering Wheel/Buttons | • Shift Lever |
| • Lower IP Various Buttons | • Seat Belt Adjusters/Buckles/Locks |
| • Ignition Switch | |

- Seats If Necessary
- Inner Mirror/Visors/Assist Handles/Moon roof Shade
- Handle/Maps Lamps & Various Buttons

The basic cleaning requirements for all vehicles are given in Table 2.1. It is best to start Cleaning at the top of the vehicle and work down to the ground. Carry out the basic Cleaning in conjunction with the specific requirements for the type of vehicle, ensuring that you remove all soil and plant material Basic cleaning requirements for vehicles

Area	Actions
Air tanks	Clean these as for fuel tanks
Air vents	Unscrew the air vents and blow them with compressed air. If filters are fitted, remove and clean them
Battery	Remove the battery and clean underneath t.
Battery box	Clean the battery box.
Bodywork	Check all damaged bodywork. Remove any floor or body strips or moldings that form lips where soil or plant material may become trapped, particularly on vehicle floor compartments
Bumper and brush guard	Clean all hollow sections and attachment points.
Canopy	Remove the canopy and brush it, then clean it with compressed air or high-pressure water.
Canopy bows	Disassemble the canopy bows, then wipe or scrub them with brushes and water. Pay particular attention to locking catches, joints and hollow cross members.
Chassis	Clean the chassis with high-pressure water using equipment with a flexible nozzle. Pay particular attention to small apertures, which may act as reservoirs for soil and plant material.

Dashboard	Use compressed air and dry paintbrushes to clean the dashboard.
Dual wheels	Take extra care cleaning vehicles fitted with dual bogie wheels. If contamination is detected, an inspector may ask for the outer wheel to be removed, cleaned and re-inspected.
Fender wells	Clean the access areas for tail-light wiring and other fender apertures that may collect soil and plant material.
Floor drain plugs	Remove all floor drain plugs to facilitate cleaning. Clean all drain plugs and apertures, paying particular attention to threaded areas.
Floor mats	Remove all floor mats or carpets and clean them.
Fuel tanks	If fuel tanks are strapped to the vehicle, clean them to remove contamination between the tank and the vehicle

Area	Actions
Insulation tape	Check all taped areas for contamination and replace the tape with new where necessary.
Interior	Remove all contamination with vacuum or compressed air equipment.
Internal panels, access panels	Where possible, remove all internal panels to allow cleaning of inner compartments.
Lights and reflectors	Remove all damaged lights (internal and external) and any lights where seals have not maintained their integrity, so that you can clean the light fittings
Metal racks	Clean all box and tubular steel racks (which have openings) with

	high-pressure water.
Mirrors	Clean all mirror holders.
Radiator (all types)	Clean the radiator with compressed air and follow this with a low pressure high-volume water wash .You may need to use brushes or To pick seed material from Between the veins on the radiator
Ropes, straps and Velcro	Check and clean all ropes and straps and items containing Velcro. Extend ropes and straps to their full length when cleaning and check all attachment points, fixtures and tension devices
Rubber seals	Windscreens, doors, tailgates and other areas and clean or replace them as necessary.
Seatbelts	Clean and check all seatbelts, especially the catches where the Seat belts fasten. You may need to remove any sheaths or covers to adequately clean seatbelts
Seat cushions	Clean the cushion covers.
Storage and tool compartment	Empty and clean all storage and tool compartments
Support and cross members	Check and clean the transmission support members and other cross Members
Tools and Equipment	Remove all items for cleaning. This may include jacks, wheel bracesetc. Wipe tools clean

Tool boxes	Empty and clean all toolboxes. If they are bolted to the floor tray, unfasten and remove them to check there is no debris trapped Between the floor and the toolboxes.
Tires	Clean the tyres, paying particular attention to the tread and any cuts or gashes.
Winch cable drum	Unwind the winch cable and clean the drum, cable and any attachments of any soil and plant material that is embedded in the components or grease.

2.2. Cleaning and vacuuming interior surfaces

The vacuum cleaner market mainly present three types of products as the

- Sled type vacuum cleaners,
- upright vacuum cleaners and
- Handheld vacuum cleaners.

