(Mineral Resources Infrastructure Work)

NTQF Level -I

Learning Guide -41

Unit of Competence: - Carry out manual excavation

Module Title: - Carrying out manual excavation

LG Code: MIN MRI1 M11 LO4-LG-41

TTLM Code: MIN MRI1 M11 0519 TTLM 0819v1

LO1: Clean up

Instruction Sheet	Learning Guide41

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

- ✓ Clearing loose material from the edge of excavation
- ✓ Clearing work area and recycling or disposing materials
- ✓ Cleaning, checking, maintaining and storing tools and equipment

This guide 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 –**

- Clear loose material away from the edge of excavation
- Clear work area and disposed or recycle materials in accordance with project environmental management plan
- Clean, check, maintain and store tools and equipment according to organizational requirement

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 7.
3. Read the information written in the “Information Sheets 1 to 3”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” in page 5, Self-check 2” in page 10, Self-check 3” in page14.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1to 3).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Clearing loose material from the edge of excavation

1.1. Basic definitions Clearing loose material

Loose material often consists of sandy soil types, gravel soils, or a mixture of both gravel and sand in an excavation area. Loose material is a layer of loose, heterogeneous superficial deposits covering solid rock.

Clearing of lose material refers to the removal of all excavated rocky, soil material from excavation area, while **grubbing** is the removal of roots that may remain in the soil. This includes the removal of all logs, brush, and debris, as well as grinding and removal of stumps. Once completed, the site is ready for grading and drain installation.

1.2. Types of loose of Materials.

(A) Unsuitable Material. Soils that cannot be properly compacted, or soils that have roots or other organic matter, garbage. Debris, junk, or any deleterious matter on the surface of buried.

(B) Excavated Material. All material excavated from project site for trench/pit.

(C) Selected Material. Suitable excavated material for specific use from areas within the excavation right-of-way.

1.3 Edge of excavation?

Edge an excavation is of the outside limit of a trench, pit and hole, area, or surface. Look the figure below to understand edge of excavation and loose materials produced from excavation.

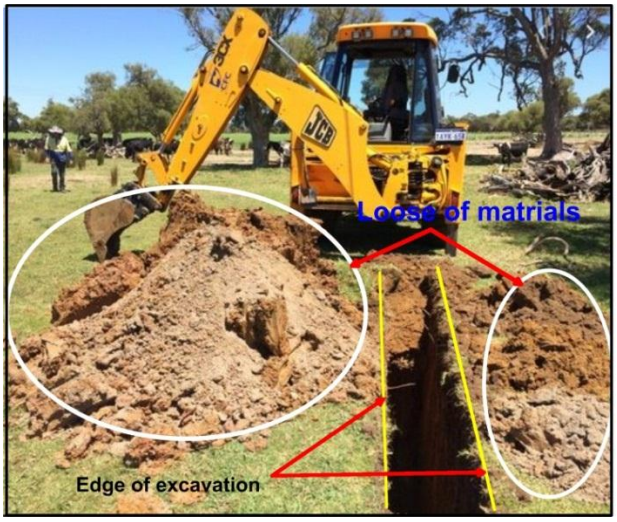

Fig 1.1. Edge of trench with its loose material

1.3. Importance of clearing loose material from the edge of excavation

- To prevent excavation collapse

- To have safe and suitable working environment
- To prevent backfilling of the excavated soil to the excavated pit
- To prevent sample contamination

1.4. Method of clearing materials from edge excavation

- ✓ Manually by using hand tools (loppers, pruners, hand saws, shovels, pickaxes, rakes and hoes.)
- ✓ By using machineries like excavator, dozer and loader ,Bulldozers

Self-Check -1	Written Test

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

1. What is edge of excavation? **2pts**
2. What is clearing loose material? **2pts**
3. List some Importance of clearing loose material from the edge of excavation. **3pts**
4. What challenges will faced if you are not clear the loose materials from an excavated trench/pit? **2pts**

Note: **Satisfactory rating – 4.5 points** **Unsatisfactory - below 4.5points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet-2	Clearing the work area and recycling or disposing materials

2.1. Basic concept of clearing the work area

Clearing the work area involves **clearing** a **site** of any machinery or equipment, unwanted surplus materials, rubbish, and so on. **Site clearance** may also involve **clearing** away vegetation and surface soil, and leveling and preparing the ground for the planned **excavation** works.

Clearing work area

- ✓ Is removing from the site trees, brush, shrubs, down timber, rotten wood, and rubbish, other vegetation as well as fences, and incidental structures necessary to allow for new construction.

