# (Mineral Resources Infrastructure Work)
# NTQF Level -I

# Learning Guide -40

Unit of Competence: - Carry out manual excavation

Module Title: - Carrying out manual excavation

LG Code: MIN MRI1 M11 LO3-LG-40

TTLM Code: MIN MRI1 TTLM 0819v1

## LO1: Complete and isolate the excavation

| Instruction Sheet | Learning Guide40 |
|---|---|

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

- ✓ Cleaning loose material out of excavation
- ✓ Checking excavation as per work instruction

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 –**

- Clean loose material out of excavation using hand tools
- Check the excavation for confirmation with the specification or work instruction

**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”. 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 7.
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 1 to 2).
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 | Cleaning loose material out of excavation |
|---|---|

## Introduction

**Loose material** is a layer of loose, heterogeneous superficial deposits covering solid rock. It includes dust, soil, broken rock, and other related materials and is present on Earth. **Loose** parts are **materials** that can be moved, carried, combined, redesigned, lined up, and taken apart and put back together in multiple ways. **Loose material** often consists of sandy soil types, gravel soils, or a mixture of both gravel and sand in an excavation area. They are **materials** with no specific set of directions that can be used alone or combined with other **materials**. **Loose** parts can be natural or synthetic.

## What is the cleaning process?

**Cleaning** is the **process** of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment. **Cleaning** occurs in many different contexts, and uses many different methods.

## Types of cleaning methods

There are many types of cleaning methods but Mechanical and chemical cleaning are the most common methods

1. **Mechanical cleaning:** The removal of impurities by mechanical units as compared with hand picking. Broadly, mechanical cleaning may be subdivided into dry cleaning and wet cleaning. Mechanical cleaning involves the use of air-driven high-speed rotating tools such as brushes, buffing tools, hones, scrapers, or cutters that clean by abrasive action. One disadvantage of high-speed rotation is the inability to control dwell time on the surface. Low-speed rotary cleaning systems have been developed to overcome this disadvantage. Depending on the type of contamination, the tools can be made from soft or hard plastics, metals, or hard ceramics. Brushes are available with bristle sizes as small as 3 mm for medical applications such as cleaning catheters or endoscopes .Often, the cleaners have ports through which water or other liquids can be injected to clean and flush in a single operation. The cleaning method is fast, economical, and safe for straight tubes, and it can clean almost all types of deposits including hard scale. Brushes have also been effective in cleaning tubes with enhanced internal surfaces (spirally indented, grooved, or finned), or tubes with thin metal inserts or epoxy type coatings. However, the presence of sharp bends in small-diameter tubing makes this cleaning method often inapplicable.
2. **Chemical cleaning (alkali or acid solutions, solvents).**

Chemical cleaning with alkaline or acid solutions is very effective in removing scale or hard oxide films, as well as other hydrocarbon contaminants and debris. Other liquids, such as solvents and even hydraulic oil, have also been used, but they are less effective in removing strongly adhering deposits. However, the use of hazardous chemicals increases the risks, requires enhanced personnel safety and expertise, and adds significant waste disposal costs to the cleaning operation. The cleaning process is also time consuming. Its use has been declining in recent years.

## Cleaning mechanisms

**The following are some of the cleaning mechanisms**

1. Brush off loose dirt.
2. Spray on a cleaning solution of water and mild soap.
3. Use a soft bristle brush to clean.
4. Allow cleaning solution to soak into the fabric.
5. Rinse thoroughly until all soap residue is removed.

6. Air dry.

**The Importance of Cleaning Services in excavation**

It's easy to say a clean machine is a better machine. But do we really know why this is? All competent construction equipment owners and operators inherently know that keeping their heavy machinery clean is the professional thing to do. It's part of their overall routine and preventive maintenance program. .Here is reasons why it makes sense to hire a professional company to clean up after excavation project:

- ✓ **It's safer** for everyone involved.
- ✓ **Completed works quickly and efficiently**. A professional cleanup company will have all the necessary equipment to do the job fast, like trucks, trailers and manpower. They can move in and get the job done before you know it, because they've done this many, many times.
- ✓ When construction equipment is regularly cleaned, there's far less strain put on fixed and moving parts.
- ✓ Clean machines keep cooler than mud-caked and grease-soaked equipment.
- ✓ Downtime is reduced by keeping construction equipment clean.
- ✓ Cleaning machines gives a great opportunity to inspect for potential problems.
- ✓ Regularly cleaned construction machinery enhances safety.
- ✓ Mechanics are much more efficient when they work on clean machines.
- ✓ Ownership pride is greatly affected when a company's fleet is kept clean and orderly.