There are also all the extractor and injector vacuum cleaners which have others

Functions than aspirate dust. These vacuum cleaners concern the consumers market.

- 1) There are also professional vacuum cleaners in the market is dominated by sled type vacuum cleaners or cylinder vacuum Cleaners.
- 2) Upright vacuum cleaner represents a smaller market.
- 3) Lastly handheld vacuum cleaners are sold each year.

Upright vacuum cleaners are very similar to sled vacuum cleaners in their use and technology.

There are less powerful but seem to as efficient as sled ones when used with an electro brush.

The use of handheld vacuum cleaners is very different. New products

In the vacuum cleaners market, product innovation, at least from a technical point of view, is limited in most areas.

These criteria influence all the life cycle of the vacuum cleaner: design, manufacturing, use and recycling possibilities. For example industrials vacuum cleaner would probably be easier to collect for recycling. The household use is also probably less intensive than the industrial one.

Regarding the market quantity for residential products, there is no reason to eliminate some products from the study. In some countries, even handheld vacuum cleaners can represent more than 20 percent of sales.

Regarding the function, upright and sled vacuum cleaners applications are the same. Handheld vacuum cleaners have an extra use for little surface or quick use. Different impacts on the environment concern this step:

- Raw material

The use of a vacuum cleaner asks the periodic renewal of paper bags and /or filters. Raw material is used even if the bag is made in paper (renewable resources) and if it uses recycled paper. The composition of filters is various like paper, textile, active coal. New technologies permit to propose to the consumer filters reusable.

A Energy

The use of vacuum cleaners involves an energy consumption and consequently a Nonrenewable raw material consumption like fuel, gas...In relation of Life cycle Assessment this consumption can be easily estimated when we know the power of the vacuum cleaner and its use life.

The power of suction will depend also of the type of process. For example, between vacuum cleaner with a bag and a vacuum cleaner without bag, we can see differences on suction power and also on maintenance in the time of suction power.

B. Atmospheric Emission

When we use a vacuum cleaner, there is an air movement caused by the suction and involve dust emissions in suspension in the atmosphere which can give allergy Problems.

In order to reduce this problem, vacuum cleaners have more and more efficient system for the filtration (sometimes 4 or 5 filters).

C. Noise

The noise is an environmental nuisance. The reduction of the noise depends a lot of the manufacturing of the vacuum cleaner, of the materials used and of the airtightness of the vacuum cleaner's body. We must consider this parameter.

Sometimes the consumers think that the performance of a vacuum cleaner depends of the noise. More it is noisy more it is efficient. So if we will ask for a reduction of the noise, an information will be necessary.

The recent study on consumer's requirements concerning vacuum cleaning Enhancement showed a great demand for noise reducing

D, Waste.

The use of vacuum cleaners involves wastes (bags with a lot of dust, dirty filters, Deodorant for vacuum cleaners). For without bag systems (cyclone filtration or water filtration) there are other waste. For water filtration systems, the consumers need to empty and to clean the water tank after each use. This generates one or two liters of dirty water per vacuum cleaner use. For cyclone filtration, the cyclone must be empty regularly. Without bag, this operation can provoke some dust reemission

E. End of life

At the end of the life, the vacuum cleaner is a waste. Many solutions exist.

The consumer gives back the vacuum cleaner to his retailer. At this moment we must think to the operation of dismantling, recovery of some pieces or materials.

The producer takes back the different vacuum cleaners in conformity with the directive on electronic and electric materials but, in general, vacuum cleaners still end their life in a dump or an incinerator.

So one of the best solutions to reduce environmental impacts of vacuum cleaners is to increase their durability. The motor failure is not the only origin for vacuum cleaners early end of life. In some cases, the failure of the power nozzle system is a enough reason for consumer to dump its appliance.

**Self-Check -2****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write types of vacuum cleaner
2. What are steps of the Different impacts on the environment concern?
3. Explain about.Cleaning Guidelines

Operation Sheet-2	The basic cleaning requirements for all vehicles
--------------------------	--

Apply the basic cleaning requirements for all vehicles.

It is best to start Cleaning at the top of the vehicle and work down to the ground.