(1) Remove all trees, stumps and roots within 10' of any structure or pipeline.

(2) Stumps of trees, other than the above, to be left in place shall be cut off shall be left not more than 6" above original grade. Remove all stumps unless in a fill section greater than 5 feet.

- ✓ Clearing work shall be restricted to area within rights-of-way or easements or within "Construction Limits" indicated on Contract Drawings.
- ✓ Clean up debris resulting from site clearing operations continuously with the progress of the work.
- ✓ Remove all waste material from site.
- ✓ Remove debris from site in such a manner as to prevent spillage. Keep pavement and area adjacent to site clean and free from mud, dirt and debris at all times

Fig 2.1. Working area clearance

2.1.1. Purpose of clearing work area

The main **purpose of site clearance** is to remove existing weathered rocks, waste, vegetation and, most importantly, the surface layer of soil referred to as topsoil. It is necessary to remove this layer of soil, as it is unsuitable to build on.

Before setting up the work area you will first need to clear it.

Start by removing all unwanted excavation materials away from the work area. Place them in a secure area where they won't get damaged.

Fig 2.2. Transporting all unwanted excavation materials

Dispose of unwanted materials in the following way.

- Place soil and rocky materials, recyclable plastic, paper and cardboard in the appropriate recycling bins.
- Stack timber off cuts in a firewood pile.
- Store hazardous materials such as adhesives/paints for collection by the local council.
- Place general rubbish in rubbish bins.

Fig 2.3. Dispose of rubbish materials

If you are working inside, sweep the floors to remove all dust and debris from the work area.

Fig 2.4. Cleaning of rubbish materials

2.2. Recycling or disposing materials

Waste management (or **waste disposal**) is the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.

Waste disposal. Removing and destroying or storing damaged, used or other unwanted domestic, agricultural or industrial products and substances. **Disposal** includes burning, burial at landfill sites or at sea, and recycling.

2.4. Waste disposal methods

1. **Preventing or reducing waste generation:** Extensive use of new or unnecessary products is the root cause of unchecked waste formation.
2. **Recycling:** Recycling serves to transform the wastes into products of their own genre through industrial processing. Paper, glass, aluminum, and plastics are commonly recycled. It is environmentally friendly to reuse the wastes instead of adding them to nature. However, processing technologies are pretty expensive
3. **Incineration:** Incineration features combustion of wastes to transform them into base components, with the generated heat being trapped for deriving energy.

Fig 2.5. Waste disposal methods (reducing waste generation, recycling and Incineration)

4. **Composting:** It involves decomposition of organic wastes by microbes by allowing the waste to stay accumulated in a pit for a long period of time.
5. **Sanitary Landfill:** This involves the dumping of wastes into a landfill. The base is prepared of a protective lining, which serves as a barrier between wastes and ground water, and prevents the separation of toxic chemicals into the water zone. Waste layers are subjected to compaction and subsequently coated with an earth layer. Soil that is non-porous is preferred to mitigate the vulnerability of accidental leakage of toxic chemicals. Landfills should be created in places with low groundwater level and far from sources of flooding. However, a sufficient number of skilled manpower is required to maintain sanitary landfills.
6. **Disposal in ocean/sea:** Wastes generally of radioactive nature are dumped in the oceans far from active human habitats. However, environmentalists are challenging this method; as such an action is believed to spell doom for aquatic life by depriving the ocean waters of its inherent nutrients.

Fig 2.6. Waste disposal methods (Composting, Sanitary Landfill and Disposal in ocean /sea)

2.5. Importance of recycling:

- To Make Environment Clean
- Conservation of Materials
- To Save Energy
- Reduce Garbage in Landfills

Self-Check -2	Written Test

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

1. What is the clearing of work area? What is the importance of clearing of work area?**2pts**
2. Discus the steps of setting work area before starting the work. **3pts**
3. What is Waste management? What is waste disposal? What is the importance of recycling? **3pts**
4. Discus Waste disposal methods.**3pts**

Note: **Satisfactory rating – 4.5 points** **Unsatisfactory - below 4.5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet-3	Cleaning, checking, maintaining and storing tools and equipment

3.1. Cleaning tools and equipment

Equipment of all types should be cleaned at the location of last use before being moved to a new location. Different types of materials require different cleaning methods

Pre clearing, by removing heavy accumulations of soil and debris with appropriate tools, will save water during later washing operations. Effective cleaning to eliminate invasive species materials and prevent their spread can be accomplished by thoroughly removing soil and debris using pressurized water. In certain situations, cleaning with compressed air, rather than water, could prevent damage to certain equipment areas such as engine wiring systems and vehicle cabs.