Finally, clean equipment makes a loud and positive statement. It's clearly heard by clients, investors and future customers. Heavy equipment washing requires its own specialized equipment like water cannons or pressure washers. It also involves specific techniques that make the best use of cleaning time and materials. And then there's the safety factor to consider. Heavy excavation equipment like excavators, loaders and gravel trucks are large, complicated machines presenting hazards to operators and those tasked to clean them on a regular basis

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

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

1. What are Loose materials produced from excavation? 2pts
2. What is the cleaning process? Discus the types of cleaning methods. 3pts
3. List some of the cleaning mechanisms? 3pts
4. What is the importance of cleaning services in excavation.3pts

***Note:*** **Satisfactory rating - 5 points** **Unsatisfactory - below 5points**

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

**Short Answer Questions**

| Information Sheet-2 | Checking excavation as per work instruction |
|---|---|

### 2.1. Basic concepts work instruction

A **Work Instruction** is a **document** that provides specific **instructions** to carry out an Activity. A **Work Instruction** is a step by step guide to perform a single **instruction**. A **Work Instruction** contains more detail than a Procedure and is only created if detailed step-by-step **instructions** are needed.

**Checking excavation site** involves understanding of center line and excavation drawings, setting out of plan on ground, excavation of soil and removal of excess soil. Quality checks such as recording ground level and marking of reference points should be done.

### 2.2. Who is responsible to check excavation as per work instruction?

## Competent person

'**Competent person'** refers to the temporary works designer, who should be competent to assess and manage the risks relevant to the excavation's depth and have a working knowledge. A competent person is a person who has acquired through training, qualification or experience the knowledge and skills to carry out a task. A competent person **must inspect excavations**: At least once in every day during which persons are at work there. If more than 2 meters deep, at the start of each shift before work begins. After any event likely **to** have affected the strength or stability of the **excavation** or the shoring.

### 2.3. Quality Checks for Excavation

1. Check whether the excavation has done according Center line and excavation drawings, setting out of plan on ground
2. Dressing bottom and sides of pits as per drawing with respect to centerline.
3. Recording initial ground level and check size of bottom.
4. Disposal of unsuitable material for filling.
5. Stacking suitable material for backfilling to avoid double handling.
6. Strata classification approval by competent authority.
7. Necessary safety measures observed.

| SITE LOCATION: | | |
|---|---|---|
| DATE: | TIME: | COMPETENT PERSON: |
| SOIL CLASSIFICATION: | EXCAVATION DEPTH: | EXCAVATION WIDTH: |
| TYPE OF PROTECTIVE SYSTEM USED: | | |

Table 2.1. Excavation checklist to be completed by competent person

### 2.4. Quality Checks for Filling after excavation

1. Recording initial ground level
2. Sample is approved for back filling.
3. Necessary marking/ reference points are established for final level of backfilling.
4. Back filling is being carried out in layers (15cm to 20cm).
5. Required watering, compaction is done.
6. Required density is achieved.

| Self-Check -2 | Written Test |
|---|---|

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

1. What is work instruction? What competent person will check in excavation site? 3pts
2. What are the points that you will check related to quality of excavation? 3pts
3. List three Quality Checks of Filling after excavation. 3pts

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

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

**Short Answer Questions**

| Operation sheet-1 | Cleaning loose material out of excavation |
|---|---|

**Steps of Cleaning loose material out of excavation**

**Step1**.Wear appropriate personal protective equipment

**Step2.** Select the cleaning method and mechanism

**Step3.** Select Tools and equipment that you will clean

**Step 4**. **Wash**: Use hot water and detergent to take off any grease and dirt. ...

**Step5**. **Rinse:** Rinse off any loose dirt or detergent foam.

**Step** 6. **Sanitize**

**Step6. Dry**: Allow to drip-dry or dry using drying equipment.

| 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 hours.

**Task: 1** select one equipment used for excavation and clean it.

## List of Reference Materials

- ✓ **Excavating and trenching, competent person course professional development course, 2018**

**1- WEB ADDRESSES (PUTTING LINKS)**

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