Carry out the basic Cleaning in conjunction with the specific requirements for the type of vehicle, ensuring that you remove all soil and plant material

Area	Actions
Air tanks	Clean these as for fuel tanks
Air vents	Unscrew the air vents and blow them with compressed air. If filters are fitted, remove and clean them
Battery	Remove the battery and clean underneath t.
Battery box	Clean the battery box.
Bodywork	Check all damaged bodywork. Remove any floor or body strips or moldings that form lips where soil or plant material may become trapped, particularly on vehicle floor compartments
Bumper and brush guard	Clean all hollow sections and attachment points.
Canopy	Remove the canopy and brush it, then clean it with compressed air or high-pressure water.
Dashboard	Use compressed air and dry paintbrushes to clean the dashboard.



LAP Test	Practical Demonstration
-----------------	-------------------------

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

Give necessary, tools and materials you are required to perform the following tasks

Within 2 hour. All tasks perform according to standard or workplace procedure.

Task 1: To selecting and checking Tools, equipment and materials

Task 2 To preparing Vehicle for cleaning interior and fittings

Task 3 To cleaning *interior surfaces*

Page 20 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022

Unit Three: Clean Vehicle Exterior and Fittings

This unit of competency covers the skills and knowledge required for car detailing to prepare the vehicle external and internal part includes cleaning. It describes the performance outcomes required to clean a vehicle. It requires the learner to plan and prepare the task; clean the vehicle interior, exterior and engine bay; and maintains the work area, tools and equipment.

This unit is developed to provide you the necessary information regarding the following content coverage and topics

- Preparing vehicle to clean
- Cleaning vehicle exterior and fittings

This unit will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Prepare vehicle to clean
- Clean vehicle exterior and fittings

3.1 Preparing vehicle to clean

The basic cleaning requirements for all vehicles are given in the topic of and sea It is best to start cleaning at the top of the vehicle and work down to the ground. Carry out the basic cleaning in conjunction with the specific requirements for the type of vehicle,

- Use products and procedures for cleaning the vehicle as found in the vehicle manuals.
- Follow the instructions on those products for use including any instructions to wear gloves and other personal protective equipment

A large number of different types of equipment's are required in a garage or service station for carrying out different types of repair works. Different types of equipment's are required to cope up with the wide variety of work to be done can be classified as under.

Special equipment's for service station

1. Compressed air plant
2. Car washing machine
3. Lifting tackles
- (a) Hydraulic jack

- (b) Car lift
- (c) Axle stands
- (d) Jib crane
- (e) A chain hoist
- 4. Chassis dynamometer
- 5. Wheel balancer
- 6. Tire remover
- 7. Brake drum lathe
- 8. Brake shoe lining riveting machine
- 9. Spark plug tester
- 10. High pressure grease gun
- 11. Wheel alignment gauges
- 12. Degreasing plant

Special equipments for engine repair:

- 1. Crankshaft grinding machine
- 2. Cylinder head surface grinding machine
- 3. Line boring machine
- 4. Connecting rod big end bearing boring machine
- 5. Cam shaft grinding machine
- 6. Valve refacer machine
- 7. Hydraulic press
- 8. Cylinder boring machine
- 9. Cylinder honing machine



3.2. Cleaning vehicle exterior and fittings

Classifies of vehicles into the following classifications:

1. Motorcycles (Optional)—All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handlebars rather than steering wheels. This category includes motorcycles, motor scooters, mopeds, motor powered bicycles, and three-wheel motorcycles. This vehicle type may be reported at the option of the State.

2. Passenger Cars—All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.

3. Other Two-Axle, Four-Tire Single Unit Vehicles—All two-axle, four-tire, vehicles, other than passenger cars. Included in this classification are pickups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, carryalls, and minibuses.

Other two-axle, four-tire single-unit vehicles pulling recreational or other light trailers are included in this classification. Because automatic vehicle classifiers have difficulty distinguishing class 3 from class 2, these two classes may be combined into class 2.

4. Buses—all vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. Modified buses should be considered to be a truck and should be appropriately classified.