Personnel who use equipment during cleaning operations are responsible for properly using Personal Protective Equipment (PPE) that is appropriate to the cleaning activity. Using cleaning and disinfectant chemicals, power washers, air compressors, and other types of cleaning equipment may present unique working hazards. PPE items may be required to protect hearing, skin, eyes, respiration, and other body resources. For example, certain types of cleaning equipment may require electrical power and may present electrical hazards to the operator.

Even the most careful cleaning of any equipment, however, will not guarantee that the equipment is absolutely free of contamination. Successful cleaning is dependent upon many factors, such as the amount of care taken during the cleaning operation, the type of cleaning equipment being used, the level of training of the cleaning operator, the type of equipment being cleaned, and the particular invasive species.

After decontamination, equipment should be handled only by personnel wearing clean gloves to prevent re-contamination. In addition, the equipment should be moved away (preferably upwind) from the decontamination area to prevent re-contamination. If the equipment is not to be immediately re-used it should be covered with plastic sheeting or wrapped in aluminum foil to prevent re-contamination. The area where the equipment is kept prior to re-use must be free of contaminants.

3.2. Checking of Equipment and Tools

This is designed to encourage all staff to check equipment and tools regularly for faults and condition and report defects to management immediately and not to use defective tools or equipment.

Outcomes required

The overall intention is to raise awareness of using faulty tools or equipment and that all are aware of their duty of care to themselves and others of ensuring they do not. Also the empowerment they have in not conducting unsafe acts by using and also in confidently raising with management issues with equipment and tools supplied by the company.

3.3. Equipment maintenance

Tools and equipment must be maintained if they are to be operated in a safe and effective manner. Elements of good maintenance requirements include:

- Inspection of the tools and equipment at must occur checkout or start-up of the job. This can include such items as a visual inspection of the power cord to make sure it is not damaged, visual inspection to make sure equipment parts are securely attached, and inspection for cleanliness.
- Inspection of tools and equipment must also occur at check in or at completion of the job. This should include cleaning the tools after use, reporting any problem with the tool or equipment while in use, draining any excess fuel or flammable fluids from the equipment.
- Routine maintenance as per the manufacturer's requirements should be carried out.

3.3.1 Important of maintenance of equipment

Normal wear and tear can result in lower **machine** efficiency. Preventive **maintenance** assures optimal working conditions and conserves the life span of the **equipment**. A planned preventive **maintenance** may cause small hindrance for production, but that is nothing compared to actual downtime caused by a breakdown.

3.4. Proper Storage of Tools and Equipment:

To ensure that tools and equipment remain in good condition and last for a long time, store them properly. Properly stored tools and equipment will be easy to find when needed and are less likely to be lost.

Example: Good practices for mechanical room

Parts should be properly stored and labeled	

Tools should be properly placed on the board, and labeled. Consider drawing the shapes of the tools on the board so that they always get put back in the same position.	
Use bins for storing small parts	
Consider making an individual (or individuals) responsible for the good maintenance of tools and parts.	

3.4.1. Benefits of Proper Storage of Tools and Equipment:

- Tools and parts are kept in good condition and are easy to find
- Costs are reduced
- Productivity is increased because time is not lost looking for tools, parts and equipment
- Workshop staff develop a sense of responsibility and pride in their work

How?

✓ Workshop staff identify tools, parts and equipment

✓ Workshop staff develop a system for labeling and storing tools, parts and equipment

Self-Check -3	Written Test

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

1. What is cleaning tools and equipment? 2pts
2. What is the benefit of proper storage of tools and equipment? 3pts
3. What is the importance of maintain Tools and equipment? 3pts

Note: **Satisfactory rating – 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Operation Sheet-1	Cleaning, checking, maintaining and storing tools and equipment

1.1. How to Maintain Tools and equipment

Step1. Wear personal protective equipment

Step 2. Clean your tools. Cleaning the tools regularly is essential to their proper functioning. After a day of work, your tools will be covered with some amount of dirt. It's important to clean them after you're finished using them. Although a thorough cleaning is not required on a daily basis, make sure you clean your tools regularly. When cleaning your tools, don't use chemicals that are extremely harsh

Step 3. **Protect electrical cords.** Airlines and electrical cords are prone to heavy damage since they are generally in the way of construction vehicles, and foot traffic. Other machinery like forklifts, drills, etc. can easily cut through wires. To keep the wires and airlines from getting damaged, it is important to protect them. You can cover the electrical cords with industrial strength casings or purpose-built ramps.