Note: In reporting information on trucks the following criteria should be used:

- Truck tractor units traveling without a trailer will be considered single-unit trucks.
- A truck tractor unit pulling another such units in a “saddle mount” configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit.
- Vehicles are defined by the number of axles in contact with the road. Therefore, “floating” axles are counted only when in the down position.
- The term “trailer” includes both semi- and full trailers.

5. Two-Axle, Six-Tire, Single-Unit Trucks—All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels.

Page 23 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022



D-1

6. Three-Axle Single-Unit Trucks—All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with three axles.
7. Four or More Axle Single-Unit Trucks—All trucks on a single frame with four or more axles.
8. Four or Fewer Axle Single-Trailer Trucks—All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit.
9. Five-Axle Single-Trailer Trucks—All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.
10. Six or More Axle Single-Trailer Trucks—All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.
11. Five or fewer Axle Multi-Trailer Trucks—All vehicles with five or fewer axles Consisting of three or more units, one of which is a tractor or straight truck power unit.
12. Six-Axle Multi-Trailer Trucks—All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.
13. Seven or More Axle Multi-Trailer Trucks—All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit

Preparing vehicle to clean (external cleaning that determine to example of as follows

- ✓ Key exterior touch point areas
- All Exterior Handles
- Fuel Lid/Gas Cap
- Trunk or Tailgate Button/Pull

Page 24 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022

**Self-Check -3****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Discuss about Classifies of vehicles.
2. Write The basic cleaning requirements

Unit four: Clean Engine Bay

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Preparing vehicle to clean
- Protecting electronic components and electrical connections
- Cleaning engine bay

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Prepare vehicle to clean
- Apply Protecting electronic components and electrical connections
- Clean engine bay

4.1 Preparing vehicle to clean

It is best to start cleaning at the top of the vehicle and work down to the ground. Carry out the basic cleaning in conjunction with the specific requirements for the type of vehicle, ensuring that you remove all soil and plant material. Basic cleaning requirements for vehicles Area Actions

A designated washing bay should be designed so that run-off is:

- minimized, by putting a roof over it if possible
- isolated using channels, gullies, gradient (fall on the surface) and Krebs
- directed to a silt trap or settlement tank to remove larger particles of silt and sediment
- either collected in a sealed system for reuse, discharged to the public foul sewer with prior permission of the local sewer provider or collected in a sealed system for authorized disposal
- Never discharged to the sewer through an oil interceptor. Detergents will prevent the oil interceptor from working properly. You should also:

- have procedures for everyone, including contractors, that cover where and how vehicle washing and cleaning should be carried out and what to do in a spillage emergency
- provide notices for designated washing bays saying what they're for and that washing and cleaning should only be carried out in the bay
- consider whether a fence or barrier is required to prevent spray or wind drift out of the designated area
- Minimize water use and solid waste production with appropriate equipment and procedures.

4.2. Protecting electronic components and electrical connections

Electricity is conducted through some materials better than others. Its resistance measures how well something conducts electricity. Some things hold their electrons very tightly. Electrons do not move through them very well. These things are called insulators. Rubber, plastic, cloth, glass and dry air are good insulators and have very high resistance. Other materials have some loosely held electrons, which move through them very easily. These are called conductors. Most metals -- like copper, aluminum or steel -- are good conductors. Electrical The Occupational Safety and Health Administration (OSHA) is revising the general industry electrical installation standard found in Subpart S of 29 CFR Part 1910. The Agency has determined that electrical hazards in the workplace pose a significant risk of injury or death to employees, and that the requirements in the revised standard, which draw heavily from the 2000 edition of the National Fire Protection Association's (NFPA) Electrical Safety Requirements for Employee Workplaces (NFPA 70E), and the 2002 edition of the National Electrical Code (NEC), are reasonably necessary to provide protection from these hazards. This final rule focuses on safety in the design and installation of electric equipment in the workplace. This revision will provide the first update of the installation requirements in the general industry electrical installation standard

Electricity is widely recognized as a serious workplace hazard, exposing employees to electric shock, burns, fires, and explosions. According to the Bureau of Labor Statistics, 250 employees were killed by contact with electric current in 2006. Other employees have been killed or injured in fires and explosions caused by electricity.

It is well known that the human body will conduct electricity. If direct body contact is made with an electrically energized part while a similar contact is made simultaneously with another

Page 27 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1 September, 2022
---------------	--	-------------------------------	-------------------------------

conductive surface that is maintained at a different electrical potential, a current will flow, entering the body at one contact point, traversing the body, and then exiting at the other contact point, usually the ground. Each year many employees suffer pain, injuries, and death from such electric shocks.

Current through the body, even at levels as low as 3 mill amperes can also cause injuries of an indirect or secondary injuries in which involuntary muscular reaction from the electric shock can cause bruises, bone fractures and even death resulting from collisions or falls.

4.3 Cleaning engine bay

Check all surfaces of the engine block, including between tappet covers.

- Remove and clean the air-filter pre-cleaner.
- Remove and clean the air-filter with compressed air.
- Clean inside the fan belt flywheels (harmonic balancer).
- Remove and clean any belly plates.
- Remove all non-affixed engine covers to allow access and clean all surfaces.
- Check the engine covers for any hollow support frameworks and flush these to ensure that they are clean.
- Remove all engine cover rubbers and clean them.
- Flush the hollow chassis rails either side of engine via drainage holes on the underside of the rails. You may need to remove the belly plate bolts to do this.
- Check the battery boxes either side of engine. Loosen the batteries and clean under them.
- Flush the radiator and oil cooler from both sides to ensure that the fin and core are clean.
- Loosen the radiator shroud to let loose debris fall through.
- Check either side of the radiator for vertical hollow support structures and flush them.
- Check inside all wiring harnesses.
- Check under all hydraulic looming.
- Remove zip-ties and electrical tape that hold hydraulic hoses together—this will facilitate cleaning.

The basic cleaning requirements for all vehicles are given in Table 2. It is best to start cleaning at the top of the vehicle and work down to the ground. Carry out the basic cleaning in conjunction with the specific requirements for the type of vehicle, ensuring that you remove all soil and plant material.

Page 28 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022



Basic cleaning requirements for vehicles Area Actions Air tanks clean these as for fuel tanks. Air vents UN screw the air vents and blow them with compressed air. If filters are fitted, remove and clean them. Battery Remove the battery and clean underneath it. Battery box Clean the battery box.

Bodywork

Check all damaged bodywork. Remove any floor or body strips or moldings that form lips where soil or plant material may become trapped, particularly on vehicle floor compartments.

Bumper and brush guard Clean all hollow sections and attachment points. Canopy Remove the canopy and brush it, then clean it with compressed air or high-pressure water. Canopy bows Disassemble the canopy bows, then wipe or scrub them with brushes and water. Pay particular attention to locking catches, joints and hollow cross members.

Chassis

Clean the chassis with high-pressure water using equipment with a flexible nozzle. Pay particular attention to small apertures, which may act as reservoirs for soil and plant material. Dashboard Use compressed air and dry paintbrushes to clean the dashboard.

Dual wheels

Take extra care cleaning vehicles fitted with dual bogie wheels. If contamination is detected, an inspector may ask for the outer wheel to be removed, cleaned and re-inspected. Fender wells clean the access areas for tail-light wiring and other fender apertures that may collect soil and plant material. Floor drain plugs remove all floor drain plugs to facilitate cleaning. Clean all drain plugs and apertures, paying particular attention to threaded areas. Floor mats Remove all floor mats or carpets and clean them. Fuel tanks If fuel tanks are strapped to the vehicle, clean them to remove contamination between the tank and the vehicle.

Page 29 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1 September, 2022
---------------	--	-------------------------------	-------------------------------



Self-Check -4	Written Test
----------------------	---------------------

Directions: say true or false all the questions listed below

3 and above correct answered points passed mark

1. heavy tools o upper tool chest holds commonly used tools in easy reach small carrying tray is placed
2. Check all surfaces of the engine block, including between tappet covers.
3. Electricity is conducted through some materials better than others.