Step 4. **Lubricate tools.** Whether you work with pneumatic or regular tools, it is important to lubricate them regularly. Lubricating tools helps them to perform better and reduces wear and tear of components.

Step 5. Inspect tools regularly. Regularly inspect your tools for signs of damage and faulty functioning. Inspections should take place at the end of each construction job. Ensure that you repair them immediately if there is any damage.

Step 6. **Store tools with care.** Storing tools properly is of prime importance. Although tools are designed for rough use, it is important to store them properly. Cover up your tools to keep dirt and rain away from the machine

1.2. How to Store Tools & Equipment

Step 1 Wear personal protective equipment

Step 2 Delegate a portion of your garage, shed or basement closet as a place to store tools. Clean out the junk and clutter and make a space only for tools. Figure out how much space is needed for the amount of tools you have. Sweep away cobwebs, dirt and other foreign matter. Get a shelving unit and store chemicals, liquids and paint substances out of the reach of children and pets.

Step 3 Find the parts. Locate cords, bits, nails and screws and organize them. Allocate plastic bins to store smaller household tools. If you have a large tool collection, organize by type for easy location. Keep the parts for each specific tool close by.

Step 4 Clean out dirt and debris from tools. Oil power tools to lubricate moving parts. Repair loose handles and clean out oil or other fluids used to power the tool. Sharpen blades and replace worn out parts.

Step 5 Set up racks. Mount commercially available racks along the wall of your garage or storage area to hang garden tools, cords and other equipment. Screw racks into the wall with screws recommended by the manufacturer and a power drill. Wind long cords in a loop and hang from rack. Place tools on racks by the handle. Draw the outline of the tool with a permanent marker to identify its place, or use labels to mark the location.

Step 6 Create a library. For tools and appliances that have various functions, designate a library area or bin within the storage space for user manuals and warranty sheets. Store the booklets alphabetically and in a dry area. Type up a sheet listing all of the books to create simple table of contents.

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2-4 hours.

Task 1: Maintain Tools and equipment used for excavation

Task 2: Store Tools & Equipment properly used for excavation

List of Reference Materials

- ✓ Site Clearance Capability. A guide for effective local planning, response and recovery, Department for Communities and Local Government, Australia, May 2016

1- WEB ADDRESSES (PUTTING LINKS)

https://www.google.com/search?ei=q_lsXeihC8Lngwemw5 g BA&q=Checking++ tools+and+ equipment &oq=Checking++tools+and+equipment&gs

https://www.asean.org/storage/images/2013/economic/matm/Toolboxes%20for%20Six%20Tourism%20Labour%20Divisions/Specific%20Competencies/Housekeeping%20Division/

https://www.google.com/search?q=Checking+of+Equipment+and+Tools+Prior+to+use&oq=Checking+of+Equipment+and+Tools+Prior+to+use&aqs=chrome..69i57j33.2043j0j8&so

https://www.dlsweb.rmit.edu.au/Toolbox/Rendering%20concrete%20walls/submanifest2/workingwithplasterandmortar/003clearworkarea.htm

https://www.norcalcompactors.net/6-waste-disposal-methods/

https://www.conserve-energy-future.com/importance_of_recycling.php

https://www.google.com/search?ei=q_lsXeihC8Lngwemw5-gBA&q=Checking++tools+and+equipment&oq=Checking++tools+and+equipment&gs_l=psy-ab.3..0i7i30l2j0j0i5i30j0i8i30.8977630.8980138..8984567...0.3..0.503.3324.2-2j3j3j1.....0....1..gws-wiz.....0i71j0i8i7i30j0i7i5i30.wUMjJRYhu8k&ved=0ahUKEwioo5GlgbLkAhXC8-AKHabhB0QQ4dUDCAo&uact=5

https://www.asean.org/storage/images/2013/economic/matm/Toolboxes%20for%20Six%20Tourism%20Labour%20Divisions/Specific%20Competencies/Housekeeping%20Division/Clean%20and%20maintain%20industrial%20work%20area%20and%20equipment/TM_Clean_&_maintain_ind_work_area_&_Equip_310812.pdf

https://www.google.com/search?q=Checking+of+Equipment+and+Tools+Prior+to+use&oq=Checking+of+Equipment+and+Tools+Prior+to+use&aqs=chrome..69i57j33.2043j0j8&sourceid=chrome&ie=UTF-8