OPERATION SHIT 4

operation title: - cleaning vehicle

purpose: - for safety and health as well as good business.

conditions or situations for the operations:-

- properly sorted working area
- properly operated tools and equipment's
- appropriate working cloths fit with the body.

equipment tools and material

- hand tools -brush / a scopa etc.

procedure:-

1. Clean up every time whenever you leave an area, including sweeping the floor.
2. Clean and return all tools to where you got them.
3. Use compressed air sparingly; never aim it at another person or use it to clean hair or clothes.
4. Shut off and unplug machines when cleaning, repairing, or oiling.
5. Never use a rag near moving machinery.
6. Use a brush, hook, or a special tool to remove chips, shavings, etc. from the work area. never use the hands.
7. Keep fingers clear of the point of operation of machines by using special tools or devices, such as, push sticks, hooks, pliers, etc.
8. Keep the floor around machines clean, dry, and free from trip hazards. do not allow chips to accumulate.
9. clean up and dry spills immediately and put a chair or cone over them if they are wet enough to cause someone to slip.

precautions:-

- wear working cloths which properly fit with your body
- make working area hazard free
- read and interpret manual which guide you how to use tools and equipment's

quality criteria: assured performing of the activities correctly accordance with the given procedure mentioned above.



LAP Test -4	Practical Demonstration
--------------------	--------------------------------

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates/guides, workshop, tools and materials you are required to perform the following tasks within 2:30 hours.

Task 1: use the proper tool and equipment the proper place.

Task 2: Using the given template measure and test

Task 3: Using the given template - observe at all times and appropriate personal protective equipment (PPE)

Task 4: Using a given template, Tools and equipment are handled

Unit five: Complete Work Processes

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Making final inspection
- Managing wastes
- Checking and storing tools and equipment
- Processing workplace documentation

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Make final inspection
- Manage wastes
- Apply Checking and storing tools and equipment
- Document work Process

5.1 Making final inspection

Every operations environment contains a mix of automated and manual interactions between equipment and personnel. Often, these processes are not fully documented and include extra steps and resources. As such, they are difficult to adapt to changing business needs. Additionally, as workforces age and retire, organizations are losing the knowledge that is gained from years of experience on the plant floor – as the information has not been captured electronically and put into formal processes.

Free ready-to-use final inspection checklists. There are many steps to accomplish in the inspection process before the vehicle inspector can issue a certificate of occupancy. The first step in this process is the foundation inspection, which is conducted before the concrete is poured. A final inspection checklist is used by vehicle inspectors to check newly arranged

5.2 Managing wastes

The process of managing unwanted waste items that have served their purpose but are no longer useful is referred to as Waste Management. Collecting solid waste materials, processing them, and disposing of them are all part of the solid waste management process. Human interaction with the environment has always resulted in the creation of waste.

Wastes include dead and decaying plant and animal remains, metabolic by-products (faecal remains, excreta, etc.), discarded materials from homes, workplaces, businesses, restaurants, factories, hospitals, pesticides, herbicides sprayed on fields, and many more. This article will teach students about solid waste management, including the many trash management methods and their benefits.



Fig 5.1 Sources of Waste



Waste management can be simply defined as the collection, transport, recovery, and disposal of waste, together with monitoring and regulation of the waste management process. However, the newer concept of waste management talks about the 7 R's – Rethink, Refuse, Reduce, Reuse, Recycle, Regulate, and Research.

5.3 Checking and storing tools and equipment

Toolbox stores and protects a technician's tools when not in use

Toolbox Parts lower roll-around cabinet holds bulky, heavy tools o upper tool chest holds commonly used tools in easy reach small carrying tray is placed in the upper tool chest and allows tools to be taken to the vehicle more easily Toolbox Never open more than one drawer at a time Toolbox Organization Related tools are usually kept in the same drawer various types of hammers may be stored in one drawer and all screwdrivers in another Small or delicate tools should not be kept with large, heavy tools to prevent damage Tool holders help organize small tools

5.4 Processing workplace documentation

Some types of workplace documentation are required by law. It is therefore essential to follow requirements for completing these documents and to complete them accurately. Your workplace has a legal requirement to complete documentation related to regulations, standards and codes of practice, such as dangerous goods and freight regulations. These may include load limits, health and safety legislation, equal employment legislation and environmental protection regulations. Protocols and procedures are implemented to ensure documentation is legally binding. These procedures must be easy to access in the workplace.

Workplace procedures – which are based on privacy, WHS and environmental protection legislation – should be followed when interpreting, analyzing and organizing documentation. Forms such as incident reports, risk assessments and hazard reports need to be completed accurately and according to procedures. The following guidelines will help you to meet documentation requirements.

Page 35 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1
			September, 2022



Self-Check -5	Written Test
----------------------	---------------------

Directions: say true or false all the questions listed below

1. Some types of workplace documentation are required by law (2)
2. There are many steps to accomplish in the inspection process before the vehicle inspector can issue a certificate of occupancy. (2)
3. WHS and environmental protection legislation – should be followed when interpreting, analyzing and organizing documentation. (2)

OPERATION SHEET:-proper storing tools and equipment's

PURPOSE: - For safety and health as well as good business. And for reducing overall tool cost through maintenance.

CONDITIONS OR SITUATIONS FOR THE OPERATIONS:-

- Safe working area
- Properly operated tools and equipment's
- Appropriate working cloths fit with the body.

EQUIPMENT TOOLS AND MATERIALS :

- Hand tools -screw driver, wrenches, hammers etc.
- Equipment - floor jack, hydraulic crane etc.
- Special tools - torque wrench etc.

PROCEDURE:-

- Design place for each kind of tools.
- Label the storage cabinet or place correctly.
- Store them near the point of use.
- Wash and dry properly before storing.
- Store sharp edge materials properly when not in use with sharp edge down.
- Put frequently used items in conveniently accessible conditions.
- Gather and secure electrical chord to prevent entanglement or snagging.
- Cutting boards should be stored vertically to avoid moisture collection

PRECAUTIONS:-

- Wear working cloths which properly fit with your body
- Make working area hazard free
- Read and interpret manual which guide you how to use tools and equipment

QUALITY CRITERIA:

Assured performing of the activities correctly accordance with the given procedure given above.

Page 37 of 41	Ministry of Labor and Skills Author/Copyright	Carrying out Vehicle Cleaning	Version -1 September, 2022
---------------	--	-------------------------------	-------------------------------



LAP Test -5	Practical Demonstration
--------------------	--------------------------------

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates/guides, workshop, tools and materials you are required to perform the following tasks within 2:30 hours.

Task 1: By Using the given template undertaking routine maintenance of tools and equipment

Task 2: By using the given template cleaning equipment and tools

Task 3: By Using the given template store tools and equipment safely in appropriate with work place procedure

Task 4: By using the given guide apply 5S activities

Reference

1. vehicle washing and cleaning
2. The environment, health and safety program
3. At2033 automotive safety1.
4. Environmental, health, and safety general guidelines
5. Washing machine hoses
6. Vehicle and truck classification
7. Vehicle and machinery
8. types of motor vehicles at a glance
9. specification for garage tools & equipment's
10. vehicle interior / exterior cleaning and disinfecting
11. Automotive technology update Cleaning
12. Cleaning and disinfections of vehicles
13. Directorate of Vocational Education and Training, Maharashtra State
14. Specification for garage tools & equipment
15. Automotive tools and equipment
16. Materials for Automobile Bodies equipment
17. Environmental Cleaning Standard Operating Procedures
18. Fine grinding and polishing tools &equipment

Participants of this Module (training material) preparation

No	Name	Qualification (Level)	Field of Study	Organization/Institution	Mobile number	E-mail
1	<u>Sisaylegese</u>	MSc	Automotive technology	AKPTC	0910407622	alemsisay647@gmail.com
2	<u>Andinet Asnake</u>	MSc	Automotive technology	<u>Wolkite</u> PTC	0913767250	andinetasnake31@gmail.com
3	<u>DejenaMekonen</u>	MSc	Automotive technology	<u>Adama</u> PTC	0912248339	dejenemekonin61@gmail.com
4	<u>BihonegnMekete</u>	MSc	Automotive engineering	W/ <u>rosiheen</u> PTC	0977217033	bihonegnmekete321@gmail.com
5	<u>AnduwalemHailu</u>	MSc	Automotive technology	<u>Deradewa</u> PTC	0935660194	Andualem.hailu2@gmail.com
6	<u>Endris Argaw</u>	MSc	Automotive technology	<u>Asosa</u> PTC	0953306677	emranendris11@gmail.com